

**F<sup>2</sup>MC-8FX Family**  
**8-bit MICROCONTROLLER**  
**MB95200 Series BGM ADAPTER**  
**MB2146-08-E**  
**OPERATION MANUAL**

## PREFACE

Thank you for purchasing the F<sup>2</sup>MC\*-8FX Family MB95200 Series BGM adapter (model number: MB2146-08-E).

The product is a development support tool for developing and evaluating applied products which use Fujitsu microcontrollers (hereafter MCU) that have a BDSU module.

This manual describes how to handle the MB95200 Series BGM adapter. Be sure to read it before using the product.

For information on the MCU supported by this product, contact the sales or support representative.

\* : F<sup>2</sup>MC is the abbreviation of FUJITSU Flexible Microcontroller.

### ■ Using the product safely

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.

### ■ Related manuals

You should refer to the following manuals as well:

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

### ■ European RoHS compliance

Products with a -E suffix on the part number are European RoHS compliant products.

### ■ Notice on this document

All information included in this document is current as of the date it is issued. Such information is subject to change without any prior notice.

Please confirm the latest relevant information with the sales representatives.

■ **Caution of the products described in this manual**

The following precautions apply to the product described in this manual.



Indicates a potentially hazardous situation which could result in death or serious injury and/or a fault in the user's system if the product is not used correctly.

<b>Electric shock, Damage</b>	Before performing any operation described in this manual, turn off all the power supplies to the system. Performing such an operation with the power on may cause an electric shock or device fault.
<b>Electric shock, Damage</b>	Once the product has been turned on, do not touch any metal part of it. Doing so may cause an electric shock or device fault.



Indicates the presence of a hazard that may cause a minor or moderate injury, damages to this product or devices connected to it, or may cause to loose software resources and other properties such as data, if the device is not used appropriately.

<b>Cuts, Damage</b>	Before moving the product, be sure to turn off all the power supplies and unplug the cables. Watch your step when carrying the product. Do not use the product in an unstable location such as a place exposed to strong vibration or a sloping surface. Doing so may cause the product to fall, resulting in an injury or fault.
<b>Damage</b>	Do not place anything on the product or expose the product to physical shocks. Do not carry the product after the power has been turned on. Doing so may cause a malfunction due to overloading or shock.
<b>Damage</b>	Since the product contains many electronic components, keep it 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 magnetic or electric field for an extended period of time. Inappropriate operating or storage environments may cause a fault.
<b>Damage</b>	Use the product within the ranges given in the specifications. Operation over the specified ranges may cause a fault.
<b>Damage</b>	To prevent electrostatic breakdown, do not let your finger or other object come into contact with the metal parts of any of the connectors. Before handling the product, touch a metal object (such as a door knob) to discharge any static electricity from your body.
<b>Damage</b>	Before turning the power on, in particular, be sure to finish making all the required connections. Furthermore, be sure to configure and use the product by following the instructions given in this document. Using the product incorrectly or inappropriately may cause a fault.
<b>Damage</b>	Always turn the power off before connecting or disconnecting any cables from the product. When unplugging a cable, unplug the cable by holding the connector part without pulling on the cable itself. Pulling the cable itself or bending it may expose or disconnect the cable core, resulting in a fault.
<b>Damage</b>	It is recommended that it be stored in the original packaging. Transporting the product may cause a damage or fault. Therefore, keep the packaging materials and use them when re-shipping the product.

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# 1. Checking the Delivered Product

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

- BGM adapter\*: 1
- USB cable (1.0m): 1
- Operation manual (English version, this document): 1
- Operation manual (Japanese version): 1
- Hardcopy (China RoHS report): 1

\* : Referred to as the adapter.

# 2. Optional Parts

A variety of optional parts are available for this adapter that may be purchased separately as needed. Consult a sales or support representative for details.

Note : This MB95200 series BGM adapter (MB2146-08-E) doesn't supersede F<sup>2</sup>MC-8FX Family MB95100 series (MB2146-09, MB2146-09A-E) and is not compatible with its parts, although they are similar in appearance. Do not interchange these two BGM adapters and their respective parts. This may cause malfunction of Debug system.

