FUJITSU

FUJITSU FLASH MCU Programmer for F^{2}MC-16FX

Specifications

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Specifications
Version 1.03 26 March 2008
Software version: V01L04
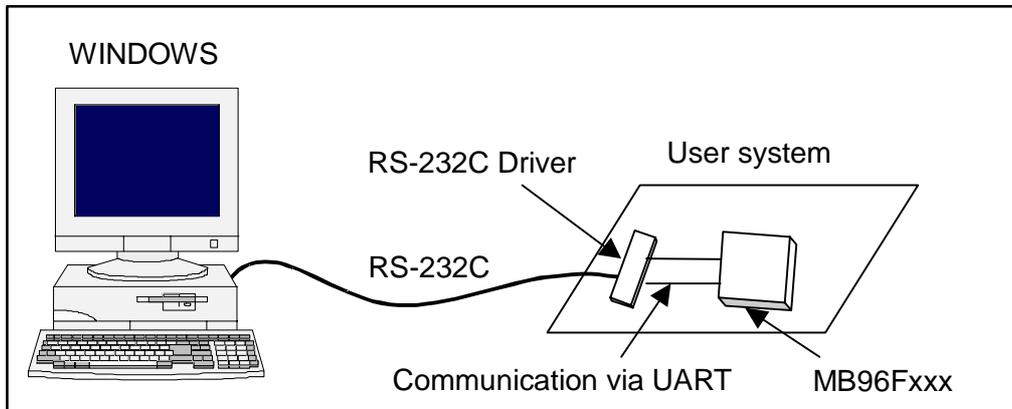©2007-2008 FUJITSU LIMITED Printed in Japan

Ver	date	page	contents
1.00	2007/2/1	---	New
1.01	2008/1/23	---	Suffix is Changed Add MB96F326A/R/Y,MB96F338R/U/Y,MB96F356A/R/Y
1.02	2008/2/20	P4 P12	Serial data I/O pins for MB96F326A/R/Y is corrected. Internal motorola S decoder specifiction is added.
1.03	2008/3/26	---	Add MB96F379R/Y

Contents

1. CONFIGURATION DIAGRAM

Using RS-232C cable connected to the personal computer (Windows PC), flash memory data in the microcontroller mounted in the user system can be reprogrammed. Note that the user system must have an RS-232C driver for communication with the microcontroller UART.

2. COMPATIBLE MICROCONTROLLERS

MB96F326A/R/Y,	MB96F338R/U/Y,	MB96F346A/R/Y,
MB96F347A/R/Y,	MB96F348A/R/Y,	MB96F348C/H/T,
MB96F356A/R/Y,	MB96F379R/Y	MB96F386R/Y,
MB96F387R/Y		

