User's manual

MIDI Breath Controller

April 2013, Rev 1.1

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2 REVISIONS

Rev.	Date	Major changes
1.0	12-October-2012	First issue
1.0b	12-November-2012	Added "Select controller" to the file menu
1.0c	23-November-2012	Section 4.1 added
1.0d	3-February-2013	Section 6 Mouthpieces added
1.0e	2-March-2013	Section 4, aftertouch and pitch bend removed from the list
1.1	26-April-2013	Section 5.4, 5.5 included description of new features of the Configuration Utility.

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		Section 5.7 - Added new libraries to the compatibility list.

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3 INTRODUCTION

http://www.patchmanmusic.com/WindControllerFAQ.html contains a very good description of Breath Controllers in general and also provides some history of breath controllers together with available solutions.

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4 OVERVIEW

The TEC MIDI Breath Controller is a breath-to-MIDI converter for use with any MIDI device accepting cc data though a USB port. It has a built-in pressure sensor as input and generates continuous MIDI data corresponding to the amount of breath pressure applied to it. The MIDI Breath Controller can be programmed to send any cc on any MIDI channel. E.g.:

- Volume
- Breath control
- Modulation wheel
- Expression

Another unique feature of the MIDI Breath Controller is its ability to add a variable amount of curvature to the response of the applied pressure. This allows you to correct for a nonlinear response, or to add greater response at one end of the breath range compared to the other. This way you can optimize the sensitivity to your own style of playing.

The MIDI Breath Controller comes with factory settings but can be configured by using the MIDI Breath Controller configuration utility. Once programmed, its settings are retained even after power is removed. The MIDI Breath Controller can be reprogrammed with new settings as often as needed. The factory default settings are CC #2 (breath control) on MIDI channel 1, with linear sensitivity and maximum input/output ranges. The MIDI Breath Controller is powered through the USB interface and requires no batteries or power supply to operate.
It is delivered with silicone tubing and standard mouthpieces. No headset is required.

4.1 Usage

The TEControl MIDI Breath Controller does not replace the Yamaha BC3a per se but provide an excellent solution for controlling your DAW by breath control. See Figure 1 for available configurations.

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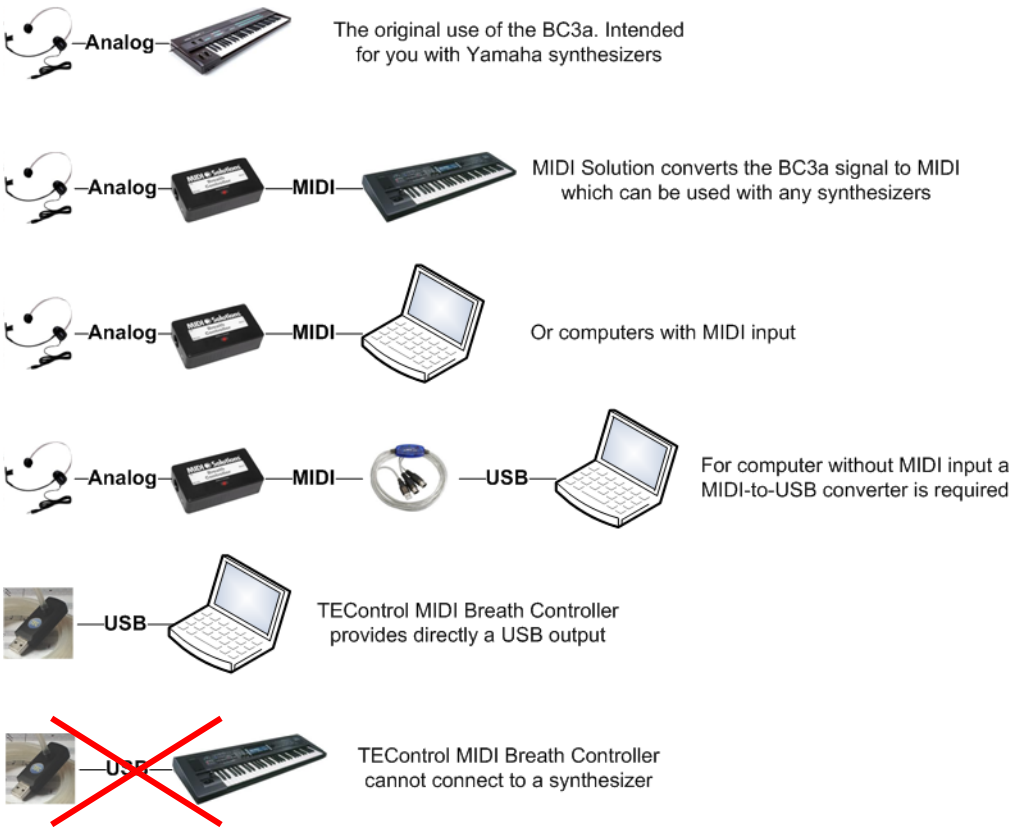


