FUJITSU MICROELECTRONICS
SUPPORT SYSTEM

MCU-UM-500001-E-11

F²MC-8FX FAMILY

8-BIT MICROCONTROLLER

MB95200H/210H SERIES

BGM ADAPTOR MB2146-08-E

OPERATION MANUAL

FUJITSU

PREFACE

Thank you for purchasing the F2MC* family 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 F2MC family BGM adapter. Be sure to read it before using the product.
For information on the MCU supported by this product, contact the Fujitsu sales or support representative.

*: F2MC is the abbreviation of FUJITSU Flexible Microcontroller.

■ 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.

■ 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"

■ European RoHS compliance

Products that have a "-E" suffix at the end of the part number are products that conform to the European RoHS. Consult a Fujitsu sales or support representative for details on the products that are RoHS compliant.
Products that have a "-E" suffix on the part number have the same functionality as products with the same part number but without the "-E" suffix (RoHS non-compliant products).

■ Caution of the products described in this document

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

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided appropriately, could result in death or serious injury and/or a fault in the user's system

Electric shock, Damage	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.
Electric shock, Damage	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.

⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided appropriately, 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.

Cuts, Damage	Before moving the product, be sure to turn off all the power supplies and unplug the cables. Watch your steps when carrying the product. Do not use the product at an unstable location such as a place exposed to strong vibration or a sloping surface. Doing so may let the product fall, resulting in an injury or fault.
Damage	Neither put anything on nor apply shock to the product. Once the product has been powered, do not carry it. Doing either may cause a fault due to a load or shock.
Damage	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. An adverse operating or storage environment can cause a fault.
Damage	Use the product within the ranges of its general specifications. Operating it outside the range of any general specification may cause a fault.
Damage	To prevent electrostatic breakdown, do not let your finger or an object touch any metal pa of the connector. Before handling the product, touch a metal object (such as a door knob) t discharge static electricity from your body.
Damage	Before turning the power on, be sure to finish making all the required connections. To set up and use the product, follow the instructions given in this document. Using the product incorrectly or inappropriately may cause a fault.
Damage	Before plugging or unplugging any cable for this product, be sure to turn the power supply off. When unplugging the cable, remove it while holding the connector without pulling the cable itself. Pulling the cable itself or bending it may expose or disconnect the cable core, resulting in a fault.
Damage	Re-transporting the product may damage it to cause a fault. Keep the packaging materials used for shipment of the product and use them when re-transporting it.

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Contents

PREFACE ..... **i**

- For your safety i
- Related manuals i
- European RoHS compliance i
- Caution of the products described in this document ii

Contents ..... **iv**

1 Checking the Delivered Product **1**

2 Optional Parts **2**

3 Appearance and Part Names **3**

4 System Configuration **4**

4.1. Using the adapter as an emulator system 4

5 Connections **5**

5.1. Connection to the host computer 5

5.2. Connection to the user system 5

6 Specifications **6**

6.1. General specifications 6

6.2. USB line specifications 6

6.3. Debug mode entry specifications 7

6.4. Adapter interface specifications 8

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
- CD-ROM (English version – Contain this document): 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 Fujitsu sales or support representative for details.

3 Appearance and Part Names

Figure 3.1 and 3.2 show the adapter appearance, major dimensions and part names.

