Please note that Cypress is an Infineon Technologies Company.
The document following this cover page is marked as “Cypress” document as this is the company that originally developed the product. Please note that Infineon will continue to offer the product to new and existing customers as part of the Infineon product portfolio.

Continuity of document content
The fact that Infineon offers the following product as part of the Infineon product portfolio does not lead to any changes to this document. Future revisions will occur when appropriate, and any changes will be set out on the document history page.

Continuity of ordering part numbers
Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.



THIS SPEC IS OBSOLETE

Spec No: 002-05267

Spec Title: AN205267 - F2MC-8FX FAMILY MB95100 SERIES EMULATOR HW SETUP

Replaced By: None

AN205267

F²MC-8FX Family MB95100 Series Emulator HW Setup

This application note describes setting up the MB2146-09 BGM ADAPTER with the MB2146-301 or MB2146-303 MCU Board for Cypress 8FX-microcontroller and its usage with 8bit-Softune Workbench V30L29 or higher.

OBSOLETE

Contents

1 Introduction....1
2 Hardware Requirements....1
2.1 Devices....1
3 Setting up the Emulation System....2
3.1 System Configuration....2
3.2 BGM Adapter....3
3.3 MCU Board....5
3.4 Evaluation board....8
4 Setting up the Emulation Software....9
4.1 Download Monitor Program....9
4.2 Making Setup File by Setup Wizard for Emulator 9
4.3 Executing Program....15
Document History....19

1 Introduction

This application note will help you setting up the MB2146-09 BGM ADAPTER with the MB2146-301 or MB2146-303 MCU Board for Cypress 8FX-microcontroller and its usage with 8bit-Softune Workbench V30L29 or higher.

2 Hardware Requirements

Debugging Tools

2.1 Devices

This section describes the procedure for actual machine verification using the emulator. The equipment used for explanation of the emulator is listed below:

- MB2146-09 : BGM Adapter
- MB2146-301 : MCU board with MB95V100-101 (3V version)
- MB2146-303 : MCU board with MB95V100-103 (5V version)
- MB95FV100-101 : 3V evaluation chip
- MB95FV100-103 : 5V evaluation chip
- MB2146-401 : Evaluation board
- Crystal oscillator : 4 MHz
- Power supply for MB2146-401 : 5 VDC
- USB(A-B) cable : USB V1.1

Warning:

Do only supply 5 volts DC to MB2146-401 evaluation board. Power supply is directly connected to MCU board if jumper settings (JP3 & JP4) on evaluation board are set to 5V. Higher voltage may damage MCU board, Evaluation board and BGM adapter!

3 Setting up the Emulation System

Hardware Installation

3.1 System Configuration

Connect the adapter between the host machine and the user system so that the adapter can serve as an emulator under control of the host machine.

Figure 1. System Configuration

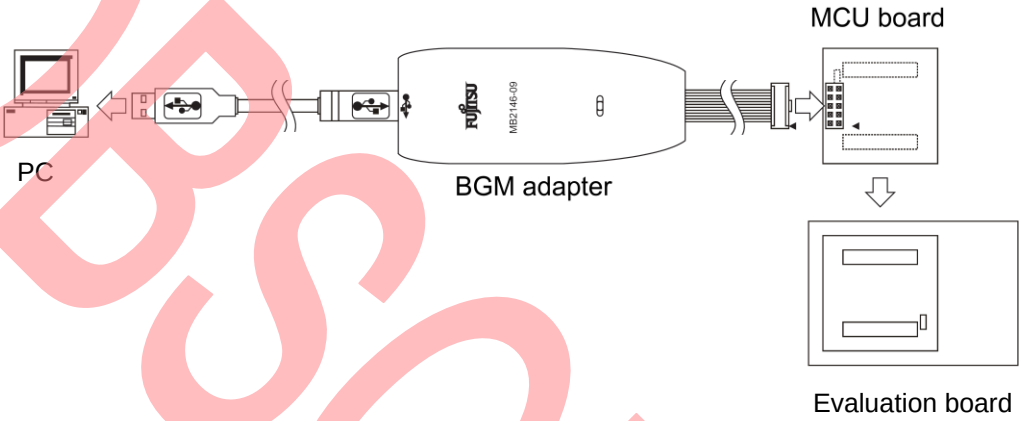


Figure 2. Configuration overview



OBSOLETE

3.2 BGM Adapter

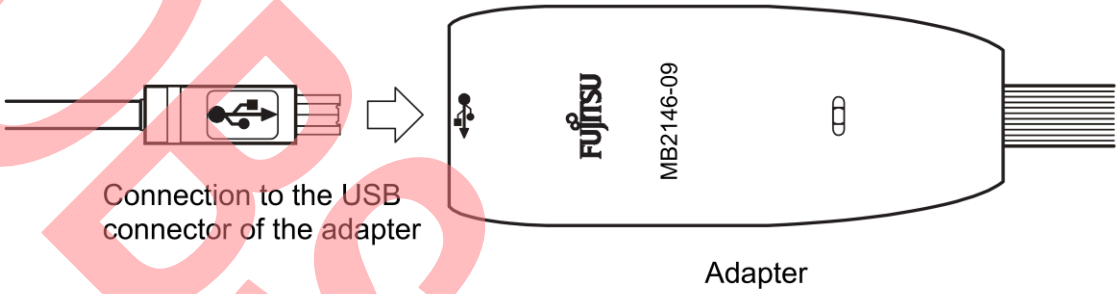
For details, refer the following manual:

- BGM Adapter MB2146-09 Operation Manual

3.2.1 Connection to the Host Machine

Connect the adapter to the host machine using the USB cable.

Figure 3. Connecting the USB Cable



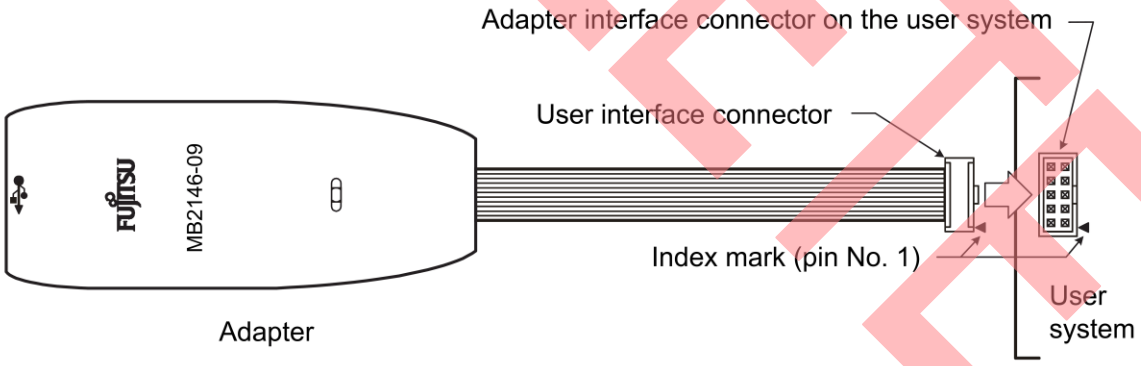
If the BGM adapter is connected the first time to the host machine, it is possible the operation system searches for a valid device driver. This driver can be found in your Softune installation directory in subfolder [Drivers], for example “C:\Softune\Drivers\ SiUSBdB.inf”.

3.2.2 Connection to the User System

Connect the adapter to the user system. Plug the user interface connector of the adapter into the adapter interface connector on the user system.

