DSU-FR EMULATOR
LQFP-176P HEADER TYPE 3
MB2198-301
OPERATION MANUAL

FUJITSU

PREFACE

■ **Purpose and intended readership of this manual**

Thank you for purchasing the LQFP-176P Header Type 3 for the DSU-FR Emulator (MB2198-301) .

This product is used together with the BGA-660P adapter for the DSU-FR Emulator (MB2198-300) *1 to connect the DSU-FR Emulator (MB2198-01) *2 and FR-DSU cable (MB2198-10) *3 to a user system that uses a MB91460 series Fujitsu FR *4 microcontroller (LQFP-176P) *5.

This manual describes how to use the LQFP-176P Header Type 3 for the DSU-FR Emulator. Please read the manual carefully before using.

Please contact your Fujitsu sales or support representative for details of which production and evaluation MCU models can be used with this product.

*1 : referred below as the "adapter"
*2 : referred below as the "emulator"
*3 : referred below as the "DSU cable"
*4 : FR is an abbreviation of FUJITSU RISC CONTROLLER and is a product of Fujitsu.
*5 : The package is the FPT-176P-M07 (0.5 mm lead pitch, 24 mm × 24 mm body size).

■ **Safe use of this product**

This manual contains important information relating to the safe use of this product. Please read this before using the product and use the product correctly in accordance with the instructions in this manual.

In particular, carefully read "Caution of the products described in this manual" at the beginning of this manual and "2.Precautions When Using this Product" 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 this product are subject to change without notice.

Also, please note that Fujitsu accepts no responsibility for any consequences that result either directly or indirectly from the use of this product.

■ **Product operating environment**

This product has an operating temperature range of 5 °C to 35 °C and an operating humidity range of 20 % to 80 %. Use the product in an environment that is free of condensation and avoid high temperature or humidity.

This product consists of an open circuit board without a frame cabinet with exposed electronic components. Accordingly, do not place other objects on top of the circuit board and do not allow the metal parts of the unit to come into contact with people or materials that may have a build up of static electricity. Similarly, keep any objects that are flammable, likely to cause a short circuit, or cause any other such problem well away from the unit when the power to the unit is turned on. Keep the unit horizontal as far as possible and do not use in locations that are subject to vibration, dust, flammable gases, or other such dangers.

If the unit is used in an environment that does not satisfy the above guidelines, there is a risk of unexpected damage to property or injury to the user or other people in the vicinity. Also, please keep the packaging materials supplied with the unit and reuse these if the unit ever needs to be returned due to a fault or other reason.

■ **Related manuals**

Please refer also to the following manuals.
- DSU-FR Emulator MB2198-01 Hardware Manual
- DSU-FR Emulator DSU-FR Cable MB2198-10 Operation Manual
- DSU-FR Emulator MB2198-300 BGA-660P Adapter Operation Manual

■ **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.
Cuts	The product has some sharp-pointed or edged parts inevitably exposed, such as jumper plugs. Use meticulous care in handling the product not to get injured with such pointed parts.
Damage	Neither put anything on or 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 part of the connector. Before handling the product, touch a metal object (such as a door knob) to discharge static electricity from your body.
Damage	When turning the power on or off, follow the relevant procedure described in this document. Before turning the power on, in particular, 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	Although the MCU socket is structured not to accept an evaluation MCU in a wrong orientation or position, pay due attention to the mounting orientation when mounting the evaluation MCU. Forcing the evaluation MCU to be inserted in a wrong orientation can damage the pins of the evaluation MCU and the accidental insertion prevention mechanism of the socket, resulting in a fault.
Damage	When stored, the product should be kept in its packaging box as it has no housing. 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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1. Product Overview

1.1 Overview

This product is an option product for use with the DSU-FR emulator and is intended to support the development of user systems that use the Fujitsu FR family of microcontrollers.
The main features of the header board are as follows.

- Used in conjunction with the adapter (separately available) to connect the user system to an emulator.
- When using the MB91V460 to emulate an MB91460 series MCU, the header board performs level shifting the 5 V output signals of MB91V460 or user system to 3.3 V.

1.2 Check package contents

Before starting to use the header board, check that the following items are all present.

- LQFP-176P header [*1]   : 1
- Header board attachment screws   : 4
  (M2 × 10 mm, 0.4 mm pitch)
- Washers   : 4
- NQPACK176SD [*2]   : 1
- HQPACK176SD [*3]   : 1
- Operation Manual (Japanese)   : 1
- Operation Manual (English, this document)   : 1

*1 : Referred to below as the "header board". The header board installs the adapter I/F connector and YQPACK176DS (Tokyo Eletech Corporation, referred to below as the "YQPACK").
*2 : IC socket (Tokyo Eletech Corporation, referred to below as the "NQPACK"). Includes a dedicated screwdriver and three guide pins. If you provide the required screw holes in printed circuit board for user system for attaching the IC socket, you can use the highly reliable NQPACK176SD-SL adapter socket (Tokyo Eletech Corporation, sold separately). Please contact Tokyo Eletech for details.
*3 : IC socket cover (Tokyo Eletech Corporation, referred to below as the "HQPACK"). Four screws (M2 × 6 mm, 0.4 mm pitch) are supplied for attaching the HQPACK.

Please contact Fujitsu sales or support representative for details of which mass production MCU models can be used with this product.

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1.3 Option Products

Table 1.1 shows the option products available for the header board. Please purchase these separately, as required.

Table 1.1 Option Products

Name	Model
DSU-FR emulator	MB2198-01
DSU-FR cable	MB2198-10
BGA-660P adapter *1	MB2198-300
Evaluation MCU *2	MB91V460

*1 : When used together with the BGA-660P adapter for the DSU-FR Emulator (Model No: MB2198-300) , the header board can be used as an adapter unit.
Refer to the "DSU-FR Emulator MB2198-300 BGA-660P Adapter Operation Manual" for details including how to handle the adapter, how to use it, and safety precautions.

*2 : Evaluation MCUs are mounted in the adapter. Please contact Fujitsu sales or support representative for details of evaluation MCU corresponding to another adapter.

1.4 System Configuration

The header board is used together with an emulator, adapter, and other components to connect to the user system.
Figure1.1 shows the system configuration to this product.