Figure 1 - Existing configurations

4.2 System requirements

The MIDI Breath Controller USB device does not require installation of drivers or software. It will work straight out of the box with both Windows and Mac. If you need to change the settings e.g. MIDI cc, it can be done with the **Configuration Utility**.

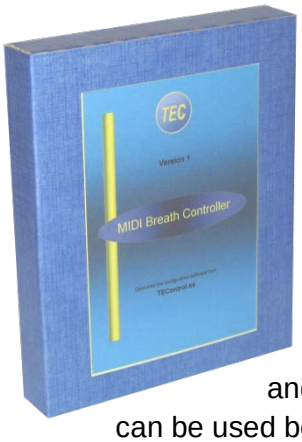
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5 GETTING STARTED

5.1 Deliverables

Your purchase of the MIDI Breath Controller includes:



- USB MIDI Breath Controller device
- Silicone tube
- Standard mouthpieces
- MIDI Breath Controller Configuration Utility (download)

5.2 Installation

Cut the silicone tube to convenient length and connect it to the USB MIDI Breath Controller device and the mouth piece. If required a USB extension cable can be used between computer and MIDI Breath Controller.

Connect the USB MIDI Breath Controller device to a USB port on your computer (No software or driver installation are required) and it will show as a **Breath Controller** in your applications.

Download the latest version of the MIDI Breath Controller Configuration Utility from the TEControl website, unzip it and run the "TEC MIDI BC.exe". For future enhancements, firmware upgrades will be available.

5.3 Default settings

The MIDI Breath Controller comes pre-configured with default settings and will work straight-out-of-the box. The default settings are as follows:

- *Linear sensitivity*
- *Input and output ranges set to maximum*
- *MIDI channel 1*
- *CC# 2 (breath control)*

5.4 Configuration Utility

The USB MIDI Breath Controller Configuration Utility is required for changing the settings.

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Starting the "TEC MIDI BC.exe" will launch the configuration utility.