# 3. Appearance and Part Names

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

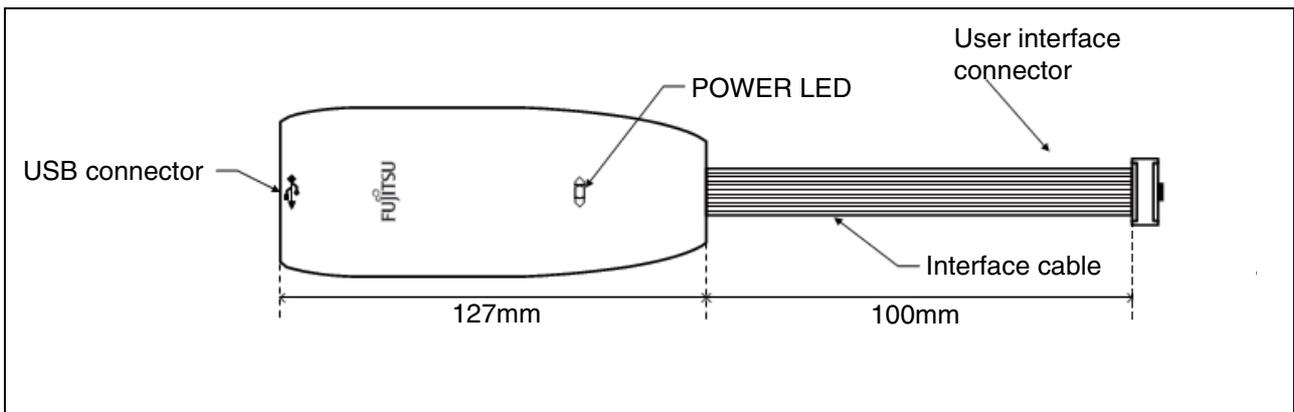


Figure 1 Adapter appearance (top view)

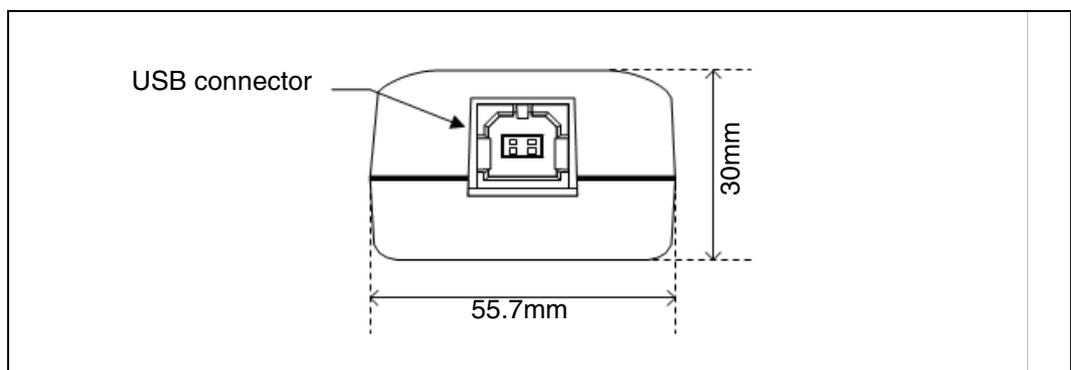


Figure 2 Adapter appearance (front view)

## 4. System Configuration

### ■ Using the adapter as an emulator system

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

Figure 3 shows the system configuration when the adapter is used as an emulator system.