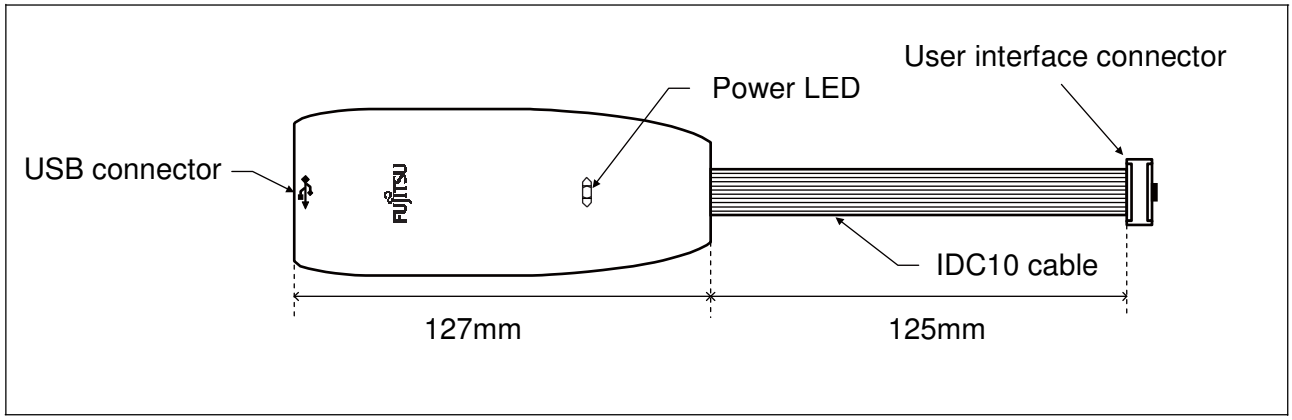

Figure 3.1 Adapter appearance (top view)

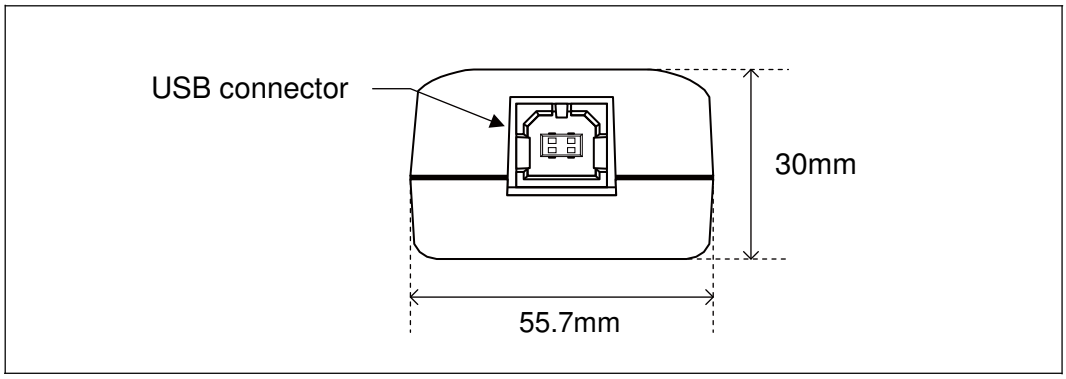

Figure 3.2 Adapter appearance (front view)

4 System Configuration

4.1. 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 4.1.1 shows the system configuration when the adapter is used as an emulator system.

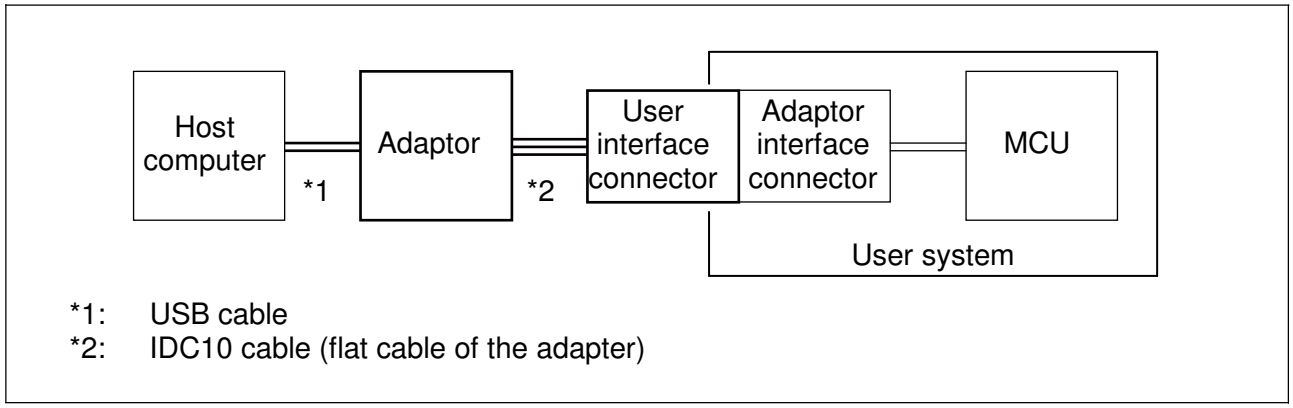

Figure 4.1.1 System configuration (emulator system)

