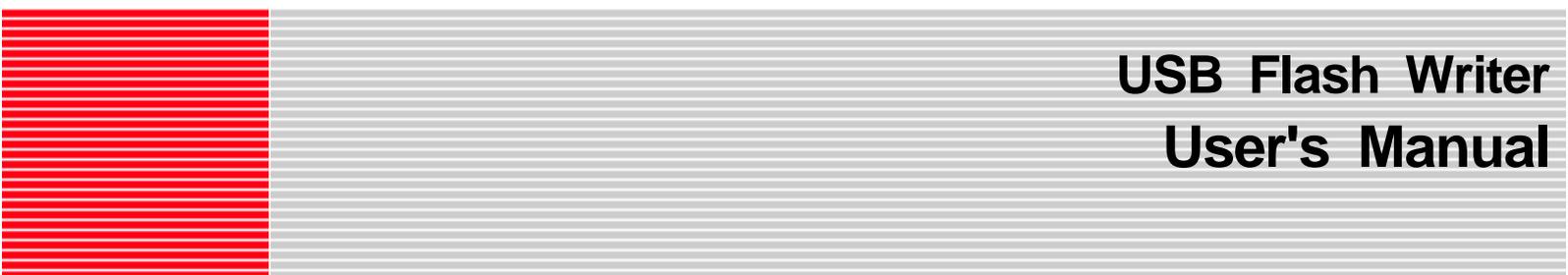


REJ10J0143-0401Z

Everywhere you imagine. **RENESAS**



# USB Flash Writer User's Manual

RENESAS SINGLE-CHIP MICROCOMPUTER  
M16C FAMILY / 740 FAMILY

Rev.4.01  
Revision date: Dec 24, 2004

Renesas Solutions Corp.  
[www.renesas.com](http://www.renesas.com)

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## Preface

Thank you for purchasing Renesas USB Flash Writer (M3A-0665).

This manual describes how to use the hardware and software products included with USB Flash Writer (M3A-0665). To other tools, look other tools's manulas.

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# 1. Contents of Product

This section shows the contents of the USB Flash Writer's product package. When unpacking your USB Flash Writer, check to see that all products listed below are included.

## 1.1 Contents of product

Table 1-1 lists the products included in the USB Flash Writer.

**Table 1-1 USB Flash Writer Product List**

Product List	Quantity	Remark
USB Monitor Board	1pc	
USB Cable (Used for the connection with the Host Computer.)	1pc	
Flat Cable	1pc	
Pin Header (HIF3FC-10P-2.54DSA: straight type)	1pc	Note 1
CD-ROM	1pc	Note 2

Note 1: Starter kit doesn't include pin header (straight type).

Note 2: When a FoUSB is included with starter kit, only one CD-ROM is in the FoUSB.



## 1.2 Operating Environment

The software includes USB Flash Writer run on the Host Computer (PC) under the OS (Operating System) version that are listed respectively in Table 1-2.

**Table 1-2 Operating Environment**

Host Computer (PC)	IBM PC/AT series or its compatible
OS (Operating System)	Microsoft Windows 98SE/ME/2000/XP
CPU	Pentium II 233MHz or newer recommended
Memory	8 Mbyte or more (16 Mbyte recommended)

## 1.3 Compatible Products

Compatible products with USB Flash Writer are as follows.

**Table 1-3 Compatible Products (1)**

Group	MCU Product Name	Corresponding Software	MCU Product Name to select in Software
M16C/10	M30100F3FP, M30102F3FP	FoUSB, KD30	M30102F3
M16C/1N	M301N2F8TFP	FoUSB, KD30	M301N2F8
M16C/24	M30245FCGP	FoUSB, KD30	M30245FC
M16C/26	M30262F3GP	FoUSB, KD30	M30262F3
	M30262F4GP	FoUSB, KD30	M30262F4
	M30262F6GP	FoUSB, KD30	M30262F6
	M30262F8GP	FoUSB, KD30	M30262F8
M16C/26A	M30260F3AGP	FoUSB, KD30	M30260F3A
	M30260F4AGP	FoUSB, KD30	M30260F4A
	M30260F6AGP	FoUSB, KD30	M30260F6A
	M30260F8AGP	FoUSB, KD30	M30260F8A
	M30263F3AFP	FoUSB, KD30	M30263F3A
	M30263F4AFP	FoUSB, KD30	M30263F4A
	M30263F6AFP	FoUSB, KD30	M30263F6A
	M30263F8AFP	FoUSB, KD30	M30263F8A
M16C/28	M30280F6HP	FoUSB, KD30	M30280F6
	M30280F8HP	FoUSB, KD30	M30280F8
	M30280FAHP	FoUSB, KD30	M30280FA
	M30281F6HP	FoUSB, KD30	M30281F6
	M30281F8HP	FoUSB, KD30	M30281F8
	M30281FAHP	FoUSB, KD30	M30281FA
M16C/29	M30290F8HP	FoUSB, KD30	M30290F8
	M30290FAHP	FoUSB, KD30	M30290FA
	M30290FCHP	FoUSB, KD30	M30290FC
	M30291F8HP	FoUSB, KD30	M30291F8
	M30291FAHP	FoUSB, KD30	M30291FA
	M30291FCHP	FoUSB, KD30	M30291FC

Table 1-4 Compatible Products (2)

Group	MCU Product Name	Corresponding Software	MCU Product Name to select in Software
M16C/24	M30245FCGP	FoUSB, KD30	M30245FC
M16C/62A(M)	M30620FCAFP/GP, M30621FCAGP M30620FCMFP/GP, M30621FCMGP	FoUSB, KD30	M30620FCA
	M30624FGAFP/GP, M30625FGAGP M30624FGMFP/GP, M30625FGMGP	FoUSB, KD30	M30624FGA
M16C/62P	M30622F8PFP/GP	FoUSB, KD30	M30622F8P
	M30623F8PGP	FoUSB, KD30	M30623F8P
	M30620FCPFP/GP	FoUSB, KD30	M30620FCP
	M30621FCPGP	FoUSB, KD30	M30621FCP
	M30624FGPFP/GP	FoUSB, KD30	M30624FGP
	M30625FGPGP	FoUSB, KD30	M30625FGP
	M30626FHPFP/GP	FoUSB, KD30	M30626FHP
	M30627FHPGP	FoUSB, KD30	M30627FHP
	M30626FJFP/GP	FoUSB, KD30	M30626FJP
M30627FJGP	FoUSB, KD30	M30627FJP	
M16C/62N	M3062GF8NFP/GP	FoUSB, KD30	M3062GF8
M16C/6N	M306N4FCTFP	FoUSB, KD30	M306N4FC
	M306N4FGTFP	FoUSB, KD30	M306N4FG
	M306N5FCTFP	FoUSB, KD30	M306N5FC
	M306NAFGTFP	FoUSB, KD30	M306NAFG
	M306NBCTFP	FoUSB, KD30	M306NBFC
M16C/80	M30800FCFP/GP, M30802FCGP	FoUSB, KD3083	M30800FC
	M30803FGFP/GP, M30805FGGP	FoUSB, KD3083	M30803FG
M32C/83	M30833FJFP/GP	FoUSB, KD3083	M30833FJ
	M30835FJGP	FoUSB, KD3083	M30835FJ
M32C/84	M30843FJFP/GP, M30845FJGP	FoUSB, KD3083	M30845FJ
M32C/85	M30853FHFP/GP, M30855FHGP	FoUSB, KD3083	M30855FH
	M30853FWFP/GP, M30855FWGP	FoUSB, KD3083	M30855FW
	M30850FJFP/GP, M30852FJGP	FoUSB, KD3083	M30852FJ
M32C/86	M30865FJGP	FoUSB, KD3083	M30865FJ
M32C/87	M30879FLFP/GP, M3087BFLGP	FoUSB, KD3083	M3087BFL
R8C/10	R5F21102FP	FoUSB, KD30	R5F21102 (R5F21104 *1)
	R5F21103FP	FoUSB, KD30	R5F21103 (R5F21104 *1)
	R5F21104FP	FoUSB, KD30	R5F21104
R8C/11	R5F21112FP	FoUSB, KD30	R5F21112 (R5F21114 *1)
	R5F21113FP	FoUSB, KD30	R5F21113 (R5F21114 *1)
	R5F21114FP	FoUSB, KD30	R5F21114
R8C/12	R5F21122FP	FoUSB, KD30	R5F21122 (R5F21124 *1)
	R5F21123FP	FoUSB, KD30	R5F21123 (R5F21124 *1)
	R5F21124FP	FoUSB, KD30	R5F21124
R8C/13	R5F21132FP	FoUSB, KD30	R5F21132 (R5F21134 *1)
	R5F21133FP	FoUSB, KD30	R5F21133 (R5F21134 *1)
	R5F21134FP	FoUSB, KD30	R5F21134
7542	M37542F8SP/FP/GP	FoUSB	M37542F8
38C2	M38C29FFAFP/HP	FoUSB	M38C29FF

\*1: When using the KD30.

## 1.4 Board Specification

Table 1-5 shows the USB Monitor Board Specification. When saving these products, put them into the conductive bag. Store them into the container box which is used for shipping as possible

**Table 1-5 USB Monitor Board Specification**

Item	Description
Debug formula	Monitor program formula
Monitor program	ROM size: Approx. 1600 byte * In the case of R8C/Tiny Series, 2K byte
	RAM size: 128 byte * In the case of M16C/80 Group, 256 byte * In the case of M32C/80 Series, 256 byte * In the case of R8C/Tiny Series, not used
	Operation frequency: 700KHz or above (Note1)
	Operation mode: Single chip mode
	Software break: 2 points to 8 points (Note2)
USB microcomputer	M37641F8HP (8 bit USB flash microcomputer)
USB interface (J1)	USB2.0 full speed
Target interface (J3)	Synchronous serial Interface
	Starter kit and 10 pin connector for target board connection
Operation voltage	4.75V to 5.25V (USB bus-powered supply or target supply enabled)
	3.0V to 3.6V (supply from target is necessary) (Note3)
Power consumption	Max.50mA
Board size	70mm x 29mm
Use environment condition (at the time of operation)	Temperature: 25±5°C (no corrosive gas)
	Humidity: no condensation
Use environment condition (at the time of storage)	Temperature: 25±5°C (no corrosive gas)
	Humidity: no condensation

Note 1: Maximum operating frequency is dependent on the MCU.

Note 2: Software break numbers are dependent on the address match circuit numbers are built-in MCU.

Note 3: When operating in 3.3V, supply power from the target board. In this case, it is not possible to change the FoUSB firmware. When the model name of the microcomputer to be used is changed, remove the target board, supply the USB bus-powered and rewrite the firmware.

## 1.5 CD-ROM

The CD-ROM contains software products necessary for developing programs and electronic manuals as well. Here follow the contents of the CD-ROM.

### **CD-ROM: Rev.2.10 or later**

```
\root
|--- Readme_e.txt      : Readme File (English version)
|--- Readme_j.txt      : Readme File (Japanese version)
|--- \Document         : User's manual is included (English and Japanese version)
|--- \FOUSB            : FoUSB Installer is included (English and Japanese common version)
|   |--- \USB Drivers  : USB Driver is included (English and Japanese common version)
|   |
|--- \KD
|   |--- \KD30         : KD30 Installer is included (English and Japanese version)
|   |--- \KD3083      : KD3083 Installer is included (English and Japanese version)
|   |
|--- \NC
|   |--- \NC30WA      : NC30WA C Compiler is included (English and Japanese version) Note
|   |--- \NC308WA    : NC308WA C Compiler is included (English and Japanese version) Note
```

**Note:** Entry version

## 1.6 System Requirements

In addition to the products listed above, you must have the following equipment before you can use the USB Flash Writer.

- 1) Host Computer (PC)
- 2) Target Board

## 2. Product Specifications

### 2.1 FoUSB (Flash-over-USB)

FoUSB is the software that allows you to operate on M16C, M32C, R8C or 740 microcomputers with built-in flash memory from a Windows version host computer (Windows 98SE or later).

### 2.2 KD30/KD3083

The KD included with the package is the debug software that runs on a Windows version host computer. This KD is usable for only the R8C/Tiny, M16C/10, M16C/20, M16C/Tiny, M16C/60, M16C/80 or M32C/80 series of Renesas 16-bit and 32-bit single-chip microcomputers with built-in flash memory. The KD provides a powerful debugging environment. In addition, it is operationally compatible with and can therefore be used the same way as PD30 (or PD308F), the emulator control debugger for Renesas 16C/62 microcomputers. The features of the Remote Debugger are outlined below. For details, see Section "5. Using the KD".

**Table 2-1 PD30 and KD30 comparison**

No.	Item	PD30	KD30
1	Software break function	64 points	2 points to 8 points (Note)
2	Hardware break function	6 points	not included
3	RAM monitor function	included	included
4	Real time trace	included	not included
5	Time measurement function	included	not included
6	Script function	included	included

Note: Software break numbers are dependent on the address match circuit numbers are built-in MCU.

**Table 2-2 PD308F and KD3083 comparison**

No.	Item	PD308F	KD3083
1	Software break function	64 points	4 points to 8 points (Note)
2	Hardware break function	6 points	not included
3	RAM monitor function	included	included
4	Real time trace	included	not included
5	Time measurement function	included	not included
6	Script function	included	included

Note: Software break numbers are dependent on the address match circuit numbers are built-in MCU.

**NOTICE: The software break number of MCUs**

Group	software break number	Group	software break number
M16C/10	2 points	M16C/6N (M3062NAFG, M3062NBFC)	2 points
M16C/1N	2 points		
M16C/24	2 points	M16C/6N (M306N4FC, M306N4FG, M306N5FC)	8 points
M16C/26, 26A	6 points		
M16C/28	6 points		
M16C/29	6 points	R8C/Tiny Series	2 points
M16C/62A(M)	2 points	M16C/80	4 points
M16C/62P	8 points	M32C/83	4 points
M16C/62N	2 points	M32C/84, 85, 86, 87	8 points

## 3. Installing

### 3.1 Before installing

Do not connect the USB Cable which belongs to this product to the Host computer (PC) before installing.

### 3.2 Preparation before installing

Be sure to confirm the following point before performing installation of a tool (GUI) and a driver.

- (1) The CD-ROM includes files required for the FoUSB (Flash-over-USB) installation. Copy all files to any folder in your PC before installation.
- (2) All tools and USB drivers must be installed with the administrator if installed on Windows 2000/XP. Both PowerUser (for a standard access) and User (for a limited access) can use software after installation.

## 3.3 FoUSB (Flash-over-USB) installing

### 3.3.1 Method of Installation

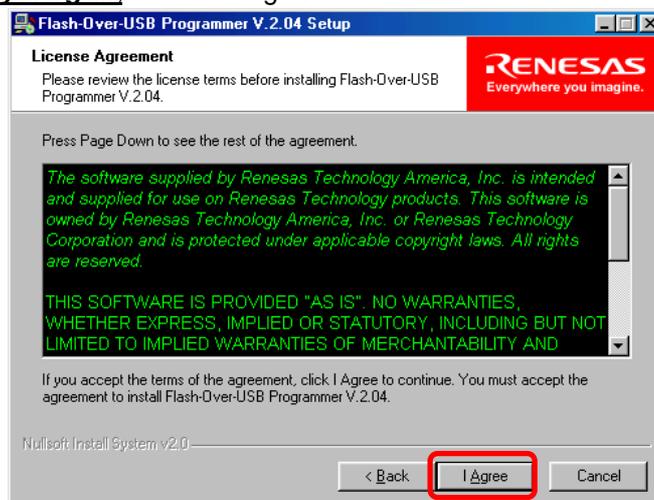
- 1) To install FoUSB, double-click “FoUSB\_V.\*.exe” on the folder into which you’ve copied FoUSB files from the CD-ROM.
- 2) Select the language of installer.



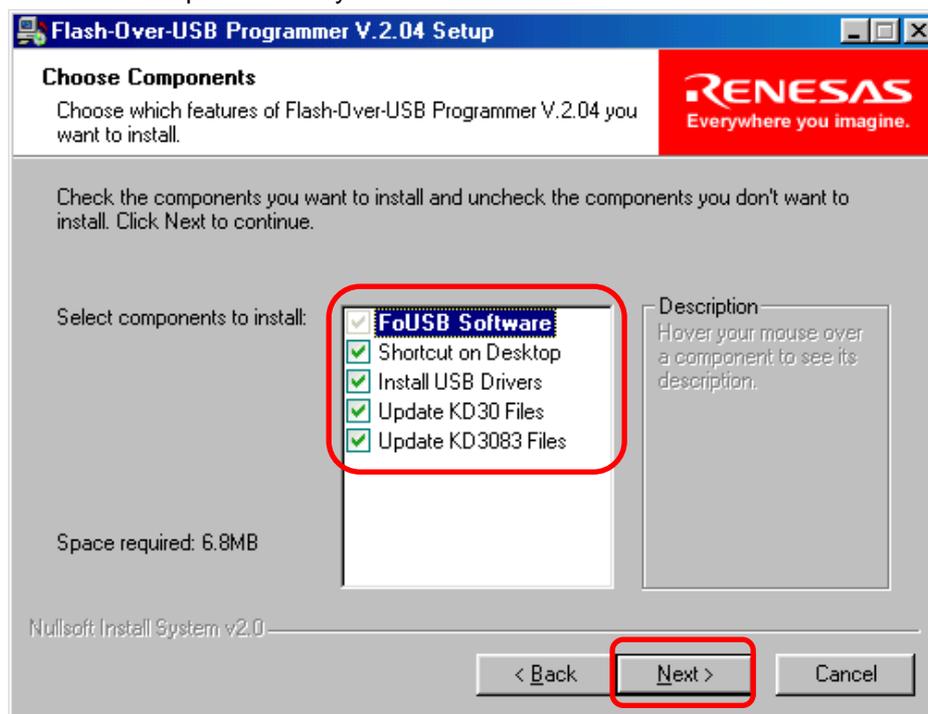
- 3) Click the <Next> button.



- 4) Only when you agree, click the <I Agree> button.



5) Choose the component which you want to install and click the <Next> button.



**NOTICE: Explanation of install component**

(a) Shortcut on Desktop

The shortcut of a FoUSB (Flash-over-USB) execution file is created on a desktop.

(b) Install USB Drivers

FoUSB installer installs a USB Driver in the correct location of Windows system automatically.

We recommend choosing this component in all operating systems. In addition, when this component is not chosen, please perform installation of a USB Driver, and recognition of USB Monitor Board with reference to [7.2 Installation of a USB Driver, and recognition of USB Monitor Board (Manual setup)].

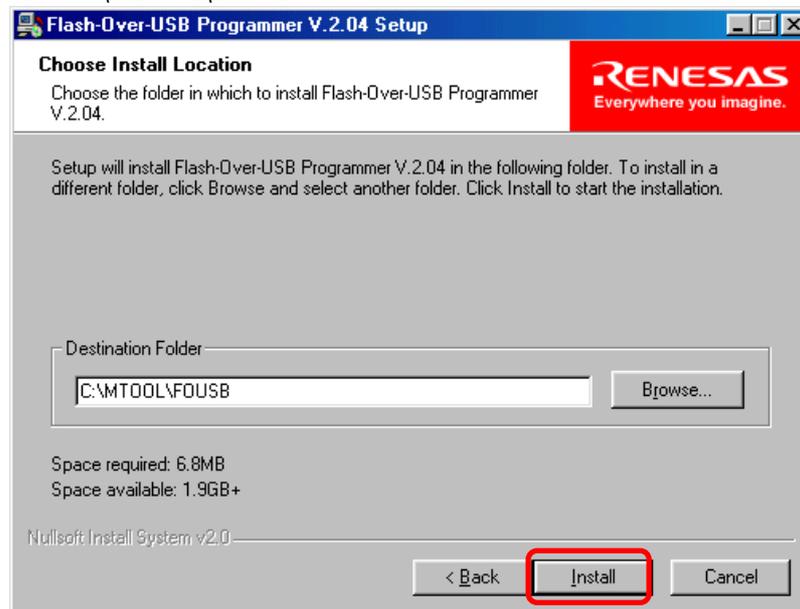
(c) Update KD30 Files

FoUSB installer updates KD30 to KD30 with a firmware older than the firmware of FoUSB.

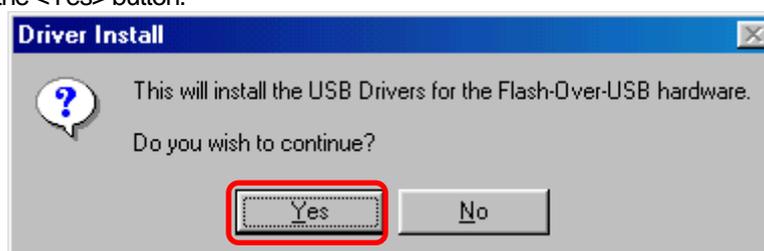
(d) Update KD3083 Files

FoUSB installer updates KD3083 to KD3083 with a firmware older than the firmware of FoUSB.

- 6) Choose the install location of FoUSB and click the <Install> button. The default install location of FoUSB is “C:\MTOOL\FOUSB”.



- 7) The following figure is displayed when the install component “Install USB Drivers” is chosen. Click the <Yes> button.



Next, warning is displayed. Please check that USB Monitor Board is not connected to your host computer (PC), and click the <OK> button.



8) When an operating system is **Windows XP**, notes screen is displayed. Click the <OK> button.

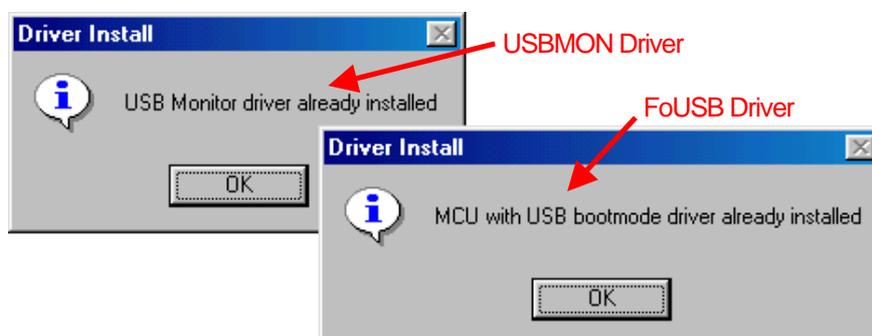


Then the software install screen is displayed two times (for USBMON Driver and FoUSB Driver), click the <Continue Anyway> button twice (**Note**).



**Note:** Microsoft has advocated authentication of the USB drivers to the USB vendors in the Microsoft® Windows® XP and Windows®-based operating systems released after Microsoft® Windows® XP. This is aimed at elimination of illegal drivers and improvement of host computer (PC). Renesas USB Drivers are not authenticated by Microsoft, but we provide them based on the sufficient examination.

9) The following figure is displayed when the USB Driver is already installed in the PC. Click the <OK> button.



- 10) The following figure is displayed when installation of USB Driver is completed. Click the <OK> button.



- 11) When the install component "Update KD30 Files" is chosen, FoUSB installer searches KD30 with a firmware older than the firmware of FoUSB. The following figure will be displayed if KD30 is detected.

If you want to update a firmware, click the <Yes> button. When <No> button is clicked, the firmware of KD30 is not updated.



Note: When the install component "Update KD3083 Files" is chosen, the update check screen is displayed like the above.

12) Finally, click the <Finish> button.



13) Now you've finished installing the FoUSB (Flash-over-USB).

### 3.3.2 Method of Uninstallation

To uninstall the FoUSB (Flash-over-USB) you've installed, choose Settings -- Control Panel from the Start menu, and then click "Add/Remove Programs". Select "Flash-over-USB V.\*.\*\*" from the program list and click the <Add/Remove> button. An uninstall window will appear, with the Flash-over-USB V.\*.\*\* compiler uninstalled.

