Universal Probe

Software Users Manual

ARM Writer

No. E090960-03

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Notes

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Operating Precautions

Failure to observe the following precautions may lead to human death or severe injury.

 **Do**	Avoid supplying voltage out of the range specified in the specifications of this product. Supplying the voltage out of the range may cause damage or fire.
 **Do**	When using the target equipped with the ground terminal, ensure that the ground terminals of the target and peripheral equipment are connected. Failure to do so may cause an equipment failure or electric shock. Avoid connecting the ground terminal to the gas pipe. This causes a fire or explosion.
 **Don't**	Do not transport this product with equipment connected. In particular, hold the plug when removing or inserting the cable. Failure to do so may damage the cable, causing a fire or electric shock.
 **Don't**	Observe the following points when handling the cable. Do not damage, process, forcibly bend, twist, pull, putting any object on or heat the cable, moving the cable close to the heating device, or touch the cable with a wet hand. Failure to observe these precautions may cause a fire or electric shock. If the cable is damaged, stop using it.
 **Don't**	When you hear thunders, do not touch the power plug. This causes an electric shock. If the product seems to be damaged by lightning strike, stop using it.
 **Don't**	Do not let a staple, clip or other metal item enter into the product. This may cause a fire or failure.
 **Don't**	Do not use or leave the product in direct sunlight, near heating devices, in an extremely hot or cold environment, under hard vibrations, in dusty area with a large amount of metal dust or oily dust, or noisy area full of spike noise. Do not apply a strong shock to the product.
 **Do not disassemble**	Do not disassemble, alter or repair the product. This may cause a fire or electric shock.
 **No wetting**	Do not use the product at a place where there is liquid or a humid place such as in the bathroom or in vicinity to glasses. This may cause an electric shock. If liquid enters into this product, immediately turn it off and stop using it.
 **Caution**	Touching the energized product for a long time may cause low-temperature burns. Do not use this product covering with comforter or other cloth.
 **Pull out the plug.**	Immediately turn the power off if unusual smell, noise, smoke or fire is detected or if the product is or may be damaged due to a fall or strong shock. Continuing to use it may lead to a serious accident. Stop using the product.

Abbreviations, Terms and Conventions

This section describes the abbreviations, terms and conventions used in this document.

- About numeric values ... All the numeric values are positive unless otherwise specified.
- K (capital letter) ... Represents 2^{10}=1024. (Example: 16K=16384)
- k (small letter) ... Represents 1000. (Example: 1kHz=1000Hz)
- [xxxxx] ... Represents the window title.
- <xxxxx> ... Represents the item in the window.

The annotations and notes used in this document are as shown in Figure 1.

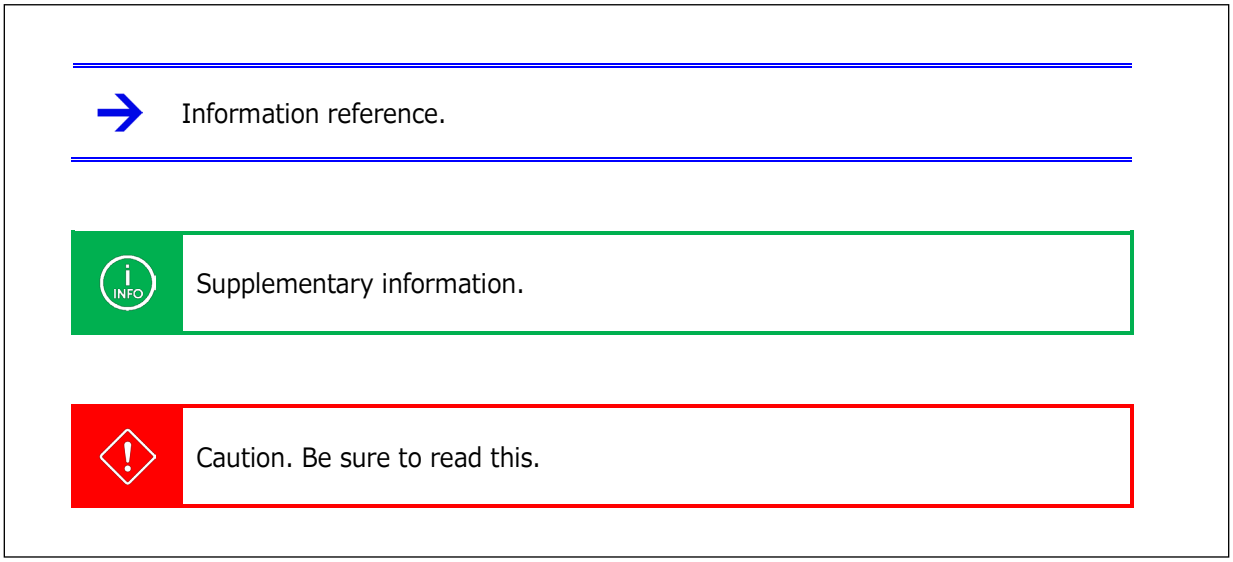


Figure 1

Abbreviations and terms are listed in Table 1.

Table 1

Abbreviations and terms	Description
This product	Universal Probe including accessories.
Probe	Universal Probe itself.
This software	ARM Writer.
Flash memory	Generic term for flash memory, EEPROM, and other memories.
Serial No.	Stands for the serial number. Means the Probe ID.
Software Code	License required to issue the License Code for each software. Not required for the free edition.
License Code	Code to add the functions that can be used in this device.
Module	Data to be written to the flash memory. This includes object data and symbol data.
Object data	Binary data to be actually written to the flash memory.
Symbol data	Data that expresses the correspondence relationship between the variable or function name (=symbol) and the address.
Host PC	PC where this software runs.
Target	Object to be controlled or measured with the Universal Probe.
Stand-alone function	Ability to operate without connecting to the host PC. (The power supply is required.)
(N/A)	Stands for Not Assigned. Indicates that no information is assigned.
PC	PC stands for the Program Counter.

1. Overview of This Software

This chapter provides an overview of this software.
This software writes data in the "**built-in flash memory**" in the ARM CPU and in the "**external flash memory**" and "**SPI flash memory**" connected to the ARM CPU.
Figure 2 shows differences in functionality and supported configuration from "SPI Writer," the software separately available.

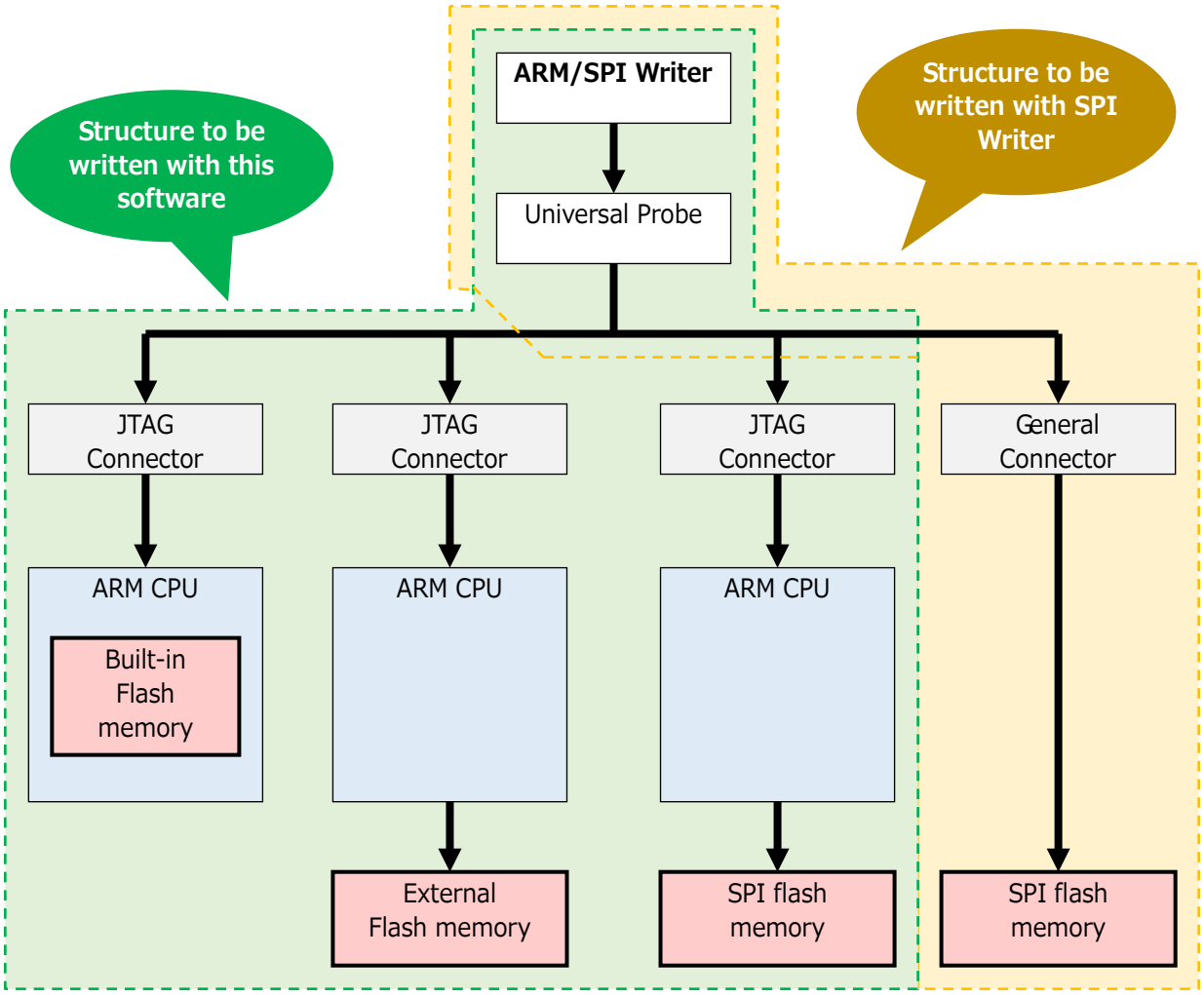


Figure 2

1.1. System Requirements

The following systems are required to run this software.

- PC running Microsoft Windows 7 or later
- CPU: 1GHz or faster (depending on the requirements of the used OS)
- Memory: 1GB or larger (depending on the requirements of the used OS)
- HDD: 500MB or larger free hard disk space
- OS: Windows 7 or later (32bit or 64bit versions are supported)
- One or more empty USB 2.0 ports

1.2. Characteristics

This software has the following characteristics.

- Various execution functions
- Memory and I/O operation functions
- Saving and restoring the operating environment by using the project file
- Download function to automatically recognize the format of written data
- Support for multiple data writing operations
- Flexible write processing realized by the batch function

1.2.1. Various Execution Functions

- CPU execution function
- CPU break (stop) function
- CPU reset function

1.2.2. Memory and I/O Operation Functions

- Fill-up function to write specific data in the specified address range
- Read/write check function for the specified address range
- Search function to search the specified address range for a character string or data
- Memory mapped I/O access function
- Functions to display and change each type of internal I/O registers
- Functions to save memory data to a file

1.3. Turning On or Off the Power

1.3.1. Connecting to the Target and Turning On the Power

Connect the probe and the target with the following procedure:

1) Confirm that the target is turned off.
2) Connect the USB cable of the probe.
3) Connect the target and the probe.
4) Turn on the target.
5) Start this software and perform functions such as writing data.

1.3.2. Turning Off the Power and Disconnecting from the Target

Disconnect the probe from the target with the following procedure:

1) Exit this software.
2) Turn off the target.
3) Remove the probe from the target.

→ For details of the hardware specifications of probe, target restrictions, connection and other items, refer to the “Hardware Users Manual.”

2. How to Operate

This chapter explains how to operate this software.

2.1. Workflow

The main processes from starting this software, writing the user module, through saving the project file are shown in Figure 3. For the operations not described here, refer to "2. How to Operate" or "4. Menu."

Figure 3

2.2. Starting This Software

Several methods are provided to start this software.

2.2.1. Starting Methods

- **Method 1**

Double-click the icon for this software on the desktop.

- **Method 2**

Click “Start” Button → “All Programs” → “Universal Probe” → “Universal Probe ARM Writer” in the “Start” menu.

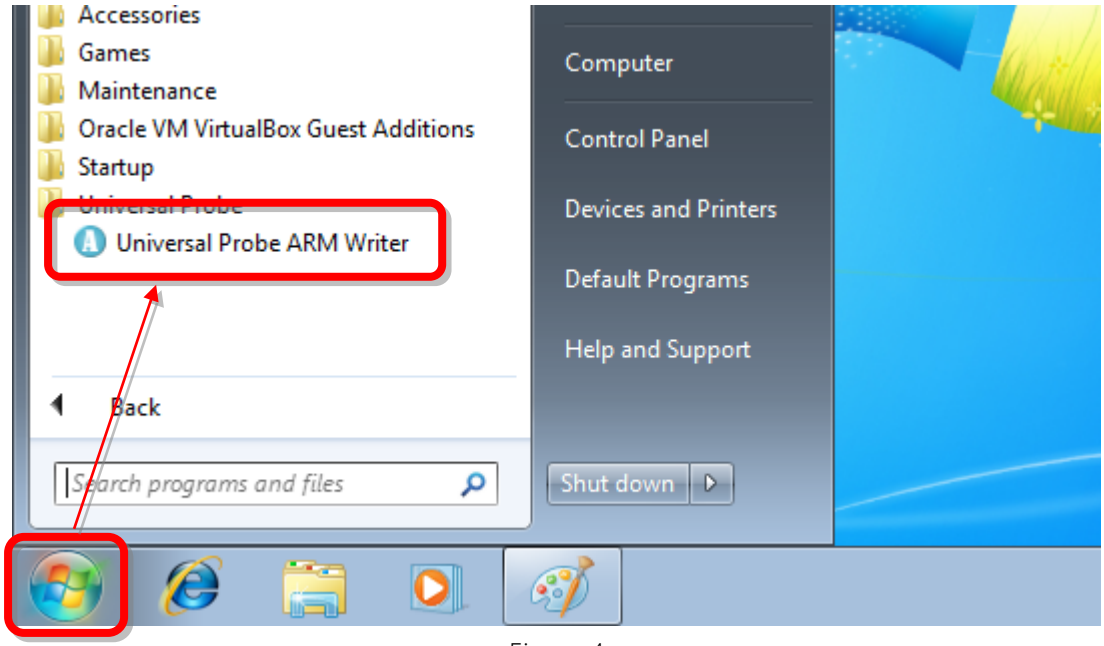


Figure 4

- **Method 3**

Double-click “ARMWriter.exe” or a project file (.armwpj) in Explorer or other tools.

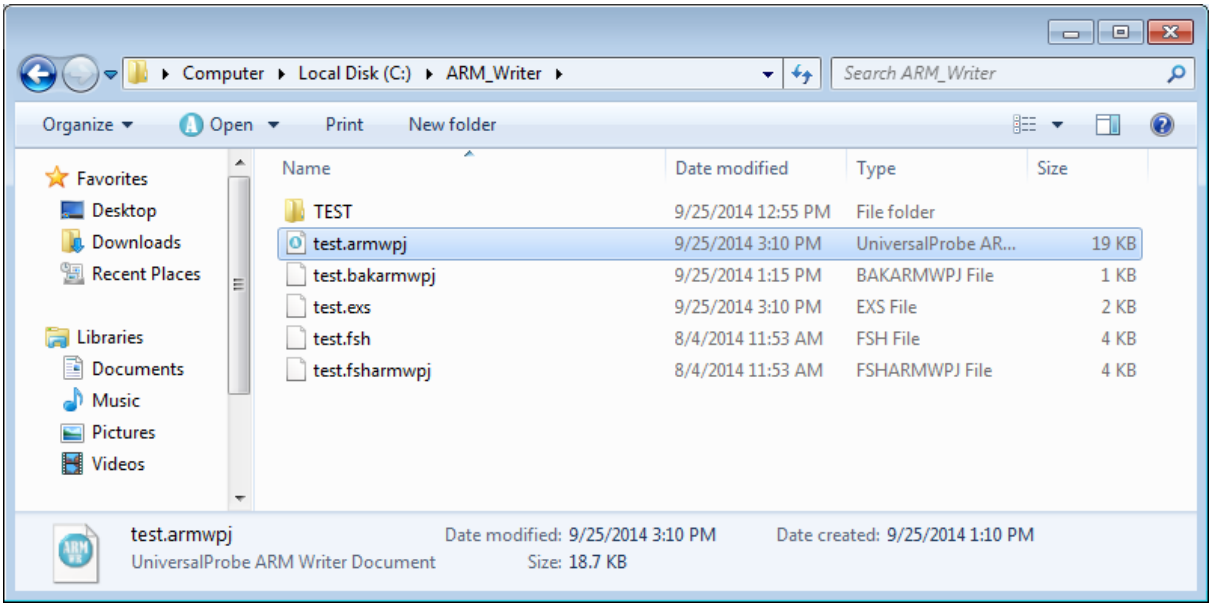


Figure 5

- **Method 4**

Click “Start” → specify “ARMWriter.exe” or a project file (.armwpj).