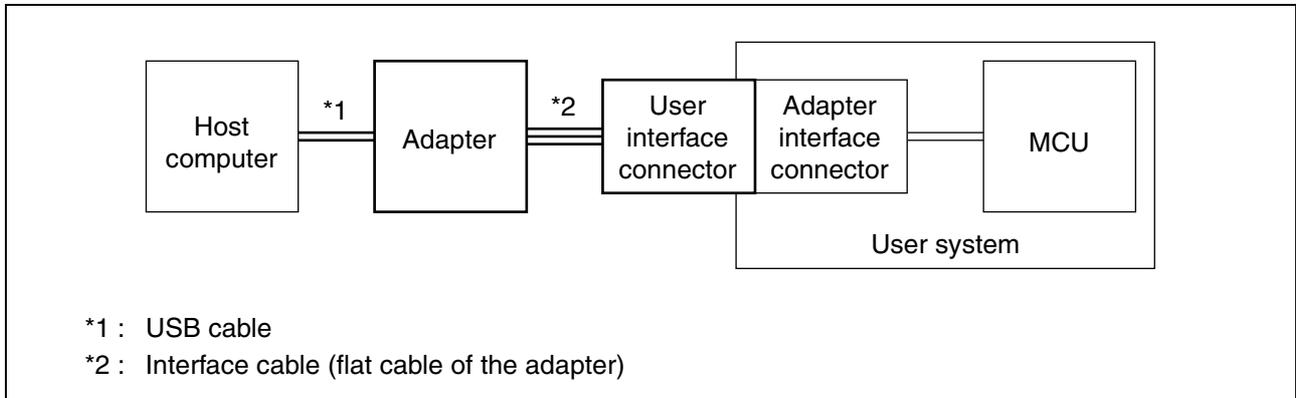


Figure 3 System configuration (emulator system)

## 5. Connections

### ■ Connection to the host computer

Connect the adapter to the host computer using the USB cable. Figure 4 shows how to connect the USB cable.

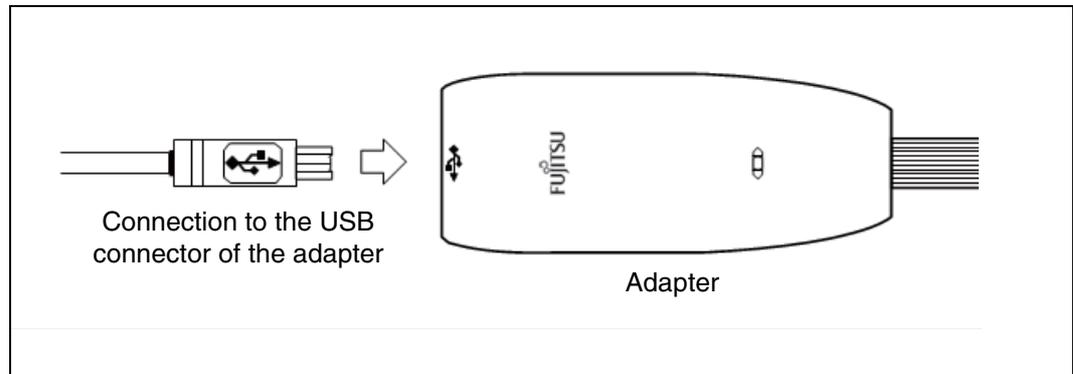


Figure 4 Connecting the USB cable

### ■ 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 connecting the user interface connector, align the index marks (pin 1) on each of the connectors.

For the specifications of the adapter interface connector, see “■ Adapter interface specifications” in Section 6 “Specifications”.

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

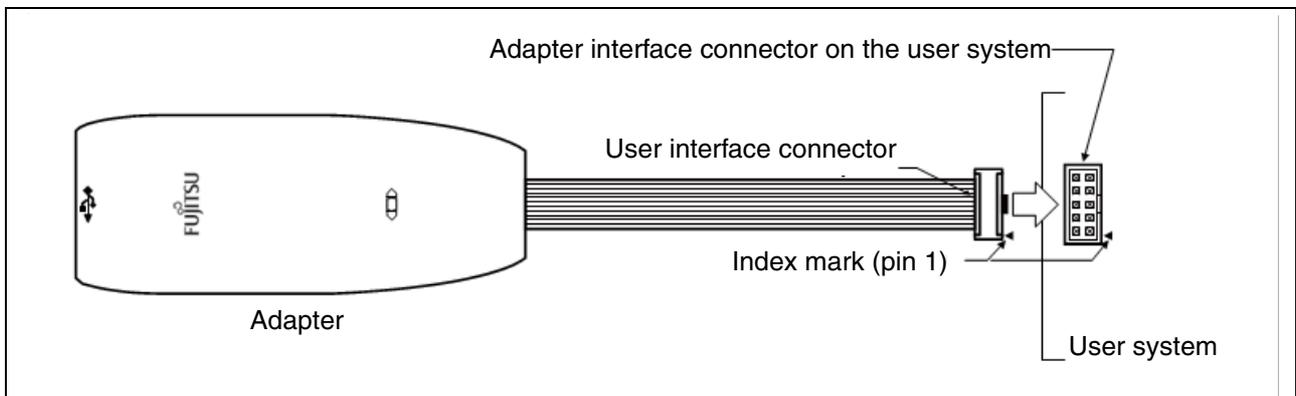


Figure 5 Connecting to the user system

## 6. Specifications

### ■ General specifications

Table 1 lists the general specifications of the adapter.