5 Connections

5.1. Connection to the host computer

Connect the adapter to the host computer using the USB cable. Figure 5.1.1 shows how to connect the USB cable.

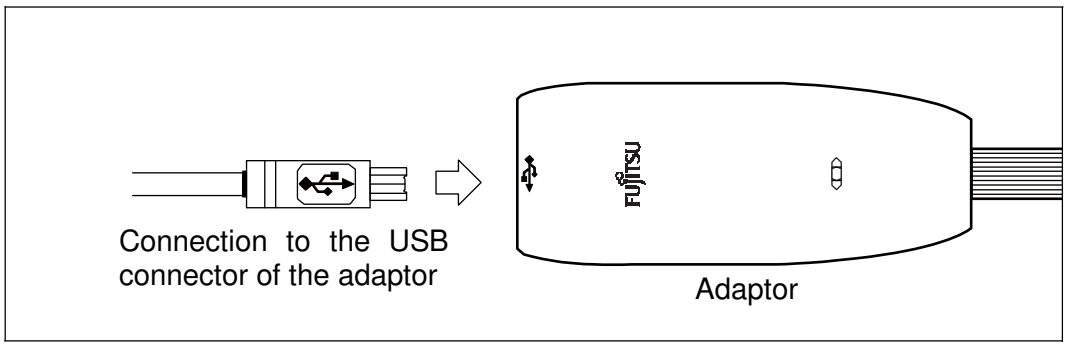

Figure 5.1.1 Connecting the USB cable

5.2. 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 5.2.1 shows how to connect the adapter to the user system.

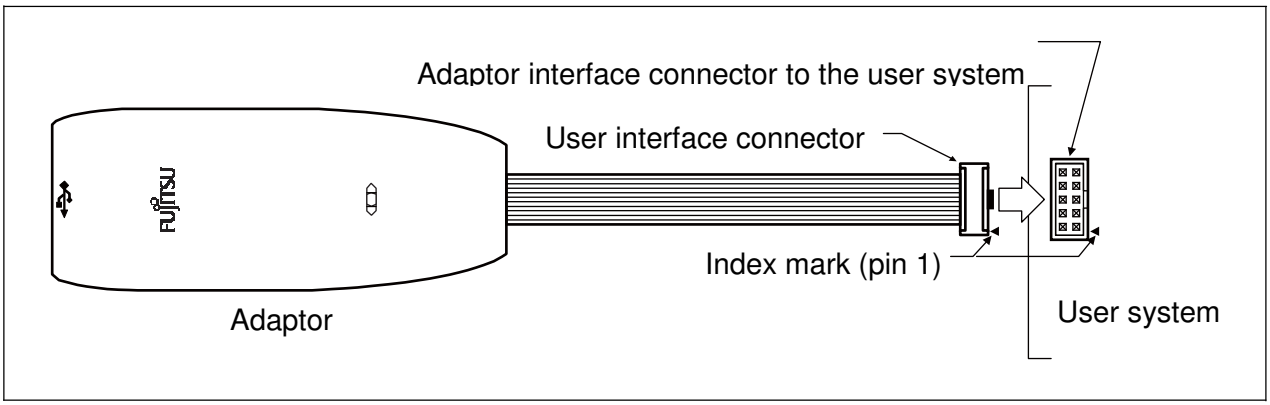

Figure 5.2.1 Connecting to the user system

6 Specifications

6.1. General specifications

Table 1 lists the general specifications of the adapter.