When plugging the user interface connector, align its index mark (pin no. 1) with the adapter interface connector's counterpart.

Figure 4. Connection to the User System



OBSOLETE

3.2.3 Adapter Interface Specifications

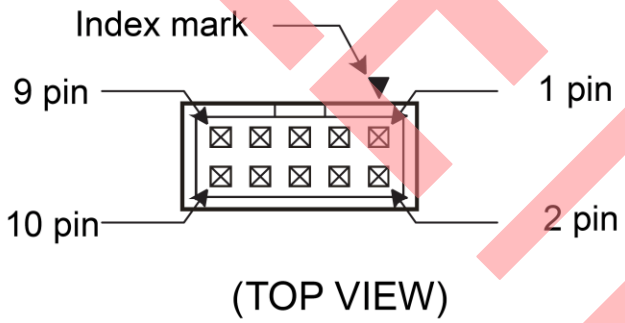
Table 1 shows a pin out of the adapter interface connector mounted on the user system. Figure 5 shows the connector pins.

Table 1. Adapter Interface Connector Pin out

Connector pin No.	Connector pin name	Input/output	Remarks
1	VCC	BGMA ← MCU	Connected to the MCU's Vcc pin.
2	GND	—	Connected to the MCU's Vss pin.
3	BRSTX	BGMA → MCU	Connected to the MCU's RSTX pin.
4	BDBMX	BGMA → MCU	Connected to the MCU's MOD pin.
5	BSOUT	BGMA ← MCU	Connected to the MCU's UO0 pin.
6	BEXCK	BGMA ← MCU	Connected to the MCU's UCK0 pin.
7	BSIN	BGMA → MCU	Connected to the MCU's UI0 pin.
8	N.C	—	Not connected
9	GND	—	Connected to the MCU's Vss pin.
10	N.C	—	Not connected

*: “BGMA” in the “Input/output” column in the table indicates the BGM adapter.

Figure 5. Adapter Interface Connector Pins



OBSOLETE

3.2.4 Tool Reset Specifications

A tool reset is a hardware reset by the adapter to reset the entire system of the microcontroller (including the BDSU module) on the user system. When both the adapter power and microcontroller's user power are turned on, the tool reset is canceled automatically to enable the microcontroller to be evaluated. The following shows how to generate a tool reset and how long it remains in effect.

Tool reset generation methods and reset "L" pulse width:

1. Set the micorocontroller's user power from OFF to ON (power-on reset). The reset remains in effect for about 16 to 70 ms after the microcontroller's user power is supplied.
2. Set the adapter power from OFF to ON (by unplugging and plugging the USB cable). The reset remains in effect for about 32 to 140 ms after the adapter power is supplied again.

If the user system and adapter cause an uncontrollable error and the system cannot be recovered by tool reset generation method 1.), execute tool reset generation method 2.).

3.3 MCU Board

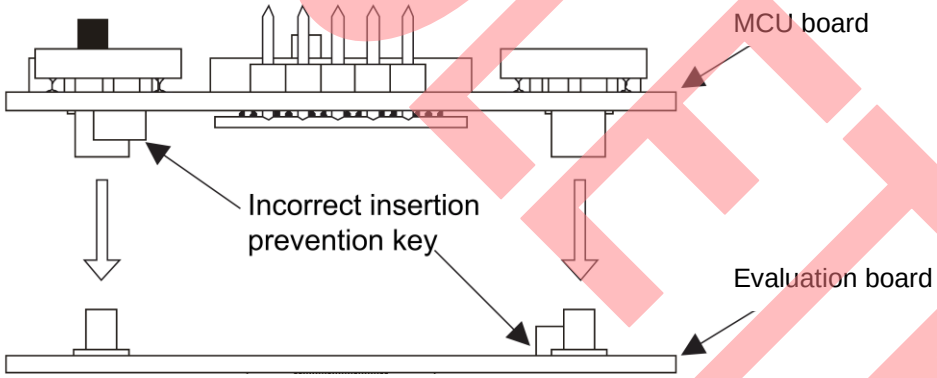
For details, refer the following manuals:

- MB2146-301 Operation Manual
- MB2146-303 Operation Manual

3.3.1 Connecting the MCU board to the Evaluation board

Align the MCU board and evaluation board facing each other, then plug their mating connectors together. The connectors are provided with incorrect insertion prevention keys located diagonally. Position the boards correctly without letting the incorrect insertion prevention keys interfere with each other and plug connectors together completely.