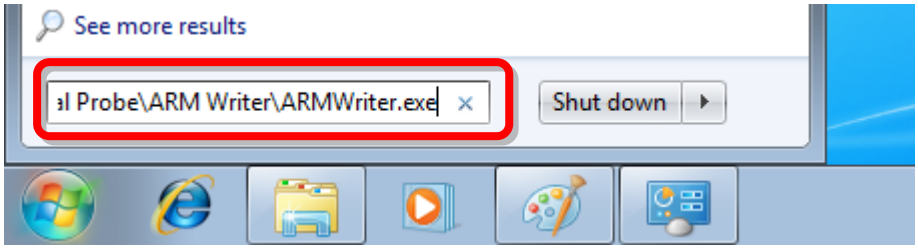


Figure 6

The above operations start this software as shown in the figure below.

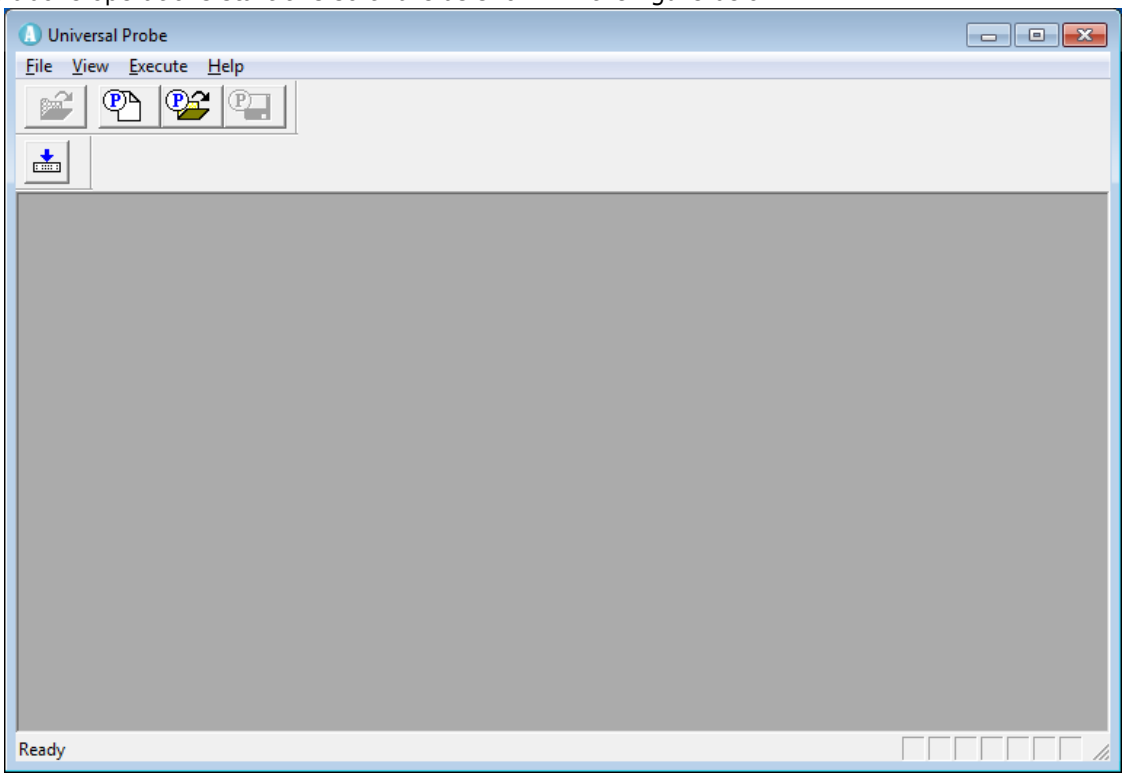


Figure 7

2.2.2. Options for Starting

This software has the following options for starting. Alphabets are case insensitive. Always use one-byte alphabetic characters (ASCII code).

Table 2

Options for starting	Description
-STARTDEFAULT	Resets the target when starting this software. (default)
-STARTRESET	Resets the target when starting this software. Same as -STARTDEFAULT.
-STARTBREAK	Forcibly breaks the target when starting this software and does not reset it.
-STARTINITIALIZATIONBREAK	Performs initialization and forcibly breaks the target when starting this software.
-STARTINITIALIZATION	Performs initialization only and does neither reset nor forcibly break the target when starting this software.

To specify the options for staring, open the shortcut properties for this software and add the options to “Link to.”

- **Example**

```
C:¥Program Files¥Sohwa&Sophia Technologies¥Universal Probe¥ARM Writer¥ARMWriter.exe -STARTINITIALIZATIONBREAK
```

2.3. Selecting a Project File

This software always uses a project file (.armwpj) to save the following settings.

- Information on the module to be written
- Settings of writing environment

Writing new data requires creation of a project file.
When the existing project file is opened, saved status can be restored.

The flash memory settings are not saved.
To save the flash memory settings, use the [**Device setup**] dialog box.

2.3.1. Creating a New Project File

Let's create the TEST folder in the C:¥ARM_Writer folder and create a project file named test.armwpj, as an example.
Click the following toolbar button or menu bar. (**Details of [Create New Project] dialog box**)

Tool button	Operation on the menu bar	Shortcut key
	**File → New Project**	---

The [Create New Project] dialog box opens.

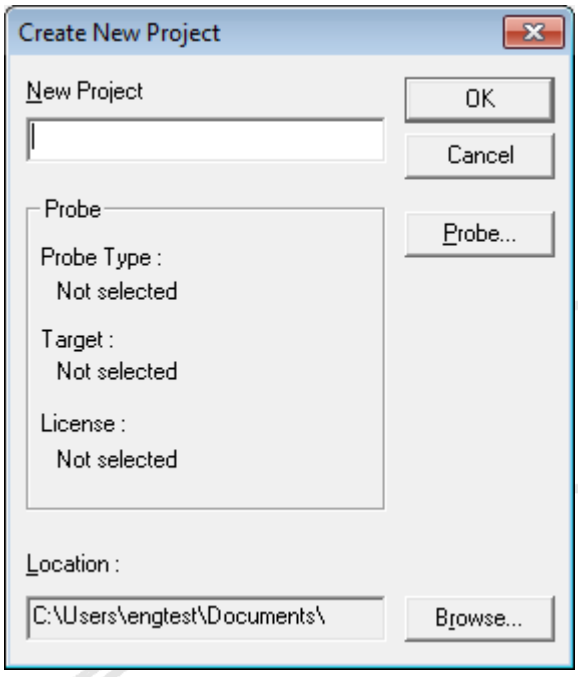


Figure 8

Create a folder to save the project file or select an existing folder.

(1) Creating a folder

Click the Browse button.

The [Folder] dialog box opens.

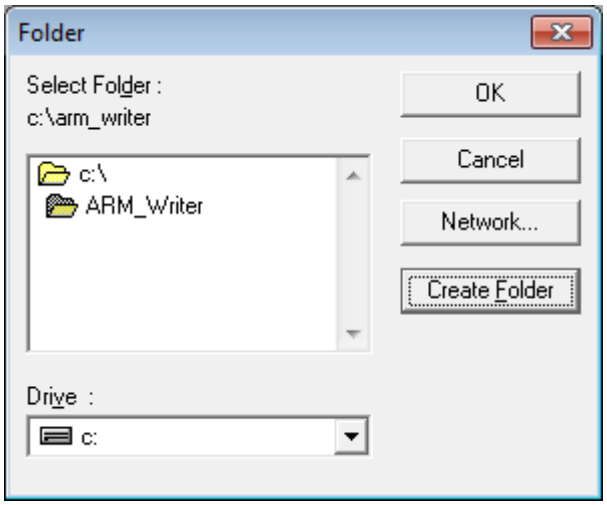


Figure 9

Select C:¥ARM_Writer and click the Create Folder button.

The [Create Folder] dialog box opens.

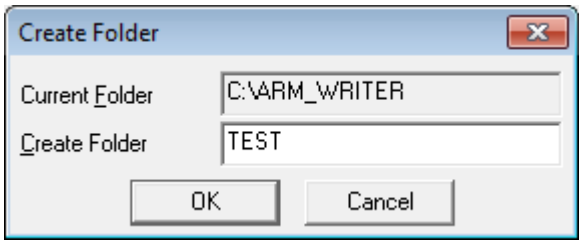


Figure 10

Enter “TEST” in <Folder to create> and click the OK button.

A space or slash cannot be included in the folder name.

Return to the [Folder] dialog box.

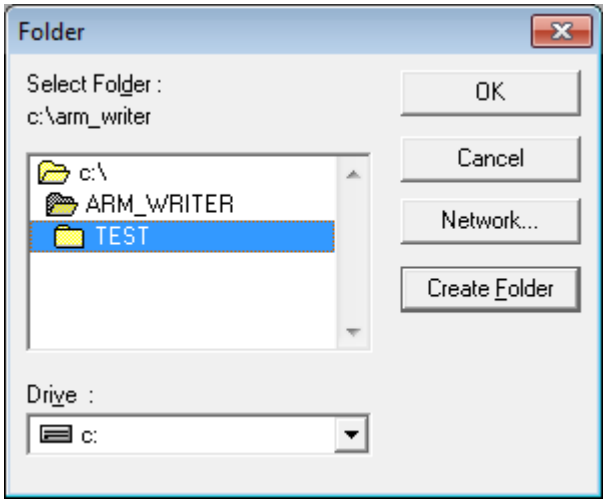


Figure 11

(2) Selecting a folder

Select the created TEST folder and click the OK button.
Return to the [Create New Project] dialog box.

(3) Specifying a project name

Specify a project name (test) in <Project name>.
This project name is used as the project file name and displayed in the <Location> box at the bottom of the dialog box.

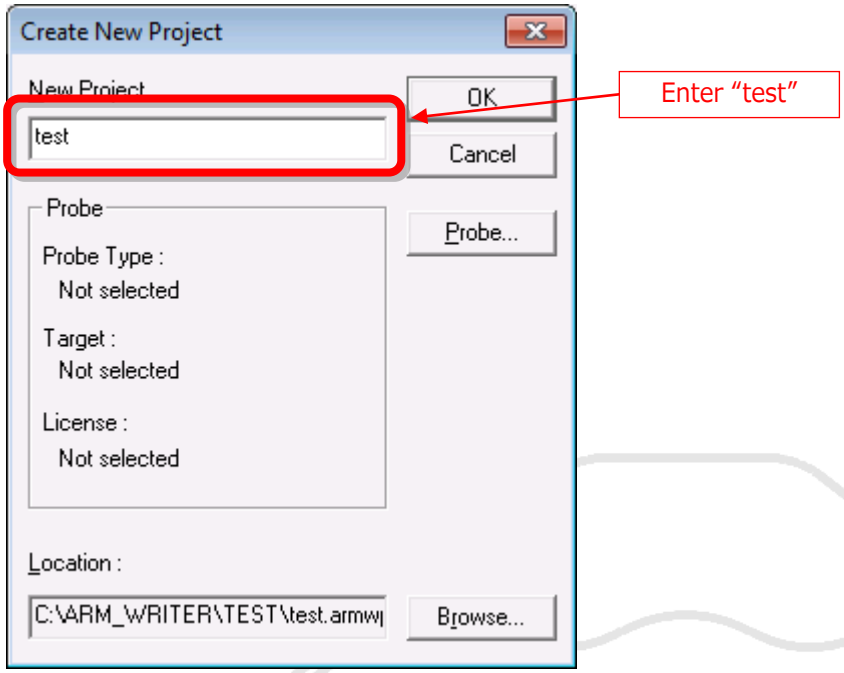


Figure 12

A space or slash cannot be included in the folder name.

2.3.2. Opening a Project File

To open a saved project file, select the project file (.armwpj) with the following operation.

Tool button	Operation on the menu bar	Shortcut key
	**File** → **Open Project**	---

The project file can be opened by double-clicking it in Explorer.
Or, the project file can be opened by dragging and dropping it to the icon for this software on the desktop.

2.4. Selecting a Probe

Select the probe to be used in this software.
Click the Probe button in the [Create New Project] dialog box.
The currently connected probes are listed in the [Select Probe] dialog box.

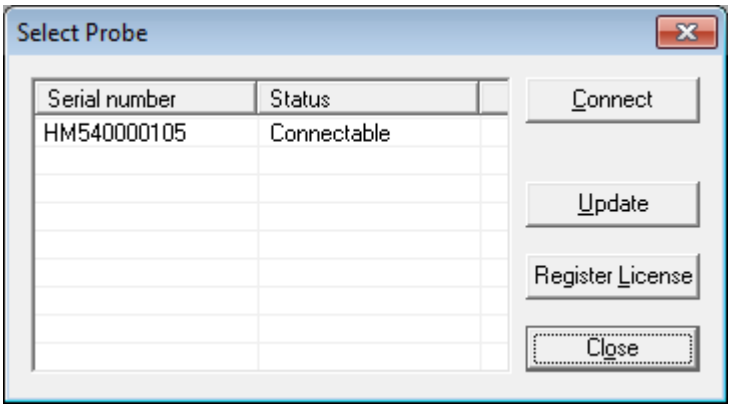


Figure 13

Click the probe to be used and click the Connect button.

Table 3

Serial number	Displays the serial number registered for the probe.
Status	Displays the status of probe. Connectable : The probe can be connected to this software and used. Currently used : The probe is already used in another application. This software cannot use this probe. License not registered : The license is not registered. To use this probe, click the Register License button to register the license.
Connect	Connects to the selected probe. This button is enabled only when the probe of which status is “Connectable” is selected. After connection is established, the dialog box closes and the [Create New Project] dialog box is displayed again.
Update	Searches for the currently connected probes again and updates the probe list.
Register License	Displays the dialog box to register the license. This button is enabled when the probe of which status is “Connectable” or “License not registered” is selected. → For details, refer to "**2.5. Registering the License Code**."
Close	Closes this dialog box.

2.5. Registering the License Code

This software employs the license system.
A separate Software Code is required to obtain the License Code.
When a user notifies us the Software Code and probe Serial No., the License Code will be issued.

(1) Entering the License Code

When this software starts, select a probe for which [Select Probe] dialog box shows “License not registered” or “Connectable” and click [Register License] button. The License Code entry window is displayed.
Enter the License Code received from us. This software becomes usable at the target probe.

Figure 14

(2) Notes on entering the License Code

Enter exactly the same License Code as the received information.

INFO If the License Code is rejected even though it matches the code in the received email, please contact us.

(3) Error display list

Table 4

Displayed Error	Meaning	Action
The License Code is incorrect.	Displayed when the License Code cannot be analyzed due to invalid format of License Code or for other reasons.	Check the email that includes the License Code and enter it again.
The License Code does not match the serial number. Please check if the License Code is matching the Serial number of Probe.	Displayed when the Serial No. of the used probe does not match the Serial No. of the probe to which the License Code is applied.	Check the email that includes the License Code and enter it again.

2.6. Selecting a CPU

Select the type of CPU to be used from the Select CPU drop-down list.

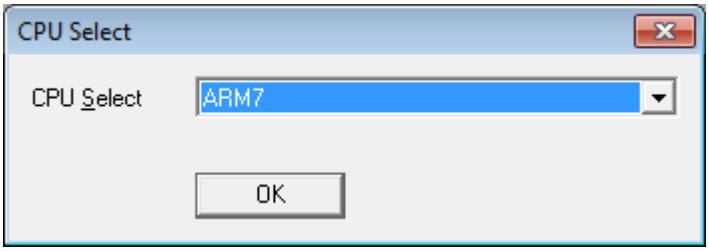


Figure 15

Then, select the device in more detail according to the CPU type.
Select the manufacturer and series to narrow down devices to more easily select the device.

