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# **F<sup>2</sup>MC Series**

## **BGM ADAPTER**

### **MB2146-09**

## **OPERATION MANUAL**

## PREFACE

Thank you for purchasing the F<sup>2</sup>MC \* series BGM adapter (model number MB2146-09).  
The product is a development support tool for developing and evaluating applied products which use Fujitsu microcontrollers (hereafter MCUs) incorporating BDSU modules.  
This manual describes how to handle the F<sup>2</sup>MC series BGM adapter. Be sure to read it before using the product.  
For information on the MCUs supported by this product, contact the Fujitsu sales or support representative.

\* : F<sup>2</sup>MC is the abbreviation used for FUJITSU Flexible Microcontroller, which is a Fujitsu product.

### ■ For Your Safety

This manual contains important information required for using the product safely. Be sure to read through the manual before using the product and follow the instructions contained therein to use it correctly.

In particular, carefully read “Caution of the products described in this manual” at the beginning of this manual to understand the requirements for safe use of the product before using it.  
After reading the manual, keep it handy for future reference.

### ■ Warranty and Liability

The specifications of the product are subject to change without notice.  
Fujitsu assumes no liability for any loss or damage whatsoever directly or indirectly arising out of the use of the product.


### ■ Related Manuals

You should refer to the following manuals as well:

- “HARDWARE MANUAL” for each type of microcontroller
- “DATA SHEET” for each type of microcontroller
- “SOFTUNE Workbench OPERATION MANUAL”
- “SOFTUNE Workbench USER'S MANUAL”
- “SOFTUNE Workbench COMMAND REFERENCE MANUAL”

■ Caution of the products described in this manual

Cautions in the following correspond to the product described in this manual.

 <b>WARNING</b>	<p>The wrong use of a device will give an injury and may cause malfunction on customers system.</p>
<b>Fire, Electric shock, Damage</b>	<p>Never open the case of the product. Do not modify the product without permission. Do not damage, revamp, put anything heavy on, strain, forcibly bend, twist, or heat the product. Doing so may cause a fire, electric shock, or damaged.</p>
<b>Fire, Electric shock, Damage</b>	<p>If any foreign matter (such as water, metal chip, liquid) is let in the product, turn off the power immediately, then contact the Fujitsu sales or support representative. Using the product as it is can cause a fire, electric shock, or damaged.</p>
<b>Fire, Electric shock, Damage</b>	<p>Do not use the product in a water place such as a bathroom or shower stall. Doing so may cause a fire, electric shock, or damaged.</p>
<b>Fire, Electric shock</b>	<p>Do not use the product with a damaged, failure, or discontinuity. Using the product as it is can cause a fire or electric shock.</p>
<b>Fire, Electric shock</b>	<p>If something goes wrong with the product, for example, if it overheats or gives out an abnormal odor or noise, turn off the power immediately. Make sure that the symptom has been removed, then ask the Fujitsu sales or support representative for repair. Never try to repair the product on your own as it is dangerous. Using the product with the symptom can cause a fire or electric shock.</p>
<b>Fire, Damage</b>	<p>Use the product within its specified ratings. Failure to do so can cause a fire or damaged.</p>
<b>Fire, Damage</b>	<p>Do not leave the product at a dusty, moist, or ill-ventilated place or a place close to fire. Doing so can cause a fire or damaged.</p>
<b>Fire, Damage</b>	<p>Before the product is left unused for an extended period of time, be sure to turn off all the power for safety. Failure to do so may cause a fire or damaged.</p>
<b>Electric shock, Damage</b>	<p>Do not put a finger or anything into the connector of the product. Doing so can cause an electric shock or damaged.</p>
<b>Electric shock</b>	<p>Do not touch the product with your hand wet. Doing so can cause an electric shock.</p>

**CAUTION**

Indicates a potentially hazardous situation which, if not avoided by following the instruction stated, may result in minor or moderate injury and/or damage to the product or the equipment to which the product is connected, to software resources such as data, or to other properties.

