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April 1st, 2010
Renesas Electronics Corporation

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F-ZTAT™ Microcomputer On-Board Writing Program (HS6400FWIW5S)

User's Manual

Renesas Microcomputer
Development Environment
System

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Preface

The F-ZTAT™ microcomputer on-board writing program (hereinafter referred to as the on-board writing program) is a program that allows the user to write data or program code to the flash memory in an F-ZTAT™ microcomputer on board. By using the on-board writing program, the user can write new contents to flash memory in the F-ZTAT™ microcomputer after it has been installed on a circuit board. The user can write application programs and update the contents of memory in the workplace or in the field. This will make product development easier and allow more flexibility.

The user can use the F-ZTAT™ microcomputer's on-board writing function by installing the on-board writing program to the host computer.

The user must read and understand this manual before using the on-board writing program. The user must keep this manual and read it when necessary. The user must not use the on-board writing program before reading this manual.

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Section 1 Overview

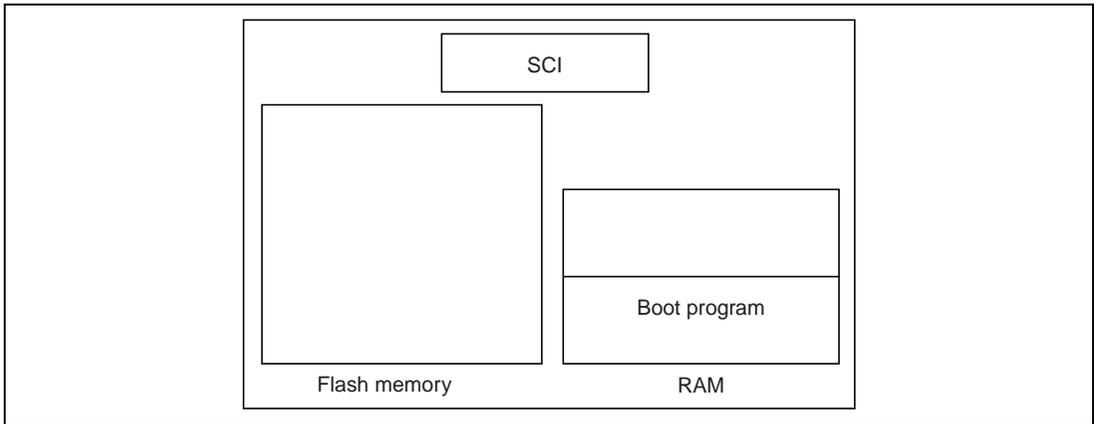
1.1 On-Board Writing Function of the F-ZTAT™ Microcomputer

An F-ZTAT™ microcomputer has two kinds of on-board writing modes: boot mode and user program mode.

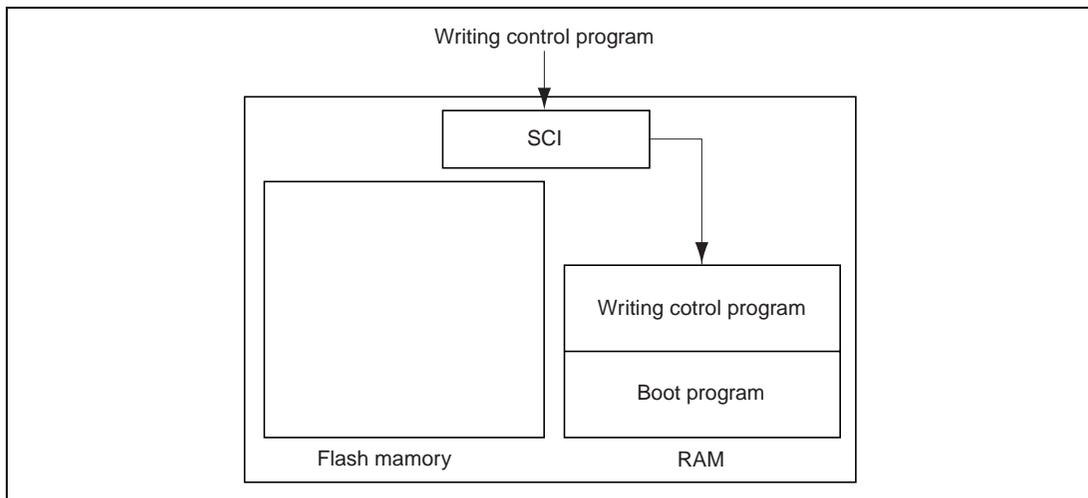
1.1.1 Boot Mode

The boot program installed in the microcomputer loads the writing program and erases the entire contents of the flash memory.

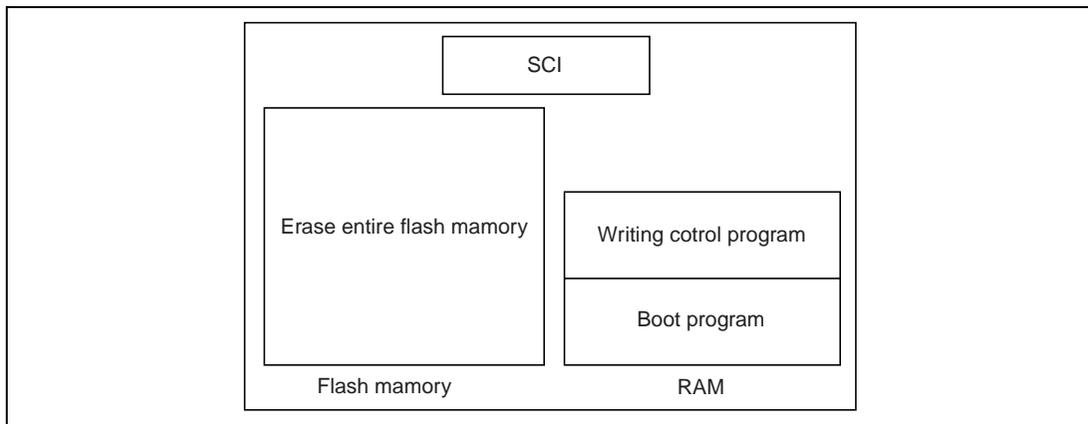
After selecting the boot mode, reset and start-up the microcomputer. The microcomputer will load the boot program to RAM and then start.



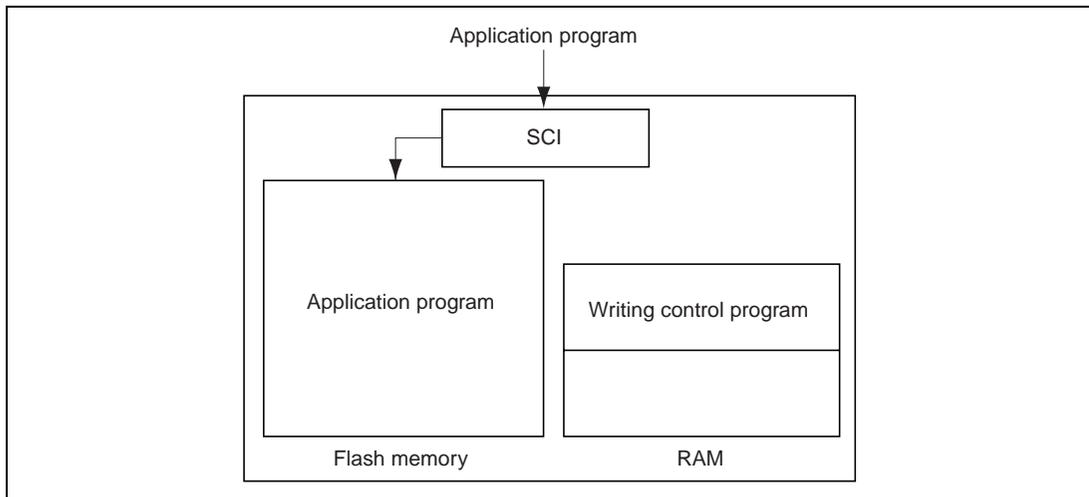
The boot program will acquire the writing program through the Serial Communication Interface (SCI) and load it into RAM.



When the boot program has loaded the writing program, the boot program will erase the entire contents of the flash memory and hand control to the writing program.



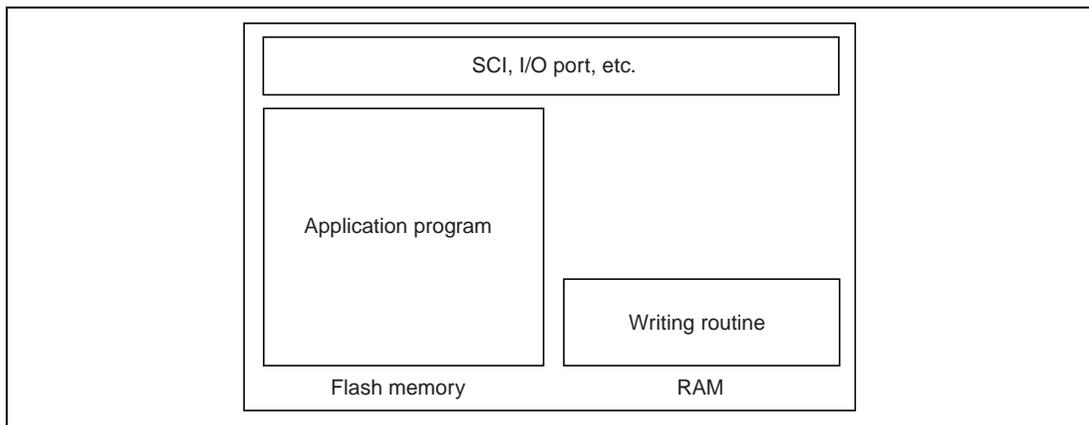
The writing program will acquire an application program from the Serial Communication Interface (SCI), etc. and load it into the flash memory.



