FUJITSU SEMICONDUCTOR

CM42-00410-2E

CONTROLLER MANUAL

F^2MC-16L/16/16H/16F

16-BIT MICROCONTROLLER

MB2140 Series EMULATOR SETUP MANUAL Windows Version

FUJITSU

F^2MC-16L/16/16H/16F

16-BIT MICROCONTROLLER

MB2140 Series EMULATOR SETUP MANUAL Windows Version

FUJITSU LIMITED

PREFACE

■ Safe usage

This manual contains important information on the safe use of this product. Always read this manual before using the product and always use in accordance with the instructions. In particular, take special note of the section entitled “Safety Precautions” and perform appropriate safety checks when using the product.

Also, please keep this manual available for reference when using the product.

■ Objectives and intended readership

This manual explains essential information about the emulator for the F^2MC-16L/16LX/16F microcontroller (MB2141A main unit and MB2145-507 emulation pod).

The manual is intended for engineers using the emulator to test and debug programs. The manual describes how to set up the emulator.

The manual is for the Windows version of the emulator-debugger.

■ Operating environment for this product

The operating environment for the product is temperature between 5 and 40°C and humidity between 30 and 80%. Avoid hot and humid conditions and do not allow condensation.

Do not block the ventilation holes or operate the product with the cover removed.

Place the product in as horizontal a position as possible. Do not use in conditions of severe vibration or in an environment that is dusty or contains explosive gas.

If transporting the product, such as when returning for repair, it is recommended that the packaging material supplied with the product be reused for protection.

Using the product in an environment that does not comply with the conditions described above may result in unexpected injury to the user or to people and property in the vicinity.

■ Trademarks

Microsoft, MS-DOS, and Windows are trademarks of Microsoft Corporation registered in the United States. and other countries.

IBM is a registered trademark of International Business Machines Corporation of the United States.

IBM PC/AT is a trademark of International Business Machines Corporation of the United States.The PC-9800 series are products of NEC Corp.

System names and product names that appear in this manual are the trademarks of their respective firms or organizations. They are not always indicated with™ and ®.

■ Safety Warnings

Important warnings items are given on the following pages.

Before using the emulation pod, read each warning and make a safety check.

⚠CAUTION

Indicates that improper use may cause minor or moderate injury, or may damage the emulation pod, connected equipment, data or other software resources, or other property.

Symbol	Description	Page
Electric shock 	There is a danger of electric shock. Always disconnect the power before connecting or disconnecting connectors, cables, the MCU, or other components.	19
*:Take care with the following when setting up the hardware. • To prevent damage to the equipment, always disconnect the power before connecting or disconnecting connectors, cables, the MCU, or other components. • To prevent broken wires, always grip the connector when disconnecting cables. • The probe cable has a very fine tip. To prevent damage, take care not to use excessive force when attaching or removing the probe.		

■ Configuration of this manual

This manual consists of the following four chapters and an appendix.

Chapter1 Product Checks

This chapter describes each of the products required to use the emulator.

Chapter2 Hardware Setup

This chapter describes how to connect the MB2140 to the host computer and user system.

Chapter3 Software Setput

This chapter describes how to setup the software environment on the host computer and emulator so as to use the emulator.

Chapter 4 Operation Procedures

This chapter describes the operation, setup, and other procedures required to use the emulator in practice.

Appendices

The appendices describe the treatment of user system pins required to operate the MCU, the setup procedure for the MB2140 series emulator (for the F^2MC-16L/16/16H/16F series), and the setup checklist.

■ Related manuals

Please refer also to the following manuals.

The manuals listed below are provided with their associated development tools.

MB2140 series manuals:

Name	Code	Comment
MB90600/700/700H/200 Series Emulator-Debugger Manual (Windows Version)	CM43-00301-X	Describes command operation and similar for the MB2140 series.
MB90600/700/700H/200 Series Emulator-Debugger Installation Manual (Windows Version)	SI3407-X	
2140 Main Unit User Manual	CM41-00410-X	Describes information about the associated product such as its structure and connections.
MB2145-507 Hardware Manual	CM41-00411-X	
10BASE-2 LAN Adaptor [MB2142-01] User Manual	CM41-00411-X	
10BASE-T LAN Adaptor [MB2142-02] User Manual	CM41-00412-X	
Parallel Communication Adaptor [MB2142-03] User Manual	CM41-00413-X	
MCU Hardware Manuals	CMXX-XXXXX-X	

1. The contents of this document are subject to change without notice. Customers are advised to consult with FUJITSU sales representatives before ordering.
2. The information and circuit diagrams in this document are presented as examples of semiconductor device applications, and are not intended to be incorporated in devices for actual use. Also, FUJITSU is unable to assume responsibility for infringement of any patent rights or other rights of third parties arising from the use of this information or circuit diagrams.
3. The contents of this document may not be reproduced or copied without the permission of FUJITSU LIMITED.
4. FUJITSU semiconductor devices are intended for use in standard applications (computers, office automation and other office equipments, industrial, communications, and measurement equipments, personal or household devices, etc.).
   CAUTION:
   Customers considering the use of our products in special applications where failure or abnormal operation may directly affect human lives or cause physical injury or property damage, or where extremely high levels of reliability are demanded (such as aerospace systems, atomic energy controls, sea floor repeaters, vehicle operating controls, medical devices for life support, etc.) are requested to consult with FUJITSU sales representatives before such use. The company will not be responsible for damages arising from such use without prior approval.
5. Any semiconductor devices have inherently a certain rate of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions.
6. If any products described in this document represent goods or technologies subject to certain restrictions on export under the Foreign Exchange and Foreign Trade Control Law of Japan, the prior authorization by Japanese government should be required for export of those products from Japan.

Reading This Manual

■ Page layout

As each section of this manual covers either one page or one spread, the contents of each section can be read without needing to turn pages.

A summary of each section appears below the section title. You can obtain a rough overview of the product by reading through these summaries.

As upper-level section titles are shown next to lower-level section titles, you can always know which section you are currently reading.

CONTENTS

FIGURES

TABLES

CHAPTER 1 Product Checks

This chapter describes each of the products required to use the emulator. Always read this chapter before using the MB2140 series emulator and check the product details.

1.1 Basic Structure of the Emulator

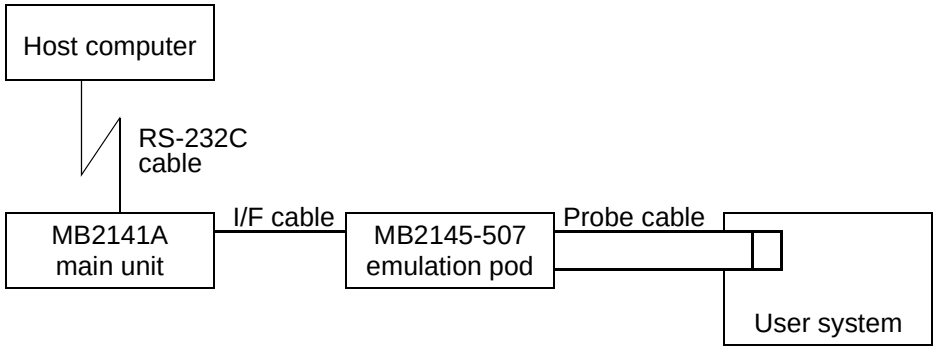
The following main components are required to use the emulator.

- **Main unit (MB2141A)**
- **Emulation pod (MB2145-507)**
- **Emulator-debugger (Windows version)**
- **Probe cable (MB2132-4XX)**
- **Evaluation MCU (MB90VXXX)**
- **Host computer**
- **RS-232C cable**
- **User system (including power supply)**

■ Basic Structure of the Emulator

Figure 1.1-1 "Basic Structure of the Emulator" shows the basic structure of the emulator.

Figure 1.1-1 Basic Structure of the Emulator



❍ Main unit (MB2141A)

The main unit controls the emulation pod. The following additional parts are included.

- AC power cable1 cable
- Pod interface cables (A, B, C)3 cables

❍ Emulation pod (MB2145-507)

The emulation pod controls the MCU.

❍ Emulator-debugger (Windows version)

The emulator-debugger is the software used to control the emulator hardware. The software is available on various media.

The following versions are available for the F^2MC-16L (MB90600), and F^2MC-16F (MB90200) series.

- 3.5 inch (1.2MB)SP3407H004
- 3.5 inch (1.44MB)SP3507H004

❍ Probe cable (MB2132-4XX)

Various probes are available to suit the different MCU packages. (A probe connection socket is required on the user system. The probe connection socket is obtained separately.)

❍ Evaluation MCU (MB90VXXX)

❍ Evaluation MCUs are available for the different MCU types.

❍ Host computer

The host computer (PC) controls the emulator via a communications link.

Types of PC and operating environments that can be used are as follows.

- PC mldels
  - Fujitsu:FMV series, FMR series
  - IBM:PC/AT series
  - NEC:PC9800 series
- Operating system
  - Microsoft Windows operating system version 3.1 (enhanced mode) and a version of Microsoft MS-DOS that supports Windows.
- Operating environment
  - CPU:80386 or higher (80486 or higher recommended)
  - Memory:8MB or more (16MB or more recommended)
  - Hard disk:3MB or more

❍ RS-232C cable

Select a straight-through type RS-232C cable that has the correct connector for your host computer.

❍ User system (including power supply)

■ How to Connect the Emulator

Use the following procedure for the basic emulator connection.

1. Host computer
2. Main unit
3. Emulation pod
4. Probe cable
5. User system

1.2 Optional Products for the Emulator

The products listed below are optional. Purchase as required.

■ Optional Products for the Emulator

❍ Communications adaptors*

- 10BASE-2 LAN adaptor (MB2142-01)
- 10BASE-T LAN adaptor (MB2142-02):Enables LAN communications.
- Parallel communications adaptor (MB2142-03):Enables high-speed downloading of object data via the Centronics interface (printer port). Includes a single interface cable.

*: Obtain LAN and printer port cables separately.

❍ External probe cable (MB2142-11)

Enables sampling of the high/low level of I/O pins on the user system.

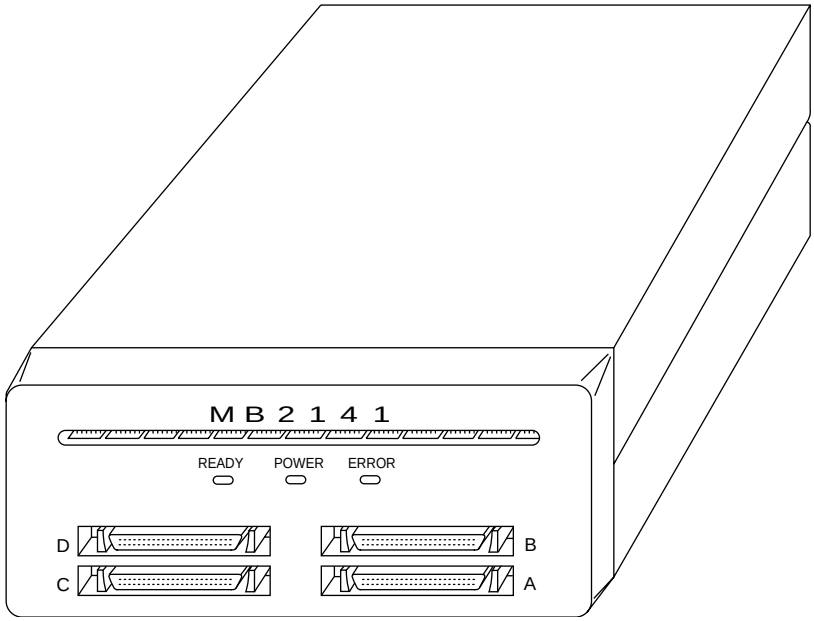
1.3 Main Unit (MB2141A) Summary

The main unit controls the emulation pod.
Note that the main unit cannot be used as an emulator on its own.

■ External Appearance of the Main Unit

Figure 1.3-1 "External Appearance of the Main Unit" shows the external appearance of the main unit.

Figure 1.3-1 External Appearance of the Main Unit

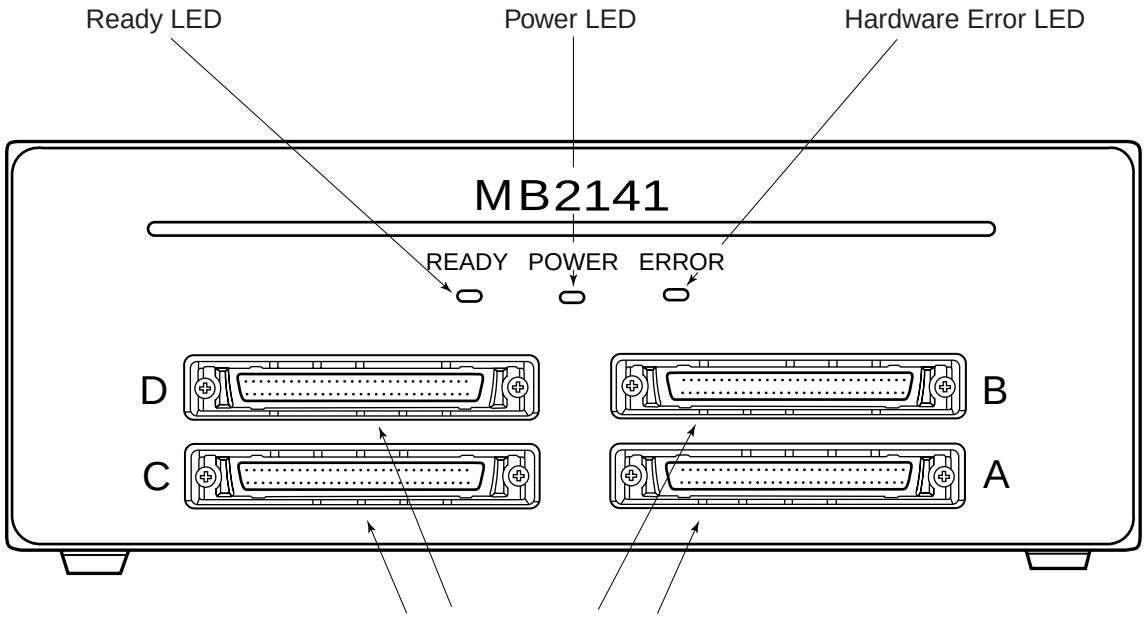


1.3.1 Names of the Main Unit Components (Front Panel)

Figure 1.3-2 "Front Panel of the Main Unit" shows the front panel of the main unit.

■ **Names of the Main Unit Components (Front Panel)**

Figure 1.3-2 Front Panel of the Main Unit



Connectors for pod interface cables A to D: Connectors used to connect the emulation pod. Note that connector D is for future use and is not used by the F2MC-16 series emulation pod.

Ready LED: Illuminates when the communication link between the main unit and host computer is established.

Power LED: Illuminates when the power is turned on.

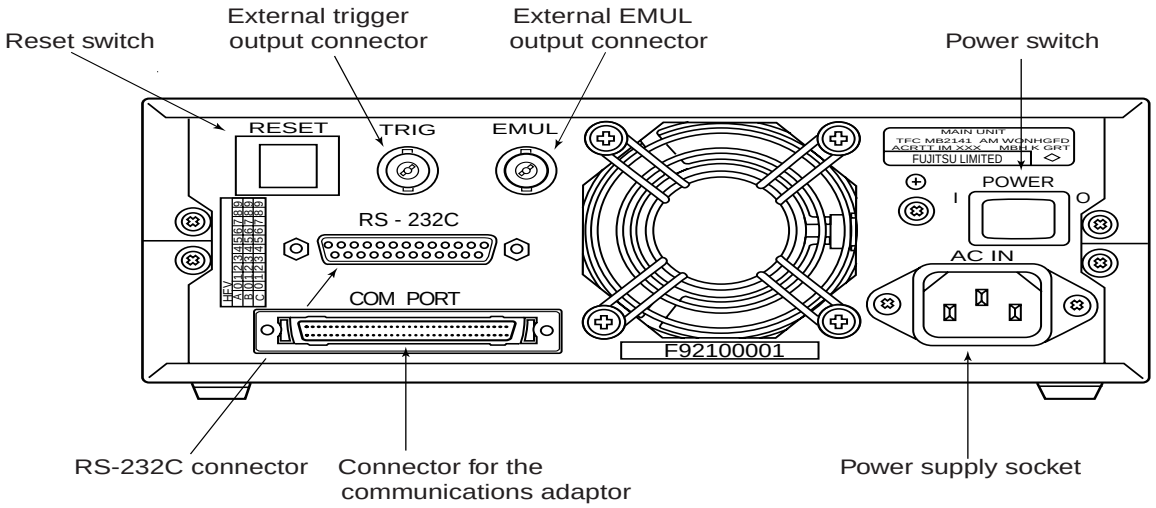
Hardware error LED: Illuminates if a fault occurs in the emulator hardware.

1.3.2 Names of the Main Unit Components (Rear Panel)

Figure 1.3-3 "Rear Panel of the Main Unit" shows the rear panel of the main unit.

■ **Names of the Main Unit Components (Rear Panel)**

Figure 1.3-3 Rear Panel of the Main Unit



Reset switch: The system reset switch. Pressing this switch initializes the emulator main unit and MCU.

External trigger output connector: Connector for connecting external measurement equipment (such as a logic analyzer). The emulator outputs an "H" (CMOS level) level for the duration of one bus cycle when the emulator event trigger conditions are satisfied. The signal can be used, for example, to synchronize external measurement equipment with the emulator.

External EMUL output connector: Connector for connecting external measurement equipment (such as a logic analyzer). The emulator outputs an "H" (CMOS level) level while the MCU is executing. The signal can be connected to a logic analyzer or other measurement equipment to mask sampling of the bus state while the MCU is halted (when an "L" level is output), for example.

Power switch: Switch for turning the power supply on or off. Set to the "1" side to turn on and to the "0" side to turn off.

RS-232C connector: Connector for the RS-232C cable.

Connector for the communications adaptor: Connector for the communications adaptor. Connect the LAN adaptor or parallel communications adaptor.

Power supply socket: Plug the AC power cable into this socket.