## 3.4 Recognition of USB Monitor Board

From installer version “V.2.04”, the FoUSB installer has an automatic USB Driver install function (Refer to [3.3 FoUSB (Flash-over-USB) installing]). This section explains recognition of USB Monitor Board when confirming this function and installing FoUSB.

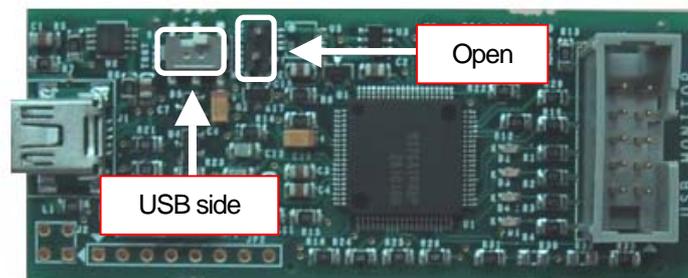
When this function is not confirmed, please perform installation of a USB Driver, and recognition of USB Monitor Board with reference to [7.2 Installation of a USB Driver, and recognition of USB Monitor Board (Manual setup)].

### 3.4.1 Recognition of USB Monitor Board 1 (for USBMON Driver)

- 1) Remove the cover of USB Monitor Board and make a USB Monitor Board (Board) the following setup, before connecting USB Monitor Board to your host computer (PC). If a setup is completed, attach a cover in a USB Monitor Board (Board).

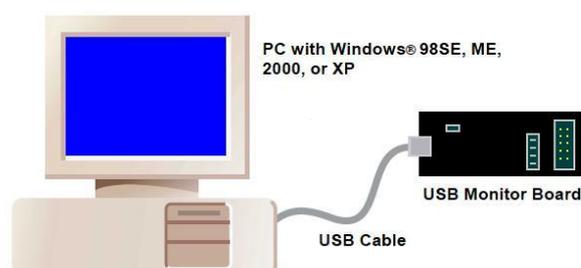
Power Source Supply Selector (S1: Power Mode): USB side

MCU Mode Pin (JP1: MCU Mode): Open



**Figure 3-1 Setup of USB Monitor Board (Board)**

- 2) Connect the USB Monitor Board included with the package to the USB port of PC. The Power indicator (D1: Power) of USB Monitor Board lights, and a Status indicator (D4: Status) blinks.



**Figure 3-2 USB Monitor Board connectivity**

- 3) When an operating system is **Windows 98SE/ME/2000**, Windows system detect USB Driver automatically and recognizes USB Monitor Board. Recognition of USB Monitor Board for USBMON Driver is completion.
- 4) When an operating system is **Windows XP**, Windows system displays the Found New Hardware Wizard screen. Then, choose "Install the software automatically" and click the <Next> button.



- 5) Next, the Hardware Installation screen is displayed, click the <Continue Anyway> button (**Note**).



**Note:** Microsoft has advocated authentication of the USB drivers to the USB vendors in the Microsoft® Windows® XP and Windows®-based operating systems released after Microsoft® Windows® XP. This is aimed at elimination of illegal drivers and improvement of host computer (PC). Renesas USB Drivers are not authenticated by Microsoft, but we provide them based on the sufficient examination.

- 6) Click the <Finish> button. Windows system recognizes USB Monitor Board (for USBMON Driver).



Recognition of USB Monitor Board for USBMON Driver is completion.

### 3.4.2 Recognition of USB Monitor Board 2 (for FoUSB Driver)

- 1) Remove the cover of USB Monitor Board and make a USB Monitor Board (Board) the following setup, before connecting USB Monitor Board to your host computer (PC). If a setup is completed, attach a cover in a USB Monitor Board (Board).

Power Source Supply Selector (S1: Power Mode): USB side

MCU Mode Pin (JP1: MCU Mode): Shorted

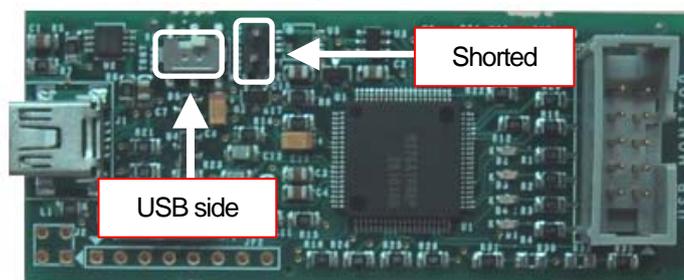
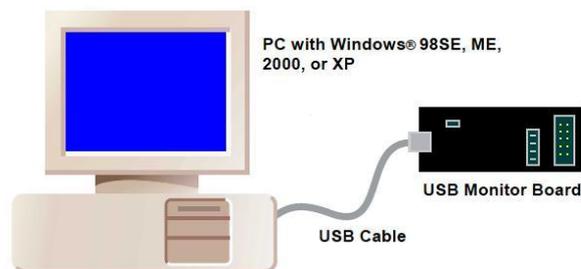


Figure 3-3 Setup of USB Monitor Board (Board)

- 2) Connect the USB Monitor Board included with the package to the USB port of PC. The Power indicator (D1: Power) of USB Monitor Board lights.



**Figure 3-4 USB Monitor Board connectivity**

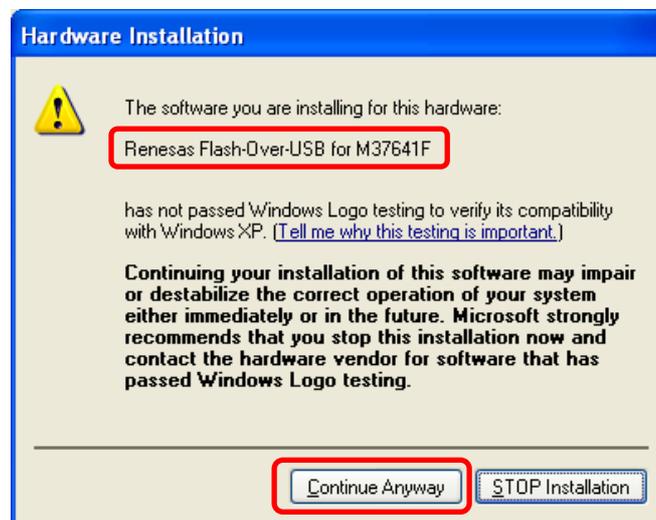
- 3) When an operating system is **Windows 98SE/ME/2000**, Windows system detect USB Driver automatically and recognizes USB Monitor Board. Recognition of USB Monitor Board for USBMON Driver is completion.

Please skip to 7).

- 4) When an operating system is Windows XP, Windows system displays the Found New Hardware Wizard screen. Then, choose “Install the software automatically” and click the <Next> button.



5) Next, the Hardware Installation screen is displayed, click the <Continue Anyway> button (Note).



Note: Microsoft has advocated authentication of the USB drivers to the USB vendors in the Microsoft® Windows® XP and Windows®-based operating systems released after Microsoft® Windows® XP. This is aimed at elimination of illegal drivers and improvement of host computer (PC). Renesas USB Drivers are not authenticated by Microsoft, but we provide them based on the sufficient examination.

6) Click the <Finish> button. Windows system recognizes USB Monitor Board (for FoUSB Driver).



Recognition of USB Monitor Board for FoUSB Driver is completion.

7) Separate USB Monitor Board from host computer (PC).

8) Finally remove the cover of USB Monitor Board and set the MCU Mode Pin (JP1: MCU Mode) as "Open".

### 3.4.3 Other Notes

**Caution:** The “USB Drivers” folder below is stored.

Driver Name	Description	Related Files
USBMON Driver	USBMON driver is a driver for using FoUSB (Flash-over-USB) and KD (KD30, KD3083)	usbmon.sys usbmon.inf
FoUSB Driver	FoUSB driver is a driver for using USB MCU (M367641F8) of USB Monitor Board in Boot mode. <b>(Note)</b>	fousb.sys fousb.inf

**(Note)**

**The Boot mode of USB MCU is used only for the use shown below.**

- 1) Installation of FoUSB Driver
- 2) When the firmware of USB MCU is erased or damaged

When the firmware of USB MCU is erased or damaged, the phenomenon of [6.4 FoUSB cannot operate Why?] or [6.6 A communication error occurs when the KD starts. What is the cause of this problem?] occurs.

In this case, it is necessary to install FoUSB driver (first time only) and download firmware compulsorily on a USB MCU. Please refer to [6.4 FoUSB cannot operate Why?].

## 3.5 KD30/KD3083 intalling

### 3.5.1 Installing

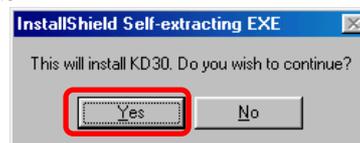
1) Installing the Remote Debugger

Double-click installer file on the CD-ROM (KD\KD30) for KD30.

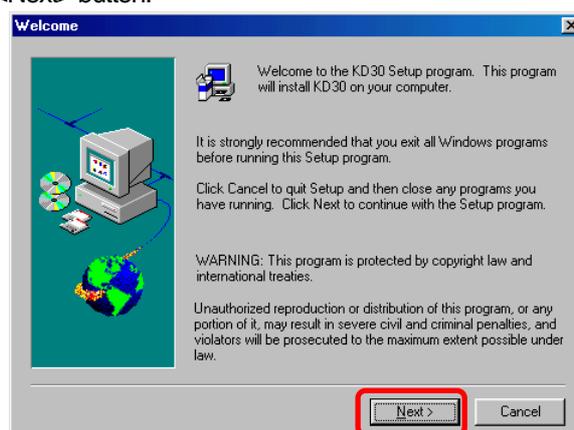
In KD3083, the installer file is included in \KD\KD3083.

2) A flow of installation procedures is shown in the pages that follow.

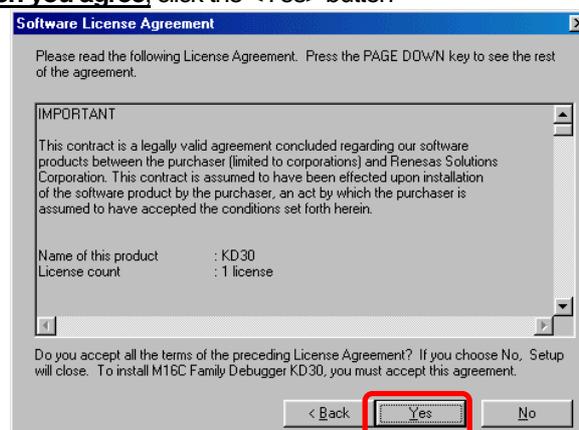
(a) Click the <Yes> button.



(b) Click the <Next> button.

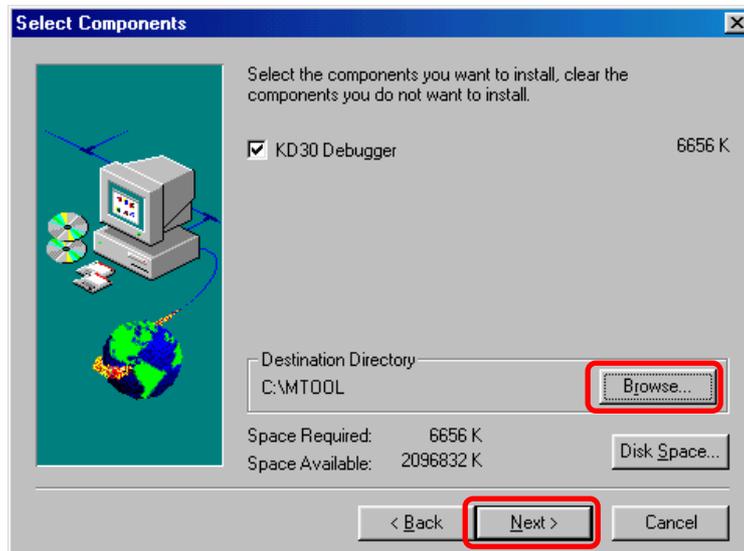


(c) Only when you agree, click the <Yes> button



(d) Click the <Next> button.

A default install location is “C:\MTOOL”. If an install location is changed, please click the <Browse> button and determine an install location.



(e) Click the <Yes> button.



(f) Click the <OK> button.



3) Now you've finished installing the KD30.

Note: The installation of KD3083 is the same.

### 3.5.2 Uninstalling the Remote Debugger

To uninstall, choose Settings -- Control Panel from the Start menu, and then click the "Add/Remove Programs". Select KD from the program list and click the <Add/Remove> button. An uninstall window will appear, with the integrated development environment uninstalled.

The uninstallation of KD3083 is the same, too.

## 4. Using the FoUSB

### 4.1 Using the FoUSB (Flash-over-USB)

#### 4.1.1 Before Starting the FoUSB

- 1) Check to see that the FoUSB is installed in your host computer (PC).
- 2) Check to see that PC, USB Cable, USB Monitor Board, Flat Cable and Target Board are firmly connected. (See Figure 4-1)

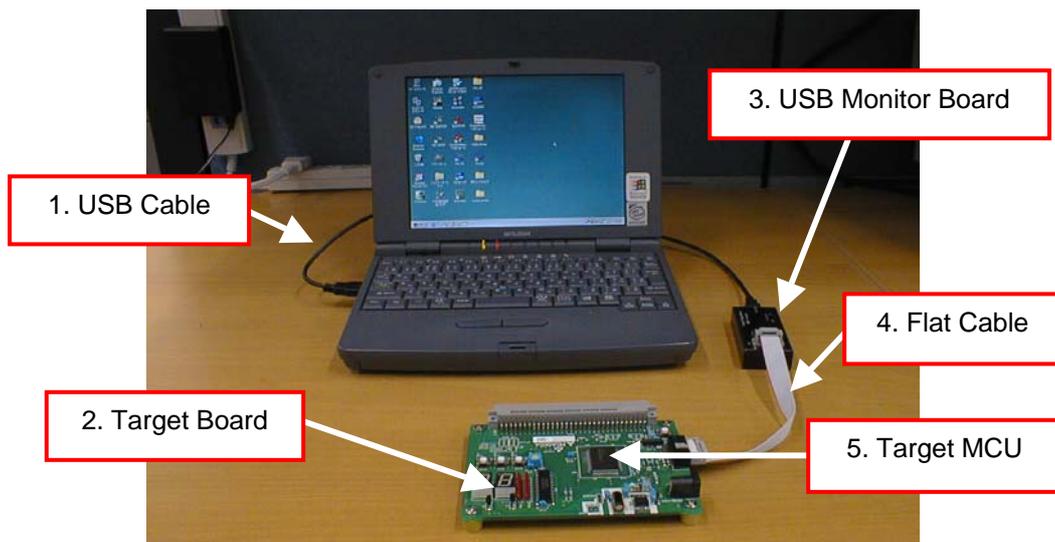


Figure 4-1 connect-1

### 3) Connection Method

It specifies as a premise that MCU is carried on the Target Board.

(1) Connection order when using the USB bus-powered.

Connect in order of 2-4-3-1-host computer (PC).

(2) Separation order after using the USB bus-powered.

Connect in order of PC-1-3-4-2.

(3) Connection order when using external power supply.

Set a power source supply selector to the TARGET side.

Connect in order of PC-1-3-4-2 and finally supply power from outside.

(4) Separation order after using external power supply.

Drop the power which is supplied from outside.

Separate in order of PC-1-3-4-2.

4) The power source supply selector on the USB Monitor Board must be set differently depending on the Target MCU used.

(1) When using 5 V

The power for the Target MCU is supplied from the USB Monitor Board. Therefore, there is no need to supply power for the Target MCU from the Target Board. In this case, set the power supply selector on the USB Monitor Board to the USB side as shown in Figure 4-2.

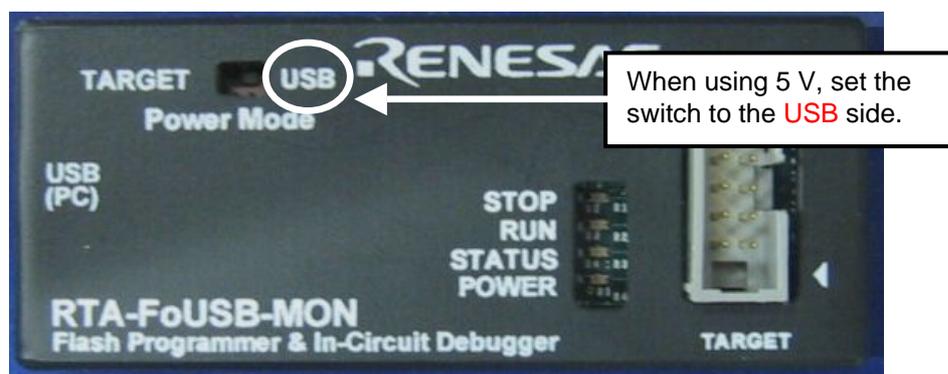
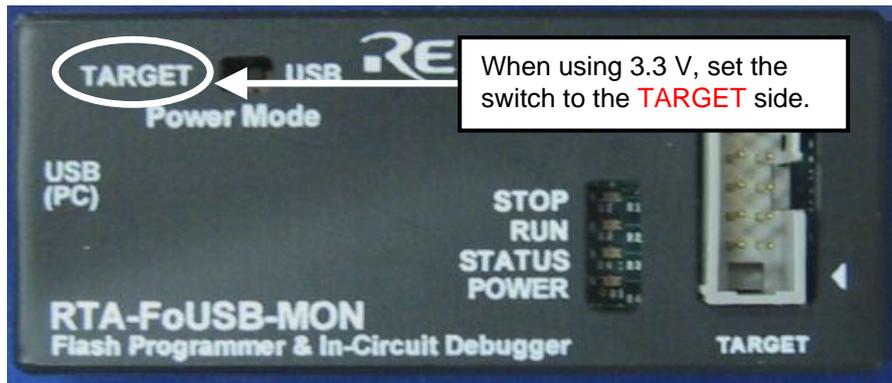


Figure 4-2 Power source supply selector-1

## (2) When using 3.3 V

The power for the Target MCU is not supplied from the USB Monitor Board and must therefore be supplied from the Target Board. In this case, set the power source supply selector on the USB Monitor Board to the TARGET side as shown in Figure 4-3.



**Figure 4-3 Power source supply selector-2**

## (3) Other

Depending on the host computer (PC) environment you are using, no 5 V power supply may be fed to the Target MCU even when the select switch on the USB Monitor Board is set to the USB side. In such a case, set the power source supply selector to the TARGET side so that the power for the Target MCU will be supplied from the Target Board.

### 4.1.2 FoUSB starts

- 1) From the Start menu, choose Programs -- RENESAS-TOOLS – Flash-over-USB V.\*.\*\* -- FoUSB Programmer to start the FoUSB. When the FoUSB starts, the FoUSB main window shown in Figure 4-4 appears.

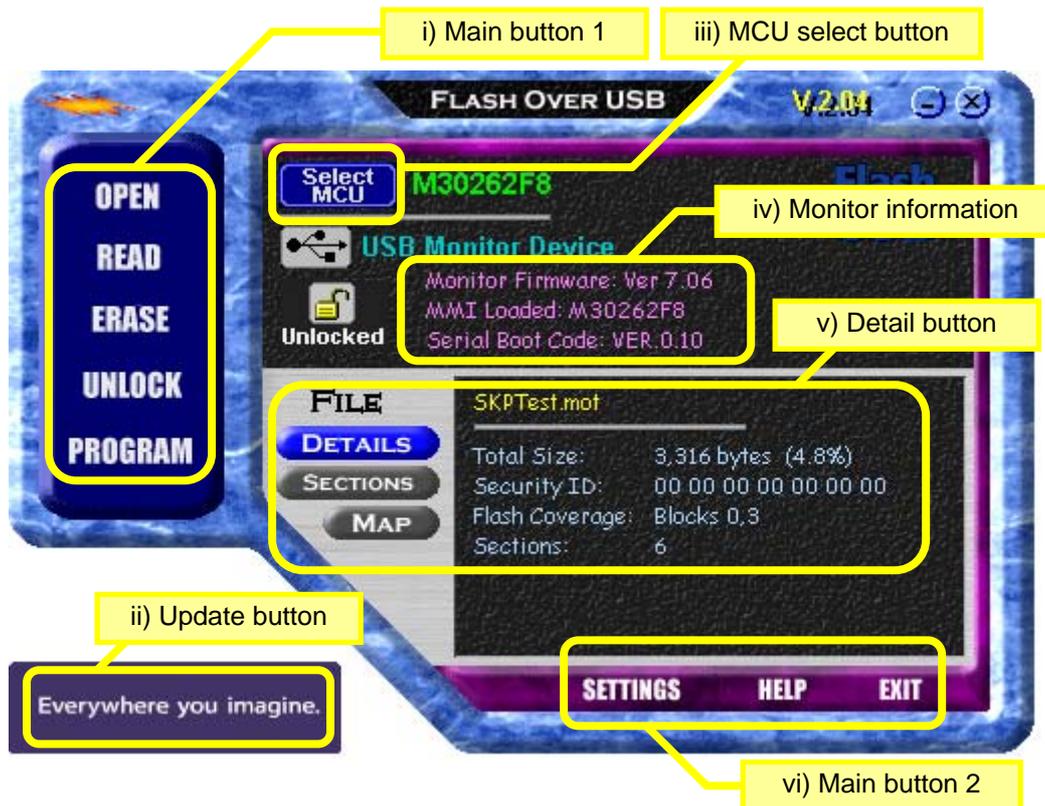


Figure 4-4 FoUSB main window

- 2) Guide to understanding the display of the main screen

No.	Item	Content
i	Main button 1	Use these main buttons to download a program as well as read, erase or write to the flash memory.
ii	Update button	Click this button to upgrade the FoUSB version.
iii	MCU select button	Use this button to select the Target MCU.
iv	Monitor information	Shows information on the selected MCU.
v	Detail button	Shows detailed information on the downloaded program.
vi	Main button 2	Use these main buttons to set functions, show help or exit.

### 4.1.3 Details of Main Button 1

#### 1) "OPEN" button

This button reads the downloading (programming) file to the Target MCU.

- (1) Click the "OPEN" button, and the screen shown in Figure 4-5 will appear, allowing you to choose the file to download into the Target MCU. The type of file that can be downloaded is HEX or Motorola. After selecting the file to download, click the <Open> button.

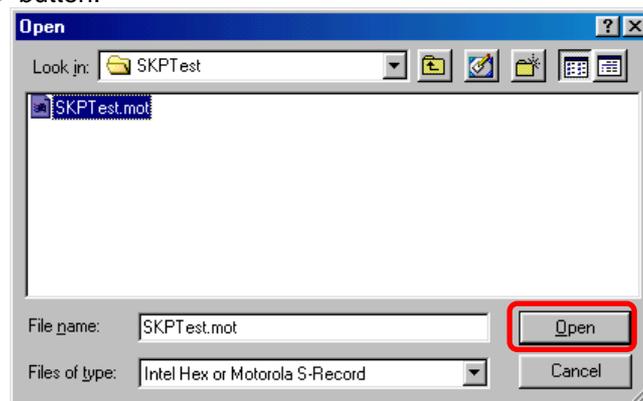


Figure 4-5 Open screen

- (2) The ID code is automatically read in. Click the <OK> button.

If file don't have ID code, a message is not displayed.



Figure 4-6 ID code screen

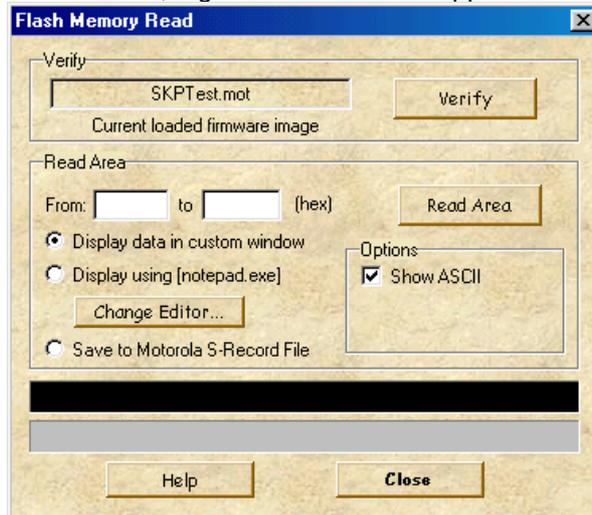
**Note:** A file which is out of flash area cannot be open.