Figure 6. Connection of MCU board and Evaluation board



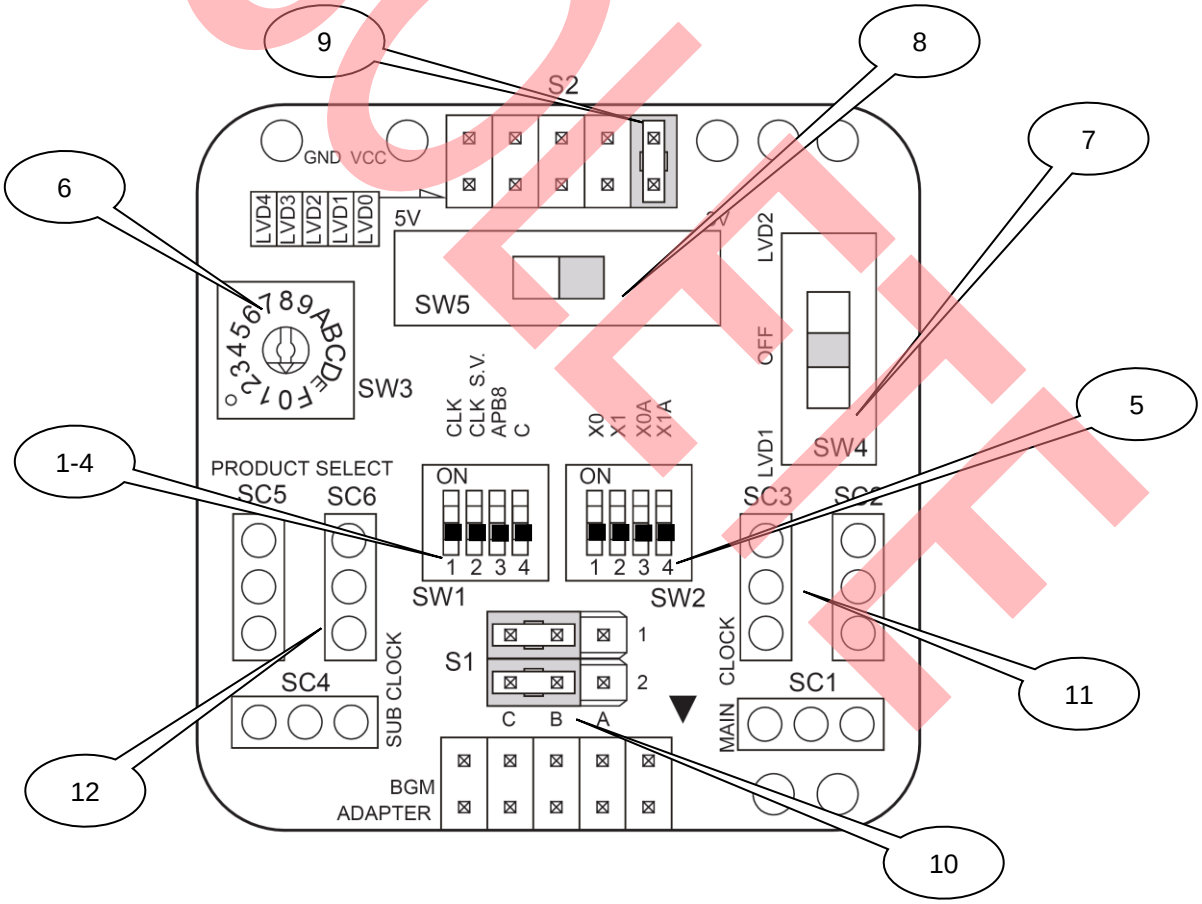
OBSOLETE

3.3.2 Jumper settings and switches on MCU board

Please set the following switches and jumpers on the MCU board

1. Set the clock selector switch (SW1-1) to OFF.
2. Set the clock supervisor selector switch (SW1-2) to OFF.
3. Set the APB8 bus output selector switch (SW1-3) to OFF.
4. Set the C-pin selector switch (SW1-4) to OFF.
5. Set the clock input selector switch (SW2) to OFF.
6. Set the product selector switch (SW3) according to Table 2.
   (set to 0: 100-pin package type for evaluation chip)
7. Set the LVD selector switch (SW4) to OFF (middle).
8. Set the power supply selector switch (SW5) to 3V or 5V.
9. Set the jumper plug S2 to LVD0 (right).
10. Set the jumper plug S1 (1+2) to CB.
11. Mount the main clock oscillator (refer chapter 3.3.3)
12. Mount the sub clock oscillator (refer chapter 3.3.3, not required)

Figure 7. switch and jumper setting on MCU board



OBSOLETE

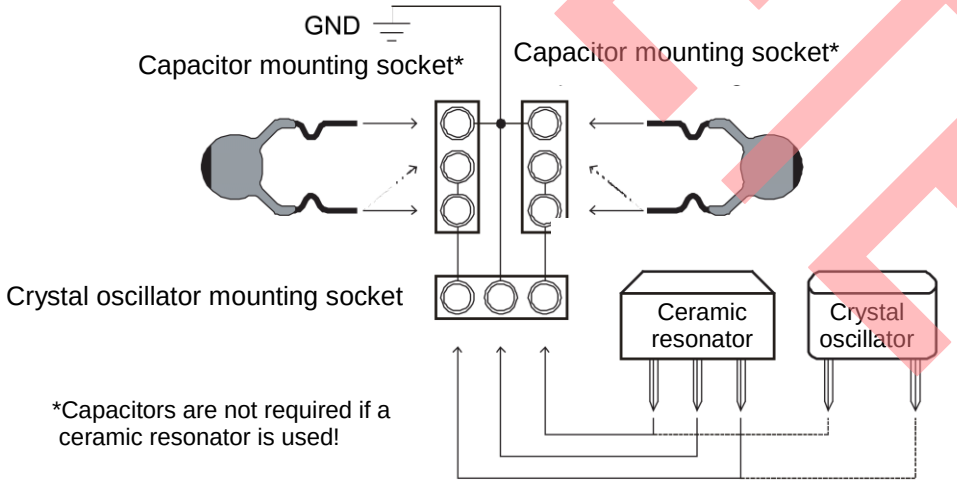
Table 2. Setting of product selector switch

Switch setting	Product type
0	100-pin package type
1	80-pin package type
2	64-pin package type
3	48-pin package type
4	32-pin package type
5	28-pin package type
6	20-pin package type
7	Setting Prohibited
8	100-pin package , LCD function integrated type
9	80-pin package , LCD function integrated type
A	64-pin package , LCD function integrated type
B	48-pin package , LCD function integrated type
C	Setting Prohibited
D	
E	
F	

3.3.3 How to mount oscillator on MCU board

Plug crystal oscillator or ceramic resonator into the crystal oscillator mounting sockets (for the main clock and sub clock) on the MCU board. The MCU board has one crystal oscillator mounting socket for the main clock (SC1-SC3) and another for the sub clock (SC4-SC6). To distinguish them from each other, the board has the “MAIN CLOCK” and “SUB CLOCK” labels printed near the main-clock socket and sub clock socket, respectively. Mount the crystal oscillator along with two capacitors on the MCU board. By use of a ceramic resonator these capacitors are nit required.

Figure 8. Crystal or ceramic oscillator mounting



OBSOLETE

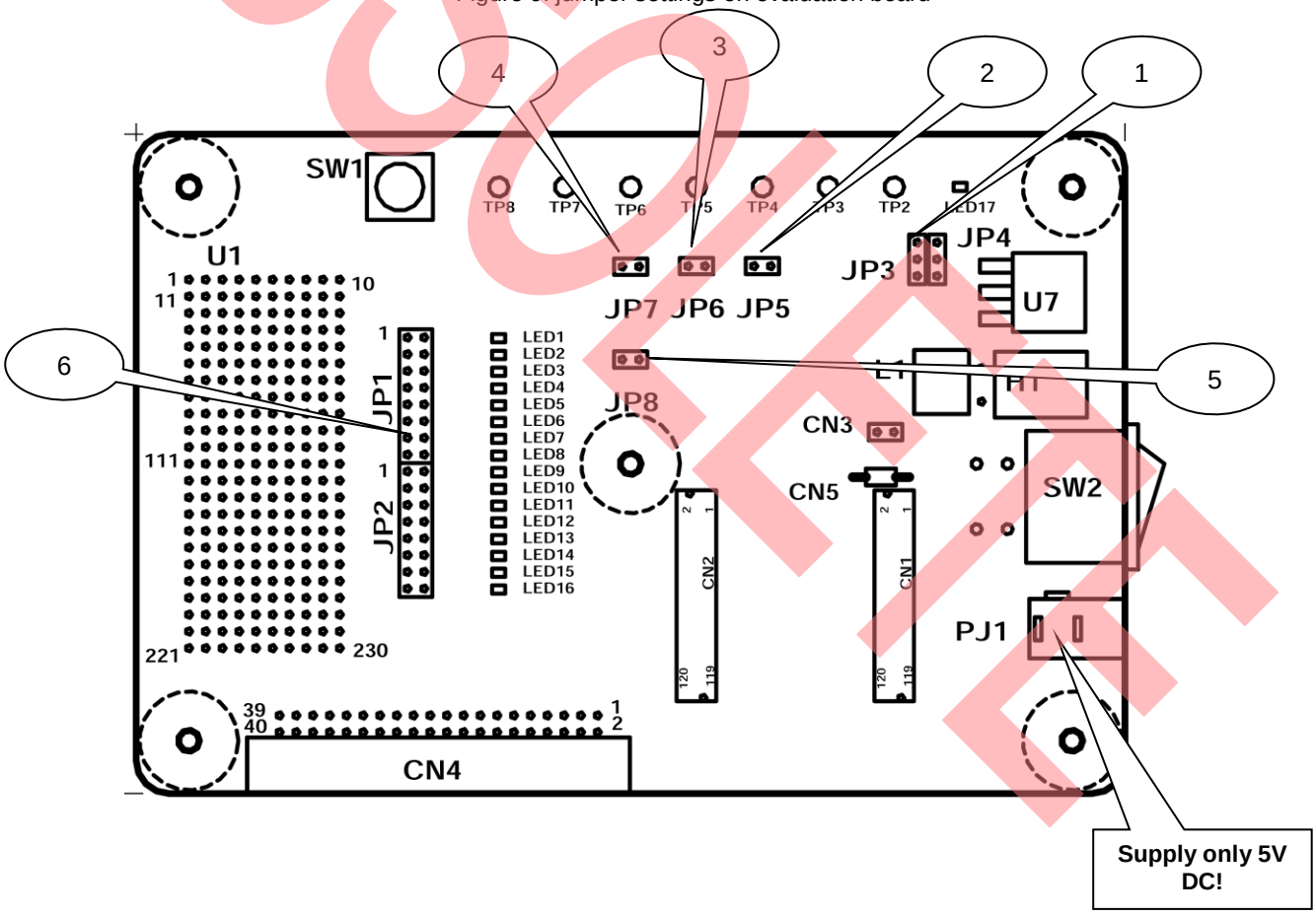
3.4 Evaluation board

3.4.1 Jumper settings on Evaluation board

Please set jumper plugs on Evaluation board according to following:

