Corporate names revised in the documents

The Fujitsu Limited reorganized its LSI business into a wholly owned subsidiary, the Fujitsu Microelectronics Limited on March 21, 2008.

The corporate names “Fujitsu” and “Fujitsu Limited” described all in this document have been revised to the “Fujitsu Microelectronics Limited”. Thank you for your cooperation and understanding this notice.

Moreover, there are no changes in the related documents other than corporate names revised.

Customers are advised to consult with sales representatives before ordering.

March 21, 2008
Fujitsu Microelectronics Limited

FUJITSU SEMICONDUCTOR
SUPPORT SYSTEM

SS01-26029-1E

F²MC-8FX Family
STARTER KIT (ver. 3V)
MB2146-401-01A
SETUP GUIDE

FUJITSU

PREFACE

Thank you for purchasing the F²MC*1-8FX Family Starter Kit (ver. 3V) (Model: MB2146-401-01A)*2.
This product is a starter kit for F²MC-8FX MB95FV100D-101 (ver. 3V), which comes with MB2146-09A-E (F²MC Family BGM Adapter)*3, MB2146-301A-E (F²MC-8FX Family MCU Board for MB95FV100D-101)*4, MB2146-401 (F²MC-8FX Family Evaluation Board)*5, and F²MC-8L/8FX Family SOFTUNE Professional Pack Evaluation Version*6.
This manual explains how to use the Starter Kit. Be sure to read this manual before using the product. For mass production/evaluation MCUs for this product, consult with sales representatives or support representatives.

*1 : F²MC is the abbreviation of FUJITSU Flexible Microcontroller.
*2 : Referred below as the "Starter Kit".
*3 : Referred below as the "BGM Adapter".
*4 : Referred below as the "MCU Board".
*5 : Referred below as the "Evaluation Board".
*6 : Referred below as the "SOFTUNE".

■ Handling and use

Handling and use of this product and notes regarding its safe use are described in the manuals for products bundled with the Starter Kit.
Follow the instructions in the manuals to use this product.
Keep this manual at hand so that you can refer to it anytime during use of this product.

■ Notice on this document

All information included in this document is current as of the date it is issued. Such information is subject to change without any prior notice.
Please confirm the latest relevant information with the sales representatives.

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

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

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

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

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

Cuts, Damage	Before moving the product, be sure to turn off all the power supplies and unplug the cables. Watch your step when carrying the product. Do not use the product in an unstable location such as a place exposed to strong vibration or a sloping surface. Doing so may cause the product to fall, resulting in an injury or fault.
Cuts	The product contains sharp edges that are left unavoidably exposed, such as jumper plugs. Handle the product with due care not to get injured with such pointed parts.
Damage	Do not place anything on the product or expose the product to physical shocks. Do not carry the product after the power has been turned on. Doing so may cause a malfunction due to overloading or shock.
Damage	Since the product contains many electronic components, keep it away from direct sunlight, high temperature, and high humidity to prevent condensation. Do not use or store the product where it is exposed to much dust or a strong magnetic or electric field for an extended period of time. Inappropriate operating or storage environments may cause a fault.
Damage	Use the product within the ranges given in the specifications. Operation over the specified ranges may cause a fault.
Damage	To prevent electrostatic breakdown, do not let your finger or other object come into contact with the metal parts of any of the connectors. Before handling the product, touch a metal object (such as a door knob) to discharge and any static electricity from your body.
Damage	Before turning the power on, in particular, be sure to finish making all the required connections. Furthermore, be sure to configure and use the product by following the instructions given in this document. Using the product incorrectly or inappropriately may cause a fault.
Damage	Always turn the power off before connecting or disconnecting any cables from the product. When unplugging a cable, unplug the cable by holding the connector part without pulling on the cable itself. Pulling the cable itself or bending it may expose or disconnect the cable core, resulting in a fault.
Damage	Because the structure of the MCU socket does not allow an evaluation MCU to be mounted in the incorrect orientation, be very careful of the orientation of the evaluation MCU when mounting it. Inserting the evaluation MCU in the wrong orientation may damage the MCU, causing the MCU to become faulty.
Damage	Because the product has no casing, it is recommended that it be stored in the original packaging. Transporting the product may cause a damage or fault. Therefore, keep the packaging materials and use them in case of for the re-shipment of the product.

- The contents of this document are subject to change without notice.
  Customers are advised to consult with sales representatives before ordering.
- The information, such as descriptions of function and application circuit examples, in this document are presented solely for the purpose of reference to show examples of operations and uses of FUJITSU semiconductor device; FUJITSU does not warrant proper operation of the device with respect to use based on such information. When you develop equipment incorporating the device based on such information, you must assume any responsibility arising out of such use of the information. FUJITSU assumes no liability for any damages whatsoever arising out of the use of the information.
- Any information in this document, including descriptions of function and schematic diagrams, shall not be construed as license of the use or exercise of any intellectual property right, such as patent right or copyright, or any other right of FUJITSU or any third party or does FUJITSU warrant non-infringement of any third-party's intellectual property right or other right by using such information. FUJITSU assumes no liability for any infringement of the intellectual property rights or other rights of third parties which would result from the use of information contained herein.
- The products described in this document are designed, developed and manufactured as contemplated for general use, including without limitation, ordinary industrial use, general office use, personal use, and household use, but are not designed, developed and manufactured as contemplated (1) for use accompanying fatal risks or dangers that, unless extremely high safety is secured, could have a serious effect to the public, and could lead directly to death, personal injury, severe physical damage or other loss (i.e., nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, missile launch control in weapon system), or (2) for use requiring extremely high reliability (i.e., submersible repeater and artificial satellite).
  Please note that FUJITSU will not be liable against you and/or any third party for any claims or damages arising in connection with above-mentioned uses of the products.
- Any semiconductor devices have an inherent chance 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.
- Exportation/release of any products described in this document may require necessary procedures in accordance with the regulations of the Foreign Exchange and Foreign Trade Control Law of Japan and/or US export control laws.
- The company names and brand names herein are the trademarks or registered trademarks of their respective owners.

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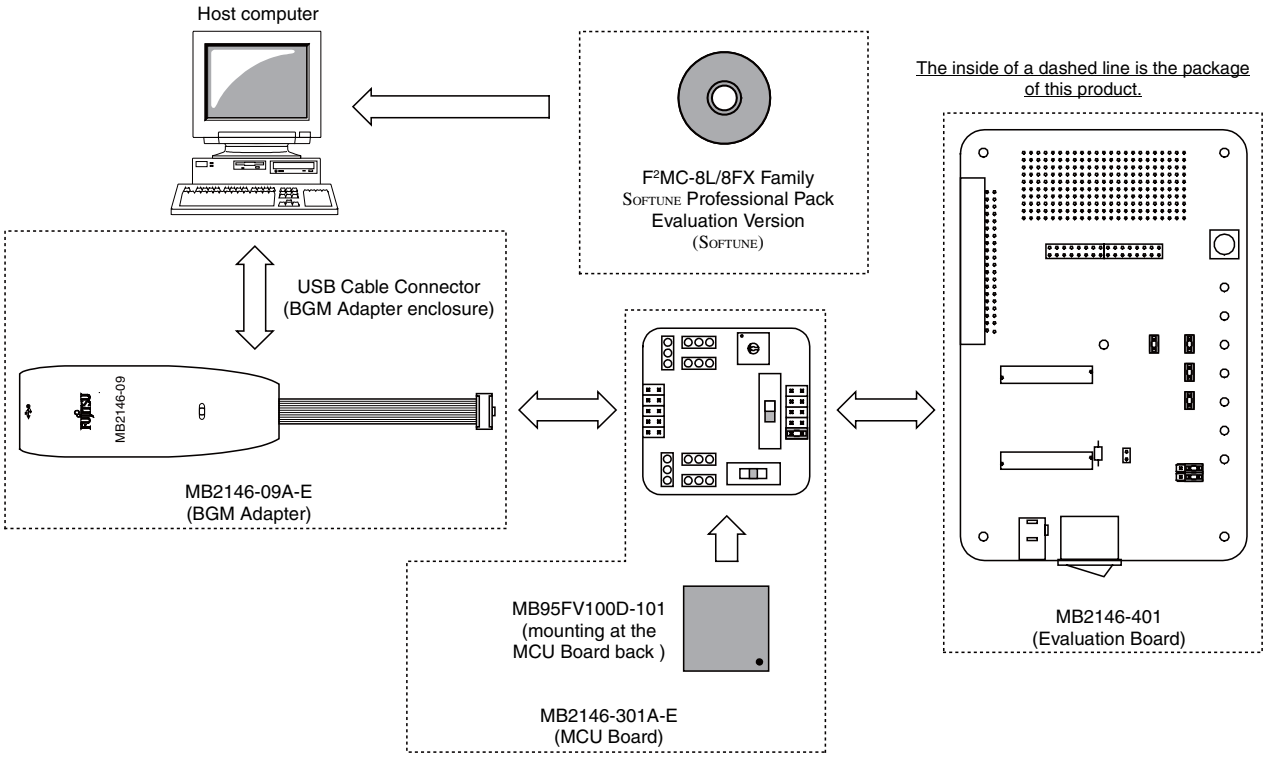
1. Checking the Delivered Product

Before using the product, make sure that the following components are included:



- MB2146-09A-E*1 : 1
- MB2146-301A-E*2 : 1
- MB2146-401*3 : 1
- F²MC-8L/8FX Family
  SOFTUNE Professional Pack Evaluation Version*4 : 1
- Setup Guide(Japanese version) : 1
- Setup Guide(English version, this manual) : 1

*1 : To use the BGM Adapter, connect it to the host computer and USB cable. The USB cable is enclosed by the BGM Adapter.

