

## Breath Controller

# OPERATING INSTRUCTIONS

MIDI Solutions Breath Controller  
Operating Instructions M217

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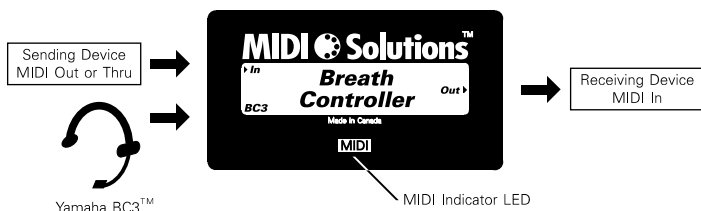
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### INTRODUCTION

Congratulations on your purchase of the MIDI Solutions Breath Controller. The MIDI Solutions Breath Controller is a Yamaha BC3™ to MIDI interface that can be used to control the value of a selected MIDI parameter in real time. The generated MIDI data is merged with incoming MIDI data and sent to the output of the Breath Controller. Programmed settings of the Breath Controller are retained in non-volatile memory until cleared or overwritten with new settings. The Breath Controller is MIDI-powered and requires no batteries or power supply to operate.



### CONNECTIONS

To program the Breath Controller, connect the **In** of the Breath Controller to the MIDI Out of the device that is sending the programming commands. The **Out** and **BC3** input can be left disconnected during programming. Once the Breath Controller is programmed, it can be inserted anywhere in your MIDI setup. Plug the Yamaha BC3™ into the **BC3** input of the Breath Controller. Connect the MIDI Out or Thru of the sending MIDI device to the **In** of the Breath Controller. Connect the **Out** of the Breath Controller to the MIDI In of the receiving MIDI device. The number of MIDI Solutions products connected between any two MIDI devices should be limited to five.

The following procedure will help you obtain the optimal settings for the **Gain** and **Offset** controls of the Yamaha BC3™: Start by setting the **Gain** to approximately the halfway point. Then increase the **Offset** from zero until the Breath Controller just starts to transmit MIDI data (the LED will flicker). At this point decrease the Offset slightly. Then apply breath pressure to the BC3 to test these settings. Repeat the above procedure of adjusting the Offset with different Gain settings until you have determined the optimal Gain and Offset positions.

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## OPERATION

Insure that the BC3 is plugged into the unit before power-up, as its circuitry is sampled at this time. The Breath Controller's MIDI Indicator LED will light as soon as the sending device is turned on, and flashes whenever MIDI data passes through the unit. Applying breath pressure to the BC3 causes the unit to send out continuous data as programmed according to the instructions on the following pages.

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## PROGRAMMING

The function of the Breath Controller is programmed by sending it MIDI System Exclusive programming messages from any device capable of creating System Exclusive messages, such as a computer-based sequencer. These messages are described in detail on the following pages. For decimal to hexadecimal conversions, see the chart on page 27. Upon receipt of a System Exclusive programming message, the MIDI indicator LED flashes rapidly for about ten seconds to indicate that the setting has been stored. Settings are retained in non-volatile memory until reprogrammed with new settings.

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### Device Parameters

The Breath Controller has three programmable global parameters which are in effect regardless of the type of message the Breath Controller is programmed to send. These parameters are **MIDI Echo**, **Curvature Amount**, and **Curvature Direction**.

When **MIDI Echo** is ON, all incoming MIDI information is echoed to the MIDI output. When **MIDI Echo** is OFF, only the messages generated by the Breath Controller are sent to the MIDI output.

**Curvature Amount** specifies the amount that the output value vs. breath pressure applied differs from a linear response. **Curvature Direction** specifies the direction of this curvature. If

curvature direction is upward, the output value will rise more quickly at the bottom of the applied breath range and more slowly at the top. If curvature direction is downward, the output value will rise more slowly at the bottom of the applied breath range and more quickly at the top.

Programming of these parameters is described on the following page.