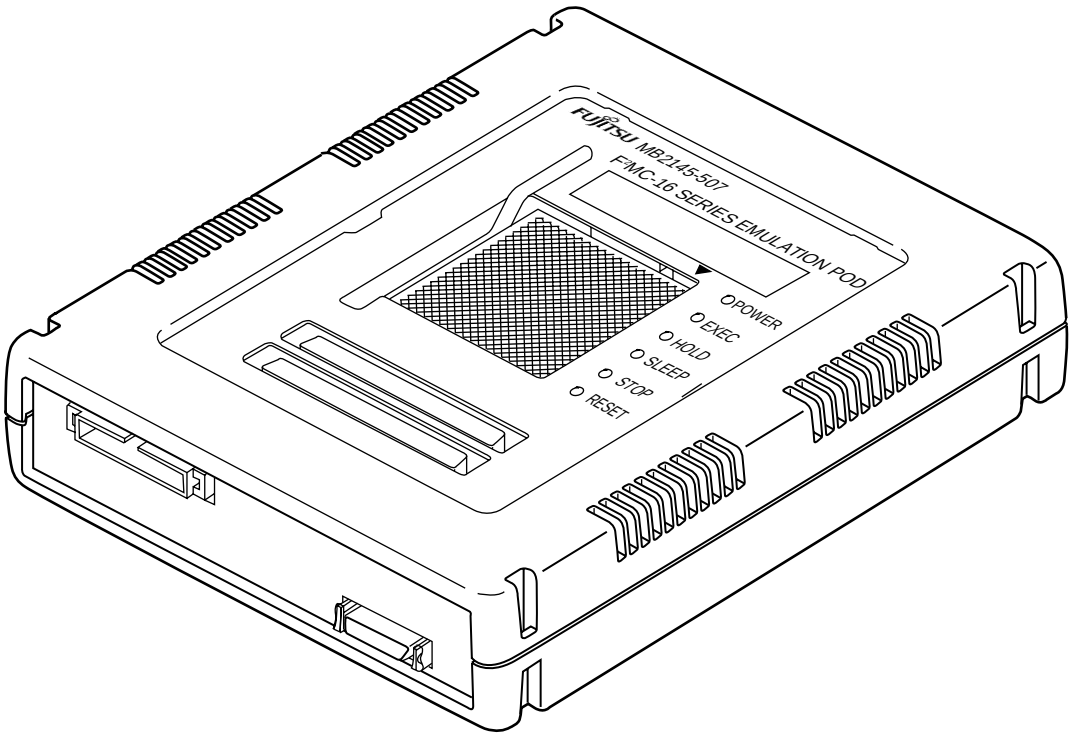
1.4 Emulation Pod (MB2145-507) Summary and Component Names

The emulation pod controls the MCU.
Note that the emulation pod cannot be used as an emulator on its own.

■ External Appearance of the Emulation Pod

Figure 1.4-1 "External Appearance of the Emulation Pod" shows the external appearance of the emulation pod.

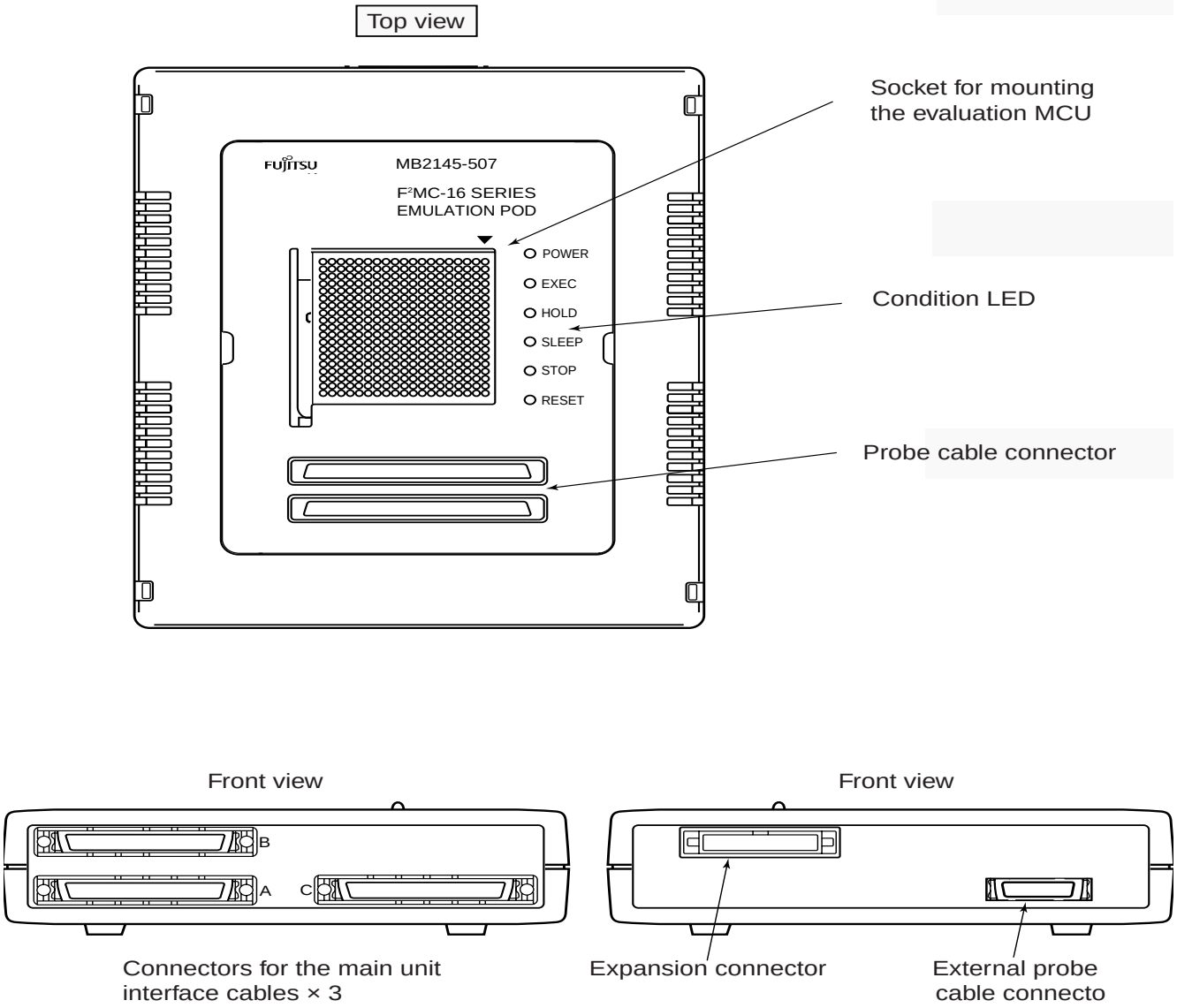
Figure 1.4-1 External Appearance of the Emulation Pod



■ Names of the Emulation Pod Components

Figure 1.4-2 "Names of the Emulation Pod Components" shows the names of the emulation pod components.

Figure 1.4-2 Names of the Emulation Pod Components



Socket for mounting the evaluation MCU: The socket for mounting the evaluation MCU.

Condition LED: Indicates the operating status of the MCU.

Probe cable connector: Connector for the probe cable

Connectors for the main unit interface cables: Connectors for connecting the main unit

Expansion connector: An expansion connector. Not normally used.

External probe cable connector: Connector for the external probe cable

1.5 Emulator-Debugger Summary (Windows Version)

The emulator-debugger is the software used to control the emulator hardware.

■ Emulator-Debugger Summary (Windows Version)

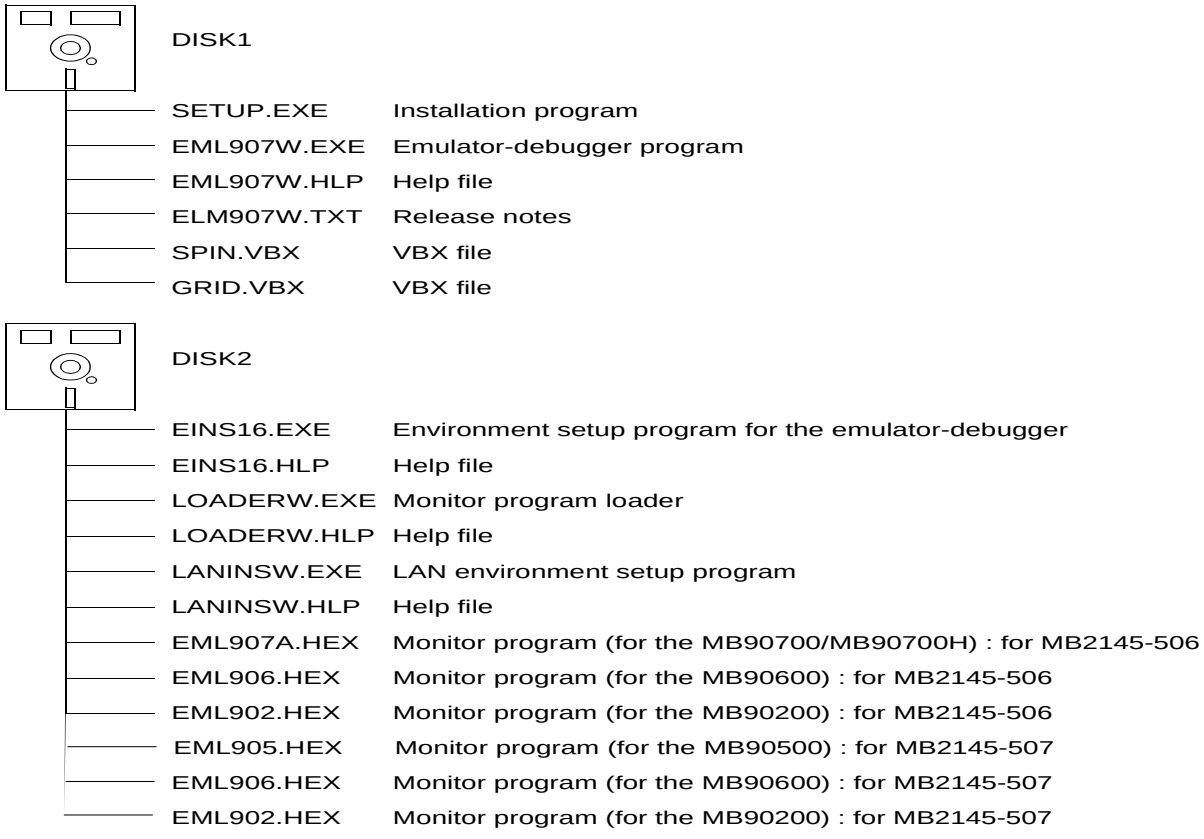
The Windows version consists of two floppy disks.

❍ For the F^{2}MC-16 (MB90700), F^{2}MC-16H (MB90700H), F^{2}MC-16L (MB90600), F^{2}MC-16LX (MB90500),and F^{2}MC-16F (MB90200) series

- 3.5 inch (1.2MB)SP3407H004
- 3.5 inch (1.44MB)SP3507H004

Figure 1.5-1 "Disk Contents" lists the files contained on the floppy disks. The files other than SETUP.EXE and EML907W.TXT are compressed.

Figure 1.5-1 Disk Contents



1.6 Probe Cable (MB2132-4XX) Summary

Various probe cables are available to suit the different MCU packages. Select the probe cable for the package you are using

■ Probe Cable (MB2132-4XX) Summary

Table 1.6-1 "Probe Cable Part Numbers" lists the part numbers for the probe cables.

Table 1.6-1 Probe Cable Part Numbers

Package	Probe Cable	Part Numbers
SH-DIP-64	MB90660 Series SH-DIP64 probe cable	MB2132-433
QFP-64	MB2132-433 + conversion adapter (manufactured by San Hayato)	MB2132-433, 64SD-64QF2-8L
QFP-80	QFP-80 probe cable 14 x 20 type	MB2132-454
SQFP-80	SQFP-80 probe cable (TQPACK version)	MB2132-444
QFP-100	QFP-100 probe cable	MB2132-457
	QFP-100 probe cable (NQPACK version)	MB2132-464
SQFP-100	MB2132-457 + conversion adapter (manufactured by San Hayato)	MB2132-457, 100QF-100SQF-16F
QFP-120	QFP-120 probe cable	MB2132-458
SQFP-120	SQFP-120 probe cable (TQPACK version)	MB2132-448
	SQFP-120 probe cable (NQPACK version)	MB2132-468
LQFP-120	LQFP-120 probe cable (NQPACK version)	MB2132-498

*:The IC socket required for connection to a user system is attached to each cable. The conversion adapter must be purchased as a separate item.

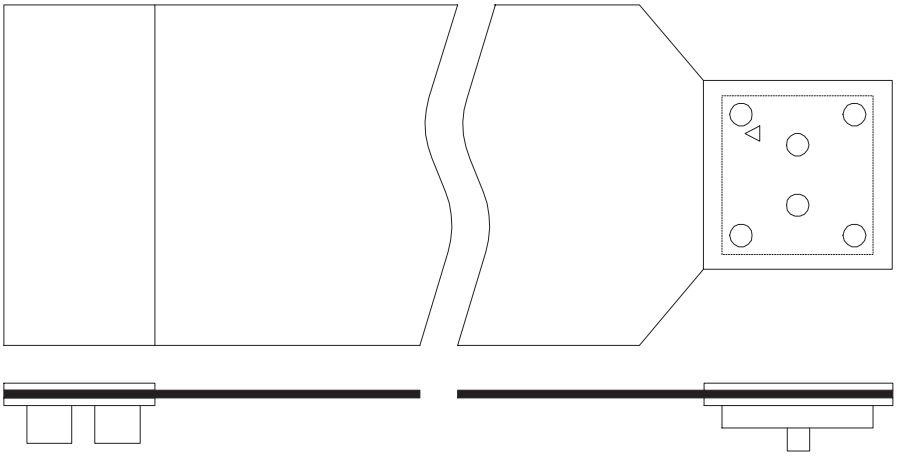
1.6.1 Probe Cable External Appearance

Figure 1.6-1 "IC Socket-Type (QFP Type) Probe Cable" to 1.Figure 1.6-4 "TQPACK-Type Probe Cable" show the external appearance of the probe cables for each package type.

■ Probe Cable External Appearance

Figure 1.6-1 "IC Socket-Type (QFP Type) Probe Cable" shows an IC socket type (QFP type) probe cable.

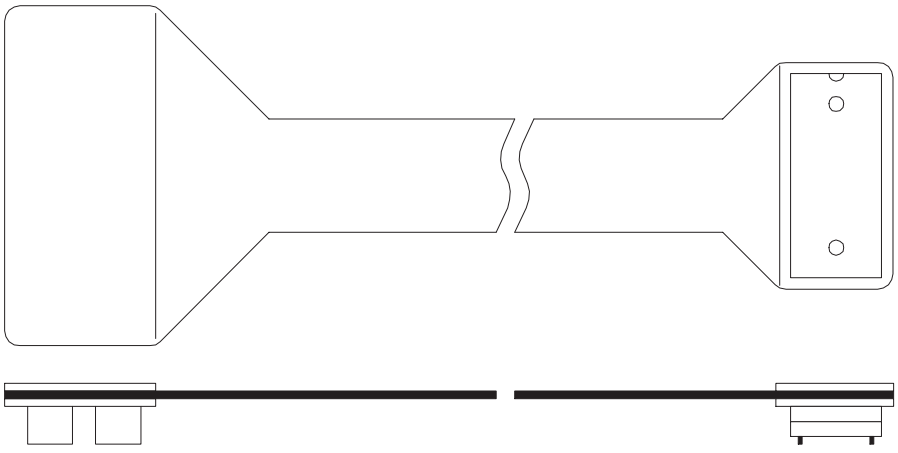
Figure 1.6-1 IC Socket-Type (QFP Type) Probe Cable



*:Corresponding probe cables: MB2132-454, MB2132-457

Figure 1.6-2 "IC Socket-Type (DIP Type) Probe Cable" shows an IC socket type (DIP type) probe cable.

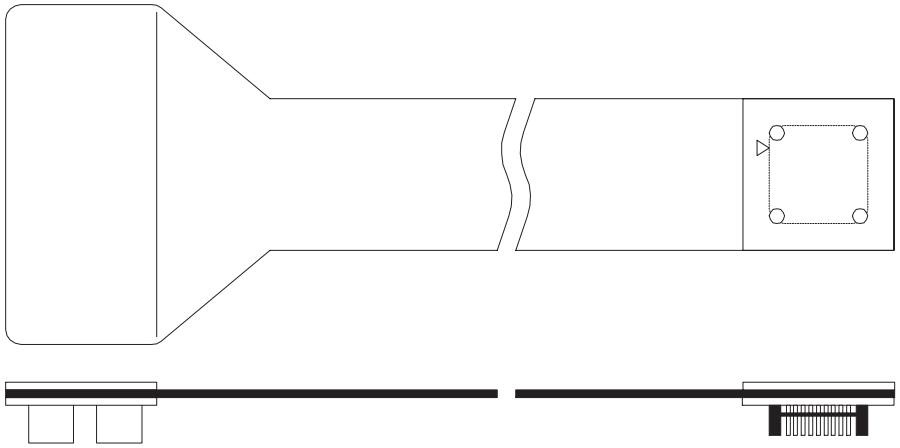
Figure 1.6-2 IC Socket-Type (DIP Type) Probe Cable



*:*Corresponding probe cable: MB2132-433*

Figure 1.6-3 "NQPACK-Type Probe Cable" shows an NQPACK type probe cable.

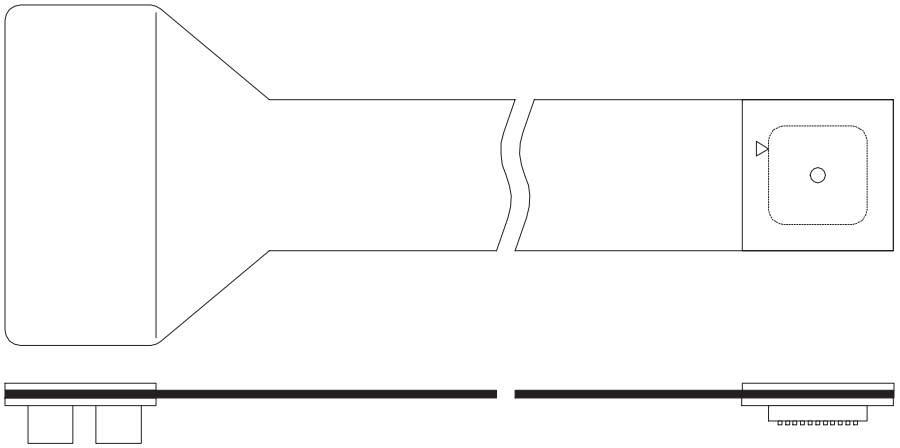
Figure 1.6-3 NQPACK-Type Probe Cable



*:Corresponding probe cables: MB2132-464, MB2132-468, MB2132-498

Figure 1.6-4 "TQPACK-Type Probe Cable" shows a TQPACK type probe cable.

Figure 1.6-4 TQPACK-Type Probe Cable



*:Corresponding probe cables: MB2132-444, MB2132-448

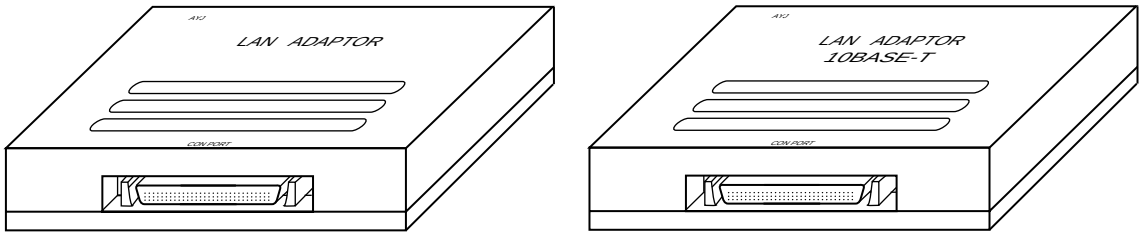
1.7 LAN Adaptor (MB2142-01/02) Summary and Component Names

Using the LAN adaptor to connect the emulator to a network containing the host computer enables the emulator to communicate with the host computer via the LAN. LAN adaptors are available for 10BASE-2 (MB2142-01) and 10BASE-T (MB2142-02).

■ External Appearance of the LAN Adaptors

Figure 1.7-1 "External Appearance of the LAN Adaptors" shows the external appearance of the LAN adaptors.