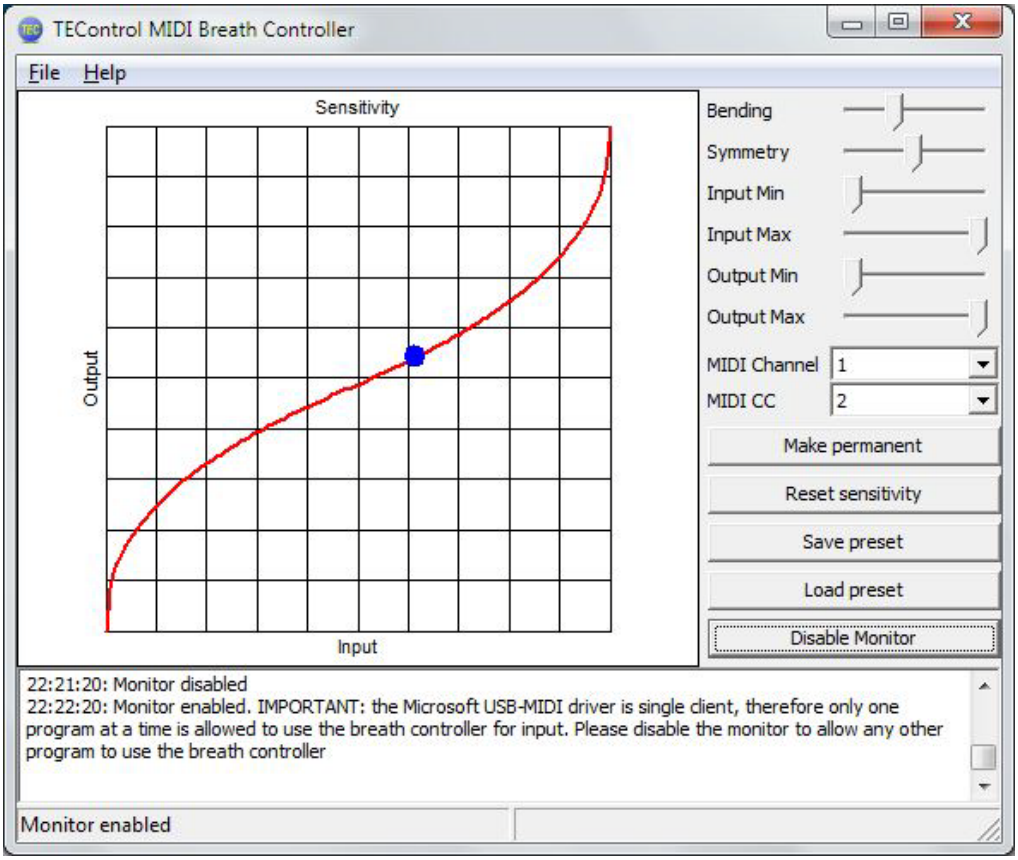


Figure 2 - Default settings

When started, the Configuration Utility will check for the connected breath controller. If not found, the lower portion of the window will display an error message "*Error - controller not detected*".

It has been reported to us that on some Windows installations, the operating system may report the Breath Controller as "*USB Audio Device*" instead of "*Breath Controller*". For those rare instances, we have added a menu "File->Select controller" to the Configuration Utility, which allows to select the correct device.

In your player, sequencer etc... the Breath Controller has to be selected as a MIDI input in order to work. The Breath Controller also appears in the MIDI output list but should not be selected since it is used by the Configuration Utility.

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5.5 How to program

The 6 sliders let you tailor the response from input pressure to cc value.

With the **Bending** and **Symmetry** sliders you can change the linear response to various shapes.

The **Input Min** sets the threshold of the input pressure i.e. any pressure below the threshold will not cause any change in the output cc value.

The **Input Max** can be tailored to how hard you want to blow to achieve max cc value (set by **Output Max**).

With the **Output Min** you can set the output cc value to be used for pressures below the input threshold. This is useful if you don't want the cc value to drop to zero.

The **Output Max** sets the maximum cc value to be sent.

MIDI messages are transmitted only when input changes cause a change in the output cc value. The minimum time resolution is 10 milliseconds. This guarantees a fast response with no noticeable latency.

With the **MIDI Channel** drop-down list you set the MIDI channel to be used for the transmittal of the MIDI message.

The **MIDI CC** drop-down list lets you select the actual controller to be used e.g. cc1 - ModWheel, cc2 - Breath Control etc... See annex for a complete list

All the above changes take immediate effect but are lost when the computer is powered off or the Breath Controller is removed from the computer. To store you settings permanently in the Breath Controller use the **Make permanent** button. This means your settings are remembered when you the Breath controller is unpowered. You can now move it to another computer with your favorite settings intact.

Every time you use the **Make permanent** button the Configuration Utility stores the parameters in the Windows registry and automatically retrieve the parameters of the Breath Controller when you start the Configuration Utility.

The **Reset sensitivity** button resets the sensitivity to linear with full input and output ranges.

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Version 1.3 includes the possibilities to **Save** and **Load** as many presets as you like. This is very convenient since each library or VST instrument might require different settings.

The Configuration Utility now also includes a breath monitor, where the blue dot travelling along the sensitivity curve indicates the input pressure. The monitor is controlled by the **Enable Monito**r and **Disable Monito**r. In the mac version you can hear the sound while you monitor the breath input. This is unfortunately not possible with the windows version due to limitations in windows where you have to disable the Breath Controller in your sequencer.

5.6 Performance

In Figure 4 SONAR has been used to record 2 seconds of MIDI Breath Controller output. The gaps in the data occurs when the input doesn't result in a change in cc data.