*2 : MB95FV100D-101 is implemented in the MCU Board.
To use the MCU Board, connect it to the BGM Adapter and the Evaluation Board.

*3 : To use the Evaluation Board, connect it to the MCU Board. AC Adapter is enclosed by the evaluation board.

*4 : To use the SOFTUNE, install it in your host computer.

MB2146-401-01A is used as a starter kit for F²MC-8FX MB95FV100D-101 (ver. 3V) by combining with the bundled products.
For details about this product, consult with sales representatives or support representatives.

2. Handling Precautions

The Starter Kit can be used in connection with its bundled products. To ensure correct use of this product in a proper environment, observe the following guideline:

- Follow the instructions described in each manual for the bundled product to use this product.

3. Feature

The F²MC-8FX starter kit is the best for a performance and functional evaluation, and a check of operation before including F²MC-8FX in a user's system.By carrying out additional purchase of the header board, continuation use also of the evaluation with a user's system can be carried out.
Below, the feature of the BGM debugger for F²MC-8FX is shown.

- Microcomputer operation voltage It corresponds to +2.6V to +3.6V.
  (The maximum and minimum of microcomputer operation voltage and frequency of operation differs with each MCU. refer to the documents (a data sheet, hardware manual, etc.) of each device relation for operation voltage and frequency of MCU of operation).
- Compact development environment, a light and small BGM Adapter.
- Since a monitor program is performed in exclusive memory space, it does not consume user memory space.
- Continuation execution, step execution, a command break, a data break, sequential break correspondence
- Command trace is possible (a maximum of 16 branches).
- It connects with a host computer by the USB interface.

4. Hardware Setup

In the hardware setup procedure, you configure and connect the hardware products. This chapter includes the configuring and connecting procedure for each product in order. Check the contents and complete the hardware setup.

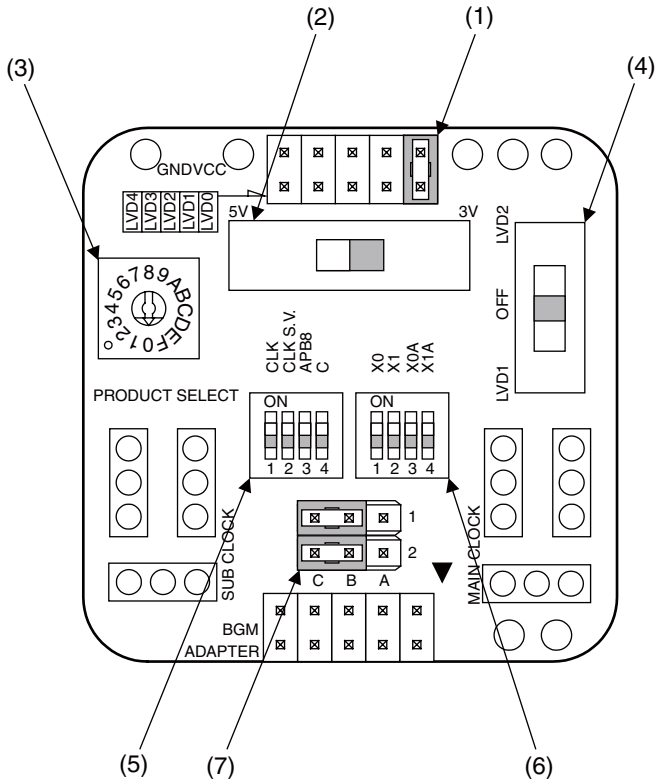
- Configuration of each product
  - Configuring MCU Board
  - Configuring Evaluation Board
- Connection of each product
  - Connecting MCU Board and Evaluation Board
  - Connecting BGM Adapter
  - Connecting oscillators
  - Connecting AC Adapter

4.1 Configuration of Each Product

This section describes how to configure the MCU Board and the Evaluation Board.

■ Configuring MCU Board

Set the following switches on the MCU Board, referring to "Figure 1 MCU Board Configuration".



(1) LVD2 detection voltage selection jumper plug
Set the value to "LVD0".

(2) Voltage selector switch
Set the value to "3V".

(3) Product selector switch
Rotate the center tab to position the pointer for the corresponding number:
For 100-pin package, set the value to "0".
For 80-pin package, set the value to "1".
For 64-pin package, set the value to "2".
For 48-pin package, set the value to "3".
For none of the above, check on the settings in the MCU Board manual.

(4) LVD selector switch
Set the value to "OFF".

(5) Miscellaneous switches
Set "CLK" to "OFF" if you use subclock, or "ON" if you don't.
Set the other switches to "OFF" (to the side of numeral letters).

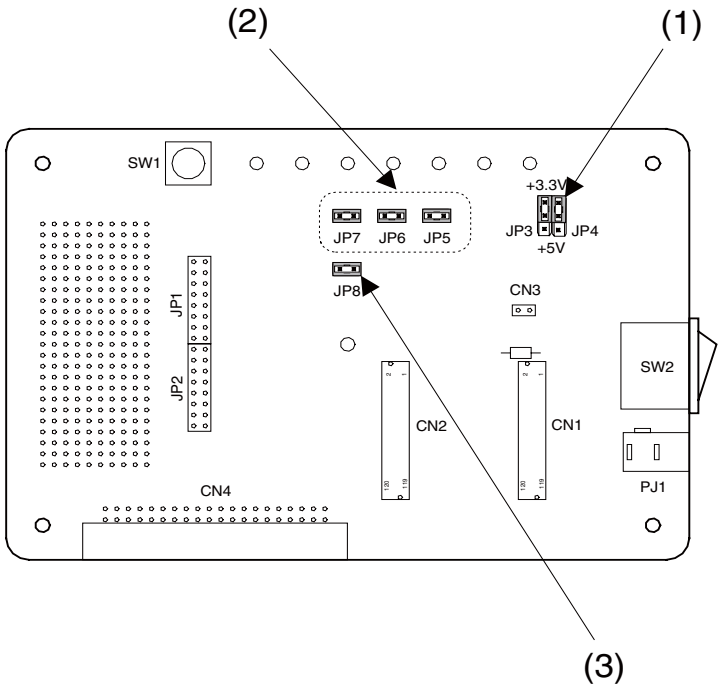
(6) Clock input selector switch
Set all to "OFF" (to the side of numeral letters)".

(7) Subclock selector jumper plug
Set all the values to the side of "B-C".

Figure 1 MCU board configuration

■ Configuring Evaluation Board

Set the following switches on the Evaluation Board, referring to "Figure 2 Evaluation Board Configurarion".



(1) 5V/3.3V Power supply selector jumper plug
Set the value to the side of "+3.3V".
(2) Analog power supply jumper plug
Insert jumper plug for all the switches.
(3) MOD selector jumper plug
Insert jumper plug.

Figure 2 Evaluation board configuration

4.2 Connection of Each Product

This section describes how to connect the MCU Board, the Evaluation Board, and the BGM Adapter. This section also describes how to mount the crystal oscillator on the MCU Board, and how to plug the AC adapter into the Evaluation Board.

■ Connecting MCU Board and Evaluation Board

Connect the MCU Board and the Evaluation Board, referring to "Figure 3 Connection of MCU Board and Evaluation Board". Each board has an index to avoid the reverse mounting. Look at the index position to connect the boards.