Figure 1.7-1 External Appearance of the LAN Adaptors

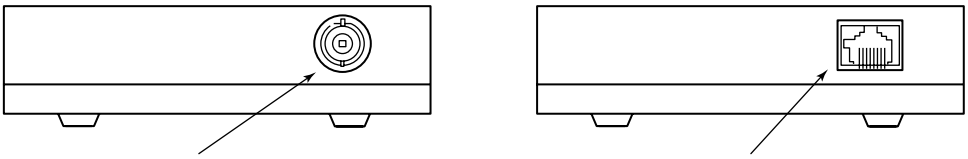


10BASE-2 adaptor　　10BASE-T adaptor

■ Names of the LAN Adaptor Components

Figure 1.7-2 "Rear View of the LAN Adaptor" shows the rear view and Figure 1.7-3 "Front View of the LAN Adaptor" shows the front view of the LAN Adaptor.

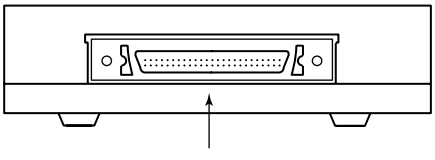
Figure 1.7-2 Rear View of the LAN Adaptor



LAN connector for coaxial cable(for 10BASE-2)

LAN connector for twisted pair cable(for 10BASE-T)

Figure 1.7-3 Front View of the LAN Adaptor



Interface connector

Interface connector: Connects to the main unit

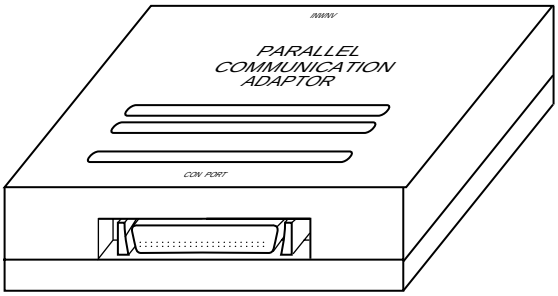
1.8 Parallel Communications Adaptor (MB2142-03) Summary and Component Names

Using the parallel communications adaptor (MB2142-03) to connect the emulator to the host computer enables the emulator to communicate with the host computer using parallel communications.

■ External Appearance of the Parallel Communications Adaptor

Figure 1.8-1 "External Appearance of the Parallel Communications Adaptor" shows the external appearance of the parallel communications adaptor.

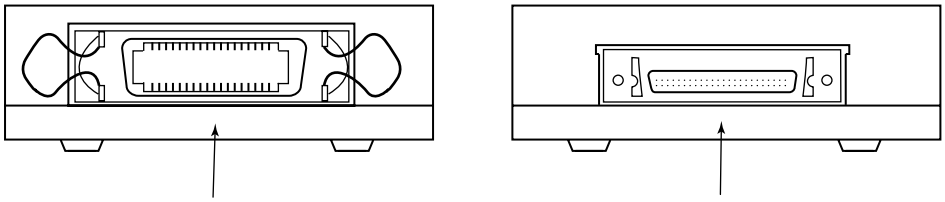
Figure 1.8-1 External Appearance of the Parallel Communications Adaptor



■ Names of the Parallel Communications Adaptor Components

Figure 1.8-2 "Front and Rear Views of the Parallel Communications Adaptor" shows the front and rear views of the parallel communications adaptor.

Figure 1.8-2 Front and Rear Views of the Parallel Communications Adaptor



Parallel communications connector
Rear view

Interface connector
Front view

Parallel communications connector: Connects to the host compurer

Interface connector: Connects to the main unit

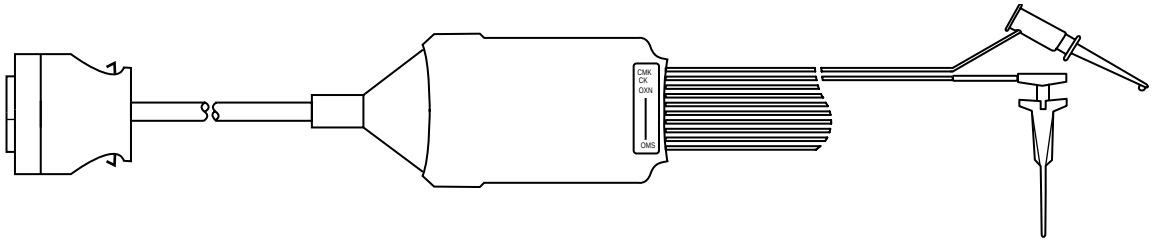
1.9 External Probe Cable (MB2142-11) Summary

The external probe cable (MB2142-11) enables sampling of the high/low level of I/O pins on the user system.
The probe also enables external signals to be used as event trigger conditions.

■ External Appearance of the External Probe Cable

Figure 1.9-1 "External Appearance of the External Probe Cable" shows the external appearance of the external probe cable.

Figure 1.9-1 External Appearance of the External Probe Cable



CHAPTER 2 Hardware Setup

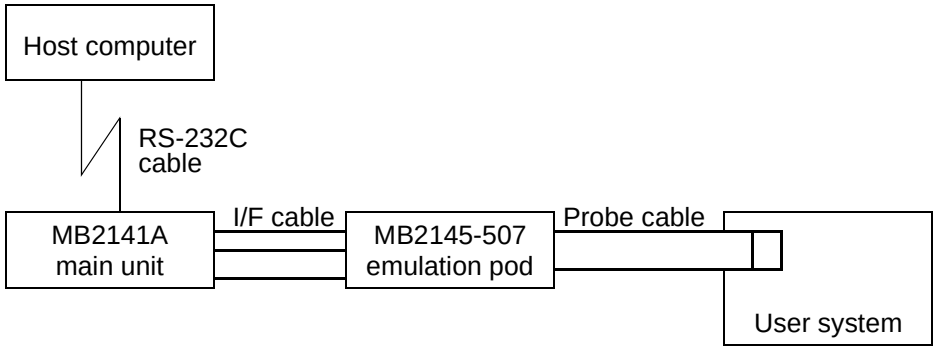
This chapter describes how to connect the MB2140 to the host computer and user system.

2.1 System Structure (Basic Structure)

Figure 2.1-1 "Outline of the System Structure" shows an outline of the basic structure of the system. The figure shows the minimum configuration for using the emulator.

■ System Structure (Basic Structure)

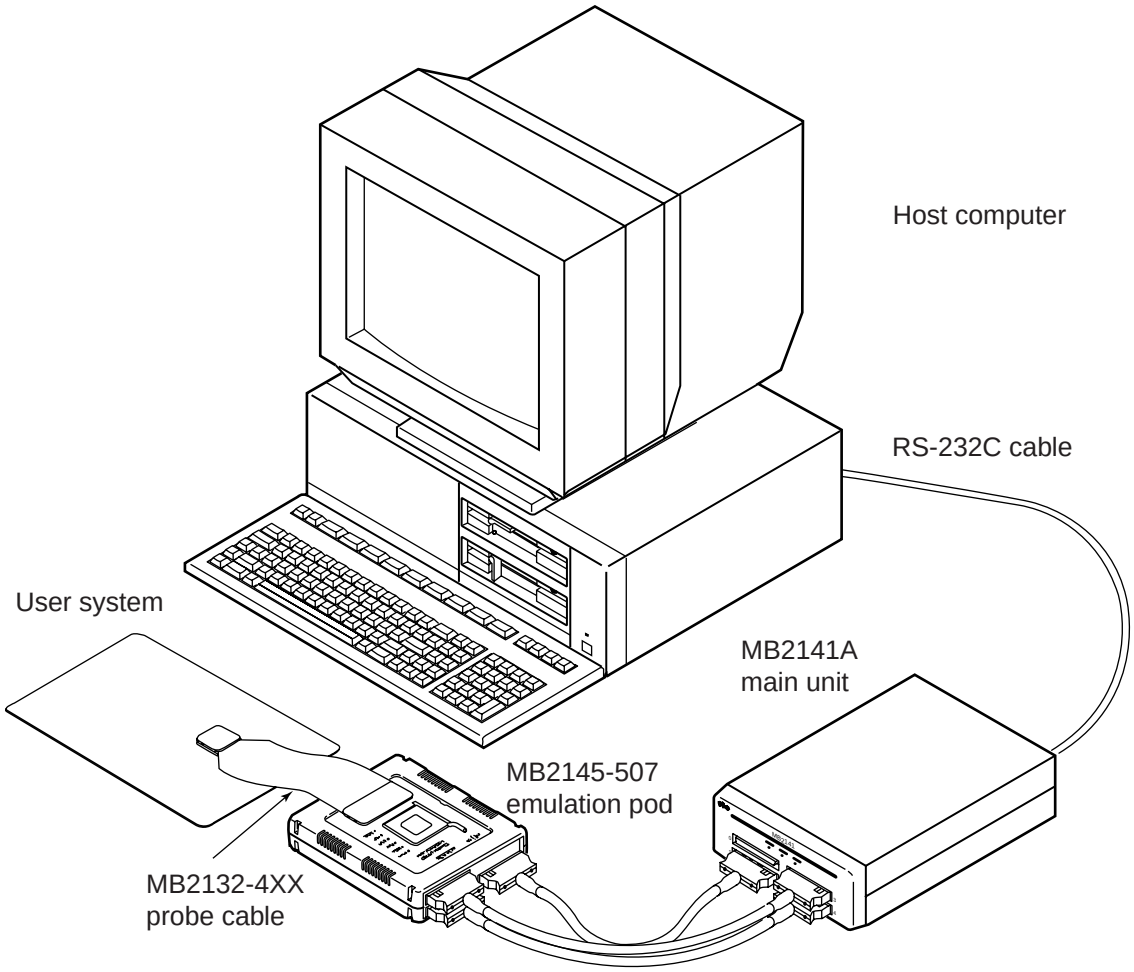
Figure 2.1-1 Outline of the System Structure



■ Example of the Basic System Structure

Figure 2.1-2 "Example of the Basic System Structure" shows an example of the basic system structure.

Figure 2.1-2 Example of the Basic System Structure

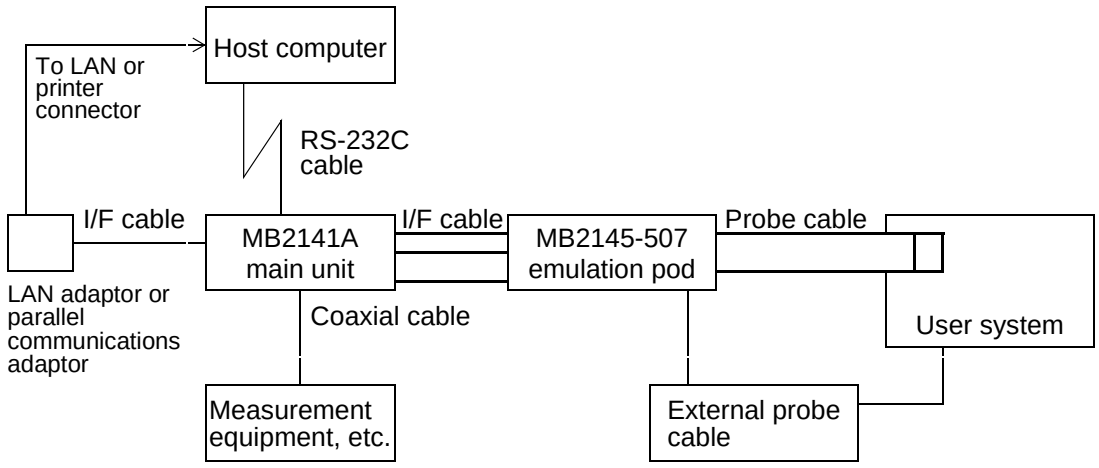


2.2 System Structure (Optional Connections)

Figure 2.2-1 "Outline of the Optional Connections" shows an outline of the optional connections. The items inside the dotted line in the figure are options. Purchase the options as required.

■ System Structure (Optional Connections)

Figure 2.2-1 Outline of the Optional Connections



2.3 Connecting the Host Computer and Main Unit

Use an RS-232C cable (straight-through type) to connect the host computer and main unit.

■ Connecting the Host Computer and Main Unit

Figure 2.3-1 "Connection Between the Host Computer and Main Unit" shows the connection between the host computer and main unit. The RS-232C cable used for the connection is a straight-through type.

Table 2.3-1 "RS-232C Cables for Different PCs" lists the three types of RS-232C cable that are available from Fujitsu to suit different host computers (RS-232C connector shape).

Figure 2.3-1 Connection Between the Host Computer and Main Unit

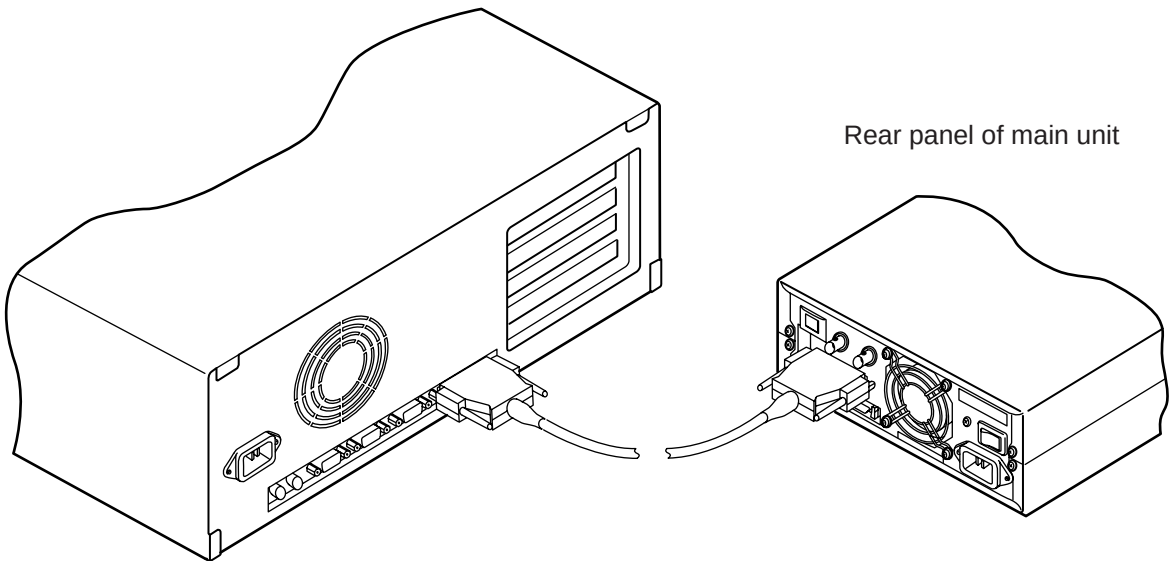


Table 2.3-1 RS-232C Cables for Different PCs

PC Type	Part Number	Cable Specifications
FMR Series PC-9800 Series	MB2124-03	D-SUB male 25-pin/male 25-pin
IBM-PC/XT	MB2124-04	D-SUB male 25-pin/female 25-pin
FMV Series IBM-PC/AT	MB2124-05	D-SUB male 25-pin/female 9-pin

2.4 Connecting the Main Unit and Emulation Pod

The main unit and emulation pod are connected by three interface cables.

■ Connecting the Main Unit and Emulation Pod

Figure 2.4-1 "Connection Between the Main Unit and Emulation Pod" shows the connection between the main unit and emulation pod.

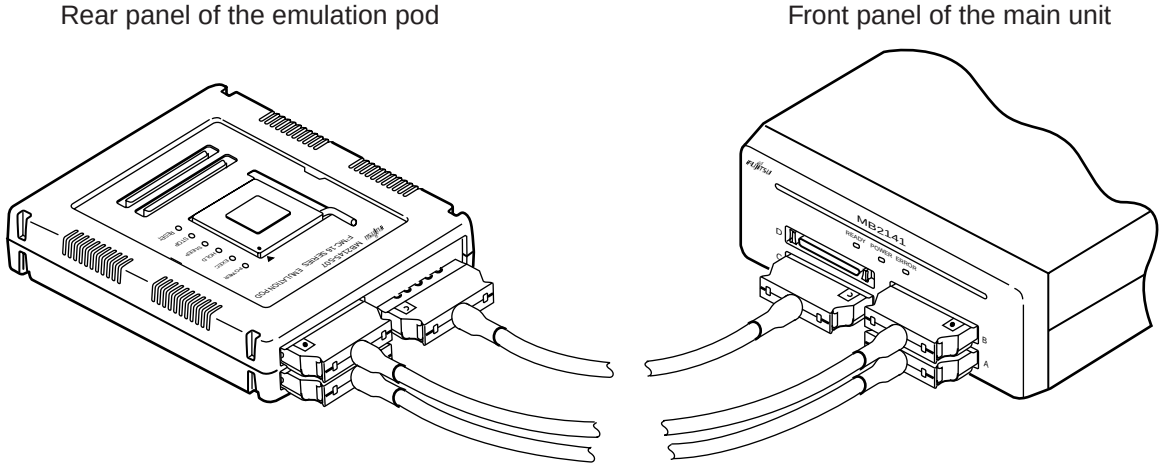
Guides are provided to prevent insertion of pod interface cables A, B, and C into the incorrect connectors on the main unit or emulation pod.

Before connecting the cables, check that the letter (A, B, or C) on the cable matches the letter on the main unit and emulation pod connectors.

The connectors on the main unit and emulation pod have a locking mechanism that engages when the cable is connected. Always insert the cables firmly until the lock engages.

Similarly, press the lock levers on each side of the pod interface cable connectors when disconnecting the cables.

Figure 2.4-1 Connection Between the Main Unit and Emulation Pod



2.5 Setting Up the Emulation Pod

The emulation pod requires the following setup.

- **Mounting the crystal for the MCU clock**
- **Mounting the evaluation MCU**

■ Setting Up the Emulation Pod

❍ Mounting the crystal for the MCU clock

As the oscillation from the crystal mounted on the user system is not available, an equivalent crystal and capacitor must be mounted in the crystal area of the emulation pod and a DIP switch set.

❍ Mounting the evaluation MCU

Mount the evaluation MCU in the IC socket. Evaluation MCUs are available for each series.

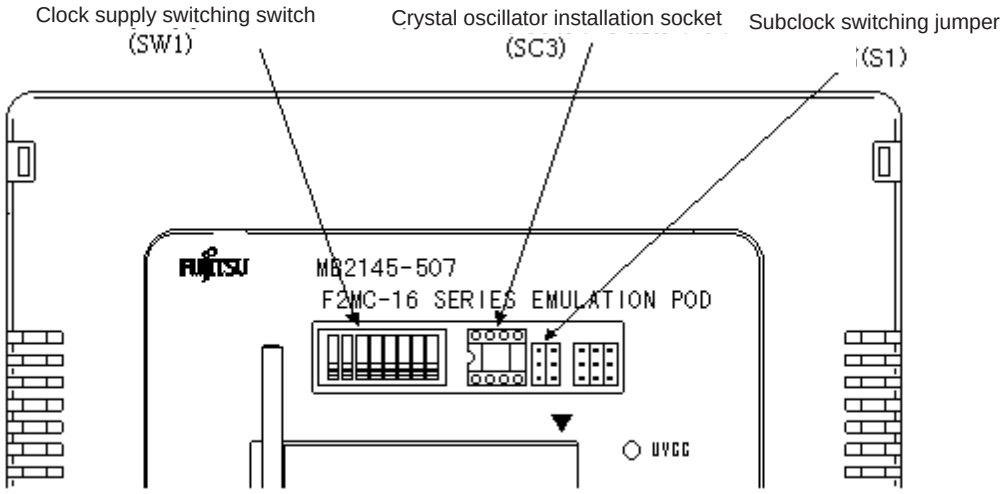
2.5.1 MCU Clock Supply

To supply the MCU clock, install a crystal oscillator and capacitors in the crystal assemble socket (SC3) on the top of the emulation pod.
Select the clock supply method with the clock switching switch (SW1) and subclock switching jumper (S1).