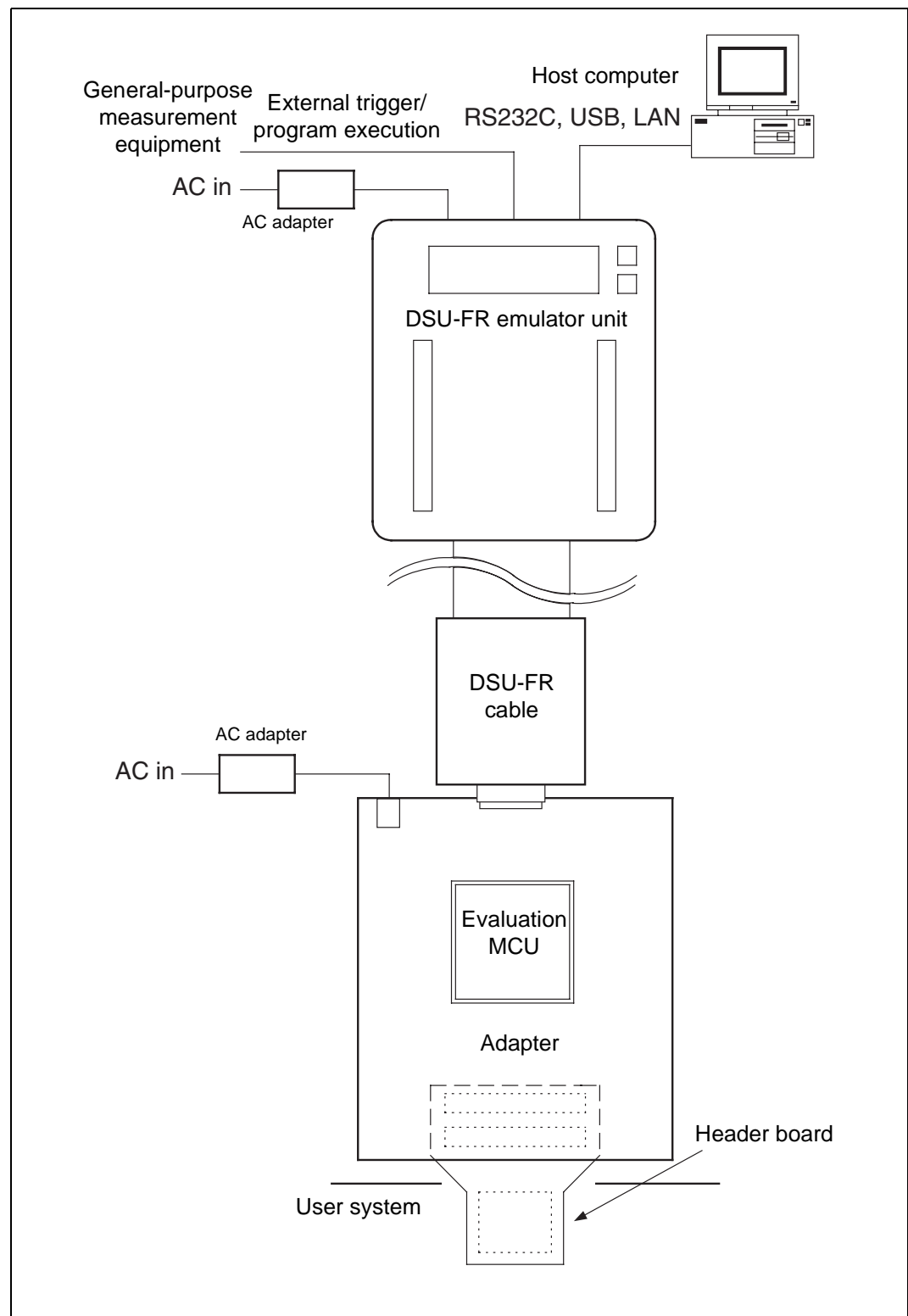Figure 1.1 System Configuration

To use the emulator, a host computer and emulator/debugger software are required separately. Please refer to the operation manual for the adapter for details about how to connect the adapter and header board. Refer to the header board's hardware manual, operation manual, and other support documentation for details of the emulator, adapter, and other specifications.

1.5 External View and Names of Each Part

Figure 1.2 shows the external view of the header board and the names of each part.
Note that Figure 1.2 shows the state of the header board when it is shipped.

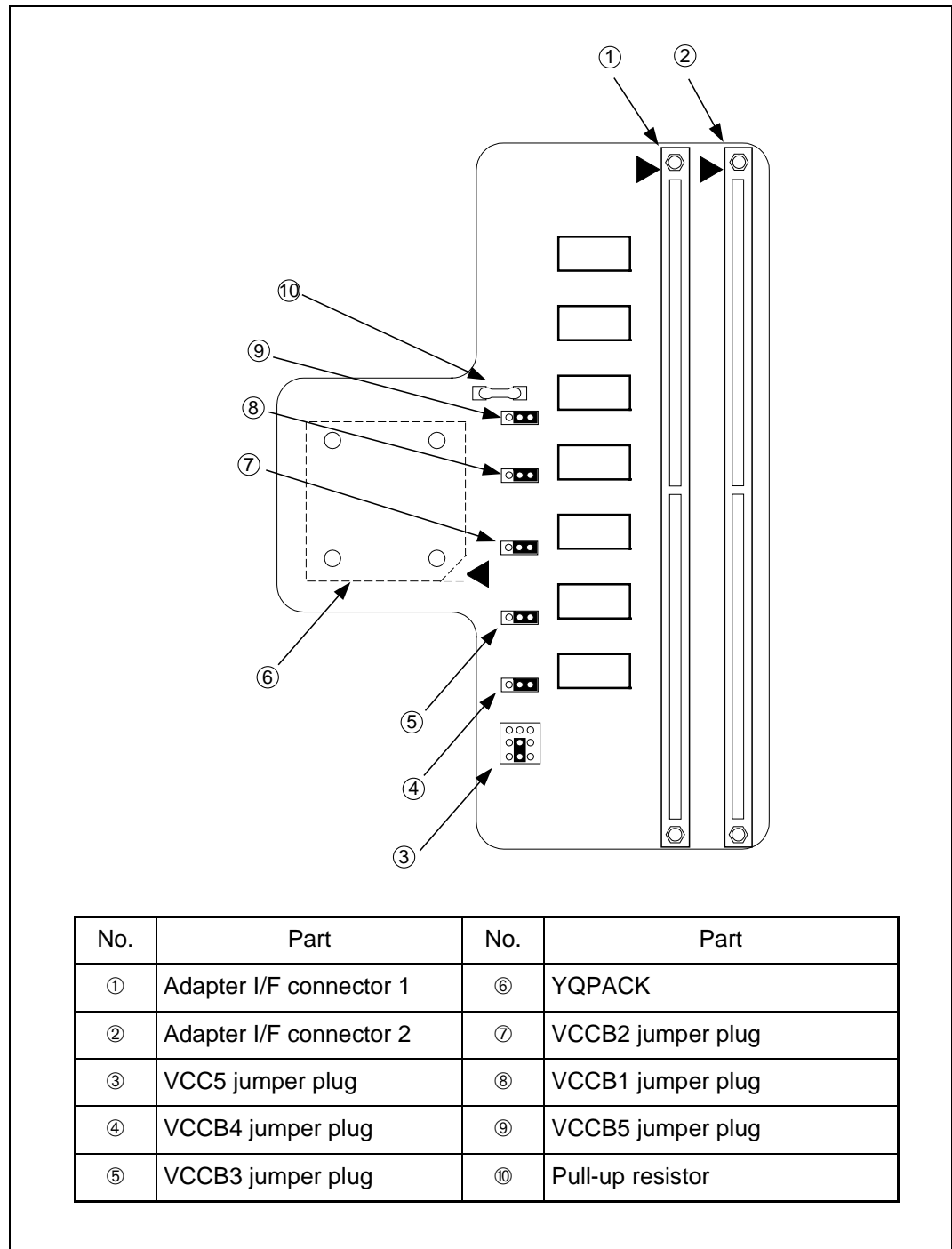| No.	Part	No.	Part
①	Adapter I/F connector 1	⑥	YQPACK
②	Adapter I/F connector 2	⑦	VCCB2 jumper plug
③	VCC5 jumper plug	⑧	VCCB1 jumper plug
④	VCCB4 jumper plug	⑨	VCCB5 jumper plug
⑤	VCCB3 jumper plug	⑩	Pull-up resistor

Figure 1.2 External View of Header Board

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2. Precautions When Using this Product

Take the precautions and restrictions below when using the header board.

■ **Precautions**

- Operating the device outside the range of any general specification may cause the device to malfunction. Use the device in the ranges of its general specifications.
- Please follow this manual about setting and using the adapter.
- Table 2.1 lists the temperature and humidity ranges for operating and storing the unit.