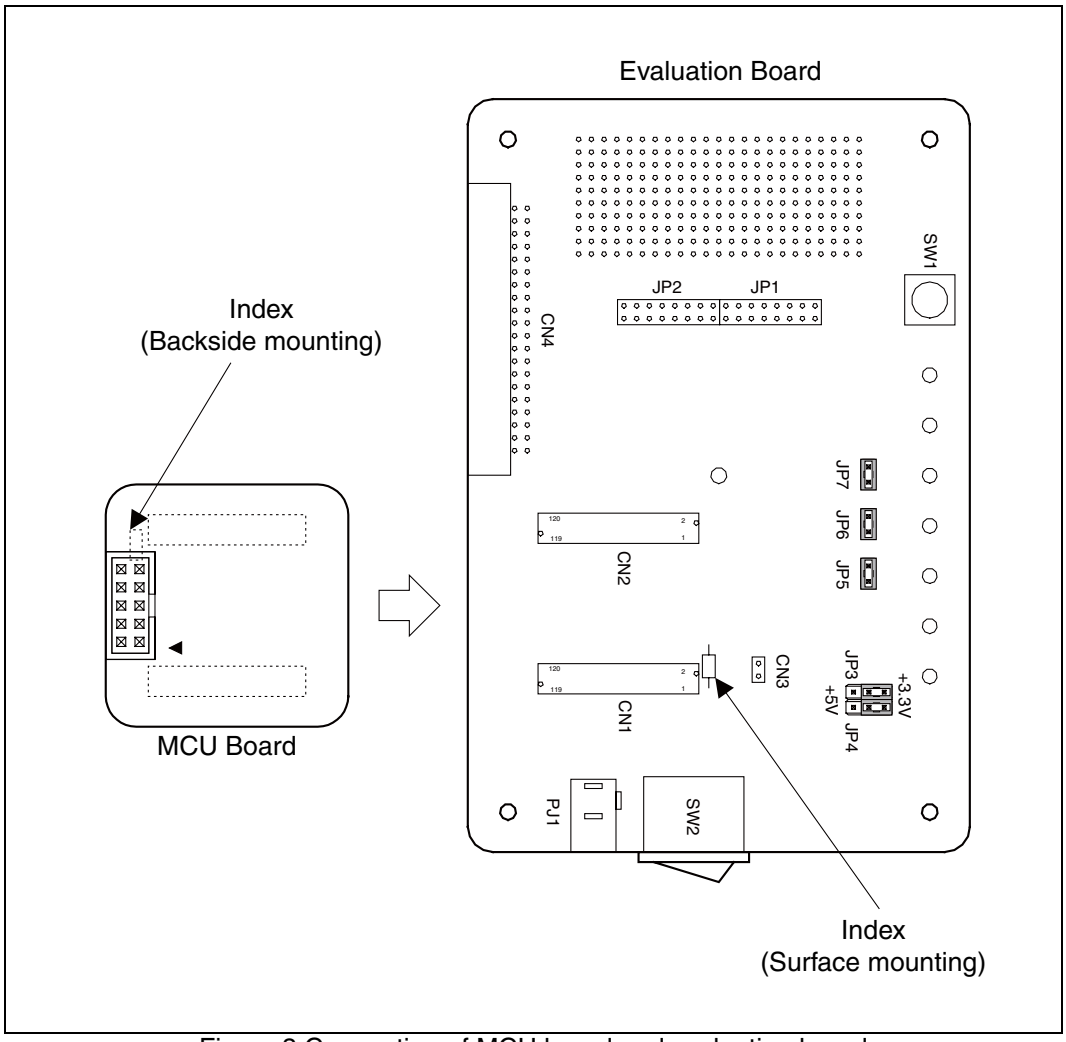


Figure 3 Connection of MCU board and evaluation board

■ Connecting BGM Adapter

Connect the BGM Adapter and the MCU Board, referring to "Figure 4 Connection of BGM Adapter". The BGM Adapter and the MCU Board have an index mark (for pin 1) on its connectors. Align the index mark on both sides.

Plug a USB cable into the BGM Adapter (the cable is bundled with the BGM Adapter).

Make sure that POWER-SW on the Evaluation Board is set to OFF (to the side of " ○ ") before plugging the cable.

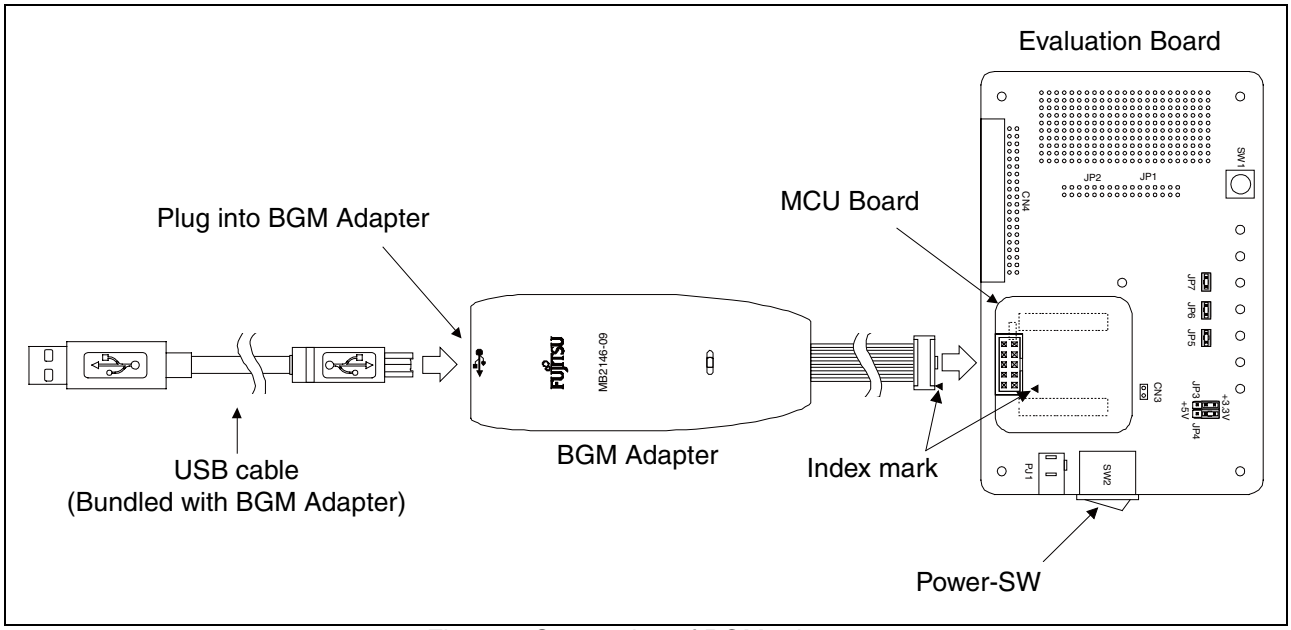
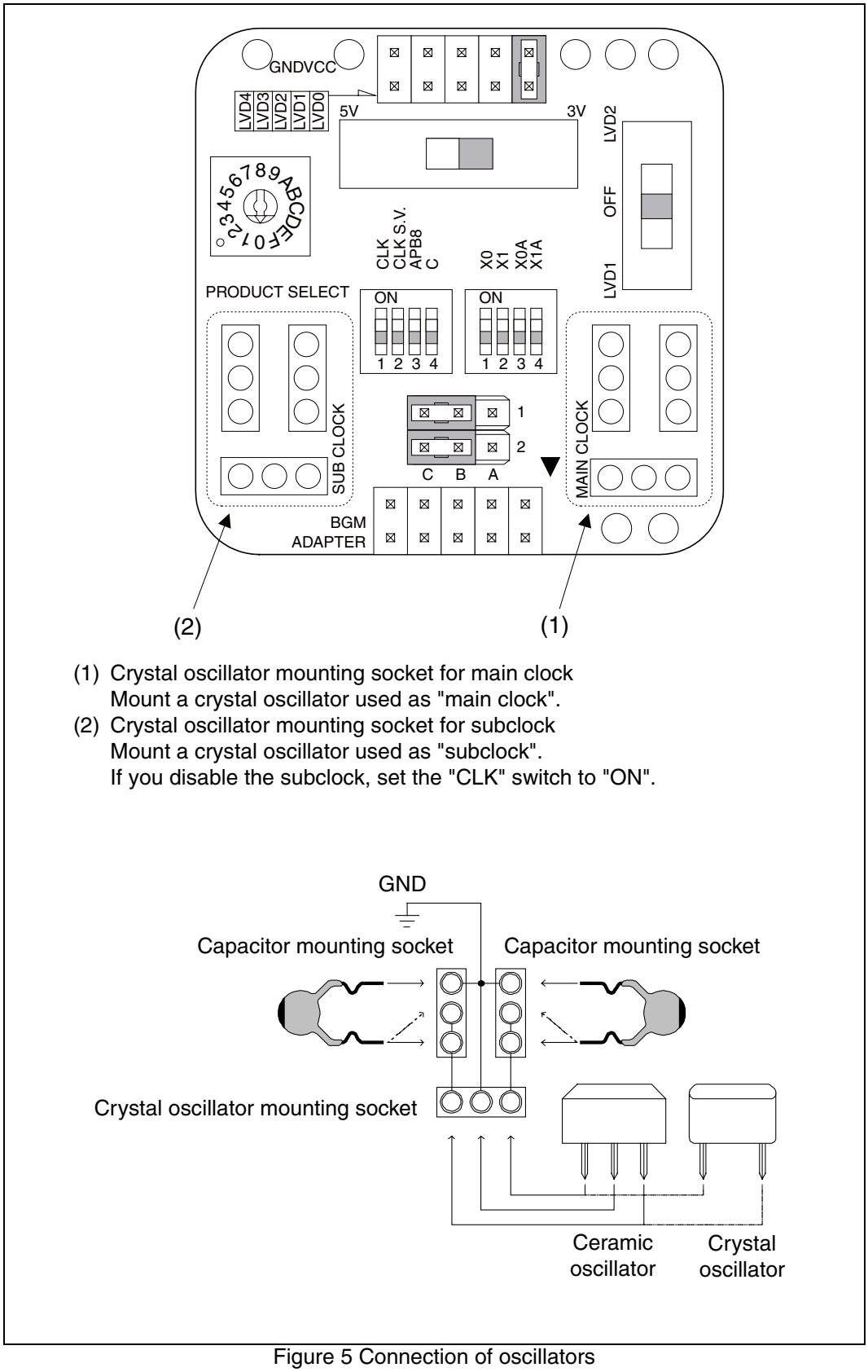


Figure 4 Connection of BGM adapter

■ Connecting Oscillators

Plug crystal/ceramic oscillators into the crystal oscillator mounting sockets (one for the main clock and the other for the subclock) on the MCU Board (See "Figure 5 Connection of oscillators") .
You can see one crystal oscillator mounting socket for main clock and the other for subclock on the MCU Board. Mount a crystal or ceramic oscillator and a capacitor on the MCU Board.



(1) Crystal oscillator mounting socket for main clock
Mount a crystal oscillator used as "main clock".
(2) Crystal oscillator mounting socket for subclock
Mount a crystal oscillator used as "subclock".
If you disable the subclock, set the "CLK" switch to "ON".