## 2) "READ" button

This button performs to verify data written in the Target MCU and the file read by "OPEN". Also, performs to read out data written in the Target MCU.

(1) Click the "READ" button, Figure 4-7 screen will appear.



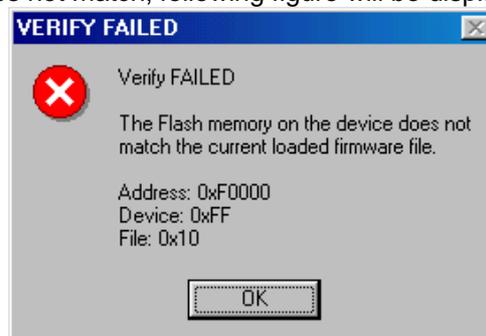
**Figure 4-7 Flash Memory Read screen-1**

(2) For Verify, click the <verify> button and the file downloaded by "OPEN" and data written in the Target MCU will be verified. If the verified result matches, Figure 4-8 will appear. Click the <OK> button.



**Figure 4-8 Verify OK screen**

If the data does not match, following figure will be displayed.



- (3) For “Read Area”, specify the range of data to read in hexadecimal. By default, the data opens in a custom window. Click the <Read Area> button, and the downloaded data will be displayed, but not saved. If you wish, select the <Show ASCII> check box in the Options section, and ASCII code will be added to the downloaded data. (See Figure 4-9 and Figure 4-10)

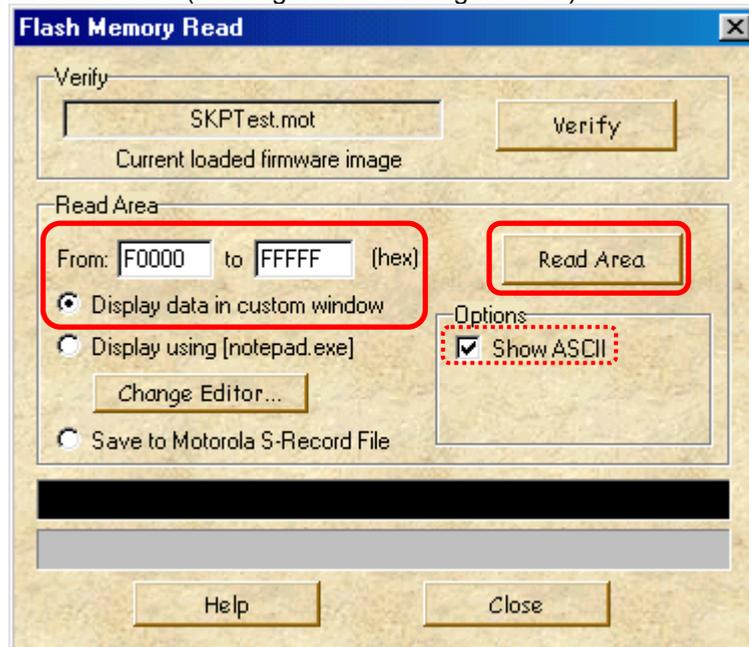


Figure 4-9 Flash Memory Read screen-2

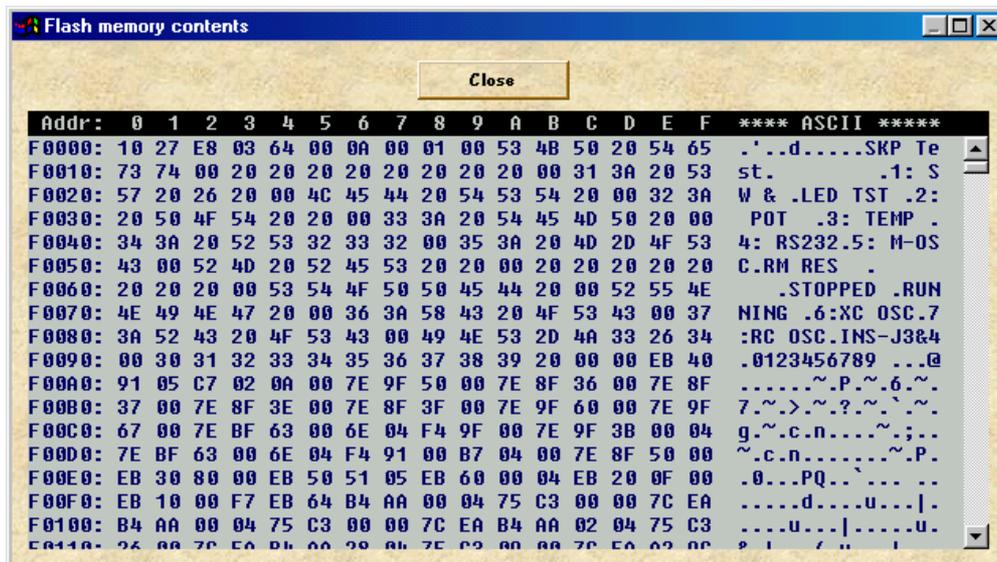


Figure 4-10 Flash Memory Contents

- (4) To change the custom window used for displaying data to an editor, select the <Display using>. By default, data is displayed in Notepad. To change Notepad to any editor, click the <Change Editor> button. (See Figure 4-11)

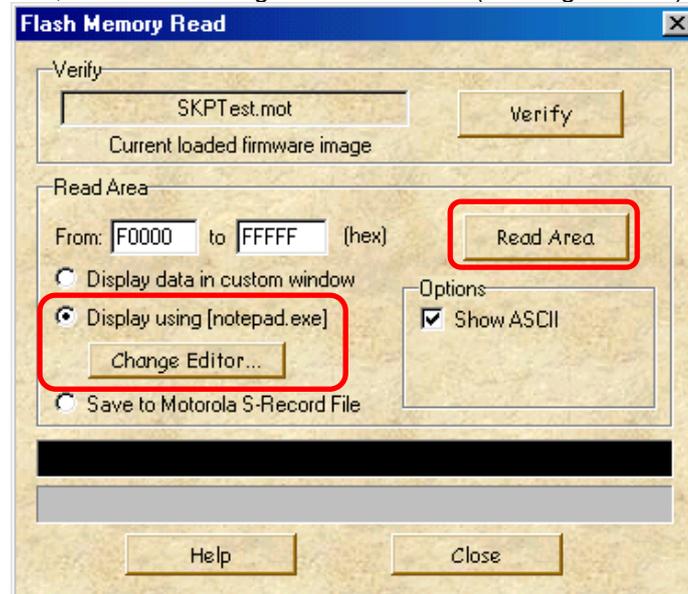


Figure 4-11 Flash Memory Read screen-3

- (5) To save the read data, select the <Save to Motorola S-Record File> and click the <Read Area> button. (See Figure 4-12)

Then enter a name for the file. (See Figure 4-13)

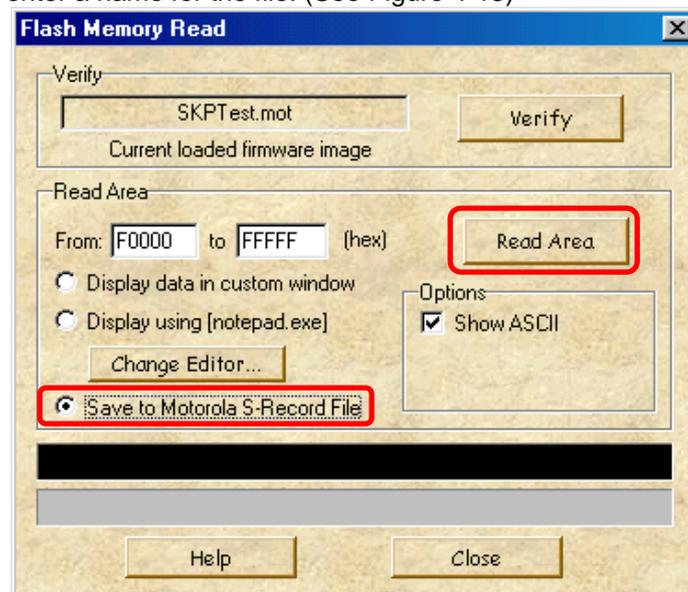
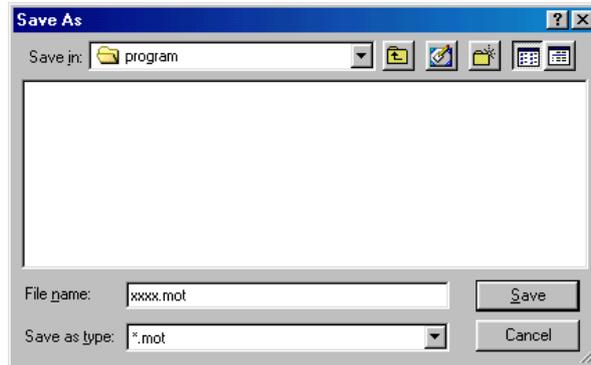


Figure 4-12 Flash Memory Read screen-4



**Figure 4-13 Save screen**

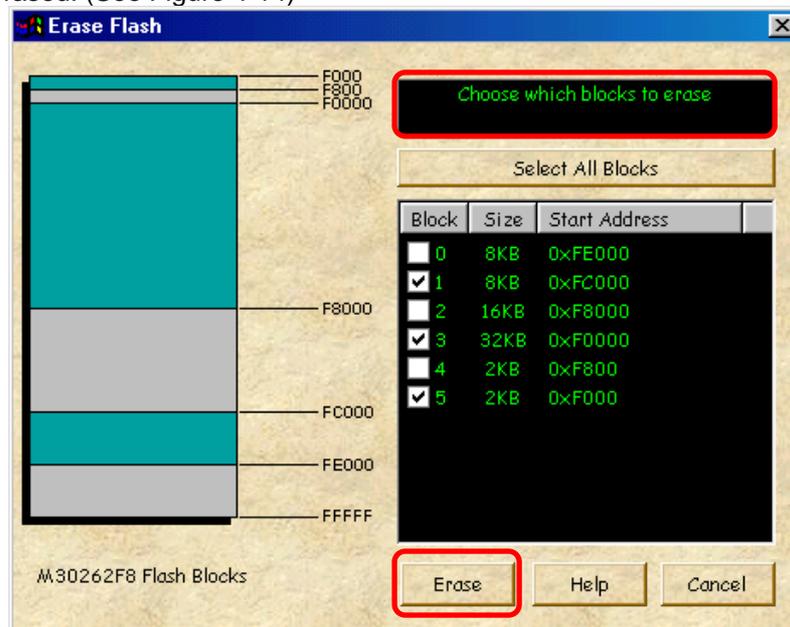
### 3) "ERASE" button

This button erases the Flash ROM in the Target MCU.

(1) When you click the "ERASE" button, the screen changes to one of the following two depending on whether you've downloaded data using "OPEN".

(2) Before downloading

You can choose to erase all blocks (Select All) or erase every one block. When you select a block to erase, the check box by block is indicated with a check mark and the block is displayed in color. Click the <Erase> button, and the block will be erased. (See Figure 4-14)



**Figure 4-14 Erase Flash-1**

(3) After downloading

The system reads information from the downloaded data to determine which block to erase and marks the corresponding check box with a check mark and displays the block in color. Click the <Erase> button, and the block will be erased. You can erase all blocks collectively or one block at a time. (See Figure 4-15)

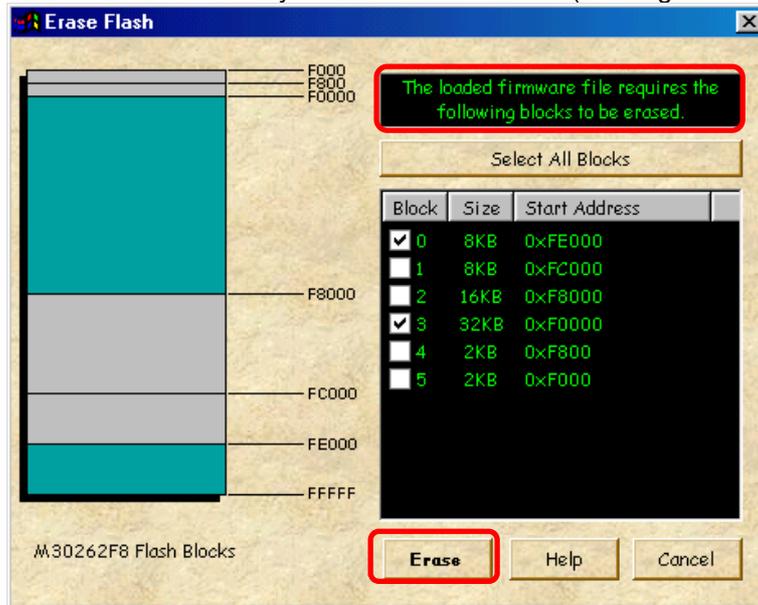


Figure 4-15 Erase Flash-2

4) “UNLOCK” button

This button sends the ID code to the locked Target MCU, and unlock the Target MCU. In the “Locked” display as shown in the following figure, a flash command (program, erase, read, verify) to the Target MCU cannot be executed.



When you click the “UNLOCK” button, the system checks ID code. The ID code check has automatic setting and manual setting.

(1) Automatic setting

Automatic setting checks in the following condition in ID code of “All FFh” and “All 00h”.

>> When FoUSB is started.

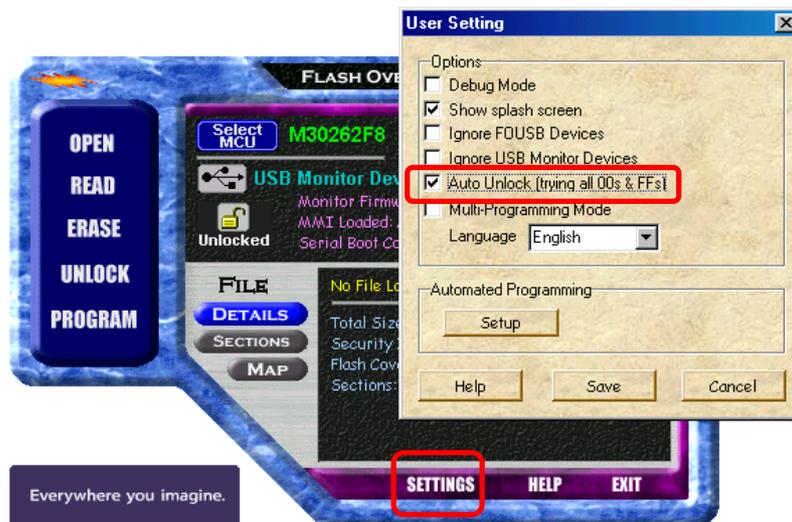
>> When a firmware is changed during FoUSB use. This condition shows FoUSB restart.

If the ID code consists “All 00h”, Figure 4-16 will be displayed, and the Target MCU is unlocked. When the ID code of Target MCU is not “All FFh” or “All 00h”, please unlock Target MCU using manual setting.



Figure 4-16 Unlocked screen

Automatic setting can select whether it performs by user. Click the “SETTING” button and user setting screen is displayed. Select enabled or disabled in “Auto Unlocok” check box and click the <Save> button.



Note: When the <Cancel> button is clicked on a user setting screen, a former setting condition is saved.

(2) Manual setting

If you click the “UNLOCK” button, Figure 4-17 will be displayed. Enter the ID code and click the <OK> button.

When the ID code written in the Target MCU matches with the input ID code and Figure 4-18 will be displayed. When the ID code does not match, Figure 4-19 will be displayed (Target MCU is locked) and enter the correct ID code.

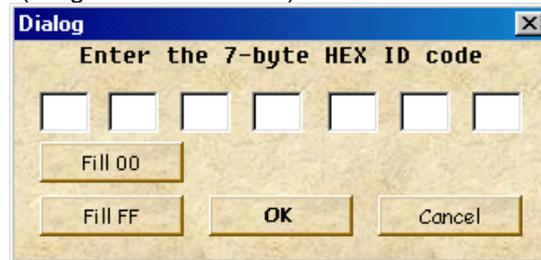


Figure 4-17 ID code dialog



Figure 4-18 ID code match



Figure 4-19 ID code not match

The setting method of the ID code is the following.

a. Macro input

The <Fill 00> button or the <Fill FF> button is clicked, and input “All 00h” or “All FFh”.

b. Manual input

Input the ID code by the keyboard input.

c. File input

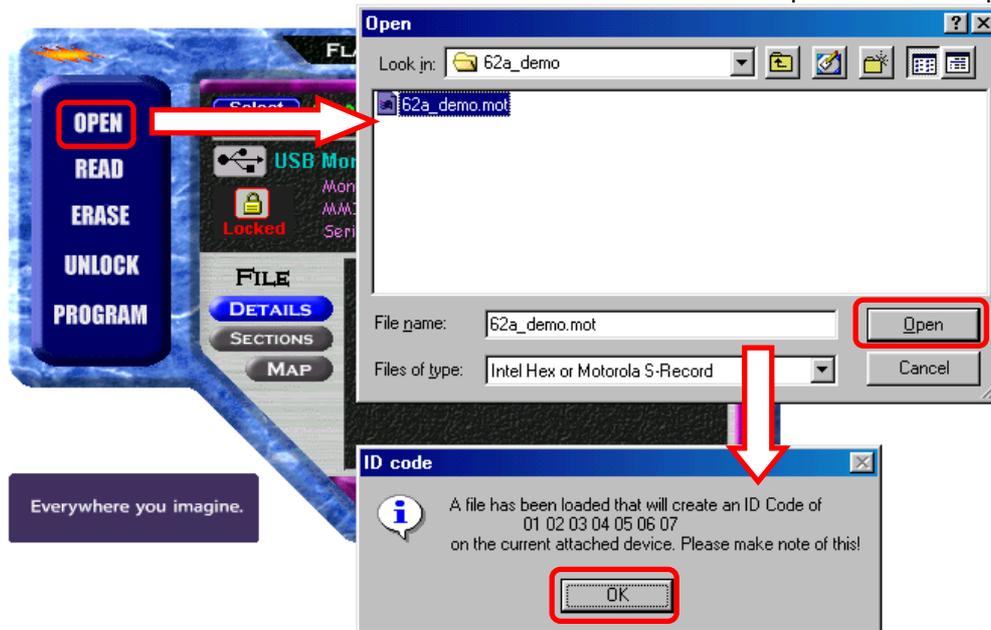
Input the HEX file or Motorola file which has an ID code.

The example of File input is shown in the next page.

### Example of File input

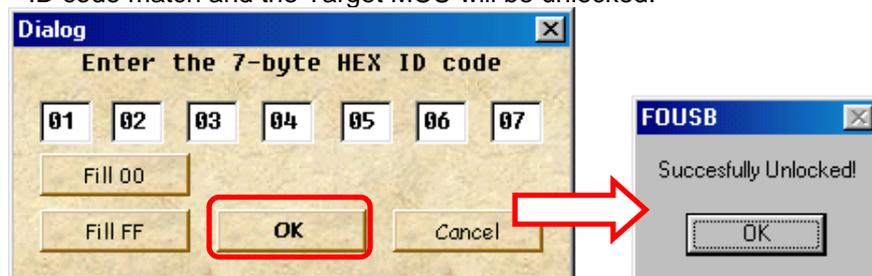
In this example, the ID code of "01 02 03 04 05 06 07" is programmed in the Target MCU.

First, click the "OPEN" button and open the HEX file or Motorola file which has an ID code. Click the <OK> button on the ID code screen which FoUSB displays. The Motorola file with the ID code of "01 02 03 04 05 06 07" is open in this example.



Next, click the "UNLOCK" button. The screen into which the ID code of the read file was input is displayed.

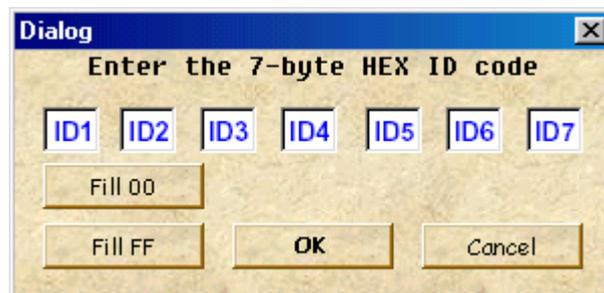
When clicking the "OK" button, the ID code written in the Target MCU and the input ID code match and the Target MCU will be unlocked.



**NOTICE: ID code address of MCU**

Series	ID code address
M16C/10 M16C/20 M16C/Tiny M16C/60	ID1: 0FFFDfH ID2: 0FFFE3h ID3: 0FFFEbH ID4: 0FFFEfH ID5: 0FFFF3h ID6: 0FFFF7h ID7: 0FFFFbH
M16C/80 M32C/80	ID1: 0FFFFDFh ID2: 0FFFFE3h ID3: 0FFFFEBh ID4: 0FFFFEFh ID5: 0FFFFFF3h ID6: 0FFFFFF7h ID7: 0FFFFFFbH
R8C/Tiny	ID1: 0FFDFh ID2: 0FFE3h ID3: 0FEBh ID4: 0FEfH ID5: 0FFF3h ID6: 0FFF7h ID7: 0FFbH
740 38000	ID1: 0FFD4h ID2: 0FFD5h ID3: 0FFD6h ID4: 0FFD7h ID5: 0FFD8h ID6: 0FFD9h ID7: 0FFDAh

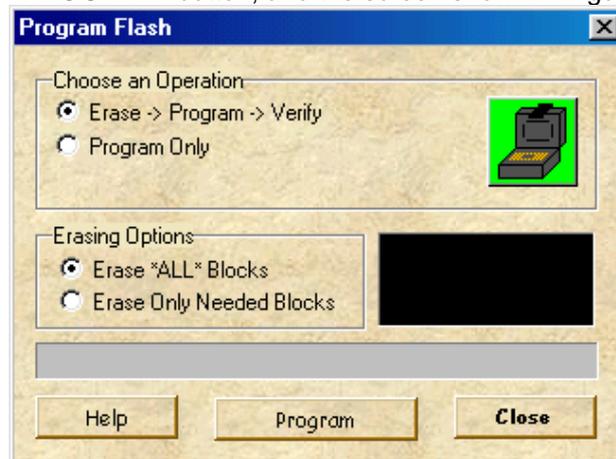
The ID code address of MCU and the ID code input forms of FoUSB are the following relations.



## 5) "PROGRAM" button

This button performs programming to the Target MCU.

(1) Click the "PROGRAM" button, and the screen shown in Figure 4-20 will appear.



**Figure 4-20 Program Flash screen**

(2) In the Choose an Options section, select either "Erase -> Program -> Verify" or "Program Only".

(a) Erase -> Program -> Verify (without lock bit function)

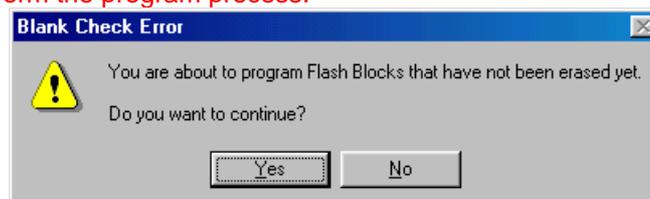
When you select this option, processing is performed in order of Erase, Program and Verify. A progress bar is displayed, indicating the progress of processing in Erase, Program and Verify.

(b) Program Only (without lock bit function)

When you select this option, processing is performed for only programming. A progress bar is displayed, indicating the progress of processing in programming.