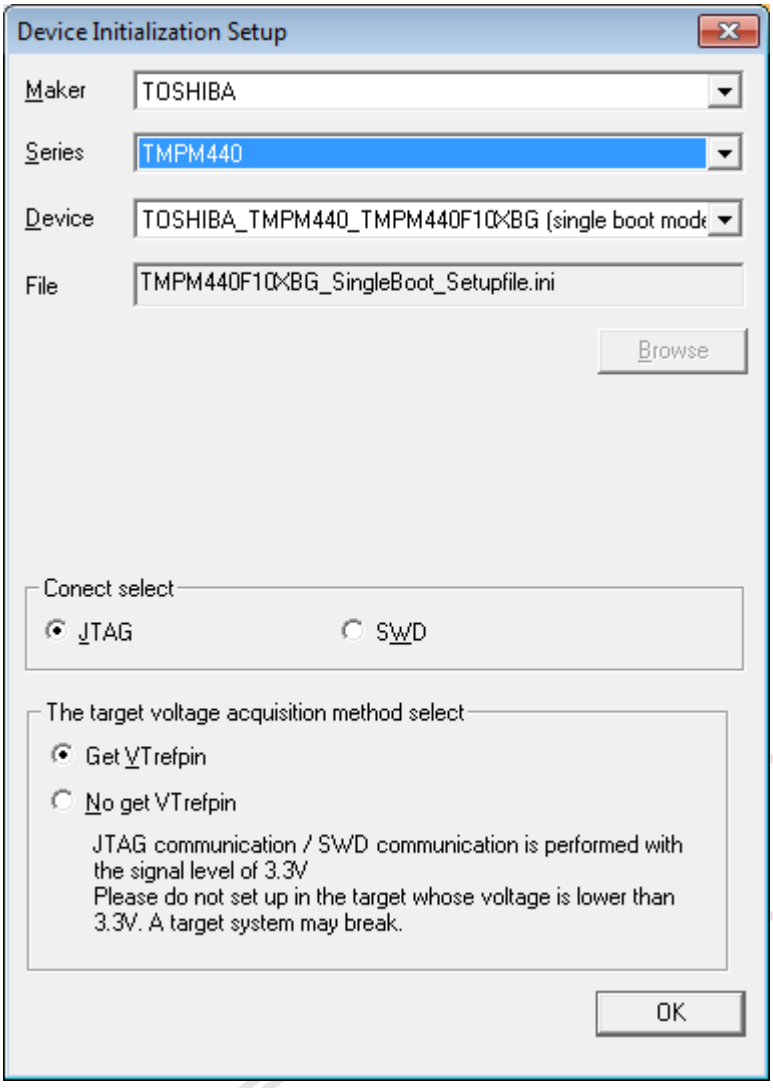


Figure 16

Table 5

Selecting the connection method	Select the interface through which the target is connected. JTAG: Uses the signal interface that conforms to the IEEE1149.1. SWD: Uses the two-wire interface defined by the ARM.
Selecting the target source voltage acquisition	Select whether to acquire the voltage for the interface to the target from the target. Acquire target source voltage from the VTref pin: Acquires the power supply for interface from the target. The voltage changes in the range between 1.2V and 5.0V following the target. Ignore the VTref pin: Ignores the power supply from the target and fixes the interface voltage to 3.3V.

2.7. Setting JTAG

The [JTAG Setup] dialog box can be used to set the JTAG clock, daisy chain and other settings according to the used target.

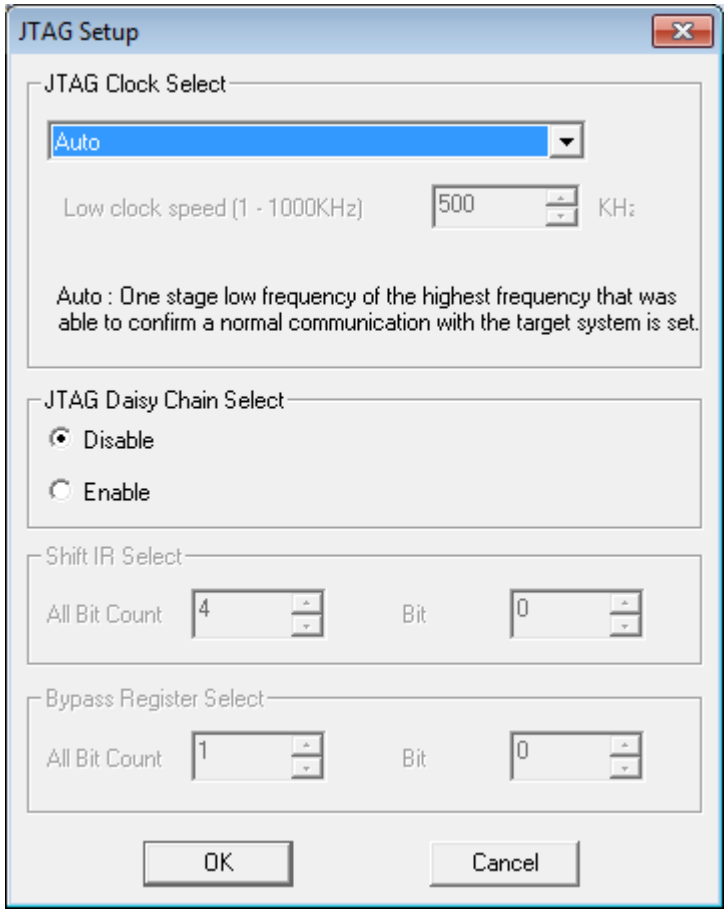


Figure 17

If only one device is connected to the JTAG, click the OK button without changing anything.

Table 6

JTAG Clock Select	Select the JTAG clock frequency. "Auto" recognizes the frequency automatically and sets the optimal frequency. Selecting the Low-speed Clock allows specifying the frequency in the KHz. (up to 1000KHz)
JTAG Dayis Chain Select	Specify the connection status of the JTAG daisy chain. Specifically, select "Enable" when there are multiple TAPs or DAPs.
Shift IR Select	Specify the total number of bits and the bit positions.
Bypass Register select	Specify the total number of bits and the bit positions.

For details of "daisy chain," "setting a shift IR," and "setting a bypass register," refer to the next page.

● **Daisy chain setting example 1**

This section describes an example of connecting two CPUs in the daisy chain.

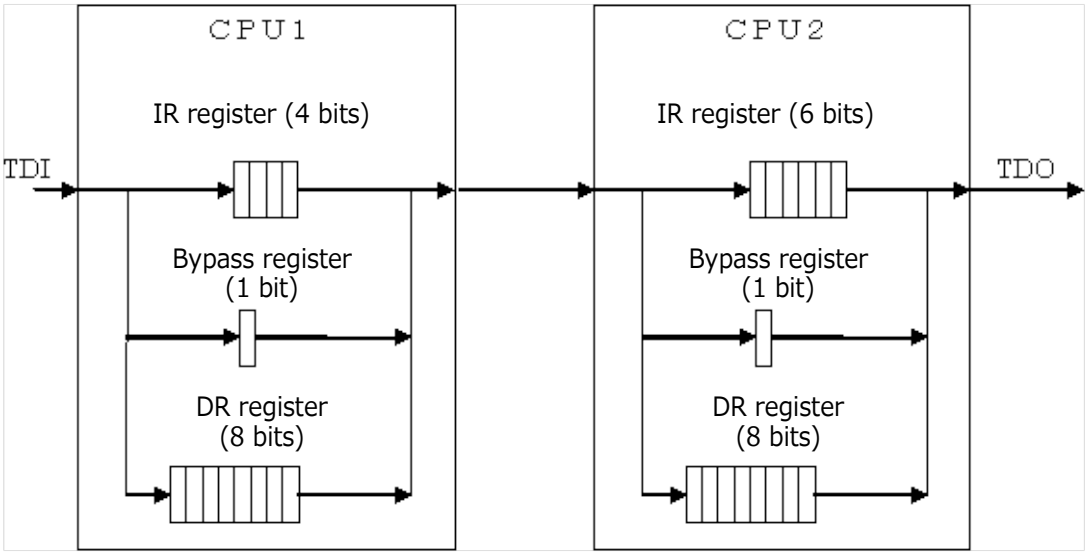


Figure 18

(1) When debugging CPU 1 in the above example
Total bits set for Shift IR is the total of IR registers, which is 10, and the bit position of CPU 1 is 6.
The total number of bits set in the bypass register is equal to the total number of bypass registers, which is 2.
The bit position of bypass register for CPU 1 is 1.

(2) When debugging CPU 2 in the above example
Total bits set for Shift IR is total of IR registers, which is 10, and the bit position of CPU 2 is 0.
The total number of bits set in the bypass register is equal to the total number of bypass registers, which is 2.
The bit position of bypass register for CPU 2 is 0.

- **Daisy chain setting example 2**

Even if there is only one device, it is assumed that there are “multiple” devices if the CPU includes multiple TAPs and DAPs that are connected as the JTAG chain.
In the following example, it is assumed that six elements are connected in the daisy chain.

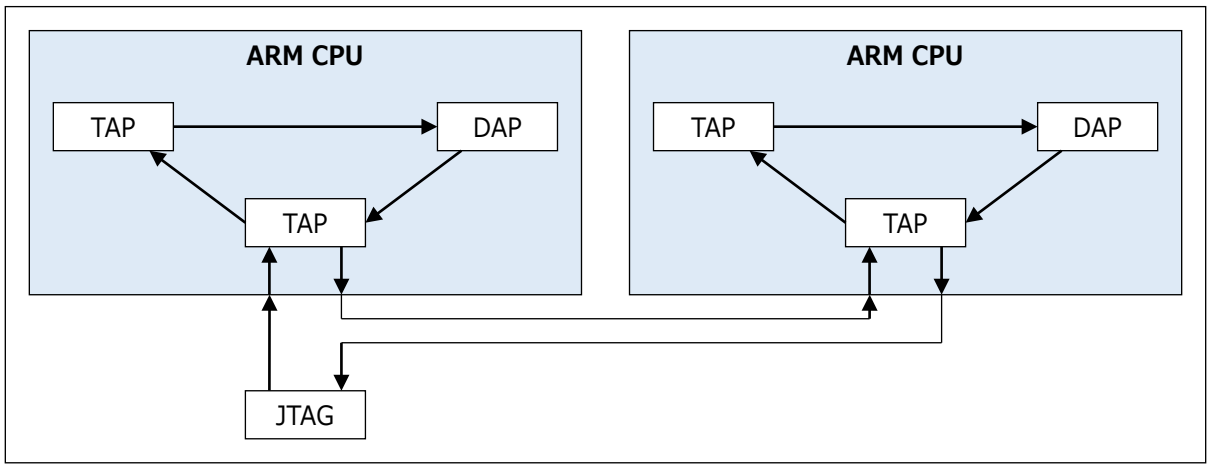


Figure 19

2.8. Setting When Starting the Probe

Set the RTCK and reset signals of JTAG connector.
Select whether resetting or forcibly breaking the target when starting this software.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource → Probe Initialization Setup**	---

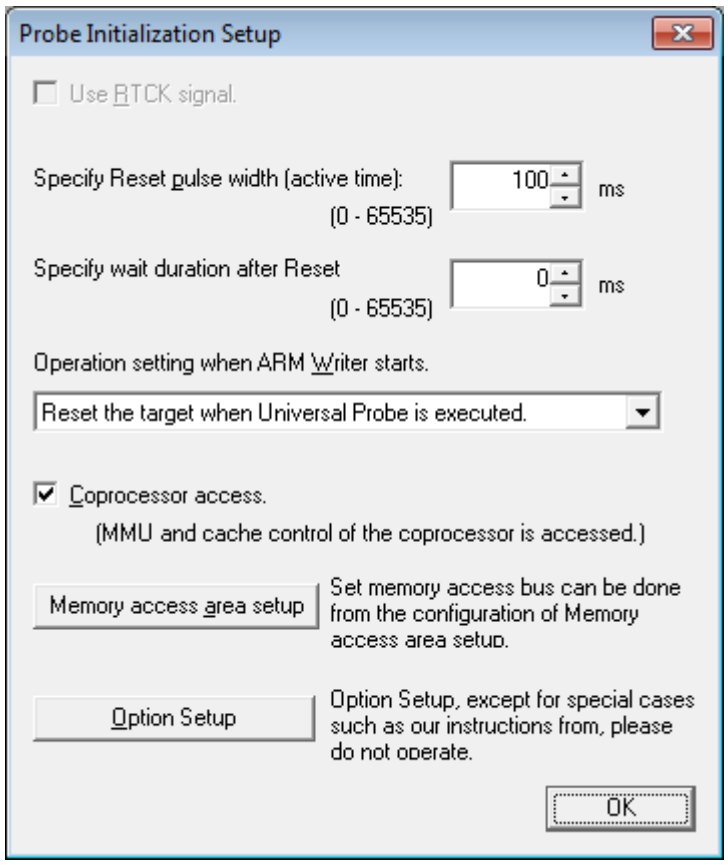


Figure 20

Usually, it is not necessary to change the displayed settings.
When the setting finishes, click the OK button.

2.9. Setting the CPU Operation Mode

Here, specify endianness and whether to detect abort when accessing the memory.

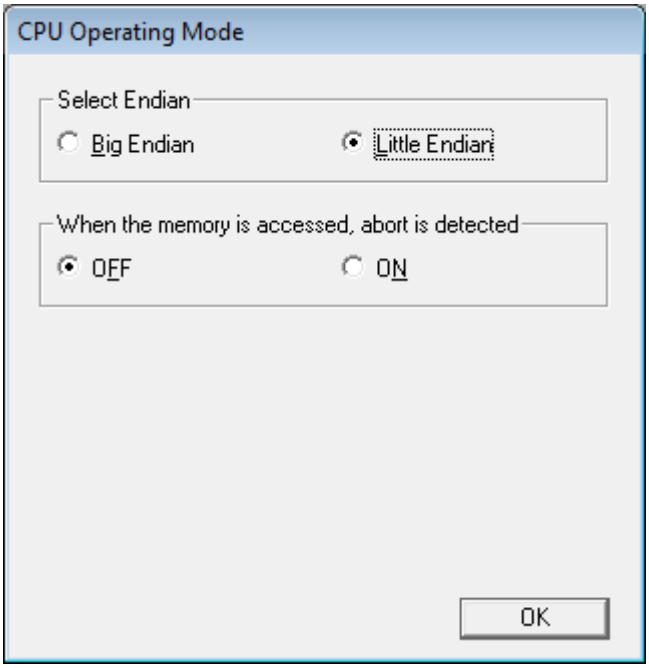


Figure 21

Usually, click the OK button without changing anything.

➔ These settings can be changed later. For details, refer to (3) Switch in "**4.2.3. Set a Probe Environment**."

2.10. Flash Memory Setting

Specifies the settings for the flash memory to be written.
It is necessary to first specify the settings for the target flash memory to write or clear data. If you select a CPU from the list at startup, the settings for the built-in flash memory in the CPU are automatically made.
Select the following menu item displays the [Flash Memory Settings] dialog box.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Flash Memory** → **Device Setup**	---

For details of the data to be entered, refer to the "**Device Setup**" tab.
Confirm that necessary setting items are entered, and click the Add button at the right top of the dialog box to add the flash memory settings.

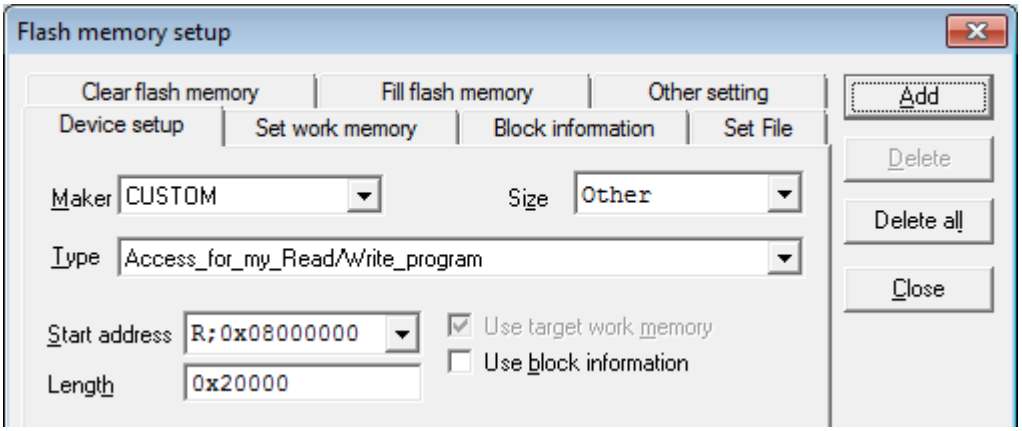


Figure 22

The settings for flash memory can be confirmed from the list at the bottom of the dialog box.