1. Set jumper plugs JP3 and JP4 to the right supply voltage, depending on your evaluation MCU and MCU board (1-2: 5V, 2-3: 3.3V)
2. Set analogue power supply jumper plug JP5 (AVCC pin is connected to VCC of evaluation board)
3. Set analogue reference input jumper plug JP6 (AVR pin is connected to VCC of evaluation board)
4. Set analogue power supply (GND) jumper plug JP7 (AVSS pin is connected to VSS of evaluation board)
5. Set operation mode jumper plug JP8 (MOD pin connected to GND -> run mode)
6. Set LED jumper plugs JP1 and JP2 to connect I/O port to LEDs on evaluation board

Figure 9. jumper settings on evaluation board



OBSOLETE

4 Setting up the Emulation Software

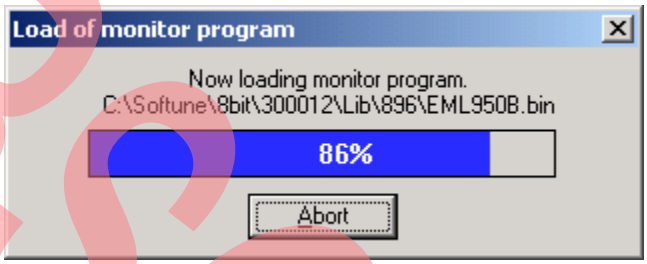
Software Settings

For the following steps a Softune 8FX/8L version later than V30L29 is needed and can be downloaded on website: www.cypress.com/softune.

4.1 Download Monitor Program

Using the Emulator Debugger requires downloading a monitor program to the ICE (In-Circuit Emulator) according to the chip to be used. The ICE checks the type and version of the monitor program at start of debugging and loads the monitor program automatically.

Figure 10. Automatic download of monitor program



This sample gives an example of the connection between the ICE (MB2146-09) and personal computer via USB.

For details, refer to the following manual:

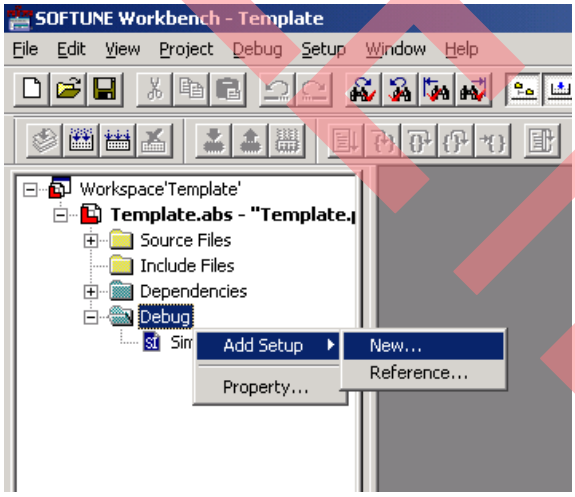
- Softune 8FX/8L First Step Guide

4.2 Making Setup File by Setup Wizard for Emulator

4.2.1 Procedure for Setting Setup File by Setup Wizard

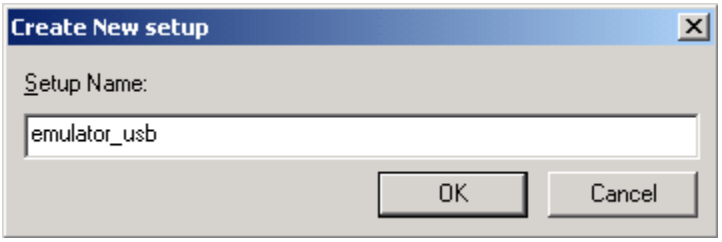
This section explains the procedure for making an additional setup file for the emulator.

1. Right click on ‘Debug’ in project-window and choose [Add Setup] -> [New…].

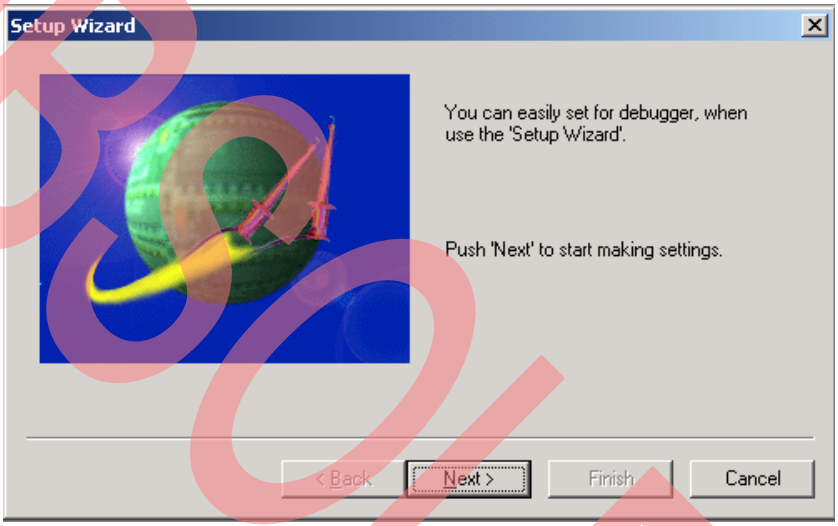


OBSOLETE

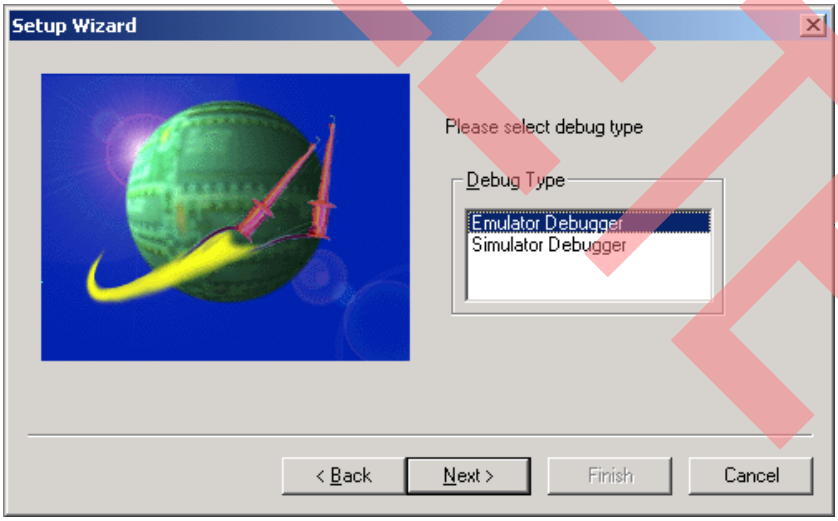
2. Enter a name for the new setup file and click [OK].