**Note:** The following warning will be displayed if clicking the "Program Only" before erasing the Target MCU. Click the <Yes> button, only when Target MCU is blank chip.

If the Target MCU is not blank, erase Flash ROM of the Target MCU and perform the program process.



(3) Erasing Options is useful when you select "Erase -> Program -> Verify" for Choose An Options, allowing you to select the method for erasing flash memory blocks.

(a) Erase All Blocks

All flash blocks are erased

(b) Erase Only Needed Block

Only the corresponding flash block is erased.

#### **4.1.4 Details of the Update Button**

Use the "Update" button when you want to upgrade the version of FoUSB.

### 4.1.5 Details of the Select MCU Button

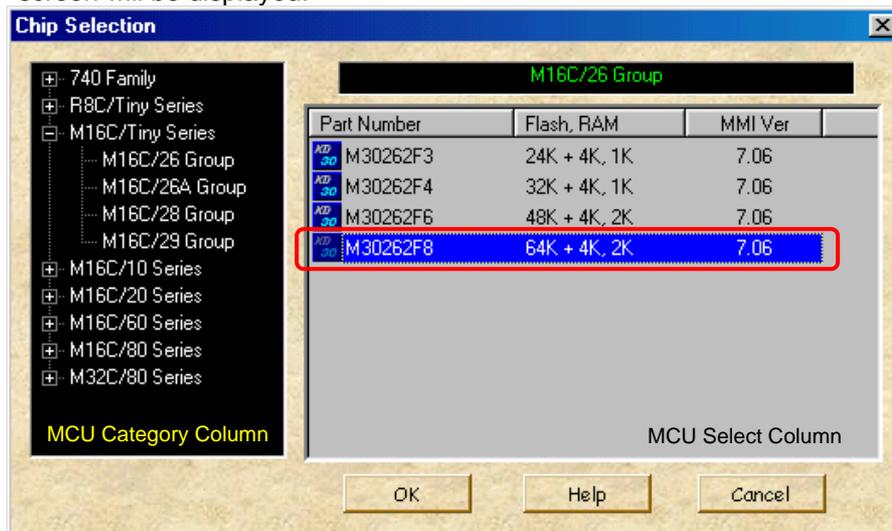
1) The following MCUs can be selected in FoUSB.

Group	MCU Product Name to select in FoUSB	Group	MCU Product Name to select in FoUSB	Group	MCU Product Name to select in FoUSB
M16C/10	M30102F3	M16C/62A (62M)	M30620FCA	R8C/10	R5F21102
M16C/1N	M301N2F8		M30624FGA		R5F21103
M16C/24	M30245FC		M3062GF8N (Note)		R5F21104
M16C/26	M30262F3	M16C/62P	M30622F8P	R8C/11	R5F21112
	M30262F4		M30623F8P		R5F21113
M30262F6	M30620FCP		R8C/12	R5F21114	
M30262F8	M30621FCP			R5F21122	
M16C/26A	M30260F3A			M30624FGP	R5F21123
	M30260F4A		M30625FGP	R5F21124	
	M30260F6A		M30626FHP	R8C/13	R5F21132
	M30260F8A		M30627FHP		R5F21133
	M30263F3A		M30626FJP	R5F21134	
	M30263F4A		M30627FJP	7542	M37542F8
M16C/28	M30280F6	M16C/6N	M306N4FC	38C2	M38C29FF
	M30280F8		M306N4FG		
	M30280FA		M306N5FC		
	M30281F6		M306NAFG		
	M30281F8	M306NBFC			
M30281FA	M16C/80	M30800FC			
		M30803FG			
M16C/29	M30290F8	M32C/83	M30833FJ		
	M30290FA		M30835FJ		
	M30290FC	M32C/84	M30845FJ		
	M30291F8	M32C/85	M30855FH		
	M30291FA		M30855FW		
	M30291FC	M32C/86	M30865FJ		
	M32C/87	M3087BFL			

Note: M3062GF8N (M16C/62N Group) is contained in M16C/62A Group list.

- 2) When pressing the "Select MCU" button, the screen shown in Figure 4-21 is displayed. Select the Target MCU in this screen.

First, select the category of the Target MCU to be used from the MCU Category Column (M16C/26 Group is selected from M16C/Tiny Series in Figure 4-21). Next, select the Target MCU to be used from the MCU Select Column. If the MCU which is indicated by highlight is double-click or <OK> button is clicked, the confirmation screen will be displayed.



**Figure 4-21 Chip Selection screen**

- 3) Click the <OK> button, if the confirmation screen is displayed, and download the firmware to USB Monitor Board.



**Figure 4-22 Confirmation screen**

- 4) The screen shown in Figure 4-23 is displayed while the system is downloading the firmware to USB Monitor Board.



**Figure 4-23 Firmware Download screen**

- 5) When the system has finished download the firmware, the screen shown in Figure 4-24 is displayed. Click the <OK> button.



**Figure 4-24 Completion screen**

**NOTICE: The cautions about firmware download in 3.3V operation**

In 3.3V operation, firmware download to USB Monitor Board cannot be performed. The following error screen will be displayed if the firmware is downloaded to USB Monitor Board in 3.3V operation.



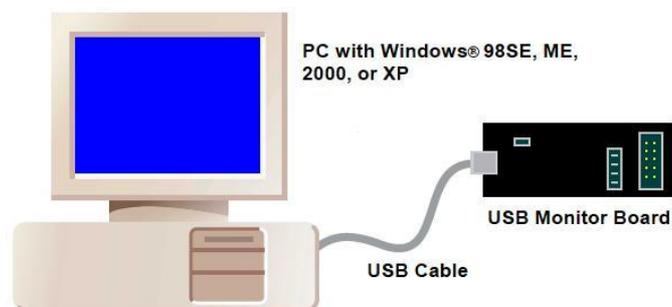
In such a case, please use FoUSB (KD30/KD3083 are included) after downloading the firmware to USB Monitor Board in the procedure shown below. Firmware download is not required unless the MCU to be used is changed after downloading the firmware.

**<Procedure of firmware download in 3.3V>**

- a) Set the power source supply selector (S1: Power Mode) on the USB Monitor Board to the **USB** side.

(Refer to Figure 4-2)

- b) Connect the USB Monitor Board to host computer (PC). In this case, do not connect the Target Board to the USB Monitor Board.

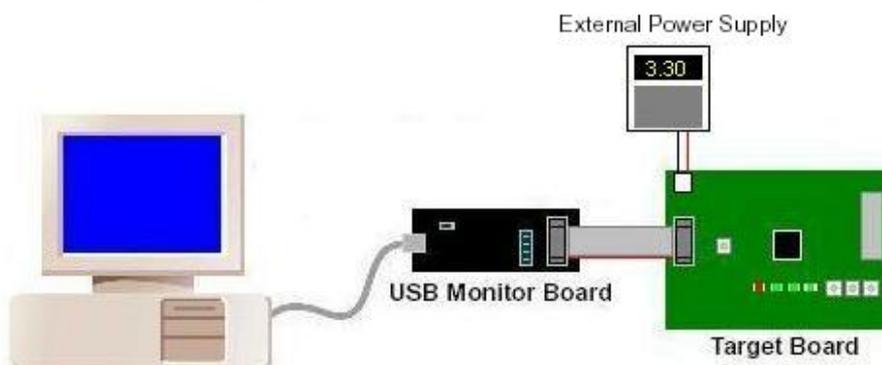


- c) Start FoUSB. At this time, although the following error screen is displayed, ignore the error and click the <OK> button.



Figure 4-25 Error screen

- d) Click the “Select MCU” button and download the firmware to the USB Monitor Board.  
(Refer to 2) to 5) of this section for details)
- e) When the download of the firmware is completed, Figure 4-25 will be displayed again.  
Ignore the error and click the <OK> button. Finish FoUSB.
- f) Remove the USB Monitor Board from host computer (PC), and set the power source supply selector (S1: Power Mode) on the USB Monitor Board to the **TARGET** side.  
(Refer to Figure 4-3)
- g) Connect the PC, USB Monitor Board and Target Board.
- h) Input 3.3V to the Target Board and USB Monitor Board from the external power.



FoUSB (KD30/KD3083 are included) can be used in 3.3V operation with the above procedure.

### 4.1.6 Monitor Information

1) Monitor Firmware

The version of the firmware currently written in the USB Monitor Board is indicated here.

2) MMI Loaded

The name of the firmware currently written in the USB Monitor Board is indicated here.

3) Serial Boot Code

The boot version written in the MCU is indicated here.

### 4.1.7 Detailed File Information

1) DETAILS button

Shows details of the downloaded data (program size, ID code, blocks and sections used).

2) SECTIONS button

Shows the address area in which the downloaded data are written.

3) MAP button

Shows the block area in which the downloaded data are written.

### 4.1.8 Details of Main Button 2

1) SETTINGS button

When you click the “SETTINGS” button, the screen shown in Figure 4-26 appears, allowing you to customize FoUSB.



Figure 4-26 User Setteing screen

(1) Contents of Options

Debug Mode: Whether debug mode is available (Unusable)

Show splash screen: Whether FoUSB sound is available

Ignore FoUSB Devices: Whether FoUSB devices are included (Unusable)

Ignore Monitor Devices: Whether USB monitor is included (Unusable)

Auto Unlock: Whether or not to automatically set ID code

Multi-Programming Mode: Whether Multi-Programming Mode is available (Unusable)

Language: Language select

(2) Automated Programming

This function currently cannot be used.

2) HELP button

Opens a help file.

3) EXIT button

Terminates FoUSB.

## 4.2. Other Functions

FoUSB does not have a “check sum” function. Therefore, when checking written contents, check “READ” > “Verify” > “Verification”. For details, refer to [4.1.3 Details of Main Button 1] for other functions, refer to Online Help.

## 5. Using the KD

### 5.1 Using the KD

#### 5.1.1 Before Starting the KD

- 1) Corresponding MCU become only R8C/Tiny, M16C/10, M16C/20, M16C/Tiny, M16C/60 series, M16C/80 and M32C/80 series.
- 2) Check to see that the KD is installed in your host computer (PC).
- 3) Check to see that PC, USB Cable, USB Monitor Board, Flat Cable and Target Board are firmly connected. (See Figure 5-1)

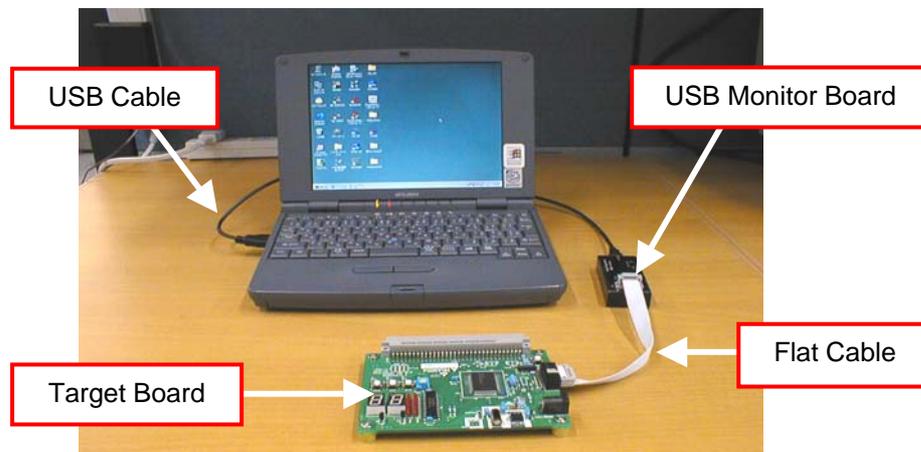
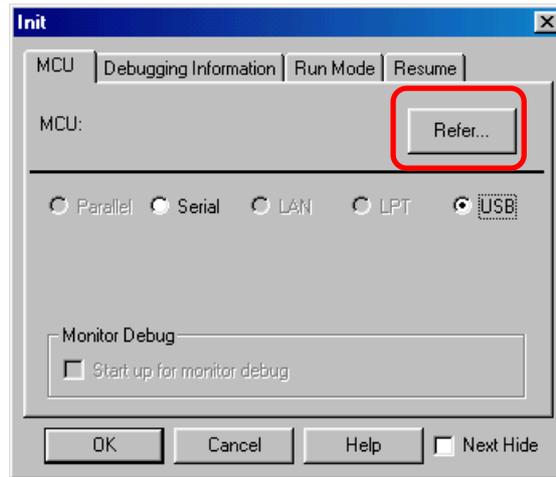


Figure 5-1 connect-2

### 5.1.2 Starting the KD

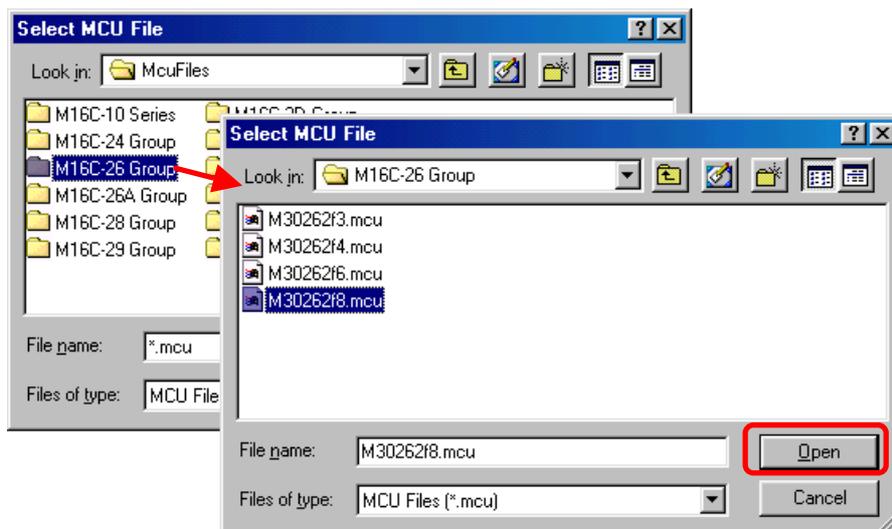
- 1) From the Start menu, choose Programs -- RENESAS-TOOLS -- KD30 V.\*\* Release\* -- KD30 to start the KD. When the KD starts, the screen shown in Figure 5-2 appears. If the screen appears, click the <Refer...> button and choose MCU File.

**Note:** In the case of M16C/80 and M32C/80, start KD3083.



**Figure 5-2 Init screen-1**

- 2) Next, the Select MCU File screen on Figure 5-3 will be displayed. For KD30, select the category folder of MCU to be used from the MCU category folder of the McuFiles folder and open it. For KD3083, open the MCU File from the McuFiles folder.



**Figure 5-3 Select MCU File screen**

- 3) The Init screen of the Figure 5-4 opens when it is done after a MCU File is chosen. Choose "USB" as the communication interface and click the <OK> button.

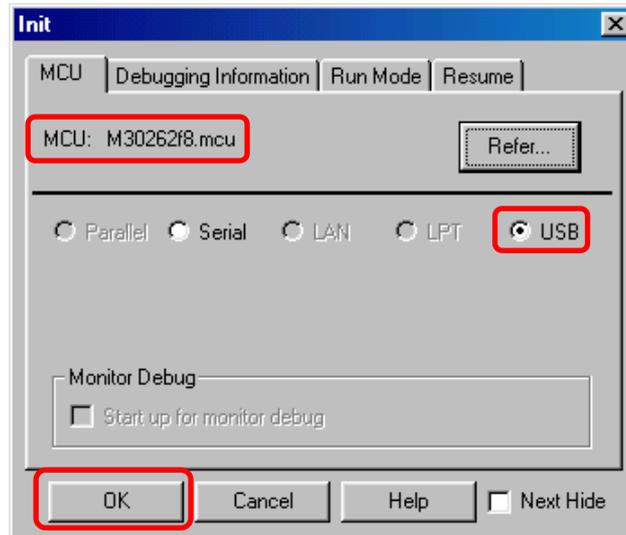


Figure 5-4 Init screen-2

**NOTICE: Precautions on KD3083 Emulation Memory**

The address allocated to the Emulation Memory cannot be debugged in the KD3083. Therefore, allocate the Emulation Memory to the address which is not used in debug.

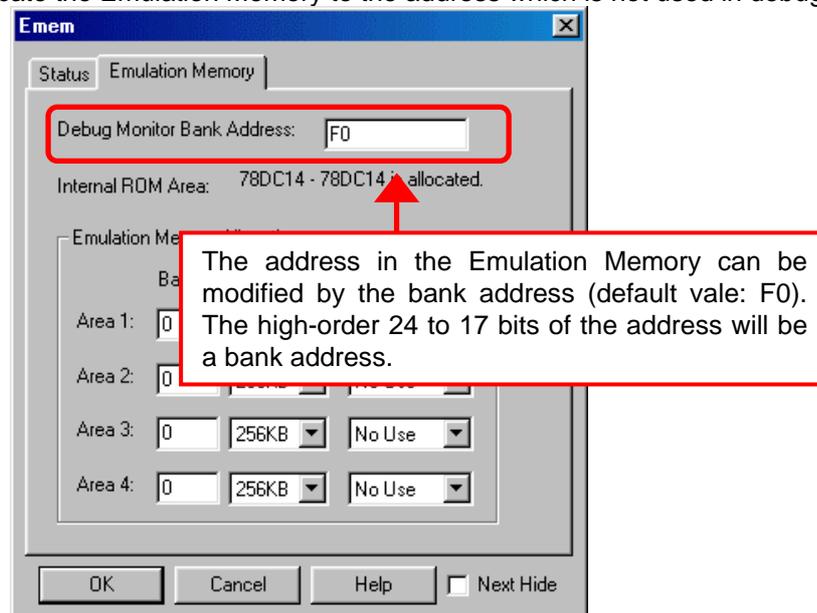
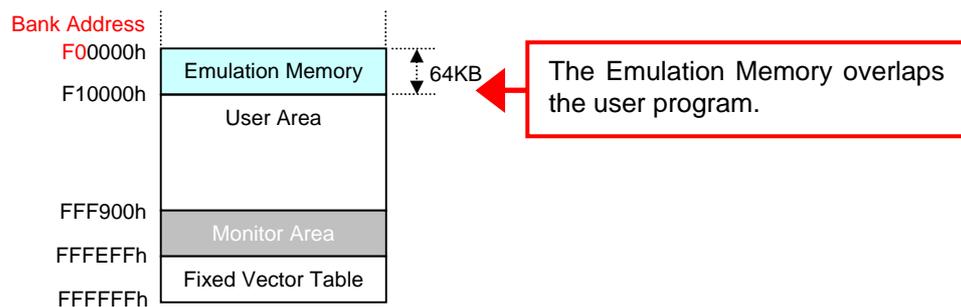


Figure 5-5 Emem screen (KD3083 only)

The following section describes the address modification of the Emulation Memory as an example of the M3087BFLGP (M32C/87 Group microcomputer).

- (a) At first an example to which the Emulation Memory overlaps the User Program is shown. In this example, the User Program is allocated from F00000h and the Emulation Memory is allocated from F00000h (using default value F0 of bank address). Therefore, the Emulation Memory overlaps the User Program and contents of the User program and assemble codes are not matched.

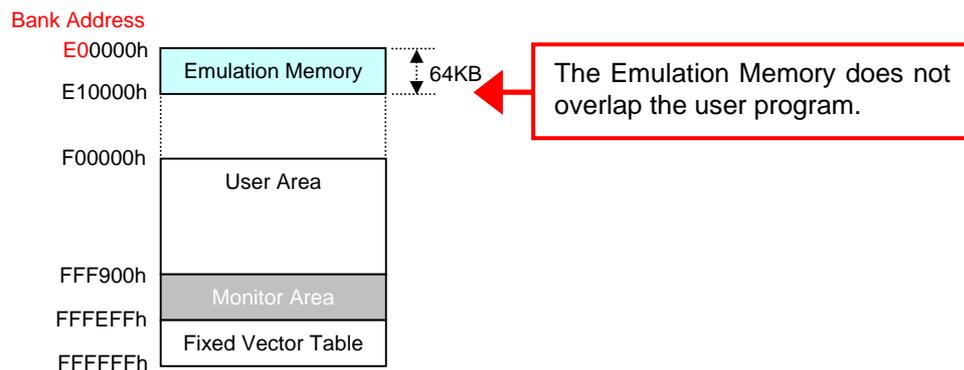


The screenshot shows a "Program Window [test1.a30]" with a table of assembly code. A red box highlights a discrepancy between the user program code and the assembly code.

Line	Address	BRK	PASS	Objcode	Label	Source/Mnemonic
00007						;
00008						
00009						
00010						
00011						
00012						
00013						;
00014						START:
00015						
00016	F00000	-		00	START	BRK nop
00017	F00001	-		00		BRK nop
00018	F00002	-		00		BRK nop
00019	F00003	-		00		BRK nop
00020	F00004	-		00		BRK BK_10:

A red box highlights the first row of the table (Line 00016), with the text: "The user program code (NOP) and assemble code (BRK) are not matched." A red arrow points from this box to the "BRK" label in the assembly code column.

- (b) Then an example to which the Emulation Memory does not overlap the User Program is shown. In this example, the User Program is allocated from F00000h and the Emulation Memory is allocated from E00000h (set E0 to the bank address). Since the Emulation Memory does not overlap the User Program, contents of the User Program and assemble codes are matched.



Line	Address	BRK	PASS	Objcode	Label	Source/Mnemonic
00007						
00008						
00009						
00010						
00011						
00012						
00013						
00014						
00015						
00016	F00000	-		DE	START	NOP
00017	F00001	-		DE		NOP
00018	F00002	-		DE		NOP
00019	F00003	-		DE		NOP
00020	F00004	-		DE		NOP
						BK_10:

The user program code (NOP) and assemble code (NOP) are matched.

Note: The setting contents on the Emem screen will be continued to the upcoming KD3083. Therefore, it is not necessary to set every time the KD3083 starts.

- 4) This KD Main screen appears when the KD was able to communicate normally at startup.

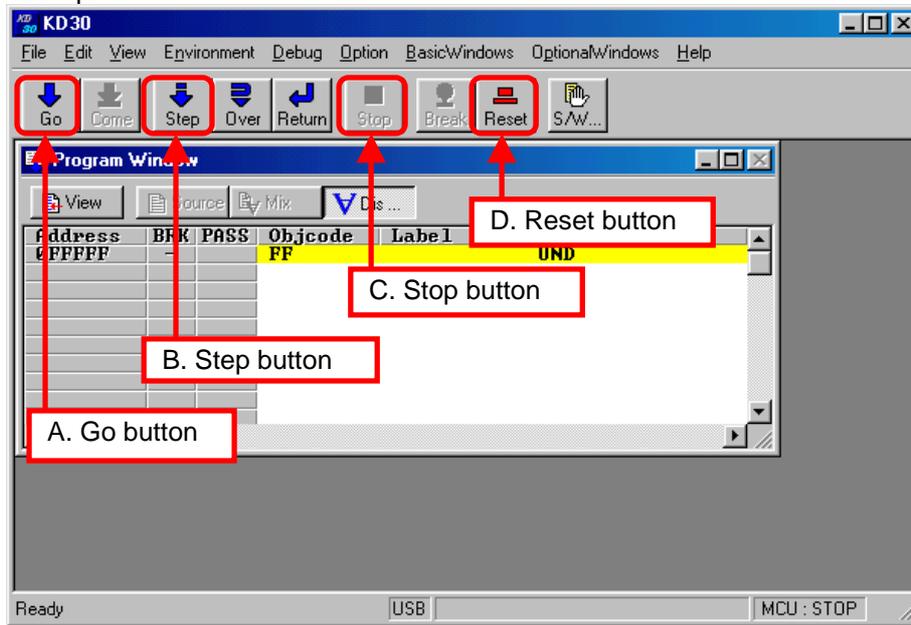


Figure 5-6 KD Main screen

### 5.1.3 Program Download

- 1) Download a program by "File -- Download" in KD Main screen. Please note that "SKPTest.x30" is not included in this product.