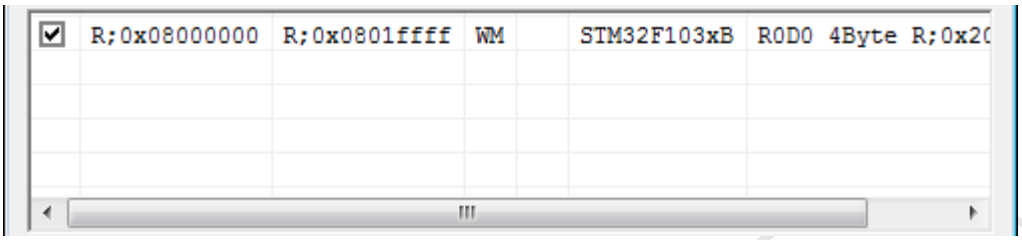


Figure 23

2.11. Clearing the Flash Memory

If the flash memory contains data, clear it before writing new data.
Select the following menu item and display the [Flash memory setup] dialog box.
If the dialog box is already open, select the "**Clear Flash Memory**" tab.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource → Flash Memory → Clear Flash Memory**	---

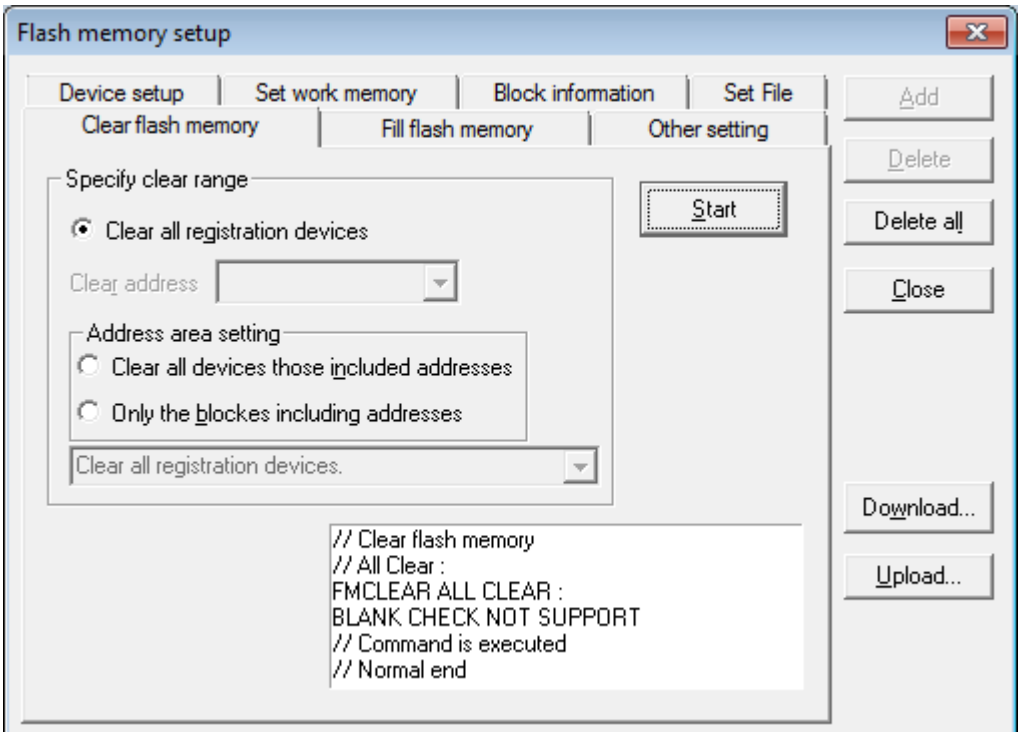


Figure 24

Select one of the following clearing ranges and click the Start button.

(1) Clear all registration devices

Clears all the registered devices.

(2) Clear all devices those included addresses

Clears the whole device that contains the address entered in <Clear address>.

(3) Only the blockes including addresses

Clears one block of the device that contains the address entered in <Clear address>.

→ For details, refer to "**4.5.6. Clear Flash Memory tab**."

The progress is displayed during the clearing process.

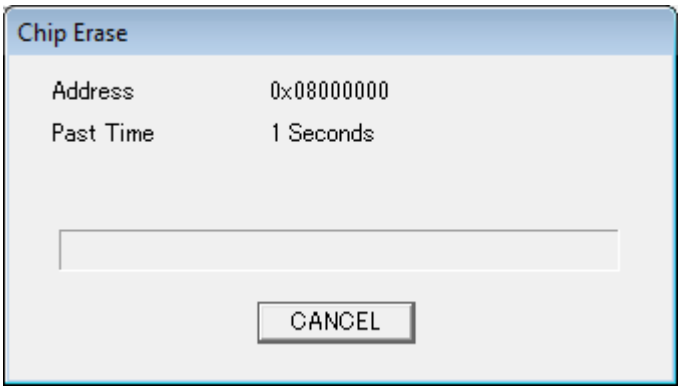


Figure 25

The operation result is displayed when the clearing process is complete.

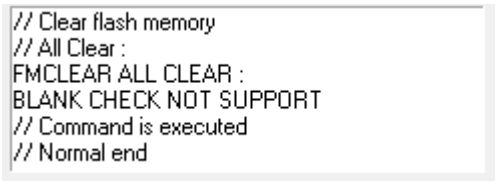


Figure 26

Confirm that the specified range was successfully cleared in the **Memory Dump window**.

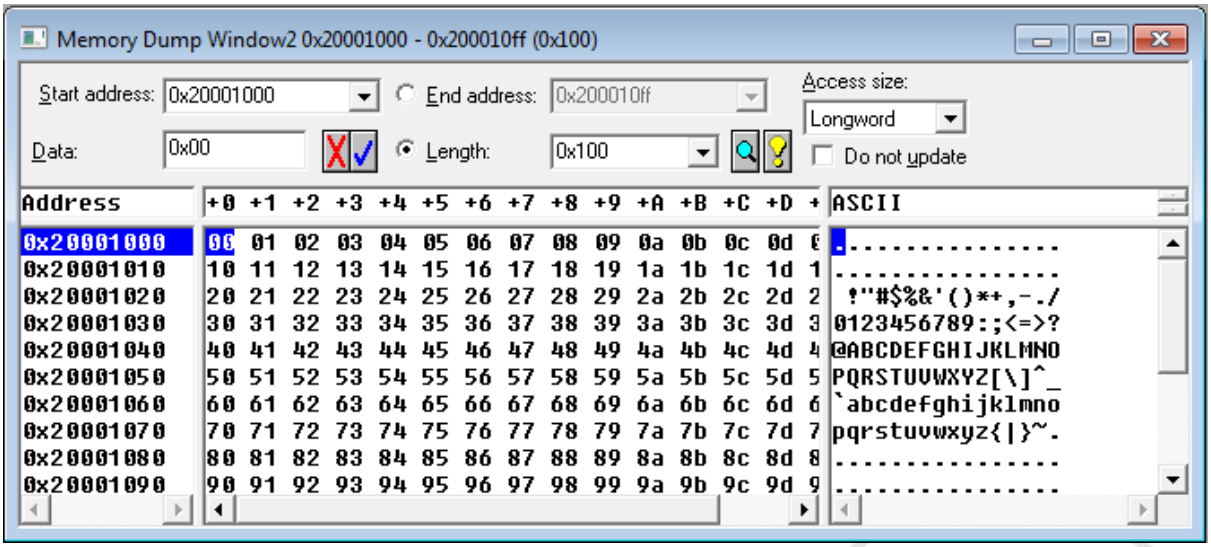


Figure 27

2.12. Writing Object Data

Download object data to the set flash memory.
Select the following menu item and display the [Download Settings] dialog box.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Download**	---

Set the information on the module to be written in the [**Download Setttings**] dialog box and click the Download button.
The progress dialog box is displayed during the download process.

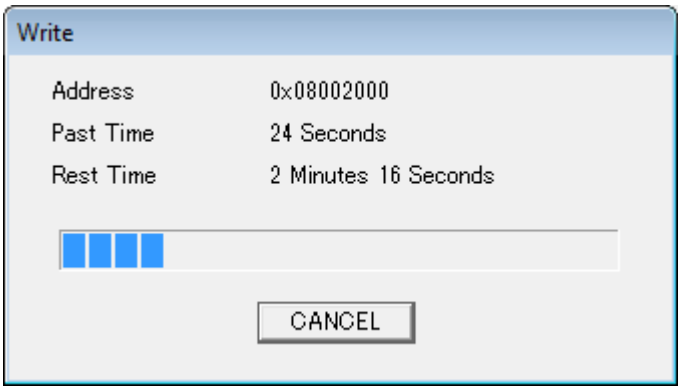


Figure 28

If the flash memory to be processed is set not to use block information, the writing progress dialog box is not displayed.

Display the **Memory Dump Window** and confirm that the object data was downloaded in the flash memory. If the data was not downloaded, confirm the flash memory settings again.

When writing fails, perform the following:

1. Confirm that **Clearing the Flash Memory** was completed.
2. Confirm that the <Ignore setup when downloading> checkbox is not checkmarked in the [**Flash memory setup**] dialog box. If checkmarked, the writing processing to the flash memory is not performed.

2.13. Setting the Work Memory

Set the work memory which is used to accelerate the writing process.
Select the following menu item and display the [Flash memory setup] dialog box.
If the [Flash memory setup] dialog box is already displayed, select the "**Set work memory**" tab.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Flash Memory** → **Set work memory**	---

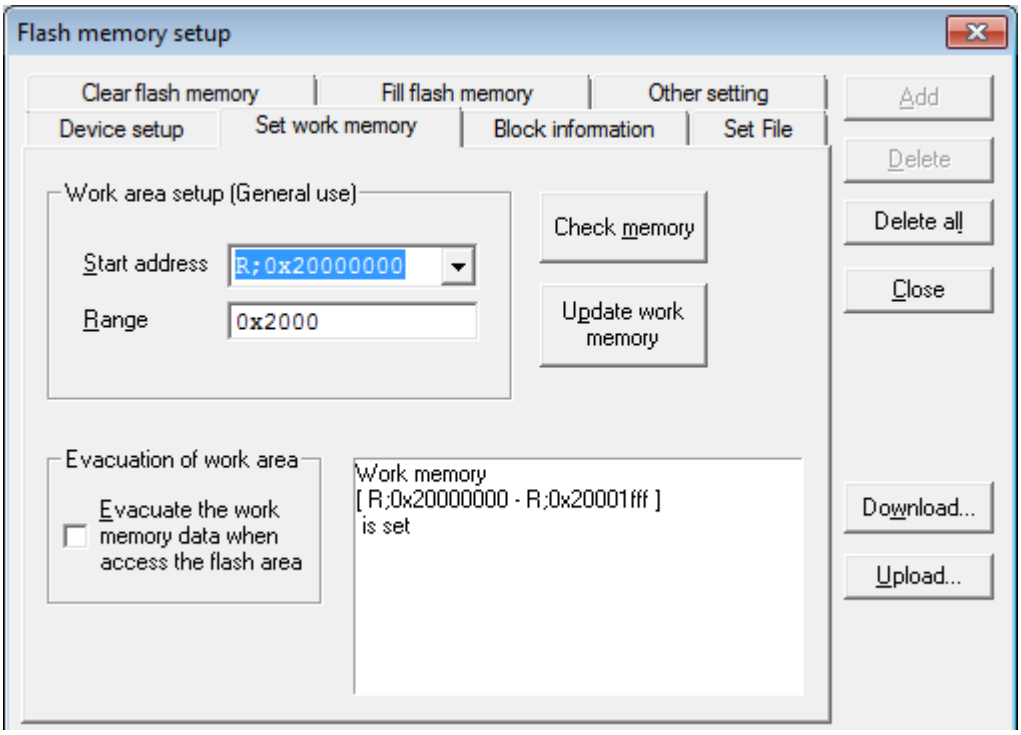


Figure 29

Conduct memory check before setting to see if the memory can be read and written to check if the specified area is usable.
Specify addresses and conduct memory check in the specified area with the Check Memory button.
The memory check execution result is displayed at the right bottom of the dialog box.

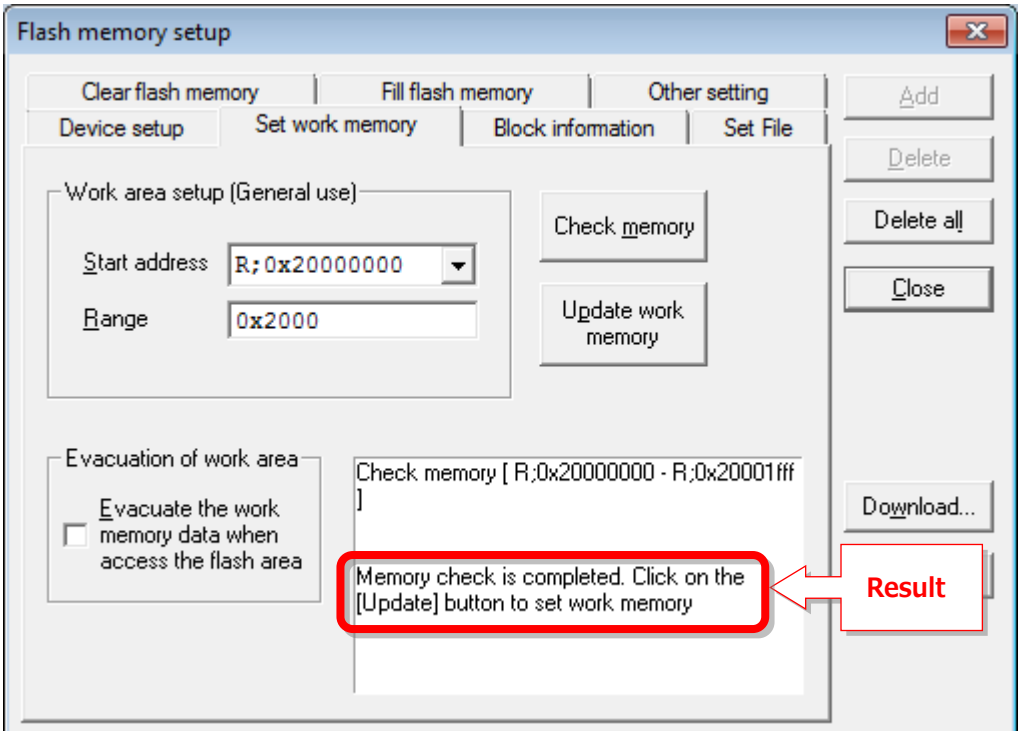


Figure 30

Click the Update Work Memory button to update the work area to the set range. The updated work area can be confirmed at the left bottom of the [Flash memory setup] dialog box.

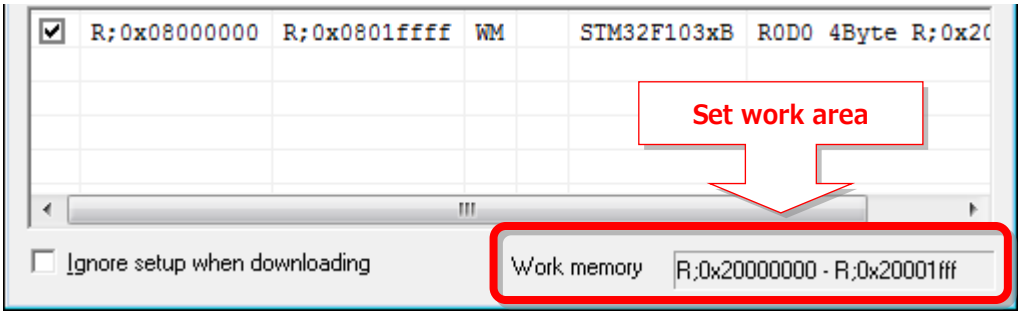


Figure 31

2.14. Checking Block Information

Check the block information in the flash memory currently set to reduce the range to be cleared before writing data to the flash memory.
Only necessary blocks can be cleared by checking block information. This enables you to avoid unnecessarily reducing the lifetime of flash memory or increasing the processing time by clearing unnecessary memory blocks.