3. EXAMPLE OF CONNECTION FOR ON-BOARD REPROGRAMMING BY PROGRAMMER

*1: Check the settings of the serial data input/output pins used in each microcontroller.
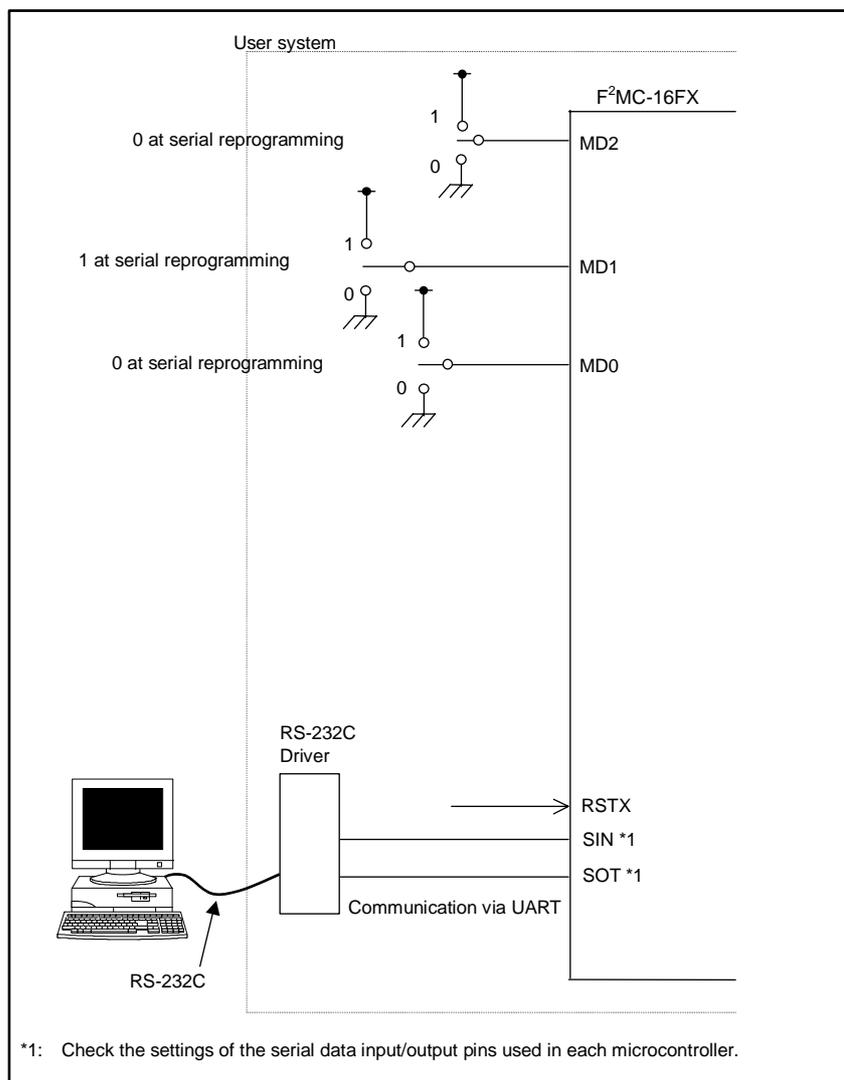
The MD2, MD1, MD0 pins cannot be controlled by the PC and should be set in the user system.

When the RSTX pin is set from "Low" to "High" level after setting the MD2, MD1, MD0 pins, the microcontroller enters the serial reprogramming mode, enabling serial reprogramming from the PC.

After the reprogramming, control is shifted to the normally-used mode as for MD2, MD1 and MD0 pins. Then RSTX pin set from "Low" to "High" level executes user program.

Note: The port numbers of the SIN and SOT pins vary with the types of microcontrollers. See the **Tables** in **Chapter 4** for details.

When programming data to mass-produced products using the Yokogawa Digital Computer serial programmer some time in the future, it is best to generate the patterns for serial clock pins on the printed circuit board according to the connection example for serial programming described in the **Hardware Manual** for each microcontroller.

4. PINS USED FOR ON-BOARD REPROGRAMMING

(1) Control pins for on-board programming

Function	Pin	Supplementary
Mode pins	MD2, MD1, MD0	Should be controlled in flash memory reprogramming mode. When MD2 and MD0 are set to "L" and MD1 is set to "H", they enter the reprogramming mode.
Reset pin	RSTX	Cancel reset after setting Mode pins to the flash reprogramming mode.
Serial data input pin	SIN	Note that the pin varies with the type of microcontroller.
Serial data output pin	SOT	Note that the pin varies with the type of microcontroller.