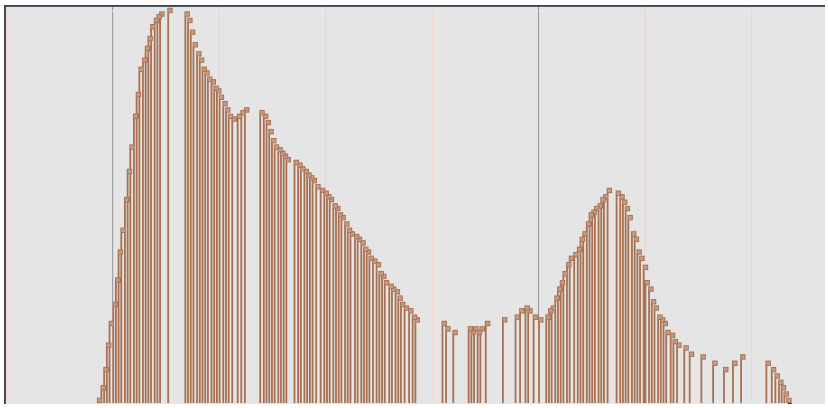


Figure 3 - CC data as recorded

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5.7 Compatibility

Compatibility has been verified with the following sample libraries:

8DIO - Adagio violas. Beautiful, beautiful!

AudioBro LA Scoring Strings LASS - Excellent results can be achieved by controlling the Kontakt player ModWheel or Expression with MIDI Breath Controller cc data.

East West Quantum Leap (EWQL) - East West Play Software is easily controlled by the MIDI Breath Controller by using e.g. ModWheel or Expression cc data.

Orchestration Tools. We have tested the Berlin Woodwinds and it works fantastically well.

ProjectSam - Both Symphobia 1 & 2 and True Strike 1 & 2 use the Kontakt player and works beautifully with the MIDI Breath Controller.

Sample*modeling* - We have tested the Trumpet (Kontakt based) and the Clarinet (SWAM based). It's a marriage made in heaven!

SpectraSonics - The MIDI Breath Controller works great with Omnisphere, Trilian and Stylus RMX.

Spitfire Albion - This library uses the Kontakt player from Native Instrument and is easily controlled from the MIDI Breath Controller through ModWheel or Expression cc data.

Vienna Symphonic Library (VSL) - The Vienna Instrument PRO has itself extensive capabilities of routing any cc data to appropriate parameters as well as a fully configurable sensitivity curve. The MIDI Breath Controller works wonderfully with e.g EPIC horns.

Wallander Instruments - A perfect match!

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All in all, we have not found any sample player not compatible with the MIDI Breath Controller. There are of course many left to be tested and although TEControl cannot guarantee compatibility there is no reason to believe the MIDI Breath Controller isn't compatible with all of them assuming they all comply with the MIDI standards.

6 MOUTHPIECES

The TEC MIDI Breath Controller is delivered with two different mouthpieces and a bleed valve. This is subject to change as we continuously seek to improve the mouthpieces to find a universal, convenient and cost effective solution. We are fully aware that this does not present a solution comparable to the elegant BC3 mouthpiece but it keeps the price to an affordable level.

We are constantly looking for ways to improve and we reserve the right to make changes to the tube and mouthpieces without prior notice.