Select the following menu item and display the [Flash memory setup] dialog box.
If the [Flash memory setup] dialog box is already displayed, select the "**Block Information**" tab.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource → Flash Memory → Block information**	---

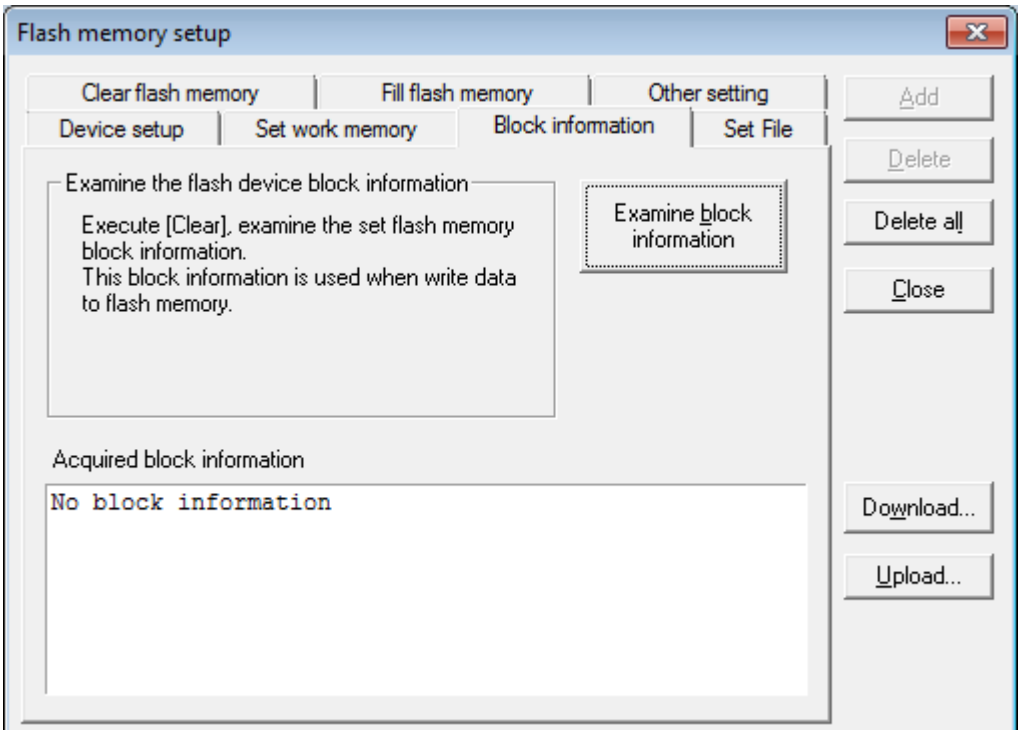


Figure 32

(1) Check Block Information button

After **setting the device**, click the Examine Block Information button to check the block information in the flash memory.
If the set flash memory does not use block information, no processing is performed.
When block information is checked, the flash memory is cleared. The following message box is displayed. To start the process, click the OK button.

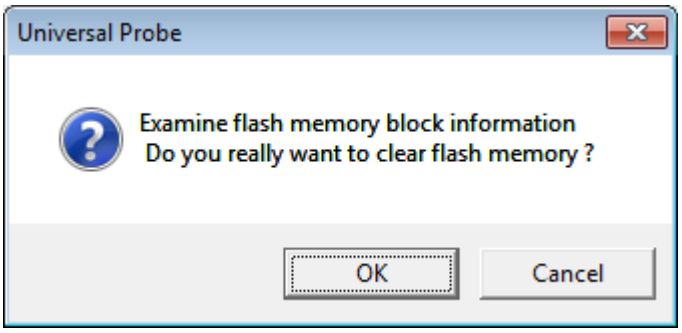


Figure 33

The progress dialog box as shown in Figure 34 is displayed during block information check.

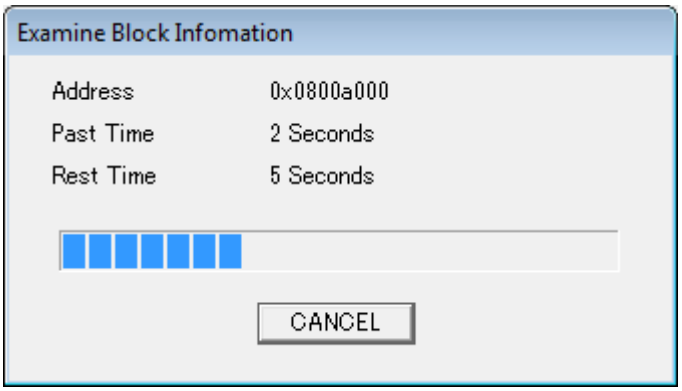


Figure 34

(2) Acquired block information list

After block information check is complete, the result is displayed in the "Acquired block information" field.

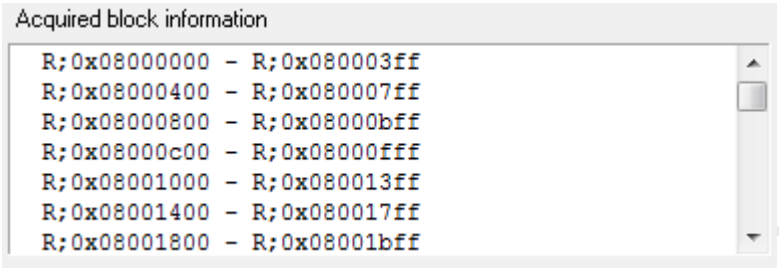


Figure 35

2.15. Filling up the Flash Memory

Fill up the set flash memory.
Select the following menu item and display the [Flash memory setup] dialog box.
If the [Flash memory setup] dialog box is already displayed, select the "**Fill flash memory**" tab.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Flash Memory** → **Fill flash memory**	---

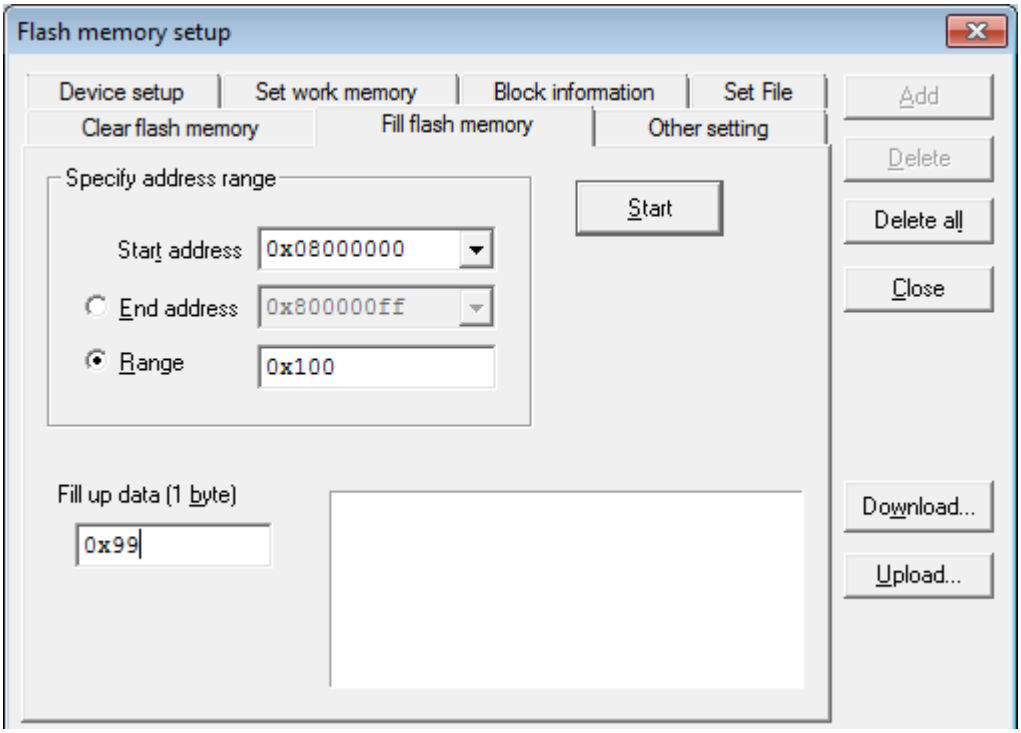


Figure 36

(1) Start button

Specify the fill up range and data to be filled up and click the Start button to start the fill up process.
The progress dialog box is displayed during the fill up operation.

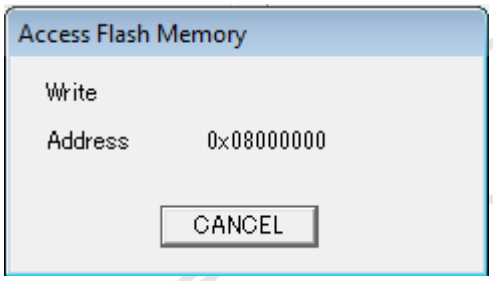


Figure 37

If the flash memory to be processed is set not to use block information, the progress dialog box is not displayed.

When the fill-up process is complete, the processing result is displayed at the right bottom of the dialog box.

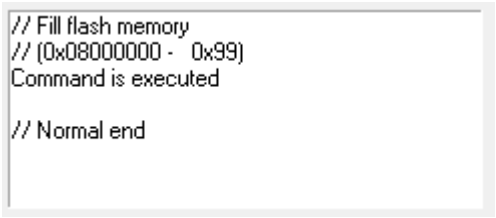


Figure 38

Confirm that the specified range was successfully filled up in the **Memory Dump Window**.

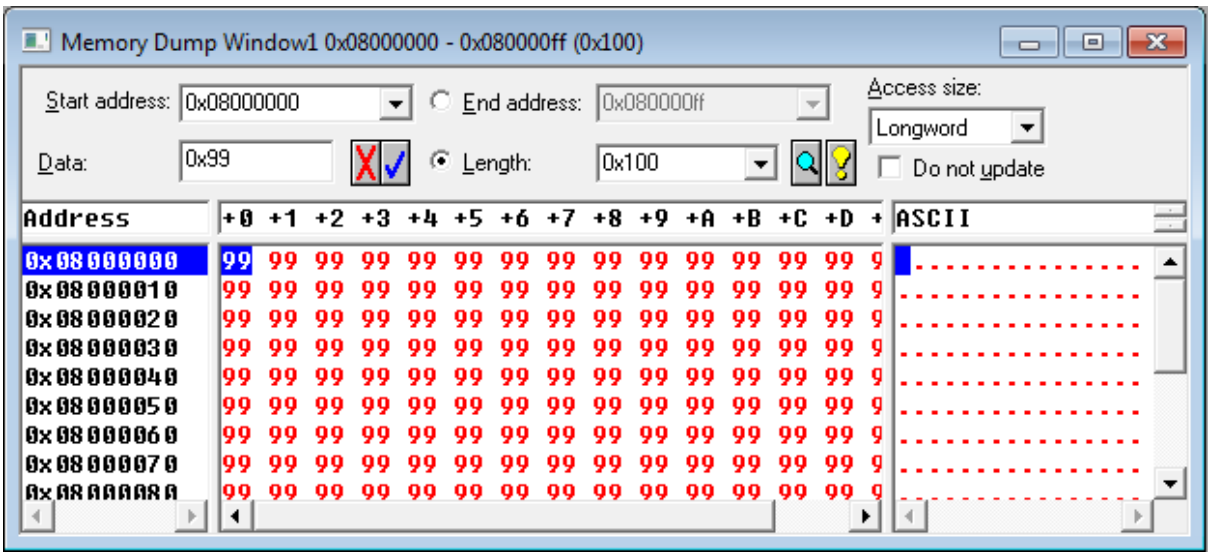


Figure 39

2.16. Saving the Flash Memory Settings

Save the flash memory settings to a file.
Select the following menu item and display the [Flash memory setup] dialog box.
If the [Flash memory setup] dialog box is already displayed, select the "**Set File**" tab.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Flash Memory** → **Set File**	---

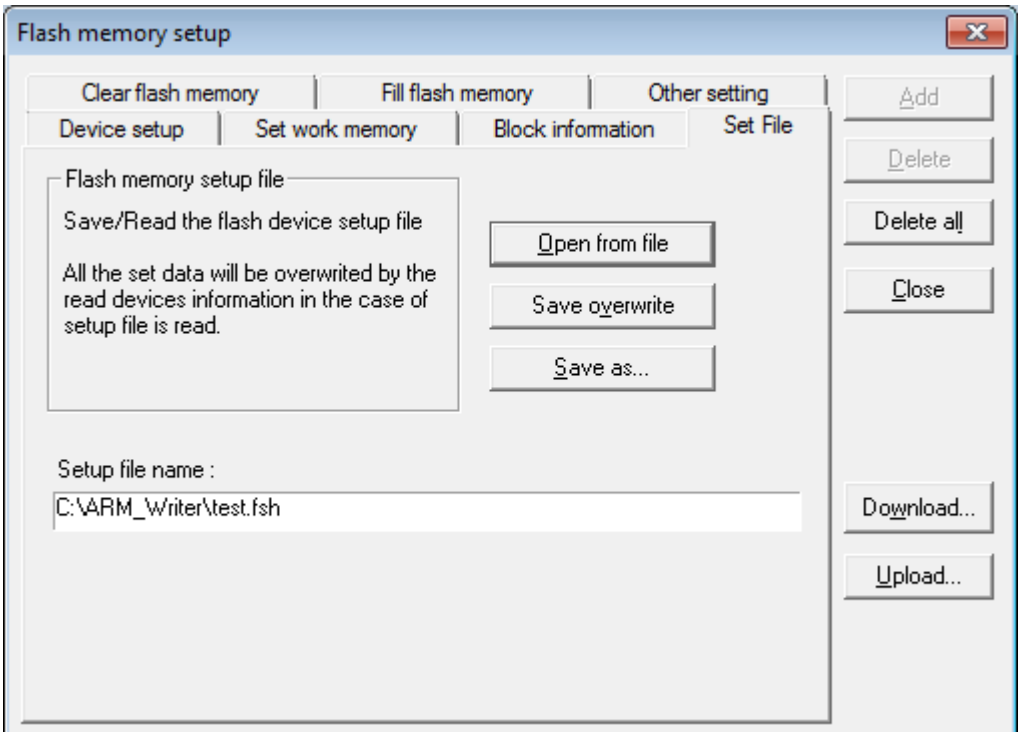


Figure 40

(1) Open from File

Load the saved configuration file for flash memory and register it in <setup file name> used for the current project.

(2) Save overwrite

Overwrite current settings to the file displayed in <setup file name>.

(3) Save As

Click the Save As button to save the configuration file for flash memory in the displayed file dialog box. The saved file is registered in <setup file name> used for the current project.

The flash memory settings are not saved even when the project file is saved.
Be sure to save the flash memory settings with this operation.

(4) <Setup file name>

Displays the configuration file used for the current project.

2.17. Saving the Project File

The project settings can be saved in the project file.
Refer to "**Save a Project**."

2.18. Exiting This Software

To exit this software, select the following menu item or click the X button at the right top of the window.

Tool button	Operation on the menu bar	Shortcut key
---	**File** → **Exit**	---

When the [Close Project File] dialog box is displayed, select whether to save the project before exiting the software.

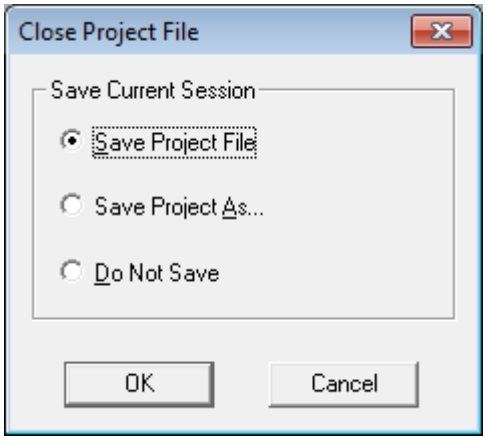


Figure 41

(1) Save Project File

Overwrites the created project file in the current project file and exits the software.

(2) Save Project As

Saves the created project file as a different project file and exits the software.

(3) Do Not Save

Exits the software without saving the current project settings.

3. Data Expression in This Software

This chapter describes how data is expressed in this software.

3.1. Numerical Expression

This software can handle numerical expressions in binary, decimal and hexadecimal.

Table 7

Format	Radix	Example
0x<numerical value>	Hexadecimal	0x12345678
H'<numerical value>	Hexadecimal	H'12345678
@<numerical value>	Binary	@01011101
<numerical value>	Decimal	12346578

3.2. Address Expression

This software expresses addresses by combining a format and operator shown in Table 8.

Table 8

Format	Meaning	Remark
<Address value>	Logical address	
mmu:<Address value>	Logical address	
r;<Address value>	Physical address	
INR:<Address value>	Built-in I/O register space	
APB:<Address value>	Access path	Method to have the CPU core execute the memory access command. Access the logical address of APB path. Valid for Cortex A/R only.
AHB:<Address value>	Access path	Method to directly access the memory. Access the physical address of AHB path. The MMU does not convert the address. Valid for Cortex A/R only.

3.3. Data Expression

This software expresses data by combining a format and operator shown in Table 7.
Also, in this software are treated as Byte = one-byte, Word = two-byte, Long Word = four-byte.