(2) Serial data I/O pins for each type of microcontroller

Type	Serial Data Input Pin	Serial Data Output Pin	Supply Voltage
MB96F338R/U/Y MB96F346A/R/Y MB96F347A/R/Y MB96F348A/R/Y MB96F348C/H/T MB96F379R/Y	P08_2/SIN0 (UART0)*1 or P08_5/SIN1 (UART1)*1 or P05_0/SIN2 (UART2)*1 or P01_2/SIN3 (UART3)*1	P08_3/SOT0 (UART0)*1 or P08_6/SOT1 (UART1)*1 or P05_1/SOT2 (UART2)*1 or P01_3/SOT3 (UART3)*1	3V – 5V product
MB96F386R/Y MB96F387R/Y	P13_4/SIN0 (UART0)*2 or P03_7/SIN1 (UART1)*2 or P10_2/SIN2 (UART2)*2	P08_5/SOT0 (UART0)*2 or P13_0/SOT1 (UART1)*2 or P10_1/SOT2 (UART2)*2	3V – 5V product
MB96F326A/R/Y MB96F356A/R/Y	P05_0/SIN2 (UART2)*3 or P01_2/SIN3 (UART3)*3	P05_1/SOT2 (UART2)*3 or P01_3/SOT3 (UART3)*3	3V – 5V product

1*: The user can select one channel of UART0-2 or 3.
2*: The user can select one channel of UART0-1 or 2.
3*: The user can select one channel of UART2 or 3.

5. TIMING CHART FOR EACH PIN

Input data to each pin of the microcontroller with the following timing on the basis of the input of the RSTX pin.
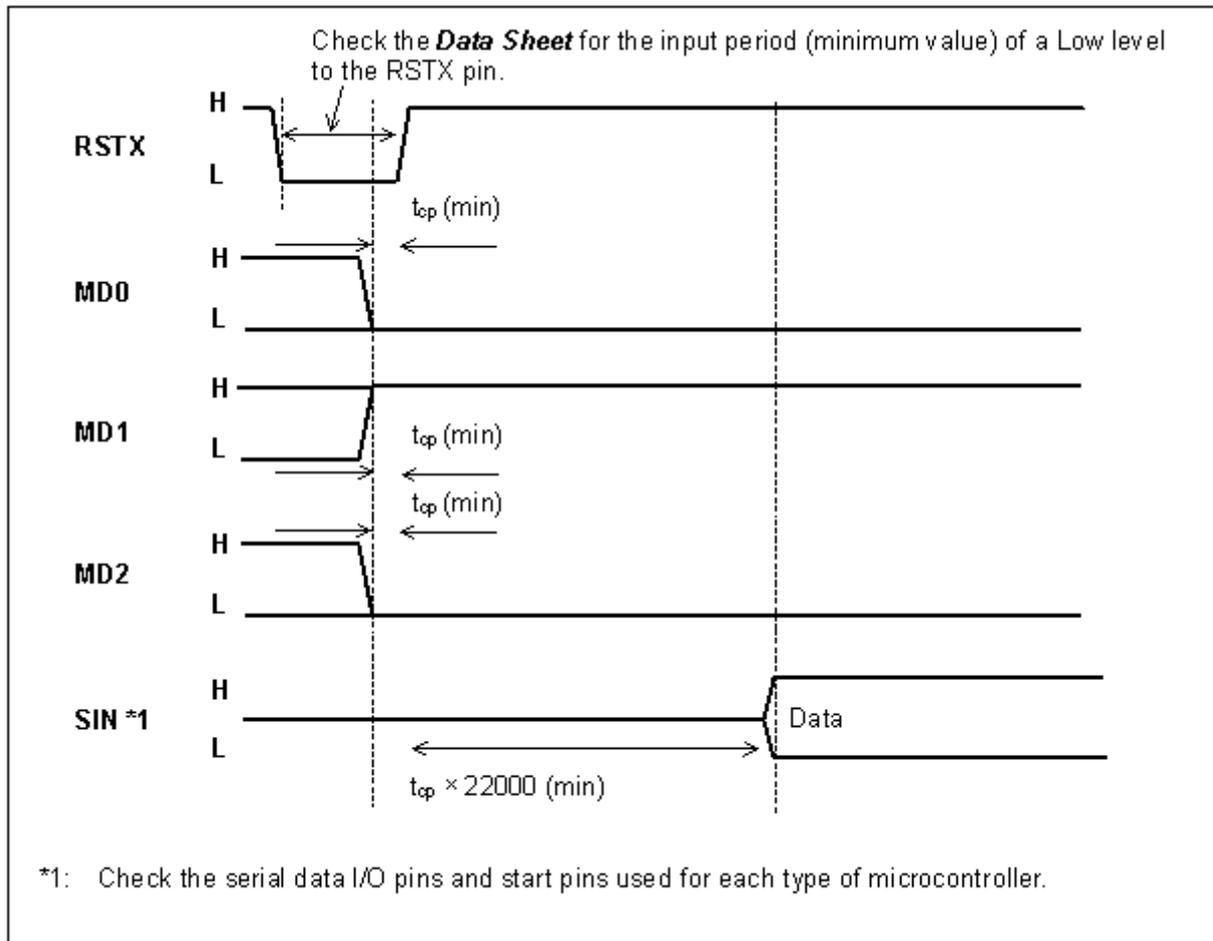
Minimum values of setup and hold times of each signal on rising edge of RSTX