3. Follow the steps in the upcoming setup wizard. Click [Next] to go to the next window.

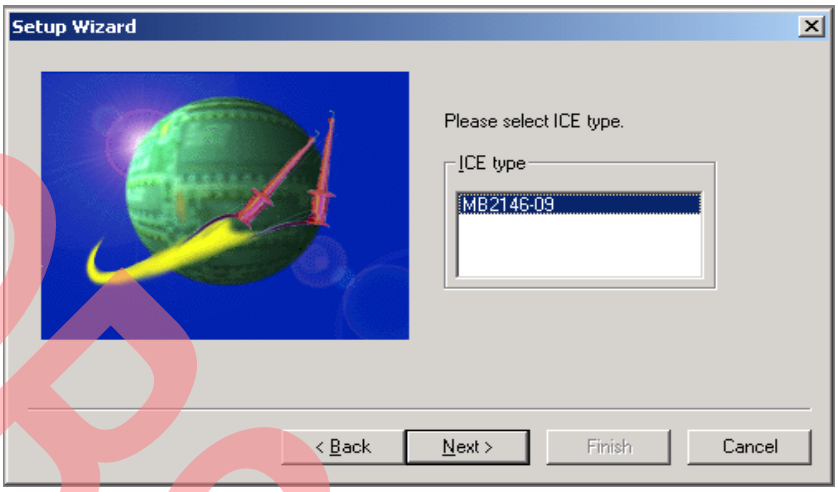


4. Select ‘Emulator Debugger’ as Debug Type.

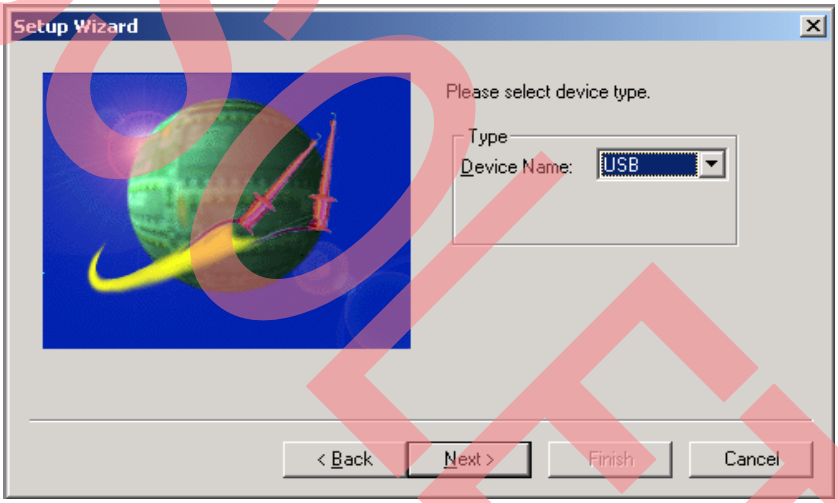


OBSOLETE

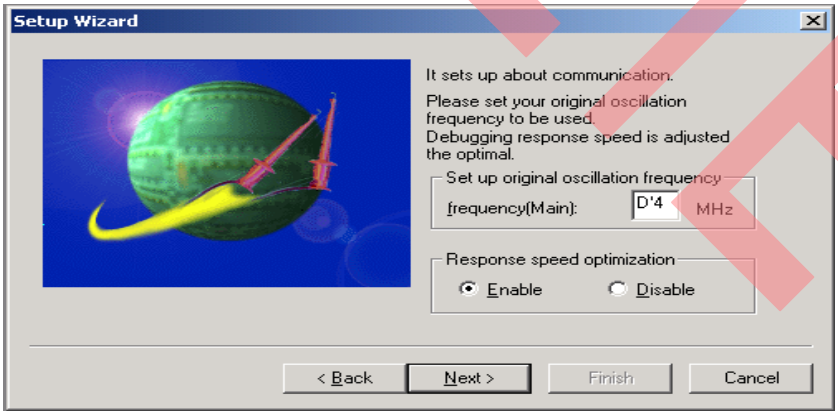
5. Select ‘MB2146-09’ as ICE type.



6. Choose ‘USB’ for Device Name.

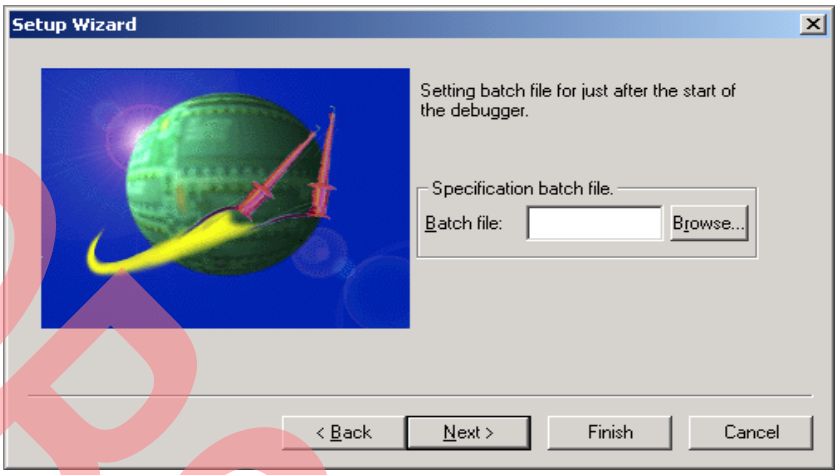


7. Enter oscillator frequency in MHz. (In this case 4MHz)

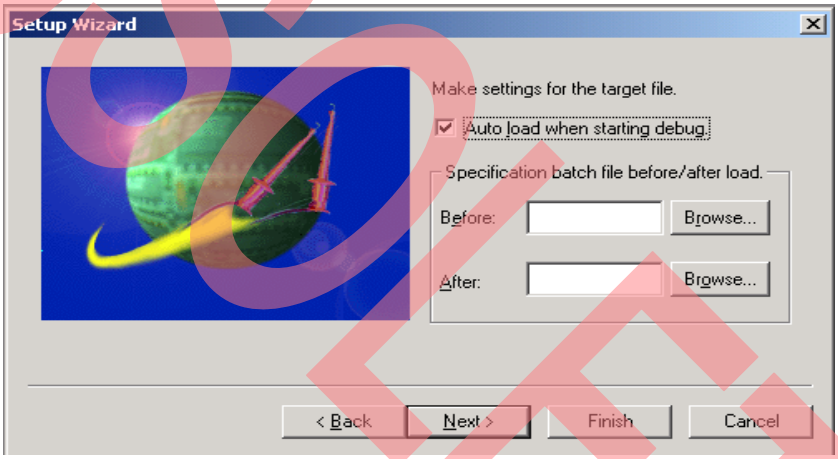


OBSOLETE

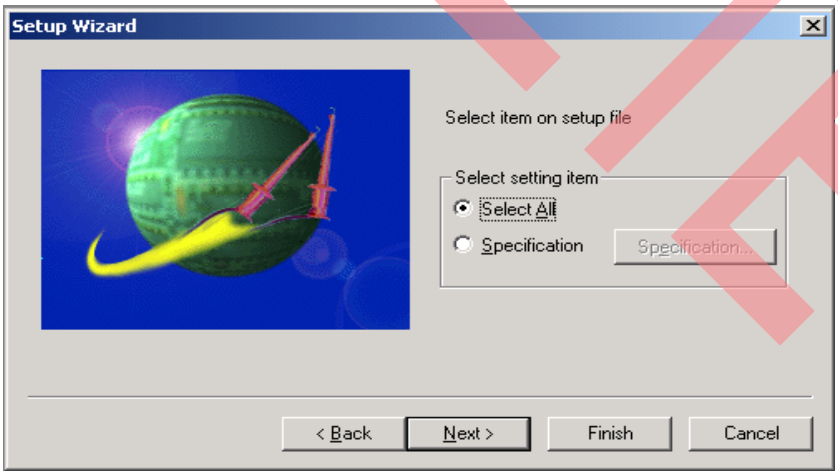
8. Here a batch file to be executed directly after start of debugger can be specified. (not needed in this case)



9. Activate 'Auto load when starting debug' option by checking the box. Here a batch file executed before or after load can be specified (not in this case).