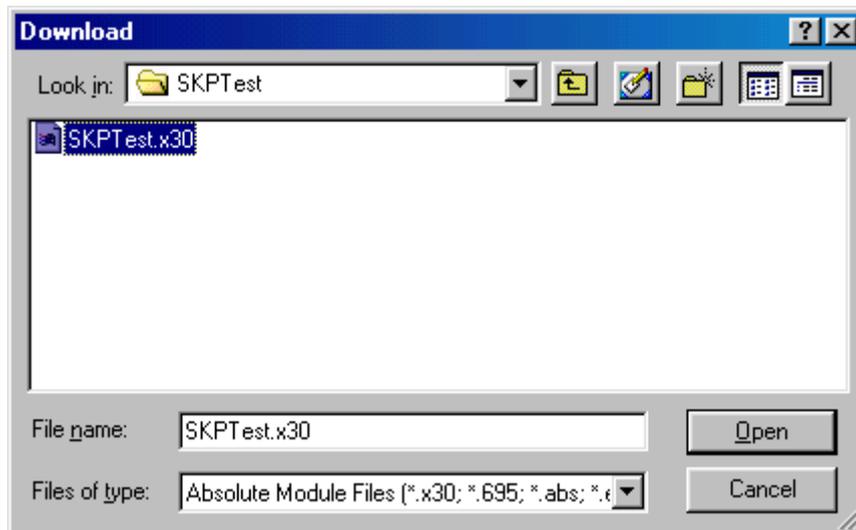


Figure 5-7 Program Download

- 2) When completing the download, a program which is downloaded into "Program window" is indicated (See Figure 5-8).

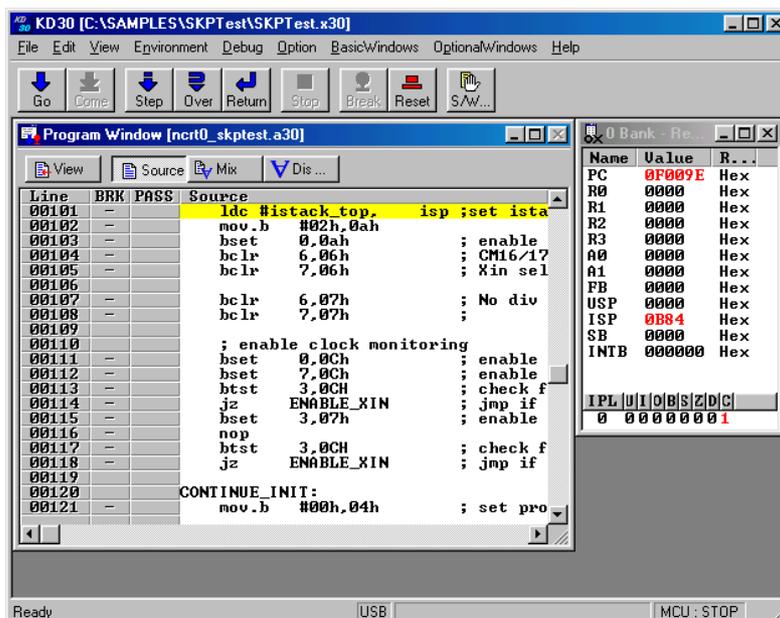


Figure 5-8 Program window

### 5.1.4 Program Execution

When completing download, click the "Go" button on the KD Main screen to execute a program. After this, the program is executed.

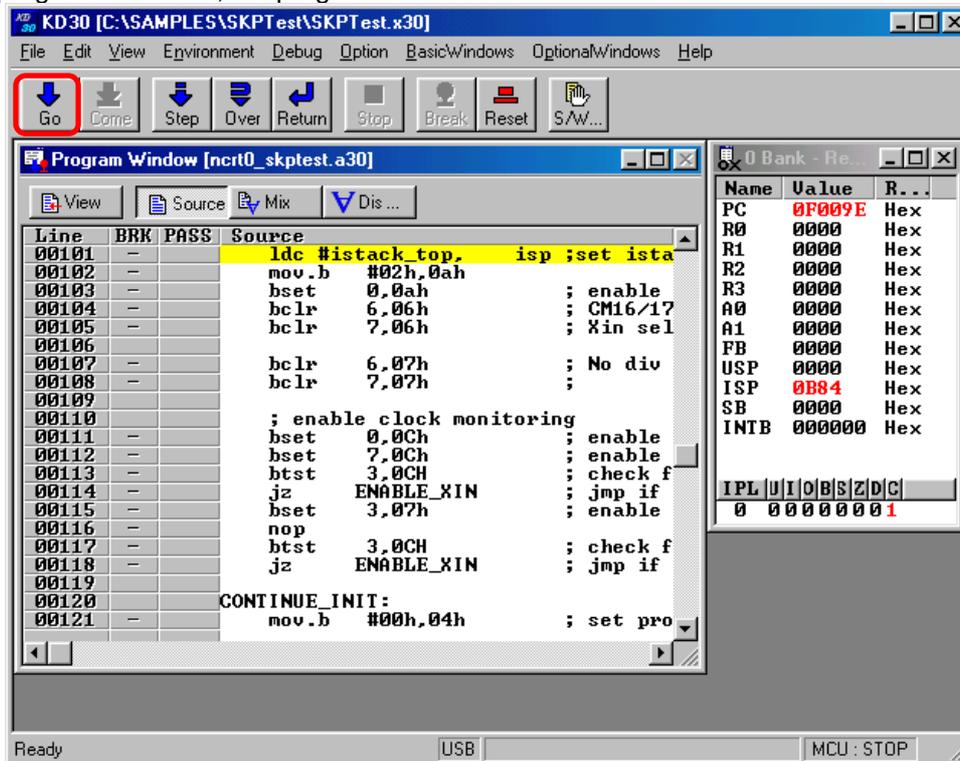


Figure 5-9 Program Execution

### 5.1.5 Program Stop

Click the "Stop" button on the KD Main screen (Figure 5-6, C) to stop the program which is already executed after this, the program is stopped the KD Main screen is as Figure 5-8.

### 5.1.6 Program Step Execution

When performing step execution, click the "Step" button (Figure 5-6, B) on the KD Main screen.

### 5.1.7 Software Break Method

When executing the software break, the software break can be set as the place which has "-" in "BRK" in Program Window screen. The KD Main screen is as Figure 5-10.

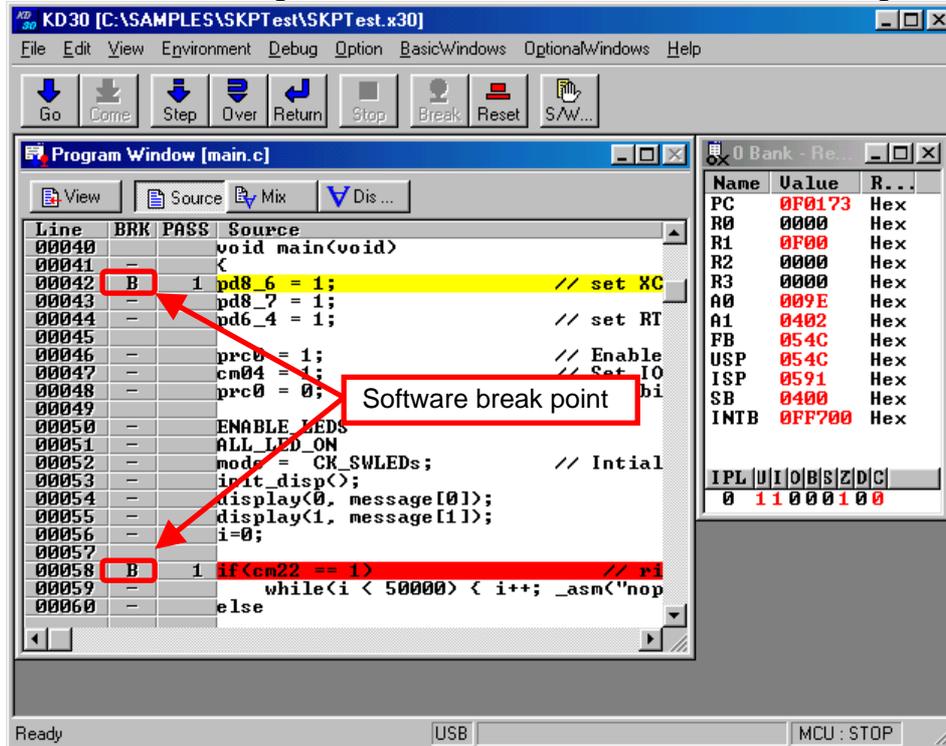


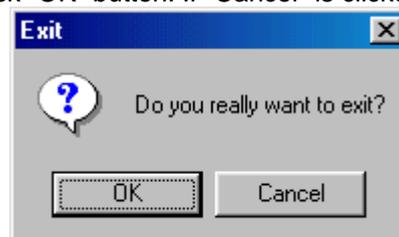
Figure 5-10 Software Break

### 5.1.8 Reset Execution

User Program is in the same status as immediately after download. Click the "Reset" button (Figure 5-6, D) on the KD Main screen.

### 5.1.9 KD Completion

- 1) Before completing a KD, stop the User Program.
- 2) Next, select "File -- Exit" menu in the KD Main screen. When the Exit menu is selected opens, click "OK" button. If "Cancel" is clicked, the KD is not completed.



### 5.1.10 If a Communication Error Occurs

If a communication error occurs, the error screen shown in Figure 5-11 appears. In that case, click the “OK” button and check the following two points. When you finished checking, restart the KD.

Check1: Is the power source supply selector on the USB Monitor Board set to USB side?

Check2: Are the USB Cable and Flat Cable are firmly inserted into position?



Figure 5-11 Communication Error screen

### 5.1.11 Error Except a Communication Error Occurs

If an error except a communication error occurs, refer to the KD online help.

### 5.1.12 Operation Method

When operating except specifying above, refer to the KD online help.

## 5.2 KD Limitations

### 5.2.1 Limitations on Special Page Vector

A Monitor Program uses several Special Page Vectors. Therefore, the Special page Vector which can be used in the User Program is limited as Special Page Vector Number shown in the following table.

When updating the version of the Monitor Program (or Firmware), the Special Page Vector which can be used in the User Program may be modified.

**Table 5-1 Special Page Vector Limitations**

Group	Available Special Page Vector Number
M16C/10	#127 to #24
M16C/1N	#238 to #24
M16C/24	#234 to #24
M16C/26	#205 to #24
M16C/26A, 28, 29	#199 to #24
M16C/62A (M) M16C/6N (6NA, 6NB)	#234 to #24
M16C/62P M16C/6N (6N4, 6N5)	#200 to #24
M16C/62N (M3062GF8N)	#237 to #24
M16C/80	#196 to #24
M32C/83	#182 to #24
M32C/84, 85, 86, 87	#164 to #24

**Note:** The contents in this Table are applied to the following KD30/KD3083.

- KD30 Ver.4.10 Release 1 (Firmware version: V.8.00)
- KD3083 Ver.3.30 Release 1 (Firmware version: V.8.00)

## 5.2.2 A limitation item about the C language

When using Renesas C compiler. It is necessary to change a start up file (ncrt0.a30 and sect30.inc).

### (1) The change point of "ncrt0.a30"

#### (a) Initialize standard I/O

The UARTi setting is modified in the I/O initialization treatment. Therefore, to ensure that the I/O initialization treatment is not called up, comment it out.

--> Applicable MCUs

All MCUs

#### (b) Reset treatment (after reset, this program will start)

The interrupt enable flag is cleared and communication is disabled after the LDINTB instruction. Therefore, execute the interrupt enable setting immediately after the LDINTB instruction.

--> Applicable MCUs

M16C/10, M16C/1N, M16C/62A(M), M16C/6N(M306NAFG, M306NABFC only)

M16C/24, M3062GF8N, M16C/80

#### (c) Variable Vector process (INTERRUPT VECTOR ADDRESS definition)

The initial setting of the relocatable vector table (variable vector table) will cause the program to overlap with the monitor memory area. Set the address so that it does not overlap with the memory area.

--> Applicable MCUs

All MCUs except R8C/Tiny

### (2) The change point of "sect30.inc"

#### (a) UARTi receive interrupt vector address setting

The user must set the UARTi receive interrupt address for communication between the monitor program and the debugger. Set the interrupts as indicated below applicable MCUs.

--> Applicable MCUs

UART1 receive interrupt (FF900h): M16C/24, M16C/62A(M), M3062GF8N

M16C/6N(M306NAFG, M306NBFC only)

UART0 receive interrupt (FF900h): M16C/10, M16C/1N

UART1 receive interrupt (FFF900h): M16C/80

### 5.2.3 Limitations on Memory Extension

When using memory extension, make sure the power source supply selector on the USB Monitor Board is set to the **TARGET** side so that the power for the Target MCU will be supplied from the Target Board. Memory extension cannot be used when the selector is set to the USB side.

### 5.2.4 Precautions on Internal Reserved Area Expansion Bit

#### **a. M16C/62A (M), M16C/62P**

The Target MCU operates when the PM13 bit (Internal Reserved Area Expansion Bit) is set to “1” (Expands the internal RAM area and internal ROM area to over 15KB and to over 192KB respectively) for 256KB or above version of the M16C/62A (M) and 62P groups. Since the access area of the internal memory is limited (The Monitor Program RAM area is limited) by setting the PM13 bit to “0”, the KD will not be able to be used. Therefore, do not set the PM13 bit to “0” on the User Program.

Applicable MCUs: M30624FGAFP/GP, M30625FGAGP, M30624FGMFP/GP  
M30625FGMGP, M30624FGPPFP/GP, M30625FGPGP  
M30626FHPFP/GP, M30627FHPGP, M30626FJPFP/GP  
M30627FJPGP

#### **b. M16C/6N (6N4)**

The Target MCU operates when the PM13 bit (Internal Reserved Area Expansion Bit) is set to “1” (Expands the internal ROM area to over 192KB) for 256KB version of the M16C/6N (6N4) group. Although the PM13 bit is set to “0”, the Monitor Program area is not limited and the KD will be able to be used. However, the area of C0000h to CFFFFh cannot be used.

Applicable MCUs: M306N4FGTFP

#### **c. M16C/6N (6NA)**

The Target MCU operates when the PM13 (Internal Reserved Area Expansion Bit) is set to “0” (The internal ROM area is 192KB or less) for 256KB version of the M16C/6N (6NA) group. Therefore, the area of C0000h to CFFFFh cannot be used. When using the area of C0000h to CFFFFh, set the address after D0000h to the reset vector and set the PM13 bit to “1” on the User Program which operates from the address after D0000h.

Applicable MCUs: M306NAFGTFP

### 5.2.5 Limitations on Stop and Wait Modes

To use stop or wait modes in the User Program, start the KD in free-run mode. If you want to debug, close the RAM, C Watch and ASM Watch Windows before actually debugging. Furthermore, set a breakpoint or take other necessary measures when getting out of stop or wait mode in order to ensure that no window operations will be performed until the program stops at the breakpoint.

### 5.2.6 Realtime Capability of the User Program

Please be aware that while the Monitor Program is in its “STOP”ed state, the hardware peripherals will continue to run. Therefore, interrupts may not be serviced properly. Also, the watchdog timer will not be serviced and will likely timeout if active.

**Note:** While the Monitor Program is in its “RUN”ning state, there is no overhead on the User Program, **unless** the RAM, C Watch and ASM Watch Windows are open in KD30/KD3083. These windows require periodic communication with the target MCU, which suspends normal User Program operation while servicing the request (approximately 2000 BCLK cycles for each 16 bytes of data displayed in the window are used per window update). When enabling Realtime Capability in the User Program, close these windows.

### 5.3 Memory Map Limitations

Table 5-2 and Table 5-3 list the ROM/RAM areas which the monitor program uses. Figure 5-12 shows the memory map.

**Table 5-2 ROM/RAM areas (1)**

Group	MCU	ROM/RAM	XXXXXh	YYYYYh	ZZZZZh
M16C/10	M30102F3	24K/1K	780h	7FFh	0FA000h
M16C/1N	M301N2F8	64K/3K	F80h	FFFh	0F0000h
M16C/24	M30245FC	128K/10K	2B80h	2BFFh	0E0000h
M16C/26	M30262F3	24K/1K	780h	7FFh	0FA000h
	M30262F4	32K/1K	780h	7FFh	0F8000h
	M30262F6	48K/2K	B80h	BFFh	0F4000h
	M30262F8	64K/2K	B80h	BFFh	0F0000h
M16C/26A	M30260F3A	24K/1K	780h	7FFh	0FA000h
	M30260F4A	32K/1K	780h	7FFh	0F8000h
	M30260F6A	48K/2K	B80h	BFFh	0F4000h
	M30260F8A	64K/2K	B80h	BFFh	0F0000h
	M30263F3A	24K/1K	780h	7FFh	0FA000h
	M30263F4A	32K/1K	780h	7FFh	0F8000h
	M30263F6A	48K/2K	B80h	BFFh	0F4000h
	M30263F8A	64K/2K	B80h	BFFh	0F0000h
M16C/28	M30280F6	48K/4K	1380h	13FFh	0F4000h
	M30280F8	64K/4K	1380h	13FFh	0F0000h
	M30280FA	96K/8K	2380h	23FFh	0E8000h
	M30281F6	48K/4K	1380h	13FFh	0F4000h
	M30281F8	64K/4K	1380h	13FFh	0F0000h
	M30281FA	96K/8K	2380h	23FFh	0E8000h
M16C/29	M30290F8	64K/4K	1380h	13FFh	0F0000h
	M30290FA	96K/8K	2380h	23FFh	0E8000h
	M30290FC	128K/12K	3380h	33FFh	0E0000h
	M30291F8	64K/4K	1380h	13FFh	0F0000h
	M30291FA	96K/8K	2380h	23FFh	0E8000h
	M30291FC	128K/12K	3380h	33FFh	0E0000h
M16C/62A (62M)	M30620FCA	128K/10K	2B80h	2BFFh	0E0000h
	M30624FGA	256K/20K	5380h	53FFh	0C0000h
M16C/62P	M30622F8P	64K/4K	1380h	13FFh	0F0000h
	M30623F8P	64K/4K	1380h	13FFh	0F0000h
	M30620FCP	128K/10K	2B80h	2BFFh	0E0000h
	M30621FCP	128K/10K	2B80h	2BFFh	0E0000h
	M30624FGP	256K/20K	5380h	53FFh	0C0000h
	M30625FGP	256K/20K	5380h	53FFh	0C0000h
	M30626FHP	384K/31K	7F80h	7FFFh	0A0000h
	M30627FHP	384K/31K	7F80h	7FFFh	0A0000h
	M30626FJP	512K/31K	7F80h	7FFFh	080000h
	M30627FJP	512K/31K	7F80h	7FFFh	080000h
M16C/62N	M3062GF8	64K/8K	2380h	23FFh	0F0000h

Table 5-3 ROM/RAM areas (2)

Group	MCU	ROM/RAM	XXXXXh	YYYYYh	ZZZZZh
M16C/6N	M306N4FC	128K/5K	1780h	17FFh	0E0000h
	M306N5FC	128K/5K	1780h	17FFh	0E0000h
	M306N4FG	256K/10K	2B80h	2BFFh	0C0000h
	M306NBFC	128K/5K	1780h	17FFh	0E0000h
	M306NAFG	256K/10K	2B80h	2BFFh	0C0000h
M16C/80	M30800FC	128K/10K	2B00h	2BFFh	FE0000h
	M30803FG	256K/20K	5300h	53FFh	FC0000h
M32C/83	M30833FJ	512K/31K	7F00h	7FFFh	F80000h
	M30835FJ	512K/31K	7F00h	7FFFh	F80000h
M32C/84	M30845FJ	512K/24K	6300h	63FFh	F80000h
M32C/85	M30855FW	320K/24K	6300h	63FFh	FB0000h
	M30855FH	384K/24K	6300h	63FFh	FA0000h
	M30852FJ	512K/16K	4300h	43FFh	F80000h
M32C/86	M30865FJ	512K/24K	6300h	63FFh	F80000h
M32C/87	M3087BFL	1M/48K	C300h	C3FFh	F00000h
R8C/10	R5F21102 <a href="#">Note1</a>	8K/512	---	7FFh	0C800h
	R5F21103 <a href="#">Note1</a>	12K/768	---	7FFh	0C800h
	R5F21104	16K/1K	---	7FFh	0C800h
R8C/11	R5F21112 <a href="#">Note2</a>	8K/512	---	7FFh	0C800h
	R5F21113 <a href="#">Note2</a>	12K/768	---	7FFh	0C800h
	R5F21114	16K/1K	---	7FFh	0C800h
R8C/12	R5F21122 <a href="#">Note3</a>	8K/512	---	7FFh	0C800h
	R5F21123 <a href="#">Note3</a>	12K/768	---	7FFh	0C800h
	R5F21124	16K/1K	---	7FFh	0C800h
R8C/13	R5F21132 <a href="#">Note4</a>	8K/512	---	7FFh	0C800h
	R5F21133 <a href="#">Note4</a>	12K/768	---	7FFh	0C800h
	R5F21134	16K/1K	---	7FFh	0C800h

Note1: When using KD30, select the "R5F21104" MCU File.

Note2: When using KD30, select the "R5F21114" MCU File.

Note3: When using KD30, select the "R5F21124" MCU File.

Note4: When using KD30, select the "R5F21134" MCU File.

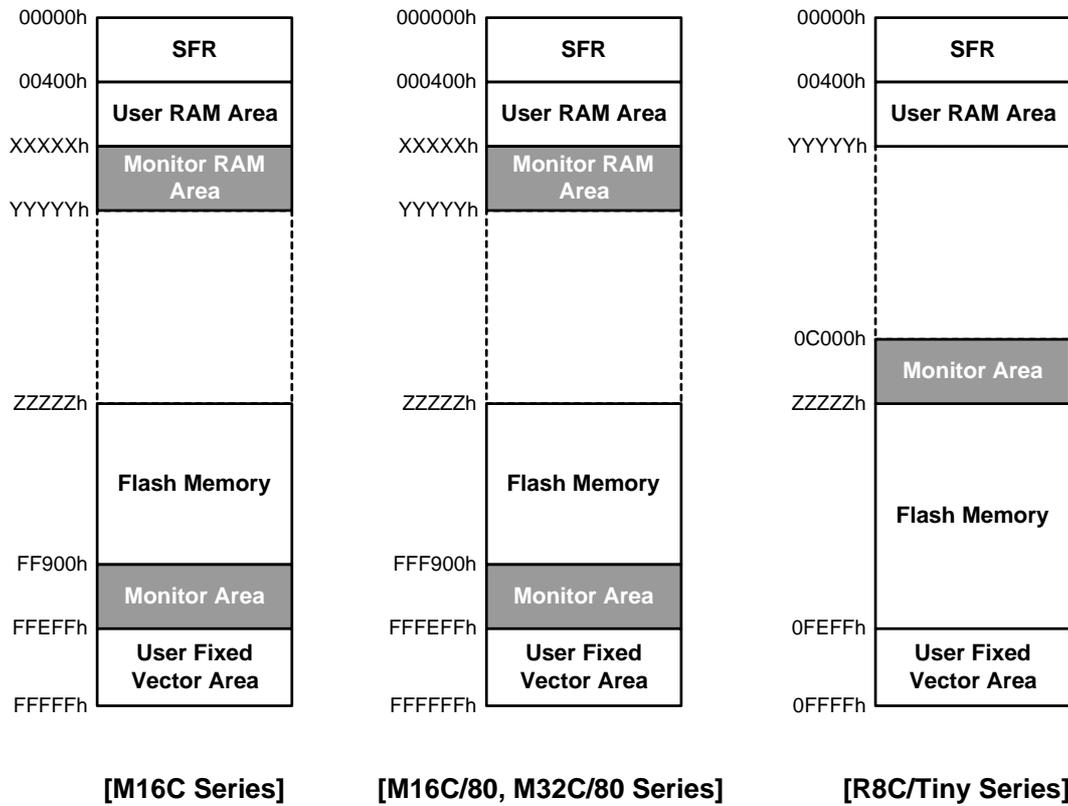


Figure 5-12 Mmemory map

## 5.4 Peripheral Function Related Limitations

### 1) UART pins (TxDi, RxDi)

The UARTi transmit and receive interrupts are used for communication between the USB Monitor Board and host computer (PC). Make sure that UARTi is not used in the User Program. Do not connect the UART pins with other pins.

