To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

Send any inquiries to http://www.renesas.com/inquiry.

RENESAS

Notice

1. All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.

2. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.

3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.

4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.

5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.

6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.

7. Renesas Electronics products are classified according to the following three quality grades: "Standard", "High Quality", and "Specific". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as "Specific" without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as "Specific" or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is "Standard" unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.

   "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.

   "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.

   "Specific": Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.

8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.

9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.

10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.

11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.

12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

F-ZTAT Microcomputer On-Board Purge/Write Tool

User's Manual HS6400FWIW3SE

Renesas Microcomputer Support Software

Cautions

1. Hitachi neither warrants nor grants licenses of any rights of Hitachi's or any third party's patent, copyright, trademark, or other intellectual property rights for information contained in this document. Hitachi bears no responsibility for problems that may arise with third party's rights, including intellectual property rights, in connection with use of the information contained in this document.

2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.

3. Hitachi makes every attempt to ensure that its products are of high quality and reliability. However, contact Hitachi's sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.

4. Design your application so that the product is used within the ranges guaranteed by Hitachi particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. Hitachi bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating Hitachi product does not cause bodily injury, fire or other consequential damage due to operation of the Hitachi product.

5. This product is not designed to be radiation resistant.

6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from Hitachi.

7. Contact Hitachi's sales office for any questions regarding this document or Hitachi semiconductor products.

Preface

- **READ this user's manual before using the F-ZTAT microcomputer on-board purge/write tool.**
- **KEEP the user's manual handy for future reference.**

Do not attempt to use the F-ZTAT microcomputer on-board purge/write tool until you fully understand its mechanism.

This manual describes how to use Hitachi's tool for controlling data write to flash memory of the F-ZTAT[1] microcomputer.   This tool operates under the Microsoft® Windows® 95 operating system[2] or Microsoft® WindowsNT® operating system[2] which runs on an IBM personal computer (IBM PC[3]) or a compatible machine (hereafter collectively referred to as IBM PC).

Notes: 1. **F-ZTAT (Flexible-Zero Turn Around Time) is a trademark of Hitachi, Ltd.**
2. **Microsoft®, Windows®, Microsoft® Windows® 95 operating system, Microsoft® WindowsNT® operating system, and MS-DOS are registered trademarks of Microsoft Corporation in the United States and/or other countries.**
3. **IBM PC is a registered trademark of International Business Machines Corporation in the United States.**

Contents

Figures

Tables

Section 1   Overview

1.1   Functions

The F-ZTAT microcomputer on-board purge/write tool (hereafter referred to as the on-board writing tool) is a program that allows the user to control data write to flash memory of the F-ZTAT microcomputer.   This tool operates under an operating system running on an IBM PC, as described in Preface.

This tool facilitates writing user data in the host computer (IBM PC) to the flash memory of an F-ZTAT microcomputer installed in the user system.

1.2   Connection

Figure 1-1 shows how to connect the user system to the host computer via the RS-232C cable.
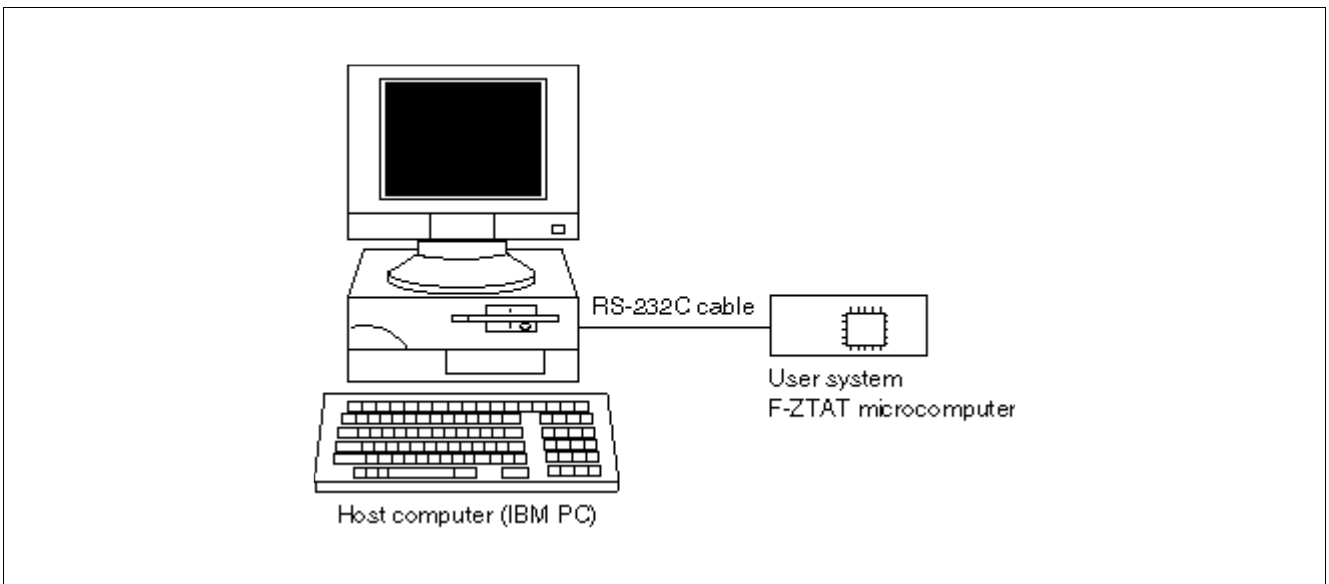
Figure 1-1   Connection between User System and Host Computer

Connecting to the IBM PC: The RS-232C cable connects the IBM PC to the user system on which the F-ZTAT microcomputer is installed.   Connect the RS-232C cable to the RS-232C port on the IBM PC. Some IBM PCs support more than one RS-232C port. Specify the port number at initiation. For more details, refer to section 2.1, Installation.