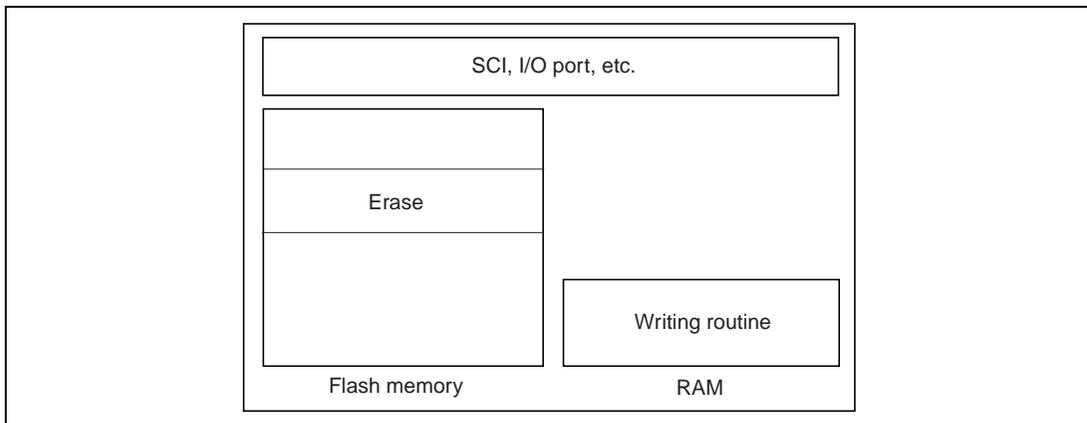
1.1.2 User Program Mode

Application programs erase the contents of and write to the flash memory.

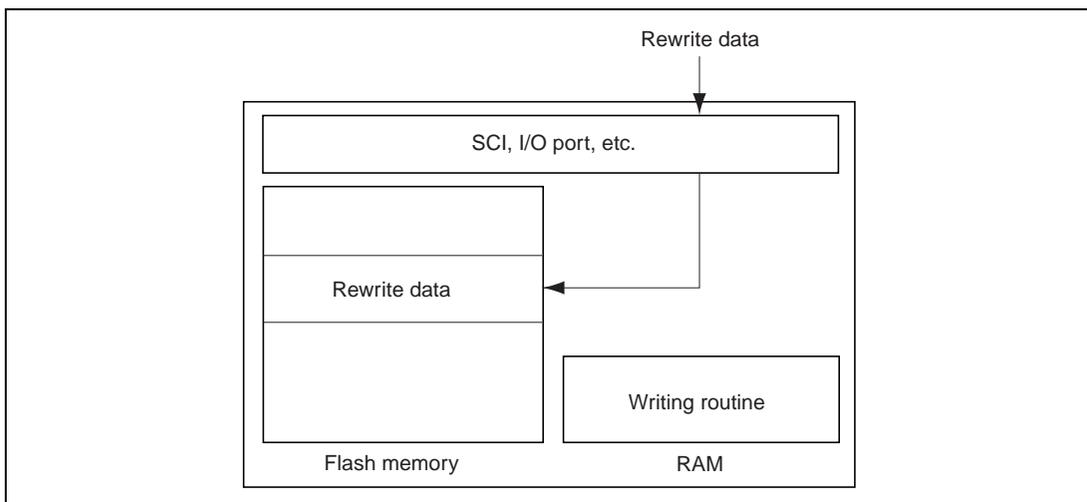
The application program will start to write to the flash memory when the microcomputer enters the user program mode. While the application program is writing to the flash memory, the user cannot read the flash memory; therefore, the user must load the writing routine to RAM or external memory to execute the writing routine.



The writing routine will erase the contents of the flash memory in block units.



The writing routine will acquire rewriting data from the SCI, I/O port, etc. and writes them to the flash memory. The writing routine can acquire the writing data from arbitrary peripheral functions according to the user system's function.



1.2 Function and Structure of On-Board Writing Program

By installing the on-board writing program in the host computer, flash memory in an F-ZTAT™ microcomputer can be erased and written to. Connect the host computer (OS: Windows® 95/98/Windows NT®/2000) and the microcomputer by a serial link. Connect the host computer's serial port and microcomputer's SCI through an interface; user system must have an appropriate interface to the host computer's serial port. Or use an adapter, because the voltage levels will be different for the two systems. Application programs simply mean data to be written to the flash memory. Send the application program to the microcomputer by serial communications and thus rewrite the contents of the flash memory.

The on-board writing program consists of two programs, which are:

- Main program: runs on the host computer (Flash.exe)
- Writing program: runs on the microcomputer (xxx.inf, xxx.sub, xxx.src; where xxx indicates the product type)

Use the main program as a user interface and host for on-board writing. Use the writing program as a routine to erase and write the contents of the flash memory. Use these two programs to erase the contents of and write to the flash memory in boot mode.

The main program communicates with the boot program, which is installed in the microcomputer, and loads the writing program to the RAM of the microcomputer. The main program then communicates with the writing program and writes an application program to the microcomputer's flash memory.

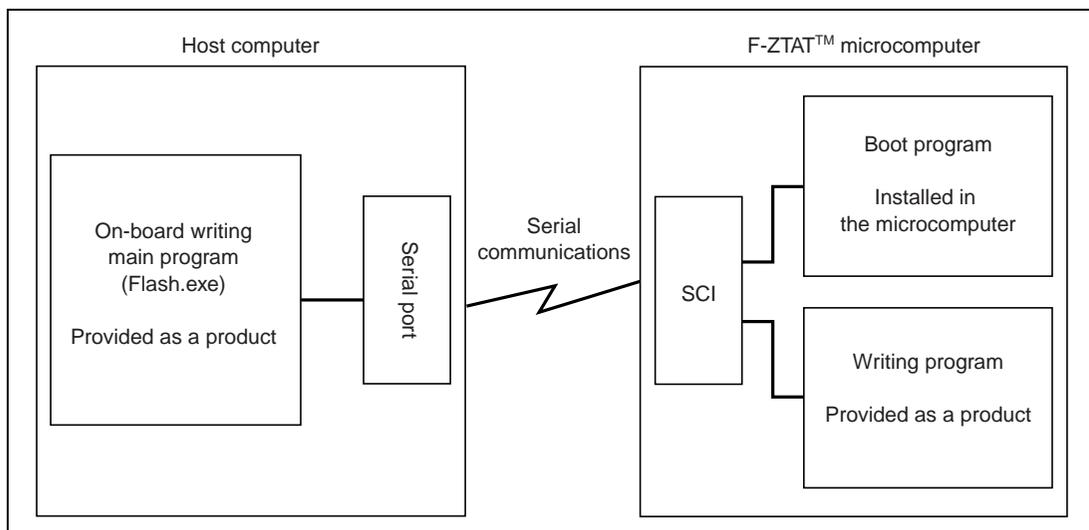


Figure 1.1 Model of Operation of an On-Board Writing Program

Note: Do not directly connect the host computer's serial port to the microcomputer's SCI. Because the voltage levels will be different for the two systems, this may damage the product. For details on serial port specifications, refer to the manuals of the host computer. For the SCI specifications, refer to the hardware manual for the microcomputer.

Each microcomputer has its own writing program. Each writing program consists of the following three files. Refer to the attached papers for the supported microcomputers and corresponding writing program.

- xxx.inf: Information file (INF file)
- xxx.sub: Main writing program (S-type load module)
- xxx.src: Main writing program (source program)

File xxx.inf gives information relating to the microcomputer and writing program. File xxx.inf contains setting for the main program running on the host computer to select the function for each product.

Files xxx.sub and xxx.src are writing programs. xxx.sub is executed in the boot mode to write to the flash memory. file xxx.sub, which is an S-type load module. The frequency in file xxx.src can be modified. For details, refer to section 3.1, Modifying the Writing Program. The user can also use file xxx.sub as sample program.

Section 2 Installation

2.1 Installation

Insert the CD-ROM into the CD-ROM drive of the host computer and double-click the icon for file Setup.exe on the CD-ROM. When the dialog box in figure 2.1 is displayed, click the [Next >] button to proceed. To cancel, click [Cancel].



Figure 2.1 [Welcome] Dialog Box

When the dialog box in figure 2.2 is displayed, input the destination directory. When nothing is input, the standard directory is assumed.



Figure 2.2 [Choose Destination Location] Dialog Box

Click the [Next >] button when you have finished. The installer will copy the program to the host computer. When the installer has completed copying, the dialog box shown in figure 2.3 will be displayed.



Figure 2.3 [Setup Complete] Dialog Box

Click the [Finish] button to complete installation.

Section 3 Preparation Before On-Board Writing

3.1 Modifying the Writing Program

The writing program continuously sets control register flags at a specified interval while the user is writing programs or data to the flash memory. These control register flags are set so that the necessary voltage can be applied to the flash memory cells. The writing program must do the same thing when erasing the contents of the flash memory. The writing program uses the clock to calculate the parameters used to set the timing. However, since the writing program cannot determine the clock, which is in use, the user must determine the clock and notify the writing program.

The clock in the writing program can be modified in the following two ways:

- Through an on-board writing operation (setup function)
- By modifying part of the program

Details on the former way of notifying the clock will be given later. Here, we will explain the latter method.

Each writing program consists of the following three files (xxx means product type).

- xxx.inf: Information file (INF file)
- xxx.sub: Main writing program (S-type load module)
- xxx.src: Main writing program (source program)

Modify the program via the source program (xxx.src). Use the following procedure:

1. Modify xxx.src.

Use a text editor to modify xxx.src. Search for the definition symbol MHZ or KHZ. In the program, these symbols are written so that they represent the operation frequency. Usually, these symbols are defined at the beginning of a program. Modify the MHZ or KHZ according to the clock of the user system. Fraction that goes beyond two digits below the fraction point are rounded down for MHZ, and fraction that goes beyond three digits below the fraction radix point are rounded down for KHZ. Refer to the comments for details.

2. Convert xxx.src to an S-type load module.

Use the assembler, linkage editor, and object converter to convert xxx.src to an S-type load module. For details, refer to the user's manual for each software tool.

3. Replace xxx.sub with the created an S-type load module.

To save the created file under a different name or in a different directory rather than replace xxx.sub with the modified S-type load module, follow the procedure below:

- The main part of the file name (xxx) must be the same for the information (.INF) and load module (.SUB) files.
- Store an xxx.inf that corresponds to xxx.sub in the same directory.

The clock of the writing program must be the same as the microcomputer internal system clock.

The clock equals to the clock input to the microcomputer multiplied by the multiplier generated by the Clock Pulse Generator (CPG) or the frequency of the crystal oscillator connected to the microcomputer multiplied by the multiplier generated by the Clock Pulse Generator (CPG).

For details, refer to the hardware manual.

Note: Set the clock correctly. If the clock parameters are not set or incorrectly set, the flash memory will not be erased or written correctly.