<b>Cuts, Damage</b>	Before moving the product, be sure to turn off all the power and unplug the cables. Watch your steps when carrying it. Do not use the product at a place exposed to strong vibration or an unstable place such as a sloping place. Doing so may let the product fall, resulting in an injury or damaged.
<b>Damage</b>	Keep the product away from direct sunlight, high temperature, and high humidity to prevent condensation. Do not use or store the product where it is exposed to much dust or a strong electric or magnetic field for an extended period of time. Doing so may cause a damaged.
<b>Damage</b>	To prevent electrostatic breakdown, do not let your finger or an object touch any metal part of the connector. Before touching the product, touch a metal object (such as a door knob) to discharge static electricity from your body. Failure to do so may cause a damaged.
<b>Damage</b>	Do not apply shock to the product. Doing so may cause a fault.
<b>Damage</b>	When unplugging the cable, be sure to hold its connector. Pulling the cable itself may expose or disconnect the cable core, resulting in a damaged.

- The contents of this document are subject to change without notice. Customers are advised to consult with FUJITSU sales representatives before ordering.
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## 1. Checking the Delivered Product

Before using the product, make sure that your package contains the following items:

- BGM adapter \* : 1
- USB cable (1.8 m) : 1
- Operation manual (Japanese version)) : 1
- Operation manual (English version - This document) : 1

\*: Hereafter called the adapter.

## 2. Appearance and Part Names

Figures 1 and 2 show the adapter appearance, major dimensions and part names.

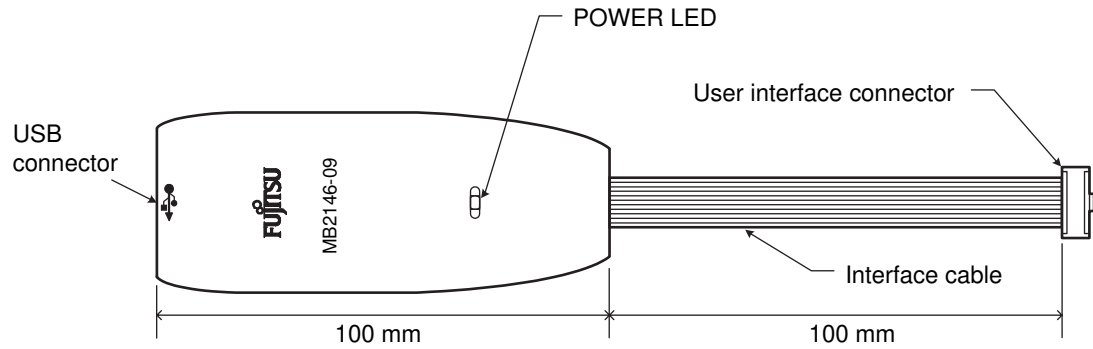


Figure 1 Adapter Appearance (Top view)

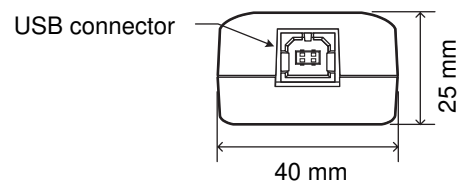


Figure 2 Adapter Appearance (Front view)

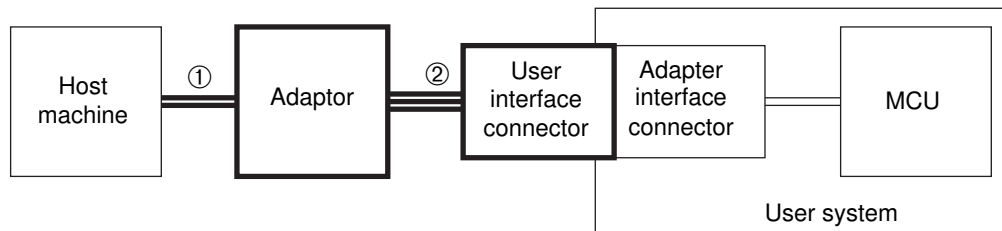


### 3. Connecting the Adapter

#### ■ System Configuration

Connect the adapter between the host machine and the user system so that the adapter can serve as an emulator under control of the host machine. For using emulator debugger software on the host machine, refer to the “SOFTUNE Workbench OPERATION MANUAL”.