Figure 1-2 shows the physical connections between the IBM PC and the user system.

Figure 1-2   Connection between IBM PC and User System

For details on connecting to the F-ZTAT microcomputer, refer to the F-ZTAT microcomputer hardware manual.

1.3   Communication Parameters
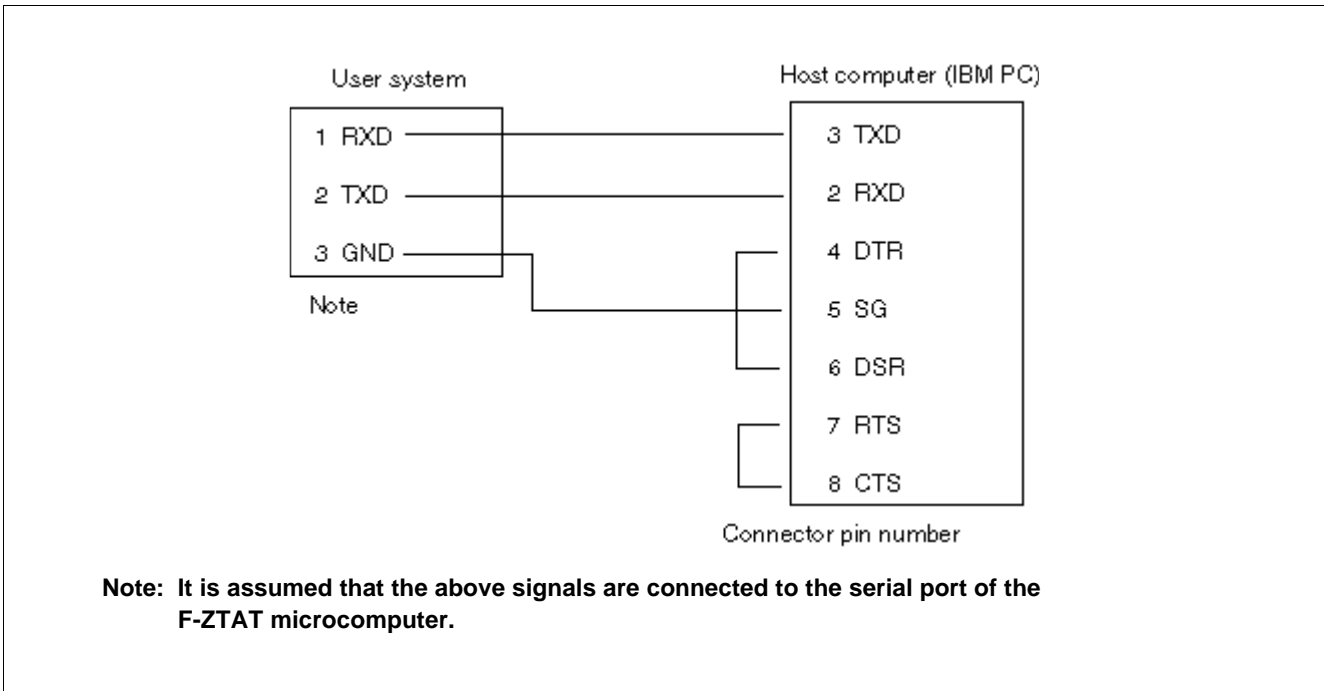
The operating conditions of the host computer are listed in table 1-1.   This on-board writing tool operates correctly only under these conditions.   Set up the serial ports on the host computer according to the operating conditions. The transfer rate depends on the operating frequency of the F-ZTAT microcomputer used.   For more details, refer to the F-ZTAT microcomputer hardware manuals.

Table 1-1   Communication Parameters

Item	Specification
Transfer rate	38400, 19200, 9600, 4800, 2400 bps
Synchronization method	Asynchronous method
Data bits	8
Stop bit	1
Parity	None

bps: Bits per second

1.4　Supplied Software

The product number of the on-board writing tool is HS6400FWIW3SF.　Programs will be supplied on 3.5-inch 2HD floppy disks (1.44-Mbyte formatted, double sided, high density, and double track).

Table 1-2 lists the files that constitute this tool.

Table 1-2　Supplied Files

File Type	File Name in 3.5-inch FD
Installer	SETUP.EXE
Installation information file	SETUP.INF
F-ZTAT MCU on-board writing tool	FLASH.EXE
Flash memory block information file	<device name>.INF
User write control program	<device name>.SRC
User write control program source file	<device name>.SUB

For details, refer to the Supplement of F-ZTAT Microcomputer On-Board Purge/Write Tool User's Manual.

Section 2   Operation Procedures

2.1   Installation

1. Insert the floppy disk for the on-board writing tool into the floppy disk drive of the IBM PC to be used.
2. Initiate the SETUP.EXE file on the floppy disk.
3. The message shown in figure 2-1 is displayed. Select [OK] to continue installation, or select [Cancel] to abort installation.
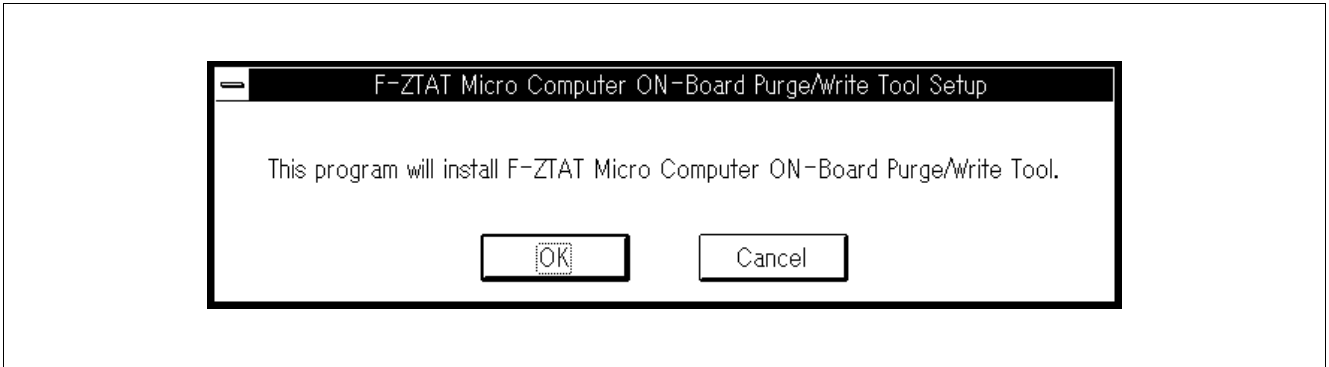