3.4. Reading/Writing Data from/to Memory & I/O Port

To execute the ASSIGN or dot (.) command in the command window or read or write memory or I/O data with a conditional expression in the batch program, specify as follows:

Table 9

Expression	Meaning
[Address formula] or [Address formula].B	Byte data at the specified address
[Address formula].W	Word (two-byte) data at the specified address
[Address formula].L	Long word (four-byte) data at the specified address

● **Example**

```
For the normal memory space, just enter the address.

.[0x4000].B=0x10            //Write 0x10 as a byte data to address 0x4000.
.[0x4000].W                 //Refer to the word data at address 0x4000.
.$A=[0x4000].L              //Assign four-byte data at address 0x4000 to work variable $A.
if([0x4000].W==0x1234)      //True when the word data at address 0x4000 is 0x1234.

For the built-in I/O register space, add INR:.

.[INR:0x4000].B=0x10        //Write 0x10 as a byte data to address 0x4000.
.[INR:0x4000].W             //Refer to the word data at address 0x4000.
```

4. Menu

This chapter explains the menus of this software.

4.1. File

The "File" menu item is used to operate the files related to the project.

4.1.1. Close

Closes the currently focused child window.
This menu item cannot be selected if there is no child window.

4.1.2. Create a New Project

Creates a new project.
When using for the first time, select the following tool button or menu item to create a project.
The project is saved to a project file (.armwpj).

Tool button	Operation on the menu bar	Shortcut key
	**File** → **New Project**	Ctrl + P

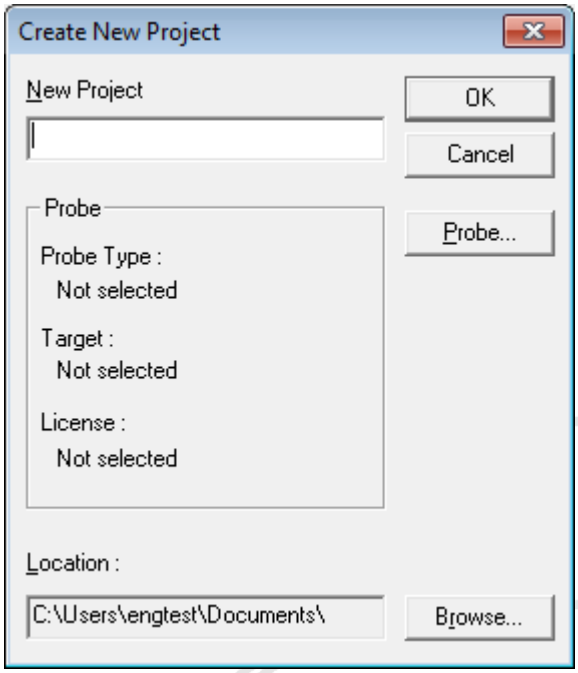


Figure 42

Table 10

New Project	Specifies a project name.
Probe	Probe type : Type of probe Target : Target name License : License type is displayed. Size-limited → It is a license with 1KByte write size limit. Available → It is a license without write size limit.
Probe(P)...	Displays the [Select Probe] dialog box, and lists the currently connected probes. To select the probe to be used, click the probe name part and click the OK button.
Location	Displays the full path to the project file to save.
Browse	The [Select Folder] dialog box is displayed. Select the folder where the project file is saved.
OK	Creates a project file.
Cancel	Aborts creation of a project file.

4.1.3. Open a Project

Opens the saved project file. Restores the settings when you finished the last work.

Tool button	Operation on the menu bar	Shortcut key
	**File** → **Open Project**	Ctrl + R

The settings specified in the [Flash memory setup] dialog box are not restored even when the project is opened.
Separately open them on the "**Set File**" tab.

4.1.4. Save a Project

Saves a variety of information currently set in the existing project file.

Tool button	Operation on the menu bar	Shortcut key
	**File** → **Save Project**	Ctrl + S

The content set in the [Flash memory setup] dialog box is not saved even when the project is saved.
It needs to be saved within the [Flash memory setup] dialog box.

4.1.5. Save as a Project

Variety of information currently set is saved in another project file.

Tool button	Operation on the menu bar	Shortcut key
	**File** → **Save Project As**	Ctrl + A

4.1.6. Close a Project

Closes the currently open project.
The [Close Project File] dialog box is displayed before the project is closed.

Tool button	Operation on the menu bar	Shortcut key
---	**File** → **Close Project**	---

4.1.7. Exit

Exits this software.
For details, refer to "**Exiting This Software**."

4.2. Resource

The “Resource” menu is used to read/write data from/to the flash memory.

4.2.1. Download

The [Download Settings] dialog box is used to set the module to be written and give the actual writing instruction.
Multiple modules can be specified.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource → Download**	---

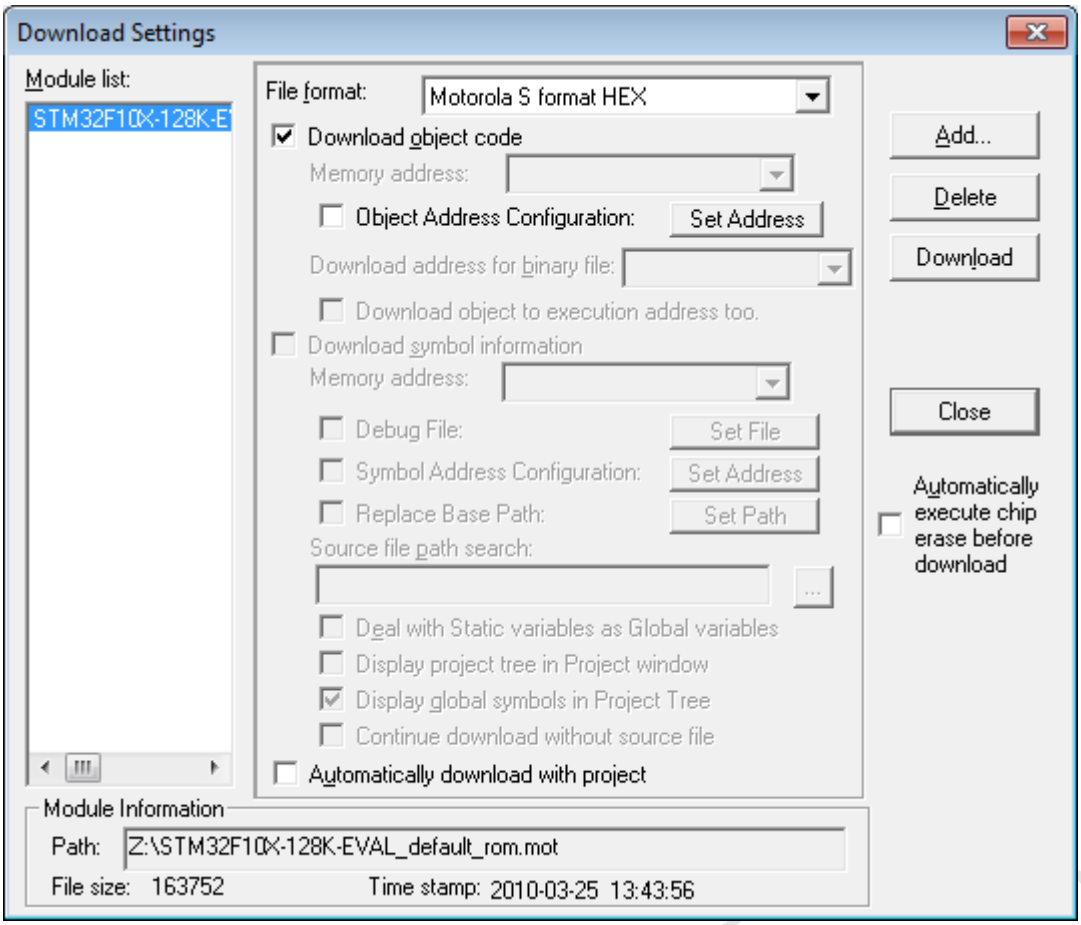


Figure 43

Table 11

Module list	List of modules to be downloaded. Multiple files can be selected by holding down the Ctrl or Shift key.
File Format	Select the object format of the module to be downloaded. Auto selection is selected by default. This item must be specified for each module when multiple modules are selected.
Download object code	Checkmark this checkbox when downloading object data. This item must be specified for each module.
Download symbol information	Not usable in this software.
Automatically download with project	Automatically downloads the module when the project file is opened.
Module information	Display the module path, file size, and timestamp.
Add	Adds a module to be downloaded. The [Open] dialog box is displayed. Select the module to be added in it. The added module is displayed in the module list.
Delete	Deletes the module selected in the module list.
Download	Downloads the selected module. The <Download object code> checkbox must be checkmarked. If multiple modules are selected in the module list, all the selected modules are downloaded.
Erase all data in the flash memory before download	When this checkbox is ON, all the data in the flash memory is cleared before download. The memory is cleared only once for a single download operation. Even when multiple modules are selected and downloaded, the clear operation is executed only once.

If memory access errors frequently occur when object data is downloaded, select the [**Probe Environment**] and select <Memory Write Verification>.
When < Memory Write Verification> is set, whether the memory was correctly written can be confirmed from this software. Verification is disabled by default.

Up to **1KByte** of object data can be downloaded in the size limited version.

4.2.2. Upload

The upload function reads data from the flash memory, converts to a variety of format, and saves to a file.
Selecting the following menu item opens the [Upload] dialog box.
To upload data, display the [Upload] dialog box and specify the memory range and format to be saved to a file.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Upload**	---

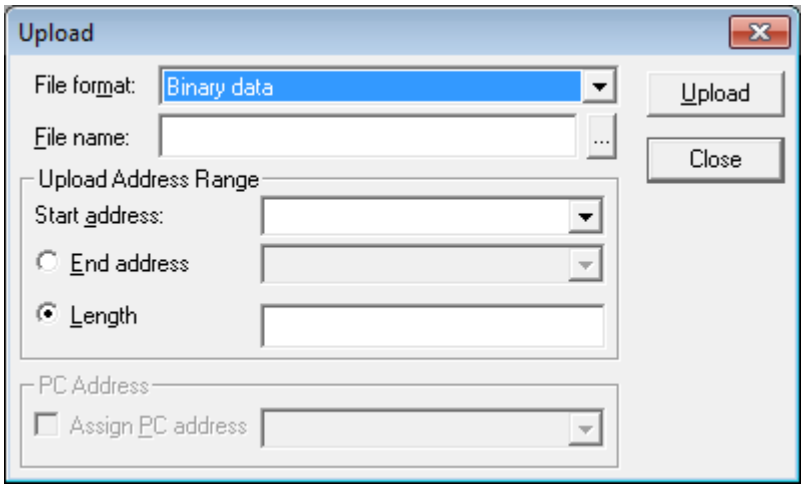


Figure 44

Table 12

<table>
<tr><td>File Format</td><td>Select one of the following file formats.

<table>
<tr><th>Format</th><th>Memory range</th><th>PC address specification</th><th>Automatic recognition</th><th>Remark</th></tr>
<tr><td>Intel standard HEX</td><td>0 to 64KB</td><td>Allowed</td><td>Allowed</td><td></td></tr>
<tr><td>Intel extention HEX</td><td>0 to 1MB</td><td>Allowed</td><td>Allowed</td><td>Segment value is added.</td></tr>
<tr><td>Intel 32bit HEX</td><td>0 to 4GB</td><td>Allowed</td><td>Allowed</td><td></td></tr>
<tr><td>Motorola S format HEX (S1 - S9)</td><td>0 to 64KB</td><td>Allowed</td><td>Allowed</td><td></td></tr>
<tr><td>Motorola S format HEX (S2 - S8)</td><td>0 to 16MB</td><td>Allowed</td><td>Allowed</td><td></td></tr>
<tr><td>Motorola S format HEX (S3 - S7)</td><td>0 to 4GB</td><td>Allowed</td><td>Allowed</td><td></td></tr>
<tr><td>High-speed download (SHF)</td><td>0 to 4GB</td><td>Not allowed</td><td>Allowed</td><td>This is our proprietary format.</td></tr>
<tr><td>Binary data</td><td>0 to 4GB</td><td>Not allowed</td><td>Not allowed</td><td>Uploads data as binary data.</td></tr>
</table>

INFO “Allowed” in the automatic recognition field indicates whether the format can be automatically recognized when this software downloads data.</td></tr>
<tr><td>File name</td><td>Specify the name of the file to save.</td></tr>
<tr><td>Upload Address range</td><td>Start address : Specify the start address.
End address : Specify the end address.
Length : Select and specify the end address or the range length.</td></tr>
<tr><td>PC Address</td><td>When the Intel HEX or Motorola HEX format is selected, the PC start address can be specified.</td></tr>
<tr><td>Upload</td><td>Reads data from the memory and saves to the specified file.</td></tr>
</table>

4.2.3. Set a Probe Environment

Set the probe environment.
Selecting the following menu item opens the [Probe Environment Setup] dialog box.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Probe Environment**	---

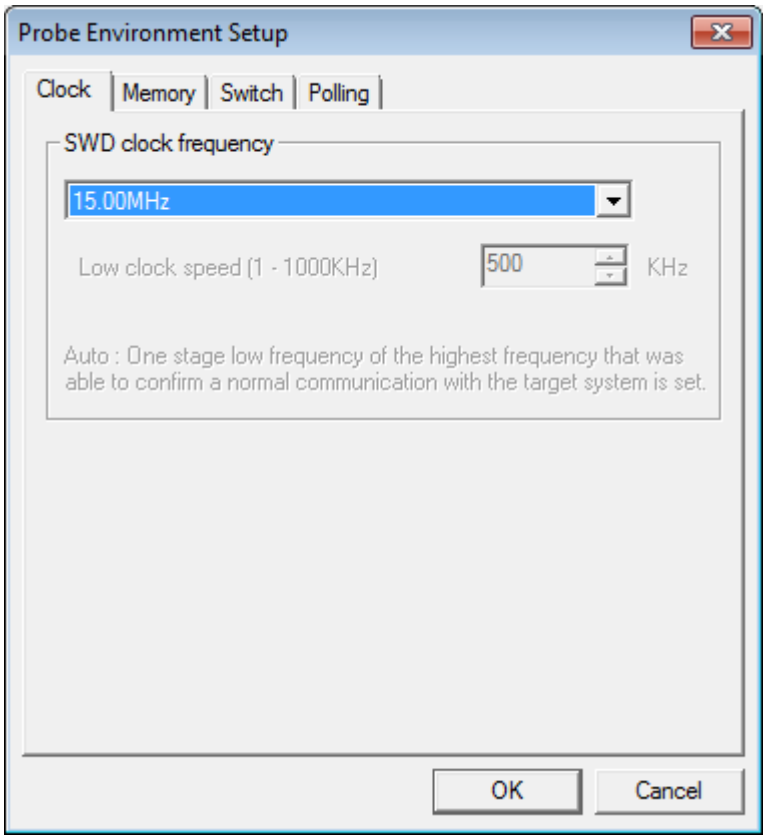


Figure 45

(1) Clock

Set the frequency of JTAG/SWD clock and user clock.
Lower the frequency if a JTAG/SWD error occurs.

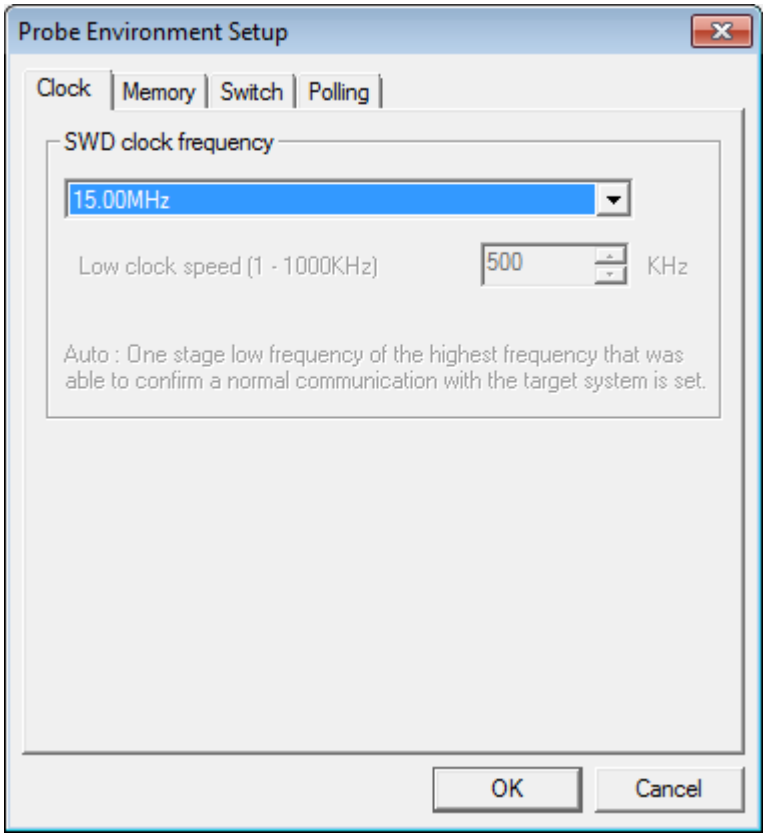


Figure 46

Table 13

JTAG clock frequency/ SWD clock frequency	Select the JTAG or SWD clock frequency. * The low-speed clock frequency can be specified from 1 to 1000KHz.