3.2 Connecting the Host Computer to the User System

This section will explain how to connect the host computer's serial port to the microcomputer's SCI. The host computer's serial port and microcomputer's SCI runs at different voltage levels, so the user cannot connect them directly.

1. Connecting an IBM PC to an F-ZTAT™ microcomputer

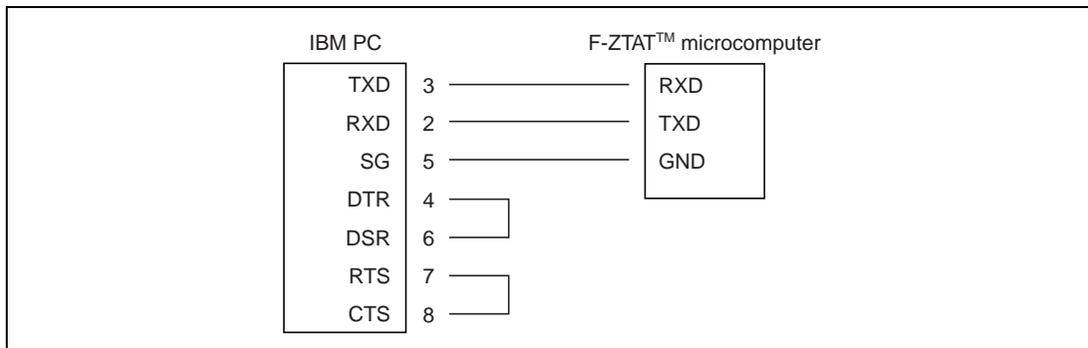


Figure 3.1 Connecting IBM PC Serial Port to SCI (Model)

For details on serial port specifications, refer to the manual of the host computer. For details on SCI specifications, refer to the microcomputer's hardware manual.

Note

The user must not directly connect the host computer's serial port to the microcomputer's SCI because the voltage level differs for the two; otherwise the microcomputer will be damaged.

3.3 Setting the Serial Port

Table 3.1 shows the communication specifications for the host computer and microcomputer. Set up the serial port to match these specifications.

Table 3.1 Communications Specifications

Item	Specifications
Communications	Asynchronous serial
Data length	8 bits
Stop bit length	1 bit
Parity bit	None
Flow control	None
Bit rate	2,400 bit/s, 4,800 bit/s, 9,600 bit/s, 19,200 bit/s, 38,400 bit/s, 56,000 bit/s, 57,600 bit/s, 115,200 bit/s

Note: The on-board writing program automatically sets the bit rate.

Section 4 Using the On-Board Writing Program: Basic Operations

4.1 Starting the On-Board Writing Program

To start the on-board writing program, select [Program]->[Hitachi F-ZTAT™]->[Flash5] from the Windows® Start menu. Alternatively, open the program file (Flash.exe) through Explorer to start the on-board writing program. Select the program from the menu or execute the program file directly; the on-board writing program will display the window shown in figure 4.1.

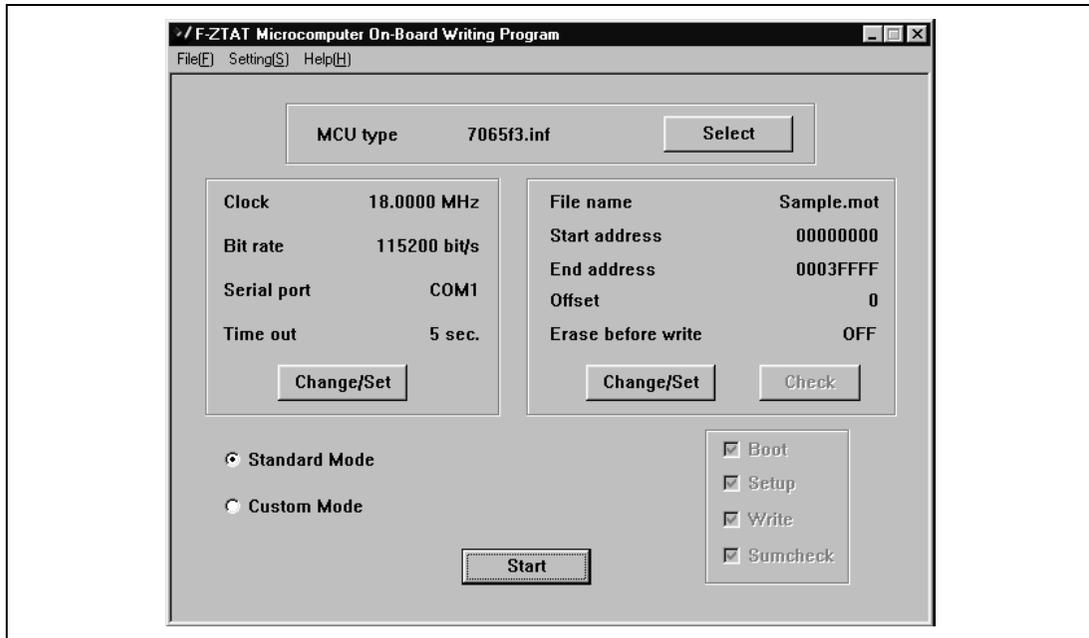


Figure 4.1 Main Window

The window will show the settings from the last time the user executed (clicked the [Start] button for) the on-board writing program. Clicking the [Start] button without modifying anything will start the on-board writing program with the same conditions.

4.2 Ending the On-Board Writing Program

To end the on-board writing program:

1. Select [Exit] from the [File] menu.
2. Click the button at the upper-right hand corner of the window (the [x] button); or

3. Select [Close] from the system menu (you can display the system menu by clicking the icon at the upper-left hand corner of the main window) as before.

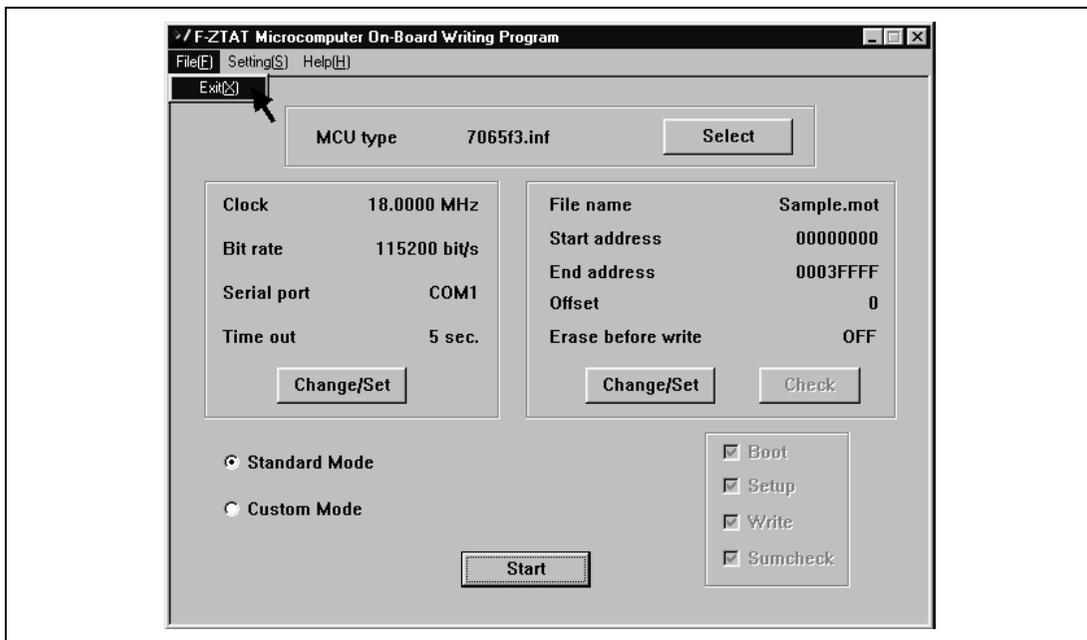


Figure 4.2 Main Window: Ending the On-Board Writing Program

4.3 Selecting Standard Mode

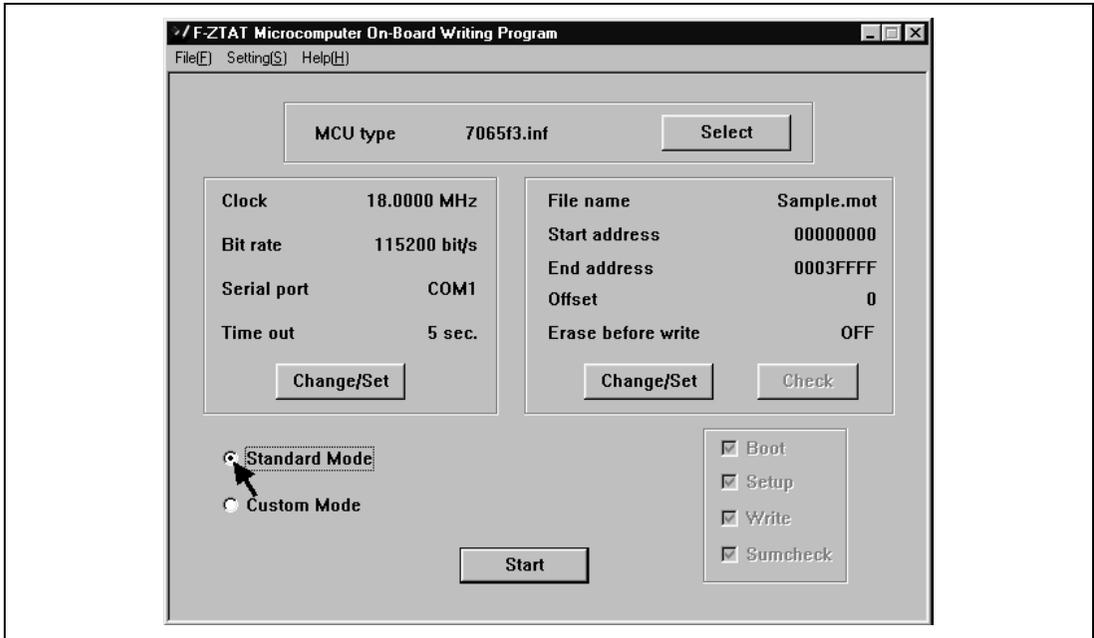


Figure 4.3 Main Window: Selecting the Standard Mode

Select the Standard Mode check box located at the lower-left hand corner of the main window. Then, set the microcomputer, clock, bit rate, timeout, file name, start address, end address, and offset, and click the [Start] button. The boot program will automatically execute the writing program and write the flash memory. Standard Mode is useful when the user wants to write over the entire contents of the flash memory.