■ MCU Clock Supply

Figure 2.5-1 "each part" shows each part.

Figure 2.5-1 each part



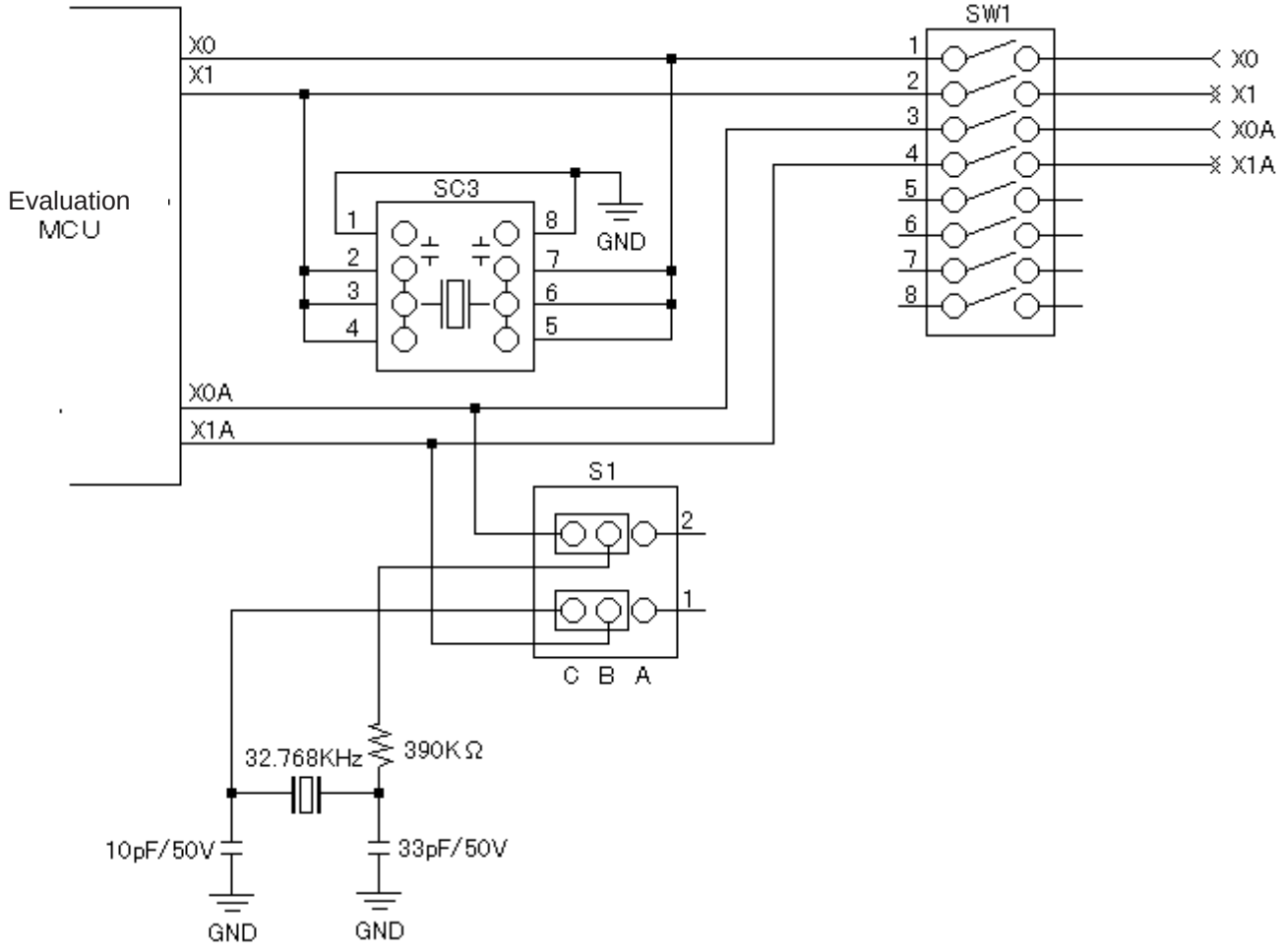
Top of the emulation pod

2.5.2 Clock Circuit

Figure 2.5-2 "Clock and Peripheral Circuits" shows the circuit diagram of the clock circuit.

■ **Clock Circuit**

Figure 2.5-2 Clock and Peripheral Circuits



2.5.3 Clock Circuit

Table 2.5-1 "Clock Selection Switch (SW1) Settings" shows how to set the clock switching switch (SW1) and jumper (S1).

■ **Clock Circuit**

Table 2.5-1 Clock Selection Switch (SW1) Settings

Clock Supply Type		SW1 setting				S1 setting	Remarks
Main clock	**Sub-clock**	1	2	3	4		
Crystal area	Supplied	OFF	OFF	OFF	OFF	Connect B1 and C1, and B2 and C2	*1
	Not supplied	OFF	OFF	ON	ON	Connect A1 and B1, and A2 and B2	*3
User system	Supplied	ON	ON	OFF	OFF	Connect B1 and C1, and B2 and C2	*1, *2
	Not supplied	ON	ON	ON	ON	Connect A1 and B1, and A2 and B2	*2, *3

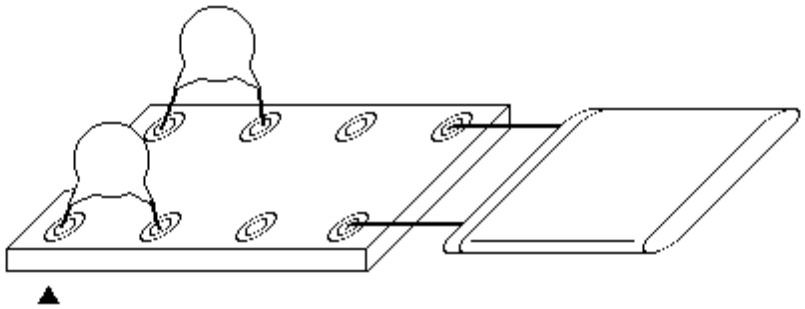
*1:The sub-clock uses the 32.768KHz crystal in the emulation pod.
*2:Oscillation in which a crystal oscillator is installed in the user system is not supported.To supply the clock from the user system, provide an oscillation circuit in the user system and supply the clock through the CMOS buffer or with a similar circuit.
*3:Always use this setting for MCUs that do not have a sub-clock.

2.5.4 Mounting the Crystal and Capacitor

Figure 2.5-3 "Installing a crystal oscillator and capacitors" shows an example of mounting the crystal and capacitor.

■ **Mounting the Crystal and Capacitor**

Figure 2.5-3 Installing a crystal oscillator and capacitors



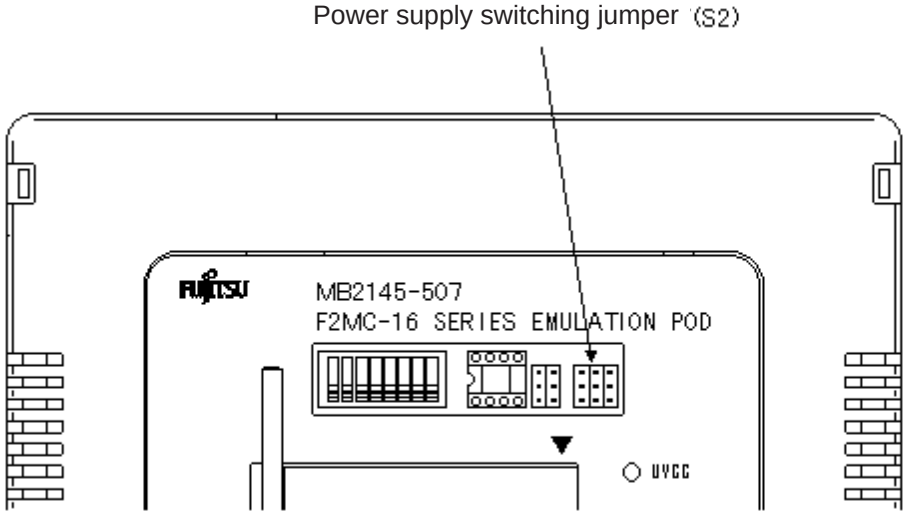
2.5.5 Power Supply to the Evaluation MCU

Power is supplied to the evaluation MCU with the power supply switching jumper (S2).

■ **Power Supply to the Evaluation MCU**

Figure 2.5-4 "individual parts" shows the individual parts.

Figure 2.5-4 individual parts



Emulation pod top

2.5.6 Setting the Power Supply Switching Jumper

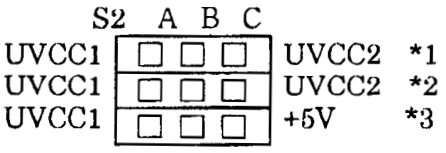
Figure 2.5-5 "Power Supply Switching Jumper" shows the power supply switching jumper. Table 2.5.6a lists the settings for supplying power used specifically by the emulator.
Table 2.5-2 "Switching the Emulator-Specific Power Supply Terminal" lists the settings for supplying user port power.

■ Power Supply Switching Jumper

Set the power supply switching jumper depending on whether an emulator-specific power supply terminal (*1) of the evaluation MCU is provided.

*1:Ask the Fujitsu Sales Division for product types having an emulator-specific power supply.

Figure 2.5-5 Power Supply Switching Jumper



*1 : Power supply switching jumper for user port 0
*2 : Power supply switching jumper for user port 1
*3 : Switching jumper for emulator-specific power supply terminal

■ Switching the Emulator-Specific Power Supply Terminal

Table 2.5-2 Switching the Emulator-Specific Power Supply Terminal

Emulator-specific power supply terminal	S2 setting
Installed	Connect B and C (+5 V side)
Not installed	Connect A and B (UVCC1 side)

■ Switching the User Port Power Supply

Set the port power supply switching jumper for the appropriate user port power supply (*1) if the evaluation MCU has the two-system user power supply terminal.

*1: Only user ports 0 and 1 are supported.

Table 2.5-3 Jumper Setting for Switching the User Port Power Supply

User power supply system	S2 setting	
	Port 0 switching jumper (*1)	Port 1 switching jumper (*1)
System 1	Connect A and B (UVCC1 side)	Connect A and B (UVCC1 side)
System 2	Connect on the power supply side (*2)	Connect on the power supply side (*2)

*1: See Figure 2.5-5 "Power Supply Switching Jumper" for the jumper terminal positions.
*2: Connect on the VCC side for the port power supply.
Example: The power supply for port 0 is UVCC1, and that for port 1 is UVCC2.
Port 0 switching jumper Connect A and B (UVCC1 side)
Port 1 switching jumper Connect B and C (UVCC2 side)

2.5.7 Switching Terminal C

Set the terminal C switching switch depending on whether the evaluation MCU has a terminal C.

■ Switching Terminal C

Set the terminal C switching switch depending on whether the evaluation MCU has a terminal C.

Figure 2.5-6 "Terminal C Processing Circuit" shows the terminal C processing circuit. Table 2.5-4 "Setting the terminal C Switching Switch" lists the settings for the terminal C switching switch.

Figure 2.5-6 Terminal C Processing Circuit

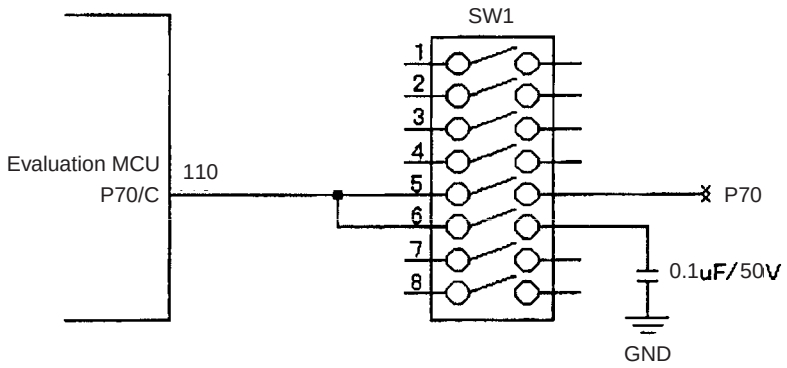


Table 2.5-4 Setting the terminal C Switching Switch

Terminal C function	SW1 setting	
	5	6
Provided	OFF	ON
Not provided	ON	OFF

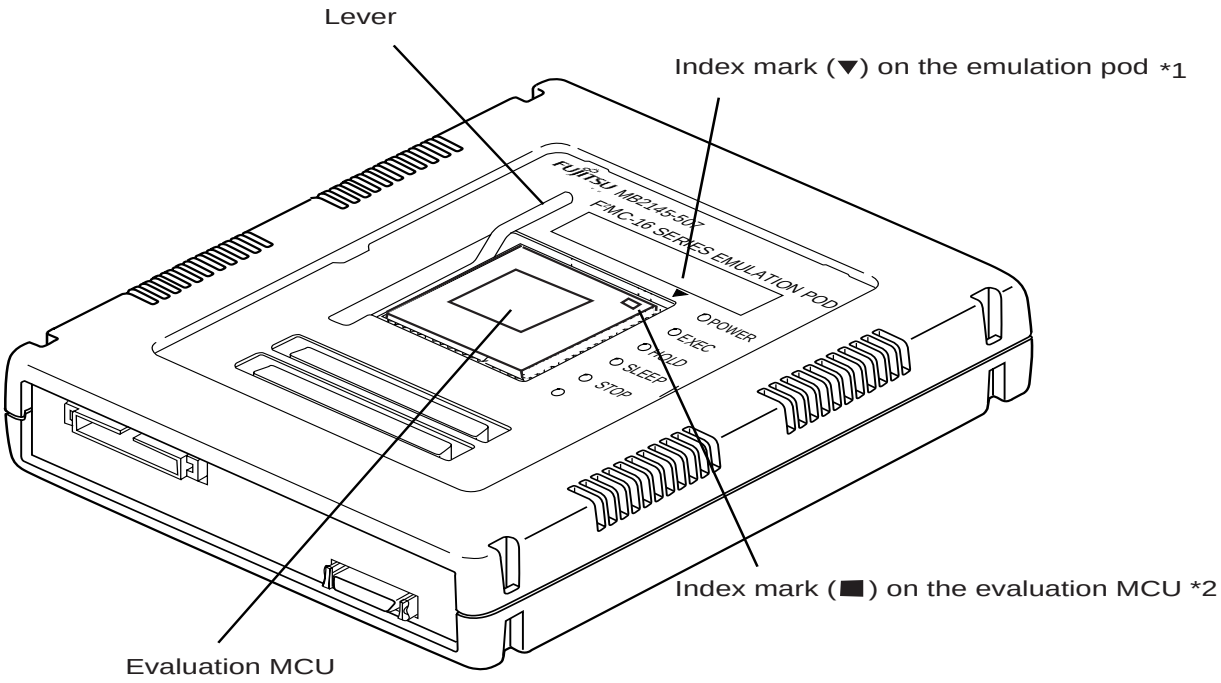
2.5.8 Assembling the Evaluation MCU

Install the evaluation MCU after installing the cover of the emulation pod.
Lift up the lever on the emulation pod. Insert the evaluation MCU in the IC socket, aligning the index mark (*1) on the evaluation MCU with the index mark (*2) on the emulation pod. Set the lever until it snaps into place.

■ Installing the Evaluation MCU

Figure 2.5-7 "Installing the Evaluation MCU" shows installation of the evaluation MCU.

Figure 2.5-7 Installing the Evaluation MCU



■ Installation Procedure for the Evaluation MCU

Install the evaluation MCU according to the following procedure.

1. Lift the lever up.
2. Insert the evaluation MCU in the IC socket, aligning the index mark (*1) on the evaluation MCU with the index mark (*2) on the emulation pod.
3. Set the lever until it snaps into place.

2.6 Connecting the Emulation Pod to a User System

The emulation pod is connected to a user system with a probe cable. The probe cable corresponds to the MCU package that will be used, as listed in Table 2.6-1 "Probe Cables".

■ Connecting the Emulation Pod and a User System

Table 2.6-1 Probe Cables

Package	Probe cable name	Probe cable type
SH-DIP-64	MB90660 Series SH-DIP64 probe cable	MB2132-433
QFP-64	MB2132-433 + conversion adapter (manufactured by San Hayato)	MB2132-433, 64SD-64QF2-8L
QFP-80	QFP-80 probe cable 14 x 20 type	MB2132-454
SQFP-80	SQFP-80 probe cable (TQPACK version)	MB2132-444
QFP-100	QFP-100 probe cable	MB2132-457
	QFP-100 probe cable (NQPACK version)	MB2132-464
SQFP-100	MB2132-457 + conversion adapter (manufactured by San Hayato)	MB2132-457, 100QF-100SQF-16F
QFP-120	QFP-120 probe cable	MB2132-458
SQFP-120	SQFP-120 probe cable (TQPACK version)	MB2132-448
	SQFP-120 probe cable (NQPACK version)	MB2132-468
LQFP-120	LQFP-120 probe cable (NQPACK version)	MB2132-498

The method of connection to a user system depends on the probe cable that will be used. See the description of the probe cable that will be used for setup.

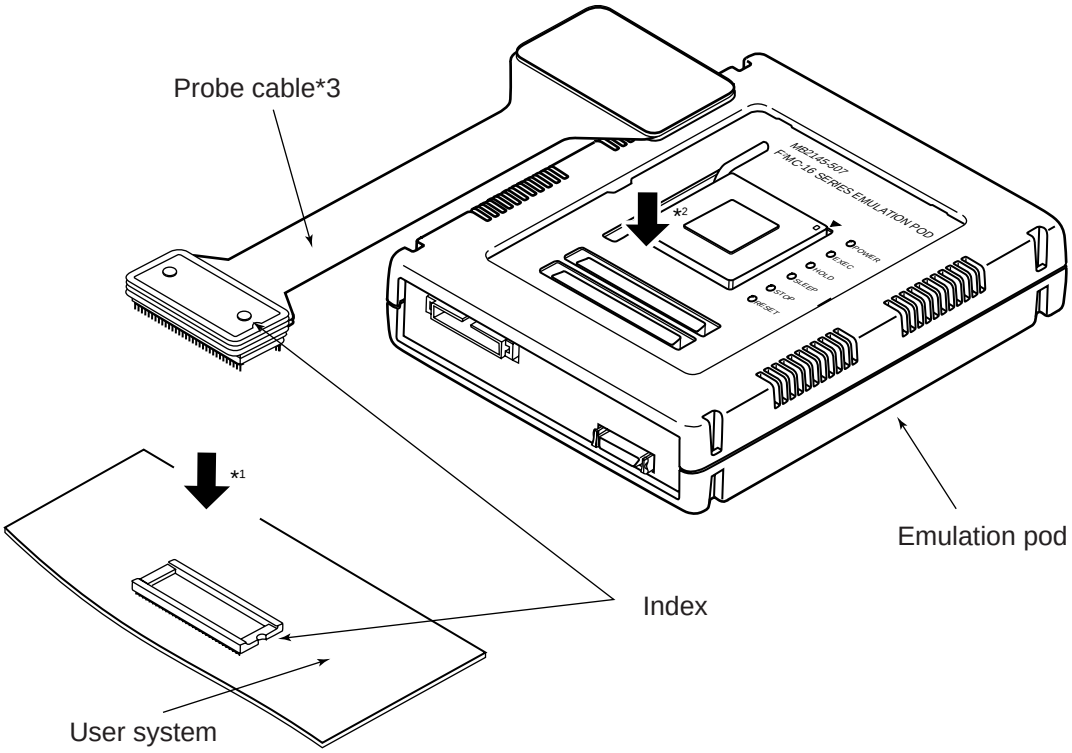
- When the SH-DIP-64 package is used:Go to Section 2.6.1 "IC Socket (DIP) Type Probe Cable".
- When the QFP-80 package or QFP-100 package is used:Go to Section 2.6.2 "IC Socket (QFP) Type Probe Cable".
- When the SQFP-80 package or SQFP-120 package is used:Go to Section2.6.3 "TQPACK Type Probe Cable".
- When the QFP-100 package, SQFP-120 package, or LQFP-120 package is used:Go to Section2.6.4 "NQPACK Type Probe Cable"..
- When the QFP-64 package is used:Go to Section 2.6.5 "NQPACK Type Probe Cable".
- When the SQFP-100 package is used:Go to Section 2.6.6 "NQPACK Type Probe Cable"

2.6.1 IC Socket (DIP) Type Probe Cable

Figure 2.6.1a shows the connection method of an IC socket (DIP) type probe cable.