#### **UART1 use prohibition MCUs**

R8C/10 Group, R8C/11 Group, R8C/12 Group, R8C/13 Group, M32C/80 Series  
M16C/80 Group, M16C/Tiny Series, M16C/24(M30245) Group, M16C/62A(M) Group  
M16C/62P Group, M16C/62N(M3062GF8) Group, M16C/6N Group

#### **UART0 use prohibition MCUs**

M16C/10 Group, M16C/1N Group

### 2) Set up "0FF900h" or "0FFF900h" in the UARTi receive with User Program because UARTi is being used for the communication with KD30 and KD3083. The interruption of relocatable vector table (variable vector table) except for UARTi can be used with User Program.

#### **UART1 receive interrupt setting required MCUs (0FF900h address)**

M16C/62A(M) Group, M16C/6N(M306NAFG, M306NBFC only) Group  
M16C/24(M30245) Group

#### **UART0 receive interrupt setting required MCUs (0FF900h address)**

M16C/10 Group, M16C/1N Group

#### **UART1 receive interrupt setting required MCUs (0FFF900h address)**

M16C/80 Group

**Note:** Setting the UARTi receive interrupt is not necessary for MCUs other than the above MCU.

## 5.5 FoUSB Debugger Principle

FoUSB debug formula is a monitor program formula. The monitor program debugs by communicating with FoUSB. A use program is interrupted at the time of command execution, and a monitor program is executed. A monitor program is written in flash memory user ROM area when a debugger (KD30 and KD3083) is started.

The monitor program has the following functions.

- 1) A function which communicates with FoUSB.
- 2) A function which executes command.

Next, the differences between the realization method of these functions and CPU operation are described.

### 5.5.1 Communication Function with FoUSB

The clock synchronous serial I/O is used for FoUSB and the monitor program communication. When the data is received, the DBC interrupt generates and the monitor program is executed. The DBC interrupt is not influenced of I flag. (The receive interrupt is used for some models because there is no DBC interrupt. In this case, the DBC interrupt is influenced of I flag). The monitor program analyzes the received data and executes each command.

### 5.5.2 Command Execution

#### 1) User Program execution

A User Program is executed in the following procedure.

- (1) An address match interrupt is disabled.
- (2) One instruction of a User Program is executed (using a single step interrupt and executing only one instruction) and go back to the monitor program.
- (3) When a software break is set, enable an address match interrupt.
- (4) The User Program continuance is executed.

When a User Program is stopped by a software break, if a User Program is executed, an address match interrupt is generated and stops in the same address again, therefore to move from the address is not possible. Above (1) to (3) processes are performed to avoid this re-interrupt.

#### 2) Software break

An address match interrupt is used for software break. When an address match interrupt is generated, a monitor program is operated. The number of the software breaks which can be used simultaneously is the same as the number of the address match functions which are built in a microcomputer.

#### 3) Step Execution

A single step interrupt is used for step execution. When a single step interrupt is generated, a monitor program is operated. Step execution has step, over and return.

#### 4) Dump

When using dump, a User Program execution is stopped temporarily, and the data of the area currently opened in the dump window is transferred. A monitor program is used for a register regarding a clock, therefore these registers may be the values which the user doesn't set up.

5) RAM monitor

When using RAM monitor, a User Program execution is stopped temporarily.

6) Register reference

When using register reference, a User Program execution is stopped temporarily and the data of CPU register and SFR is transferred.

7) User Program stop

A User Program stops, a monitor program operates and it waits for next command.

### **5.5.3 The difference from an actual CPU operation**

1) Real time

When opening a RAM monitor window, a User Program execution is stopped temporarily, RAM is read out and the communication is performed. Since a User Program is stopped, User Program execution time is prolonged.

2) Reset vector table

A reset vector is rewritten at the routine address which is used for a monitor program, therefore when referring this area by dump, the value is different from the value which a user sets.

3) Interrupt

Interrupts of Address Match interrupt and Single Step interrupt and BRK instruction interrupt and DBC interrupt are used by a monitor program, therefore do not use these interrupts in a User Program.

4) Values after reset

When a microcomputer is reset, a monitor program is operated, therefore when a program is stopped at the head of a User Program, the CPU register and the SFR value may differ from the initial value (value after reset) of a microcomputer.

## 6. Troubleshooting

### 6.1 FoUSB cannot communicate with the Target MCU Why?

It is possible that the firmware written in the USB Monitor Board has gone wild. In such a case, temporarily remove the USB Cable and insert it back into position.

### 6.2 The MCU cannot enter standard serial I/O why?

- 1) Check to see that the Busy signal is connected to the writer's connector accurately.
- 2) Check to see that the Reset signal is pulled up (5K) on a board.

### 6.3 The MCU cannot be programmed using FoUSB Why?

Check to see that the MCU type name displayed in FoUSB and that of the Target MCU match.

### 6.4 FoUSB cannot operate Why?

When FoUSB (Flash-over-USB) is started in the state where your host computer (PC), USB Cable, USB Monitor Board, Flat Cable, and Target Board are connected, the firmware of USB MCU is erased or damaged if the following window (see Figure 6-1) is displayed.

Moreover, when firmware is erased or damaged (the status display of USB Monitor Board lights only a Power indicator), FoUSB and KD (KD30, KD3083) cannot be used.



Figure 6-1 FoUSB main window

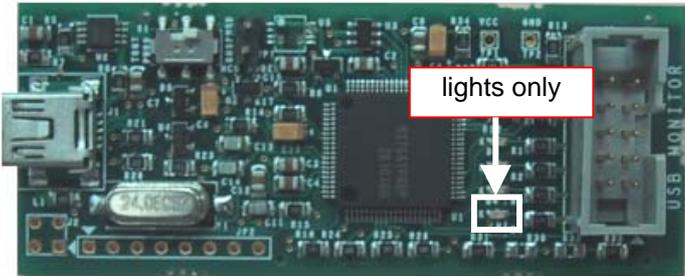
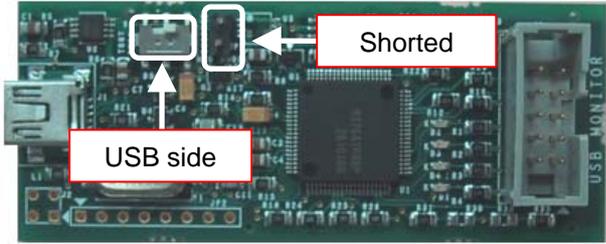


Figure 6-2 USB Monitor Board (Board)

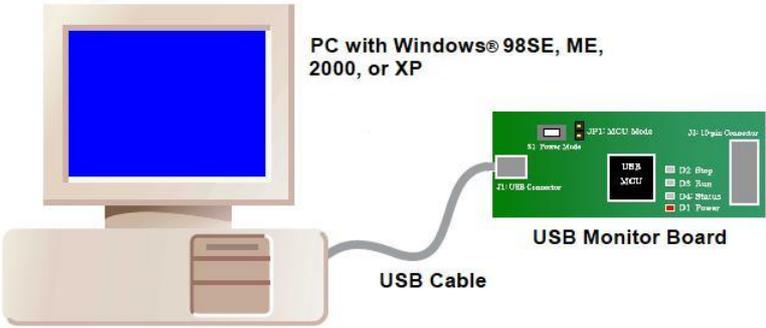
In such a case, it is necessary to download firmware compulsorily to USB MCU. Please perform compulsive download of firmware to USB MCU according to the procedure shown in the following page.

### 6.4.1 Compulsive download procedure of firmware

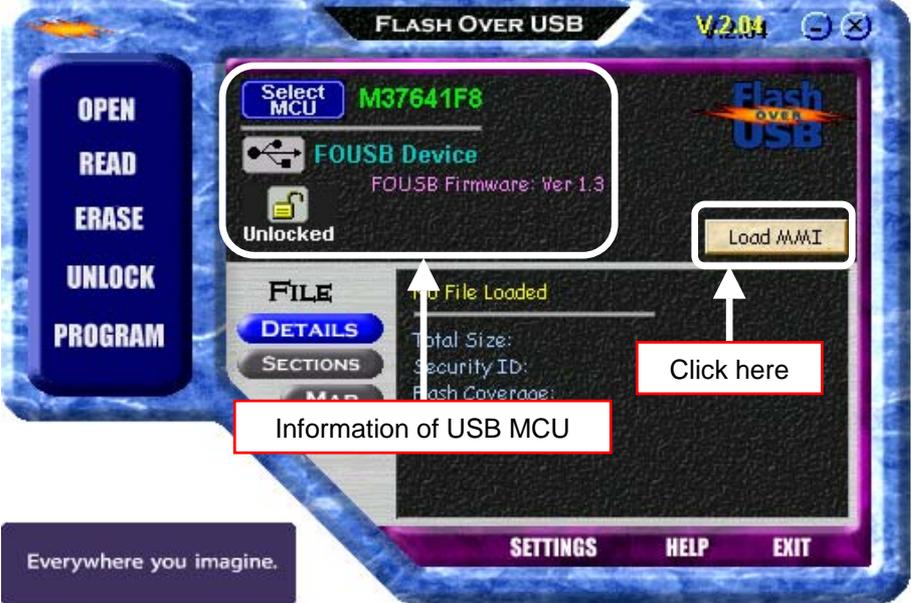
1) Remove the cover of USB Monitor Board and make a USB Monitor Board (Board) the following setup.



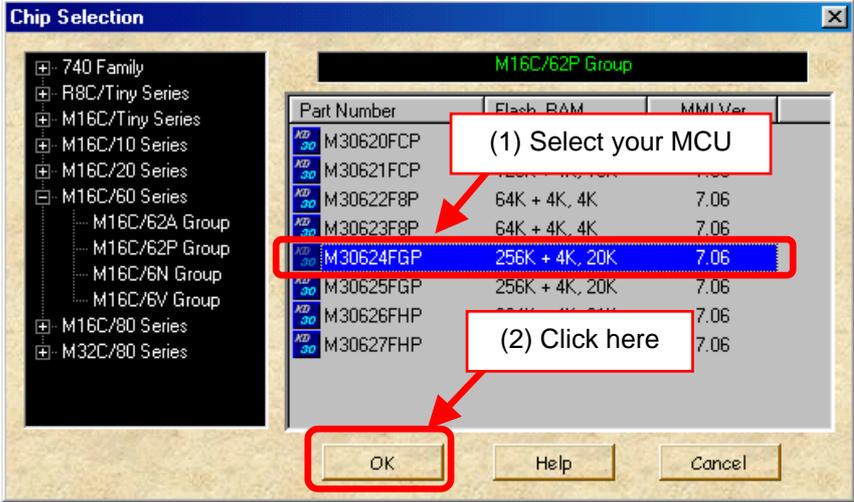
2) Connect the USB Monitor Board (Board) with your host computer (PC).



3) Start FoUSB (Flash-over-USB) and click the "Load MMI" button on a GUI window.



4) On the Chip Selection screen, select your MCU and download a firmware to the USB MCU.

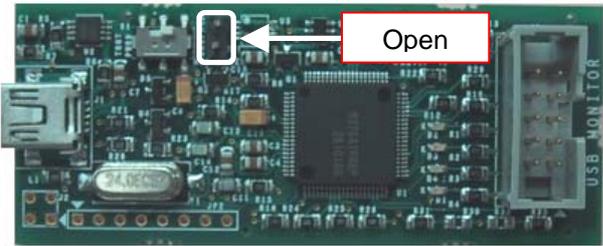


5) If download of firmware is completed to USB MCU, since the completion screen of download will be displayed, click the <OK> button.

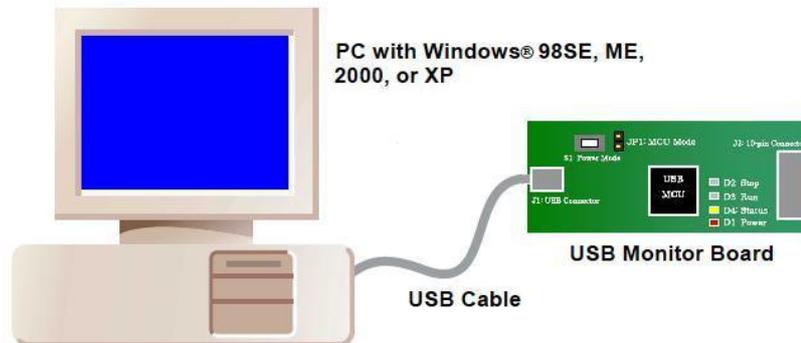


6) End FoUSB and separate a USB Monitor Board (Board) from your host computer (PC).

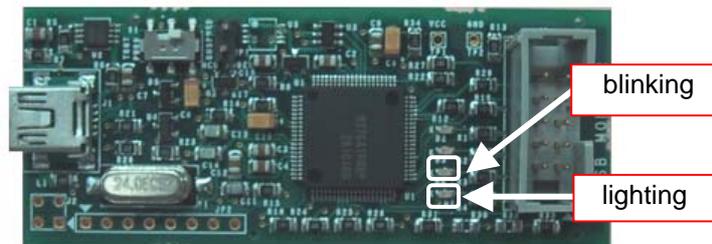
7) Make Open JP1 (MCU Mode Pin) of the USB Monitor Board (Board).



8) Connect USB Monitor Board (Board) with your host computer (PC).



9) Since firmware has downloaded normally if a Power indicator (D4: Status) is lighting and the Status indicator is blinking as shown in the following figure, FoUSB and KD (KD30, KD3083) can be used.



10) Separate USB Monitor Board (Board) from PC and attach a cover in the USB Monitor Board (Board).

11) Now you've finished compulsive downloading the firmware.

## 6.5 Can FoUSB information be transmitted to KD?

A written program using FoUSB cannot be debugged with KD. It is necessary to download a program on KD again when executing debug using KD. Therefore, written program information in flash area is not transmitted to KD30 (KD3083).

## 6.6 A communication error occurs when the KD starts. What is the cause of this problem?

If a communication error occurs when the KD starts, check the following.

- 1) Whether the cables are properly connected and whether the power is turned on?
- 2) Whether the serial port you set in the KD's Init dialog box is correct?
- 3) Whether the Status indicator (D4: Status) of USB Monitor board is blink?
- 4) Has CNVss pin on the target board been pulled down?
- 5) Is the target MCU ID code "all 00h" or "all FFh"?

In 3), when the Status indicator is not blinking, the firmware of USB MCU is erased or damaged. When firmware is erased or damaged, FoUSB (Flash-over-USB) and KD (KD30, KD3083) cannot be used.

In such a case, it is necessary to download firmware compulsorily to USB MCU. Please refer to [6.4 FoUSB cannot operate Why?], in order to download firmware compulsorily to USB MCU.

## 6.7 A communication error occurred when debugging the program. What is the cause of this problem?

- 1) If a communication error occurs when debugging your program, initialize the system following the procedure described below. This should help you restart debugging.
  - (1) Click the <OK> button in the error dialog box to close the KD.
  - (2) Start up the KD again.
  - (3) Download your program.
  
- 2) Check whether the data "**0FF900h**" or "**0FFF900h**" is set when transmitting/receiving via UARTi in your program.

3) If a communication error occurs frequently when debugging your program, check the following:

When using an interrupt program in which multiple interrupts (interrupt from within another interrupt) are not enabled...

-> If the interrupt program takes more than 260  $\mu$ s of processing time, set the I flag to 1 at the beginning of the interrupt program.

## **6.8 A message "Source file cannot be found" was output. What should I do?**

If an error "Source file cannot be found" occurs, check the following:

- 1) Whether the source file and the executable file exist in the same directory (or folder).
- 2) Whether the source file has been opened by any editor other than the KD.

## **6.9 Is peripheral I/O operating during a break?**

Although no interrupts are accepted during a break, peripheral I/O continues operating. If the User Program is halted by a break after starting a timer, for example, timer interrupts are not accepted although the timer continues counting

## **6.10 Can coveragefunction be used in KD?**

Coverage function cannot be used in KD.

## **6.11 Can check sum function be used?**

FoUSB dose not have "check sum" function. Therefore, when checking written contents, check "READ" > "Verify" > "Verification". For details, refer to [4.1.3 Details of Main Button 1].

## **6.12 ID code written to microcomputer after KD exits?**

The ID code of the User Program is not written to the microcomputer, but "all FFh" is written to it when using KD. Therefore, the ID code which is written to the microcomputer after KD exits is assumed "all FFh".

## 6.13 Debug operation has not worked well

Isn't the resource of a Monitor Program used?

When using the resource of the Monitor Program in debug, a communication error or an unexpected operation may occur. Therefore, note that the resource of the Monitor Program should not be used.

### **a. Peripheral (Serial I/O)**

The BUSY, SCLK, TxD and RxD pins are used for communications between the Target MCU and KD30/KD3083. Do not connect a user I/O to these pins.

Related section: [5.4 Peripheral Function Related Limitations] 1)

### **b. SFR (UART association)**

Do not modify registers associated with UARTi (including the port register and port direction register allocated to the Serial I/O) on a User Program. When modifying ports other than the serial port, modify it with the read-modify write instruction (BSET, BCLR, etc.).

Related section: [5.2.2 A limitation item about the C language] (1) - (a)

### **c. RAM**

Do not use a Monitor Program RAM on a User Program. The Monitor Program RAM is allocated from the lowest-order address in RAM which the Target MCU has. However, there is no Monitor Program RAM since R8C/Tiny has special debug RAM.

Related section: [5.3 Memory Map Limitations]

### **d. Flash ROM (Excluding Fixed Vector Table)**

Do not overlap a User Program with a Monitor Program ROM. When the User Program overlaps with the Monitor Program, the KD30/KD3083 indicate an error (Error 16256: "The specified area includes the debugging monitor memory area.").

Related section: [5.2.2 A limitation item about the C language] (1) - (c)  
[5.3 Memory Map Limitations]

**e. Interrupt**

Interrupts shown below are the resources of the Monitor Program. Do not use these interrupts.

Also, some microcomputers do not support the DBC interrupt (**Note**). In microcomputers which do not support the DBC interrupt (ex.: M16C/62A group), the UARTi receive interrupt is used. Therefore, when using (relocation) the Relocatable Vector Table (Variable Vector Table) in the User Program, it is necessary to set the UARTi receive interrupt routine (FF900h or FFF900h) on the Monitor Program to the vector address of the UARTi receive interrupt.

## &lt;Hardware Interrupt&gt;

Interrupt	Vector Address		
	R8C/Tiny	M16C/10, 20, 60, Tiny	M16C/80, M32C/80
BRK Instruction	FFE4h to FFE7h	FFFE4h to FFFE7h	FFFFE4h to FFFFFE7h
Address Match	FFE8h to FFE Bh	FFFE8h to FFFEBh	FFFFE8h to FFFFEBh
Single Step	FFEC h to FFEF h	FFFECh to FFFEFh	FFFFEC h to FFFFFEFh
DBC	FFF4h to FFF7h	FFFF4h to FFFF7h	FFFFF4h to FFFFF7h

## &lt;Software Interrupt&gt;

UART0 transmit/receive interrupt: M16C/10 series

UART1 transmit/receive interrupt: MCUs other than M16C/10 series

**Note:** Whether the DBC interrupt is applicable or not and the UART channel are shown below. Users cannot use the UARTi transmit/receive interrupt even if the DBC interrupt is applicable.

Group	DBC	UARTi	Group	DBC	UARTi
M16C/10	N/A	0	M16C/80	N/A	1
M16C/1N	N/A	0	M32C/83	Applicable	1
M16C/24	N/A	1	M32C/84, 85, 86, 87	Applicable	1
M16C/26, 26A, 28, 29	Applicable	1	R8C/10, 11, 12, 13	Applicable	1
M16C/62A (M), 62N	N/A	1	\		
M16C/6N (M306NAFG, M306NBFC)	N/A	1			
M16C/6N (M306N4FC, M306N4FG, M306N5FC)	Applicable	1			
M16C/62P	Applicable	1			

Related section: [5.2.2 A limitation item about the C language] (2)

[5.4 Peripheral Function Related Limitations] 2)

## 6.14 Message List

The following lists the messages output by FoUSB.

Normal message
Your device has been automatically unlocked with the ID code.
The correct firmware already loaded on the USB Monitor Board.
Do you want to reprogram anyway
Programming in new firmware image
Download successful!!
Verify passed
A file has been loaded that will create an ID code of 00 00 00 00 00 00 00 on the current attached device. Please make note of this!

Error message
The ID code did not match the one on the device
You are about to program Flash blocks that have not been erased yet. Do you want to continue?
Device is locked! You must first unlock the device.
The USB Monitor Board is currently begin used as part of the KD30 Debugger System. Please close KD30 first before using the USB monitor board.
the firmware currently loaded on your USB monitor board doesn't support the device you have selected.
Verify FAILED The Flash memory on the device does not match the current loaded firmware file.
No Flash Blocks Selected
Please only enter numbers between C0000 and FFFFF only
USB Monitor could not erase that Flash Block
Error erasing device!!!
Erase Unsuccessful!!!
No File loaded
Vendor Read Request Error: unable to complete GET_DEV_INFO command.
Unknown USB device attached!!
the target board that is attached USB monitor board currently does not have its own 5volt supply ---
Unable to place target MCU into synchronoos, BootMode

## 7. Appendix

### 7.1 USB Monitor Board

#### 7.1.1 Board Specifications

Figure 7-1 list Board specifications of USB Monitor Board.

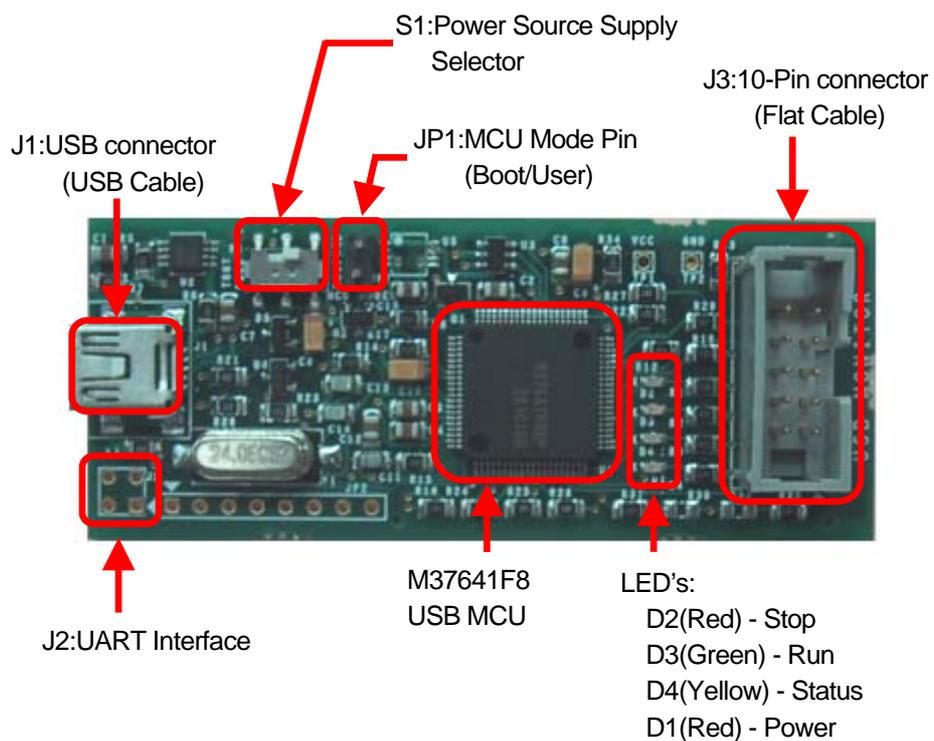


Figure 7-1 USB Monitor Board (Board specifications)

## 7.1.2 Pin Assignments

As an example of M16C/62A group, Pin assignments of the 10-pin connector (for Flat Cable) are shown in Figure 7-2.