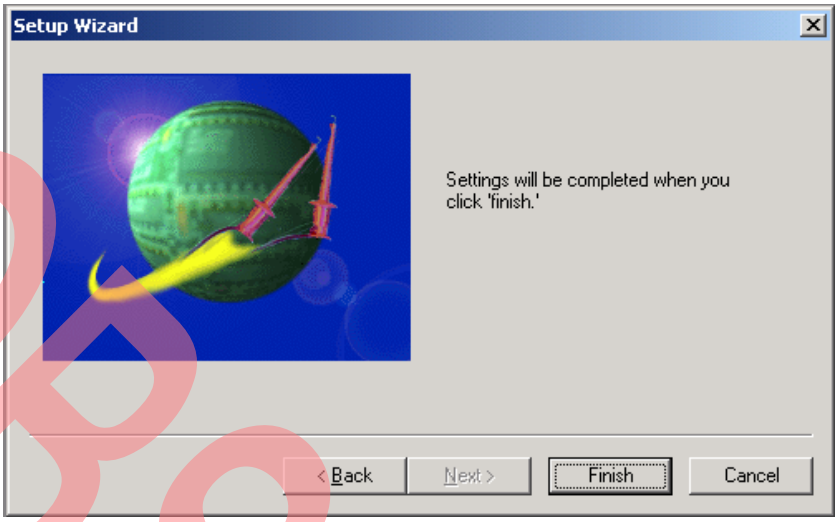


10. Choose 'Select All' under Select setting item.

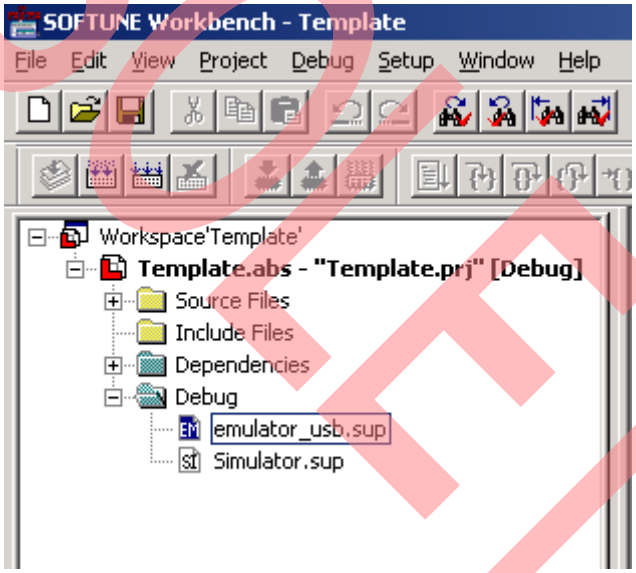


OBSOLETE

11. Click [Finish] to end the setup wizard and to complete setup.



12. The added setup file appears in the ‘project’-window. The setup file, which starts up when the [Start debug] command in the [Debug] menu is executed, is displayed in blue. Double-clicking the setup file, the Debugger starts up according to its setup information.



OBSOLETE

4.2.2 Optimization of response speed during debugging

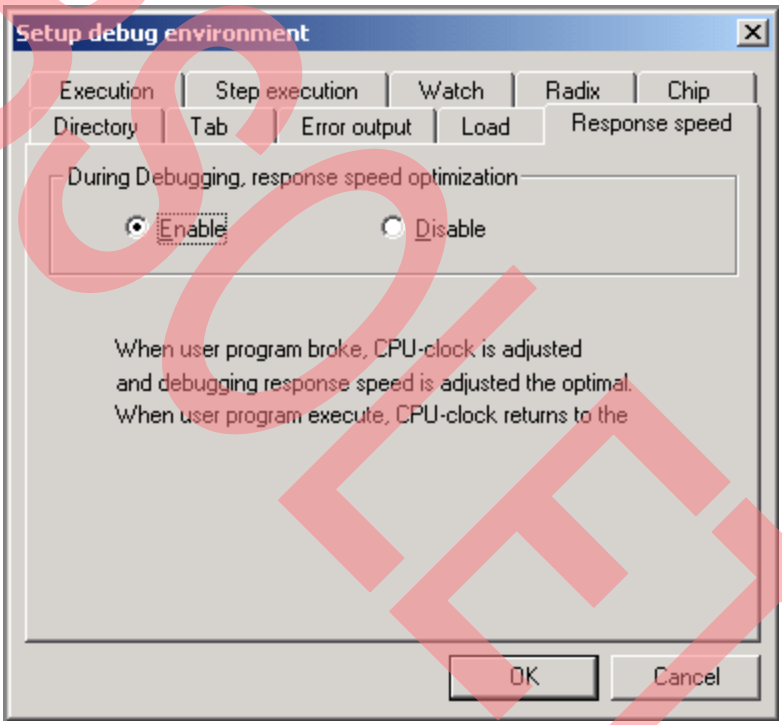
The communication speed of user system and MB2146-09 change by the operating frequency of the target microcontroller. When the operating frequency is reduced, especially in the sub clock mode, communication speed is also reduced. In this case, optimize the communication speed. The function increasing the operating frequency automatically is called clock-up mode. The default is ON at that time.

Also, this setting is performed at the setup wizard or [Setup] -> [Debug Environment] -> [Debug Environment…] -> [Response speed] tab.

Note:

When the clock-up mode is used, the operating frequency is changed automatically at breaking. If the failure is caused by changing the operating frequency, disable the clock-up mode.

If a break occurs immediately after changing the system clock mode by the user program, no clock up is performed during oscillations stabilization wait state. Clock up will be performed when oscillations are stabilized.