■ Connecting an IC Socket (DIP) Type Probe Cable

Figure 2.6-1 Connecting an IC Socket Type (DIP) Probe Cable



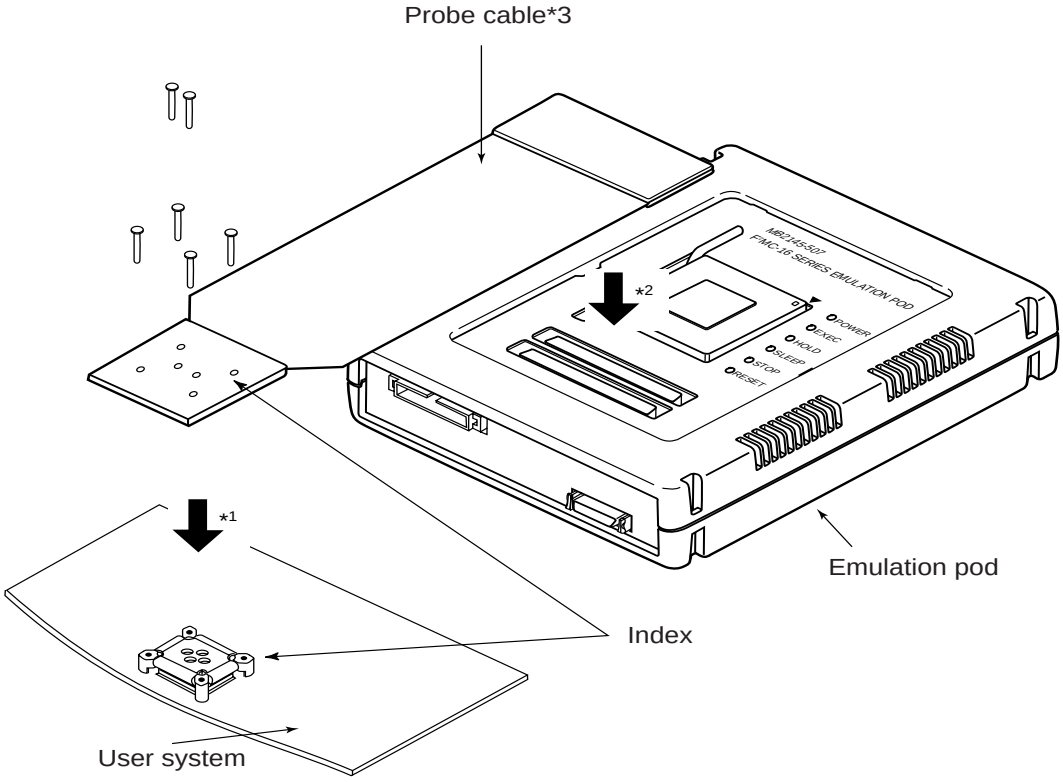
*1: Fully insert the probe cable into the socket, aligning the index (semicircular notch mark) at the end of the probe cable with the index (semicircular notch) on the socket.
*2: Insert the probe cable into the connector on the top of the emulation pod.
*3: The probe cable is not flexible enough to handle horizontal stress. Arrange the emulation pod and user system so that excessive stress is not applied to the probe cable.

2.6.2 IC Socket (QFP) Type Probe Cable

Figure 2.6-2 "Connecting an IC Socket (QFP) Type Probe Cable" shows the connection method for an IC socket (QFP) type probe cable.

■ **Connecting an IC Socket (QFP) Type Probe Cable**

Figure 2.6-2 Connecting an IC Socket (QFP) Type Probe Cable



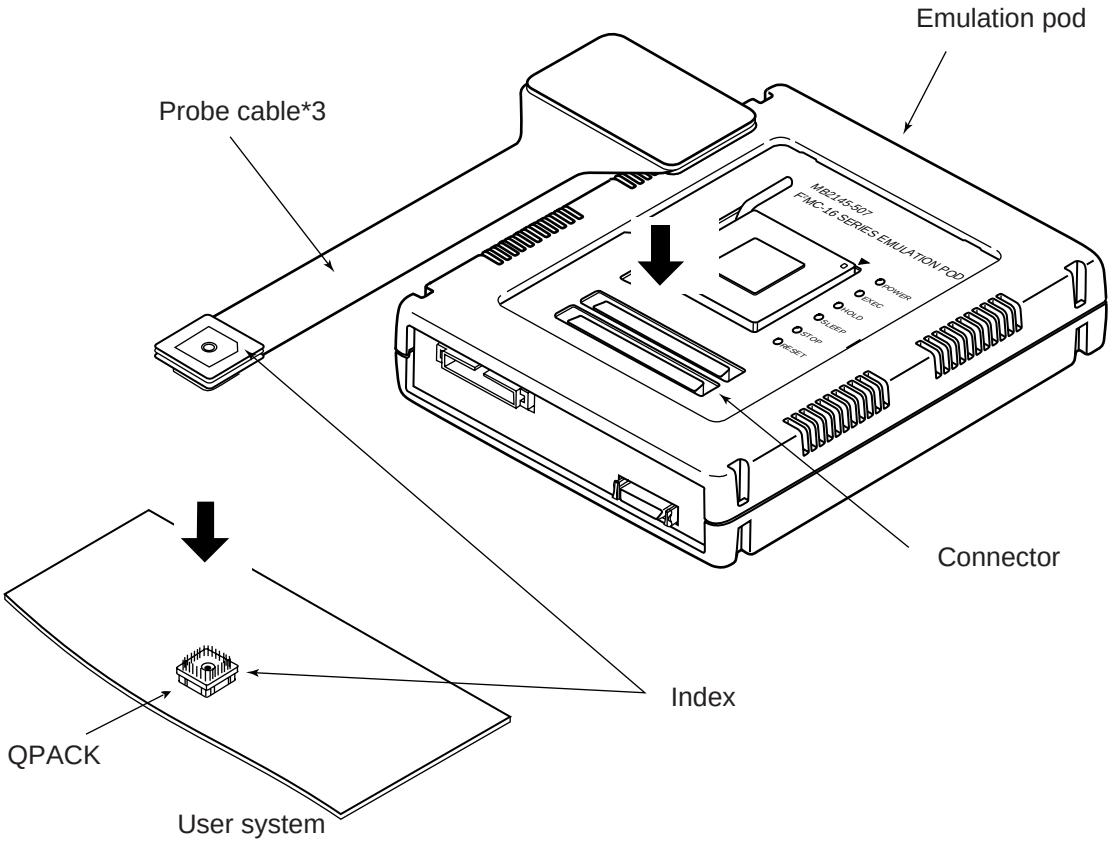
*1 : Gently insert the probe cable into the socket, aligning the index (▲) mark etched on the position indicted by the arrow in the above figure) at the end of the probe cable with the index (▲) on the socket. Secure the probe cable, using the screws and washers attached to the probe cable. Be careful not to tighten the screws too much. Doing so will damage the socket threads.
*2 : Insert the probe cable into the connector on the top of the emulation pod.
*3 : The probe cable is not flexible enough to handle horizontal stress. Arrange the emulation pod and user system so that excessive stress is not applied to the probe cable.
*4 : The foot pattern of the socket of the user system may be different from the foot pattern of mass production MCUs. Note this point during design of PC boards.

2.6.3 TQPACK Type Probe Cable

Figure 2.6-3 "Connecting a TQPACK Type Probe Cable" shows the connection method of a TQSOCKET type probe cable. A connector called TQPACK is required for the user system.
Figure 2.6-4 "Connecting TQPACK" shows the connection method.

■ Connecting a TQPACK Type Probe Cable

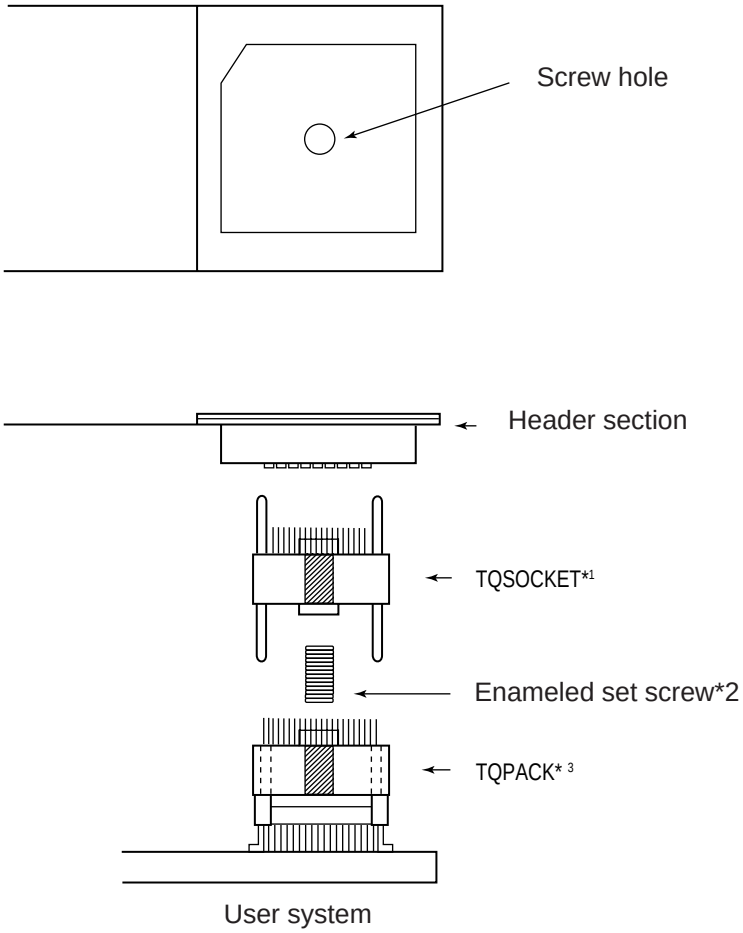
Figure 2.6-3 Connecting a TQPACK Type Probe Cable



*1: Align the index (▲ mark) at the end of the probe cable to the TQPACK index (notch of the connector). Gently insert the probe cable into the TQPACK connector, locking the terminals above the TQPACK in the holes of the probe cable.
*2: Insert the probe cable into the connector on the top of the emulation pod.
*3: The probe cable is not flexible enough to handle horizontal stress. Arrange the emulation pod and user system so that excessive stress is not applied to the probe cable.

■ Connecting TQPACK

Figure 2.6-4 Connecting TQPACK



*1: It is very difficult to replace the TQPACK. Be sure to use it with the TQPACK.
*2: Put the enameled set screw attached to the TQPACK in the TQSOCKET. Then, connect the TQSOCKET to the TQPACK.
*3: Compared to mass production MCUs, the part of the TQPACK that contacts the PC board (flat part at the top of a terminal) may have a different size. Take this point into consideration when designing the pattern on a PC board.
*4: The probe cable is not flexible enough to handle horizontal stress. Arrange the emulation pod and user system so that excessive stress is not applied to the probe cable.

■ Removing the Probe Cable

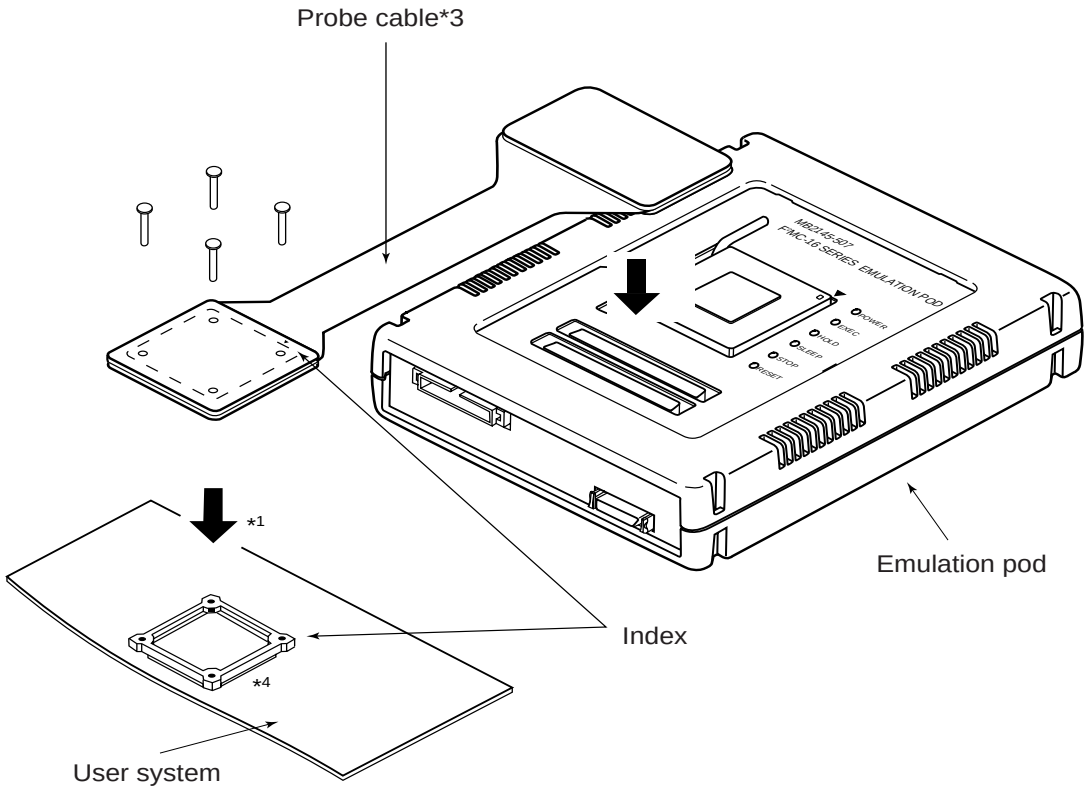
Tighten the machine screw attached to the probe cable from the header part. The machine screw touches the enameled set screw, thereby loosing the connector of the probe cable. Remove the probe cable after it is completely loose. If the probe cable cannot be removed with the above method, raise the probe cable from all four sides, using a small flat-blade screw driver or similar object.

2.6.4 NQPACK Type Probe Cable

Figure 2.6-5 "Connecting NQPACK" shows the connection method of an NQSOCKET type probe cable. A connector called NQPACK is required for the user system. Figure 2.6-6 "Details of NQPACK Connection" shows the connection method.

■ Connecting an NQPACK Type Probe Cable

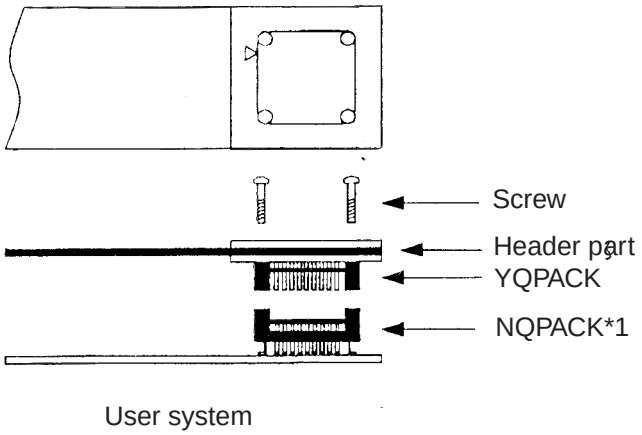
Figure 2.6-5 Connecting NQPACK



*1: Align the index (▲ mark) at the end of the probe cable with the YQPACK index (notch of the connector). Secure the probe cable, using the four screws and washers attached to the probe cable.
*2: Insert the probe cable into the connector on the top of the emulation pod.
*3: The probe cable is not flexible enough to handle horizontal stress. Arrange the emulation pod and user system so that excessive stress is not applied to the probe cable.
*4: The foot pattern of the YQPACK of the user system may be different from the foot pattern of mass production MCUs. Note this point during design of PC boards.

■ Connecting NQPACK

Figure 2.6-6 Details of NQPACK Connection

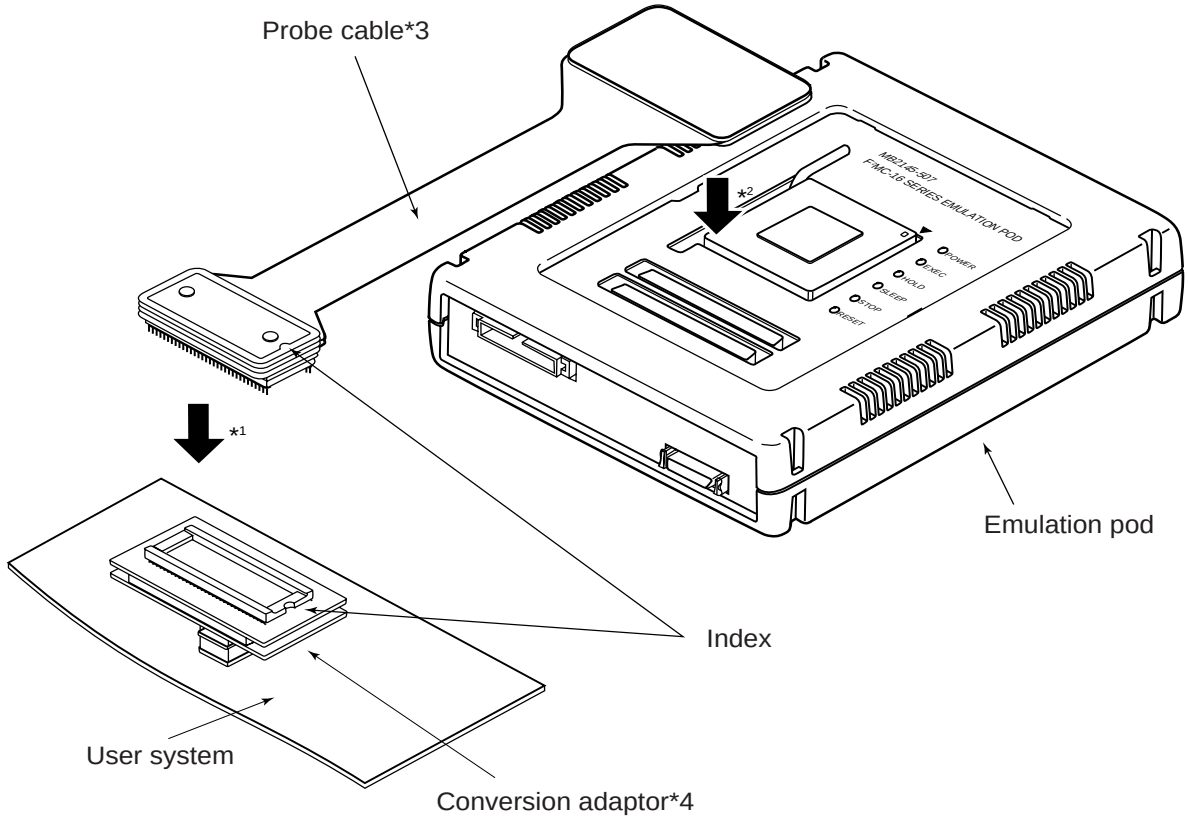


2.6.5 Probe Cable of the Conversion Adapter Type (DIP[***]QFP)

Figure 2.6-7 "Connecting a Conversion Adapter Type (from DIP to QFP) Probe Cable" shows the connection method for the conversion adapter type (from DIP to QFP) probe cable.