For details on Custom Mode, refer to section 5, Using the On-Board Writing Program: Further Operations.

4.4 Selecting the Microcomputer

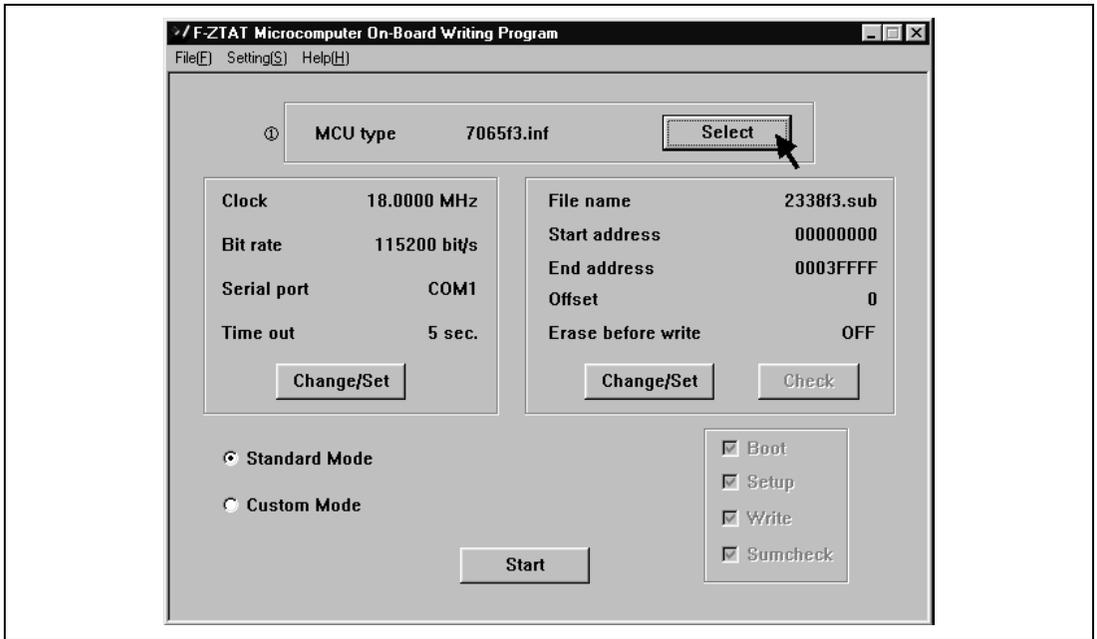


Figure 4.4 Main Window: Selecting the Microcomputer

1. Microcomputer

Select the microcomputer type.

Specify the type as the name of the writing program information file (INF file) for the microcomputer.

Refer to the attachment for the microcomputer type and its information file.

The on-board writing program uses this information to acquire information on the microcomputer and its writing program.

Selecting the microcomputer (information file) will reset the settings to the new settings. Selecting the same microcomputer as last time will still reset the settings.

Clicking the [Select] button selects the microcomputer type. Clicking the [Select] button will open figure 4.5.



Figure 4.5 [Open] Dialog Box: Selecting the Microcomputer

Select the information file (INF file) for the microcomputer in use.

The dialog box will display the directory including the information file currently selected by the user. Usually, the writing program is stored in the directory where the on-board writing program is installed. So the on-board writing program will display that directory. However, the user can select the information file from a different directory.

After selecting the file, click [Open]. Clicking the [Cancel] button will not select the file and will close the dialog box. Alternatively, close the dialog box without selecting the file by clicking the button at the upper-right hand corner button ([x] button).

4.5 Clock and Communication Setting

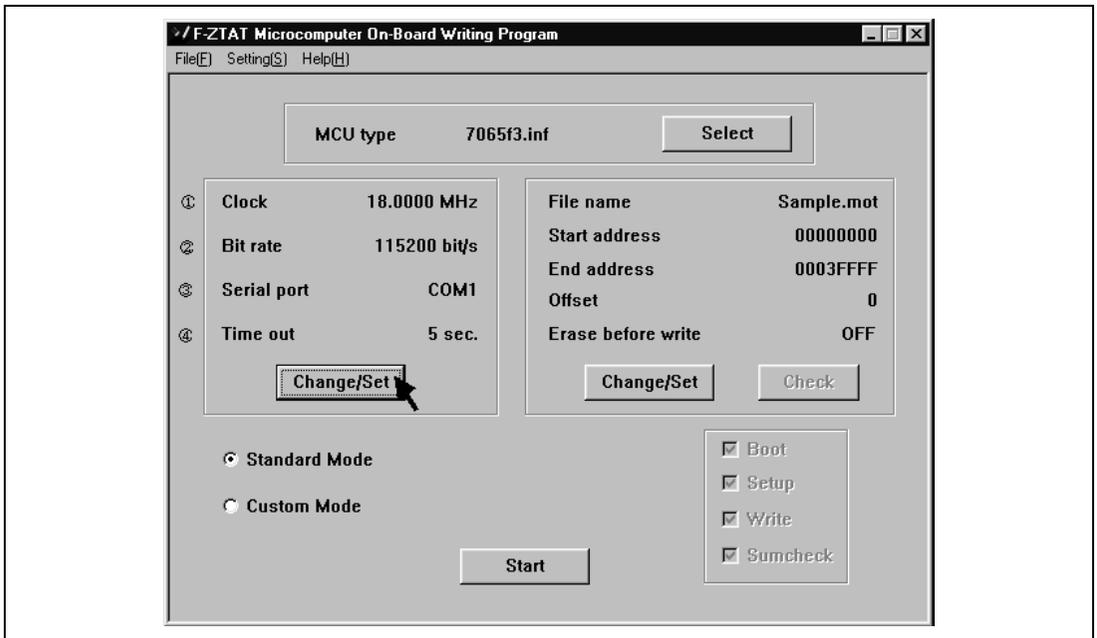


Figure 4.6 Main Window: Clock and Communication Setting

1. Clock

Microcomputer clock (system clock frequency).

The on-board writing program uses this clock to calculate how long voltage is applied to the flash memory cells during write operations, and to set the SCI's bit rate.

2. Bit rate

Bit rate for serial communications.

The on-board writing program will transfer application programs at this bit rate.

The on-board writing program cannot set certain bit rates because of the clock frequency. Microcomputer's SCI uses the system clock for timing. Some system clocks will generate errors in the bit rate. Set a bit rate such that the error is within 3%. For details, refer to the hardware manual.

3. Serial port

The host computer uses its serial port to communicate with the F-ZTAT™ microcomputer (user system). Input the communication port number. Default is COM1.

4. Timeout

The time over which the system must remain unresponsive to the user. The user can set any time between 1 and 300 s, but 5 s is usually suitable.

Click the [Modify/Set] button to display the [Clock and Communication Setting] dialog box and modify the setting contents.

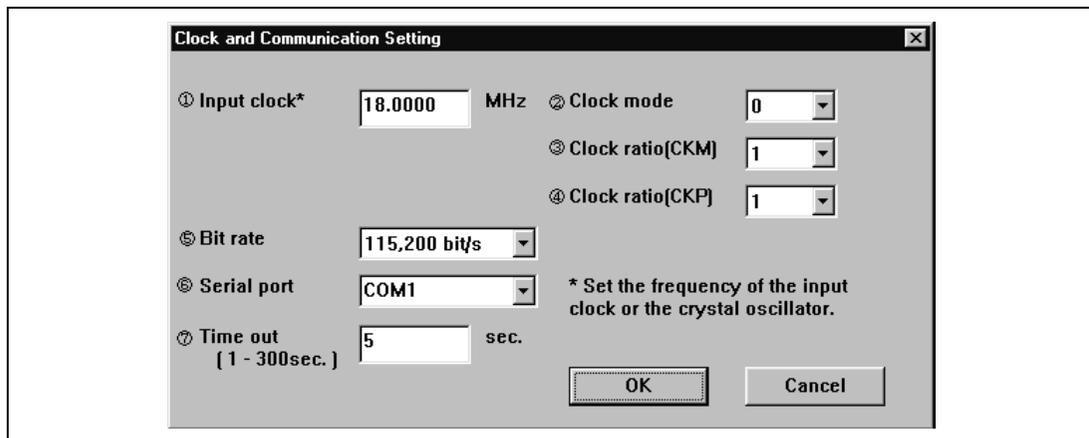


Figure 4.7 [Clock and Communication Setting] Dialog Box

1. Input clock

Enter the frequency of the clock input to the microcomputer, or the external crystal oscillator (connected to the microcomputer) clock as an integer with a decimal fraction. The user can enter up to four digits after the decimal point.

2. Clock mode

In some microcomputers, you can select the clock mode. In such cases, select a suitable clock mode from those available in that microcomputer. Select the clock mode from the list box.

3. Frequency ratio (CKM)

Input a multiplier to derive the system clock (master clock) from the input clock. Select the frequency ratio from the list box.

4. Frequency ratio (CKP)

In some microcomputers, you can select the frequency ratio (CKP). Input a multiplier to derive the peripheral clock from the input clock. Select the frequency ratio from the list box.

5. Bit rate

Enter the bit rate to transfer an application program. Select a bit rate from the list box. Select one of the following eight bit rates:

- 2,400 bit/s
- 4,800 bit/s
- 9,600 bit/s
- 19,200 bit/s
- 38,400 bit/s
- 56,000 bit/s
- 57,600 bit/s

— 115,200 bit/s

6. Serial port

Enter the serial port of the host computer to be used to communicate with the microcomputer.

7. Timeout

Enter a timeout interval. Enter between 1 to 300 s

When the user is using a writing program that has setup functions, the input clock, clock mode, frequency ratio, and bit rate must be entered. In Custom Mode, which will be described later, the user can enter a bit rate for all product types. This bit rate is only for loading an application program. Communication other than loading an application may use the bit rate of the microcomputer.

When the user does not select bit rate or selects [None] from the list box, the on-board writing program will continue to use the existing bit rate. However, the user must always select a bit rate when using a writing program that has setup functions.

Click the [OK] button to set the entered values. Click the [Cancel] button to clear the values entered in the dialog box and close the dialog box. The dialog box can also be closed the without setting the values by clicking the button at the upper-right hand corner ([x] button).