Table 2.1   Operation and Storage Conditions

	Temperature	Humidity
Operation	5 °C to 35 °C	20 % to 80 % (with no condensation)
Storage	0 °C to 70 °C	20 % to 80 % (with no condensation)

■ **Points to note when designing the printed circuit board for the user system**

A height restriction applies to any components on the user system that are located close to where the header board connects to the user system.
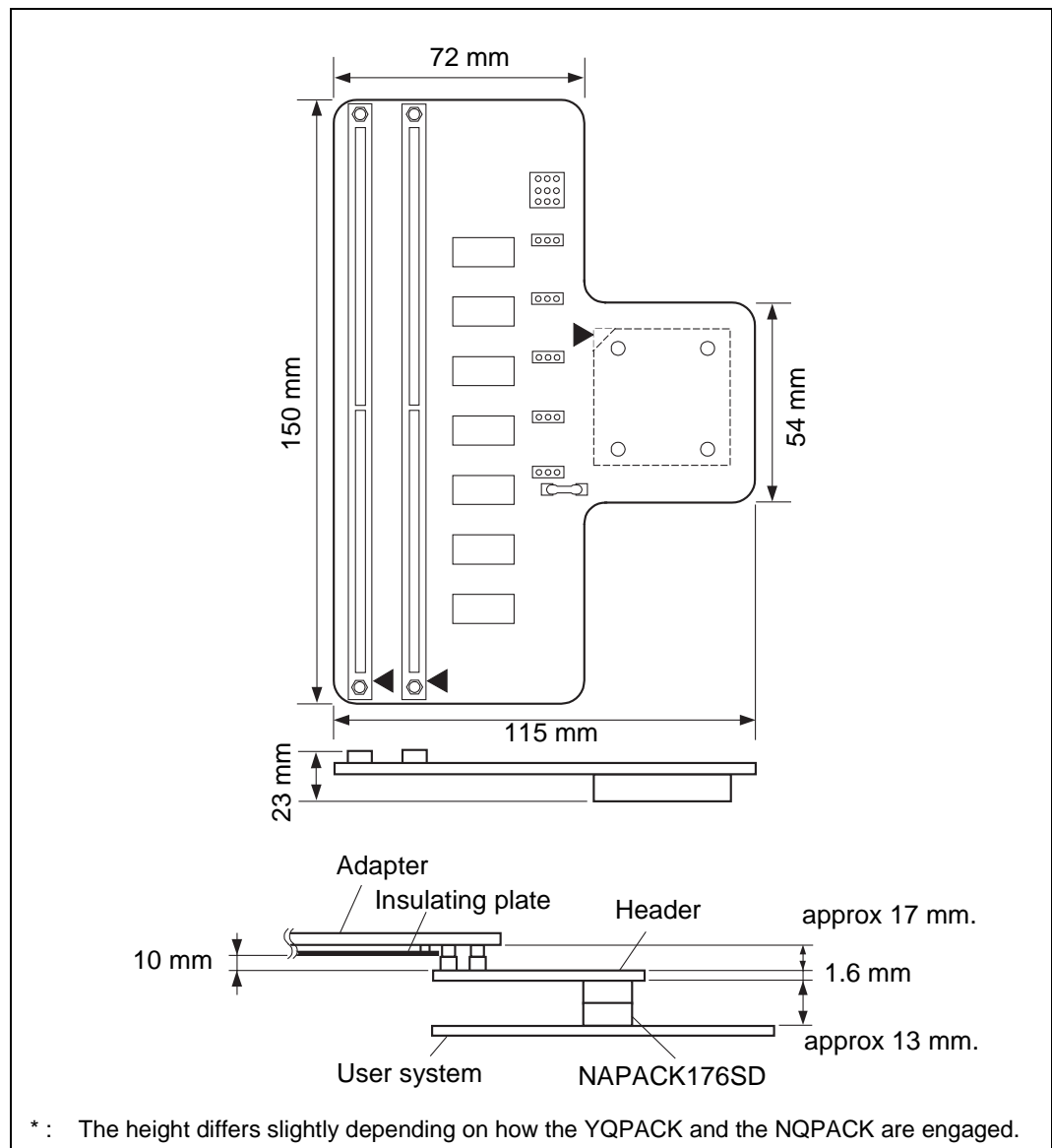Take note of this when designing the printed circuit board for the user system.

* :   The height differs slightly depending on how the YQPACK and the NQPACK are engaged.

Figure 2.1 Header Board Dimensions

■ Points to note when designing the MCU foot pattern

The figure shows the recommended foot pattern dimensions for mounting the NQPACK on the printed circuit board for the user system. Please take account of the NQPACK foot pattern requirements as well as the recommended foot pattern for the mass production MCU when designing the printed circuit board for the user system.

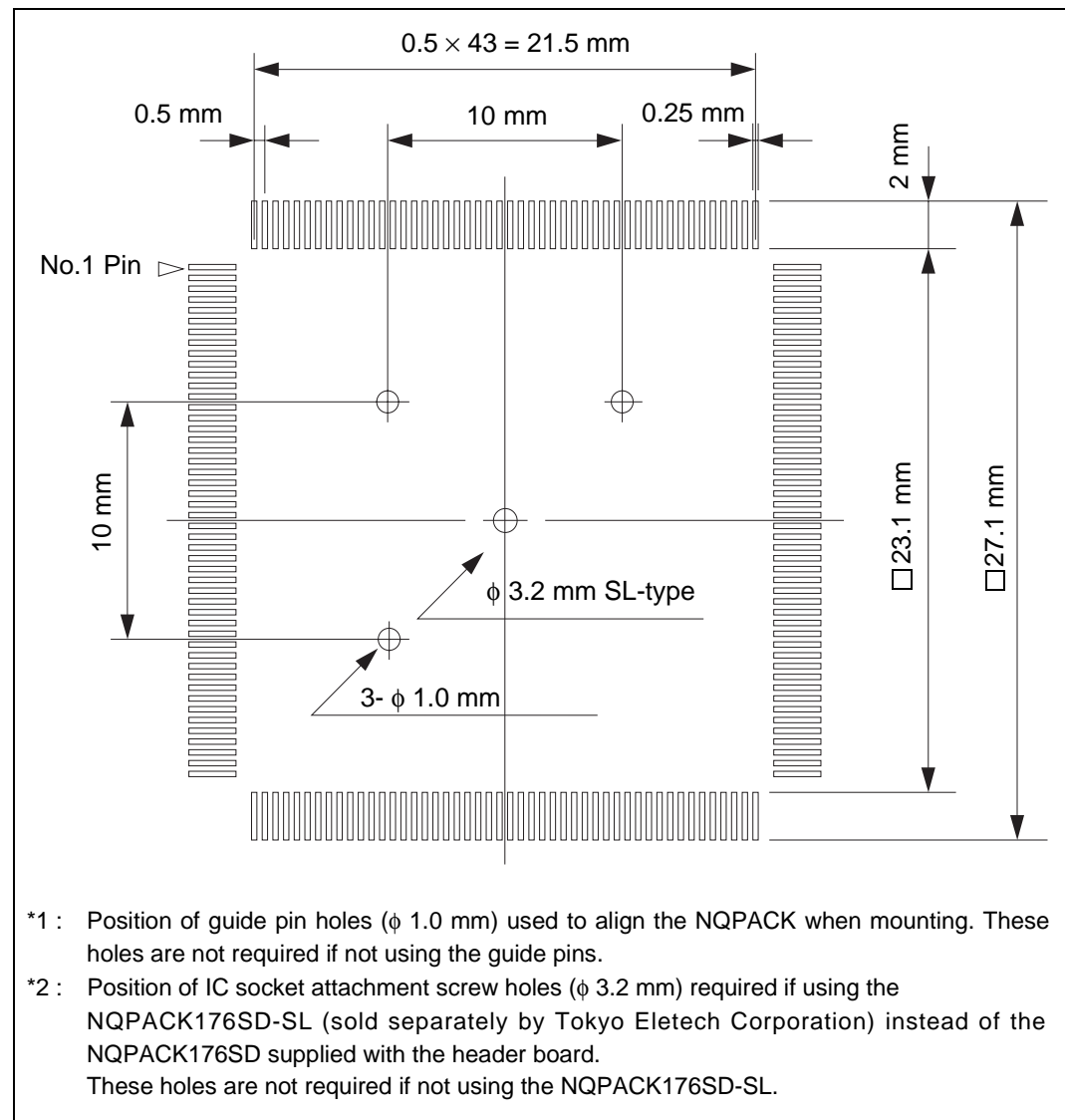Contact Tokyo Eletech Co. Ltd. for more details.