■ **Connecting a Conversion Adapter Type (from DIP to QFP) Probe Cable**

Figure 2.6-7 Connecting a Conversion Adapter Type (from DIP to QFP) Probe Cable



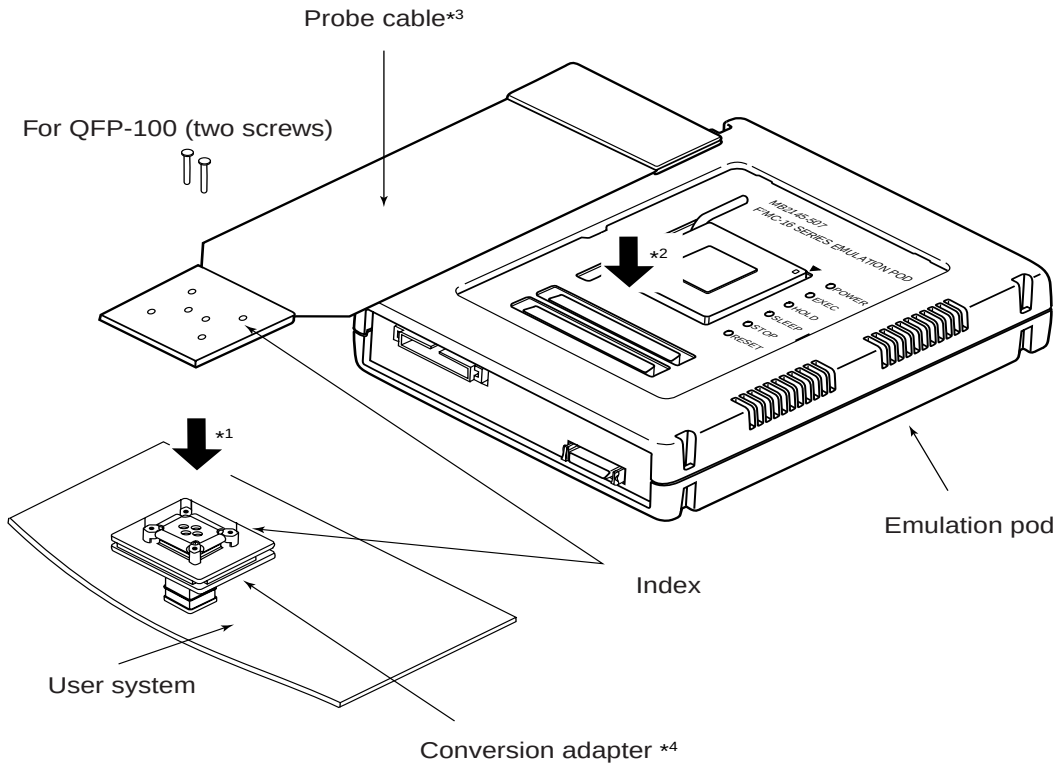
*1: Firmly insert the probe cable into the socket, aligning the index (semicircular notch mark) at the end of the probe cable with the index (semicircular notch) on the socket.
*2: Insert the probe cable into the connector on the top of the emulation pod.
*3: The probe cable is not flexible enough to handle horizontal stress. Arrange the emulation pod and user system so that excessive stress is not applied to the probe cable.
*4: The foot pattern of the conversion adapter may be different from the foot pattern of mass production MCUs. Note this point during design of PC boards.

2.6.6 Conversion Adapter Type (QFP[***]SQFP) Probe Cable

Figure 2.6-8 "Connecting a Conversion Adapter Type (from QFP to SQFP) Probe Cable" shows the connection method for a conversion adapter type (from QFP to SQFP) probe cable.

■ **Connecting a Conversion Adapter Type (from QFP to SQFP) probe cable**

Figure 2.6-8 Connecting a Conversion Adapter Type (from QFP to SQFP) Probe Cable



*1: Gently insert the probe cable into socket, aligning the index (▲ mark etched at the location indicated by the arrow in the above figure) at the end of the probe with the index (▲) on the socket. Secure the probe cable, using the screws and washers attached to the probe cable. Be careful not to tighten the screws too much. Doing so will damage the socket threads.

*2: Insert the probe cable into the connector on the top of the emulation pod.

*3: The probe cable is not flexible enough to handle horizontal stress. Arrange the emulation pod and user system so that excessive stress is not applied to the probe cable.

*4: The foot pattern of the conversion adapter may be different from the foot pattern of mass production MCUs. Note this point during design of PC boards.

2.7 Connecting Options (Communications Adaptors)

The parallel communications adaptor is used in addition to the RS-232C link. Therefore, always connect the RS-232C cable between the host computer and main unit.
The connector used to connect the communications adaptor and emulation pod has a locking mechanism that engages when the cable is connected. Always insert the cable firmly until the lock engages.
Similarly, when disconnecting the communications adaptor interface cable, press the lock levers on each side of the cable connectors.

■ Connecting a Communications Adaptor

Figure 2.7-1 Connecting a Communications Adaptor

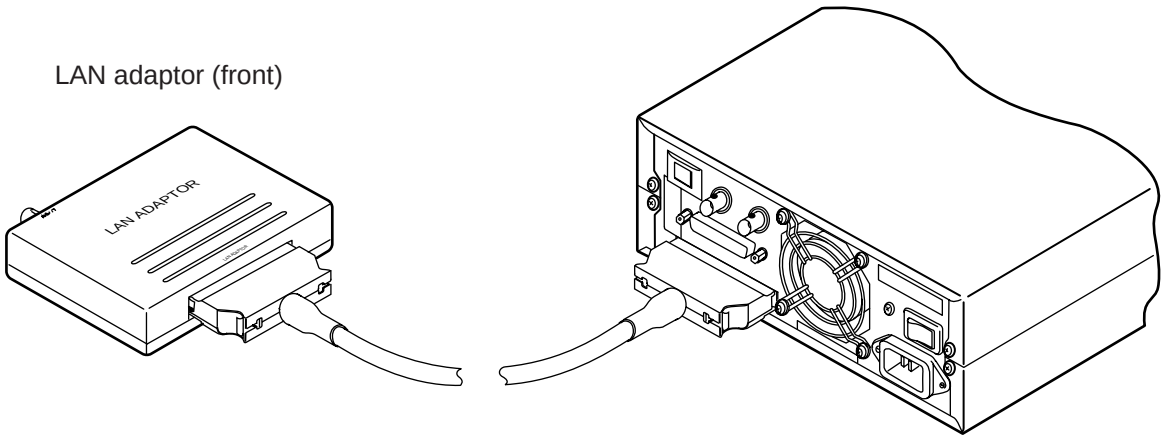


Figure 2.7-1 "Connecting a Communications Adaptor" shows the connection between the main unit and communications adaptor. The example shown in the figure is for a LAN connection.

The next setup step depends on whether or not an external probe cable is used, as follows.

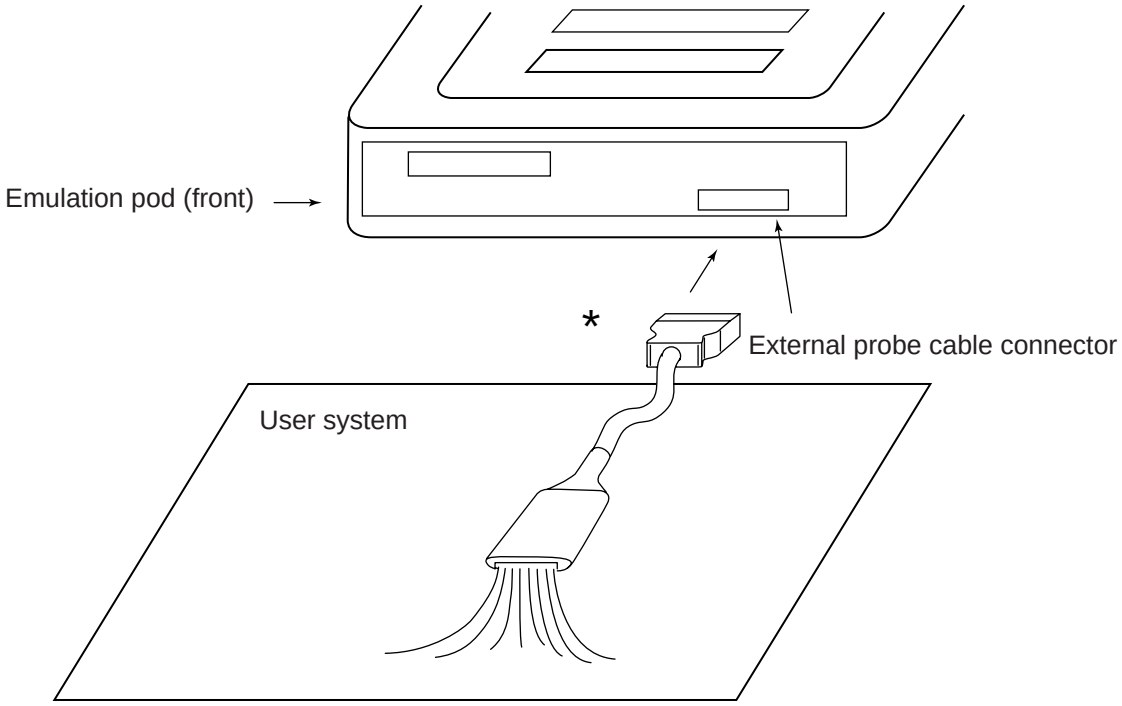
- External probe cable not used:Proceed to “Chapter 3 "Software Setup".
- External probe cable used:Proceed to “Section2.8 "Connecting Options (External Probe Cable)".

2.8 Connecting Options (External Probe Cable)

Figure 2.8-1 "Connection Between External Probe Cable and Emulation Pod" shows the connection between the external probe cable and emulation pod.When connecting an external probe cable to the user system, check the signal names on the label on the external probe cable and connect the IC clips securely to the user system.

■ Connection Between External Probe Cable and Emulation Pod

Figure 2.8-1 Connection Between External Probe Cable and Emulation Pod

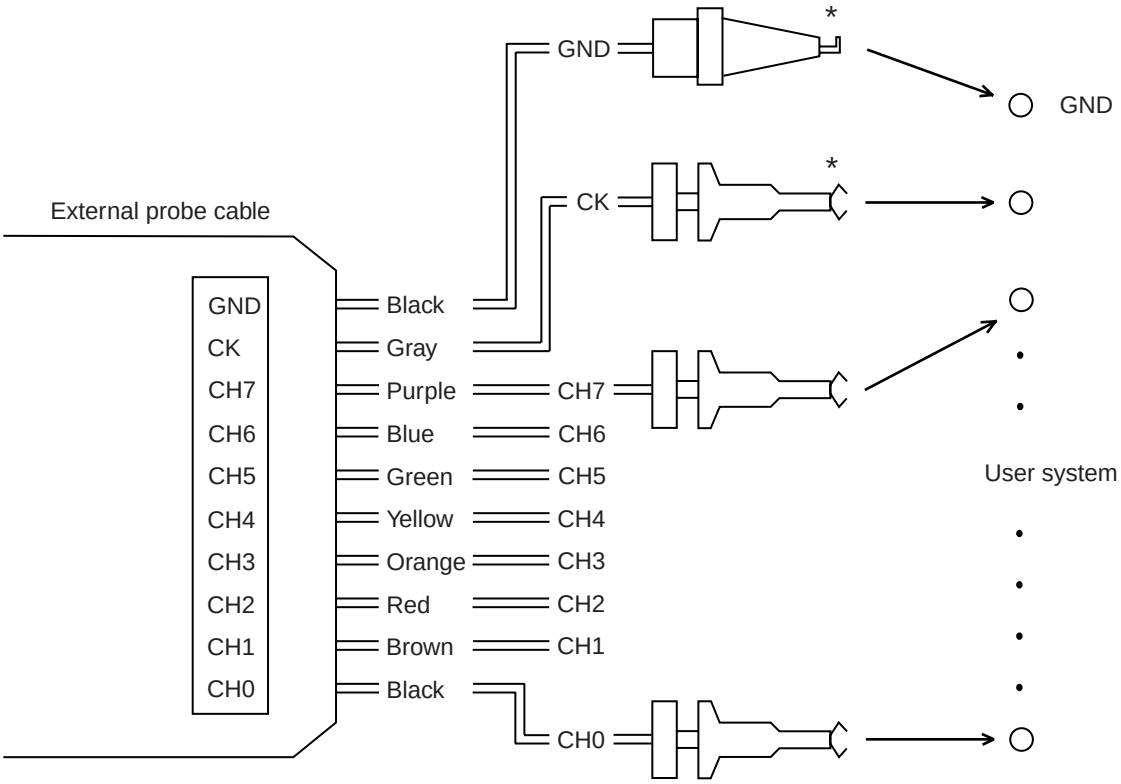


*: The connector used to connect the external probe cable to the emulation pod has a locking mechanism that engages when the cable is connected. Always insert the cable firmly until the lock engages.
Similarly, when disconnecting the external probe cable, press the lock levers on each side of the cable connector.

■ Connection Between External Probe Cable and User System

Figure 2.8-2 "Connection Between External Probe Cable and User System" shows the connection between the external probe cable and user system.

Figure 2.8-2 Connection Between External Probe Cable and User System



*: Note that IC clips for the GND wires have a different shape to the IC clips for other signals.

Table 2.8-1 "External Probe Cable Signals" lists the external probe cable signals.

Table 2.8-1 External Probe Cable Signals

Color	Signal Name	Color	Signal Name
Black	CH0 (Channel 0 input)	Green	CH5 (Channel 5 input)
Brown	CH1 (Channel 1 input)	Blue	CH6 (Channel 6 input)
Red	CH2 (Channel 2 input)	Purple	CH7 (Channel 7 input)
Orange	CH3 (Channel 3 input)	Gray	CK (External clock input)
Yellow	CH4 (Channel 4 input)	Black	GND (GND)

CHAPTER 3 Software Setup

This chapter describes how to setup the software environment on the host computer and emulator so as to use the emulator.

3.1 RS-232C Interface Specifications

Table 3.1-1 "RS-232C Interface Specifications" lists the specifications for the emulator RS-232C interface.

■ RS-232C Interface Specifications

Table 3.1-1 RS-232C Interface Specifications

Parameter	Specification
Connection type	DCE
Baud rate	4800, 9600, 19200 [bps]
Number of data bits	8 bits
Parity bit	None
Number of stop bits	1 bit
X control	None

3.2 Program Installation

Use the installation program to install the software on your hard disk. You must have at least 3MB of spare space on your hard disk.

■ Program Installation Procedure

1. Start Windows in enhanced mode.
2. Insert “DISK1” of the installation disks in the floppy disk drive.
3. Use File Manager or similar to run the program “SETUP.EXE” from the floppy disk. Follow the instructions displayed by the installation program and specify the following information when requested.
   - Specify the directory in which to install the program:The installation program creates the directory if it does not already exist. The default is “C:\FTOOL”.
   - Specify the group name:The default is “F^2C16series emulator”.
4. When installation completes, the specified group is created in Program Manager.

3.3 Setting Up the Emulator-Debugger Environment

When you start the emulator-debugger, the program reads the install file "EML907A.INS" (default file name) and performs various settings for the communications interface and target MCU. Therefore, this file must be created before you start using the emulator-debugger.
The install file is a text file and therefore can be created using a standard text editor by referring to the setting items described later in this manual. However, the install file can be created more easily using the [EML907W Setup] program provided.

■ Setting Up the Emulator-Debugger Environment

The procedure for creating “EML907A.INS” using the [EML907W Setup] program is as follows.

1. Double click on the [EML907W Setup] icon in the emulator-debugger group.
2. Specify the target MCU in [Select Chip].
3. Select the setup item in [Select Item].
4. Click the [Details] button in [Settings].:A detailed setup window opens for you to set parameters.
5. Repeat steps [3] and [4] for the required number of setup items.
6. Select [Save As] from the [File] menu.:The file name “EML907A.INS” appears as the default. Specify the directory containing the emulator-debugger and save.

Table 3.3-1 Setting Items in the Emulator-Debugger Install File

Setting Item	Description	Emulator debugger/target MCU				Remarks
		EML907A				
		F^2MC-16	F^2MC-16H	F^2MC-16L	F^2MC-16F	
INTERFACE	Specifies the communication interface	T1	T1	T1	T1	
CHIP	Specifies the target MCU	T1	T1	T1	T1	
INROM	Specifies the internal ROM area	T2	T2	T2	T2	
ROMIMAGE	Specifies whether an internal ROM image is present or not	—	—	T2	T2	
BUSWIDTH	Specifies the external data bus width	T2	T2	T2	T2	
TYPE	Specifies the external data bus type	—	T2	—	—	

Table 3.3-1 Setting Items in the Emulator-Debugger Install File

Setting Item	Description	Emulator debugger/target MCU				Remarks
		EML907A				
		F^2MC-16	F^2MC-16H	F^2MC-16L	F^2MC-16F	
IOMAX	Specifies the I/O area	—	—	—	—	*
RAM	Specifies the internal RAM area	—	—	—	—	*
EXERAM	Specifies the internal instruction RAM area	—	T3	—	—	
PARALLEL	Specifies the parallel port number	T3	T3	T3	T3	
SPEED	Specifies the emulator operation speed	—	—	—	—	
TMP	Specifies the work directory	T3	T3	T3	T3	
NATIVE CHECK	Specifies whether or not command restrictions apply	T3	T3	—	—	

T1:The item must always be set.
T2:Items applicable to the MCU operation must always be set.
T3:The item must be set when required.
—:Setting not required.
* :Setting is required when using the MB2145-505 emulation pod.

3.4 Install File Setting Items

This section describes the main install file setting items. Refer to the "Emulator-Debugger Manua" for further information about these and other setup items.

■ Install File Setting Items

– Communication interface setting (INTERFACE)

Specifies the interface between the host computer and emulator hardware.

– Chip type setting (CHIP)

Specifies whether debugging is being performed for an F^2MC-16L, F^2MC-16LX, F^2MC-16/16H, or F^2MC-16F MCU.

– Internal ROM area setting (INROM)

Specifies the internal ROM area for MCUs that have internal ROM.

– Internal ROM image present or not setting (ROMIMAGE)

Specifies whether an internal ROM image is present or not.

– External data bus width setting (BUSWIDTH)

Specifies the width of the external data bus for MCUs that perform external access.

– External data bus type setting (TYPE)

Specifies the type of the external data bus. Only applies to F^2MC-16H chips that have internal instruction RAM.