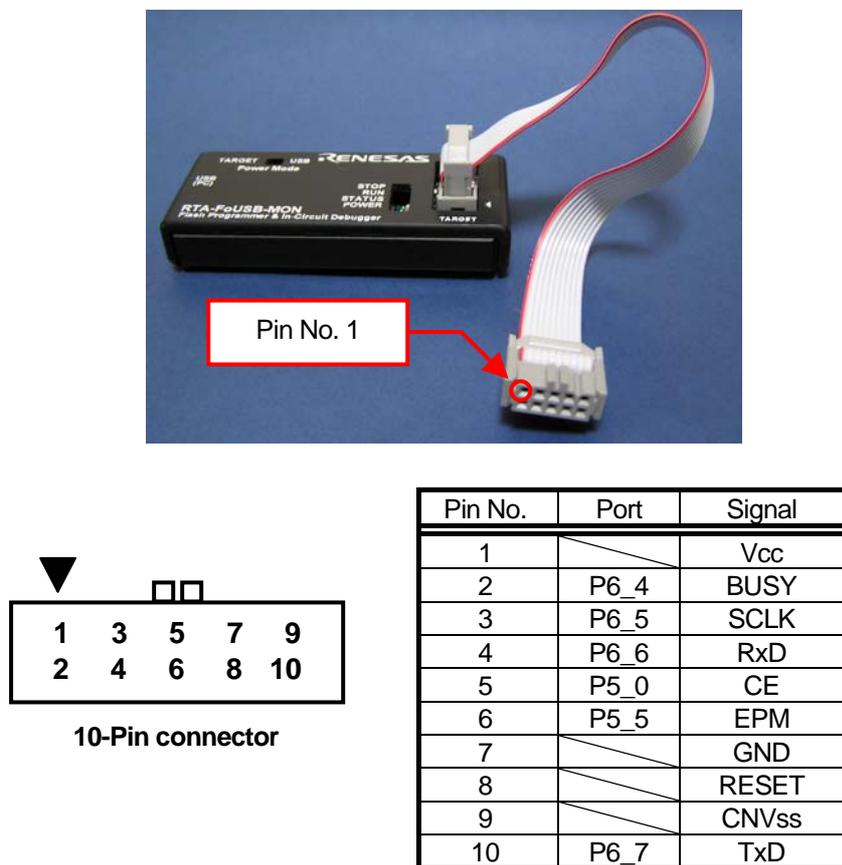
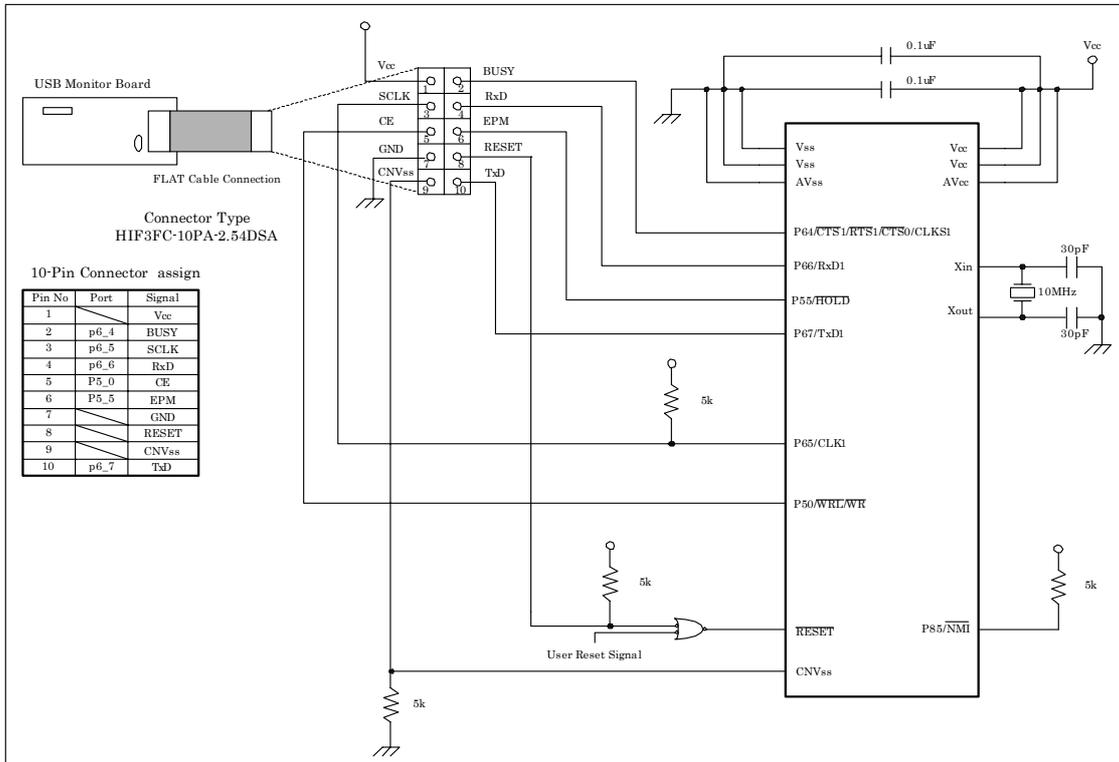


Figure 7-2 An example of 10-Pin connector pin assignment

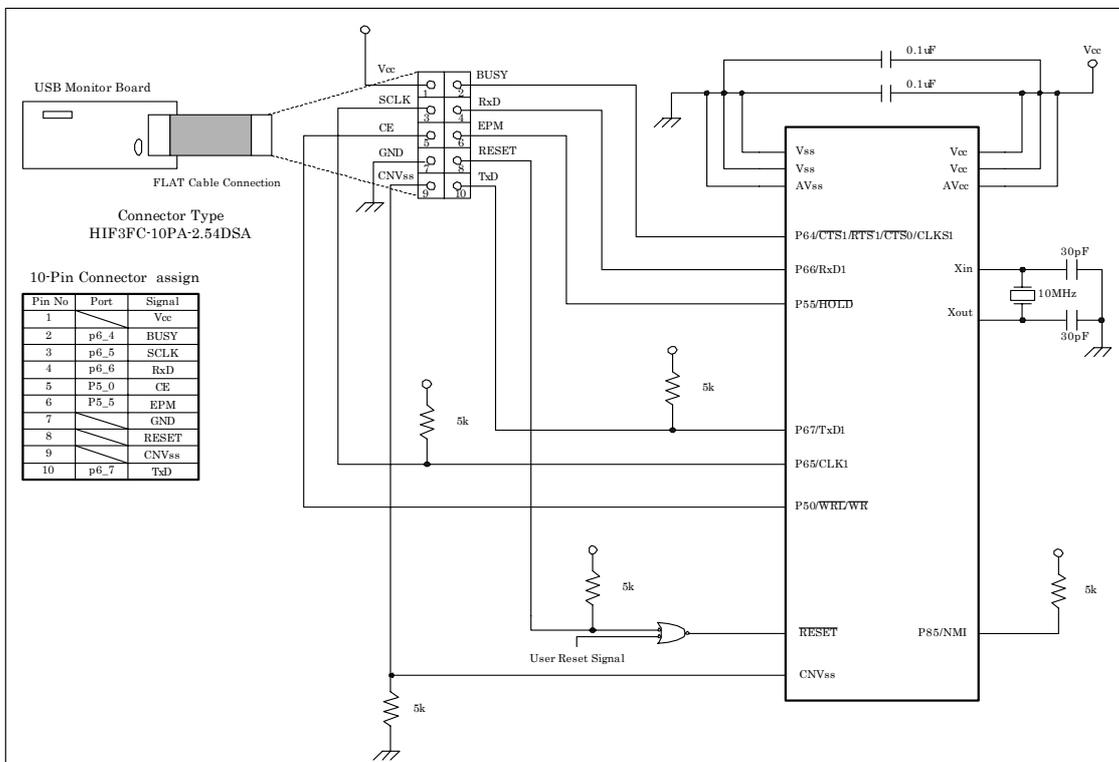
## 7.1.3 Example Connection

An example of how to connect the 10-pin connector (for the Flat Cable) to the Target Board is shown in following page.

**Example Connection for M16C/62A(M), 6N(M306NAFG, M306NBFC only), M3062GF8N, 80, 24**

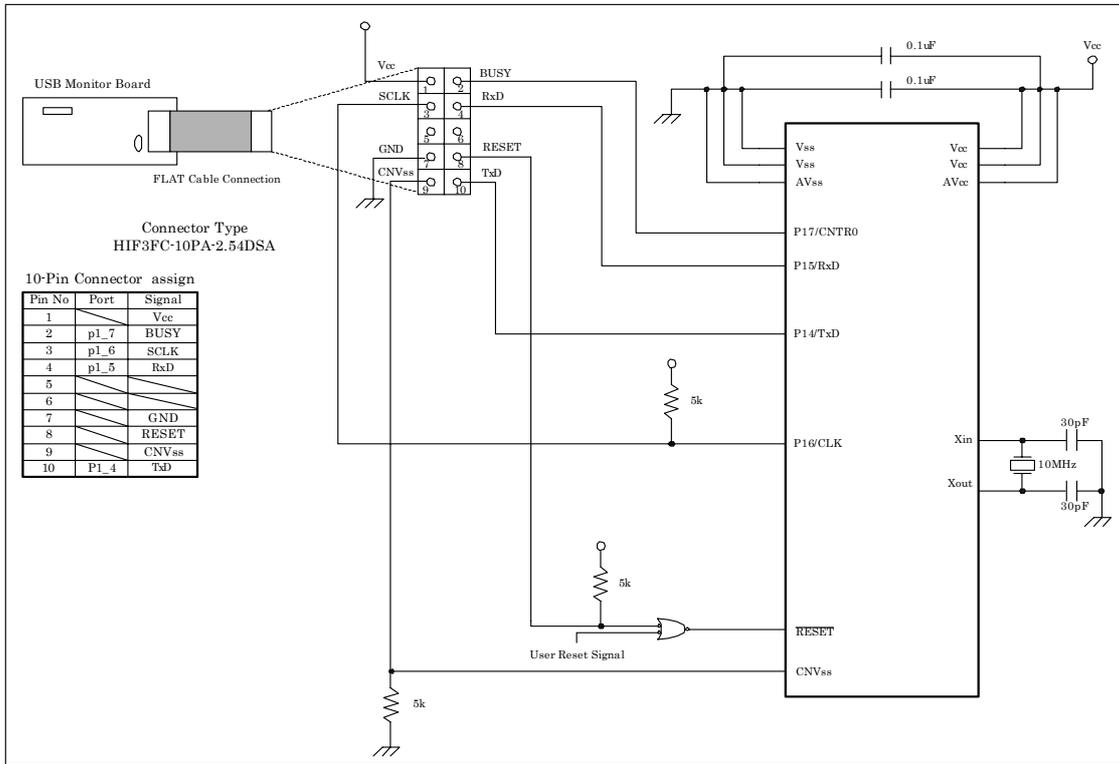


**Example Connection for M16C/62P, 6N(M306N4FC, M306N4FG, M306N5FC only)**

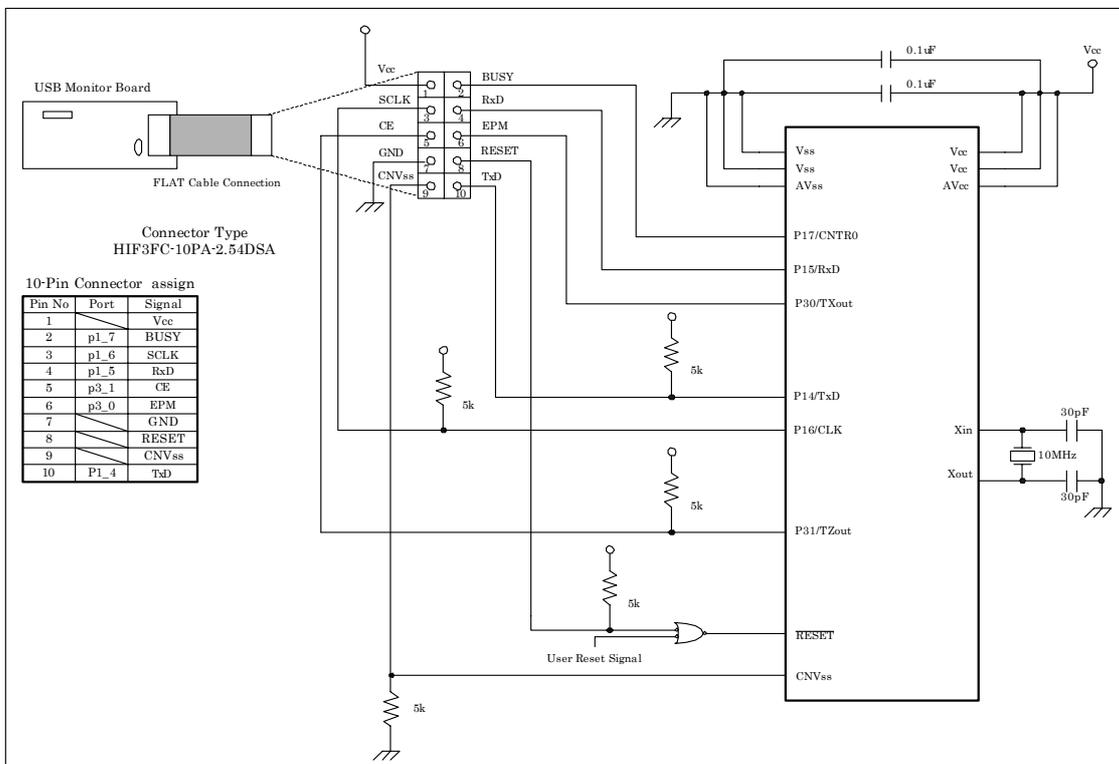




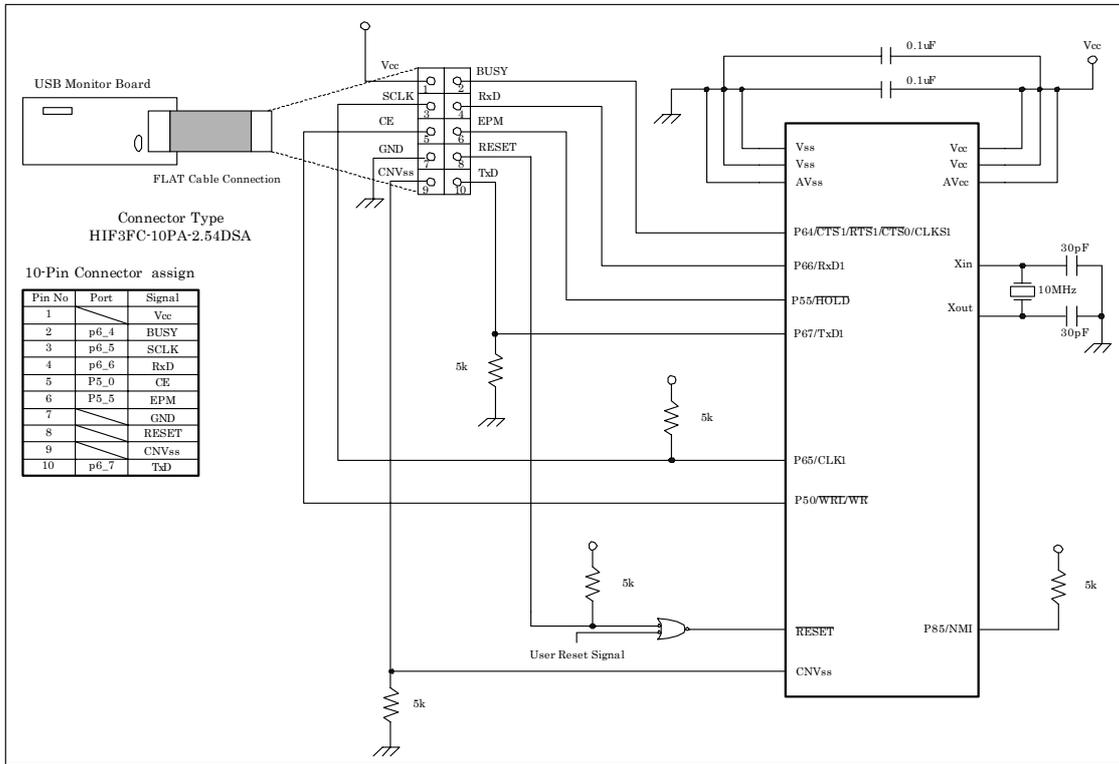
**Example Connection for M16C/10**



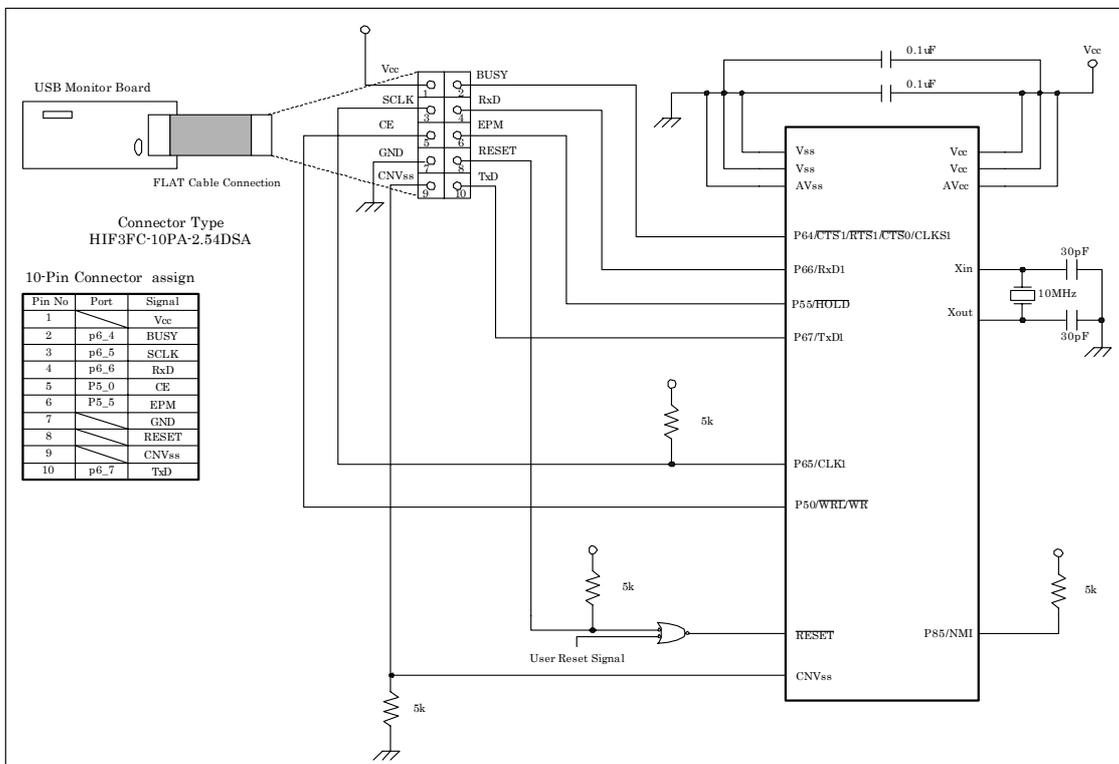
**Example Connection for M16C/1N**



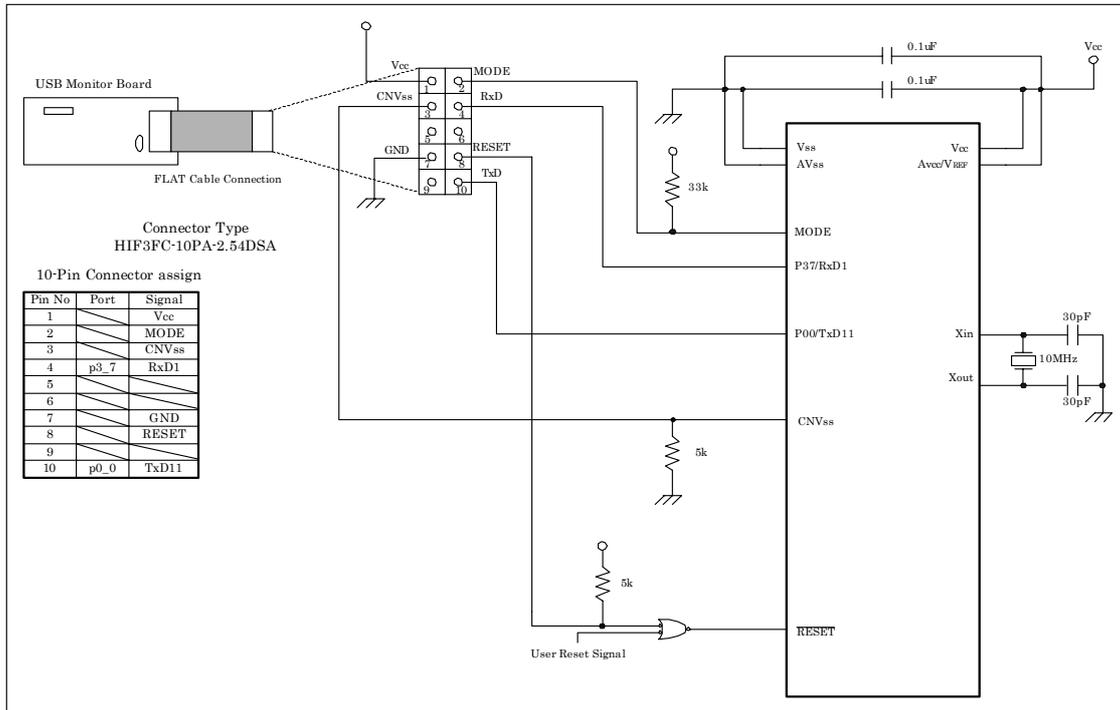
**Example Connection for M32C/83**



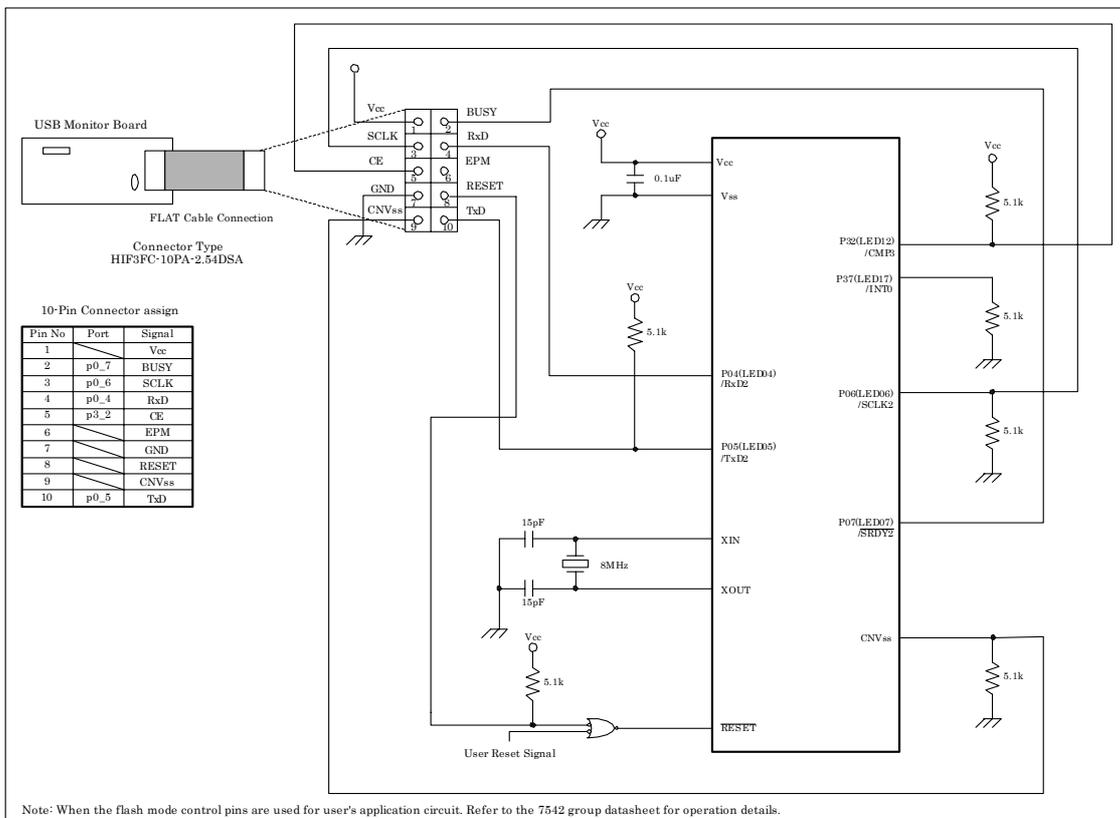
**Example Connection for M32C/84, 85, 86, 87**