*1 :   Position of guide pin holes (φ 1.0 mm) used to align the NQPACK when mounting. These holes are not required if not using the guide pins.

*2 :   Position of IC socket attachment screw holes (φ 3.2 mm) required if using the NQPACK176SD-SL (sold separately by Tokyo Eletech Corporation) instead of the NQPACK176SD supplied with the header board.
These holes are not required if not using the NQPACK176SD-SL.

Figure 2.2 Foot Pattern Dimensions for Mounting the NQPACK

■ Restrictions

The following general restrictions apply to the header board.

- When using the adapter and header, the MCU on the user system must be mounted in a socket. Use the NQPACK176SD (Tokyo Eletech Corporation) as the IC socket.
- Ensure that all power is turned off to the adapter, emulator, and user system before setting the jumpers on the header board.
- The configuration of the level shift circuit is such that VOH for signals that expect a 4.5 V output is limited to 4.4 V.
- As no level shift function is provided for pins 89 to 108, the output signal level depends on the power supply used to drive these pins.

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3. Connection

3.1 Connecting the Header Board to the User System

Mount the supplied NQPACK on the user system before using the header board.

The header board is used together with the adapter.
Refer to the hardware manual for the adapter for details about how to connect the header board and adapter.

■ **Connection procedure**

1. To connect the header board to the user system, align the index mark (▲) on the header board with pin 1 on the NQPACK mounted on the user system. Pin 1 on the NQPACK is also indicated by an index mark (▲) (See Figure 3.1) .
   As the YQPACK pins are thin and easily bent, check that the YQPACK pins are kept straight when inserting into the NQPACK.

2. Insert the header board attachment screws, together with washers, into the four screw holes in the top of the header board and tighten the diagonally opposite screws in turn (See Figure 3.2) .
   Use the dedicated screwdriver supplied with the NQPACK to tighten the screws and tighten each screw equally in turn. Take care not to over-tighten as this may cause a bad connection.

Figure 3.1 Index Positions

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Figure 3.2 Header Board Connection Procedure

■ **Disassembly procedure**

To remove the header board, first remove the four screws and then lift the header board vertically up/off the NQPACK.

3.2 Mounting a Mass Production MCU Model

Use the supplied HQPACK to mount the mass production MCU in the user system.

1. Align the index mark on the mass production MCU (●) with the index mark on the NQPACK mounted on the user system (▲), and then insert.

2. Check that the mass production MCU is correctly inserted into the NQPACK, and then align the index marks on the HQPACK and NQPACK (angle cut linearly at one place only) and insert (See Figure 3.3).
   As the HQPACK pins are thin and easily bent, check that the HQPACK pins are kept straight when inserting into the NQPACK.