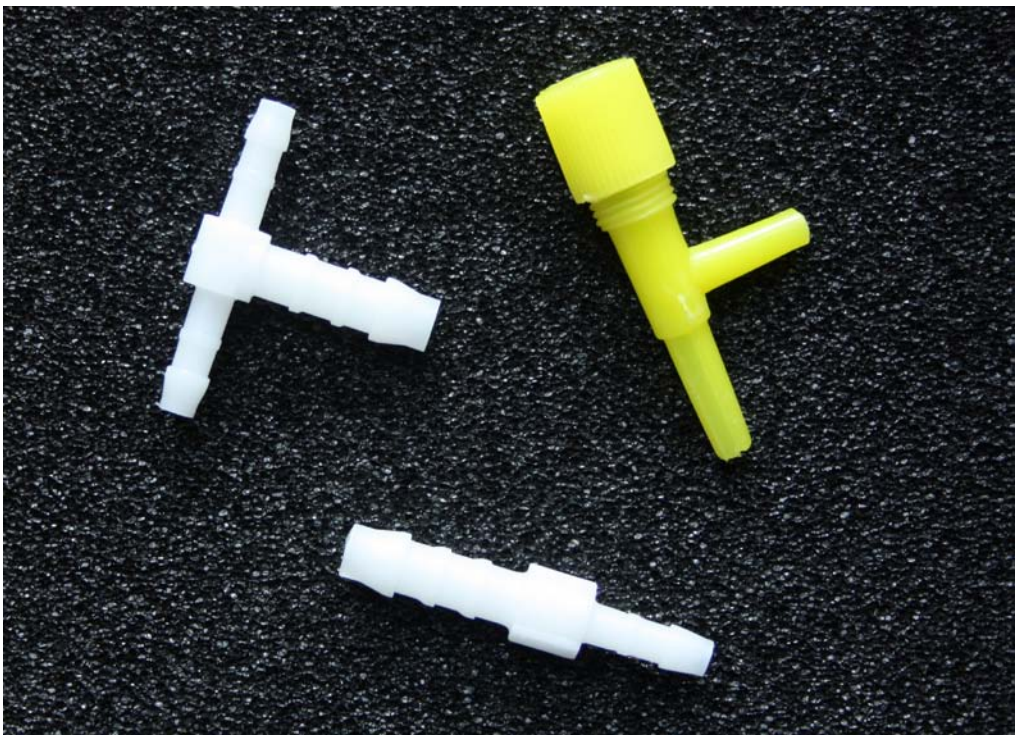


Figure 4 - Mouthpieces and bleed valve

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The straight mouthpiece can be used for static pressure and is favored by many customers. If a flow is desired it can be achieved by bleeding the air by opening the lips a little bit.



Figure 5 - Straight mouthpiece for static pressure

Woodwind and brass players mostly favors a constant flow and select the T-shaped mouthpiece. The yellow bleed valve can be adjusted to achieve the desired flow. Just cut a piece of the tube to place between the T-piece and the bleed valve. Please note that the longer the tube in between the less flow. For maximum flow use the T-piece without tube and bleed valve.

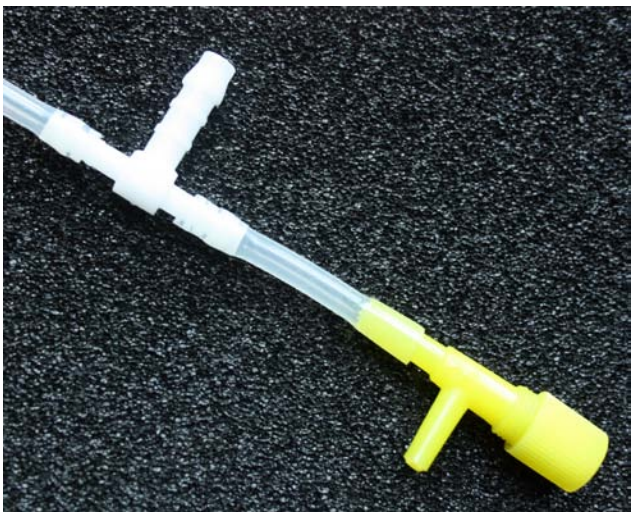


Figure 6 - T-piece with bleed valve for constant flow

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7 CONTROL CHANGE NUMBERS

The following table lists all currently defined **Control Change** messages and **Channel Mode** messages, in control number order. (Adopted from "MIDI by the Numbers" by D. Valenti-Electronic Musician 2/88, updated by the MIDI Manufacturers Association.)

Registered Parameter Numbers (RPNs) are an extension to the Control Change message for setting additional parameters. Appended at the bottom is a table of all currently defined RPNs.

Control Changes and Mode Changes (Status Bytes 176-191)					
Control Number (2nd Byte Value)			**Control Function**	**3rd Byte Value**	
Dec	**Binary**	**Hex**		**Value**	**Used As**
0	00000000	00	Bank Select	0-127	MSB
1	00000001	01	Modulation Wheel or Lever	0-127	MSB
2	00000010	02	Breath Controller	0-127	MSB
3	00000011	03	Undefined	0-127	MSB
4	00000100	04	Foot Controller	0-127	MSB
5	00000101	05	Portamento Time	0-127	MSB
6	00000110	06	Data Entry MSB	0-127	MSB
7	00000111	07	Channel Volume (formerly Main Volume)	0-127	MSB
8	00001000	08	Balance	0-127	MSB
9	00001001	09	Undefined	0-127	MSB
10	00001010	0A	Pan	0-127	MSB
11	00001011	0B	Expression Controller	0-127	MSB
12	00001100	0C	Effect Control 1	0-127	MSB
13	00001101	0D	Effect Control 2	0-127	MSB
14	00001110	0E	Undefined	0-127	MSB
15	00001111	0F	Undefined	0-127	MSB
16	00010000	10	General Purpose Controller 1	0-127	MSB
17	00010001	11	General Purpose Controller 2	0-127	MSB