Figure 3 shows the system configuration.



①USB cable

②Interface cable (adapter's flat cable)

Figure 3 System Configuration

#### ■ Connection to the Host Machine

Connect the adapter to the host machine using the USB cable.

Figure 4 shows how to plug the USB cable.

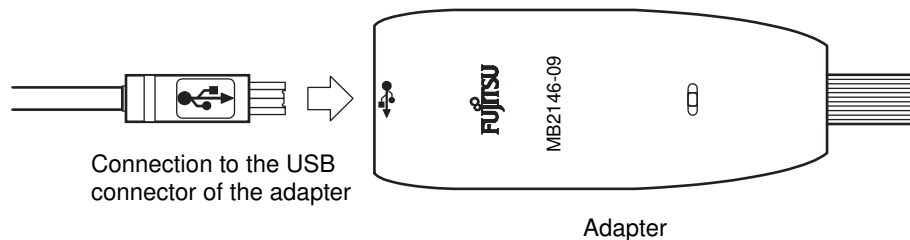


Figure 4 Plugging the USB Cable

## ■ Connection to the User System

Connect the adapter to the user system.

Plug the user interface connector of the adapter into the adapter interface connector on the user system.

When plugging the user interface connector, align its index mark (pin No. 1) with the adapter interface connector's counterpart.

For the specifications of the adapter interface connector, see “Adapter Interface Specifications” in Section 4 “Specifications”.

Figure 5 shows how to connect the adapter to the user system.

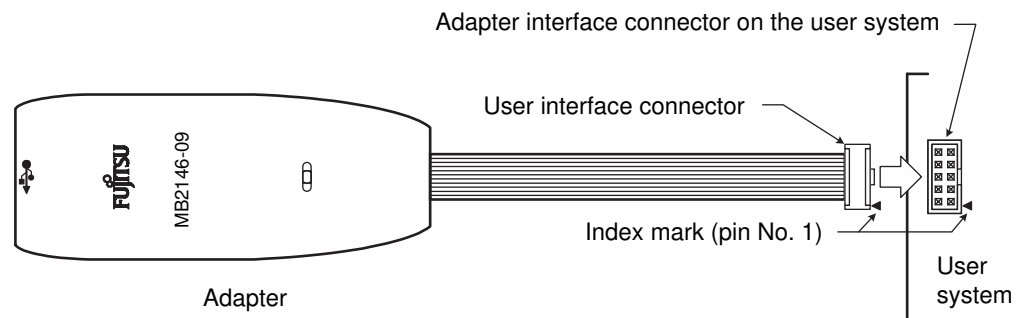


Figure 5 Connecting to the User System

## 4. Specifications

### ■ General Specifications

Table 1 lists the general specifications of the adapter.

Table 1 General Specifications

Item	Specification	
Name	F <sup>2</sup> MC series BGM adapter	
Model number	MB2146-09	
Power supply specifications	Adapter power input	Max 50 mA (USB BUS power used)
	User power input	+2.7 to +5.5 V * <sup>1</sup> Max 20 mA * <sup>2</sup>
POWER LED indication	[Green]: On when only adapter power is supplied (with the USB cable connected). [Red]: On when only user power is supplied. [Orange]: On when both adapter power and user power are supplied.	
User interface connector * <sup>3</sup>	MIL standard compliant key type (with the center key)	
Operating temperature/humidity	+5 to +35 °C 20 to 80 % (No condensation allowed)	
Storage temperature/humidity	0 to +70 °C 20 to 80 % (No condensation allowed)	
Dimensions	Adapter case: 40 (W) × 100 (D) × 25 (H) mm (Protrusions excluded)	
	Interface cable length: 100 mm (User interface connector excluded)	
Weight	55g	

\*1 : The maximum and minimum voltages depends on the MCU used.  
For details, contact the Fujitsu sales or support representative.