3. Insert the four screws for attaching the HQPACK into the four screw holes in the top of the HQPACK and tighten the diagonally opposite screws in turn.
   Use the dedicated screwdriver supplied with the NQPACK to tighten the screws and tighten each screw equally in turn. Take care not to over-tighten as this may cause a bad connection.
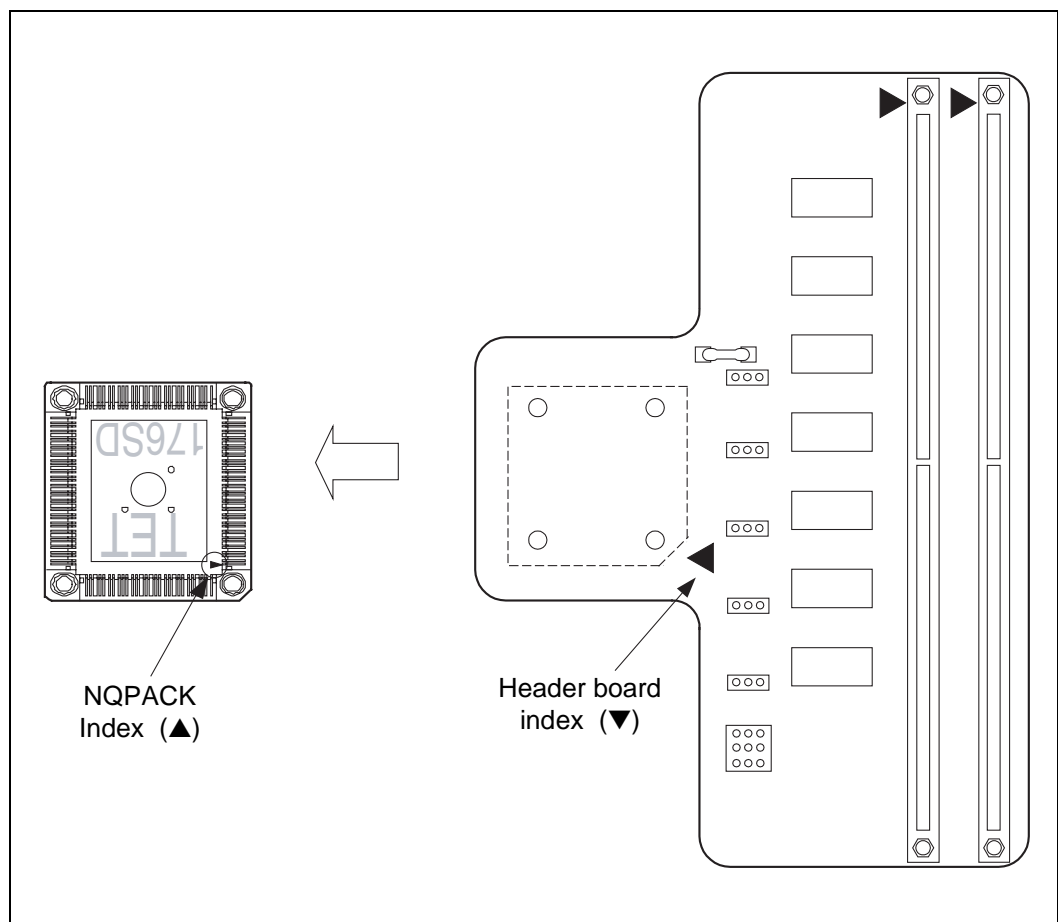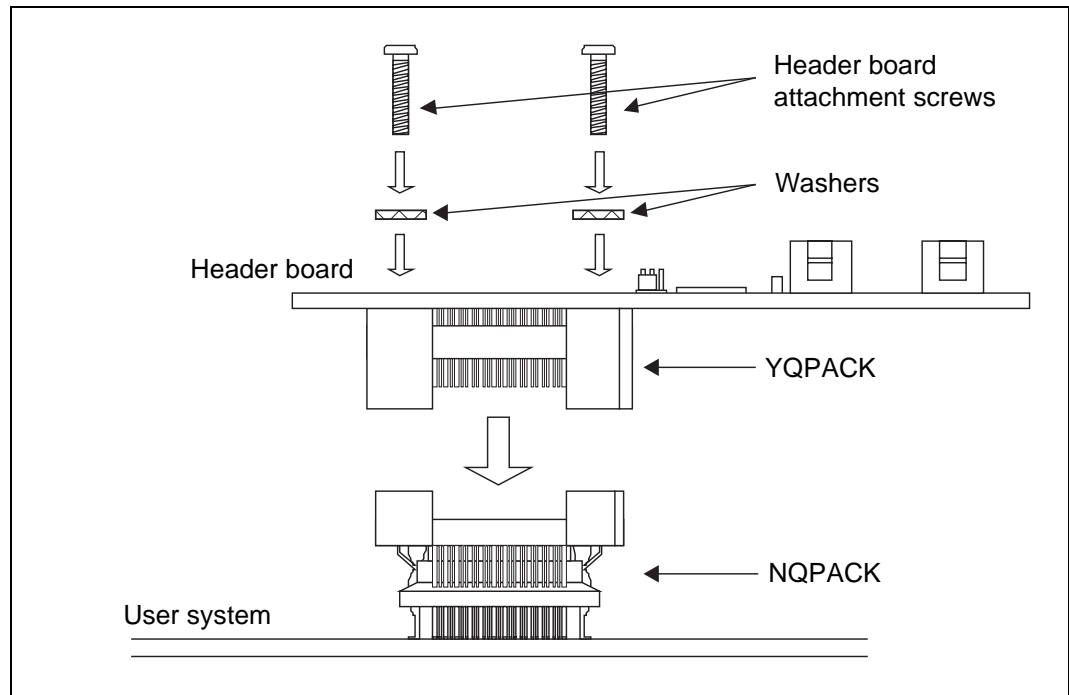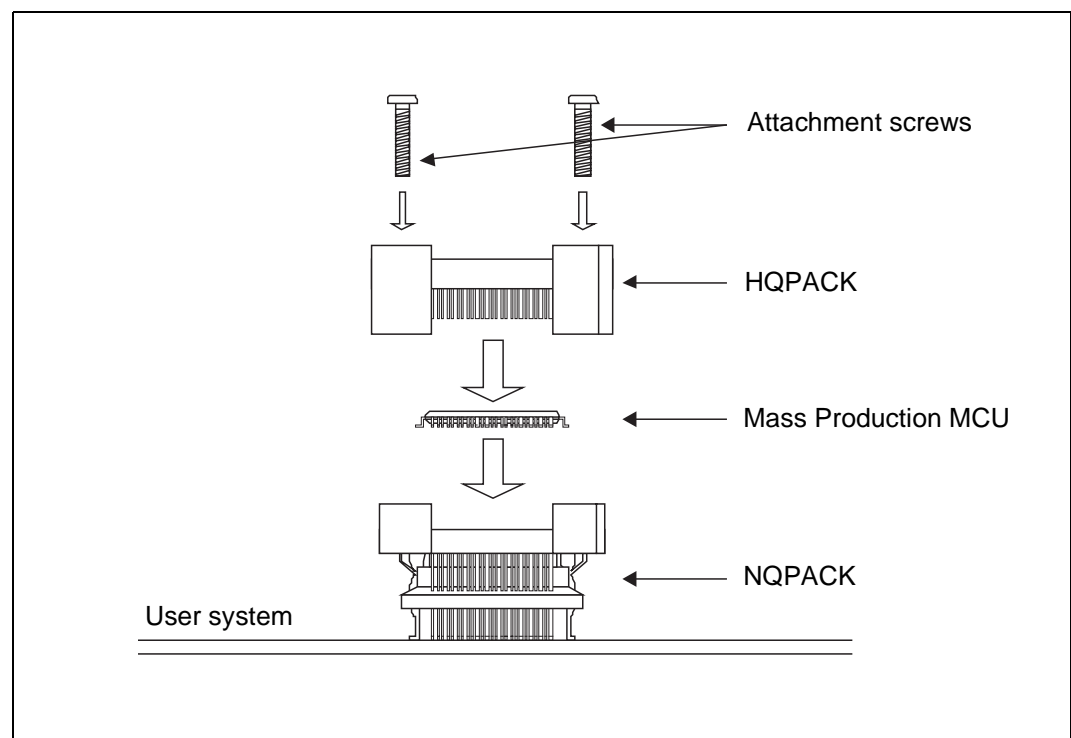

Figure 3.3 Mounting a Mass Production MCU Model

■ **Disassembly procedure**

To remove the HQPACK, first remove the four screws and then lift the HQPACK vertically up/off the NQPACK.

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4. Operation

The following describes how to set the various settings, and the procedure for turning the power on and off. Be sure to read the setting as shown below before turning on the power.

4.1 Jumper Plug Settings

■ VCC5 jumper plug setting

Figure 4.1 shows the factory setting and setting meaning of VCC5 jumper plugs.

Please set it to the terminal number in which the terminal VCC3 is impressed to a different voltage among terminals VCC5 of mass production MCU (The terminal number: 133,147,162,176) . Moreover, please set it to either of terminal even when you use mass production MCU in a single power supply.

Setting	Meaning
133	Apply voltage at pin 133 of the mass production MCU, voltage being different from the VCC3 pin.
147	Apply voltage at pin 147 of the mass production MCU, voltage being different from the VCC3 pin.
162	Apply voltage at pin 162 of the mass production MCU, voltage being different from the VCC3 pin.
176	Apply voltage at pin 176 of the mass production MCU, voltage being different from the VCC3 pin.