4.6 Write and Erase Setting

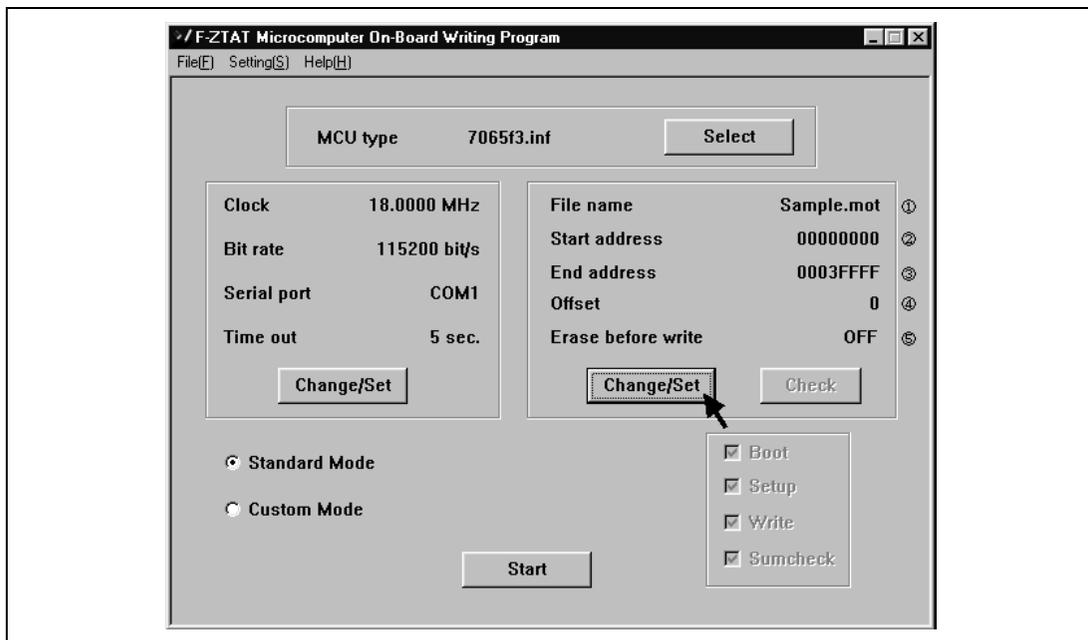


Figure 4.8

Main Window: Write and Erase Setting

1. File name

Name of the file storing the application program.

The application program must be an S-type load module.

The on-board writing program will simply display the file name.

2.and 3 Start address and end address

Flash memory addresses to write application program to.

4. Offset

Address offset.

An offset can be added to the address of the S-type load module storing the application program to set the appropriate address range in the flash memory.

For example, when the user sets an offset of 1000 (hexadecimal), the on-board writing program will write data of address H'0 in the S-type load module to address H'1000 in the flash memory.

5. Erase before write

Indicates whether or not the contents of the flash memory will be erased before writing. In Standard Mode, this is always set OFF (the contents of the flash memory are not erased).

When the [Modify/Set] button is clicked, the on-board writing program will display the [Write and Erase Setting] dialog box to modify the setting contents.

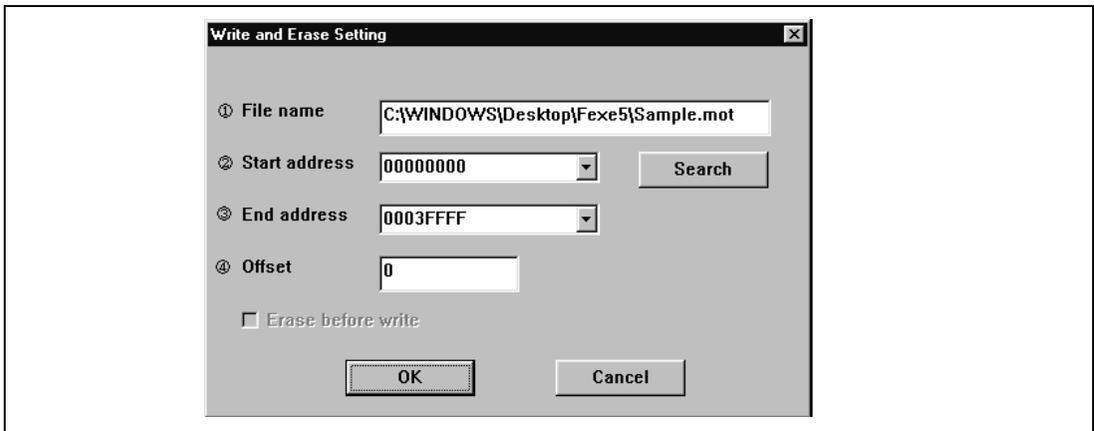


Figure 4.9 [Write and Erase Setting] Dialog Box

1. File name

Enter the name of the file storing the application program. Click the [Search] button to display the dialog box to specify a file to search for.

Specify the absolute path. If only the file name or a relative path is specified, the file may not be found or a file with the same name in a different directory may be read, depending on the current directory.

2.and 3 Start address and end address

Enter the flash memory address range for writing, in hexadecimal.

The list box will display the start and end addresses of the block to be erased. Select the addresses.

4. Offset

Enter an address offset in hexadecimal.

Click the [OK] button to set the entered values. Click the [Cancel] button to clear the values entered in the dialog box and close it. The dialog box can also be closed without setting the values by clicking the button at the upper-right hand corner ([x] button).

4.7 Starting On-Board Writing

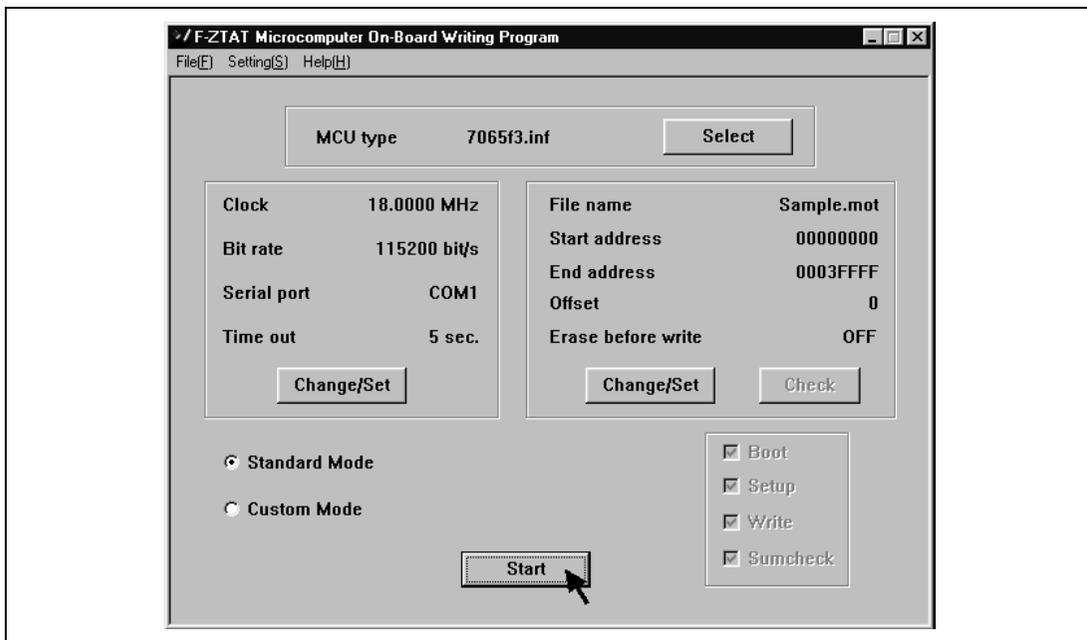


Figure 4.10 Main Window: Starting On-Board Writing

On-board writing begins when the [Start] button is clicked. When on-board writing begins, the dialog box in figure 4.11 below will be displayed.

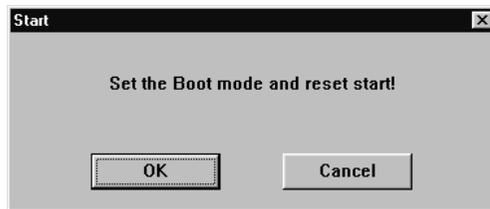


Figure 4.11 [Start] Dialog Box

Click [OK] to set the microcomputer to the boot mode and reset the microcomputer. Click the [Cancel] button to stop the operation.

When boot programming begins, the on-board writing program will display a cancel/information box as shown in figure 4.12.



Figure 4.12 Display During Boot Programming

The boot program inside the microcomputer runs the writing program. Click the [Cancel] button to cancel on-board writing. When on-board writing to the flash memory commence, the cancel/information box shown in figure 4.13 will be displayed.

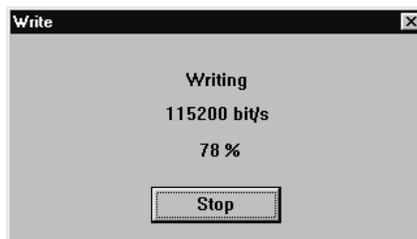


Figure 4.13 Display During On-Board Writing

The writing program writes the application program to the flash memory. Click the [Cancel] button to cancel on-board writing.

When the on-board writing program completes writing to the flash memory, a dialog box as shown in figure 4.14 will be displayed.



Figure 4.14 [End] Dialog Box

Writing has been completed. Click the [OK] button. When the writing program has a checksum function, the writing programs checks the checksum of the entire flash memory against data on the personal computer when writing has completed.

Section 5 Using the On-Board Writing Program: Further Operations

5.1 Further Operations of On-Board Writing Program

In addition to the methods outlined in section 4, Using the On-Board Writing Program: Basic Operations, there are other ways to use the on-board writing program. These are listed below:

1. On-board writing in several steps

In operation as described in section 4, Using the On-Board Writing Program: Basic Operations, the on-board writing program writes to the entire flash memory. However, the on-board writing program can execute the boot program alone or write to the flash memory in several steps. On-board writing includes the following four processes:

- Boot: Boot process_of the writing program
- Set up: The writing program sets up (clock and bit rate) process (some product cannot use this process)
- Write: Writing application programs to the flash memory
- Sumcheck: Calculates the checksum for the contents of the flash memory.