Figure 2-1   Installation Start Message

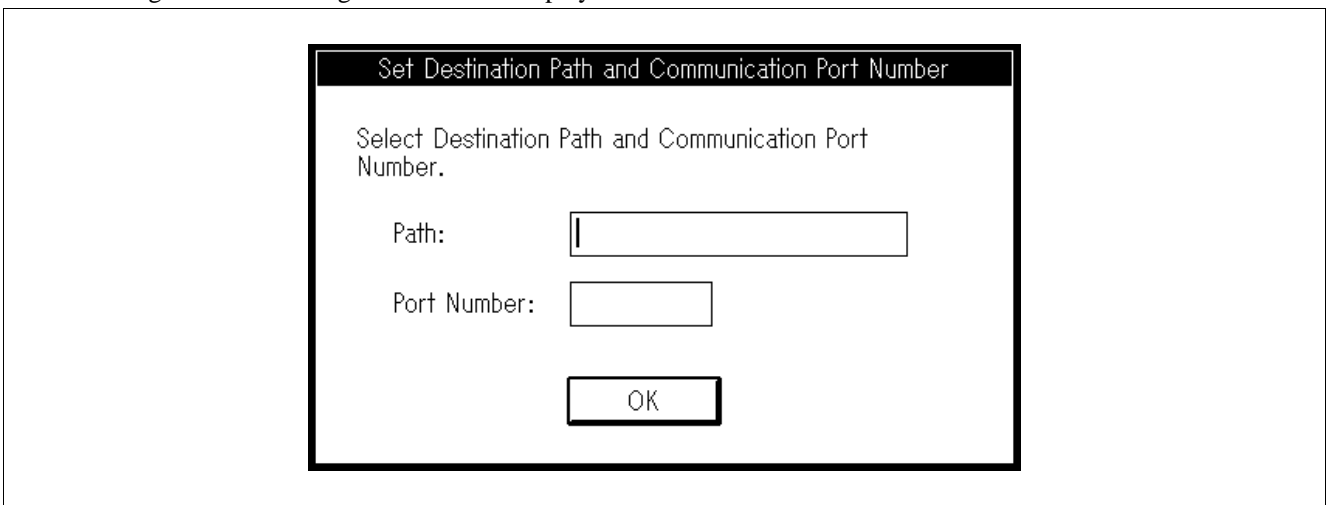4. The dialog box shown in figure 2-2 is then displayed.

Figure 2-2   Dialog Box for Installation

(a) Enter a directory name in which the on-board writing tool is to be copied in [Path]. If the specified directory does not exist, the installation program creates the directory to which the on-board tool is copied.

(b) Enter the RS-232C port number that is used for communication with the user system as a numerical value in [Port Number].   The default value is 1 (COM1).

(c) Selecting [OK] copies the on-board writing tool files to the specified directory.

5. When copying is completed, the message shown in figure 2-3 is displayed. When [OK] is selected, the FLASH groups and the on-board writing tool icon are registered to the program manager, and installation is terminated. When [Cancel] is selected, the installation is canceled without registering the group and the icon.
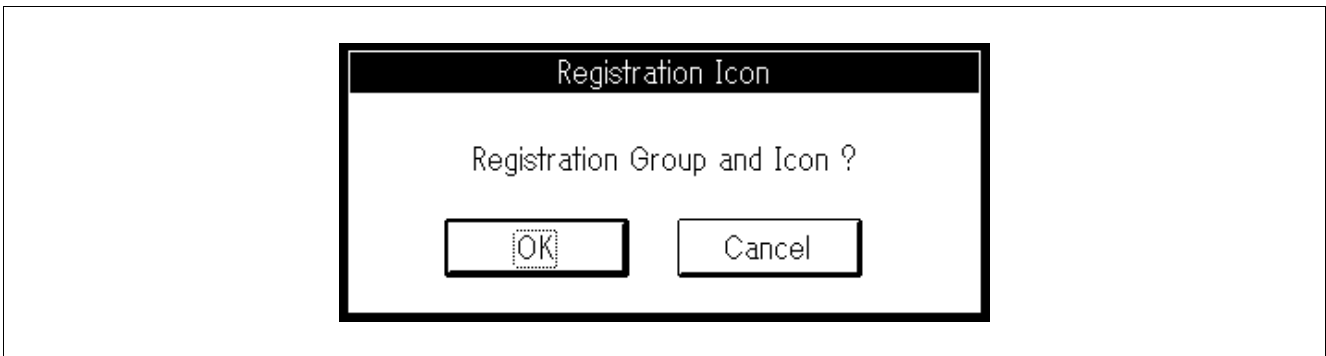

Figure 2-3   Group and Icon Registration Confirmation Message

Note: **The installer provided with this version will unconditionally overwrite all files listed in table 1-2 (Supplied Files) except for SETUP.EXE and SETUP.INF to the specified directory.**
Before installation, confirm the directory contents and make sure to specify the correct directory name.

2.2 On-Board Writing Tool Information Files

The flash memory block information file and user write control program are needed to operate the on-board writing tool. To use an F-ZTAT microcomputer that cannot be used with the provided information files, create the flash memory block information file (<device name>.INF) and an original user write control program (<device name>.SUB).   If the operating frequency differs from the default operating frequency of the provided information files, a user write control program must also be newly created.