Figure 5 Connection of oscillators

■ Connecting AC Adapter

Connect the AC Adapter and the Evaluation Board, referring to "Figure 6 Connection of AC Adapter". The AC Adapter (bundled with the Evaluation Board) is plugged into the PJ1 on Evaluation Board and the AC 100V Power Supply.

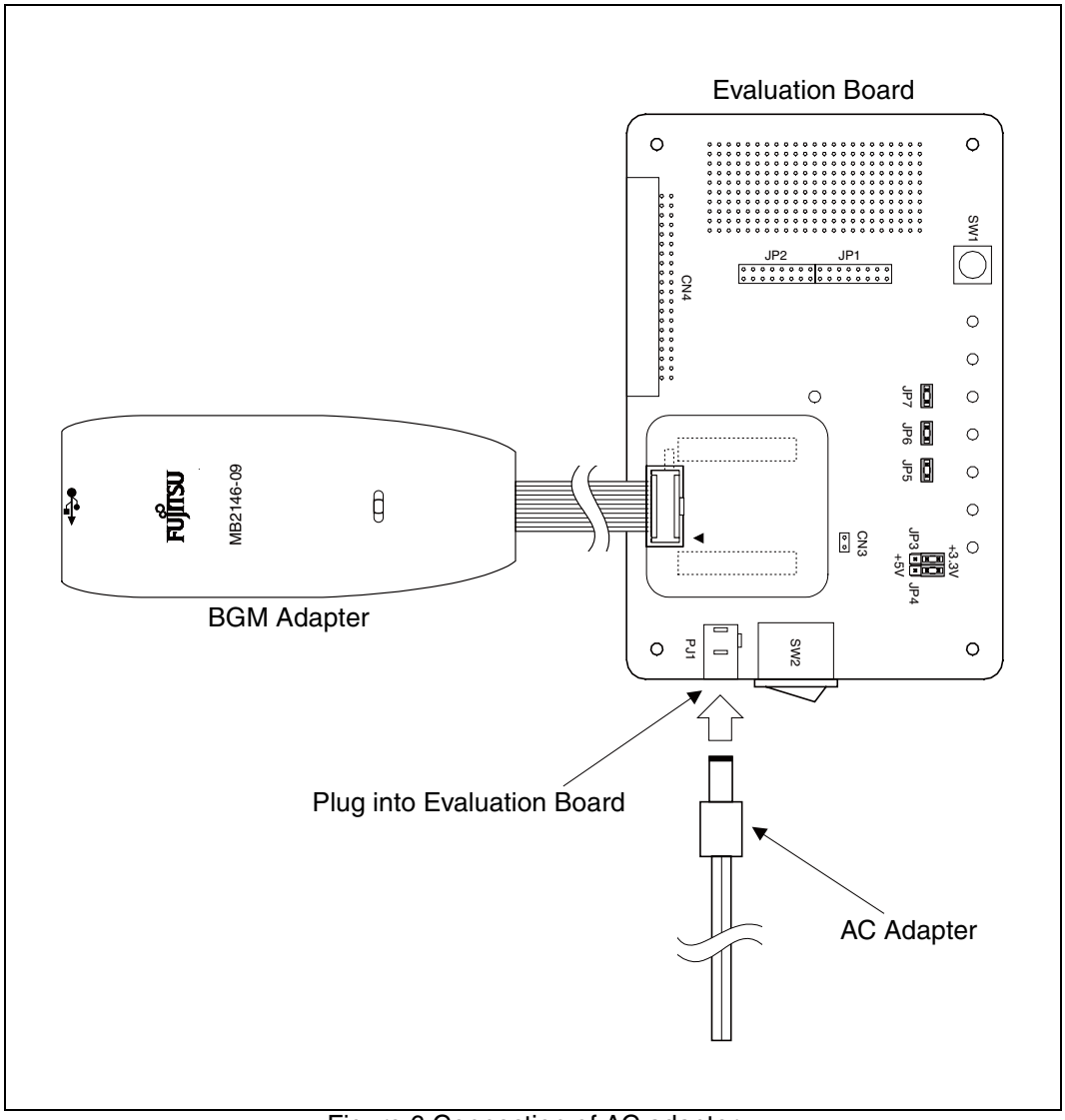


Figure 6 Connection of AC adapter

5. Software Setup

In the software setup procedure, you install and operate the software applications.
This chapter includes the installing and operating procedure for each software in order. Check the contents and complete the software setup.

- Installation of software
  - Installing SOFTUNE
  - Installing USB driver
  - Installing sample program
- Operation of SOFTUNE
  - Starting SOFTUNE Workbench
  - Starting Debugging
  - Initializing MCU
  - Running the program
  - Aborting the program
  - Ending Debugging
  - Exiting SOFTUNE Workbench

5.1 Installation of Software

This section describes how to install SOFTUNE and the USB driver in your host computer, as well as how to install the sample program.

■ Installing SOFTUNE

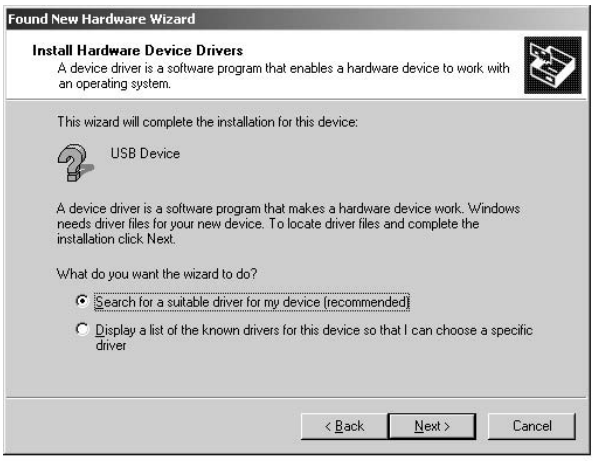
Follow the instruction described in "F²MC-8L/8FX Family 8-bit Microcontroller SOFTUNE Workbench Installation Guide" to install SOFTUNE in your host computer.

■ Installing USB Driver

Plug a USB cable connected to BGM Adapter into your host computer. After you connect the host computer and the BGM Adapter, the [Found New Hardware Wizard] window appears. Follow the instruction below to install the USB driver.

In a few seconds after the above dialog is displayed, the [Welcome to the Found New Hardware Wizard] screen appears. Click [Next] to install the device driver.

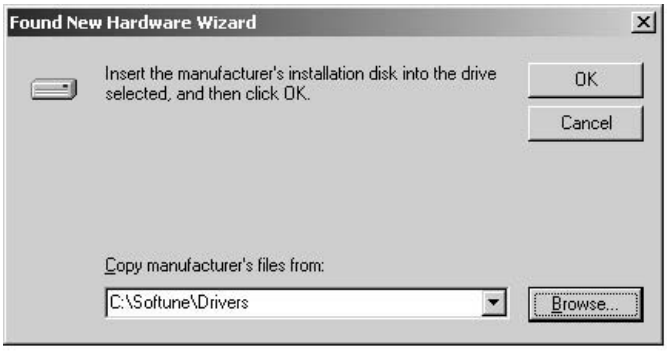
The [Install New Hardware Device Drivers] screen appears.
Click [Search for a suitable driver for my device (recommended)], and then click [Next] to search for a suitable driver for your device.



The [Locate Driver Files] screen appears.
Check [Specify a location], and then click [Next] to specify the location for the driver.

A file location dialog appears.
Select "SiUSBdB.INF" in the "\Drivers" folder (under a directory where SOFTUNE is installed), and click [Open] to specify the driver.

In the [Copy manufacturer’s files from] box, make sure that the "\Drivers" folder (under a directory where SOFTUNE is installed) is selected, and click [OK].



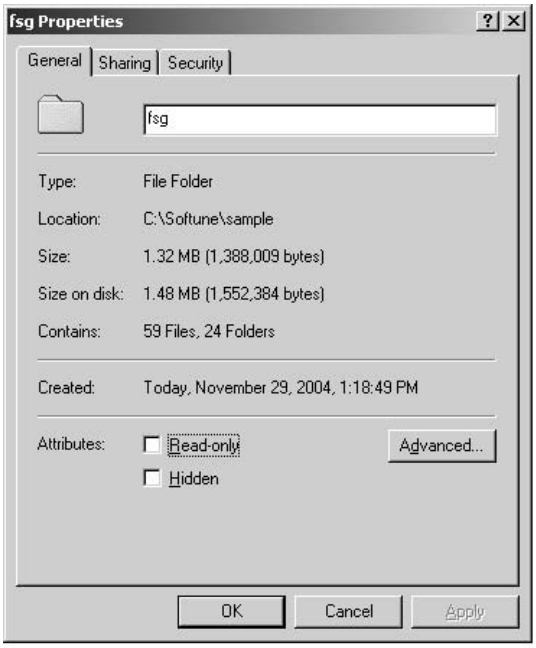
The [Driver Files Search Results] screen appears.
Click [Next] to start installing the driver.

The [Completing the Found New Hardware Wizard] screen appears.
Now that the USB driver installation has completed, click [Finish] to exit the Wizard.

■ Installing Sample Program

Copy only a folder named "\fsg" under "\MANUAL\FirstStepGuide" in SOFTUNE CD into the "\sample" folder under a directory where SOFTUNE is installed.

All the data in the "\fsg" folder is set to "read-only". Open the folder's properties, and deselect the [Read Only] checkbox, and click [OK].