In the Boot process above, the on-board writing program loads a writing program for the microcomputer to its RAM. When the writing program receives control from the boot program, the writing program will wait for a command from the host computer (command wait state). The Set up process sets the clock and bit rate for the writing program. The Write process transfers the application program from the host computer and writes it to the flash memory. These processes can be executed individually. Sumcheck calculates the checksum for the contents of the flash memory and displays the results.

2. Use a writing program written by the user

The user can customize the original writing program or write a new one. When such programs have communications specifications identical to the main on-board writing program, these programs can be used for on-board writing.

3. User program mode

The on-board writing program can be used in user mode which uses the microcomputer's SCI. In user mode, rewriting data can be acquired from the SCI, I/O port, etc. If the specifications between the application program and the main on-board writing program are identical, the main on-board writing program can be used for the host of the write process.

To use the on-board writing program in any of the ways described above, the user must understand the basic functions of F-ZTAT™ microcomputers. Read and understand the hardware manual for the microcomputer before using the on-board writing program in such ways.

5.2 Selecting Custom Mode

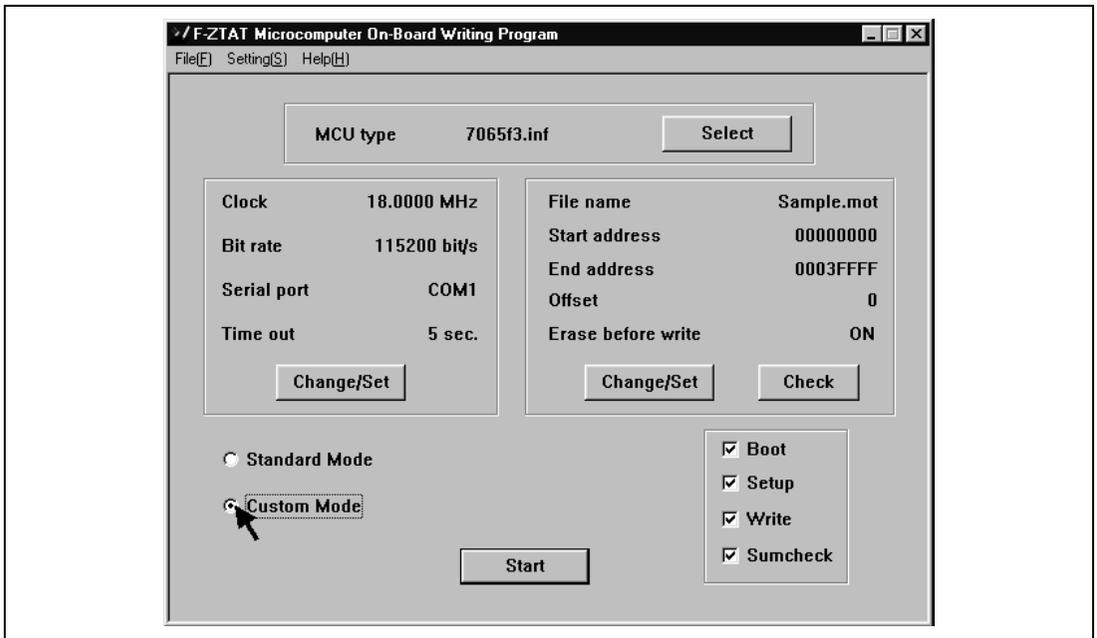


Figure 5.1 Main Window: Selecting Custom Mode

Select the Custom Mode check box at the lower-left hand corner of the main window. The custom mode is used to customize the writing program or in user program mode. However, if the user sets an incorrect value, the flash memory may be damaged.

For details on Standard Mode, refer to section 4, Using the On-Board Writing Program: Basic Operations.

5.3 Selecting Boot/Set up/Write/Sumcheck

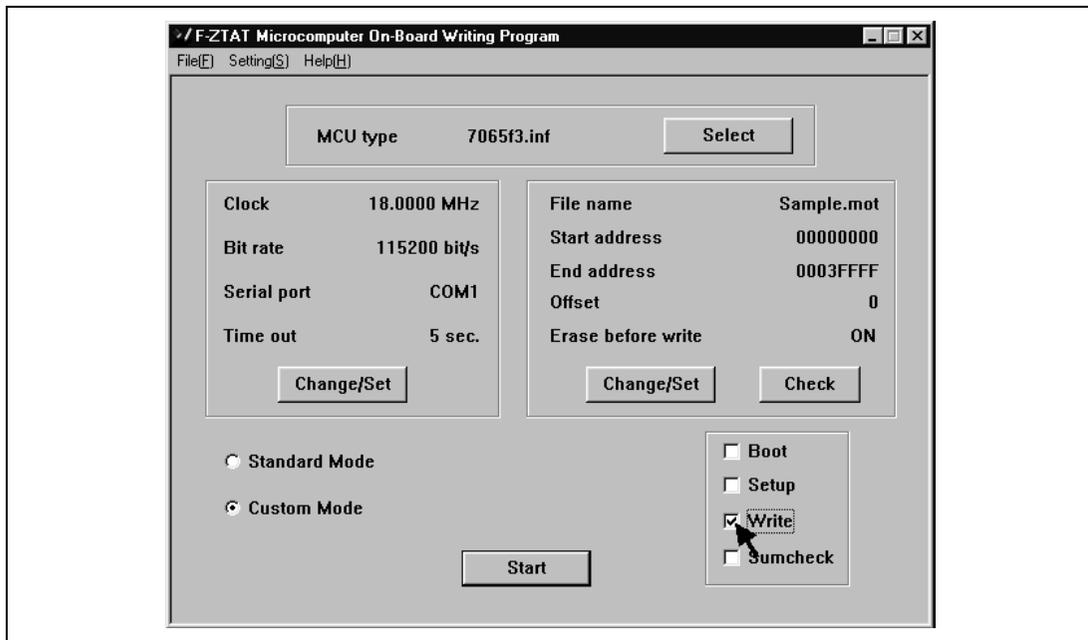


Figure 5.2 Main Window: Selecting Boot/Set up/Write

In Custom mode, select the process to be executed when the [Start] button is clicked. The user can select Boot, Set up, Write, or Sumcheck from the lower-right hand corner of the main window. The user must select the processes to execute.

- Boot: Boots the writing program
- Set up: Sets up the writing program
- Write: Writes the application program to the flash memory
- Sumcheck: Calculates the checksum for the contents of the flash memory.

When the user selects more than one processes, the on-board writing program will execute the processes in the order: Boot, Set up, Write, then Sumcheck.

5.4 Specifying the Block to Erase

When the microcomputer enters boot mode, the boot program will erase the whole flash memory; therefore, the user does not have to erase the flash memory before writing data to it. However, in the user program mode, the user must explicitly erase the contents of the target address range; except regions in which the contents have already been erased.

In the boot mode, when writing will be done in several times, select [Erase before write] check box to prevent addresses that have already been overwritten to be written again.

In Custom mode, all flash memory can be written to the block where data has been erased. The boot program will erase the contents of the flash memory in block units. This means that the on-board writing program will erase each specified block before writing data to it.

When the user selects the [Erase before write] check box in the [Write and Erase Settings] dialog box, the user can specify and check the blocks to be erased.

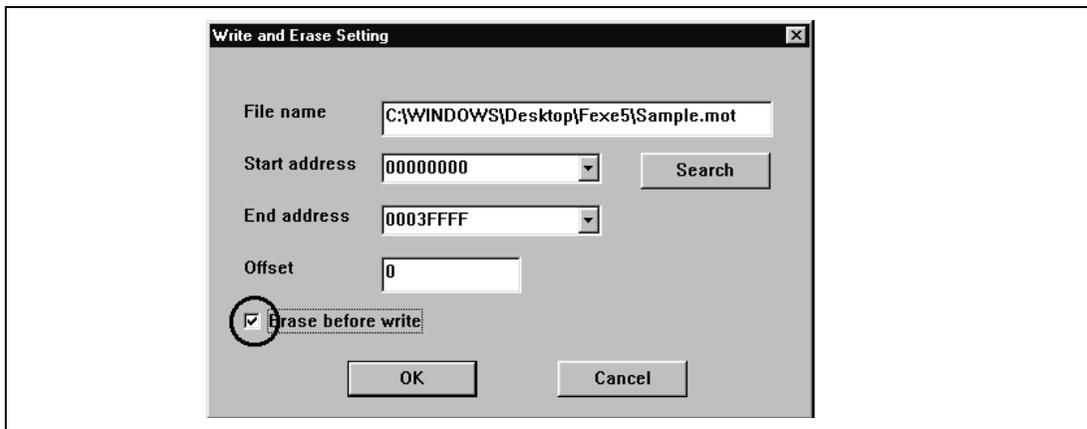


Figure 5.3 [Write and Erase Settings] Dialog Box: Selecting Erase before Write

Selecting the Custom Mode automatically selects the [Erase before write] check box. Therefore, if the flash memory does not have to be erased by block, click this check box to cancel the selection.

Selecting the [Erase before write] check box then clicking the [OK] button in the [Write and Erase Setting] dialog box will display the [Erase Block Selection] dialog box.

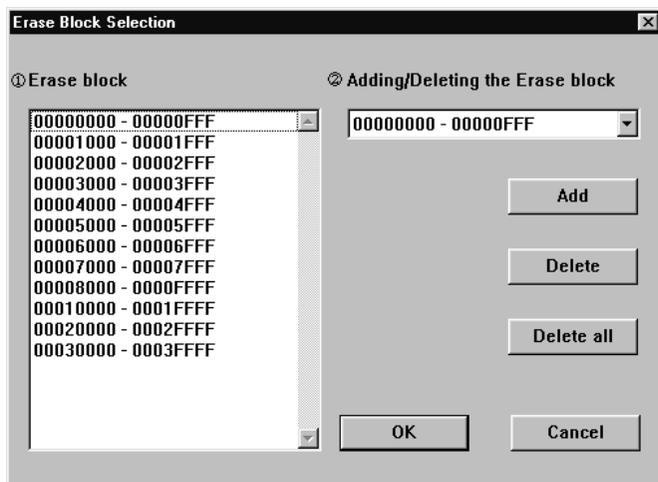


Figure 5.4 [Erase Block Selection] Dialog Box

1. Erase block

Displays the block to erase before writing.

Opening the dialog box will display the blocks to erase. Some or all of the blocks in the range selected in the [Write and Erase Setting] dialog box can be chosen for erasure.