The same device name must be used for all information files to be created.

2.2.1   Flash Memory Block Information Files (<device name>.INF)

The flash memory block information file is an ASCII file which specifies the flash memory area to write user data, area to load the user write control program, RAM emulation block, and the corresponding registers.   Contents of the flash memory block information file for the H8/538F is shown in figure 2-4.   To use the on-board writing tool with a different device, start and end addresses of each block must be edited.   For more details, refer to the device's hardware manual.
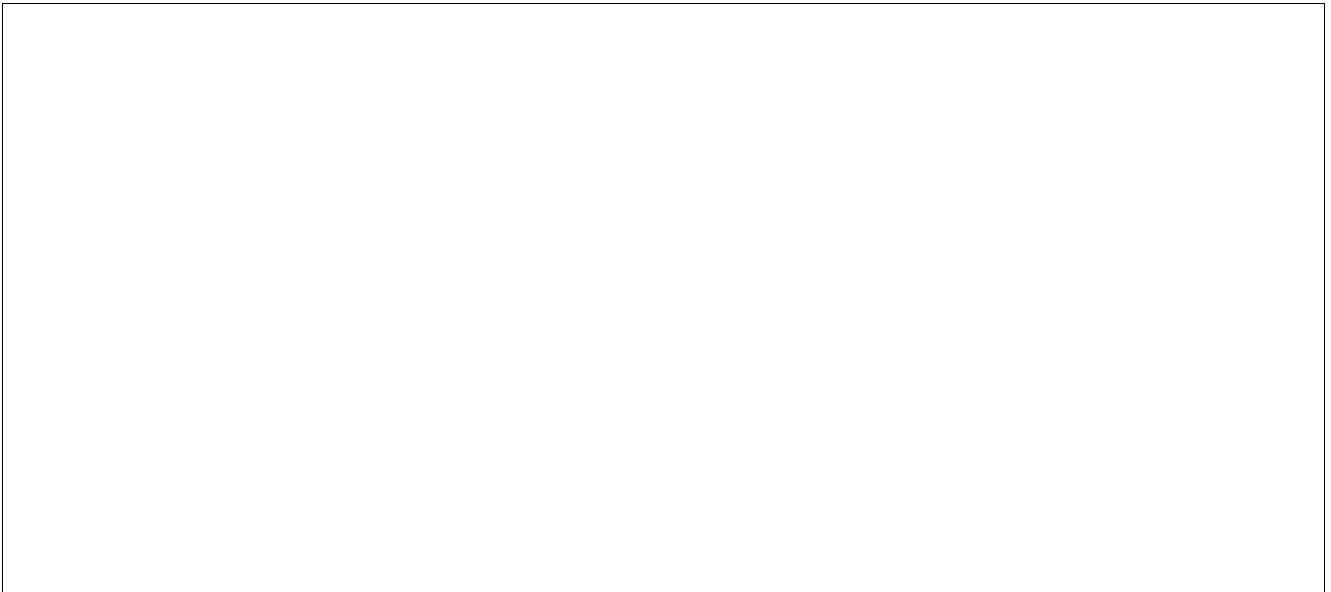
Figure 2-4   Flash Memory Block Information File for the H8/538F

2.2.2 User Write Control Program (<device name>.SUB)

The user write control program is a program that controls how user data that is transferred from the host computer with the on-board writing tool is written to the flash memory on the F-ZTAT microcomputer.   The user write control program must be transferred to the F-ZTAT microcomputer in the boot program mode before transferring the user data.

2.2.3 User Write Control Program Source File (<device name>.SRC)

The user write control program provided with this tool is a sample program assuming that the user system operating frequency is the operating frequency shown in table 1-2, Supplied Files. Therefore, when using an F-ZTAT microcomputer with a different operating frequency, the user write control program source file also provided with this tool must be modified to create a new user write control program.

Note that when the operating frequencies of the user write control program and F-ZTAT microcomputer differ, a timeout error or erase error will occur.

An example of modifying the operating frequency is shown below.

Ex. Modification of symbol MHZ
   In the user write control program source file (<device name>.SRC), symbol MHZ is defined as follows:

```
MHZ     .EQU     H'10     ; 16MHz     (a)
;MHZ    .EQU     H'0A     ; 10MHz     (b)
```

When the operating frequency of the F-ZTAT microcomputer is 16 MHz as in the above example, modification is not needed. However, for other operating frequencies, modify the value of symbol MHZ to match the operating frequency. For example, when the F-ZTAT microcomputer operates at 10 MHz, add a semicolon to the beginning of statement (a) and delete the semicolon at the beginning of statement (b) as shown below.

```
;MHZ    .EQU     H'10     ; 16MHz     (a)
MHZ     .EQU     H'0A     ; 10MHz     (b)
```

When using the source file with modification other than operating frequency or when creating an original user write control program, execute the following (modification of user write control program source file for the H8/538F) to create the user write control program.   **Note that the correct operation of this tool is not guaranteed if any modifications are made.**

The following operations must be performed under MS-DOS.