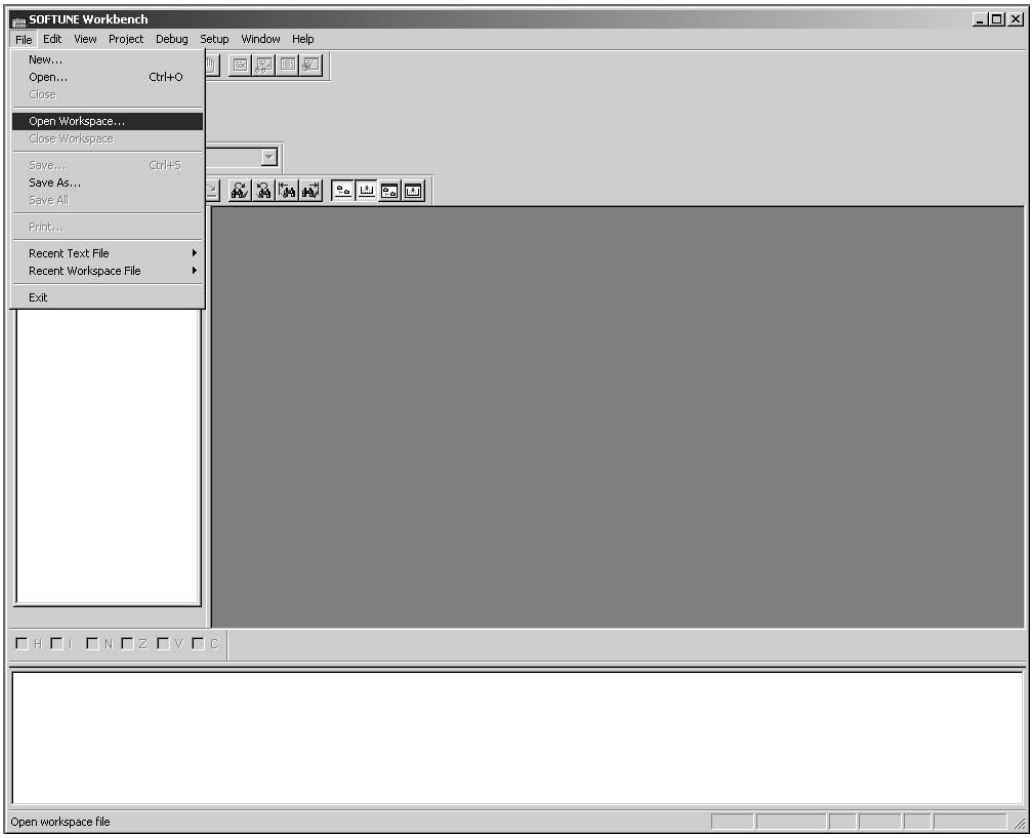
In the [Confirm Attribute Change] dialog, check [Apply Changes to this folder, sub-folders, and files], and click [OK] to confirm the attribute change.

5.2 Operation of SOFTUNE

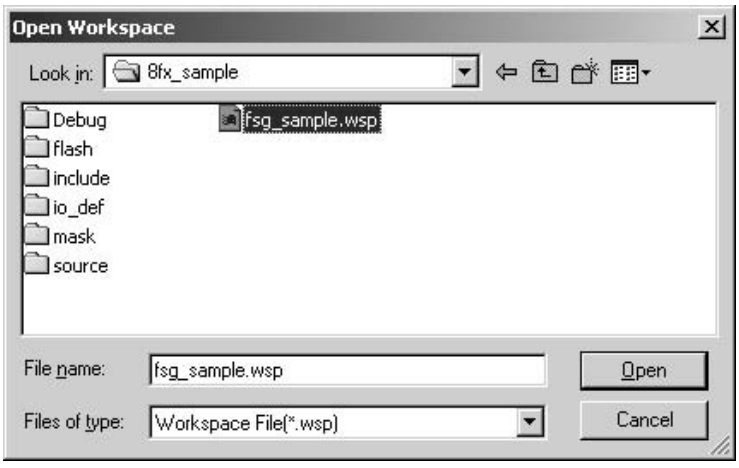
This section describes how to start SOFTUNE Workbench and operate it using the sample program.

■ Starting SOFTUNE Workbench

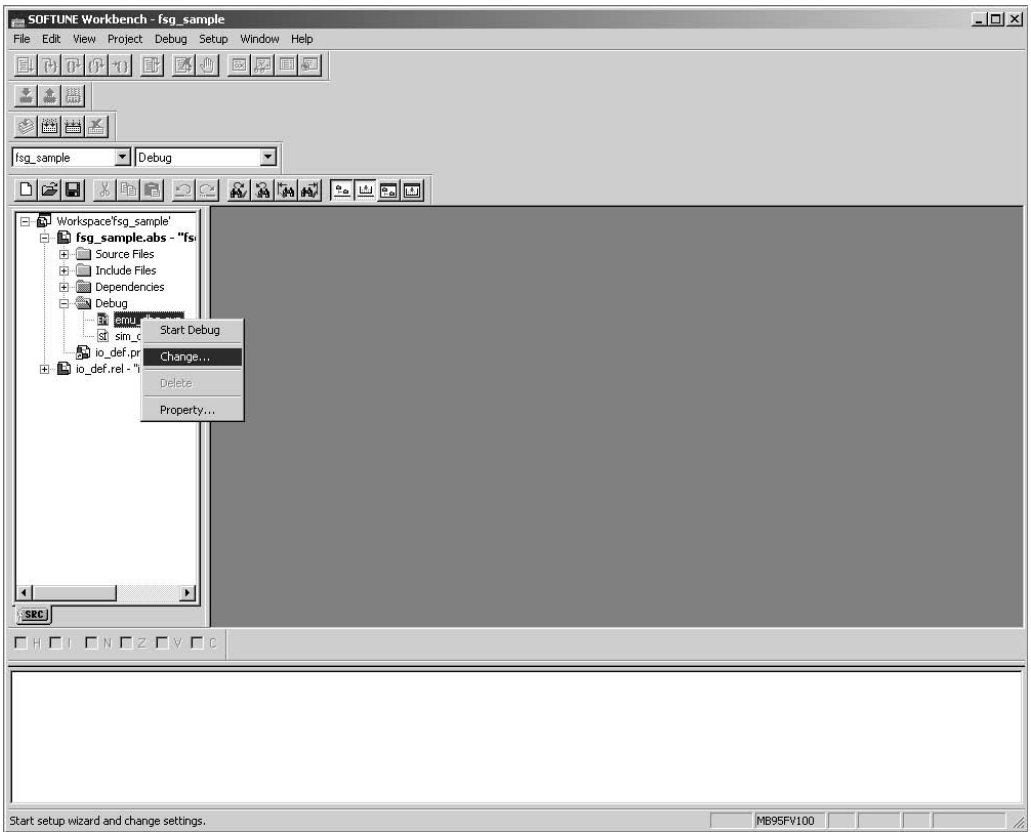
Start SOFTUNE and configure the SOFTUNE development environment. From the [File] menu, click [Open Workspace].



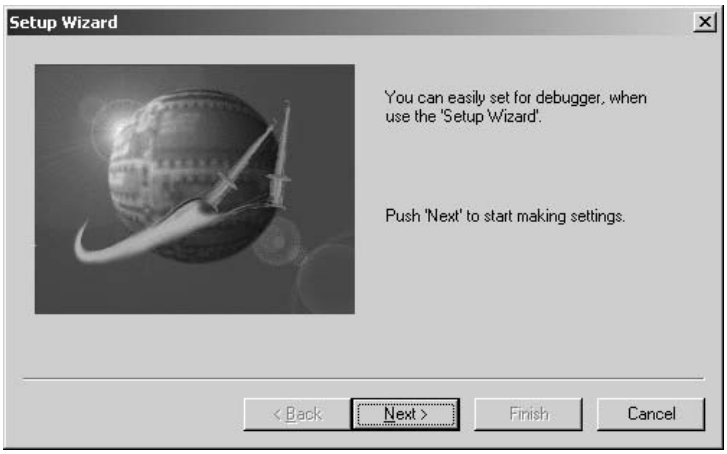
In a file location dialog, select the "\sample\fsg\8fx_sample" folder under a directory where SOFTUNE is installed, and specify "fsg_sample.wsp", then click [Open].



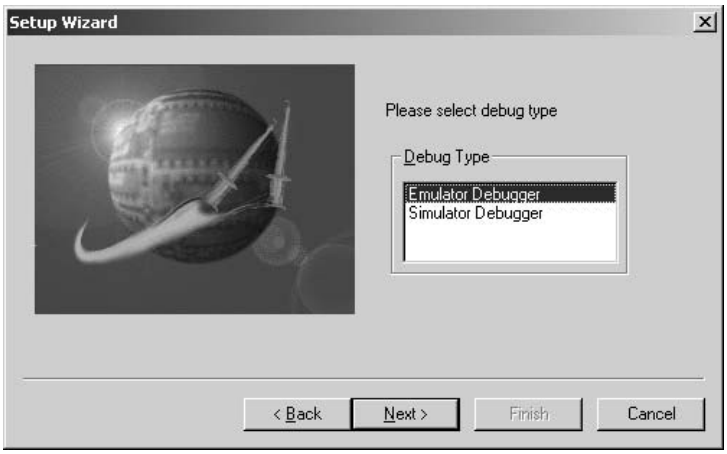
Select and right-click "emu_dbg.sup" under the "Debug" folder, then click [Change Settings] to start the setup wizard.