**Example Connection for R8C/10, 11, 12, 13**

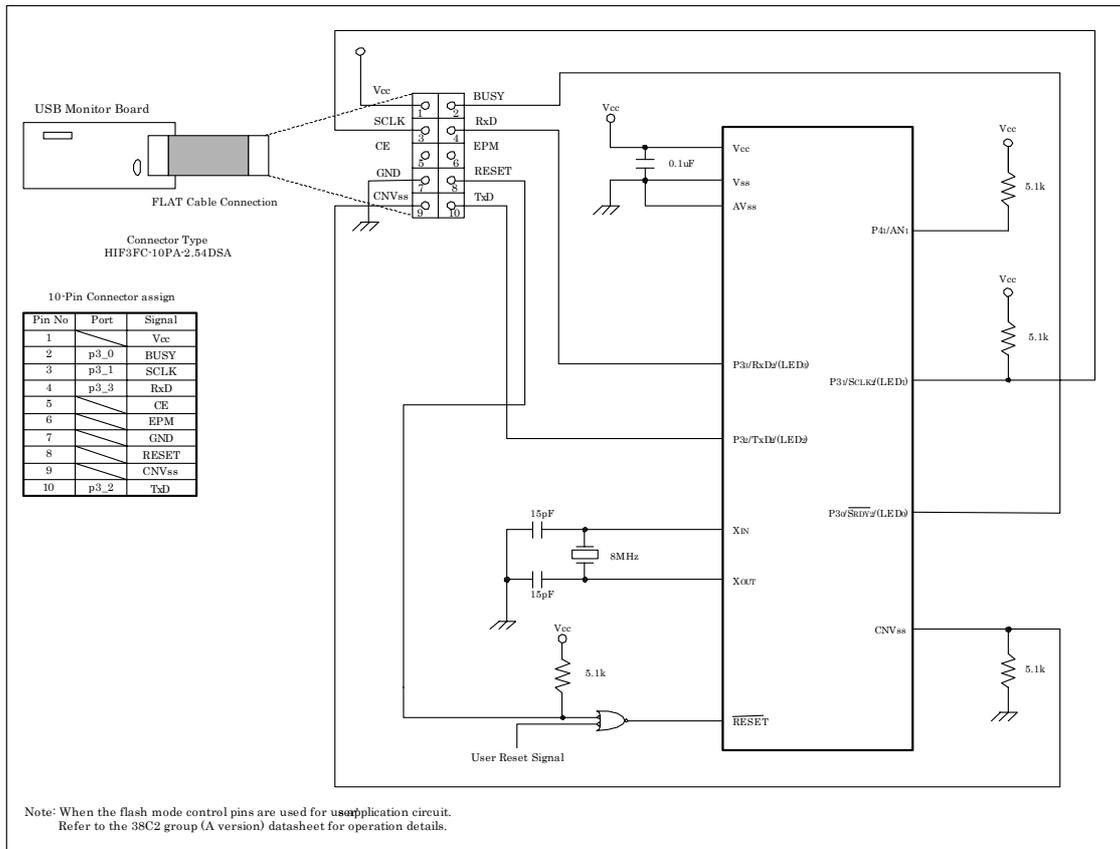


**Example Connection for 7542**



Note: When the flash mode control pins are used for user's application circuit. Refer to the 7542 group datasheet for operation details.

**Example Connection for 38C2**



### 7.1.4 Power Source Supply Selector

Specifications of the Power Source Supply Selector (S1: Power Mode) are shown in Table 7-1.

**Table 7-1 Jumper Settings**

Switch No.	Default State	Function
S1	USB (BUSPWRD)	<p>Selects the power supply for the Target MCU.</p> <p>USB (BUSPWRD): The power is supplied from the USB Monitor Board.</p> <p>TARGET (TRGTPWRD): The power is supplied from the Target Board.</p>

**Note:** The USB Monitor Board supplies a 5 V power. If a 3.3 V power supply is needed, choose to supply the power from the Target Board.

### 7.1.5 LED Status Indicators

The LED status indicators on the USB Monitor Board are listed in the table below.

LED No.	Color	Function
STOP	Red	When steadily on, the Target MCU is idle.
RUN	Green	When steadily on, the Target MCU is running.
STATUS	Yellow	<p>When flashing (normal), the USB Monitor is normal.</p> <p>When flashing (fast), the USB Monitor is operating erratically. <b>(Note)</b></p>
POWER	Red	When steadily on, the Target MCU is being supplied with power.

**Note:** If this LED flashes fast, the USB Monitor Board may have gone wild. In such a case, see Section [6. Troubleshooting].

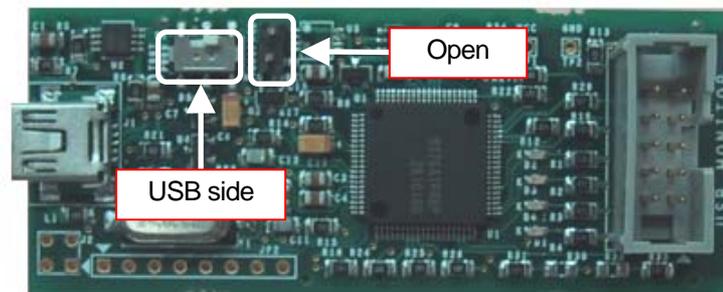
## 7.2 Installation of a USB Driver, and recognition of USB Monitor Board (Manual setup)

### 7.2.1 For USBMON Driver

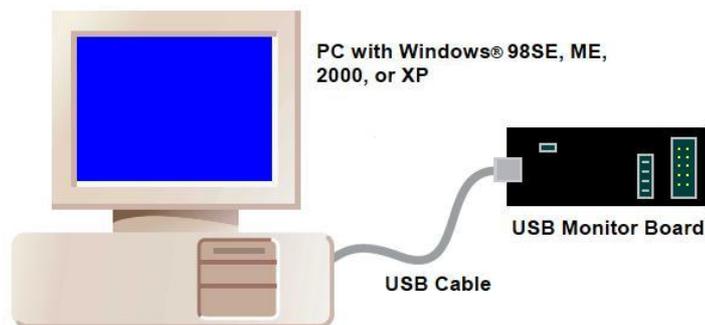
- 1) Remove the cover of USB Monitor Board and make a USB Monitor Board (Board) the following setup, before installing USBMON Driver. If a setup is completed, attach a cover in a USB Monitor Board (Board).

Power Source Supply Selector (S1: Power Mode): USB side

MCU Mode Pin (JP1: MCU Mode): Open

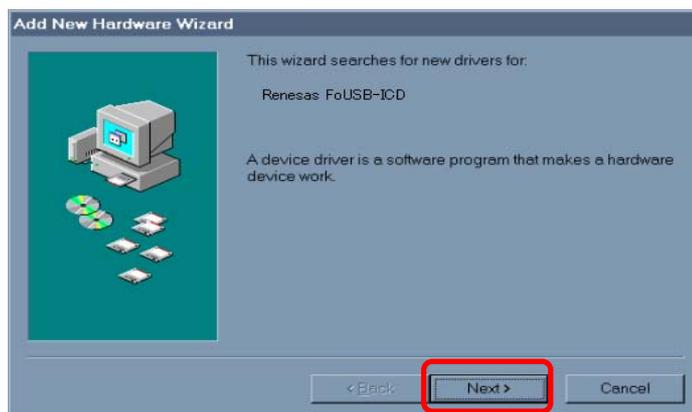


- 2) Connect the USB Monitor Board included with package to the USB port of your host computer (PC). The Power indicator (D1: Power) of USB Monitor Board lights, and a Status indicator (D4: Status) blinks.

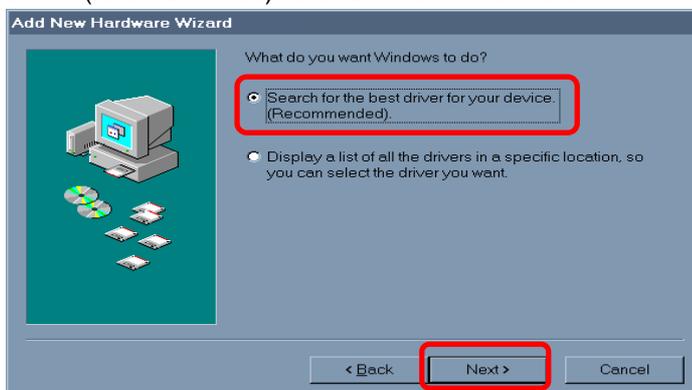


- 3) Windows system recognizes new hardware. The following installation methods are the examples which used Windows 98SE. Although the installation methods differ a little for every operating system, it is installable by the almost same operation.

4) Recognition of new hardware displays an install wizard. So click the <Next> button.



5) Select the method to search for your new hardware. Normally, choose “Search for the best driver for your device (Recommended)” and click the <Next> button.



6) Select the check box labeled “Specify a location”. Then specify the folder into which you’ve installed FoUSB files (“USB Drivers” folder) and click the <Next> button.



- 7) When the Windows system has been prepared to install the driver the wizard shown in Figure 7-3 appears. So click the <Next> button.



**Figure 7-3 USBMON Driver-1**

- 8) When the Windows system has finished installing the driver, the wizard shown in Figure 7-4 appears. So click the <Finish> button.



**Figure 7-4 USBMON Driver-2**

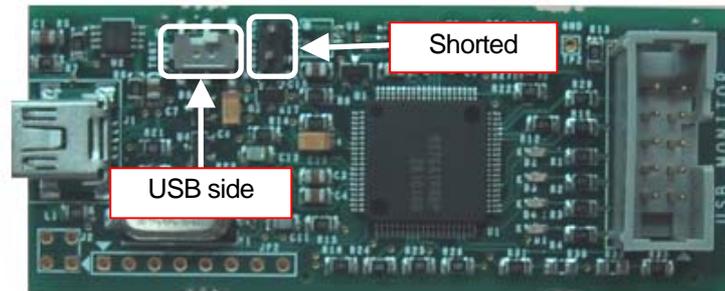
- 9) Installation of a USBMON Driver, and recognition for USB Monitor Board have been finished. Separate USB Monitor Board from your host computer (PC).

## 7.2.2 For FoUSB Driver

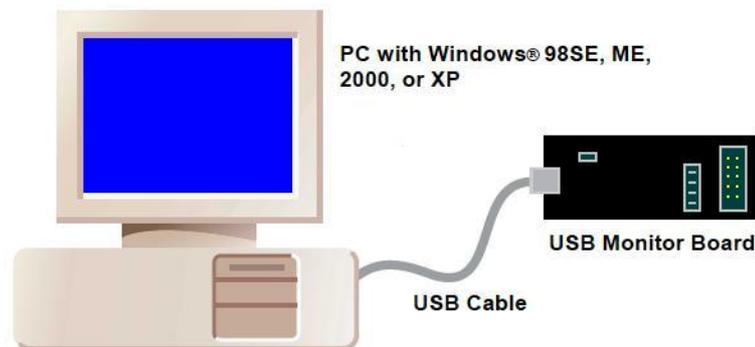
- 1) Remove the cover of USB Monitor Board and make a USB Monitor Board (Board) the following setup, before installing FoUSB Driver. If a setup is completed, attach a cover in a USB Monitor Board (Board).

Power Source Supply Selector (S1: Power Mode): USB side

MCU Mode Pin (JP1: MCU Mode): Shorted

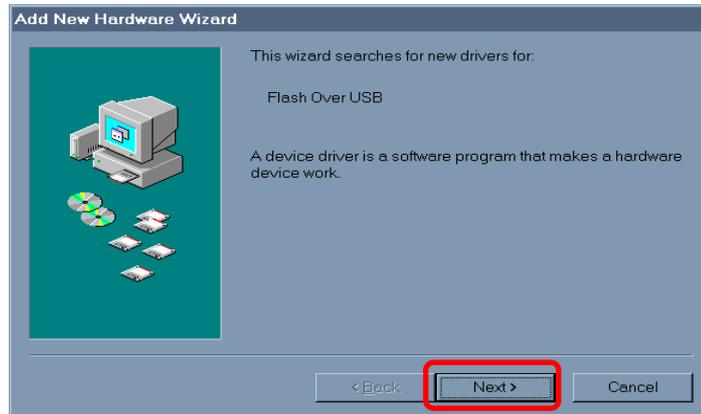


- 2) Connect the USB Monitor Board included with the package to the USB port of your host computer (PC). The Power indicator (D1: Power) of USB Monitor Board lights.

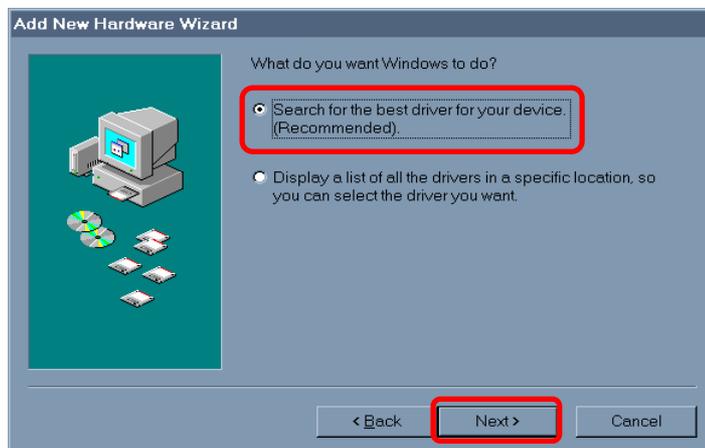


- 3) Windows system recognizes new hardware. The following installation methods are the examples which used Windows 98SE. Although the installation methods differ a little for every operating system, it is installable by the almost same operation.

4) Recognition of new hardware displays an install wizard. So click the <Next> button.



5) Select the method to search for your new hardware. Normally, choose "Search for the best driver for your device (Recommended)" and click the <Next> button.



6) Select the check box labeled "Specify a location". Then specify the folder into which you've installed FoUSB files ("USB Drivers" folder) and click the <Next> button.



- 7) When the Windows system has been prepared to install the driver, the wizard shown in Figure 7-5 appears. So click the <Next> button.



**Figure 7-5 FoUSB Driver-1**

- 8) When the Windows system has finished installing the driver, the wizard shown in Figure 7-6 appears. So click the <Finish> button.

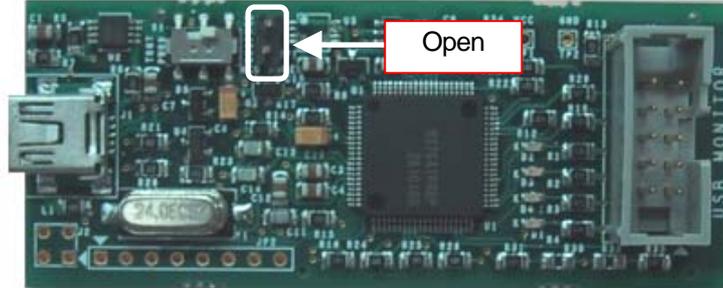


**Figure 7-6 FoUSB Driver-2**

- 9) Installation of a FoUSB Driver, and recognition for USB Monitor Board have been finished. Separate USB Monitor Board from your host computer (PC).

10) Remove the cover of USB Monitor Board and make a USB Monitor Board (Board) the following setup. If a setup is completed, attach a cover in a USB Monitor Board (Board).

MCU Mode Pin (JP1: MCU Mode): Open



## 7.3 Referencing Electronic Manuals

Electronic Manuals of the Product are in the form of files in PDF (portable document format). To reference them, the user needs Adobe Acrobat Reader. The user can download Adobe Acrobat Reader from the home page of Adobe Systems Incorporated. For latest information as to Adobe Acrobat Reader, go to the following URLs.

<http://www.adobe.co.jp/>

<http://www.adobe.com/>

## 7.4 Product Information

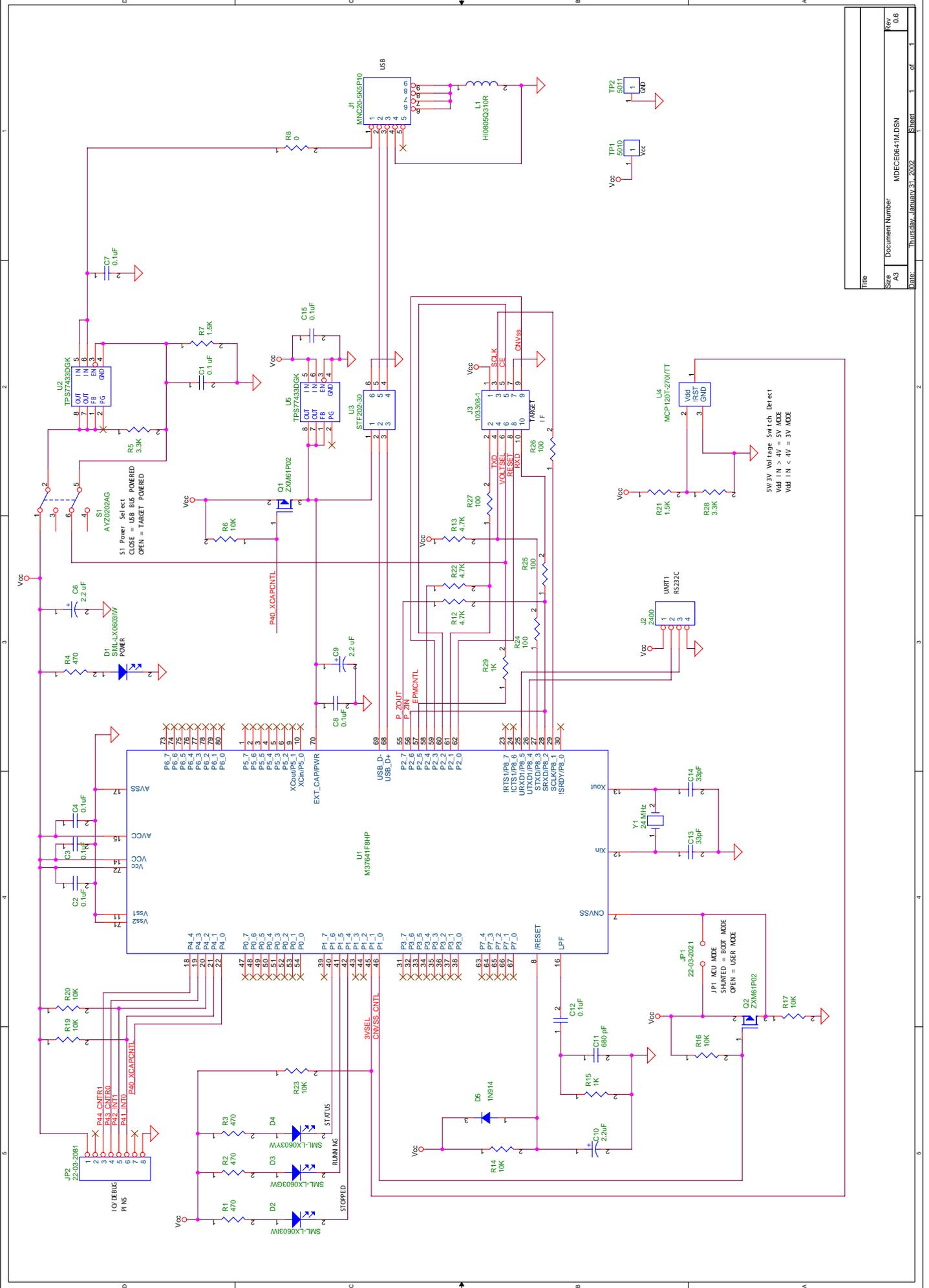
The latest information about this product is carried here.

M16C Family

<http://www.renesas.com/en/m16c>

740 Family

<http://www.renesas.com/en/740>



Title	
Size	Document Number
A3	MDECE641M.DSN
Date	Thursday, January 31, 2002
	Sheet 1 of 1
Rev	0.6

REVISION HISTORY
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Rev.	Date	Description	
		Page	Summary
2.00	Jul 12, 2003	-	Whole page is revised according to the firm name change
2.10	Sep 12, 2003	9	Changed method of USB Driver's installation
		39	Added limitations on Memory Expansion (M16C/62P)
2.20	Oct 15, 2003	8	Added method of USB Driver's (FoUSB Driver) installation
		28	Added countermeasure when a firmware of USB MCU is erased or damaged
		38	Changed example connection of target board (M16C/26, 28)
2.30	Nov 05, 2003	39	Changed example connection of target board (M16C/26, 28)
2.40	Jan 15, 2004	39	Changed example connection of target board (addition of oscillator circuit)
			Added example connection of target board (M16C/1N and M32C/85)
		54	Changed peripheral function related limitations
3.00	Jan 31, 2004	-	Chapter orders and composition contents are all revised
3.01	Feb 15, 2004	-	Cover is renewed
		5	Windows NT is deleted from OS which can be used
		59	Pin assignment is revised
4.00	Jul 30, 2004	-	Whole page is revised according to the FoUSB version upgrade
4.01	Dec 24, 2004	6	Compatible Product List is upgrade
		10	Software Break Number List is upgrade
		24	"Software License Agreement" screen is added to install procedure
		43	Selectable MCU List is upgrade
		51 - 53	Precautions on KD3083 Emulation Memory is added
		59	Section Title is changed
"5.2.1 Limitations on Special Page Jump" -> "5.2.1 Limitations on Special Page Vector" Description of Section "5.2.1" is changed			

Rev.	Date		Description
		Page	Summary
4.01	Dec 24, 2004	61	Section "5.2.4 Precautions on Internal Reserved Area Expansion Bit" is added
		62	Description of Section "5.2.6" is changed
		63, 64	ROM/RAM Area Table is upgrade
		66	Description of NMI pin is deleted from Section "5.4"
		68	Description of Realtime and Reset Vector Table in Section "5.5.3" is changed
		76, 77	Section "6.13 Debug operation has not worked well" is added
		80 - 86	User reset signal is added to Example connection of target board
		82	Example connection of target board (M16C/26, 26A, 28, 29) is changed
		86	Example connection of target board (38C2) is added

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USB Flash Writer

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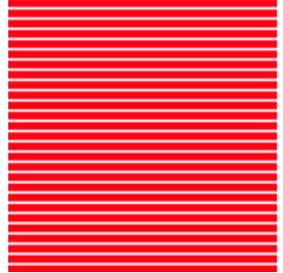
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