- Assemble the user write control program source file:
  ```
  C>ASM8Δ538.SRC (RET)
  ```

- Create an absolute load module:
  ```
  C>LNKΔ538.OBJ (RET)
  ```

- Create an S-type load module:
  ```
  C>CNVSΔ538.ABS (RET)
  ```

- Change file name to make sure that the on-board writing tool is recognized as the user write control program:
  ```
  C>RENAMEΔ538.MOTΔ538.SUB (RET)
  ```

2.3 Installing the On-Board Writing Tool

The on-board writing tool is installed by double-clicking the FLASH icon within the FLASH group in the program manager. When the on-board writing tool is initiated, the main window is first displayed, and then the initiation dialog box shown in figure 2-5 is displayed.
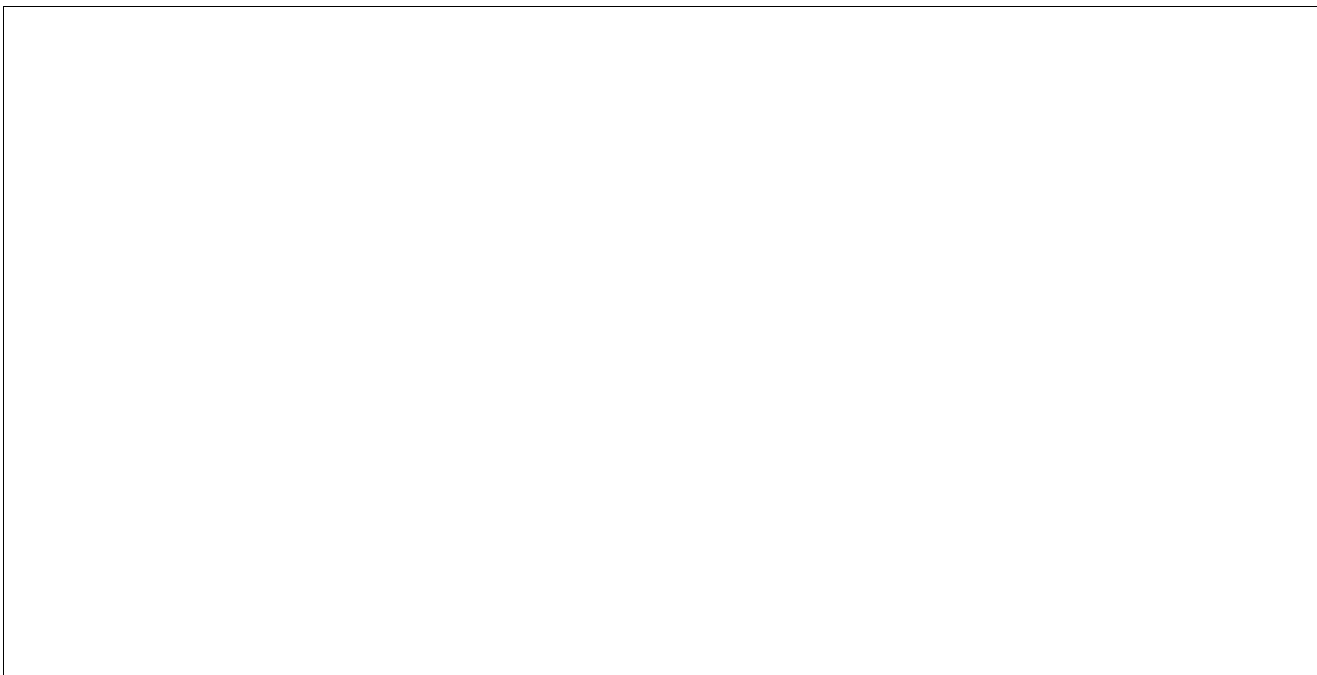
Figure 2-5   Initiation Dialog Box

1. The flash memory block information file (*.INF) on the directory in which this on-board writing tool is installed is displayed in the [Flash memory block information file]. Select the flash memory block information file to be used.

2. Set the timeout period to detect no response when communicating with the user system in [Timeout]. The default is five seconds. The modification must be made in units of seconds.

3. Select the program mode in [Select Program Mode]. The default is the boot mode. For details, refer to section 2.4, Selecting the Program Mode.

2.4   Selecting the Program Mode

Two program modes are available for writing data.   For details on these program modes, refer to the F-ZTAT microcomputer hardware manual.

Boot Program Mode: In the boot program mode, the user data is transferred to the flash memory after the user write control program is transferred to the RAM on the F-ZTAT microcomputer.   In this case, the transferred user write control program receives the user data and writes data to the flash memory on the F-ZTAT microcomputer.

User Program Mode: A program on the ROM/RAM on the F-ZTAT microcomputer receives the user data and writes it to the flash memory on the F-ZTAT microcomputer.   For details on how the program in the ROM/RAM works in the user program mode, refer to the F-ZTAT microcomputer hardware user's manuals.

2.4.1   Operation in the Boot Mode

1. When the boot mode is selected in the initiation dialog box shown in figure 2-5, the boot mode dialog box shown in figure 2-6 is displayed.

Figure 2-6   Boot Mode Dialog Box

2. By setting the F-ZTAT microcomputer to the boot mode and selecting [OK], the sending the user write control program dialog box shown in figure 2-7 is displayed, and the user write control program is sent. The sending status is indicated by the percentage number. When [Cancel] is selected, in the boot mode dialog box, the on-board writing tool is terminated and the system returns to the main window.
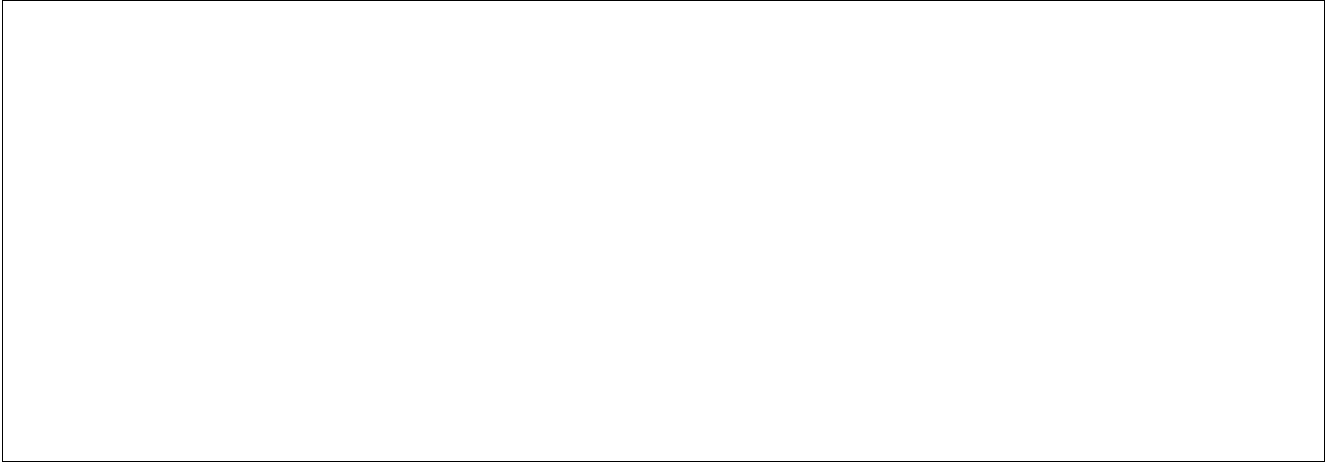