Table 1 General specifications

Item		Specification
Name		MB95200 Series BGM adapter
Model number		MB2146-08-E
Power supply specifications	Adapter power input	Max: 50mA (uses USB BUS power)
	User power input	+ 2.7 V to + 5.5 V * <sup>1</sup> , Max: 20mA* <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>		AMP LATCH MIL type receptacle connector
Operation temperature / humidity		+5 °C to +35 °C / 20% to 80% (no condensation)
Storage temperature / humidity		0 °C to +70 °C / 20% to 80% (no condensation)
Dimensions		Adapter case: 55.7mm(W) × 127mm(D) × 30mm(H) (excluding protrusions)
		Interface cable length: 100mm (excluding user interface connector)
Weight		169g (Including USB Cable).

\*1 : The maximum and minimum voltage depends on the MCU used.

For details, contact the sales or support representative.

\*2 : Does not include the power consumption of the MCU.

\*3 : The part number of the connector is: 1-215882-0 (Tyco Electronics Corporation)

### ■ 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	12Mbps
Connector shape	Series B
Power supply	BUS Powered

■ **Debug mode entry specifications**

The following timing will enable MB95200 Series MCU enter Debug mode.

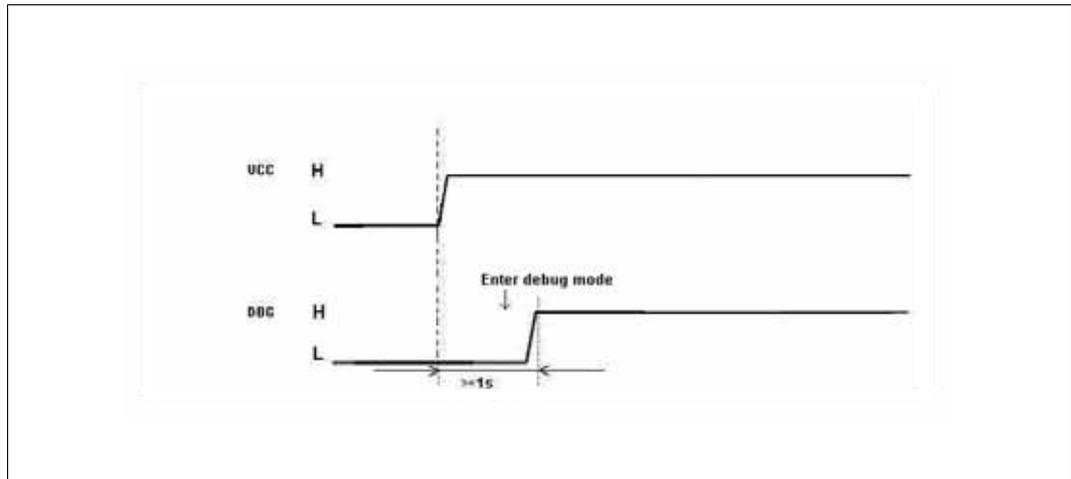


Figure 6 Adapter interface connector pin configuration

## ■ Adapter interface specifications

The pin outs of the adapter interface connectors mounted on the user system are shown in Tables 3. The recommended connectors are listed in Table 4, and the pin configuration is shown in Figure 7. When the adapter interface connector is mounted on the user system, connect the MCU to the adapter interface connector according to the following specifications. For the detailed method of connecting the user system and the adaptor, refer to the hardware manual of MCU to be used.