2. Adding or deleting the block to erase

Use the list box to select the blocks to be erased. Click the [Add] button to add the block to the blocks to be erased. Click the [Delete] button to remove the block from the list of blocks to be erased. Click the [Delete all] button to delete all of the blocks from the list for erasure.

Some or all of blocks in the memory range which was specified by the user in the [Write and Erase Setting] dialog box can be specified for erasure in the [Erase Block Selection] dialog box. Use this dialog box to remove blocks that have already been erased and blocks which are not to be erased.

Click [OK] after the block addresses have been entered. Click the [Cancel] button to clear the values entered in the dialog box and close the dialog box. The dialog box can also be closed and the selections cancelled by clicking the button at the upper-right hand corner ([x] button). When cancelled, the [Write and Erase Setting] dialog box will be displayed again.

To check the blocks that have been erased, click the [Check] button in the main window.

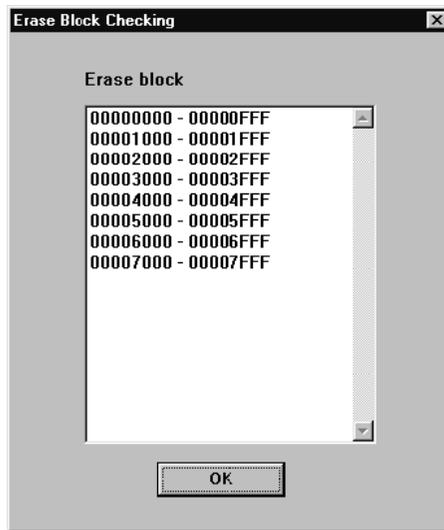


Figure 5.5 [Erase Block Checking] Dialog Box

Section 6 Menus

6.1 [File] Menu

The [File] pull-down menu has an [Exit] item. Select this item to exit from program execution.

6.2 [Setting] Menu

The [Setting] pull-down menu has three items. The user can select the following dialog boxes through these menus instead of clicking buttons in other dialog boxes.

- [Setting]–[MCU type]: Select the MCU type.
- [Setting]–[Clock/Communication]: Set the clock and bit rate.
- [Setting]–[Write/Erase]: Make settings for writing and erasing.

6.3 [Help] Menu

The [Help] menu has an [About] item. Select this item to display the dialog box in figure 6.1. The dialog box shows the version of the on-board writing program.

Click the [OK] button to close this dialog box. The dialog box can also be closed and the selections cancelled by clicking the button at the upper-right hand corner ([x] button).

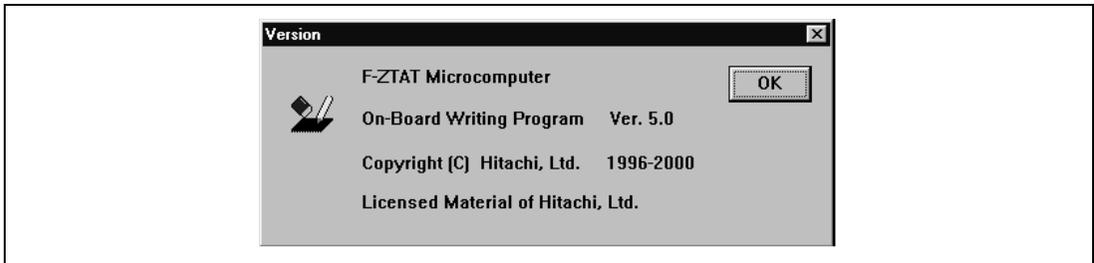


Figure 6.1 Information on the Version

Section 7 Error Messages

7.1 Error Dialog Box

When an error occurs, the on-board writing program displays the dialog box in figure 7.1. Click the [OK] button to confirm viewing of the message.

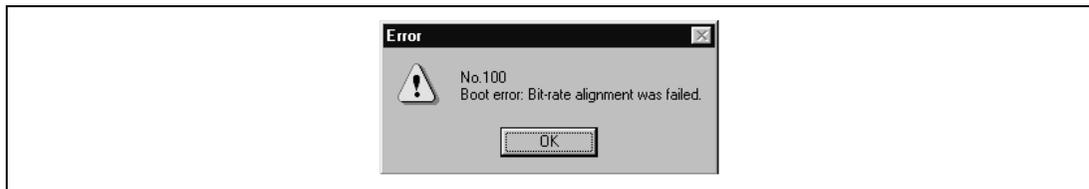


Figure 7.1 Error Dialog Box

7.2 List of Error Messages

No. 100

[Message]: Boot error: Bit-rate alignment was failed.

[Description]: Bit-rate alignment failed. The host computer could not receive H'0x00 and failed.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board, etc.)

Are the settings of the serial port of the host computer correct?

Is the serial port of the host computer operating correctly?

Is the correct microcomputer selected?

Are the contents of the information file (INF file) correct?

Was the microcomputer reset in boot mode?

No. 101

[Message]: Boot error: Bit-rate alignment was failed.

[Description]: Bit-rate alignment failed. The host computer received other than H'0xAA and failed.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Are the host computer and serial port operating correctly?

Is the correct microcomputer selected?

Are the contents of the information file (INF file) correct?
Has the on-board writing program booted the microcomputer?

No. 102

[Message]: Boot error: Bit-rate alignment was failed.

[Description]: Bit-rate alignment failed. The host computer could not receive H'0xAA and timeout occurred.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Are the host computer and serial port operating correctly?

Is the correct microcomputer selected?

Are the contents of the information file (INF file) correct?

Has the on-board writing program booted the microcomputer?

No. 103

[Message]: Boot error: Writing program transfer was failed.

[Description]: An error occurred while transferring the writing program.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Is the correct microcomputer selected?

No. 104

[Message]: Boot error: Writing program transfer was failed. (size error)

[Description]: The writing program is too large.

Check the following:

Is the correct microcomputer selected?

Are the contents of the information file (INF file) correct?

Is the writing control program (SUB file) correct?

No. 105

[Message]: Boot error: Writing program transfer was failed. (time out)

[Description]: The microcomputer remains unresponsive to the user while the writing program is being transferred.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Is the correct microcomputer selected?

No. 106

[Message]: Boot error: Flash memory erase was failed.

[Description]: An error occurred while the entire flash memory was being erased.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Is the correct microcomputer selected?

If the settings and operations are correct, the microcomputer may be damaged.

No. 107

[Message]: Boot error: Flash memory erase was failed. (time out)

[Description]: The microcomputer remains unresponsive to the user while the entire flash memory is being erased.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

No. 108

[Message]: Setup error

[Description]: An error occurred during setup.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Is the correct microcomputer selected?

Are the information file (INF file) contents correct?

Is the writing program (SUB file) correct?

Are the writing program and user system selecting the same multiplier?

No. 109

[Message]: Setup error (time out)

[Description]: The microcomputer remains unresponsive to the user during setup.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Is the correct microcomputer selected?

Are the information file (INF file) contents correct?

Is the writing program (SUB file) correct?

No. 110

[Message]: Write error: Flash memory erase was failed.

[Description]: An error occurred while the flash memory was being erased.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Is the correct microcomputer selected?

Are the information file (INF file) contents correct?

Is the writing program (SUB file) correct?

Is the clock correct?

If the clock setting is incorrect, the time to apply voltage to erase the contents of the memory cells cannot be controlled correctly. If the settings and operations are correct, the microcomputer may be damaged.

No. 111

[Message]: Write error: Flash memory erase was failed. (time out)

[Description]: The microcomputer remains unresponsive to the user while the flash memory is being erased.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Is the correct microcomputer selected?

Are the information file (INF file) contents correct?

Is the writing program (SUB file) correct?

Is the clock correct?

If the clock setting is incorrect, the time to apply voltage to erase the contents of

the memory cells cannot be controlled correctly, and the SCI bit rate cannot be set correctly.

No. 112

[Message]: Write error: Flash memory write was failed.

[Description]: An error occurred while writing to the flash memory.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Is the correct microcomputer selected?

Are the information file (INF file) contents correct?

Is the writing program (SUB file) correct?

Is the clock correct?

If the clock setting is incorrect, the time to apply voltage to erase the contents of the memory cells cannot be controlled correctly. If the settings and operations are correct, the microcomputer may be damaged.

No. 113

[Message]: Write error: Flash memory write was failed. (time out)

[Description]: The microcomputer remains unresponsive to the user while writing to the flash memory.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Is the correct microcomputer selected?

Are the information file (INF file) contents correct?

Is the writing program (SUB file) correct?

Is the clock correct?

If the clock setting is incorrect, the time to apply voltage to erase the contents of the memory cells cannot be controlled correctly, and the SCI bit rate cannot be set correctly.

No. 114

[Message]: Sumcheck error: Flash memory sumcheck was failed. (time out)

[Description]: The microcomputer did not respond during calculation of the flash memory checksum.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer serial port settings correct?

Is the correct microcomputer selected?

Are the information file (INF file) contents correct?

Is the writing program (SUB file) correct?

No. 115

[Message]: Sumchecks of flash memory and buffer memory in PC are not matched.

[Description]: The checksum for the contents of flash memory and of the PC buffer memory do not match.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer serial port settings correct?

Is the correct microcomputer selected?

Are the information file (INF file) contents correct?

Is the writing program (SUB file) correct?

Is the clock correct?

If the clock setting is incorrect, the timing for applying voltage to write to the memory cells cannot be controlled correctly, and the SCI bit rate cannot be set correctly.

No. 116

[Message]: Serial port could not open.

[Description]: The host computer serial port could not be opened.

Check that the serial port specified can be used. Some personal computers cannot use COM2.

No. 117

[Message]: Serial port read was failed.

[Description]: An error occurred while reading data from the host computer serial port.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Are the host computer and serial port operating correctly?

No. 118

[Message]: Serial port write was failed.

[Description]: An error occurred while writing data to the host computer serial port.

Check the following:

Is the connection between the host computer and user system correct? (Serial cable and adapter board)

Are the host computer and serial port settings correct?

Are the host computer and serial port operating correctly?

No. 119

[Message]: No clock and bit rate are set.

[Description]: Set the clock and bit rate.

No. 120

[Message]: No file name, start address, end address, and offset are set.

[Description]: Set the file name, start address, end address, and offset.

No. 121

[Message]: No Boot/Setup/Write/Sumcheck are selected.

[Description]: Select the process to execute.

No. 122

[Message]: No write data

[Description]: The specified file includes no data in the address range specified by the start address, end address, and offset.