Figure 2-7   Sending User Write Control Program Dialog Box

3. After the user write control program has been sent, the user data can be sent to the F-ZTAT microcomputer. When [Stop] is selected, user write control program sending is aborted, and the initiation dialog box shown in figure 2-5 is displayed.

2.4.2　Operation in the User Program Mode

1. When user program mode is selected in the initiation dialog box shown in figure 2-5, the user program mode dialog box shown in figure 2-8 is displayed. [Set Baud rate] lists the baud rates. Select the appropriate baud rate.

Figure 2-8　　User Program Mode Dialog Box

2. When [OK] is selected in the user program mode dialog box shown in figure 2-8, user data is sent to the F-ZTAT microcomputer. When [Cancel] is selected, the system returns to the main window.

2.5 Menu for On-Board Writing Tool

The main window is shown in figure 2-9.

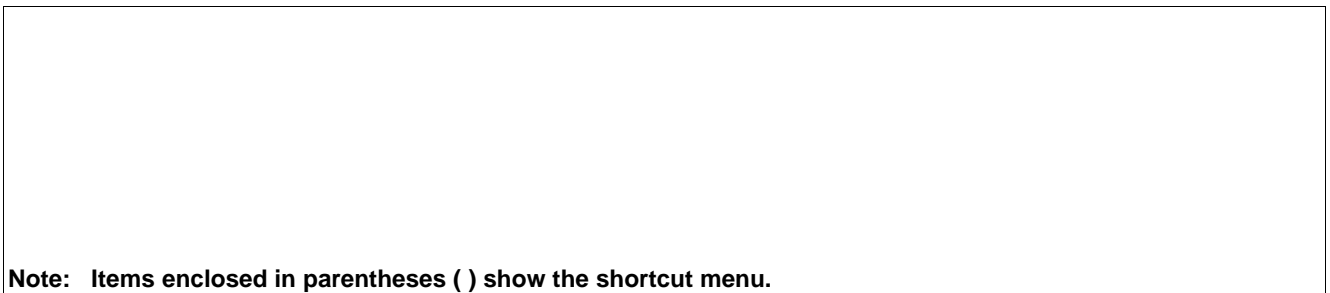
Figure 2-9   Main Window

The menu is listed in figure 2-10.

Note: Items enclosed in parentheses ( ) show the shortcut menu.

Figure 2-10   On-Board Writing Tool Menu

2.5.1   User Data Write

Function:

- Transfers user data to the F-ZTAT microcomputer. If an address range is specified, the specified range is extracted from the user data and transferred to flash memory.
- Before transferring the user data to the F-ZTAT microcomputer, whether or not to erase the corresponding flash memory block must be confirmed (only in the user program mode). When the memory block is to be erased, the user data is transferred after erasing the memory block.

Operation:

1. When [WRITE] is selected from the menu, the write command setting dialog box shown in figure 2-11 is displayed.
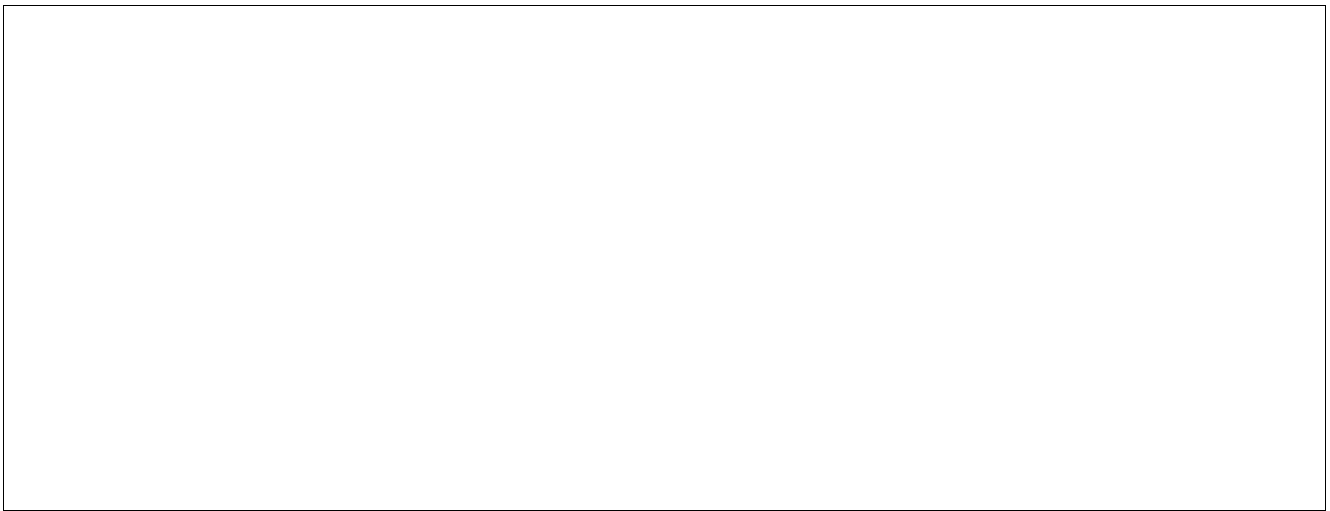

Figure 2-11   Write Command Setting Dialog Box

(a) In [File name], specify the file name in which the user data to be written is stored. If the directory in which the file exists is not found, select [Reference] to display the file reference dialog box to select the file in which the user data is stored.