6. INSTALLATION AND EXECUTION OF SOFTWARE

If the old software version is installed, uninstall it first before installation.

Starting the installer to operate as instructed will complete the installation. Note that the install might not be performed when a directory in a deep nest is specified as the install directory.

After installation, click the Windows *Start* button *=> Program => FUJITSU FLASH MCU Programmer => FMC16FX* to start the programmer software.

7. PROGRAMMER FUNCTIONS

Erase, Blank Check, Program & Verify, Read & Compare, and Copy can be executed for flash memory integrated into the microcontroller.

- Main dialog box

  Programmer software is started to open the dialog box as shown below.
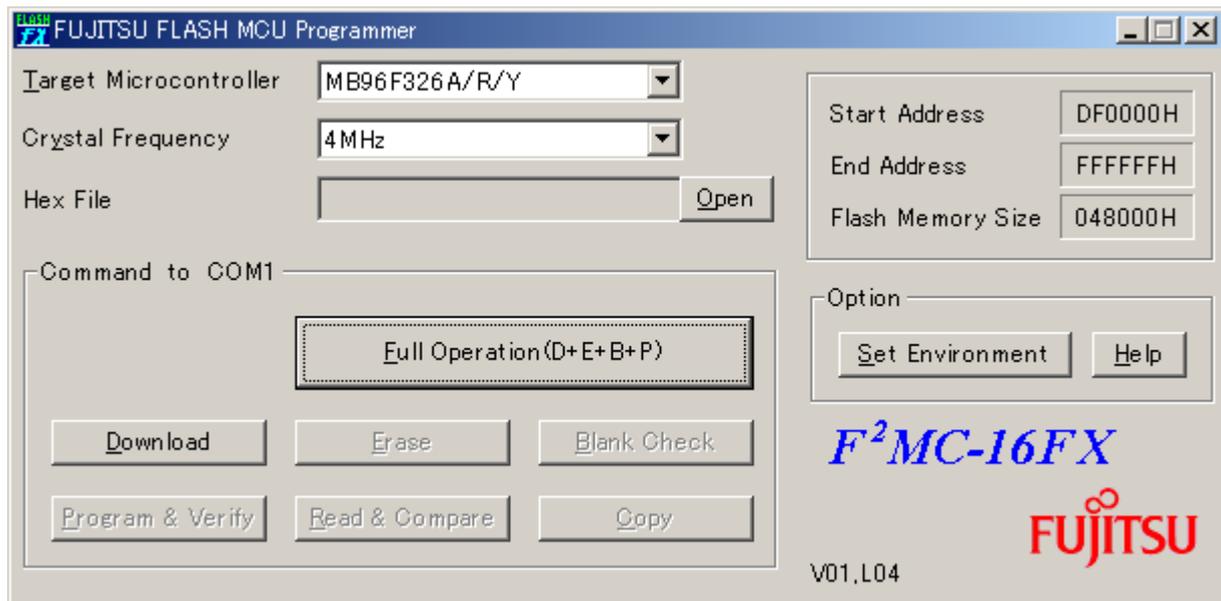
- Overview of operating procedure

  First, complete setting of the user system (microcontroller board) that data is programmed to (see **_Chapter 3_**). When the programmer software has been started or when setting (setting of Taget Microcontroller or Crystal Frequency) has been changed, it is necessary to perform downloading (described later).