Figure 4.1 VCC5 Jumper Plug Settings

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■ VCCB1 to VCCB5 settings
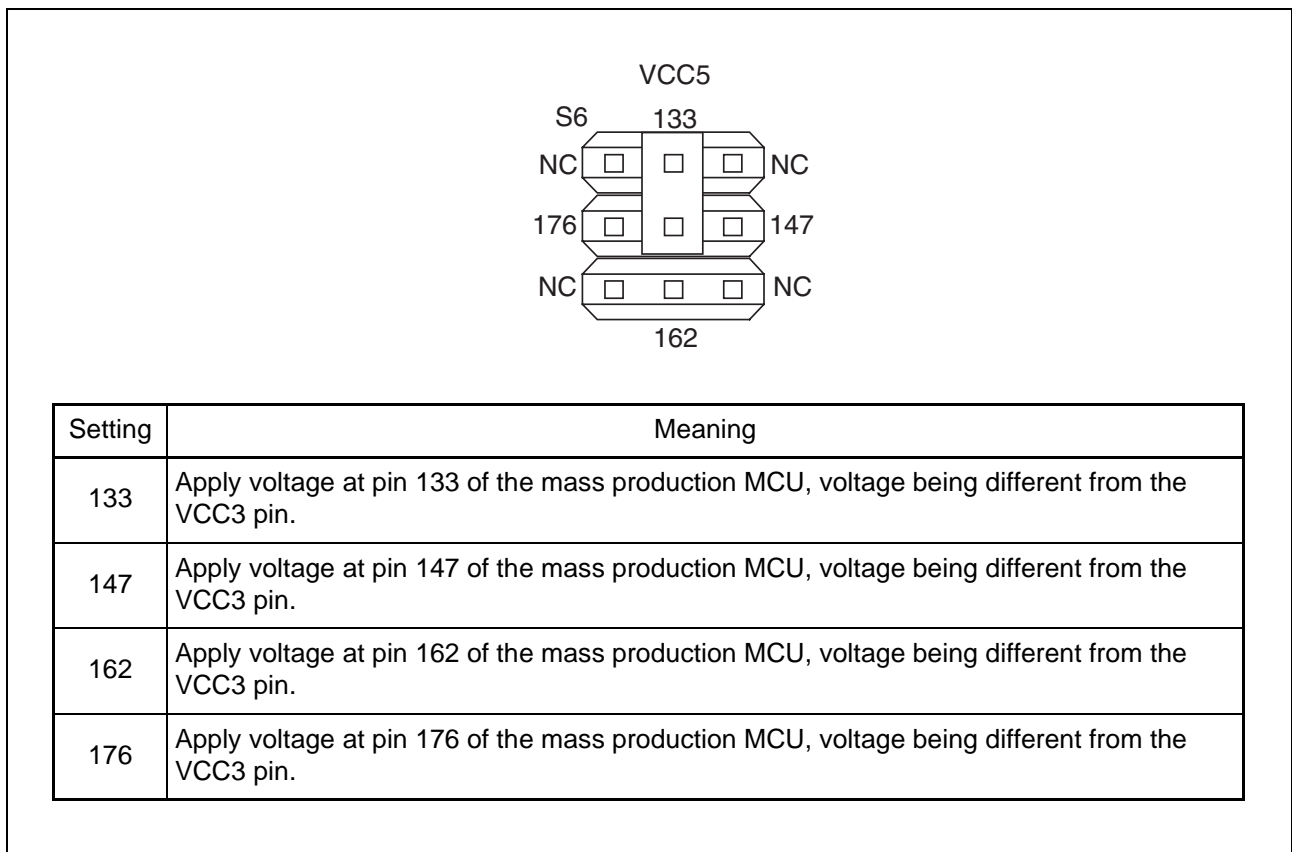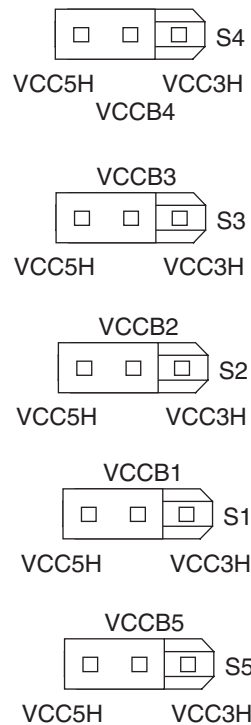
Figure 4.2 describes the factory setting of VCCB1 to VCCB5 jumper plugs and the setting of the jumper plugs.

Jumper plug	Setting	Meaning	Remarks
VCCB1	VCC5H	Adjust the level of group 1 output signals to 4.4 V.	Select this setting if connecting a 5 V ± 10 % power supply to pin 176.
	VCC3H	Adjust the level of group 1 output signals between 3.6 V and 3.0 V.	Select this setting if connecting a 3.3 V ± 0.3 V power supply to pin 176.
VCCB2	VCC5H	Adjust the level of group 2 output signals to 4.4 V.	Select this setting if connecting a 5 V ± 10 % power supply to pin 162.
	VCC3H	Adjust the level of group 2 output signals between 3.6 V and 3.0 V.	Select this setting if connecting a 3.3 V ± 0.3 V power supply to pin 162.
VCCB3	VCC5H	Adjust the level of group 3 output signals to 4.4 V.	Select this setting if connecting a 5 V ± 10 % power supply to pin 147.
	VCC3H	Adjust the level of group 3 output signals between 3.6 V and 3.0 V.	Select this setting if connecting a 3.3 V ± 0.3 V power supply to pin 147.
VCCB4	VCC5H	Adjust the level of group 4 output signals to 4.4 V.	Select this setting if connecting a 5 V ± 10 % power supply to pin 133.
	VCC3H	Adjust the level of group 4 output signals between 3.6 V and 3.0 V.	Select this setting if connecting a 3.3 V ± 0.3 V power supply to pin 133.
VCCB5	VCC5H	Adjust the level of group 5 output signals to 4.4 V.	Select this setting if connecting a 5 V ± 10 % power supply to the VCC3 pin.
	VCC3H	Adjust the level of group 5 output signals between 3.6 V and 3.0 V.	Select this setting if connecting a 3.3 V ± 0.3 V power supply to the VCC3 pin.

Figure 4.2 VCCB1 to VCCB5 Jumper Plug Settings

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For method to select each jumper plug, when the power supply connected to VCC3 is 3.3 V ± 0.3 V, VCCB5 should be set to VCC3H. In this case, the jumper plugs corresponding to the VCC5 pins that have a power supply with a voltage different to VCC3 (5 V ± 10 %) should be set to VCC5H. The jumpers for the pins with the same power supply voltage as VCC3 should be set to VCC3H. The following shows an example.

Example
VCC3 = 3.3 V
Pin 133 (VCC5) = 3.3 V
Pin 147 (VCC5) = 5 V
Pin 162 (VCC5) = 5 V
Pin 176 (VCC5) = 5 V

Jumper plug settings
VCCB1 = VCC5H
VCCB2 = VCC5H
VCCB3 = VCC5H
VCCB4 = VCC3H
VCCB1 = VCC3H

When the power supply connected to VCC3 is 5 V ± 10 %, VCCB5 should be set to VCC5H. In this case, the jumper plugs corresponding to the VCC5 pins that have a power supply with a voltage different to VCC3 (3.3 V ± 0.3 V) should be set to VCC3H. The jumpers for the pins with the same power supply voltage as VCC3 should be set to VCC5H. The following shows an example.

Example
VCC3 = 5 V
Pin 133 (VCC5) = 3.3 V
Pin 147 (VCC5) = 5 V
Pin 162 (VCC5) = 5 V
Pin 176 (VCC5) = 5 V

Jumper plug settings
VCCB1 = VCC5H
VCCB2 = VCC5H
VCCB3 = VCC5H
VCCB4 = VCC3H
VCCB1 = VCC5H

If connecting a single power supply (5 V ± 10 % or 3.3 V ± 0.3 V) to both VCC3 and VCC5, the unit will operate correctly regardless of the settings (VCC5H or VCC3H) .

4.2 Use of Pull-Up Resistor

■ Use of pull-up resistor

A 100 kΩ pull-up resistor is connected to pin 99 on the mass production MCU which connects to the VCC3 power supply.
The output signal from the header to this pin does not contain any component other than the pull-up. If this pull-up component is not required by the user system, please remove the resistor.

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5. Specifications

5.1 General specifications

Table 5.1 lists the general specifications of the header board.

Table 5.1 General Specifications

Item		Specification	Remarks
Product name (model no.)		LQFP-176P Header Type 3 (Model No.: MB2198-301)	—
User system power supply	VCC5 (note)	3.0 V to 5.5 V	Supplied for user system
	VCC3 (note)	3.0 V to 5.5 V	Supplied for user system
Header power supply	VCC5H	UVCC5+1 V (lower limit 4.0 V, upper limit 5.4 V)	Supplied for adapter Requires level shifter
	VCC3H	UVCC3+1 V (lower limit 4.0 V, upper limit 5.4 V)	Supplied for adapter Requires level shifter
Operating temperature and storage temperature		Operation: 5 °C to 40 °C Storage : 0 °C to 70 °C	No condensation
Operating humidity and storage humidity		Operation: 20 % to 80 % Storage: 20 % to 80 %	No condensation
External dimensions		150 mm (W) × 115 mm (D) × 23 mm (H)	—
Weight		84.8 g	—

Note : The operating voltage range may be differed for some evaluation MCUs.