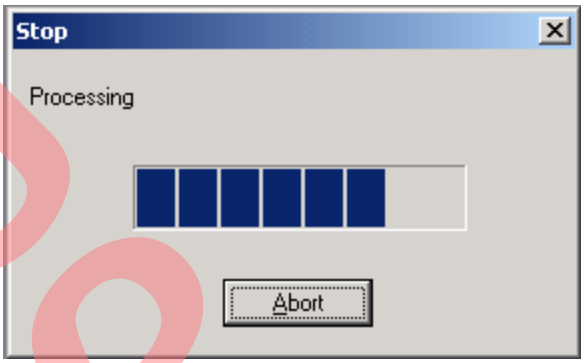


OBSOLETE

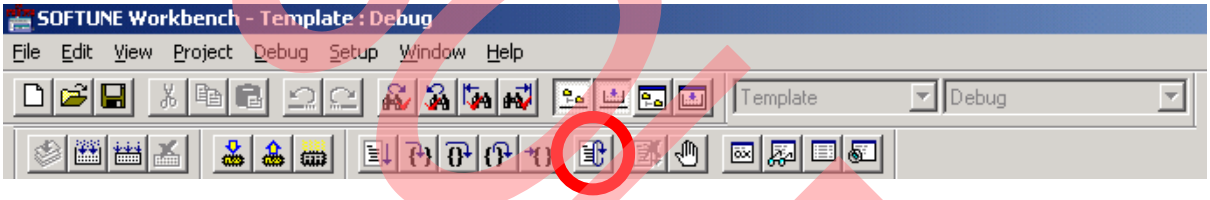
4.3 Executing Program

4.3.1 Run Program

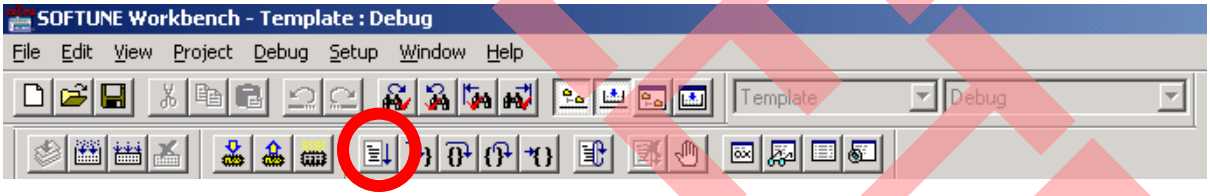
1. Turn on the user power to the MB2146-401.
2. The MB2146-09 POWER LED turns orange.
3. Double-click **emulator_usb.sup** (or however you named setup file before) in the debug folder in the project window to start the emulator debugger.



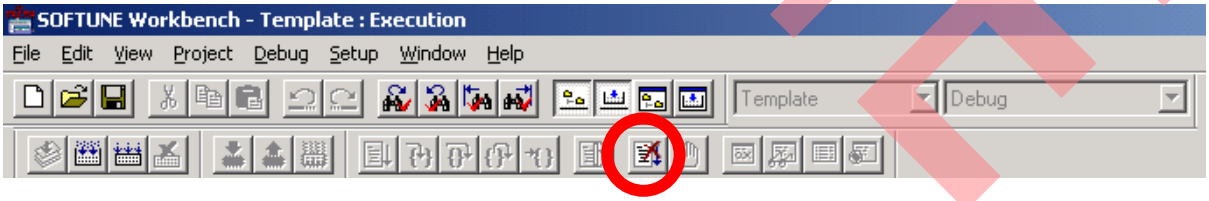
4. Reset MCU before executing the program.



5. Run your user program.



6. To stop user program click the marked button.



OBSOLETE

4.3.2 Setting Breakpoints

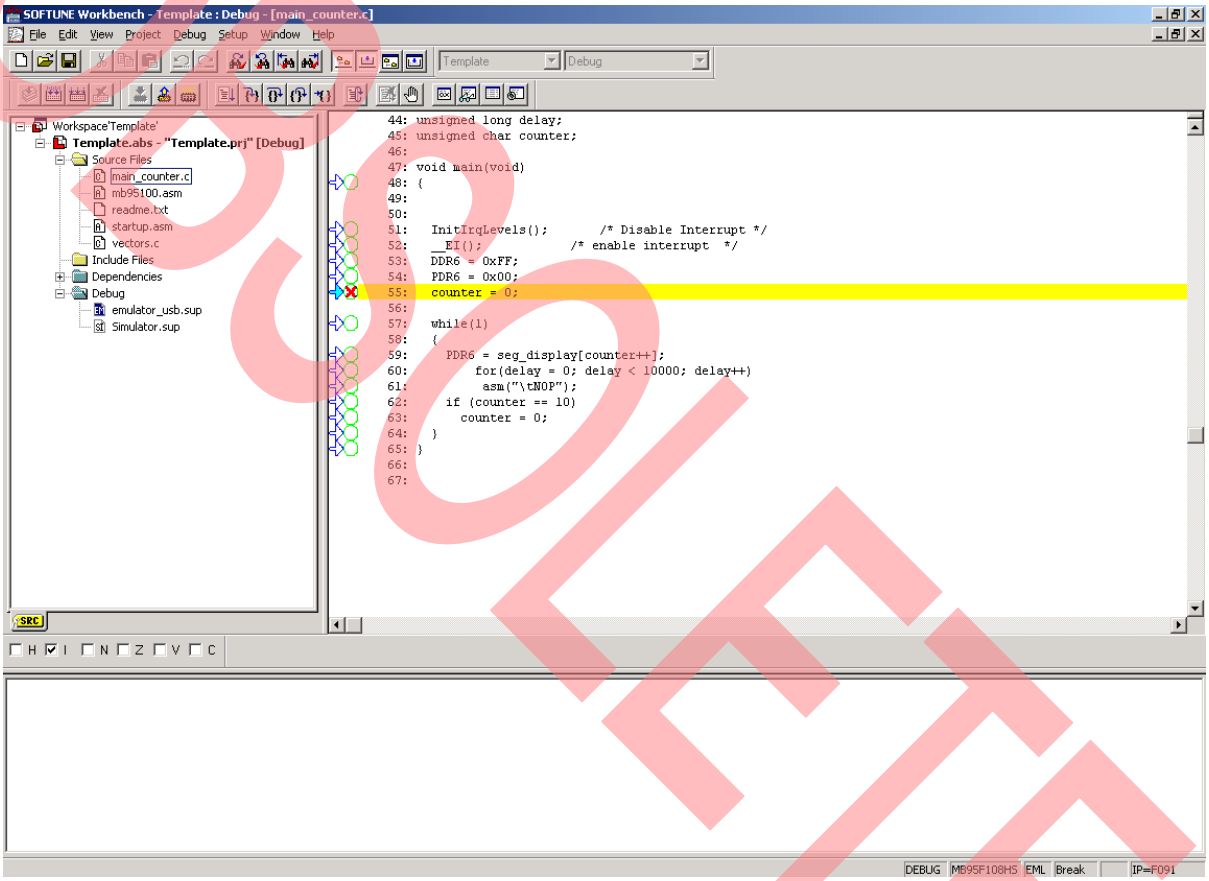
While the Debugger executes a program, the execution of the program can be stopped when the program counter (PC) passes a certain address or accesses data at a certain address.

The position where the execution of the program is stopped is called a breakpoint. The user can set the code breakpoints, data monitoring breakpoints and sequence breakpoints.

Click the left circle of the source window to set the breakpoint “X”.

The yellow line indicates the current position of the instruction pointer (IP).

Note: The IP value is the same as the PC value.



OBSOLETE

4.3.3 Types of breakpoints and how to set

There are three types of breakpoint as follows:

Select [Breakpoint] from the [Debug] menu to open the [Break] dialog.

This dialog can also set breakpoints. It also provides a list of set breakpoints.

- Code breakpoint

  Code breakpoint is a breakpoint to stop the program when the PC attempts to execute a set address. For both Simulator and Emulator, the PC stop position is a breakpoint before execution. Up to 256 code breakpoints can be set.

- Data breakpoint

  Data breakpoint is a breakpoint to stop program when the PC accesses data at a set address. Read, write, and read/write can be set as access conditions. Up to two data breakpoints can be set.

- Sequence breakpoint

  This breakpoint stops the program being executed when the program is executed at two specified addresses from "Level 1" to "Level 2."