\*2 : The power consumption by the MCU used is not included.

\*3 : The connector part number is given below.  
FAS-1001-2101-0BF (YAMAICHI ELECTRONICS Co., Ltd.)

### ■ USB Line Specifications

Table 2 lists the USB line specifications of the adapter.

Table 2 USB Line Specifications

Item	Description
Conforming standard	USB1.1
Communication method	Full Speed Bulk Transfer
Data transfer rate	12 Mbps
Connector shape	Series B
Power supply	BUS Powered

## ■ Tool Reset Specifications

A tool reset is a hardware reset by the adapter to reset the entire system of the MCU (including the BDSU module) on the user system.

When both of the adapter power and MCU's user power are turned on, the tool reset is canceled automatically to enable the MCU to be evaluated.

The following shows how to generate a tool reset and how long it remains in effect.

- Tool reset generation methods and reset "L" pulse width
  - 1) Set the MCU user power from OFF to ON (power-on reset).  
The reset remains in effect for about 16 to 70 ms after the MCU user power is supplied.
  - 2) Set the adapter power from OFF to ON (by unplugging and plugging the USB cable).  
The reset remain in effect for about 32 to 140 ms after the adapter power is supplied.

If the user system and adapter cause an uncontrollable error but the system cannot be recovered by tool reset generation method 1), execute tool reset generation method 2).

## ■ Adapter Interface Specifications

Table 3 is a pinout of the adapter interface connector mounted on the user system. Table 4 lists recommended connectors. Figure 6 shows the connector pins.

When the adapter interface connector is installed on the user system, connect the adapter interface connector to the MCU according to the following specifications.

Table 3 Adapter Interface Connector Pinout

Connector pin No.	Connector pin name	Input/output	Remarks
1	VCC	BGMA ← MCU	Connected to the MCU's Vcc pin.
2	GND	—	Connected to the MCU's Vss pin.
3	BRSTX	BGMA → MCU	
4	BDBMX	BGMA → MCU	
5	BSOUT	BGMA ← MCU	
6	BEXCK	BGMA ← MCU	
7	BSIN	BGMA → MCU	
8	N.C	—	Not connected
9	GND	—	Connected to the MCU's Vss pin.
10	N.C	—	Not connected

\*: "BGMA" in the "Input/output" column in the table indicates the BGM adapter.

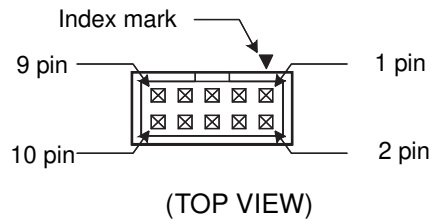


Figure 6 Adapter Interface Connector Pins

Table 4 Recommended Adapter Interface Connectors

Part number	Specifications		Manufacturer
FAP-1001-2202-0BS	Right-angle solder dip	Housing provided Middle latch provided	YAMAICHI ELECTRONICS Co., Ltd.
FAP-1001-2204-0BS	Straight solder dip	Housing provided Middle latch provided	
FAP-10-08#2-0BS	Right-angle solder dip	Housing provided Latch not provided	
FAP-10-08#4-0BS	Straight solder dip	Housing provided Latch not provided	

#### ■ Options

Various options are available to the adapter. Purchase them as required. See Table 5 for the options.

Table 5 Options

Name	Part number
MCU *	MBxxxxx

\*: The part number depends on the MCU used.

For details, contact the Fujitsu sales or support representative.

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**FUJITSU SEMICONDUCTOR • SUPPORT SYSTEM**

F<sup>2</sup>MC Series  
BGM ADAPTER  
MB2146-09  
OPERATION MANUAL

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