(b) In [Start address], specify the start address of the write. The default is the start address of the flash memory. Note, however, that when the menu is selected after the RAM emulation menu has been executed, the default is the flash memory block start address selected when RAM is emulated. In the list box, the start address of each flash memory block is displayed.

(c) In [End address], specify the end address of the write. The default is the end address of the flash memory. Note, however, that when the menu is selected after the RAM emulation menu has been executed, the default is the flash memory block end address selected when RAM is emulated. In the list box, the end address of each flash memory block is displayed.

(d) In [Offset], specify the offset of the write address. This specification is used to modify the write address without changing the user data load address. The default is 0.

(e) Figure 2-12 shows an example of the write command setting dialog box, to extract the addresses 0x10 to 0x5F from the user data, and transfer them to the F-ZTAT microcomputer.

Figure 2-12   Example of the Write Command Setting Dialog Box

2. When [OK] is selected in the write command setting dialog box in the user program mode, the erase flash memory block specification dialog box shown in figure 2-11 is displayed.   In the boot mode or when RAM emulation is selected, the flash memory block is not erased and user data is transferred. When [Cancel] is selected, the dialog box is closed and the system returns to the main window without performing erase or transfer.

Figure 2-13   Erase Flash Memory Block Specification Dialog Box

(a) The flash memory block in which the user data is to be installed is displayed in [Erase flash memory block list]. The displayed flash memory block is to be erased.

(b) If a flash memory block that does not need to be erased is displayed, select the corresponding block from the displayed flash memory block in the [Erase flash memory block list] by clicking with the mouse, and select [Delete] not to erase the memory block.

3. Selecting [OK] in the erase flash memory block specification dialog box shown in figure 2-13 displays the erasing flash memory dialog box shown in figure 2-14, and starts to erase the flash memory block. When [Cancel] is selected, the flash memory block is not erased, the dialog box is closed, and the system returns to the main window.
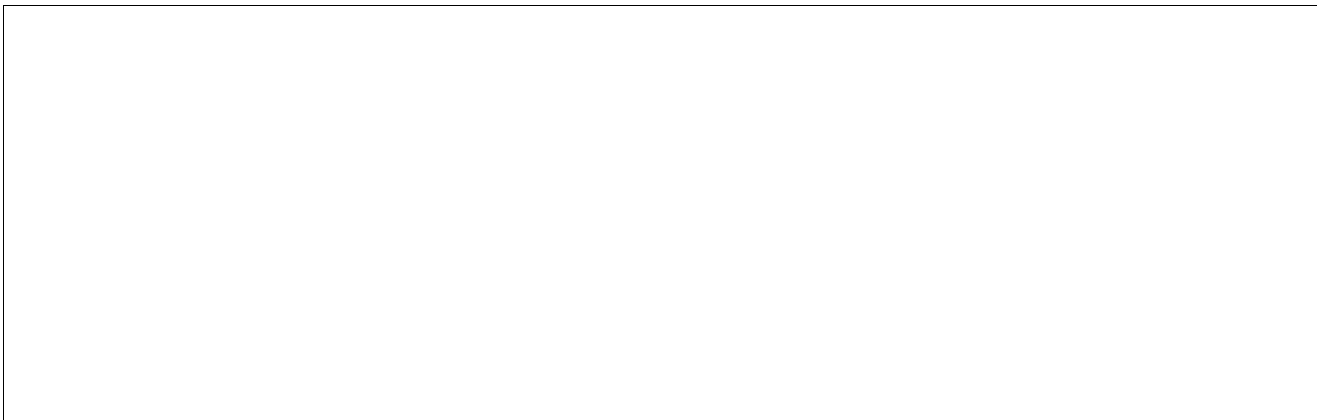
Figure 2-14   Erasing Flash Memory Block Dialog Box

4. When erasing the flash memory block is completed, the transferring user data dialog box shown in figure 2-15 is displayed, and user data transfer is started.
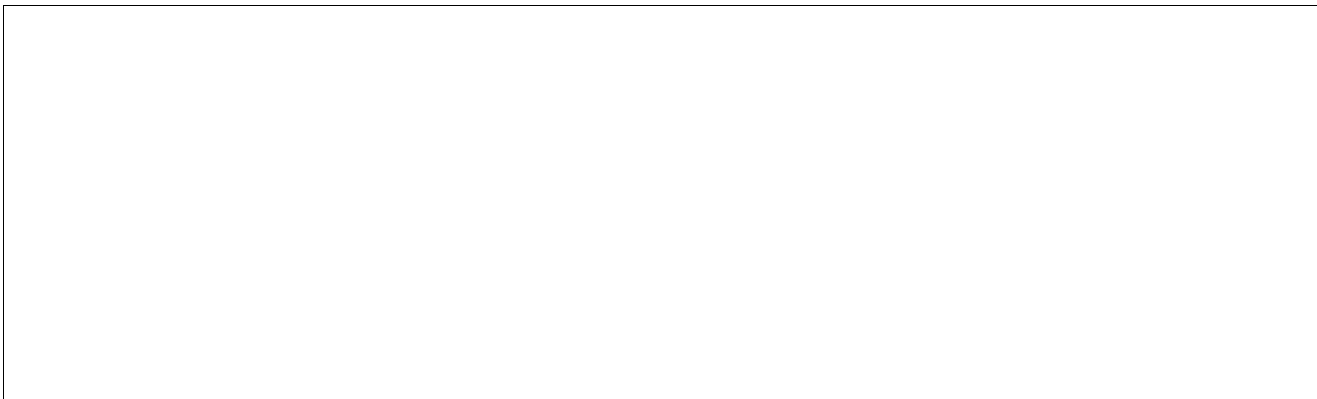
Figure 2-15   Transferring Flash Memory Block Dialog Box

5. When the user data transfer is completed and the write to the flash memory is completed without an error, the transferring flash memory dialog box is closed. When [Stop] is selected, user data transfer is aborted and the dialog box is closed, and the system returns to the main window.