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5.2 Function Specifications

Table 5.2 lists the function specifications of the header board.

Table 5.2 Function Specifications of Header Board

Item	Specification
Header board	Connects the user system and adapter.
Level shift function	The header board includes a level shifter used to convert the VCC5 level output signals of the MB91V460 or user system to the VCC3 level when using the MB91V460 (evaluation MCU: user I/O uses a single VCC5 power supply) to emulate an MB91461 or other MB91460 series mass production MCU (user I/O uses dual VCC5 and VCC3 power supplies) . The potential of level-shifted signals corresponding to VCC5 and VCC3 are in the range upper limit = 4.4 V, lower limit = 3 V (error for each power supply is ± 1 V or less) . Note that the circuit configuration means that I/O pins that expect VCC5 level signals will have a signal level of 4.4 V or less. The following shows an example of level shifting when VCC5 = 5 V and VCC3 = 3.3 V. <table><tr><th>MB91V460</th><th>Level Shift</th><th>Mass Production MCU</th></tr><tr><td>VCC5 I/O pin output = 5 V</td><td>→</td><td>VCC5 I/O pin input = 4.4 V</td></tr><tr><td>VCC5 I/O pin output = 5 V</td><td>→</td><td>VCC3 I/O pin input = 3.3 V</td></tr><tr><td>VCC5 I/O pin input = 4.4 V</td><td>←</td><td>VCC5 I/O pin output = 5 V</td></tr><tr><td>VCC5 I/O pin input = 3.3 V</td><td>←</td><td>VCC3 I/O pin output = 3.3 V</td></tr></table> The level shift function separates the power supply pins that drive the mass production MCU's I/O pins (VCC3 pin, pin 133 (VCC5) , pin 147 (VCC5) , pin 162 (VCC5) , and pin 176 (VCC5)) into five groups and sets up level shifting independently for each group. The settings are specified using the VCCB1 to VCCB5 jumper plugs. Figure 5.1 shows the make up of each group. Note that level shifting is not performed for pins 89 to 108 on the mass production MCU.
Power supply	Selects the power supply with different potential to VCC3 among the MB91461's VCC5 pins (pin 176, 162, 147, or 133) and connects it to the adapter Use the VCC5 jumper plug to set this selection.

Figure 5.1 Grouping for Level Shift Function

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5.3 Connector Specifications

■ YQPACK specifications

On the header board, the signals from the evaluation MCU mounted on the adapter are connected in accordance with the mass production MCU pin layout (same layout as YQPACK) via the two adapter interface connectors on the header board.

Refer to the data sheet or hardware manual of the mass production MCU for information about its pin layout.

Tables 5.3, 5.4, 5.5, and 5.6 list the pin layouts for the adapter board interface connectors.

Note :

- The "A row" in the table titles refers to the side of the connector that has the polarity marking. The "B row" refers to the other side.
- "O" in the CBTS column indicates that the signal goes from the YQPACK176SD to adapter interface connector 1 or 2 via the level shifter (SN74CBTS16211, Texas Instruments Incorporated) .
- VCC3 connects to the VCC3 pin on the mass production MCU.
- VCC5 connects to VCC5 pins on the mass production MCU (pin 133, 147, 162, or 176) . Use the VCC5 jumper plug on the header board to specify the pins to which to connect.

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Table 5.3 Adapter Interface Connector 1 (Row A)

Connector Pin No.	Mass Production MCU Pin No.	Pin Name	CBTS	Connector Pin No.	Mass Production MCU Pin No.	Pin Name	CBTS
A1	—	VCC5	—	A51	—	GND	—
A2	—	VCC5	—	A52	—	GND	—
A3	27	WR1X	○	A53	9	DACKX0	○
A4	26	WR0X	○	A54	8	DREQ0	○
A5	—	NC	—	A55	—	NC	—
A6	—	NC	—	A56	10	DEOP0	○
A7	24	BGRNTX	○	A57	—	NC	—
A8	25	RDX	○	A58	—	NC	—
A9	22	RDY	○	A59	—	NC	—
A10	23	BRQ	○	A60	—	NC	—
A11	—	GND	—	A61	—	GND	—
A12	—	GND	—	A62	—	GND	—
A13	18	CS1X	○	A63	169	P141	○
A14	19	CS0X	○	A64	168	P140	○
A15	16	CS3X	○	A65	171	P143	○
A16	17	CS2X	○	A66	170	P142	○
A17	—	NC	—	A67	—	NC	—
A18	15	CS4X	○	A68	—	NC	—
A19	—	NC	—	A69	—	NC	—
A20	—	NC	—	A70	—	NC	—
A21	—	GND	—	A71	—	GND	—
A22	—	GND	—	A72	—	GND	—
A23	29	ASX	○	A73	158	P151	○
A24	28	SYSCLK	○	A74	157	P150	○
A25	—	NC	—	A75	160	P153	○
A26	—	NC	—	A76	159	P152	○
A27	—	NC	—	A77	—	NC	—
A28	—	NC	—	A78	—	NC	—
A29	—	NC	—	A79	—	NC	—
A30	—	NC	—	A80	—	NC	—
A31	—	GND	—	A81	—	NC	—
A32	—	GND	—	A82	—	NC	—
A33	21	IOWRX	○	A83	—	NC	—
A34	20	IORDX	○	A84	—	NC	—
A35	—	NC	—	A85	—	GND	—
A36	—	NC	—	A86	—	NC	—
A37	—	NC	—	A87	—	NC	—
A38	—	NC	—	A88	—	NC	—
A39	—	NC	—	A89	—	NC	—
A40	—	NC	—	A90	—	NC	—
A41	—	GND	—	A91	82	NMIX	○
A42	—	GND	—	A92	—	NC	—
A43	—	NC	—	A93	—	NC	—
A44	—	NC	—	A94	—	VCC5	—
A45	—	NC	—	A95	—	GND	—
A46	—	NC	—	A96	131	INITX	○
A47	—	NC	—	A97	—	GND	—
A48	—	NC	—	A98	—	NC	—
A49	—	NC	—	A99	—	GND	—
A50	—	NC	—	A100	—	VCC5H	—

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Table 5.4 Adapter Interface Connector 1 (Row B)