  After downloading terminates normally, perform procedures such as Erase and Programming.

7.1 Downloading

This section describes the operating procedure for downloading and the operating state of the program.

(a) Specify the type of microcontroller used in the user system in **Target Microcontroller** of the main dialog box.

Please look at **Chapter 2** about the selectable types.

Note:To select the type of microcontroller, use the **Tab** key to move to **Target Microcontroller**, select with the cursor keys and then press the **Enter** key.

(b) Specify the frequency of the crystal oscillator input to the microcontroller in **Crystal Frequency** of the main dialog box.

The frequency of the crystal oscillator that can be specified for each type of microcontroller is limited as follows.

Product Type	Frequency of Crystal Oscillator (MHz)
MB96F326A/R/Y	4,5,8,10,16
MB96F338R/U/Y	4,5,8,10,16
MB96F346A/R/Y	4,5,8,10,16
MB96F347A/R/Y	4,5,8,10,16
MB96F348A/R/Y	4,5,8,10,16
MB96F348C/H/T	4,5,8,10,16
MB96F356A/R/Y	4,5,8,10,16
MB96F379R/Y	4,5,8,10,16
MB96F386R/Y	4,5,8,10,16
MB96F387R/Y	4,5,8,10,16

Notice:This program will not operate normally if the microcontroller uses a crystal oscillator frequency not listed in the above table.

(c) Select the COM port of the PC connected to the user system.

Click the **[Set Environment]** button in the main dialog box to open the setup window. When the **[COM PORT]** tab in the setup window is clicked, the specifying window is opened. Select any of the following COM ports.

COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8

(d) Execution of downloading

Click the *[Download]* button.

If the following dialog window is opened, Input a reset signal to the microcontroller to start the program in the flash programming mode and then click the *[OK]* button

Downloading is performed to open the "Download" window. When downloading is completed normally, the following dialog window opens.
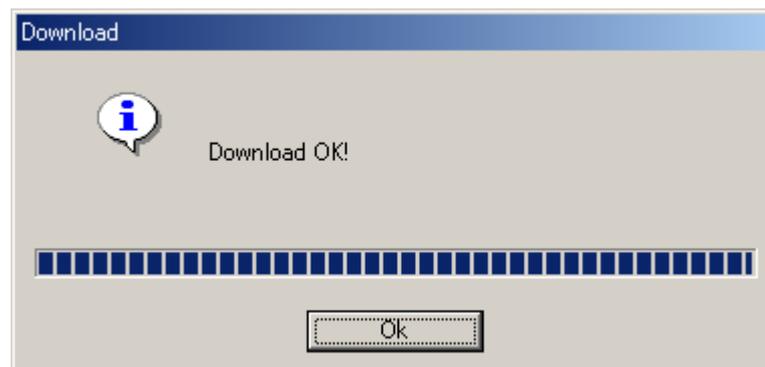
When the *[OK]* button is clicked to close the dialog window, the *[Erase]*, *[Blank Check]*, *[Program & Verify]*, *[Read & Compare]* and *[Copy]* buttons are enabled.

Note: Downloading can also be performed using the *Tab* key to move to the *[Download]* button and pressing the *Enter* key or pressing the *ALT* and *D* keys at the same time.