Check the following:

Are the correct start and end addresses specified?

Is the correct offset specified?

Is the correct file storing the application file specified?

No. 200

[Message]: Illegal contents of initialization file

[Description]: There is a problem in the initialization file (Flash5.ini).

Check the following:

Was the on-board writing program forcibly terminated immediately prior to this?

Do any application files conflict with the initialization file?

If the on-board writing program was forcibly terminated immediately prior to the execution of the initialization file, the contents of the initialization file may have been damaged. The settings that have been saved in the initialization file will also have been lost.

When the initialization file is deleted, the on-board writing program can be restarted. The initialization file is under the Windows directory.

If any application files conflict with the initialization file, move the offending application to another host computer.

No. 201

[Message]: Initialization file write was failed.

[Description]: An error occurred while the initialization file (Flash5.ini) was being written. Check that free space exists on the host computer disk. The initialization file is in the Windows directory. Check if free space exists in the Windows directory. If there are no problems, the host computer may be operating incorrectly.

No. 300

[Message]: No information file was found.

[Description]: The information file (INF file) could not be found.

Check the following:

Is the correct microcomputer selected (information file specified)?

Was installation completed correctly?

If only the file name or a relative path is specified, the file may not be found or a file with the same name in a different directory may be read, depending on the current directory.

No. 301

[Message]: Illegal contents of information file

[Description]: Something is wrong with the information file (INF file).

No. 302

[Message]: Information file: Incorrect specification of Baud

[Description]: Specify one of the following Baud rates for the information file (INF file):

2,400, 4,800, 9,600, 19,200, 38,400, 56,000, 57,600, or 115,200

The value specified is the bit rate to start adjusting the bit rate in boot mode.

For details on the product type and value to be specified, refer to the attachment.

No. 303

[Message]: Information file: Incorrect specification of Byte

[Description]: There is an error in the **Byte** specification format or **Byte** has been specified more than once in the information file (INF file). The **Byte** specification indicates the size in bytes of the application program to be transferred to flash memory from the host computer by executing the writing program.

No. 304

[Message]: Information file: Incorrect specification of Sumcheck

[Description]: There is an error in the **Sumcheck** specification format or **Sumcheck** has been specified more than once in the information file (INF file). The **Sumcheck** specification indicates that calculation of the checksum for the contents of the flash memory by the writing program is enabled.

No. 305

[Message]: Information file: Incorrect specification of Input

[Description]: There is an error in the **Input** specification format or **Input** has been specified more than once in the information file (INF file). The **Input** specification indicates the clock frequency range of the input clock.

No. 306

[Message]: Information file: Incorrect specification of ModeInput

[Description]: There is an error in the **ModeInput** specification format in the information file (INF file). The **ModeInput** specification indicates the frequency range of the input clock (crystal oscillator). It indicates the frequency range for each clock mode.

No. 307

[Message]: Information file: Incorrect specification of Clock

[Description]: There is an error in the **Clock** specification format or **Clock** has been specified more than once in the information file (INF file). The **Clock** specification indicates the frequency range of the system clock.

No. 308

[Message]: Information file: Incorrect specification of Ratio

[Description]: There is an error in the **Ratio** specification format or **Ratio** has been specified more than once of the information file (INF file). The **Ratio** specification indicates the ratio of the system clock frequency to the input clock frequency.

No. 309

[Message]: Information file: Incorrect specification of ModeRatio

[Description]: There is an error in the **ModeRatio** specification format or **ModeRatio** has been specified more than once in the information file (INF file). The **ModeRatio** specification indicates the ratio of the system clock frequency to the input clock frequency. It indicates the frequency ratio of each clock mode.

No. 310

[Message]: Information file: Incorrect specification of Clock*N*

[Description]: There is an error in the **ClockN** specification format or **ClockN** has been specified more than once in the information file (INF file). The **ClockN** specification indicates the clock frequency range of the input clock. It indicates the frequency ratio of each clock mode.

No. 311

[Message]: Information file: Incorrect specification of Ratio*N*

[Description]: There is an error in the **RatioN** specification format or **RatioN** has been specified more than once of the information file (INF file). It indicates the clock frequency ratio of the system clock to the input clock. It indicates the frequency ratio of each clock mode.

No. 312

[Message]: Information file: Incorrect specification of ModeRatio*N*

[Description]: There is an error in the **ModeRatioN** specification format of the information file (INF file). The **ModeRatioN** specification indicates the clock frequency ratio of the system clock to the input clock. It indicates the frequency ratio of each clock mode.

No. 313

[Message]: Information file: Incorrect specification of Clock*N*/Ratio*N*/ModeRatio*N*

[Description]: There is an error in the **ClockN/RatioN/ModeRatioN** specification in the information file (INF file). The value of N must be 0 or 1.

No. 314

[Message]: Information file: Incorrect specification of address

[Description]: There is an error in the address specification of the information file (INF file). Address specifications are used to indicate the start and end addresses of the area to be erased and the area which the writing program loads to. An address must be specified as 8 hexadecimal digits. Also, there must be one line to specify the start address and one line to specify the end address.

No. 315

[Message]: Information file: Contradictory combination of specification

[Description]: The combination of specifications in the information file (INF file) is contradictory.

No. 316

[Message]: Information file: Contradictory specification of address.

[Description]: The address specification in the information file (INF file) is contradictory. Check the address specification.

No. 317

[Message]: Information file: Contradictory specification of clock mode.

[Description]: The clock mode specification in the information file (INF file) is contradictory. Check the clock mode specification.

No. 400

[Message]: No writing program was found.

[Description]: The writing program (SUB file) could not be found.

Check the following:

Is the correct microcomputer selected (information file specified)?

Was installation completed correctly?

The file (SUB file) storing the writing program must have the same body file name as the information file (INF file) and must be in the same directory.

No. 401

[Message]: Writing program read was failed.

[Description]: An error occurred while reading the writing program (SUB file).

Check the following:

Is the correct microcomputer selected (information file specified)?

Was installation completed correctly?

The file (SUB file) storing the writing program must have the same body file name as the information file (INF file) and must be in the same directory.

If there are no problems with installation, the host computer may be operating incorrectly.

No. 402

[Message]: Writing program is not S-type load module.

[Description]: The writing program (SUB file) must be an S-type load module.

No. 403

[Message]: Load address or size of writing program is illegal.

[Description]: The load address or size of the writing program contradicts the specification in the information file. Check the following.

Is the correct microcomputer selected?

Are the information file (INF file) contents correct?

Is the writing program (SUB file) correct?

No. 500

[Message]: No specified file was found.

[Description]: Could not find the file storing the application program.

Check that the file name is correct. If only the file name or a relative path is specified, the file may not be found or a file with the same name in a different directory may be read, depending on the current directory.

No. 501

[Message]: Specified file read was failed.

[Description]: An error occurred while reading the file that stores the application program. Check that the file name is correct. If only the file name or a relative path is specified, the file may not be found or a file with the same name in a different directory may be read depending on the current directory. If there are no problems with the file, the host computer may be operating incorrectly.

No. 502

[Message]: Specified file is not S-type load module.

[Description]: The application program must be an S-type load module.

No. 600

[Message]: No input clock frequency is specified.

[Description]: Specify the clock input to the microcomputer or the clock of the crystal oscillator connected to the microcomputer.

No. 601

[Message]: No serial port is specified.

[Description]: Select the serial port for the host computer.

No. 602

[Message]: No time out is specified.

[Description]: Specify a timeout value. This value is used to set the maximum period when the microcomputer remains unresponsive to the user. The timeout value can be set any value between 1 to 300 seconds. 5 seconds is a typical setting.

No. 603

[Message]: Input clock frequency was illegally specified.

[Description]: Enter the frequency as an integer or an integer with a decimal fraction (e.g., 14.7456). The user can enter up to nine digits including the digits after the decimal point.

No. 604

[Message]: Input clock is out of the range of microcomputer operation.

[Description]: Check that the setting of the input clock is correct.

No. 605

[Message]: Clock is out of the range of microcomputer operation.

[Description]: Check that the settings of the input clock and frequency ratio are correct.

No. 606

[Message]: Clock “CKM” is out of the range of microcomputer operation.

[Description]: Check that the settings of the input clock and frequency ratio (CKM) are correct.

No. 607

[Message]: Clock “CKP” is out of the range of microcomputer operation.

[Description]: Check that the settings of the input clock and frequency ratio (CKP) are correct.

No. 608

[Message]: This bit rate cannot be set for SCI.

[Description]: Certain bit rates cannot be set because of the clock frequency. Since the error in the bit rate for the specified clock frequency and bit rate exceeds 4%, the on-board writing program will not be able to perform communication correctly. Set the bit rate so that the error is within $\pm 3\%$. For details, refer to the hardware manual.

No. 609

[Message]: Time out setting is illegal.

[Description]: Enter an integer. The user can set any time between 1 and 300 s, but 5 s is usually suitable.

No. 610

[Message]: Serial port could not use.

[Description]: The requested serial port on the host computer could not be opened. Check if it possible to use the specified serial port. On some host computers, COM2 may not be available.

No. 700

[Message]: No file name is specified.

[Description]: Input the S-type load module file name in which the application program was stored.

No. 701

[Message]: No start address is specified.

[Description]: Specify the start address of the flash memory to which the application program should be written.

No. 702

[Message]: No end address is specified.

[Description]: Specify the end address of the flash memory to which the application program should be written.

No. 703

[Message]: No offset is specified.

[Description]: Specify an offset. The offset is added to the address of S-type load modules.

No. 704

[Message]: No specified file was found.

[Description]: Could not find the file specified as storing the application program. Check that the file name is correct. If only the file name or a relative path has been specified, the file may exist but may not be found, or a file with the same name in a different directory may be read, depending on the current directory.

No. 705

[Message]: Start address is illegally specified.

[Description]: Specify the flash memory address in hexadecimal and in up to eight digits.

No. 706

[Message]: End address is illegally specified.

[Description]: Specify the flash memory address in hexadecimal and in up to eight digits.

No. 707

[Message]: Offset is illegally specified.

[Description]: Specify in hexadecimal and in up to eight digits.

No. 708

[Message]: Start address is larger than end address.

[Description]: Check and correct the specifications of the start and end addresses.

No. 709

[Message]: Offset is larger than end address.

[Description]: Check and correct the specifications of the offset and end addresses.

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