– Internal instruction RAM area setting (EXERAM)

his setting is only required for F^2MC-16H chips that have internal instruction RAM.

Ensure that settings related to the MCU specification, operating mode, and similar are set correctly for the actual conditions. Emulation will not operate correctly if the settings do not match the actual conditions.

- [ ] :Parameters enclosed in brackets can be omitted.
- {|} :Specify one of the parameters separated by |.

3.4.1 Communication Interface Setting (INTERFACE)

Specifies the interface between the host computer and emulator hardware.

■ Communication Interface Setting (INTERFACE)

❍ When connecting via RS-232C

```
INTERFACE RS232C [port number [baud rate]]
```

If omitted, the port number defaults to zero (existing RS232C port). If the baud rate is omitted, the optimum baud rate for the host computer is selected.

(Example) INTERFACE RS232C 0 9600

❍ When connecting via a LAN

```
INTERFACE LAN host name
```

(Example) INTERFACE LAN EML1001

3.4.2 Chip Type Setting (CHIP)

Specifies whether debugging is being performed for an F^{2}MC-16L,16LX, and 16/16H

■ Chip Type Setting (CHIP)

❍ When debugging an F^{2}MC-16L

```
CHIP 16L
```

❍ When debugging an F^{2}MC-16LX

```
CHIP 16LX
```

❍ When debugging an F^{2}MC-16/16H

```
CHIP 16
```

❍ When debugging an F^{2}MC-16F

```
CHIP 16F
```

3.4.3 Internal ROM Area Setting (INROM)

Specifies the internal ROM area for MCUs that have internal ROM.

■ **Internal ROM Area Setting (INROM)**

```
INROM address range
```

Specify the address range for the internal ROM area as follows.

MCU ROM sizes such as 48KB or 96KB cannot be specified. Instead specify 64KB or 128KB respectively.

Internal ROM Size	Address Range
4KB	FFF000..FFFFFF
8KB	FFE000..FFFFFF
16KB	FFC000..FFFFFF
32KB	FF8000..FFFFFF
64KB	FF0000..FFFFFF
128KB	FE0000..FFFFFF

(Example) INROM FF0000..FFFFFF

3.4.4 Internal ROM Image Present or Not Setting (ROMIMAGE)

Specifies whether an internal ROM image is present or not.

■ **Internal ROM Image Present or Not Setting (ROMIMAGE)**

```
ROMIMAGE {ON|OFF}
```

Specify ON for MCUs that have an internal ROM image. Otherwise, specify OFF.

(Example) ROMIMAGE ON

3.4.5 External Data Bus Width Setting (BUSWIDTH)

Specifies the width of the external data bus for MCUs that perform external access.

■ External Data Bus Width Setting (BUSWIDTH)

❍ For the F^{2}MC-16F/16/16H

```
BUSWIDTH buswidth
```

Specify “8” for an 8-bit bus and “16” for a 16-bit bus.

(Example) BUSWIDTH 8

❍ For the F^{2}MC-16L/16LX

```
BUSWIDTH buswidth [I/O bus width [HIGH bus width [LOW bus width]]]
```

For each bus width, specify “8” for an 8-bit bus and “16” for a 16-bit bus.

Always set the bus width used on the MCU.

(Example) BUSWIDTH 16 8 8 8

3.4.6 External Data Bus Type Setting (TYPE)

Specifies the type of the external data bus. Only applies to F^{2}MC-16H chips that have internal instruction RAM.

■ External Data Bus Type Setting (TYPE)

```
TYPE {MULTI | NONMULTI | BHE | ALT}
```

- MULTI:Specify when multiplex mode is used for the memory access mode in a single-chip type system.
- NONMULTI:Specify when non-multiplex mode is used for the memory access mode in a single-chip type system.
- BHE:Specify when BHE mode is used for the memory access mode in a host type system.
- ALT:Specify when alternate write mode is used for the memory access mode in a host type system.

3.4.7 Internal Instruction RAM Area Setting (EXERAM)

This setting is only required for F^{2}MC-16H chips that have internal instruction RAM.

■ Internal Instruction RAM Area Setting (EXERAM)

```
EXERAM read start address  write start address  size  [upper write address mask]
```

- Specify one of the following for the size parameter.

  0100, 0200, 0400, 0800, 1000, 2000, 4000

- When using the upper 8 bits of the write address (A23 to A16) as ports, set an 8-bit mask pattern as follows for the upper write address mask.

A23	A22	A21	A20	A19	A18	A17	A16
MSB							LSB

0: Use as a port
1: Use as an address
(Example) EXERAM FF8000 008000 1000 FF

3.5 When Using a LAN

Performing communications over a LAN requires an MB2142-01 (for 10BASE-2) or MB2142-02 (for 10BASE-T) LAN adaptor in addition to the emulator main unit.

■ When Using a LAN

Performing communications over a LAN requires an MB2142-01 (for 10BASE-2) or MB2142-02 (for 10BASE-T) LAN adaptor in addition to the emulator main unit.

When installing a LAN for the first time, refer to the “MB2140 Series LAN Installation Handbook” and “Emulator-Debugger Installation Manual”.

3.6 Downloading the Monitor Program

To use the emulator, you must download (write data to the emulator) the monitor program for the target MCU series. The monitor programs are stored in the directory in which the emulator-debugger was installed.
You can run the [Monitor Loader] program in the emulator-debugger group to download the monitor program.
The monitor program is written to non-volatile memory in the emulator. Therefore, once you have downloaded the monitor program, you do not have to download again unless you are changing the target MCU or upgrading the monitor program version.

■ Downloading the Monitor Program

Use the following procedure to download the monitor program using the Monitor Loader.

1. After connecting the emulator as described in section2 “Hardware Setup”, turn on the power in the following sequence.After turning on the power to the main unit, check that the POWER and READY LEDs on the front panel are illuminated.
   - The first step: Host computer
   - The second step: Main unit
   - The third step: User system
2. Double click on the [Monitor Loader] icon in the emulator-debugger group.
3. Select the load file for the MCU series you are using.
   - F^2MC-16L series:EML906.HEX/EML906N.HEX
   - F^2MC-16LX Series:EML905N.HEX
   - F^2MC-16/16H series:EML907A.HEX
   - F^2MC-16F series:EML902.HEX/EML902N.HEX
4. Setup the communications.
5. Check the load file selection and communications setup, then click [Start Load].

3.6.1 Monitor Loading Error Messages

**Table 3.6-1 "Monitor Loading Error Messages" lists the error messages displayed if the monitor program cannot be downloaded for some reason.
Follow the "Action" instructions to remove the cause of the error then restart the download.**

■ **Monitor Loading Error Messages**

Table 3.6-1 Error Messages for Monitor Program Downloading

FATAL 601 Communication error Description:The communication link is abnormal or the cable is connected incorrectly. Action:Check the communication link.
FATAL 901 Not enough memory for startup Description:Unable to reserve sufficient memory to run the program. This error may occur if a number of other Windows applications are running at the same time. Action:Close the other applications and start the program again.
ERROR 108 Not enough memory Description:Insufficient free memory in the host computer to execute a command. This error may occur if a number of other Windows applications are running at the same time. Action:Close the other applications.
ERROR 201 Can’t access file Description:The program could not access a file. Action:Check the disk on the host computer.
ERROR 208 Illegal file format Description:The format of the file being loaded is incorrect. Action:Check the contents of the file.
ERROR 601 Communication error Description:The communication link is abnormal or the cable is connected incorrectly. Action:Check the communication link.

3.6.2 Error Message Output Format

Error messages are output in the following format.

■ **Error Message Output Format**

- Fatal error message: Output when the emulator does not start or communication fails.

  *** FATAL××× Message

- Error message: Output for incorrect input or when execution conditions are incorrect.

  *** ERROR ××× Message

Here, ××× represents a decimal number. The numbers are classified as follows.

0 to 99:Syntax error

100 to 199:Command execution error

200 to 299: File error

400 to 499: Emulator error

600 to 699:Communication link error

900 to 999:Other errors

Refer to "F^2MC-16L/16/16H/16F Emulator-Debugger Manual Windows Version" for further information about the messages.

CHAPTER 4 Operation Procedures

This chapter describes the operation, setup, and other procedures required to use the emulator in practice.

4.1 Sequence for Turning the Emulator Power On and Off

Turn on the power to the emulator in the following sequence.

- **Host computer**
- **Main unit**
- **User system**

Similarly, turn off the power in the reverse sequence.

■ Sequence for Turning the Emulator Power On and Off

Turn on the power to the emulator as follows. Failing to observe the procedure described below may result in damage to the main unit or emulation pod.

1. Turn on the power to the host computer.
2. Turn on the power to the main unit.
3. Turn on the power to the user system.

Similarly, turn off the power in the reverse sequence.

1. Turn off the power to the user system.
2. Turn off the power to the main unit.
3. Turn off the power to the host computer.

However, the power to the host computer can be turned off at any time.

Note:

- Always turn the power on and off in the correct sequence as failure to do so may damage the equipment.
- After turning on the power, do not move the equipment or subject it to shock or vibration.

4.2 Starting and Exiting the Emulator-Debugger

First, turn on the power to the computer, main unit, and user system and check that the POWER and READY LEDs are illuminated. Next, double click on the debugger icon in Program Manager to start the debugger.
To exit the emulator-debugger, select [Exit] from the [File] menu to exit the debugger.

■ Starting the Emulator-Debugger

Double clicking on the [eml907w] icon in Program Manager starts the debugger.

Note that the emulator-debugger does not start normally if the READY LED does not illuminate after turning on the power, or if the ERROR LED is illuminated. In this case, press the reset switch on the main unit.

If pressing the reset switch does not correct the problem, check the cable connections and similar.

■ Exiting the Emulator-Debugger

Select [Exit] from the [File] menu to exit the debugger.

Alternatively, use the [Close] command in the control menu of the application window to exit the debugger.

4.3 Error Messages When Starting the Emulator-Debugger

Table 4.3-1 "Error Messages When Starting the Emulator-Debugger" lists the error messages displayed if the emulator-debugger cannot start for some reason. Follow the "Action" instructions to reove the cause of the error then restart the emulator-debugger.

■ Error Messages When Starting the Emulator-Debugger

Table 4.3-1 Error Messages When Starting the Emulator-Debugger (Cont.)

FATAL 204 Invalid command or parameter in install file	
Description:	The install file (EMLXXX.INS) contains an invalid installation command or parameter.
Action:	Check the contents of the install file.
FATAL 401 Illegal emulation pod	
Description:	The emulation pod or MCU cable is not the correct type. Alternatively, the emulation pod is not connected correctly.
Action:	Turn off the emulator power and check the emulation pod and MCU cable. Restart after connecting correctly.
FATAL 402 Illegal monitor program	
Description:	The monitor program loaded into the emulator is not the correct type.
Action:	Run the loader program provided with the emulator-debugger and download the monitor program to the emulator main unit. Then, start the emulator again. See “3.6 Downloading the Monitor Program” for further information.
FATAL 403 ICE internal error	
Description:	The emulator hardware does not operate correctly.
Action:	Check whether the MCU is operating correctly. Reset the emulator main unit and restart. If this error occurs frequently, there may be a fault in the emulator hardware, MCU, or target system.
FATAL 404 Mismatch monitor program version	
Description:	The monitor program loaded into the emulator hardware is an old version and cannot be used.
Action:	Run the loader program provided with the emulator-debugger and download the monitor program to the emulator main unit. Then, start the emulator again.See “3.6 Downloading the Monitor Program” for further information.

FATAL 602 Illegal device name	
Description:	The specified communications device name is incorrect or no device name is specified.
Action:	Check the communications device name in the install file.
FATAL 605 Can not initialize “WINSOCK.DLL”	
Description:	Cannot initialize WINSOCK.DLL.
Action:	The emulator requires a version of WINSOCK.DLL for your LAN. Refer to your LAN software documentation and install in the Windows directory or in a directory specified in the PATH.
FATAL 901 Not enough memory for startup	
Description:	Unable to reserve sufficient memory to run the program. This error may occur if a number of other Windows applications are running at the same time.
Action:	Close the other applications and start the program again.
FATAL 902 System error	
Description:	The program cannot operate correctly due to an operating system error.
Action:	Reboot the operating system and restart the program.
ERROR 409 Supply voltage error	
Description:	The power supply voltage supplied from the user system is abnormal or the user system has a fault.
Action:	Check the voltage of the user system power supply.
ERROR 410 System clock error	
Description:	The system clock supplied from the user system is abnormal or the user system has a fault.
Action:	Check the system clock of the user system.
ERROR 412 MCU makes no response	
Description:	Command cannot be executed because the MCU is unable to operate normally. This error has the following possible causes. 1. The MCU is in the sleep, stop, or hold state. 2. The power supply or clock from the user system is unstable. 3. An “L” level is being input to the reset pin of the MCU or there is a fault in the reset signal generation circuit on the user system.
Action:	1. Release the standby state. 2. Check the power supply and clock from the user system. 3. Check the reset signal from the user system.

4.4 Settings After Starting the Emulator-Debugger

After starting the emulator-debugger, the following are the minimum settings that are required before you can start debugging using the emulator.

- **Memory map setting**
- **Debug area setting**
- **Reset vector and mode data setting, program downloading**
- **MCU reset**

■ MCU reset

The memory space must be allocated according to the memory type such as user memory or emulation memory.

1. Select [Memory Map] from the [Environment] menu. This opens a window for setting the memory map.
2. Set the address range.
3. Select the memory area used under [Type].
4. Set the access properties under [Properties]. (Multiple properties can be set.)
5. Clicking the Set button sets the above parameters and displays the settings in the [Map Area].
6. Repeat steps [2] to [5] for each memory area.

The following shows an example memory map. However, the settings shown are examples only. Setup your system in accordance with the MCU being used, the target structure, the progress of debugging, and similar considerations.

For further information, refer to “1.1 Setting Up the Environment” and “3.7.1 Memory Map” in the Emulator-Debugger Manual or refer to the emulator-debugger help.

❍ When using user memory areas (memory on the user system)

Type of Memory Used	Type	Properties
External data RAM on the user system	User	Read/Write
External code ROM on the user system	User	Read/Code

❍ When substituting emulator memory for user memory areas

Type of Memory Used	Type	Properties
Substituting external data RAM	Emulation	Read/Write
Substituting external code ROM	Emulation	Read/Code

❍ Setting for the MCU internal I/O area and internal RAM area

Type	Properties
User	Read/Write

❍ Internal ROM area

Emulation memory is substituted for internal ROM areas. The area can only be specified in the INROM setting in the install file (see 3.3 “Setting Up the Emulator-Debugger Environment”). If the area is specified in the install file, the area is automatically set in the memory map when the emulator-debugger starts and does not need to be set here.

■ Debug Area Setting

Set the areas that you specifically wish to debug.

This setting is optional. However, the setting enhances the breakpoint and coverage functions and therefore should be set whenever possible.

1. Select [Debug Area] from the [Environment] menu. This opens a window for setting the debug area.
2. Select the [Area Number].
   - Two areas can be set.
3. Set the [Start Bank Number].
   - The debug area is set as a continuous 512KB (8 banks) area.
4. Set the [Properties]
   - Sets the properties for breakpoints set in the debug area.
5. Clicking the [Set] button displays the settings in the [List].

■ Reset Vector and Mode Data Setting, Program Downloading

This sets the reset vector and mode data for the MCU. This information is normally contained in the program and downloading the program sets the values automatically. If the reset vector and mode data are not specified in the program, click on [Memory] in the tool bar to open a memory window. Set an address in the range FFFFDC to FFFFDF.

To download the program, select [Load Object] from the [File] menu and specify an object file name (extension “ABS”).

A source window appears when the program is downloaded successfully.

■ MCU Reset

Downloading the program sets the instruction pointer (IP) of the MCU to the address specified by the reset vector. However, no hardware reset occurs. To reset the MCU, select [Reset MCU] from the [Execute] menu.

The above are the minimum settings required after starting the emulator-debugger.

As the memory map and debug area settings are saved, you do not need to set these again unless changing the settings.

4.5 Emulator-Debugger Operating Environment

The following operating environment settings must be set as required in order to operate the emulator-debugger.

- **MCU operating mode**
- **Debug area**
- **Memory area**
- **Memory mapping**

■ Emulator-Debugger Operating Environment

- MCU operating mode
  - The available operating modes are debug mode and native mode. Select [Debug Environment] from the [Environment] menu to set the mode.
- Debug area
  - Set the area of the total memory space that you specifically wish to debug. The breakpoint, data breakpoint, and coverage measurement functions are enhanced in the debug area.
  - Select [Debug Area] from the [Environment] menu to set the debug area.
- Memory area
  - Memory is allocated in units called areas. Seven different types of area are available. Set the areas based on the MCU specifications and debugging conditions.
- Memory mapping
  - Access properties can be specified for the memory areas set via [Memory Map] in the [Environment] menu. A guarded break occurs and program execution can be forcibly halted if an access occurs during program execution that violates the access properties.

4.5.1 MCU Operating Mode

The available operating modes are debug mode and native mode. Select [Debug Environment] from the [Environment] menu to set the mode.

■ MCU Operating Mode

- Debug mode
  - This mode enables all operations of the evaluation chip to be analyzed but the operating speed is slower than for the mass production chip.
- Native mode
  - The operating speed has the same timing as the mass production chip. However, restrictions apply to the debug functions, as listed in Table 4.5-1 "Restrictions to Debug Functions in Native Mode"

Table 4.5-1 Restrictions to Debug Functions in Native Mode

Target Series	Debug Function Restrictions
F^2MC-16/ 16H	• The memory mapping settings are ignored and all areas are accessed in accordance with the MCU specifications. • The trace reverse assembly display is not available.
All series	• If internal and external MCU bus access occurs simultaneously, the data for the external bus access is not sampled by the trace function.

4.5.2 Debug Area

Set the area of the total memory space that you specifically wish to debug. The breakpoint, data breakpoint, and coverage measurement functions are enhanced in the debug area.
Select [Debug Area] from the [Environment] menu to set the debug area.

■ **Debug Area**

- Available areas
  - Two continuous 512KB (8 bank) memory areas can be set.
- Functions enhanced within the debug area
  - Table 4.5.2 lists the functions that are enhanced within the debug area.

Table 4.5-2 Functions Enhanced Within the Debug Area

Area	Function	
	Breakpoint Data Breakpoint	Coverage Measurement
Outside debug area	Maximum of 6 points	Measurement cannot be performed.
Inside debug area	65535 points	Measurement can be performed.

4.5.3 Memory Area

Memory is allocated in units called areas. Seven different types of area are available. Set the areas based on the MCU specifications and debugging conditions.

■ Memory Area

- User memory area
  - Areas that access the memory space on the user system are called user memory areas.
- Emulation memory area
  - Areas that are substituted by memory on the emulator are called emulation memory areas.
- Mirror area
  - Memory areas on the emulator used to take a copy of user memory access are called mirror areas. Set mirror areas when user memory is referenced during on-the-fly execution (memory is referenced while the MCU is executing).
- Internal ROM area
  - Areas for which memory on the emulator is substituted for the internal ROM area on the MCU are called internal ROM areas.
- Internal ROM image area
  - On some MCUs, the contents of specific areas of internal ROM area appear in bank 00. These areas are called internal ROM image areas.
- Internal instruction RAM area
  - Some MCUs have internal instruction RAM. These areas are called internal instruction RAM areas.
- Undefined areas
  - Areas other than those described above are called undefined areas.