7.2 Erasing and Programming

This section explains how to specify *Hex File* and the processing and operation performed when the *[Erase]*, *[Blank Check]*, *[Program & Verify]*, *[Read & Compare]*, *[Copy]* and *[Full Operation (D+E+B+P)]* buttons are clicked.
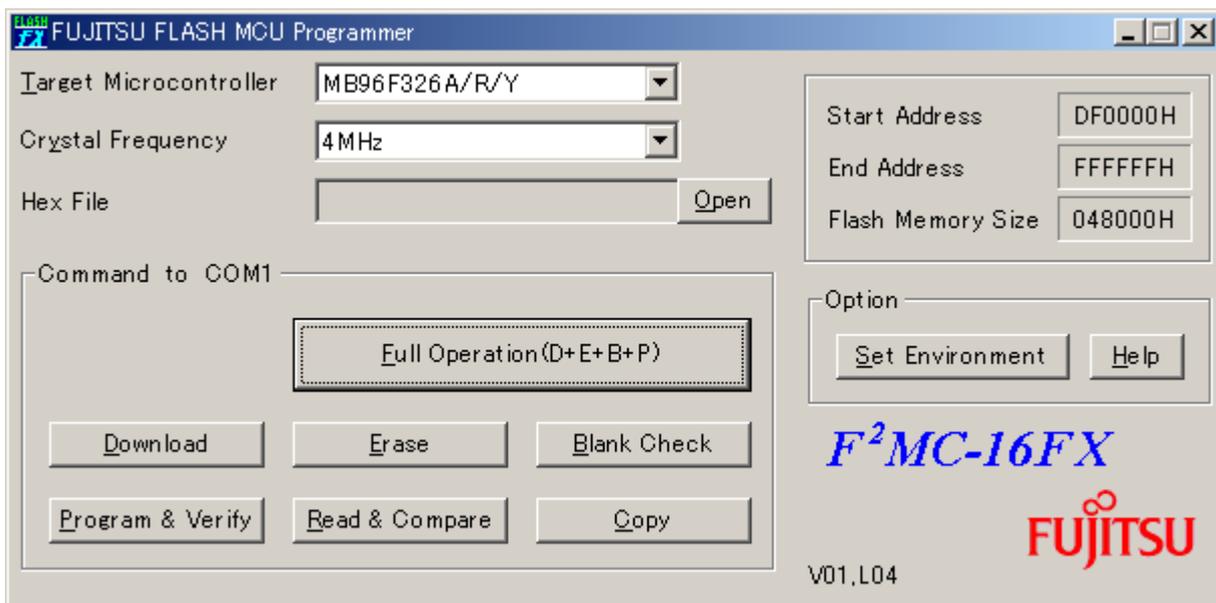
Each execution can also be performed by pressing the key corresponding to the underlined character in the button name while pressing the *ALT* key. (*Hex File* is a **O** character in *Open* button, click the **ALT + O** keys).

(a) **Hex File**: Select the file to be programmed to flash memory

Specify the Motorola-S or Intel-HEX format file to be programmed to flash memory in the microcontroller. Although the specification method by drags and drops a direct file from Explorer etc. is recommended, it can specify also by the file appointed window displayed by pushing the *[Open]* button.

Hex File must be specified to execute *[Program & Verify]*, *[Read & Compare]* and *[Full Operation (D+E+B+P)]*. Since it is decoded at the head of these processings each time, even if the specified Motorola S or Intel-HEX format file changes specification of a file just before processing, it is OK.

(b) **Erase**: Erase all flash memory areas

All flash memory must be in the erase state (0xff) when programming a new program to it. By pushing this button, a chip erase command is published to FLASH and elimination is performed.

In addition, a blank check does not perform this command.

(c) **Blank Check**: Check that all flash memory areas are blank

This button is clicked to check that all flash memory is in the erase state (0xff).