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To program the device parameters, send the unit the following System Exclusive programming message:

**F0 00 00 50 17 00 aa bb cc F7 (all values in Hexadecimal)**

**aa** = Echo ON/OFF (**aa** = 00: Echo OFF, **aa** = 01: Echo ON)

**bb** = Curvature Amount (**bb** = 00: no curvature, **bb** = 7F: maximum curvature)

**cc** = Curvature Direction (**cc** = 00: downward, **cc** = 01: upward)

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**Example:** To program the Breath Controller to echo incoming MIDI data to its output and respond linearly to breath pressure (no curvature), send it the following System Exclusive message:

F0 00 00 50 17 00 01 00 00 F7

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### Message Type

There are five programmable parameters that specify the type of message to be generated by the Breath Controller. These parameters are **aa: Message Type**, **bb: Control Change#** (or **Sysex Byte#**), **cc: MIDI Channel**, **dd: Maximum Value**, and **ee: Minimum Value**.

**Message Type (aa)** specifies the type of message to be generated. Selectable message types include Control Change, Aftertouch, Pitch Bend, and System Exclusive.

**Control Change#** or **Sysex Byte# (bb)** specifies the Control Change number if the Message Type (aa) is Control Change. If the Message Type (aa) is System Exclusive, then bb specifies the

byte of the System Exclusive message that is variable, i.e. the byte that changes in response to the applied breath pressure.

**MIDI Channel (cc)** specifies the MIDI channel of the generated message. This byte is ignored if the Message Type is System Exclusive.

**Minimum Value (dd)** specifies the minimum value generated by the Breath Controller. **Maximum Value (ee)** specifies the maximum value generated. If the Minimum Value is greater than the Maximum Value, then the generated values will decrease as more breath is applied, allowing the device to be used in reverse operation.

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### Message Type

To program the Message Type to be generated by the Breath Controller, send it the following System Exclusive programming message:

**F0 00 00 50 17 01 aa bb cc dd ee F7 (all values in Hex)**

**aa** = Message Type (**aa** = 00: Control Change, **aa** = 01: Aftertouch, **aa** = 02: Pitch Bend, **aa** = 03: System Exclusive)

**bb** = Control Change# (if **aa** = 00) or Sysex Byte# (if **aa** = 03)

**cc** = MIDI Channel (see p. 23)

**dd** = Minimum Value transmitted

**ee** = Maximum Value transmitted

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If the Message Type is System Exclusive, then the System Exclusive message to be generated must be sent immediately after this programming message (the maximum number of bytes that can be stored is 20).

**Example:** To program the Breath Controller to generate the System Exclusive message F0 22 33 44 55 F7 varying the fourth byte, with a minimum value of 9, and a maximum value of 127 (=7F Hex), send it the following programming messages:

F0 00 00 50 17 01 **03 04 00 09 7F** F7  
**F0 22 33 44 55 F7**

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### Dump Settings

To dump all of the Breath Controller's current settings, send it the following System Exclusive message:

**F0 00 00 50 17 10 F7 (all values in Hexadecimal)**

Upon receipt of this message the Breath Controller will dump its current settings the MIDI Out port.

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## MIDI CHANNEL TABLE

**cc** must be set according to the following table:

<u>Chan.</u>	<u>cc</u>	<u>Chan.</u>	<u>cc</u>	<u>Chan.</u>	<u>cc</u>
1	- 00	7	- 06	13	- 0C
2	- 01	8	- 07	14	- 0D
3	- 02	9	- 08	15	- 0E
4	- 03	10	- 09	16	- 0F
5	- 04	11	- 0A		
6	- 05	12	- 0B		

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## MIDI CONTROL CHANGE TABLE

Decimal	Hex	Control Function
0	00H	Bank Select
1	01H	Modulation wheel or lever
2	02H	Breath Controller
3	03H	Undefined
4	04H	Foot controller
5	05H	Portamento time
6	06H	Data entry MSB
7	07H	Channel Volume
8	08H	Balance
9	09H	Undefined
10	0AH	Pan
11	0BH	Expression Controller