Connector Pin No.	Mass Production MCU Pin No.	Pin Name	CBTS	Connector Pin No.	Mass Production MCU Pin No.	Pin Name	CBTS
B1	—	NC	—	B51	—	GND	—
B2	—	NC	—	B52	—	GND	—
B3	—	NC	—	B53	135	P211	○
B4	—	NC	—	B54	134	P210	○
B5	—	NC	—	B55	—	NC	—
B6	—	NC	—	B56	136	P212	○
B7	—	NC	—	B57	138	P215	○
B8	—	NC	—	B58	137	P214	○
B9	83	P167	○	B59	—	NC	—
B10	—	NC	—	B60	139	P216	○
B11	—	GND	—	B61	—	GND	—
B12	—	GND	—	B62	—	GND	—
B13	173	P171	○	B63	—	NC	—
B14	172	P170	○	B64	165	P220	○
B15	175	P173	○	B65	167	P223	○
B16	174	P172	○	B66	166	P222	○
B17	85	P175	○	B67	119	P225	○
B18	84	P174	○	B68	118	P224	○
B19	87	P177	○	B69	5	P227	○
B20	86	P176	○	B70	4	P226	○
B21	—	GND	—	B71	—	GND	—
B22	—	GND	—	B72	—	GND	—
B23	155	P181	○	B73	123	P231	○
B24	154	P180	○	B74	122	P230	○
B25	—	NC	—	B75	125	P233	○
B26	156	P182	○	B76	124	P232	○
B27	—	NC	—	B77	—	NC	—
B28	—	NC	—	B78	163	P234	○
B29	—	NC	—	B79	—	NC	—
B30	—	NC	—	B80	164	P236	○
B31	—	GND	—	B81	—	NC	—
B32	—	GND	—	B82	—	NC	—
B33	149	P191	○	B83	—	NC	—
B34	148	P190	○	B84	—	NC	—
B35	—	NC	—	B85	—	NC	—
B36	150	P192	○	B86	—	NC	—
B37	152	P195	○	B87	—	NC	—
B38	151	P194	○	B88	—	NC	—
B39	—	NC	—	B89	—	GND	—
B40	153	P196	○	B90	—	NC	—
B41	—	GND	—	B91	—	NC	—
B42	—	GND	—	B92	—	NC	—
B43	141	P201	○	B93	—	NC	—
B44	140	P200	○	B94	—	VCC5	—
B45	—	NC	—	B95	14/31	C *	—
B46	142	P202	○	B96	—	NC	—
B47	144	P205	○	B97	—	NC	—
B48	143	P204	○	B98	—	NC	—
B49	—	NC	—	B99	—	NC	—
B50	145	P206	○	B100	—	VCC3H	—

* : C (pin B95) is connected to pin 14 and pin 31 of the YQPACK176SD.

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Table 5.5 Adapter Interface Connector 2 (Row A)

Connector Pin No.	Mass Production MCU Pin No.	Pin Name	CBTS	Connector Pin No.	Mass Production MCU Pin No.	Pin Name	CBTS
A1	—	VCC3	—	A51	—	GND	—
A2	—	VCC3	—	A52	—	GND	—
A3	117	P241	○	A53	101	P291	—
A4	116	P240	○	A54	100	P290	—
A5	119	P243	○	A55	103	P293	—
A6	118	P242	○	A56	102	P292	—
A7	7	P245	○	A57	105	P295	—
A8	6	P244	○	A58	104	P294	—
A9	121	P247	○	A59	107	P297	—
A10	120	P246	○	A60	106	P296	—
A11	—	GND	—	A61	—	GND	—
A12	—	GND	—	A62	—	GND	—
A13	—	NC	—	A63	—	NC	—
A14	—	NC	—	A64	—	NC	—
A15	—	NC	—	A65	—	NC	—
A16	—	NC	—	A66	—	NC	—
A17	—	NC	—	A67	—	NC	—
A18	—	NC	—	A68	—	NC	—
A19	—	NC	—	A69	—	NC	—
A20	—	NC	—	A70	—	NC	—
A21	—	GND	—	A71	—	GND	—
A22	—	GND	—	A72	—	GND	—
A23	—	NC	—	A73	—	NC	—
A24	—	NC	—	A74	—	NC	—
A25	—	NC	—	A75	—	NC	—
A26	—	NC	—	A76	—	NC	—
A27	—	NC	—	A77	—	NC	—
A28	—	NC	—	A78	—	NC	—
A29	—	NC	—	A79	—	NC	—
A30	—	NC	—	A80	—	NC	—
A31	—	GND	—	A81	36	D16	○
A32	—	GND	—	A82	38	D18	○
A33	—	NC	—	A83	40	D20	○
A34	—	NC	—	A84	42	D22	○
A35	—	NC	—	A85	—	GND	—
A36	—	NC	—	A86	47	D25	○
A37	—	NC	—	A87	49	D27	○
A38	—	NC	—	A88	51	D29	○
A39	—	NC	—	A89	53	D31	○
A40	—	NC	—	A90	129	MD0	○
A41	—	GND	—	A91	127	MD2	○
A42	—	GND	—	A92	—	NC	—
A43	109	P281	○	A93	115	AVRH	—
A44	108	P280	—	A94	113	AVSS	—
A45	111	P283	○	A95	113	AVSS	—
A46	110	P282	○	A96	—	VCC3	—
A47	—	NC	—	A97	—	GND	—
A48	112	P284	○	A98	—	NC	—
A49	—	NC	—	A99	—	GND	—
A50	—	NC	—	A100	—	GND	—

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Table 5.6 Adapter Interface Connector 2 (Row B)

Connector Pin No.	Mass Production MCU Pin No.	Pin Name	CBTS	Connector Pin No.	Mass Production MCU Pin No.	Pin Name	CBTS
B1	—	NC	—	B51	63	A7	◯
B2	—	NC	—	B52	62	A6	◯
B3	—	NC	—	B53	64	A8	◯
B4	—	NC	—	B54	—	GND	—
B5	—	NC	—	B55	66	A10	◯
B6	—	NC	—	B56	65	A9	◯
B7	—	NC	—	B57	68	A12	◯
B8	—	NC	—	B58	67	A11	◯
B9	—	NC	—	B59	70	A14	◯
B10	—	NC	—	B60	69	A13	◯
B11	—	NC	—	B61	—	GND	—
B12	—	NC	—	B62	71	A15	◯
B13	—	GND	—	B63	75	A17	◯
B14	—	GND	—	B64	72	A16	◯
B15	—	NC	—	B65	77	A19	◯
B16	—	NC	—	B66	76	A18	◯
B17	—	NC	—	B67	79	A21	◯
B18	—	NC	—	B68	78	A20	◯
B19	—	NC	—	B69	81	A23	◯
B20	—	NC	—	B70	80	A22	◯
B21	—	NC	—	B71	—	NC	—
B22	—	NC	—	B72	—	GND	—
B23	—	GND	—	B73	—	NC	—
B24	—	GND	—	B74	—	NC	—
B25	—	NC	—	B75	—	NC	—
B26	—	NC	—	B76	—	NC	—
B27	—	NC	—	B77	—	NC	—
B28	—	NC	—	B78	—	NC	—
B29	—	NC	—	B79	—	GND	—
B30	—	NC	—	B80	—	NC	—
B31	—	NC	—	B81	37	D17	◯
B32	—	NC	—	B82	39	D19	◯
B33	—	GND	—	B83	41	D21	◯
B34	—	GND	—	B84	43	D23	◯
B35	—	NC	—	B85	46	D24	◯
B36	—	NC	—	B86	48	D26	◯
B37	—	NC	—	B87	50	D28	◯
B38	—	NC	—	B88	52	D30	◯
B39	—	NC	—	B89	—	GND	—
B40	—	NC	—	B90	128	MD1	◯
B41	—	NC	—	B91	—	NC	—
B42	—	NC	—	B92	—	NC	—
B43	—	GND	—	B93	114	AVCC3	—
B44	—	GND	—	B94	114	AVCC3	—
B45	55	A1	◯	B95	115	AVRH	—
B46	54	A0	◯	B96	—	VCC3	—
B47	59	A3	◯	B97	—	GND	—
B48	56	A2	◯	B98	33	X0	◯
B49	61	A5	◯	B99	—	GND	—
B50	60	A4	◯	B100	34	X1	◯

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