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(d) **Program & Verify**: Program data to flash memory

This button is clicked to program the Motorola-S or Intel-HEX format file specified in **Hex File** to flash memory in the microcontroller concurrently with verification. An error dialog is displayed, when writing is performed for 512 bytes of every block and a CRC error is detected by the block.
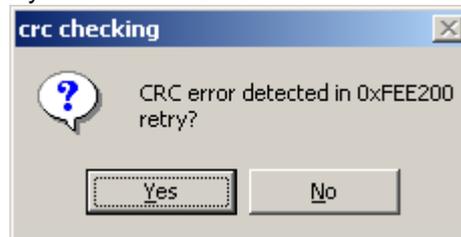
This dialog If YES is pushed, the block of an error will be resent and it will continue writing. A push on NO interrupts write-in processing.

(e) **Read & Compare**: Compare **Hex File** with data in flash memory in microcontroller

This button is clicked to compare data in the Motorola-S or Intel-HEX format file specified in **Hex File** with data in flash memory in the microcontroller. Like the **[Program & Verify]** processing, The data of FLASH is transmitted for 512 bytes of every block, a CRC error check is performed, and comparison processing is performed.

(f) **Copy**: Save data in flash memory in microcontroller to file

This button is clicked to read data from flash memory integrated into the microcontroller and save it as an Motorola-S format file. Like **[Read & Compare]** processing, FLASH memory reading is performed for 512 bytes of every block, and a CRC error check is performed similarly. A preservation place folder is specified, and if a file name is inputted and **[Save]** button is pushed, processing will begin.

(g) **Full Operation (D+E+B+P)**: Automatic programming

Operation to **[Download]** to **[Program & Verify]** is performed by package.

In the case of a blank chip, processing is performed in order of **[Download]**, **[Blankcheck]**, and **[Program & Verify]**. When it is not a blank chip, processing is performed in order of **[Download]**, **[Blankcheck]**, **[Erase]**, **[Blankcheck]**, and **[Program & Verify]**.

7.3 Motorola-S format decoder specification

Before programming, Motorola-S format Decoder of programmer changes Motorola S format data into binary data, according to the following specification.

(a) The decoder does not error when overlap of addresses occurs.
  The decoder does not error about overlap of address. If user writes a data on an address which was already written another data before, former data is overwritten by new data.

 (b) Available address
  If user writes a data beyond an address range of FLASH memory, programming results in an error. But if an address range of whole FLASH memory does not continue, decoder does not give an error and programming procedure goes on. For example, user can program a FLASH memory which starts an address H'F90000 and ends an address H'FFFFFF and does not have memory function between H'FC0000-H'FCFFFF even if user tries to program on such eclipse address range.

 (c) About the error detected by the decoder.
  The error detected by the decoder is the following (1)-(4). When these errors are detected, processing is interrupted by the decoder. Then the line number and the cause of the error are displayed in the dialog window.
  (1) file error
  The start of the line is not "S".
  (2) S-format error
    The start of the line is not "S0","S1","S2","S3","S4","S5","S6","S7","S8" and "S9".
  (3) decode error
      There are character except "0123456789ABCDEF".("S" is excluded. See (1) and (2).)
       And, the small letter "abcdef" cannot be used.
      The data number of one line is insufficient.
      The SUM data is different.
  (4) address error
    There is data besides the FLASH area. (See b.Available address)

 (d) Other detail
  The decoder skips a line. even if the line is contained only new-line code NL and programming goes on.
  A line beginning with "S0","S5","S7","S8" and "S9" is ignored and decoder skips such lines in S format file without error.
  The decoder does not give an error and programming goes on when SUM is correct, even if the line is longer than a length specified by "LENGTH". In this case, the rest of the data beyond a length specified by "LENGTH" is ignored.

7.4 Special specification

Now, there is no kind to which special specification is applied.

8. STATUS OF OPERATION CHECK

• Specifications for PC used for operation check

PC:	FUJITSU FMV2TXH161
CPU:	Pentium 450 MHz
OS:	Japanese and English version of Windows XP SP1
Memory:	192 MB

9. OTHERS

(A) Setting of sound output

The setting of sound generated when an error occurs and processing is terminated normally can be changed.