Table 1 General specifications

Item		Specification
Name		F2MC family BGM adapter
Model number		MB2146-08-E
Power supply specification	Adapter power input	Max: 50mA (uses USB BUS power)
	User power input	+ 2.7V to + 5.5V *1, Max: 20mA*2
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 *3		AMP standard IDC10 compliant key type (with center key)
Operation temperature/humidity		+5℃ to +35℃/20% to 80% (no condensation)
Storage temperature/humidity		0℃ to +70℃/20% to 80% (no condensation)
Dimensions		Adapter case: 55.7mm(W)X127mm(D)X30mm(H)(excluding protrusions)
		IDC10 cable length: 125mm (excluding user interface connector)
Weight		169g (Including USB Cable).

*1: The maximum and minimum voltage depends on the MCU used. For details, contact the Fujitsu sales or support representative.
*2: Does not include the power consumption of the MCU.
*3: The part number of the connector is: 0-281271-1 (Tyco Electronics Corporation)

6.2. USB line specifications

Table 2 lists the USB line specifications of the adapter.

Table 2 USB line specifications

Item	Description
Conforming standard	USB1.0
Communication method	Full speed bulk transfer
Data transfer rate	12Mbps
Connector shape	Series B
Power supply	BUS Powered

6.3. Debug mode entry specifications

The following timing will enable MB95200 MCU enter Debug mode.

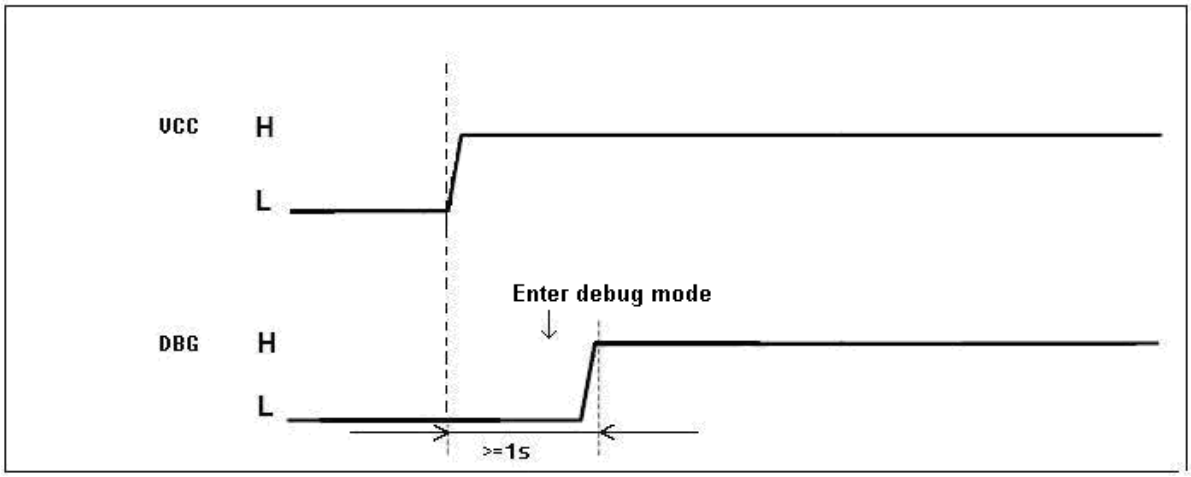

Figure 6.3.1 Adapter interface connector pin configuration

6.4. 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 6.4.1.
When the adapter interface connector is mounted on the user system, connect the MCU to the adapter interface connector according to the following specifications.

Table 3 Adapter interface connector pin out (emulator system)

Connector pin number	Input / output	Target 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, 10V 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 User system MCU.