Table 3 Adapter interface connector pin out (emulator system)

Connector pin number	Input / output	Evaluation MCU connection pin name	Function	Remarks
1	BGMA*1←MCU*2	UVCC	User power supply input	Connected to the MCU Vcc pin.
2	-	GND	Vss pin	Connected to the MCU Vss pin.
3	BGMA→MCU	RSTIN	Tool reset output	BDSU, Initialization of users logic, 10 V output
4	BGMA←MCU	RSTOUT	User System reset output	Connected to user System reset circuit
5	-	RSV	-	
6	-	RSV	-	
7	-	RSV	-	
8	BGMA←MCU BGMA→MCU	DBG	Communication line	1 line UART
9	-	RSV	-	
10	-	RSV	-	

\*1 : “BGMA” represents the BGM adapter.

\*2 : “MCU” represents the evaluation MCU.

Note : The pin assignment of MB2146-08-E is not compatible with MB2146-09, MB2146-09A-E. Do not interchange these two BGM adapters with their respective target MCU. This may cause malfunction of Debug system.

Table 4 Recommended adapter interface connectors

Part number	Specifications		Manufacturer
0-281271-1	Straight solder dip	Housing provided, post support	Tyco Electronics Corporation

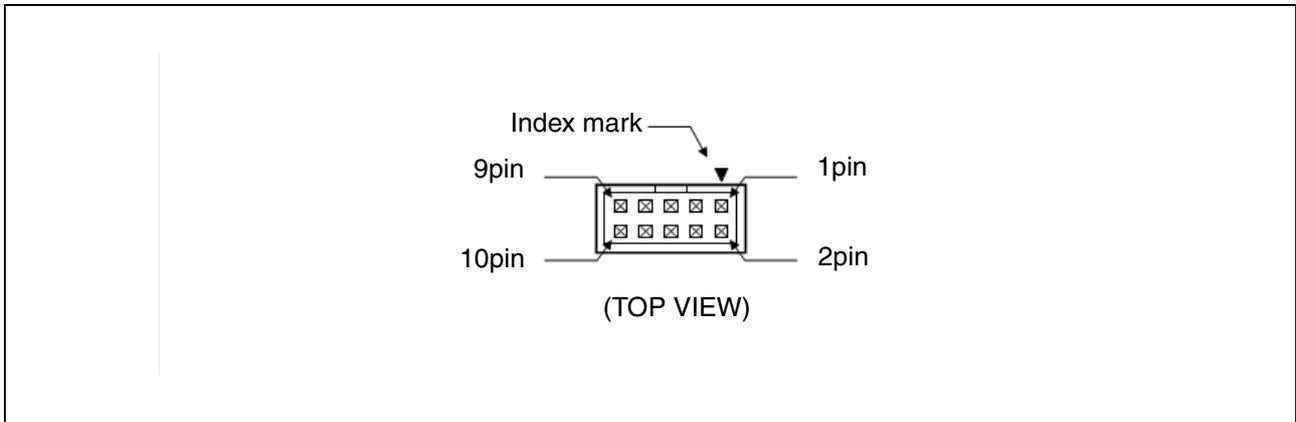


Figure 7 Adapter interface connector pin configuration

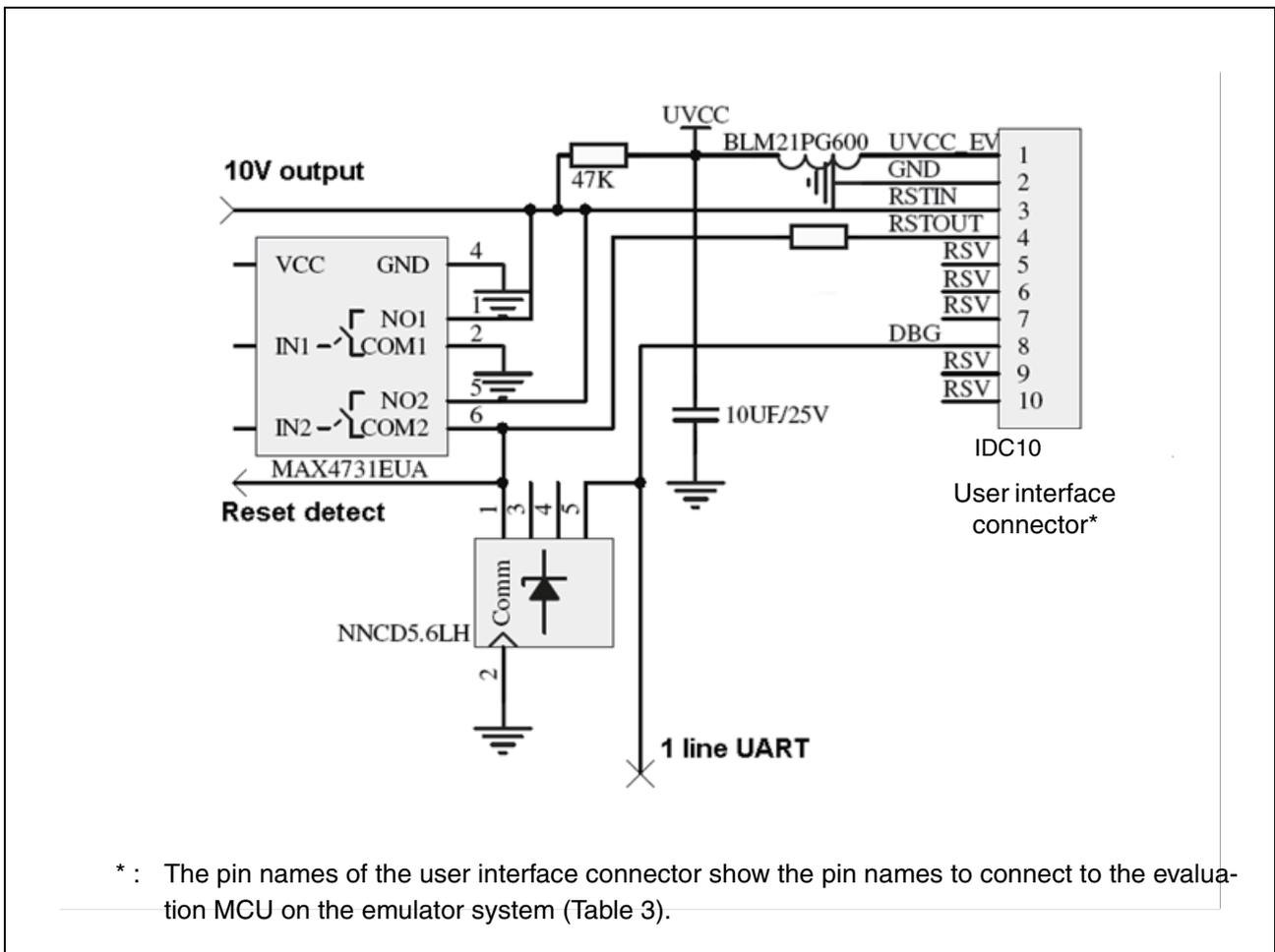


Figure 8 User interface circuitry