Table 4.5-3 "Sizes That Can be Set for Each Memory Area" lists the sizes that can be set for each memory area.

Table 4.5-3 Sizes That Can be Set for Each Memory Area

Memory Area	Setting Size	Setting Method	Restrictions
User memory area	8 areas, No size restriction	[Memory Map] in the [Environment] menu	On the F^2MC-16/16H, can only be set in debug mode.
Emulation memory area	Maximum number of emulation memory areas and mirror areas combined is 5 × 64KB.		
Mirror area			
Undefined area	No size restriction		—
Internal ROM area	Maximum 1 × 128KB area	“INROM” in the install file	—

Table 4.5-3 Sizes That Can be Set for Each Memory Area

Memory Area	Setting Size	Setting Method	Restrictions
Internal ROM image area	No area can be set.	“ROMIMAGE” in the install file	Can only be set for F^2MC-16L/16F
Internal instruction RAM area	Maximum 1 × 16KB area	“EXERAM” in the install file	Can only be set for F^2MC-16H

4.5.4 Memory Mapping

Access properties can be specified for the memory areas set via [Memory Map] in the [Environment] menu. A guarded break occurs and program execution can be forcibly halted if an access occurs during program execution that violates the access properties.

■ Memory Mapping

The following five access properties are available. Table 4.5-4 "Relationship Between Memory Areas and Access Properties" shows the relationship between memory areas and access properties.

- Code (CODE)
  - This property enables instruction execution.
- Read (READ)
  - This property enables data read access.
- Write (WRITE)
  - This property enables data write access.
- Access to undefined areas prohibited
  - This property prohibits access to undefined areas.
- Access to undefined areas enabled
  - This property allows access to undefined areas.

Table 4.5-4 Relationship Between Memory Areas and Access Properties

Memory Area	Access Property Settings
User memory area	Set the required properties from CODE, READ, and WRITE
Emulation memory area	
Mirror area	Setting unavailable
Internal ROM area	Setting unavailable. Fixed at READ and CODE.
Internal ROM image area	Setting unavailable. Fixed at READ and CODE.
Internal instruction RAM area	Setting unavailable
Undefined area	Set either access enabled or access prohibited.

4.6 Emulator-Debugger Troubleshooting

If the emulator does not appear to be operating correctly, check the following items before deciding that the unit is faulty.
If performing the recommended action does not solve the problem, the emulator may be faulty. In this case, contact your Fujitsu marketing agent or Fujitsu representative marketing agent.

■ If Problems Occur Before Starting the Emulator-Debugger

This section relates to the period from turning on the power to the main unit and user system until just before starting the emulator-debugger.

Table 4.6-1 "Checklist for Problems That Occur Before Starting the Emulator-Debugger" lists the checklist for problems that occur before starting the emulator-debugger.

Table 4.6-1 Checklist for Problems That Occur Before Starting the Emulator-Debugger

Symptom	Cause	Action
The power to the main unit does not turn on. The POWER LED on the main unit does not illuminate.	Is the main unit power cable plugged into the mains supply?	Press the “0” side of the main unit power switch then plug the power cable into the mains. Then, press the “1” side of the main unit power switch.
	Is the main unit power switch set to “1”?	Press the “1” side of the main unit power switch.
The READY LED on the main unit does not illuminate.	Have you downloaded the monitor program?	Download the monitor program using the monitor loader.

Table 4.6-1 Checklist for Problems That Occur Before Starting the Emulator-Debugger

Symptom	Cause	Action
The RESET LED on the emulation pod does not illuminate.	The emulator may not be correctly initialized.	Press the reset switch on the main unit.
	Is the emulation pod correctly connected to the user system?	Press the “0” side of the main unit power switch then securely connect the probe cable. Then, press the “1” side of the main unit power switch.
	Is the clock input to the MCU?	Check the DIP switch settings and mounting position of the crystal on the emulation pod.
	Is the correct voltage being supplied from the user system?	Adjust the user system.
	Is a reset being input to the MCU?	
	Is the MCU able to operate correctly?	Check the mode pins, standby control pins, and other MCU pins.

■ If Problems Occur When Starting the Emulator-Debugger

This section relates to the period from double clicking on the [eml907w] icon until the emulator-debugger window opens normally.

If problems occur when starting the emulator-debugger, refer to the error messages and actions described in Table 4.3-1 “Error Messages When Starting the Emulator-Debugger” and take appropriate action.

■ If Problems Occur After Starting the Emulator-Debugger (During Debugging)

This section relates to problems that occur when performing debugging in the emulator-debugger window.

Table 4.6-2 "Checklist for Problems That Occur After Starting the Emulator-Debugger (During Debugging)" lists the checklist for problems that occur after starting the emulator-debugger (during debugging).

Table 4.6-2 Checklist for Problems That Occur After Starting the Emulator-Debugger (During Debugging)

Symptom	Cause	Action
The message “*** ERROR 412 MCU makes no response ***” appears when a memory access is performed during on-the-fly debugging.	The emulator uses the cycle-steal method to perform memory access during MCU execution without interfering with MCU execution. This message is output if no free cycles can be found. This message occurs most noticeably on the F^2MC-16L series but is not a fault.	—
The trace display for the external data bus is abnormal.	Is the external data bus width specified in the install file the same as the actual bus width used by the MCU?	Change the install file setting to match the bus width used by the MCU.
The MCU execution cycle is different to the actual chip operation.	Is the operating mode set to debug mode? When using an internal ROM area, is the area set in the install file?	The emulator enters debug mode when started. Change to native mode to perform realtime operation. However, note that this restricts the debug functions. The internal ROM area setting can only be made in the install file. Set the area in the install file.
Cannot write to RAM on the user system.	Writing to external RAM is disabled after the MCU is reset.	Use the program or other method to set the external bus control register in the MCU internal registers.

APPENDIX

The appendices describe the treatment of user system pins required to operate the MCU, the setup procedure for the MB2140 series emulator (for the F^2MC-16L/16/16H/ 16F series), and the setup checklist.

APPENDIX A Treatment of User System Pins Required to Operate the MCU

The emulator operates the MCU and performs the required setup and other operations when the emulator-debugger is started. Accordingly, processing must be performed in accordance with the pin functions for the series to which the probe on the user system is connected.

■ Treatment of User System Pins Required to Operate the MCU

At a minimum, special treatment is required for the following pins.

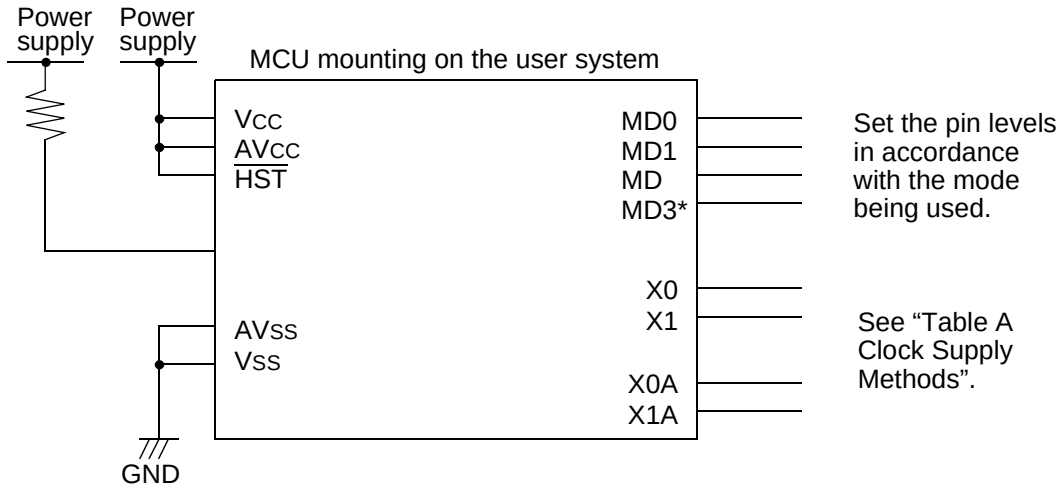
- Power supply pins:VCC, VSS
- Analog power supply pins:AVCC, AVSS
- Mode pins:MD0 to 3*
- Reset pin:$\overline{\text{RST}}$
- Standby control pin:$\overline{\text{HST}}$
- Clock input pins:X0, X1, X0A, X1A

*: The MD3 pin is only present on some models.

When using the emulator, the oscillation from the crystal on the user system (crystal resonator) is not available. You must either mount an equivalent crystal on the emulation pod or create an oscillation circuit on the user system and supply the clock via a buffer.

Figure A-1 "Treatment of Pins on the User System" shows the treatment of pins on the user system. A-1 "Clock Supply Methods" lists the clock supply methods. A-2 "Clock Supply from the User system" shows the clock supply from a user clock.

Figure A-1 Treatment of Pins on the User System



*: The MD3 pin is only present on some models.

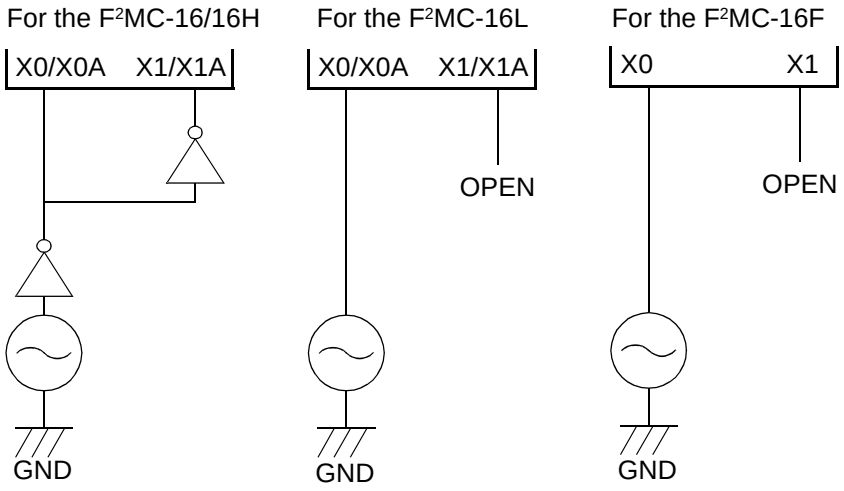
Table A-1 Clock Supply Methods

Clock Supply	Main Clock (X0, X1)	Sub Clock (X0A, X1A)

When using an oscillator	• Mount a crystal and capacitor on the crystal area of the emulation pod that are equivalent to the components used on the user system.
	• Set SW1.
	  • SW1:Setting OFF
	  • SW2:Setting OFF
		• Use the 32KHz crystal in the emulation pod.
		• Set SW1
		  • SW3:Setting OFF
		  • SW4:Setting ON
		  • SW5:Setting OFF
		  • SW6:Setting ON

Supply from user system	• Create an oscillation circuit on the user system (see Figure Ab).
	• Set SW1.
	  • SW1:Setting ON
	  • SW2:Setting ON
		• Create an oscillation circuit on the user system (see Figure Ab).
		• Set SW1.
		  • SW3:Setting ON
		  • SW4:Setting OFF
		  • SW5:Setting ON
		  • SW6:Setting OFF
		Note:
		Also set as shown above on MCUs that do not have a sub clock

Figure A-2 Clock Supply from the User system



APPENDIX B Setup Procedure for the MB2140 Series Emulator (for the F^{2}MC-16L/16/16H/16F Series)

This section summarizes the procedure for setting up the emulator. Refer to the appropriate manuals for details.
This procedure assumes that the host computer is a PC, the communications interface is RS-232C, and the emulator-debugger is the Windows version. Connect and setup other options such as an external probe as required.

■ Required Equipment

- PC (FMR/V series, PC98 series, IBM-PC series or compatible, etc.)
  - CPU: I80386 or higher
  - available hard disk space: 3MB or more
  - available memory: 8MB or more
  - able to run Windows 3.1
- Windows version of the emulator-debugger for the F^{2}MC-16L/16/16H/16F series
  - Distribution Media:art number
  - 3.5 inch (1.2MB):SP3407H004
  - 3.5 inch (1.44MB):SP3507H004
- RS-232C cable (straight-through)
  - MB2124-03 (DSUB25Pin - 25Pin) or MB2124-05 (DSUB25Pin - 9Pin)
- Main unit
  - MB2141A
- Emulation pod
  - MB2145-506
- Probe cable
  - MB2132-4XX
- Connector socket
  - required on user system to connect the probe cable
- User system
  - including power supply
- Evaluation MCU
  - MB90VXXX

■ Hardware Setup Procedure

1. Connect the PC to the main unit using the RS-232C cable.
2. Connect the AC power cable to the main unit.
3. Connect the main unit and emulation pod using pod interface cables A, B, and C.
4. Mount the evaluation MCU in the emulation pod.
5. Set DIP switch SW1 (MCU clock source) on the emulation pod.
6. Connect the emulation pod and probe cable.
7. Connect the probe cable and user system.
8. Connect the power supply to the user system (if an external power supply is used).
9. Turn on the power in the sequence: When turning off the power, turn off in the reverse of the follow sequence.
   - The first step:PC
   - The second step:main unit .
   - The third step:user system.
10. The system is operating normally if the POWER LED and READY LED on the front panel of the main unit are illuminated and the ERROR LED is not illuminated. If not operating normally, recheck the connections and setup.

Reference manuals

- MB2140 Main Unit Hardware Manual
  - Chapter 3 How to Connect
- MB2145-507 Hardware Manual
  - Chapter 3 How to Setup and Connect
  - Chapter 4 Hardware Details
- F^2MC-16L/16/16H/16F series
  - Device manual for each MCU
- F^2MC-16L/16LX/16F MB2140 Series Emulator Setup Manual Windows Version
  - Chapter 2 Hardware Setup
  - Appendix A Treatment of User System Pins Required to Operate the MCU

■ Software Setup Procedure

1. Install the emulator-debugger on the PC.
2. Use the [eml907w Setup] program to set the operating environment for the emulator-debugger.(Setup information is set in the EML907A.INS file.)
3. Use the [Monitor Loader] program to download the monitor program to the main unit. (This only needs to be performed once during setup.)
   - F^2MC-16L series monitor program:EML906.HEX
   - F^2MC-16/16H series monitor program :EML907A.HEX
   - F^2MC-16F series monitor program:EML902.HEX

Reference manuals

- F^2MC-16L/16/16H/16F series Emulator-Debugger Installation Manual Windows Version
- F^2MC-16L/16/16H/16F series Emulator-Debugger Manual Windows Version
  - Appendix B Install File
- F^2MC-16L/16/16H/16FMB2140 Series Emulator Setup Manual Windows Version
  - Chapter 3 "Software Setup"

■ Starting and Exiting the Emulator-Debugger

1. Start the emulator-debugger.
   - Double click on the [eml907w] icon.
2. Exit the emulator-debugger.
   - Select [Exit] from the [File] menu.

Reference manuals

- F^2MC-16L/16/16H/16F series Emulator-Debugger Manual Windows Version
  - Chapter 2 Operation
- F^2MC-16L/16/16H/16F MB2140 Series Emulator Setup Manual Windows Version
  - Chapter 4 "Operation Procedures"

APPENDIX C Setup Checklist for the MB2140 Series Emulator (for the F^{2}MC-16L/16/16H/16F Series)

Use this checklist to confirm that the emulator is setup correctly.
Refer to this checklist if the emulator does not start, malfunctions, or does not operate as expected.

■ Emulator Setup Checklist

The following is the emulator setup checklist.

1.Hardware:

Setup Checklist for the MB2140 Series Emulator (for the F^{2}MC-16L/16/16H/16F Series)

- Use this checklist to confirm that the emulator is setup correctly.
- Refer to this checklist if the emulator does not start, malfunctions, or does not operate as expected.

1. Hardware

- Is the emulator connected to the user system?
- (PC + main unit + emulation pod + probe cable + connector socket + user system + power supply)
- Is the evaluation MCU (MB90VXXX) mounted on the emulation pod?
- Is the power supply to the evaluation MCU being supplied from the user system?
- Is the SW1 DIP switch (evaluation MCU clock source) on the emulation pod set?
- When supplying the clock to the evaluation MCU from the pod, is the resonator or oscillator mounted in the crystal mounting socket on the pod?
- When supplying the clock to the evaluation MCU from the user system, is the clock supply buffered by a CMOS inverter or similar?
- Are the MCU pins on the user system connected correctly?
- (MD0 to 2, $\overline{\text{RST}}$, $\overline{\text{HST}}$,VCC, VSS, AVCC, AVSS, etc.)
- Is the RS-232C cable used to connect the PC and main unit a straight-through type?

Reference manuals

- MB2140 Main Unit Hardware Manual
  - Chapter 3 How to Connect
- MB2145-507 Hardware Manual
  - Chapter 3 How to Setup and Connect

- Chapter 4 Hardware Details

- F^{2}MC-16L/16LX/16F series Device manual for each MCU
- F^{2}MC-16L/16/16H/16F MB2140 Series Emulator Setup Manual Windows Version
  - Chapter 2 "Hardware Setup"
  - AppendixA "Treatment of User System Pins Required to Operate the MCU"

2.Software:

2. Software

- Have you used the [eml907w Setup] program to setup the operating environment for the emulator-debugger?(Setup information is set in the EML907A.INS file.)
  - Items that must always be set:**-Communication interface settings** (INTERFACE) **-Chip type settings**(CHIP:F^{2}MC-16L series, F^{2}MC-16/16H series, or F^{2}MC-16F series)
  - Items that must always be set to match the MCU being debugged and the system specifications:**-Internal ROM area setting**(INROM) **-Internal ROM image present or not setting**(ROMIMAGE) **-On the F^{2}MC-16L series only -External data bus width setting**(BUSWIDTH) **-External data bus type setting**(TYPE) **-On the F^{2}MC-16H series only -Internal instruction RAM area setting**(EXERAM) **-On the F^{2}MC-16H series only**
- Have you used the [Monitor Loader] program to downloaded the monitor program?(Loading the monitor program only needs to be performed once during setup.)
  - F^{2}MC-16L series monitor program:EML906.HEX
  - F^{2}MC-16/16H series monitor program:EML907A.HEX
  - F^{2}MC-16F series monitor program:EML902.HEX

Reference manuals

- F^{2}MC-16L/16/16H/16F series Emulator-Debugger Installation Manual Windows Version
- Emulator-Debugger Manual Windows Version
  - Appendix B Install File
  - B.1 Communications Interface Setting
  - B.2 Chip Type Setting
  - B.3 Internal ROM Area Setting
  - B.4 Internal ROM Image Present or Not Setting
  - B.5 External Data Bus Width Setting
  - B.6 External Data Bus Type Setting
  - B.9 Internal Instruction RAM Area Setting
- F^{2}MC-16L/16/16H/16F MB2140 Series Emulator Setup Manual Windows Version
  - Chapter3 "Software Setup"

INDEX

The index follows on the next page.
This is listed in alphabetic order.

Index

CM42-00410-2E

FUJITSU SEMICONDUCTOR •CONTROLLER MANUAL

F^2MC-16L/16/16H/16F
16-BIT MICROCONTROLLER
MB2140 Series EMULATOR SETUP MANUAL
Windows Version

January 2000 the second edition

Published **FUJITSU LIMITED** Electronic Devices

Edited Technical Communication Dept.

FUJITSU

CM42-00410-2E

FUJITSU SEMICONDUCTOR F²MC-16L/16/16H/16F 16-BIT MICROCONTROLLER MB2140 Series EMULATOR SETUP MANUAL Windows Version