Note: The pin assignment of MB2146-08-E is not compatible with MB2146-09. Do not interchange these two BGM adaptors 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	Housing provided, post support	Tyco Electronics Corporation

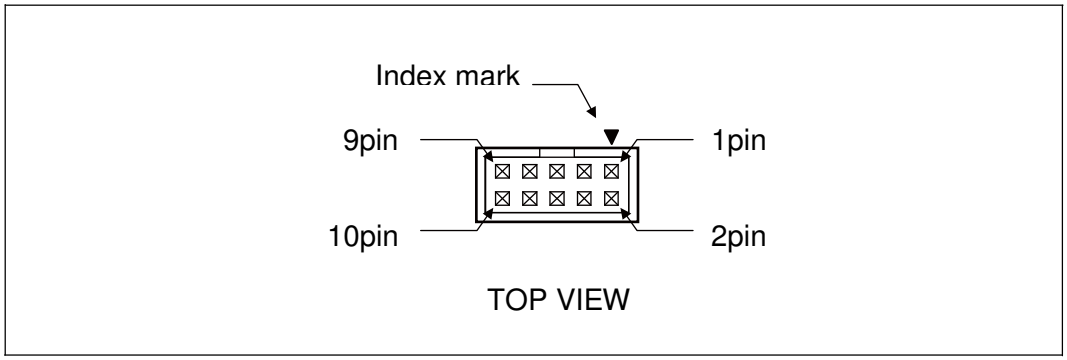

Figure 6.4.1 Adapter interface connector pin configuration

*: The pin names of the user interface connector show the pin names to connect to the target MCU on the emulator system.

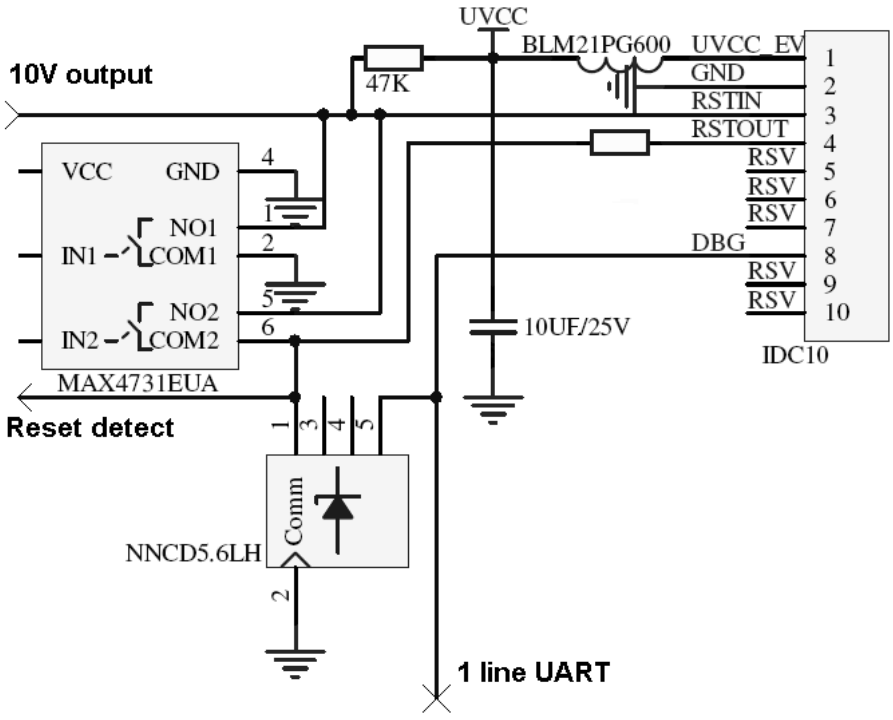

Figure 6.4.2 User interface circuitry

Table 5 DC specifications of the user interface

Connector pin number	Circuit type	IOH*1 (mA)	IOL*2 (mA)	ILI*3 (A)	Resistor connection	Remarks
3	Open drain output	-	64.0 *4	1 *4	Connected to UVCC by 47k	Connected to GND via analog switch*5
4	CMOS input	-	-	±5 *4	See Figure 6.4.2	
8	CMOS input Open drain output	-	4.0 *4	±5 *4		

*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.

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F2MC Family

BGM Adaptor

MB2146-08-E

OPERATION MANUAL

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