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12-13	0C-0DH	Effect Controls 1-2
14-15	0E-0FH	Undefined
16-19	10-13H	General Purpose Controllers (#'s 1-4)
20-31	14-1FH	Undefined
32-63	20-3FH	LSB values for 0-31
64	40H	Damper pedal (sustain)
65	41H	Portamento On/Off
66	42H	Sostenuto
67	43H	Soft pedal
68	44H	Legato Fsw (vv=00-3F: Normal, 40-7F: Legato)
69	45H	Hold 2
70	46H	Sound Controller 1 (default: Sound Variation)
71	47H	Sound Controller 2 (default: Timbre/Harmonic Content)
72	48H	Sound Controller 3 (default: Release Time)
73	49H	Sound Controller 4 (default: Attack Time)

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74	4AH	Sound Controller 5 (default: Brightness)
75-79	4B-4FH	Sound Controllers 6-10 (no defaults)
80-83	50-53H	General Purpose Controllers (#'s 5-8)
84	54H	Portamento Control
85-90	55-5AH	Undefined
91	5BH	Effects 1 Depth (formerly External Effects Depth)
92	5CH	Effects 2 Depth (formerly Tremolo Depth)
93	5DH	Effects 3 Depth (formerly Chorus Depth)
94	5EH	Effects 4 Depth (formerly Celeste (Detune) Depth)
95	5FH	Effects 5 Depth (formerly Phaser Depth)
96,97	60H,61H	Data increment, Data decrement
98,99	62H,63H	Non-Registered Parameter Number LSB, MSB
100,101	64H,65H	Registered Parameter Number LSB, MSB
102-119	66-77H	Undefined
120-127	78-7FH	Reserved for Channel Mode Messages

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## HEXADECIMAL CONVERSION TABLE

Dec/Hex	16	10	32	20	48	30	64	40	80	50	96	60	112	70	
0	00	16	10	32	20	48	30	64	40	80	50	96	60	112	70
1	01	17	11	33	21	49	31	65	41	81	51	97	61	113	71
2	02	18	12	34	22	50	32	66	42	82	52	98	62	114	72
3	03	19	13	35	23	51	33	67	43	83	53	99	63	115	73
4	04	20	14	36	24	52	34	68	44	84	54	100	64	116	74
5	05	21	15	37	25	53	35	69	45	85	55	101	65	117	75
6	06	22	16	38	26	54	36	70	46	86	56	102	66	118	76
7	07	23	17	39	27	55	37	71	47	87	57	103	67	119	77
8	08	24	18	40	28	56	38	72	48	88	58	104	68	120	78
9	09	25	19	41	29	57	39	73	49	89	59	105	69	121	79
10	0A	26	1A	42	2A	58	3A	74	4A	90	5A	106	6A	122	7A
11	0B	27	1B	43	2B	59	3B	75	4B	91	5B	107	6B	123	7B
12	0C	28	1C	44	2C	60	3C	76	4C	92	5C	108	6C	124	7C
13	0D	29	1D	45	2D	61	3D	77	4D	93	5D	109	6D	125	7D
14	0E	30	1E	46	2E	62	3E	78	4E	94	5E	110	6E	126	7E
15	0F	31	1F	47	2F	63	3F	79	4F	95	5F	111	6F	127	7F

## WARRANTY

MIDI Solutions Inc. warrants this product to be free from defects in material and workmanship for a period of one (1) year from date of purchase. This warranty is void if the product has been damaged by accident, misuse, alteration, unauthorized repairs or other causes not arising out of defects in material or workmanship. Under no circumstances will MIDI Solutions be liable for any loss of profits, benefits, time, interrupted operation, commercial loss, or consequential damages arising out of the use or inability to use the product. MIDI Solutions specifically disclaims any implied warranties of merchantability and fitness for a particular purpose. If the product requires service, a Return Merchandise Authorization (RMA) number must be obtained from MIDI Solutions and the product must be shipped prepaid to a specified Service Center. MIDI Solutions will repair or replace the product at our discretion and will pay return shipping fees. The customer is responsible for any damage or loss sustained during shipment in any direction.

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