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18	00010010	12	General Purpose Controller 3	0-127	MSB
19	00010011	13	General Purpose Controller 4	0-127	MSB
20	00010100	14	Undefined	0-127	MSB
21	00010101	15	Undefined	0-127	MSB
22	00010110	16	Undefined	0-127	MSB
23	00010111	17	Undefined	0-127	MSB
24	00011000	18	Undefined	0-127	MSB
25	00011001	19	Undefined	0-127	MSB
26	00011010	1A	Undefined	0-127	MSB
27	00011011	1B	Undefined	0-127	MSB
28	00011100	1C	Undefined	0-127	MSB
29	00011101	1D	Undefined	0-127	MSB
30	00011110	1E	Undefined	0-127	MSB
31	00011111	1F	Undefined	0-127	MSB
32	00100000	20	LSB for Control 0 (Bank Select)	0-127	LSB
33	00100001	21	LSB for Control 1 (Modulation Wheel or Lever)	0-127	LSB
34	00100010	22	LSB for Control 2 (Breath Controller)	0-127	LSB
35	00100011	23	LSB for Control 3 (Undefined)	0-127	LSB
36	00100100	24	LSB for Control 4 (Foot Controller)	0-127	LSB
37	00100101	25	LSB for Control 5 (Portamento Time)	0-127	LSB
38	00100110	26	LSB for Control 6 (Data Entry)	0-127	LSB
39	00100111	27	LSB for Control 7 (Channel Volume, formerly Main Volume)	0-127	LSB
40	00101000	28	LSB for Control 8 (Balance)	0-127	LSB
41	00101001	29	LSB for Control 9 (Undefined)	0-127	LSB
42	00101010	2A	LSB for Control 10 (Pan)	0-127	LSB
43	00101011	2B	LSB for Control 11 (Expression Controller)	0-127	LSB
44	00101100	2C	LSB for Control 12 (Effect control 1)	0-127	LSB
45	00101101	2D	LSB for Control 13 (Effect control 2)	0-127	LSB
46	00101110	2E	LSB for Control 14 (Undefined)	0-127	LSB
47	00101111	2F	LSB for Control 15 (Undefined)	0-127	LSB
48	00110000	30	LSB for Control 16 (General Purpose Controller 1)	0-127	LSB
49	00110001	31	LSB for Control 17 (General Purpose Controller 2)	0-127	LSB
50	00110010	32	LSB for Control 18 (General Purpose Controller 3)	0-127	LSB
51	00110011	33	LSB for Control 19 (General Purpose Controller 4)	0-127	LSB

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52	00110100	34	LSB for Control 20 (Undefined)	0-127	LSB
53	00110101	35	LSB for Control 21 (Undefined)	0-127	LSB
54	00110110	36	LSB for Control 22 (Undefined)	0-127	LSB
55	00110111	37	LSB for Control 23 (Undefined)	0-127	LSB
56	00111000	38	LSB for Control 24 (Undefined)	0-127	LSB
57	00111001	39	LSB for Control 25 (Undefined)	0-127	LSB
58	00111010	3A	LSB for Control 26 (Undefined)	0-127	LSB
59	00111011	3B	LSB for Control 27 (Undefined)	0-127	LSB
60	00111100	3C	LSB for Control 28 (Undefined)	0-127	LSB
61	00111101	3D	LSB for Control 29 (Undefined)	0-127	LSB
62	00111110	3E	LSB for Control 30 (Undefined)	0-127	LSB
63	00111111	3F	LSB for Control 31 (Undefined)	0-127	LSB
64	01000000	40	Damper Pedal on/off (Sustain)	≤63 off, ≥64 on	---
65	01000001	41	Portamento On/Off	≤63 off, ≥64 on	---
66	01000010	42	Sostenuto On/Off	≤63 off, ≥64 on	---
67	01000011	43	Soft Pedal On/Off	≤63 off, ≥64 on	---
68	01000100	44	Legato Footswitch	≤63 Normal, ≥64 Legato	---
69	01000101	45	Hold 2	≤63 off, ≥64 on	---
70	01000110	46	Sound Controller 1 (default: Sound Variation)	0-127	LSB
71	01000111	47	Sound Controller 2 (default: Timbre/Harmonic Intens.)	0-127	LSB
72	01001000	48	Sound Controller 3 (default: Release Time)	0-127	LSB
73	01001001	49	Sound Controller 4 (default: Attack Time)	0-127	LSB
74	01001010	4A	Sound Controller 5 (default: Brightness)	0-127	LSB
75	01001011	4B	Sound Controller 6 (default: Decay Time - see MMA RP-021)	0-127	LSB
76	01001100	4C	Sound Controller 7 (default: Vibrato Rate - see MMA RP-021)	0-127	LSB
77	01001101	4D	Sound Controller 8 (default: Vibrato Depth - see MMA RP-021)	0-127	LSB
78	01001110	4E	Sound Controller 9 (default: Vibrato Delay - see MMA RP-021)	0-127	LSB
79	01001111	4F	Sound Controller 10 (default undefined - see MMA RP-021)	0-127	LSB