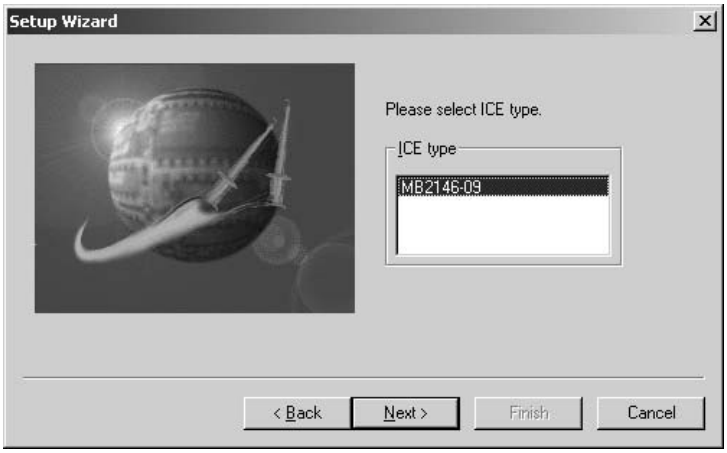
The setup wizard is started. Click [Next].



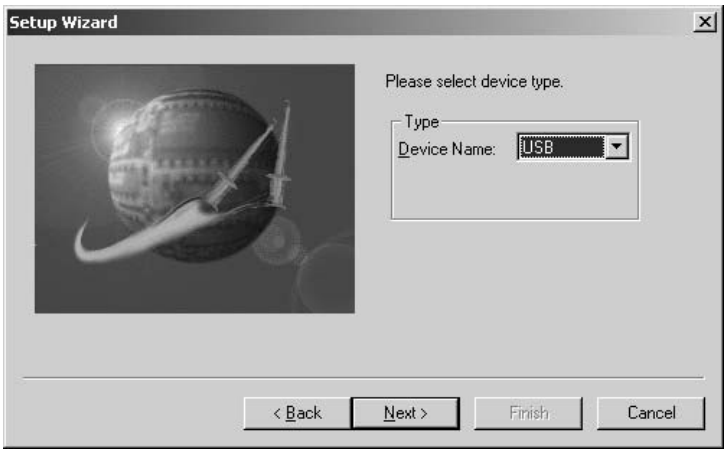
In [Debug Type], specify [Emulator Debugger], and click [Next].



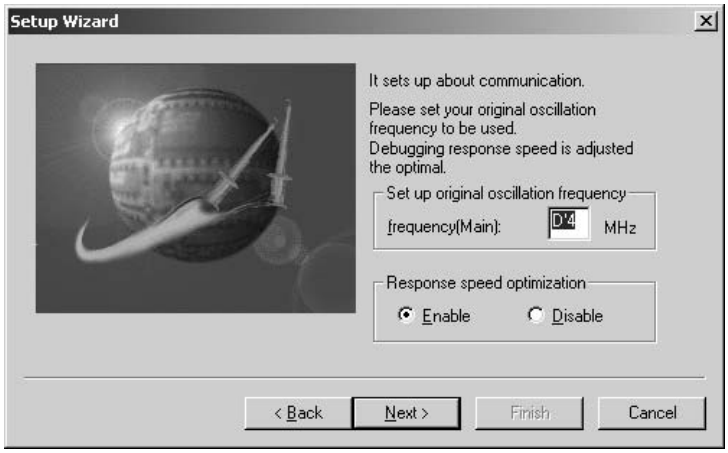
In [ICE Type], specify [MB2146-09], and click [Next].



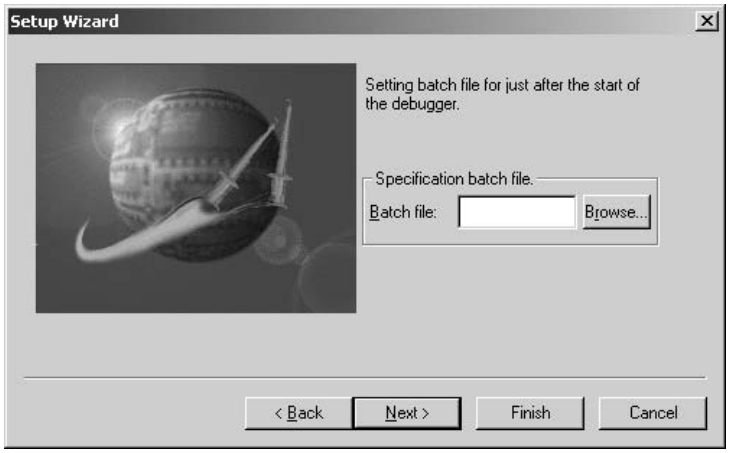
In [Device Name], specify [USB], and click [Next].



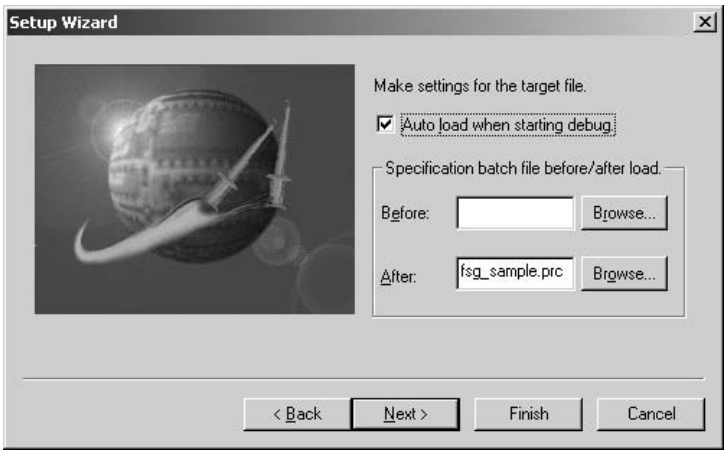
In Frequency[Main], set the frequency of oscillator connected to MCU Board, and click [Next].



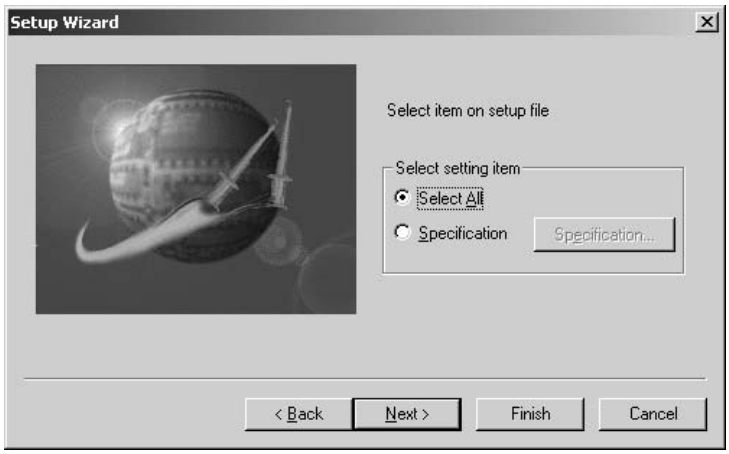
The [Batch file] setting is not required. Click [Next].



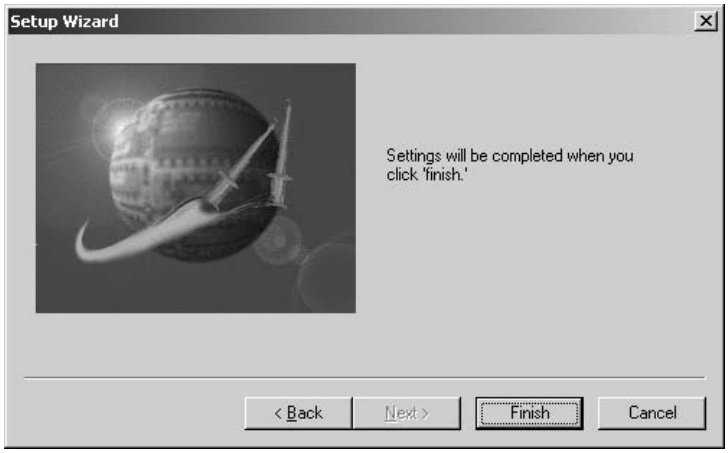
Check [Auto-load when starting debug], and specify "fsg_sample.prc" in [After] under [Specification batch file before/after load], then click [Next].



Check [Select All], and click [Next].



Click [Finish] to complete the setup of SOFTUNE development environment.