(2) Memory

Set basic memory operations in this software.

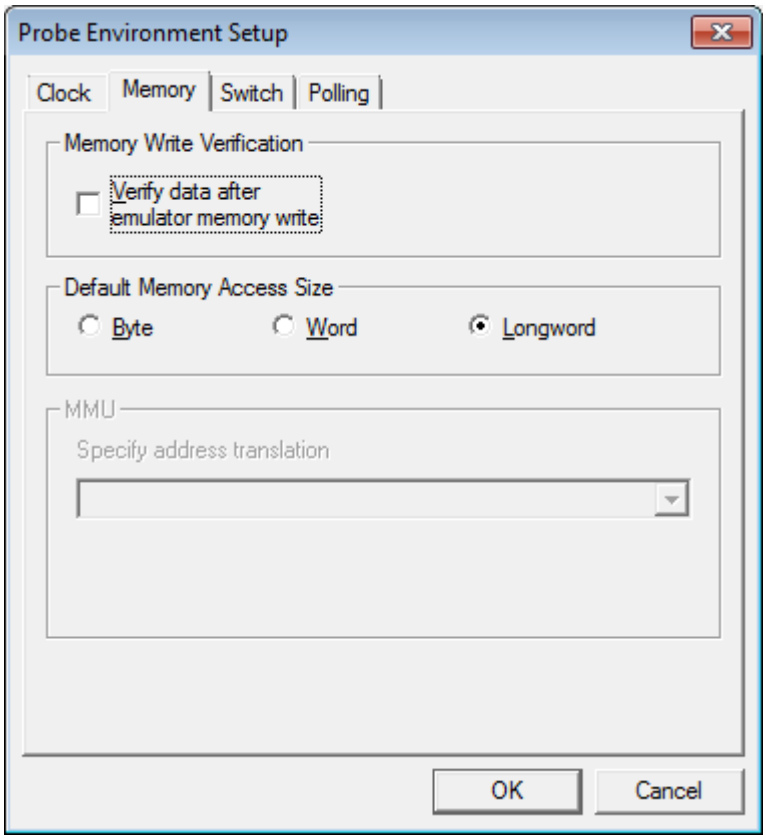


Figure 47

- **Memory Write Verification**

Table 14

Verify data after emulator	Reads the memory again to check whether data was correctly written when this software writes data in the memory. A message is displayed when data was not correctly written in the memory.

- **Default Memory Access Size**

Table 15

Byte	Select the default memory access size when this software accesses the memory.
Word	
Longword	

INFO The values set here are used when accessing the memory from the dump windows.

(3) Switch

Set the target CPU.

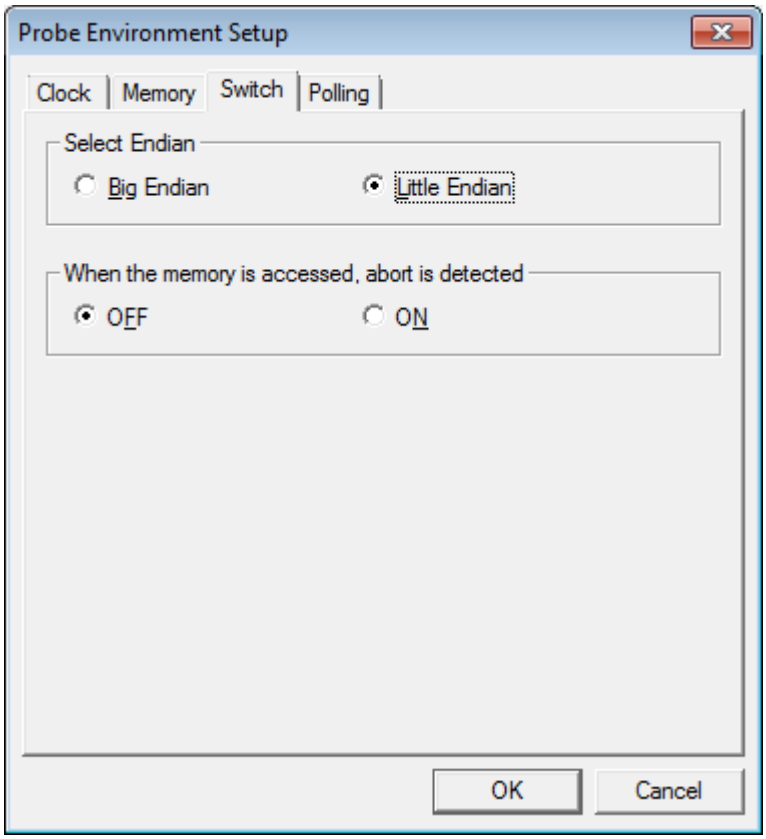


Figure 48

Table 16

Select Endian	Big Endian: Use big endian to analyze instructions and for other purposes. Little Endian: Use little endian to analyze instructions and for other purposes.
When the memory is accessed. abord is detected	OFF : Does not conduct abort check when accessing the memory. ON : Conducts abort check when accessing the memory.

(4) Polling

Set the polling interval to monitor the target status.

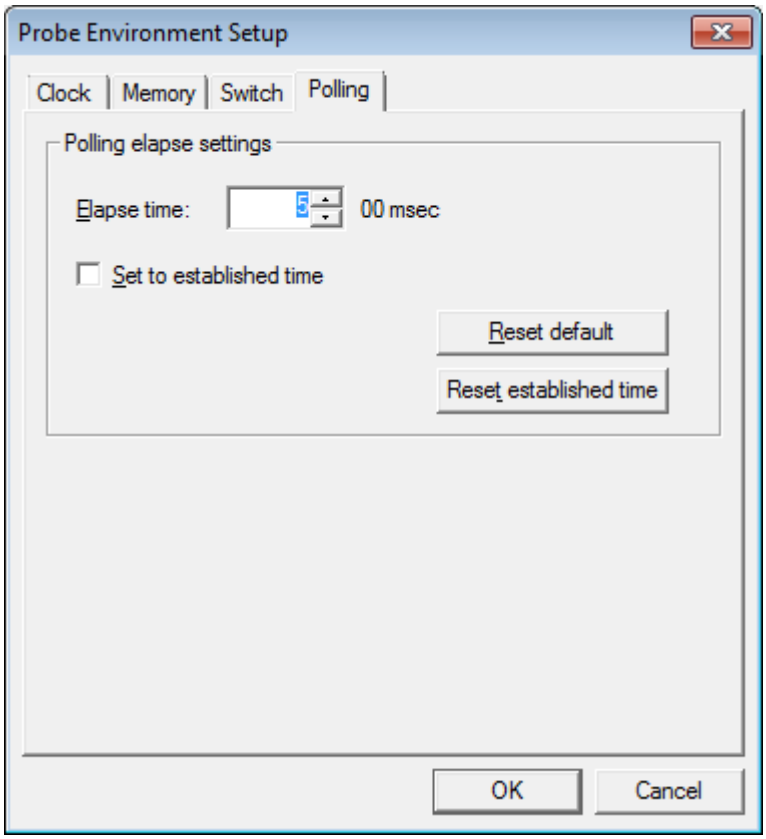


Figure 49

Table 17

Polling elapse setting	Set the polling interval to 100ms. The valid range is from 100ms to 4,294,967,200ms.
Use Elapse time	The set value becomes the preset value and used for subsequent projects.
Reset default	Restores the default value (500ms).
Reset established time	Restore the value set as a preset value.

4.2.4. Set Batch File Automatic Execution

Set the timing to automatically execute a batch program.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource → Auto Execute Batch Select**	---

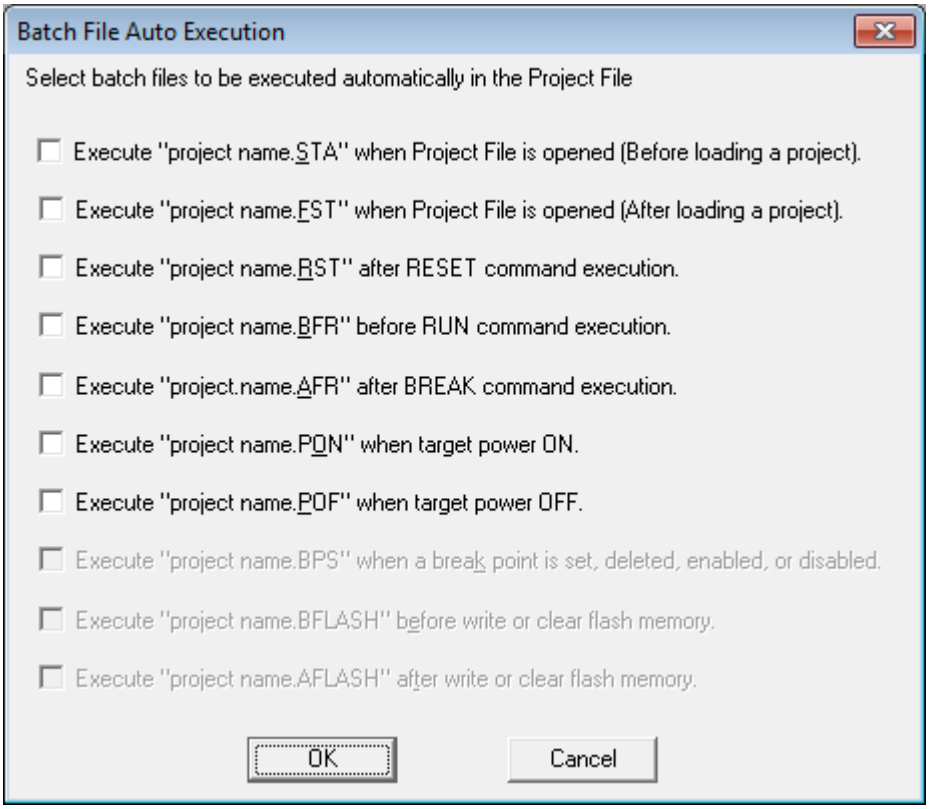


Figure 50

Table 18

When Project file is opened (before loading the project)	Execute a batch file when starting this software (before loading the project). This makes it possible to execute necessary processing in batch before loading various settings, window information and other data to avoid accessing an invalid memory or other problems. Batch file name: {project name}.sta
When Project File is opened (after loading the project)	Execute a batch file when starting this software (after loading the project). Batch file name: {project name}.fst
After RESET	Execute a batch file when the reset button is pressed. Batch file name: {project name}.rst
Before RUN command execution	Execute a batch file before executing the CPU. Batch file name: {project name}.bfr
After BREAK command execution	Execute a batch file after the CPU breaks. Batch file name: {project name}.afr
When target power ON	Execute a batch file when the target power is turned on. Batch file name: {project name}.pon
When target power OFF	Execute a batch file when the target power is turned off. Batch file name: {project name}.pof

Pressing the button on the toolbar executes a batch file named as follows:
Batch file name: {project name}.wrt

Tool button	Operation on the menu bar	Shortcut key
	---	---

Save batch files in the same folder as the project file.

4.2.5. Settings when Starting the Probe

Set the RTCK and reset signals of JTAG interface.
Select whether to reset or forcibly break the target when starting this software.
Select the following menu item and display the [Probe Initializatio Setup] dialog box.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource → Probe Initialization Setup**	---

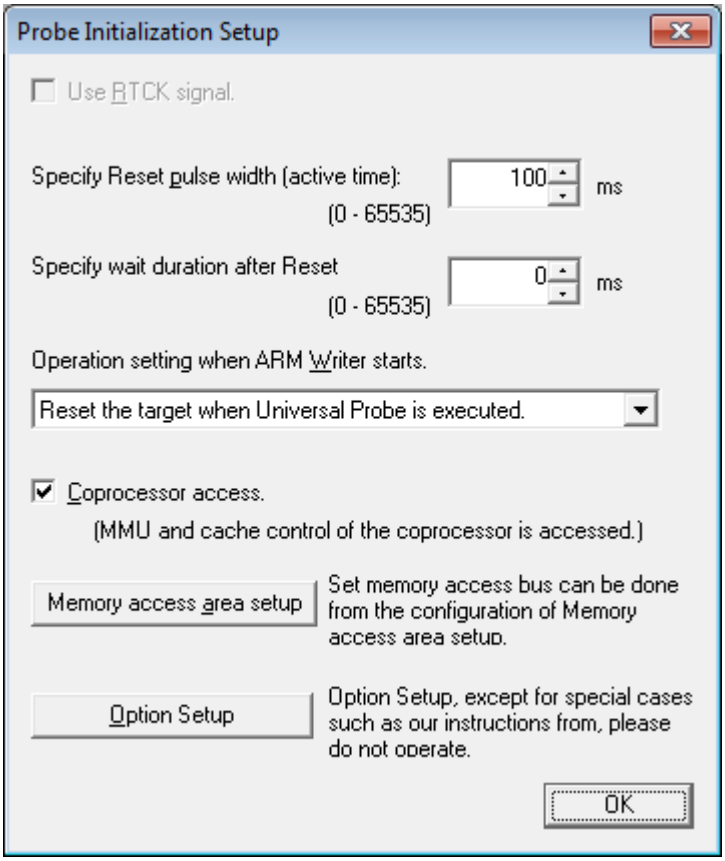


Figure 51

When the setting finishes, click the OK button.

(1) Use RTCK

Set whether the RTCK signal function on the JTAG interface is used.
The RTCK (ReturnTCK) signal is the signal output from the target.
When this checkbox is checkmarked, the probe controls JTAG using the RTCK signal.
Although the probe automatically recognizes whether to use RTCK, uncheck the checkbox if the software does not run with the checked settings.

Note that this software does not normally start if the setting is opposite to the specifications of target.

Table 19

Checkmarked	Uses the RTCK signal function.
Unchecked	Does not use the RTCK signal function.

(2) Specify Reset pulse width (active time)

Set the time to assert the reset signal of JTAG interface when the reset operation is executed in this software. The default value is 100ms. Set to 0ms if the reset signal cannot be asserted.

(3) Specify wait duration after Reset

Set the time from when the reset signal active time ends until when JTAG control starts.
The default value is 0ms.
This time must be longer than the time from when the JTAG reset signal is received until when the target releases the reset signal for CPU. If this setting is shorter than the time until release, this software controls JTAG while the CPU is in the reset status and cannot normally start as correct control is not possible.

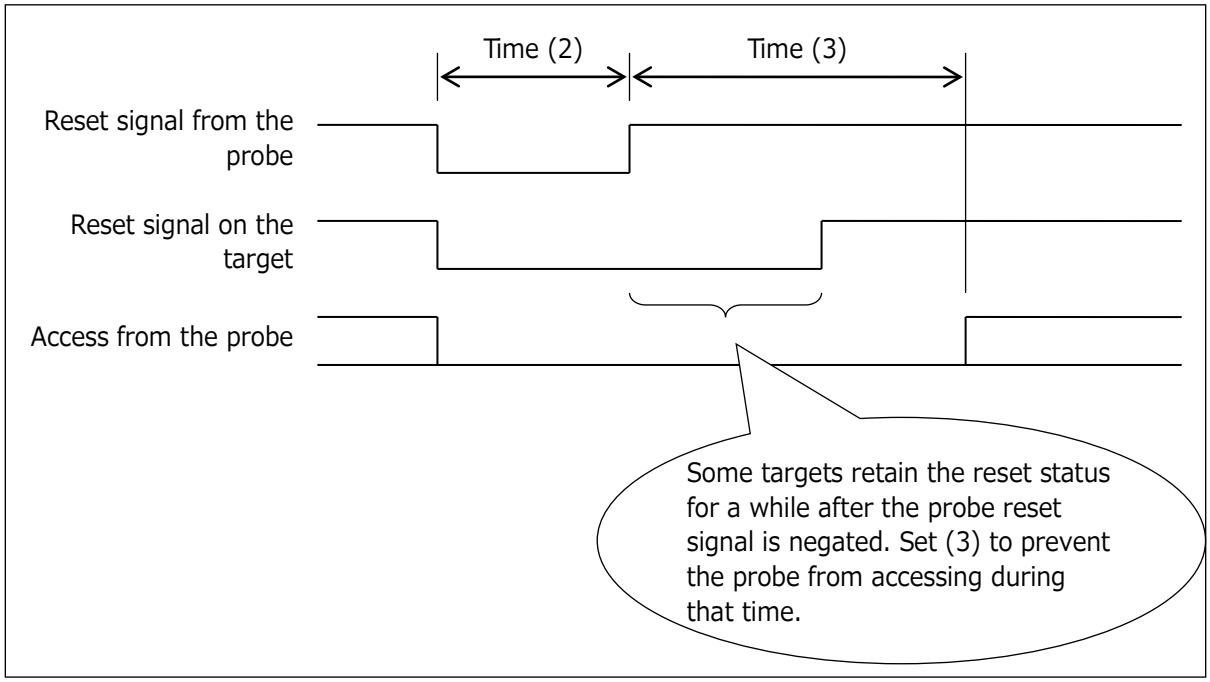


Figure 52

(4) Operation setting whe ARM Writer starts

Select whether to reset or forcibly break the target when starting this software.
This setting is saved in the project file, and therefore, is restored next time this software starts up with the same project file.