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80	01010000	50	General Purpose Controller 5	0-127	LSB
81	01010001	51	General Purpose Controller 6	0-127	LSB
82	01010010	52	General Purpose Controller 7	0-127	LSB
83	01010011	53	General Purpose Controller 8	0-127	LSB
84	01010100	54	Portamento Control	0-127	LSB
85	01010101	55	Undefined	---	---
86	01010110	56	Undefined	---	---
87	01010111	57	Undefined	---	---
88	01011000	58	High Resolution Velocity Prefix	0-127	LSB
89	01011001	59	Undefined	---	---
90	01011010	5A	Undefined	---	---
91	01011011	5B	Effects 1 Depth (default: Reverb Send Level - see MMA RP-023) (formerly External Effects Depth)	0-127	---
92	01011100	5C	Effects 2 Depth (formerly Tremolo Depth)	0-127	---
93	01011101	5D	Effects 3 Depth (default: Chorus Send Level - see MMA RP-023) (formerly Chorus Depth)	0-127	---
94	01011110	5E	Effects 4 Depth (formerly Celeste [Detune] Depth)	0-127	---
95	01011111	5F	Effects 5 Depth (formerly Phaser Depth)	0-127	---
96	01100000	60	Data Increment (Data Entry +1) (see MMA RP-018)	N/A	---
97	01100001	61	Data Decrement (Data Entry -1) (see MMA RP-018)	N/A	---
98	01100010	62	Non-Registered Parameter Number (NRPN) - LSB	0-127	LSB
99	01100011	63	Non-Registered Parameter Number (NRPN) - MSB	0-127	MSB
100	01100100	64	Registered Parameter Number (RPN) - LSB*	0-127	LSB
101	01100101	65	Registered Parameter Number (RPN) - MSB*	0-127	MSB
102	01100110	66	Undefined	---	---
103	01100111	67	Undefined	---	---
104	01101000	68	Undefined	---	---
105	01101001	69	Undefined	---	---
106	01101010	6A	Undefined	---	---
107	01101011	6B	Undefined	---	---
108	01101100	6C	Undefined	---	---
109	01101101	6D	Undefined	---	---
110	01101110	6E	Undefined	---	---
111	01101111	6F	Undefined	---	---

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112	01110000	70	Undefined	---	---
113	01110001	71	Undefined	---	---
114	01110010	72	Undefined	---	---
115	01110011	73	Undefined	---	---
116	01110100	74	Undefined	---	---
117	01110101	75	Undefined	---	---
118	01110110	76	Undefined	---	---
119	01110111	77	Undefined	---	---
Note:	Controller numbers 120-127 are reserved for Channel Mode Messages, which rather than controlling sound parameters, affect the channel's operating mode. (See also Table 1.)				
120	01111000	78	[Channel Mode Message] All Sound Off	0	---
121	01111001	79	[Channel Mode Message] Reset All Controllers (See MMA RP-015)	0	---
122	01111010	7A	[Channel Mode Message] Local Control On/Off	0 off, 127 on	---
123	01111011	7B	[Channel Mode Message] All Notes Off	0	---
124	01111100	7C	[Channel Mode Message] Omni Mode Off (+ all notes off)	0	---
125	01111101	7D	[Channel Mode Message] Omni Mode On (+ all notes off)	0	---
126	01111110	7E	[Channel Mode Message] Mono Mode On (+ poly off, + all notes off)	Note: This equals the number of channels, or zero if the number of channels equals the number of voices in the receiver.	---
127	01111111	7F	[Channel Mode Message] Poly Mode On (+ mono off, +all notes off)	0	---

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