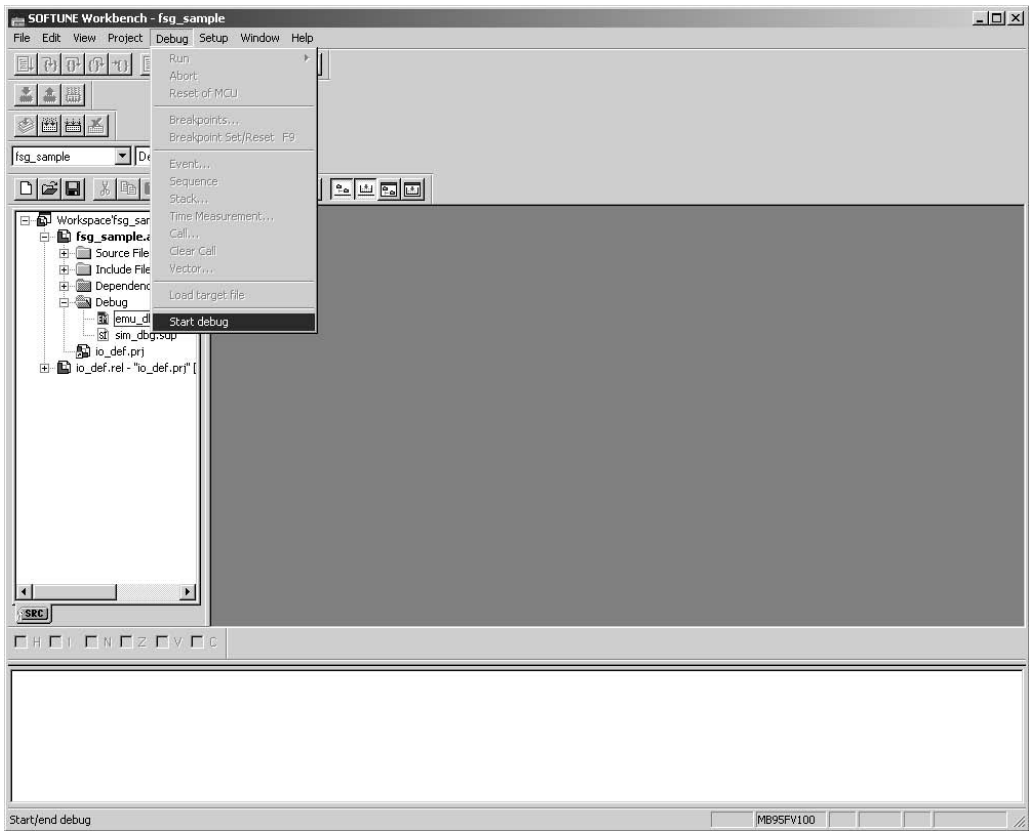
■ Starting Debugging

<Turning Evaluation Board on>

Before starting debugging, turn the Evaluation Board on. Push POWER-SW on the Board to ON (to the side of " | ") to turn it on (See "Connecting BGM Adapter" for information about POWER-SW) .

After the Evaluation Board is turned on, click [Start debug] from the [Debug] menu to start debugging.

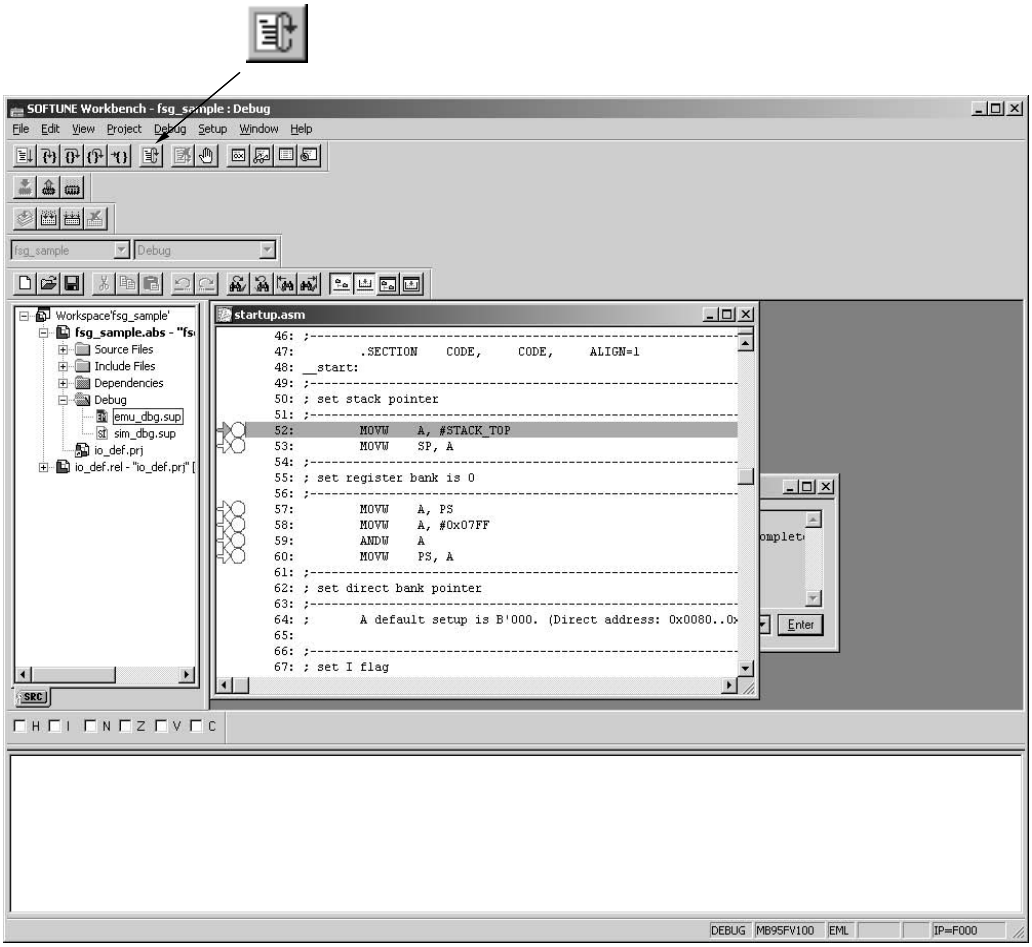
When you start debugging, the sample program is automatically loaded.



■ Initializing MCU

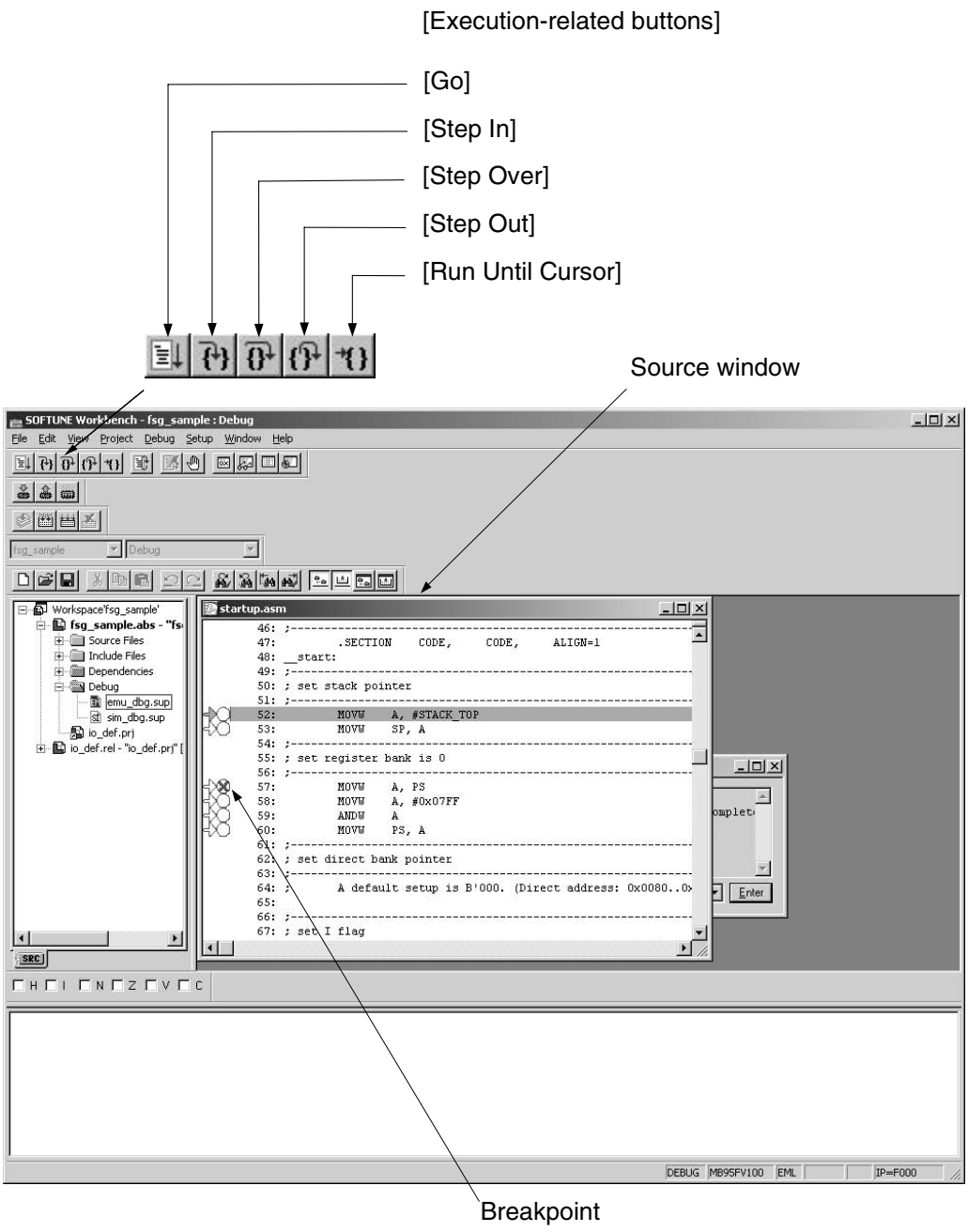
Initialize MCU. To do so, click the Reset button on the task bar.