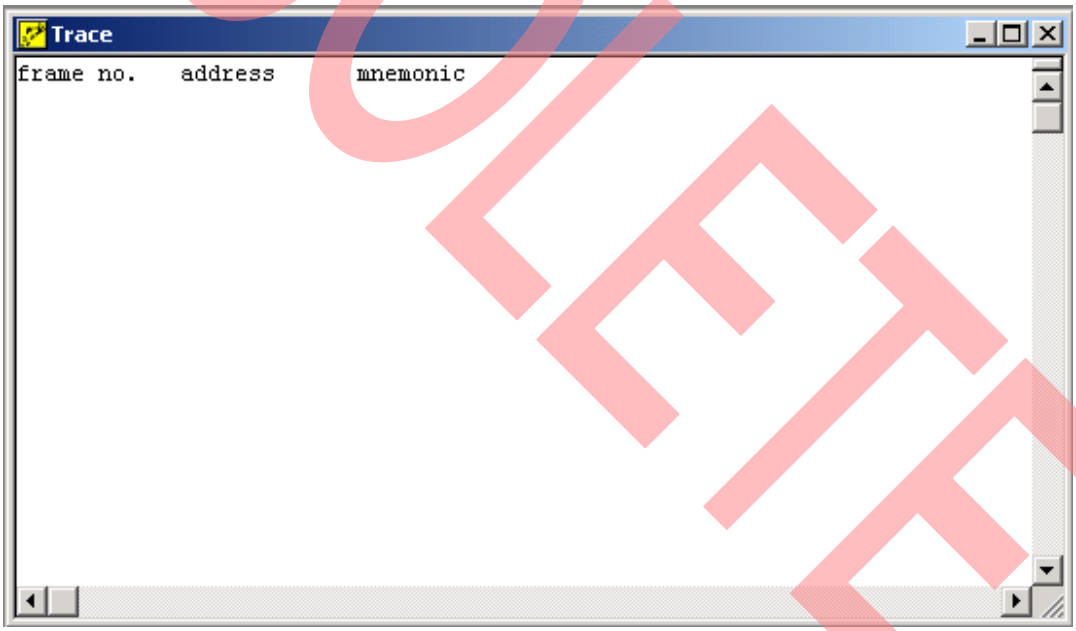
4.3.4 Trace Windows

When the trace function is enabled, data is always sampled and stored in the trace buffer during execution.

Trace information to be actually displayed is that on the 16 branches immediately preceding suspension of execution.

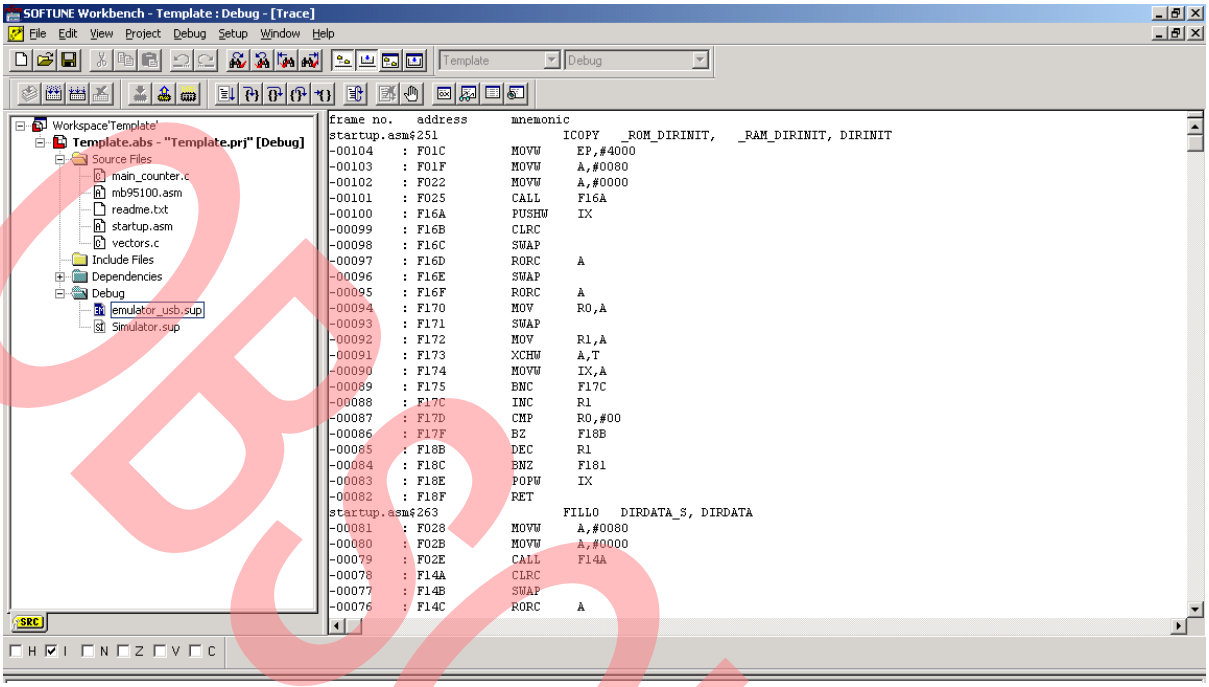
The trace buffer is structually a ring-shaped, so data is overwritten automatically from the beginning of the sequence buffer when the trace buffer is full.

1. Select [Trace] from the [View] menu to open the trace window.



OBSOLETE

2. The program is executed and stopped. Right-click the trace window to select [Refresh] from the shortcut menu. The trace result appears.



4.3.5 Display format for trace data

There are two display formats for trace data:

- Display in order of instruction execution (Instruction)
- Display in source lines (Source)

Use the shortcut menu to switch between the display format for trace data. No trace stamp is displayed.

4.3.6 Saving setup file for the Emulator

A setup file is not saved automatically until debugging is terminated. When updated, save the setup file.

Select the [Save...] command from the [File] menu to save the setup file for the emulator in the Save dialog.

The setup file can be saved only in debug mode.

OBSOLETE

Document History

Document Title: AN205267 - F²MC-8FX Family MB95100 Series Emulator HW Setup

Document Number: 002-05267

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	—	WOFR	10/12/2004	Initial release.
*A	5265863	WOFR	05/10/2016	Migrated Spansion Application note from MCU-AN-395002-E-V10 to Cypress format.
*B	5612326	WOFR	01/31/2017	Spec obsoleted, no further updates planned.

OBSOLETE

Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at Cypress Locations.

Products

ARM® Cortex® Microcontrollers	cypress.com/arm
Automotive	cypress.com/automotive
Clocks & Buffers	cypress.com/clocks
Interface	cypress.com/interface
Lighting & Power Control	cypress.com/powerpsoc
Memory	cypress.com/memory
PSoC	cypress.com/psoc
Touch Sensing	cypress.com/touch
USB Controllers	cypress.com/usb
Wireless/RF	cypress.com/wireless

PSoC® Solutions

PSoC 1 | PSoC 3 | PSoC 4 | PSoC 5LP

Cypress Developer Community

Forums | Projects | Videos | Blogs | Training | Components

Technical Support

cypress.com/support

OBSOLETE

PSoC is a registered trademark and PSoC Creator is a trademark of Cypress Semiconductor Corporation. All other trademarks or registered trademarks referenced herein are the property of their respective owners.

Cypress Semiconductor
198 Champion Court
San Jose, CA 95134-1709

Phone : 408-943-2600
Fax : 408-943-4730
Website : www.cypress.com

© Cypress Semiconductor Corporation, 2004-2016. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage ("Unintended Uses"). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit cypress.com. Other names and brands may be claimed as property of their respective owners.