Table 5 DC specifications of the user interface

Connector pin number	Circuit type	I <sub>OH</sub> * <sup>1</sup> (mA)	I <sub>OL</sub> * <sup>2</sup> (mA)	I <sub>LI</sub> * <sup>3</sup> (μA)	Resistor connection	Remarks
3	Open drain output	-	64.0* <sup>4</sup>	1* <sup>4</sup>	Connected to UVCC by 47 kΩ	Connected to GND via bus switch* <sup>5</sup>
4	CMOS input	-	-	± 5* <sup>4</sup>	See Figure 8	
8	CMOS input Open drain output	-	4.0* <sup>4</sup>	± 5* <sup>4</sup>		

\*1 : The “H” level output current.

\*2 : The “L” level output current.

\*3 : The input leakage current.

\*4 : Does not include the current through the pull-up resistance.

\*5 : The voltage monitoring IC controls the on/off connection to the GND via bus switch.

SS01-00025-2E

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**FUJITSU MICROELECTRONICS • SUPPORT SYSTEM**  
F<sup>2</sup>MC-8FX Family  
8-bit MICROCONTROLLER  
MB95200 Series BGM ADAPTER  
MB2146-09A-E  
OPERATION MANUAL

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December 2008 the second edition

Published **FUJITSU MICROELECTRONICS LIMITED**

Edited Sales Promotion Department

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