Reset button



■ Running the Program

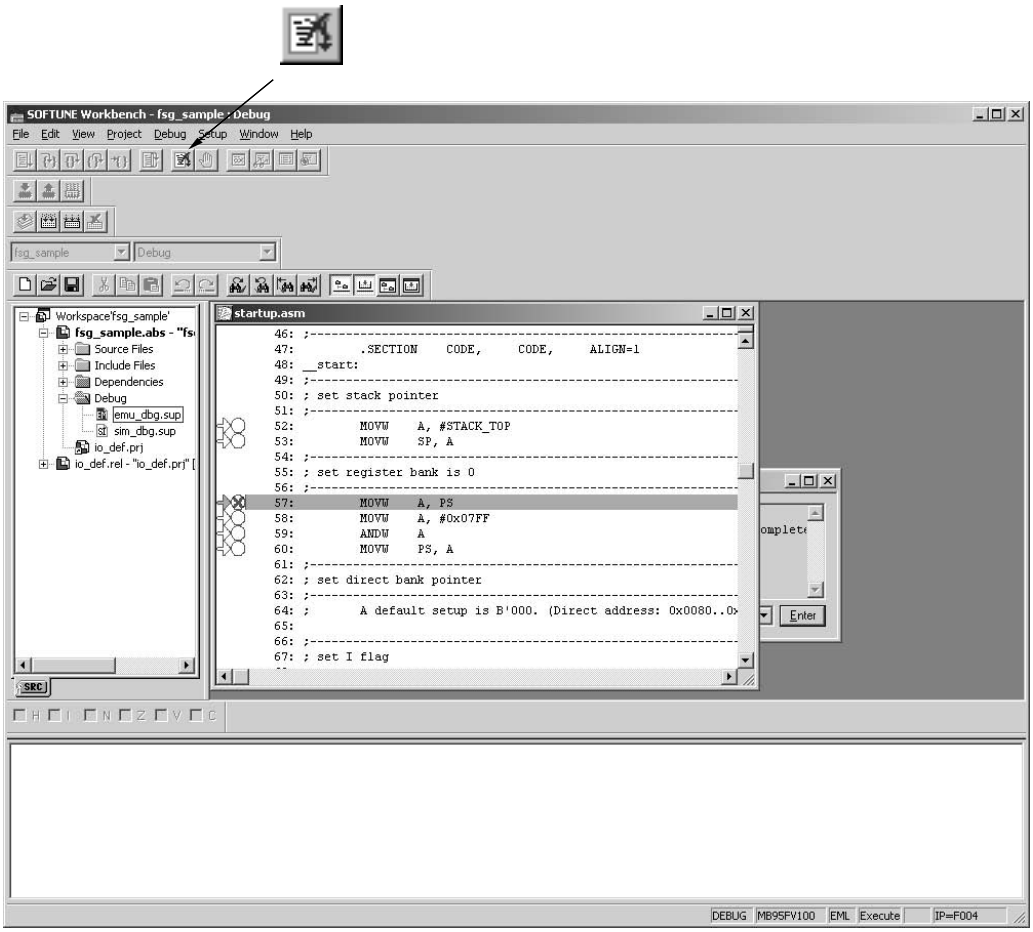
You can run the program by clicking the "execution-related buttons" on the task bar.
You can also set a breakpoint by clicking the " ○ " mark in the Source window.



■ Aborting the Program

After you have run the program, you can stop it by clicking the Abort button on the task bar.

Abort button

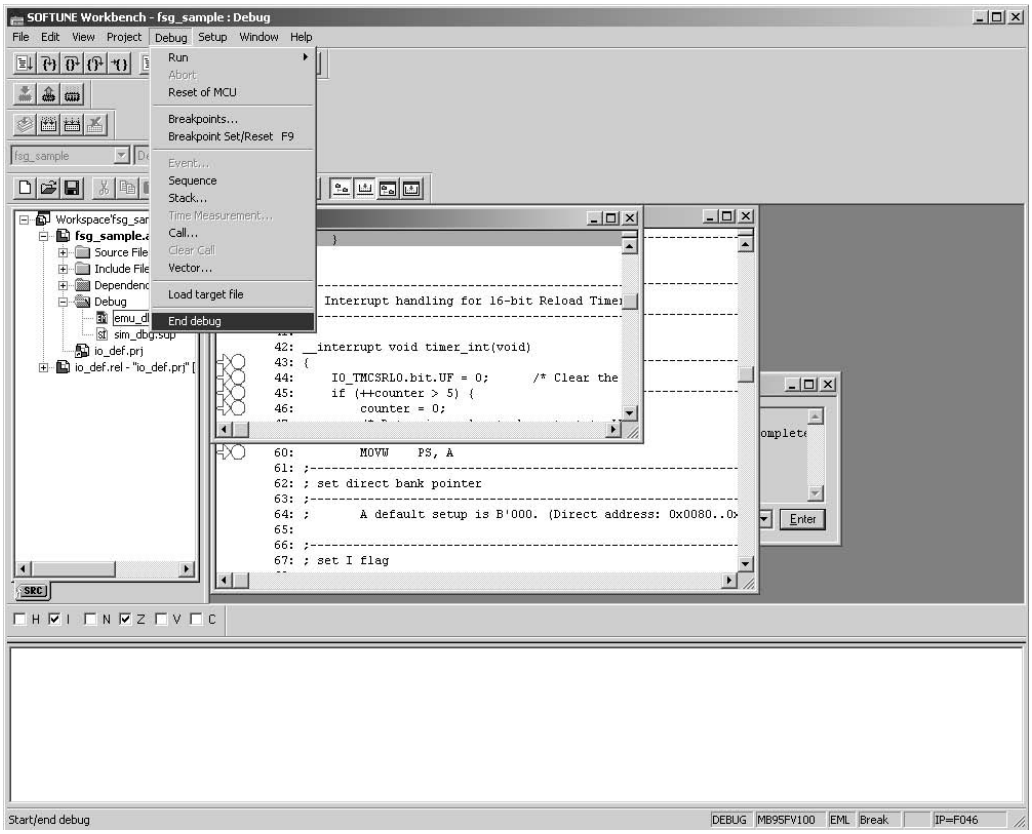


■ Ending Debugging

To end debugging, click [End debug] from the [Debug] menu.

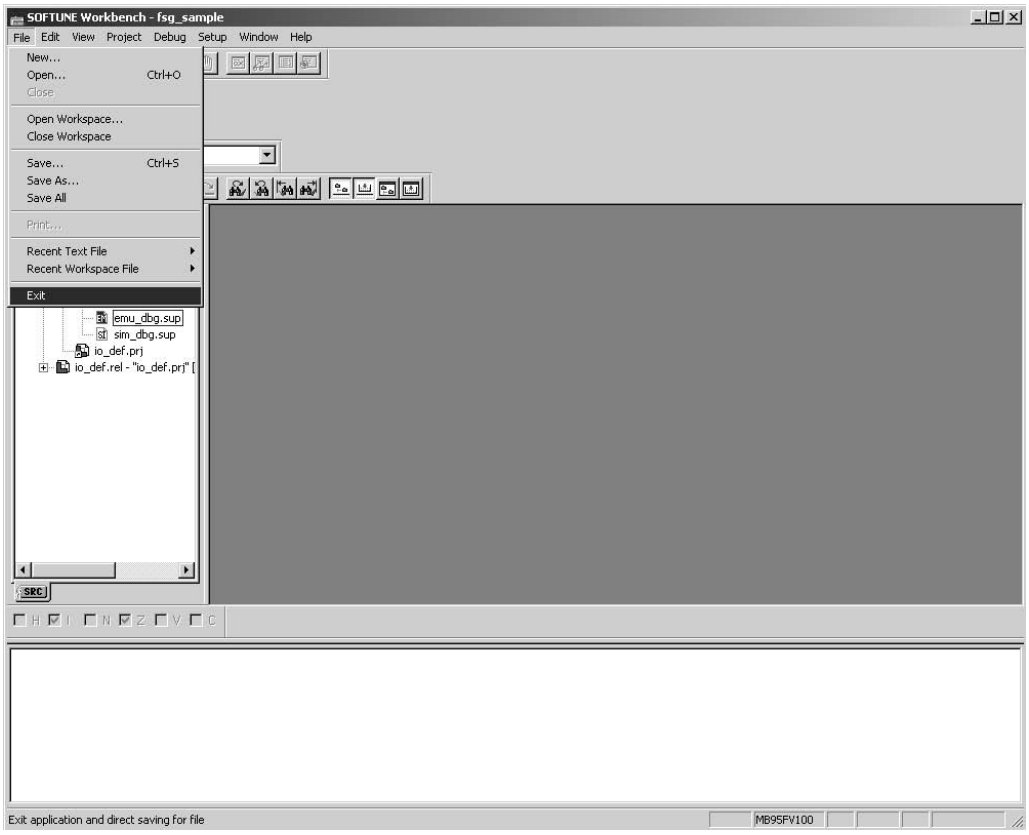
<Turning Evaluation Board off>

After you have finished debugging, turn the Evaluation Board off for safety. Push POWER-SW on the Board to OFF (to the side of " ◯ ") to turn it off. (See "Connecting BGM Adapter" for information about POWER-SW.)



■ Exiting SOFTUNE Workbench

To exit SOFTUNE Workbench, click [Exit] from the [File] menu.



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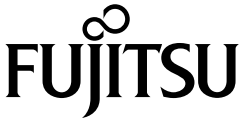
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