Select the *[Sound]* tab in the setup window that opens when the *[Set Environment]* button is clicked.

- To output sound, put a check in the *Enable sound* checkbox.

- Next, the event to take out sound is chosen in the Event column, and the sound in the event is set up by specifying SundType and WaveFile under it in the state.

- Select *Wave* or *Beep* as the type of sound to be output in *Sound type*.

- Set the wave file to be output in the *Wave* file column only when *Wave* is selected. When the *[Open]* button is clicked, the File Open window is opened. Select the *Wave* file to be output. The *[Play]* button is used to play the set *Wave* file. The *[Stop]* button is used to stop the *Wave* file.

(B) Setting of tooltips display

The tooltips display can be either "enabled" or "disabled".

Select the *[Tooltips]* tab in the setup window that opens when the *[Set Environment]* button is clicked.

When a checkmark is put in the *tooltips* checkbox to move the mouse cursor over the contents such as buttons in the dialog window, simple help (the full path of a file for Hex File) is displayed.

(C) Error messages

Many error messages are displayed owing to the setting mistake of hardware and software. the case where an error is outputted in addition even if it checks these in detail, please tell the person in charge of software acquisition origin a detailed condition.

No. 001   Download error*1
Cause: The response of download processing is unusual.
Action: Please check connection and a setup of hardware.

No. 003   Timeout error
Cause: The response of a command does not come on the contrary.
Action: Please check connection and a setup of hardware.

No. 006   Unable to open COM port
Cause: Another application is using COM.
Action: Please check the use situation and port number of a COM port.

No. 007   Unable to open Download file
Cause: `m_flash.xxx` not found
Action: Please reinstall this software.

No. 009   Unable to gain COM port info
Cause: It will be in the state where the target COM port can be used.
Action: Please check the number of a COM port and setup to be used.

No. 010   Unable to change COM port setting
Cause: A communication setup cannot be set as the target COM port.
Action: Please inform support of condition.

No. 011   Communication error
Cause: The unusual command response was received.
Action: Please reperform by improving connection and a setup of hardware.

No. 012   Read error
Cause: The response at the time of read&compare or copy processing is unusual.
Action: Please reperform by improving connection and a setup of hardware.

No. 013   Program error
Cause: The response at the time of Program&Verify processing is unusual.
Action: Please reperform by checking whether a chip is blank.

No. 015   COM port write error
Cause: There is the possibility of the abnormalities of a COM port driver or the port itself.
Action: Please inform support of condition.

No. 016   COM port read error
Cause: There is the possibility of the abnormalities of a COM port driver or the port itself.
Action: Please inform support of condition.

No. 017   File access error
Cause: Access of a **m_flash.xxx** file went wrong.
Action: Return the folder and file configurations to the installation defaults.

No. 018   Erase error *1
    Cause: The response at the time of erase processing is unusual. There is the possibility that a chip is poor.
    Action: Please improve a setup of hardware or exchange chips.

No. 101   Please set "hex file"
    Cause: "Hex file" not set
    Action: Set "hex file" in the dialog box.

No. 207   memory is not available
    Cause: Unable to allocate memory for execution
    Action: Quit any running application and retry.

Please redo from download operation *2

*1: "MCU xxH" is displayed if the error cause is returned from the microcontroller at a download error.

    "MCU xxH" means:

    MCU 02H → SUM error at downloading

    MCU 04H → Abnormal termination at downloading

*2: This is an additional message. It is displayed as necessary after other messages are displayed.

10. CAUTIONS

No responsibility is taken about the problem which faced this software use.

The operation of this program is not assured on NEC PC98 series personal computers.

The PC programming software has the possibility of receiving the influence by the communications cable, the outside environment, and the PC. Therefore, please evaluate it enough when you use the software. Please use programming systems of programmer venders when you write two or more devices at the same time.

When using this program, there are restrictions on frequencies that are input to the microcontroller as original oscillations. For details, see *(b)* of **Section 7.1**.