2.5.2 Mode Switchover

Function:

Switches the program mode.

Operation:

Selecting [File]-[Mode] from the menu displays the initiation dialog box shown in figure 2-5. The program mode can be selected in [Mode Selection].

2.5.3   RAM Emulation

Function:

Initiates the RAM emulation function for the F-ZTAT microcomputer. For details on RAM emulation, refer to the F-ZTAT microcomputer hardware manuals.

Operation:

1. Selecting [RAM Emulation] from the menu displays the RAM emulation command dialog box shown in figure 2-16. In the [Flash memory block] list box, the start and end addresses of each flash memory block are displayed. Select the memory block for RAM emulation. To cancel RAM emulation, select [Cancel] from the list box.
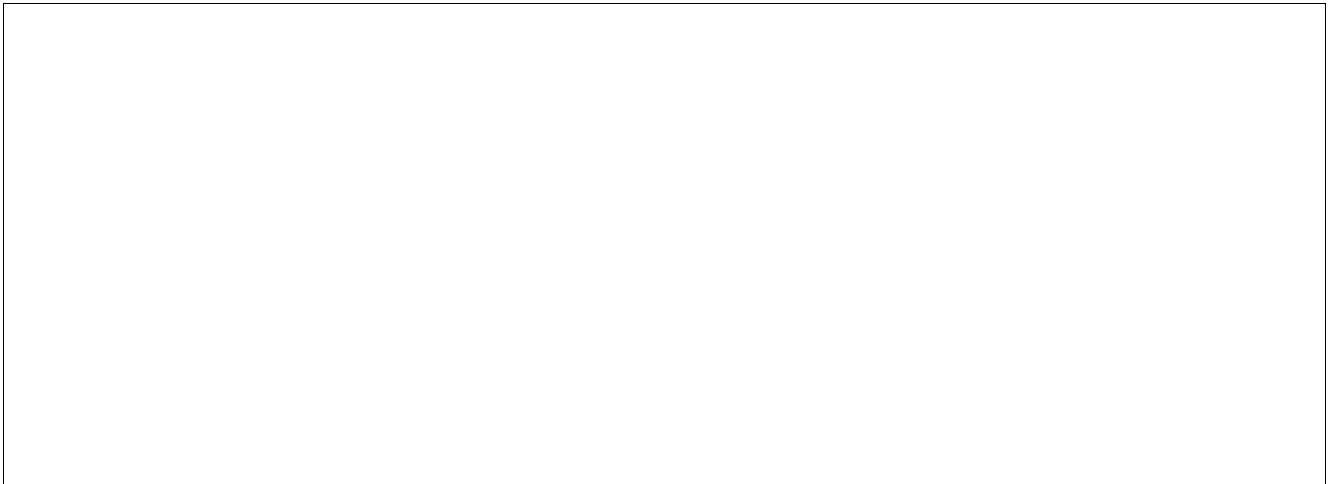

Figure 2-16   RAM Emulation Command Dialog Box

2. Selecting [OK] closes the dialog box and sends the RAM emulation command to the F-ZTAT microcomputer. Selecting [Cancel] closes the dialog box.

2.5.4   Termination

Function:

Terminates the on-board writing tool.

Operation:

Selecting [File]-[Quit] from the menu terminates the on-board writing tool.

2.6 Error Messages

Error messages of the on-board writing tool are the following:

- FILE INSTALL ERROR

  The flash memory block information file (file name: <device name>.INF) or user write control program (<device name>.SUB) is not installed. Reinstall the program.

- PORT OPEN ERROR

  The port specified at installation could not be opened. Check whether the port is used by another application.

- FLASH WRITE ERROR

  Write could not be made to flash memory. Erase data in the flash memory and try write again.

- FILE FORMAT ERROR

  The user write control program (<device name>.SUB) or specified user program is not stored as S-type records. Recreate the S-type load module.

- FLASH INFORMATION FILE ERROR

  The flash memory block information file (<device name>.INF) contains an error or the user write control program is out of the range of the user program area information specified by the flash memory block information file. Refer to the hardware manual of the device and check the contents of the flash memory information file.

- TIMEOUT ERROR

  No response was received from the F-ZTAT microcomputer in a specified time.   Restart after checking if the F-ZTAT microcomputer is operating correctly, if the cable connection is correct, if the same port number specified at installation is used, if the correct device name has been selected in the initiation dialog box, or if the [Stop] button has been clicked during user data transfer.

- FLASH ERASE ERROR

  Data in the flash memory cannot be erased.   Check the device.

- DEVICE ERROR

  User write control program cannot be sent to RAM. Check the device.

- FLASH NO WRITE DATA

  The user program to be written to the flash memory is outside the address range of the file specified at data write. Check if the S-type records of the specified file correctly match the range specification.

- RAM EMULATION ERROR

  An attempt was made to emulate the RAM with a device that does not support RAM emulation. Refer to the hardware manual of the device, and check the contents of the flash memory block information file.

- RAM EMULATION REGISTER ERROR

  The RAM could not be emulated due to an invalid register value sent from the terminal. Refer to the hardware manual of the device, and check the contents of the flash memory block information file.

- NO MEMORY

  A write could not be performed due to insufficient memory on the host computer. Quit other applications and retry.

Index