This may be set by using the **option for starting** for this software. The option for starting in this software has a higher priority than the setting saved in the project file and is convenient when you want to use the set values in the project file but temporarily change the operation at startup.

Table 20

Reset the target when ARM Writer is executed	Resets the target at startup. (default)
Stop(Break) the target when ARM Writer is executed	Forcibly breaks the target at startup.
Initialize only when ARM Writer is executed	It will execute the ARM Writer without resetting or without forcibly breaking the target at startup.

This software resets the target at startup if started by default.
However, for example when the probe and the cable are not connected, when you want to check the operating target CPU (debug the program target in midstream by keeping the operating status of the target), normal startup resets the target at startup. Therefore, use this option so that the target is not reset.

However, note that this software may not correctly acquire register or other information from the target if this software starts in the “Break at startup” mode when the target is already in break mode. (Even in this case, debug can be normally conducted after that the target is reset.)
“Break at startup” is effective for the target under execution.

(5) Coprocessor access

Select whether to access the coprocessor.
This software accesses the coprocessor and automatically controls the MMU and cache. However, some targets accessing them do not make this software correctly start. In this case, uncheck the checkbox.

Table 21

Checkmarked	Accesses the coprocessor. (default)
Unchecked	Does not access the coprocessor.

(6) Memory access area setup

Clicking this button opens the [**Memory Access Area Setting**] dialog box.
This dialog box can be used to set how to access the memory in the target from this software or the area to which access is restricted.

4.2.6. Set the Memory Access Area

This dialog box is used to set how to access the memory in the target from this software or the area to which access is prohibited in the memory space on the target for the following reasons:

- Restrict access to the address space that does not have the corresponding memory.
- The memory space is not initialized, and therefore, inaccessible.
- Accelerate the access speed by changing the memory access path (APB/AHB).

This area can be specified only by using physical addresses.

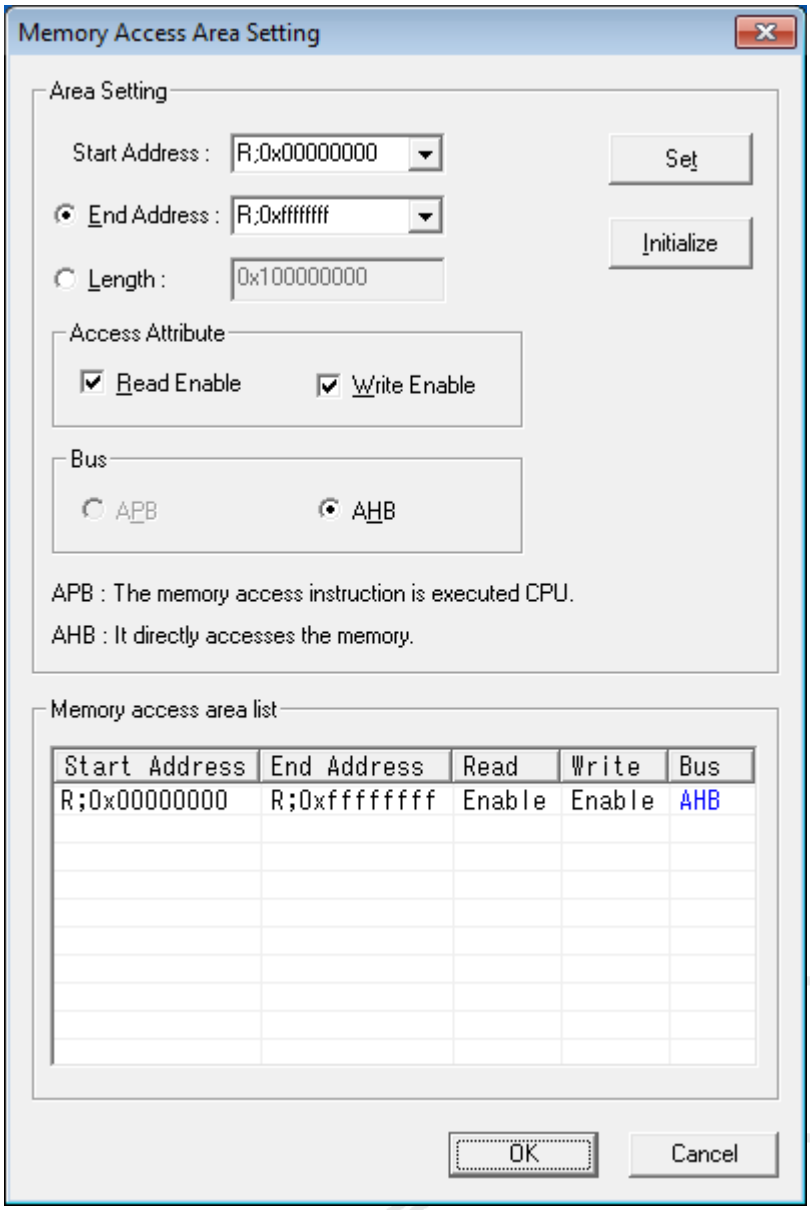


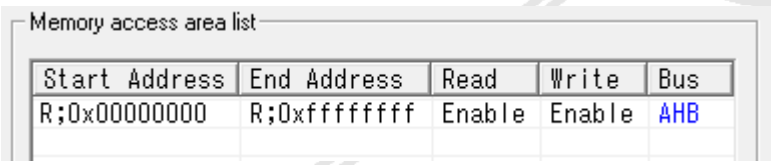
Figure 53

Table 22

Area Setting	Start address	Set the start address of the set area.
	End address	Set the end address of the set area.
	Length	Set the range length of the set area. The end address or the range length can be selected by using the radio button.
	Access Attributes	Set whether to allow reading/writing the memory. Read Enable : Allows reading the memory. Write Enable : Allows writing the memory.
	Bus	Select how to access the memory. APB : Process to make the CPU execute the memory access command. AHB : Method to directly access the memory bypassing the CPU.
	Set	Pressing the Set button adds the settings to the memory access area list.
	Initialize	Initializes the setting status in the memory access area list.
Memory access area list		Display memory access area settings. Displayed items are as follows (from left to right): • Start address • End address (or range length) • Status of read operation (allowed/prohibited) • Status of write operation (allowed/prohibited) • Status of access path (APB/AHB) To switch between the end address and the range length, set the radio button in [Set Area] or click the header end address and length.
OK		Enables the settings and closes the dialog box.
Cancel		Cancels all the operations performed after opening this dialog box and closes the dialog box.

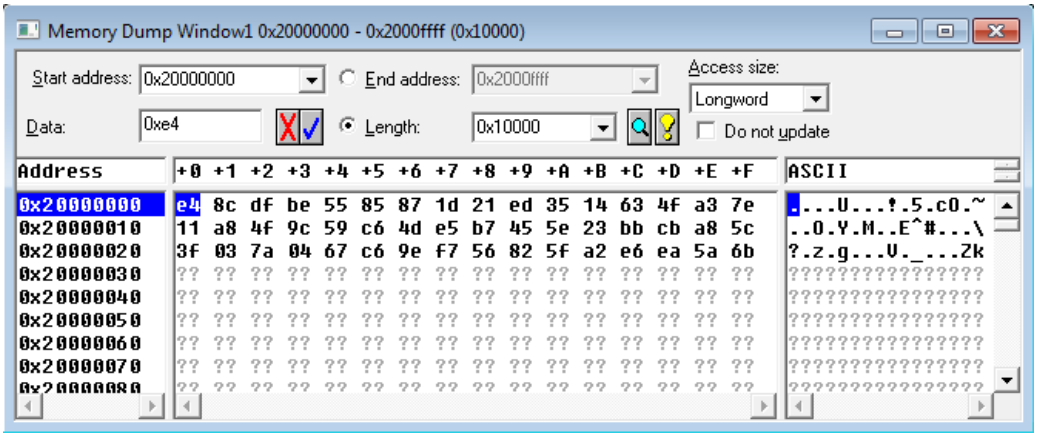
The memory may not be correctly accessed when using the AHB path, depending on CPUs.

The whole memory area is accessible (readable and writable) when newly created.



*The initial access path differs depending on the product.

When the area in the memory that cannot be read is displayed in the Memory Dump Window, gray question marks are displayed.



When the range specified in the Memory Dump Window includes the area in the memory that cannot be read, the whole part after the area is considered as not readable (even if there are areas that can be read) and gray question marks are displayed.

4.2.7. Memory/Port

For details, refer to "**4.4. Memory/Port**."

4.2.8. Flash Memory

For details, refer to "**4.5. Flash Memory**."

4.3. Go

The "Go" menu contains menu item that is used to control the execution status of the target CPU.

4.3.1. Start Execution

Start execution of the program from the current PC.
Execute CPU until it breaks.

Tool button	Operation on the menu bar	Shortcut key
	**Go** → **Go**	F5

4.3.2. Break

Break the running program forcibly and returns control back to this software.
The program can be forcibly broken in infinite loop, but it may impossible to forcibly break if the CPU is running out of control.

Tool button	Operation on the menu bar	Shortcut key
	**Go** → **Break**	ESC

4.3.3. Reset

Reset the target.
If the program is running on the CPU, the execution of the program is reset and stops at the reset address.

Since reset asserts the SRST signal of the probe, the SRST signal of the probe must be connected to the target, and the circuit of the target side must be able to reset the CPU. If the SRST signal is not connected, the target cannot be reset.

If (2) Time to assert the reset signal in "**4.2.5. Settings when Starting the Probe**" is 0ms, the SRST signal is not asserted but only the PC is reset to the reset address.

Tool button	Operation on the menu bar	Shortcut key
	**Go** → **Reset**	---

4.3.4. Cancel

Abnormal operation in the target, an attempt to access an area that cannot be accessed, or other unexpected or illegal operations may disable communication between the host PC (and the probe) and the target.
Executing this command may restore communication between them. However, even if communication could be restored, you should save the project file and restart all the systems since it is often the case that such a communication problem cannot be controlled properly.

Tool button	Operation on the menu bar	Shortcut key
---	**Go → Cancel**	---

4.3.5. Verify (Compare When Writing)

If writing is executed with this menu item checkmarked, verification is conducted after writing.

Tool button	Operation on the menu bar	Shortcut key
	**Go → Verify (Compare When Writing)**	---

4.3.6. Verify Only (Compare Without Writing)

If writing is executed with this menu item checkmarked, verification is conducted without writing.

Tool button	Operation on the menu bar	Shortcut key
	**Go → Verify Only (Compare Without Writing)**	---

4.3.7. Calculate Checksum Value

Whether a module could be written to the flash memory of the target or not can be checked by calculating and comparing the checksums of the module to be written and the data in the flash memory.

Table 23

Check sum in the data	Show the checksum of the data to be written to the flash memory. If no writing procedure has been registered, nothing is displayed.
Checksum in the target memory	Show the checksum of the data written to the flash memory. If no writing procedure has been registered, nothing is displayed.
Ranges	Show the address range of the data to be written to the flash memory. If no writing procedure has been registered, "None" is displayed.
Calculate	Calculates the checksums of the data to be written to the flash memory and the data written to the flash memory. If no writing procedure has been registered, "None" is displayed.

In order to use this function, a writing procedure must have been registered in the probe.
For details about registration of a writing procedure, refer to "**9. Stand-alone Functions**."

4.4. Memory/Port

The "Memory/Port" menu contains menu item that handles the memory.

4.4.1. Fill Up Memory

Fill up the specified range of memory with specified data.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Memory/Port** → **Fill**	---

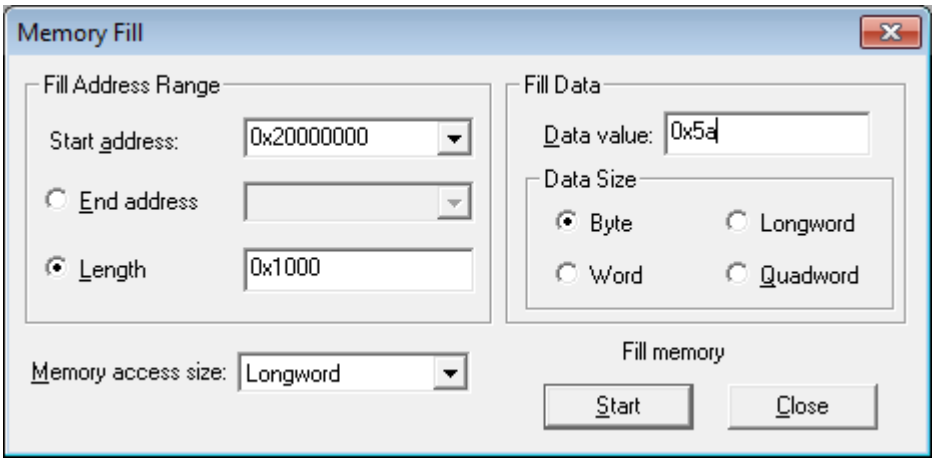


Figure 54

(1) Fill Address Range

Set the address range to fill up.

Table 24

Start address	Specify the start address.
End address	Specify the end address.
Length	Specify the range length.

(2) Fill Data

Table 25

Data value	Specify data with which to fill up.
Data Size	Specify the size of data with which to fill up. Example 1: If you select Long Word and specify "0x5A" as the fill-up data, the data "0x0000005A" is filled up. Example 2: If you select Byte and specify "0x1234" as the fill-up data, the data "0x34" is filled up.

(3) Memory Access Size

Specify the access size when memory is filled up.
Sets the default in "Set Default Memory Access Size" in the "Memory" tab in the [**Probe Environment Setup**] dialog box.

(4) Memory Fill-up Result

Shows the result of memory fill-up.
If a large memory range is specified, the following dialog box may appear.
If the operation takes too long, it can be cancelled.

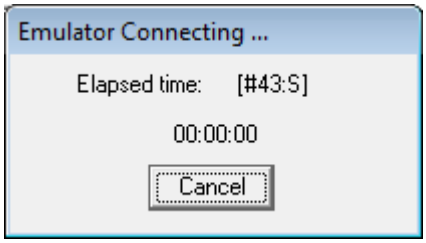


Figure 55

The result also appears in the Command window.

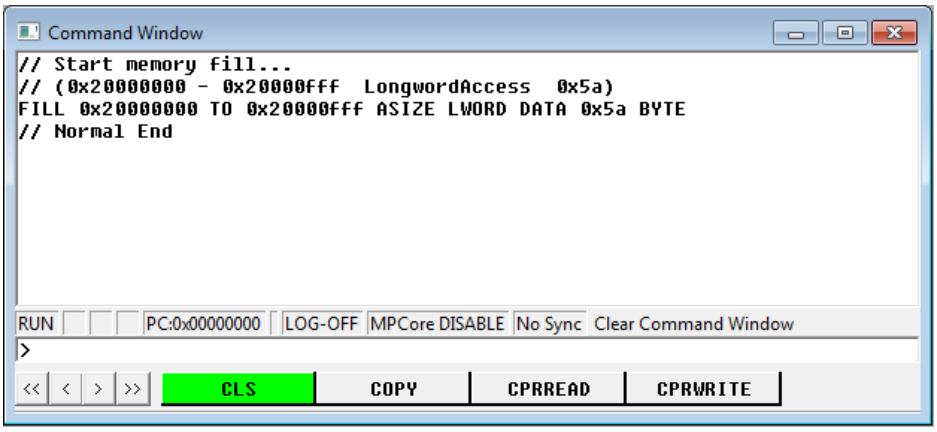


Figure 56

4.4.2. Check Memory

Reads/writes data from/to the specified area of memory with the specified memory access size and checks the memory.
Random data is read/written.
If an error is found, the address where the error occurred, the written data, and the read data are displayed.
If the number of errors reaches 100, memory check is discontinued.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource → Memory/Port → Check**	---

Note that the data in the checked memory area is overwritten by check data.

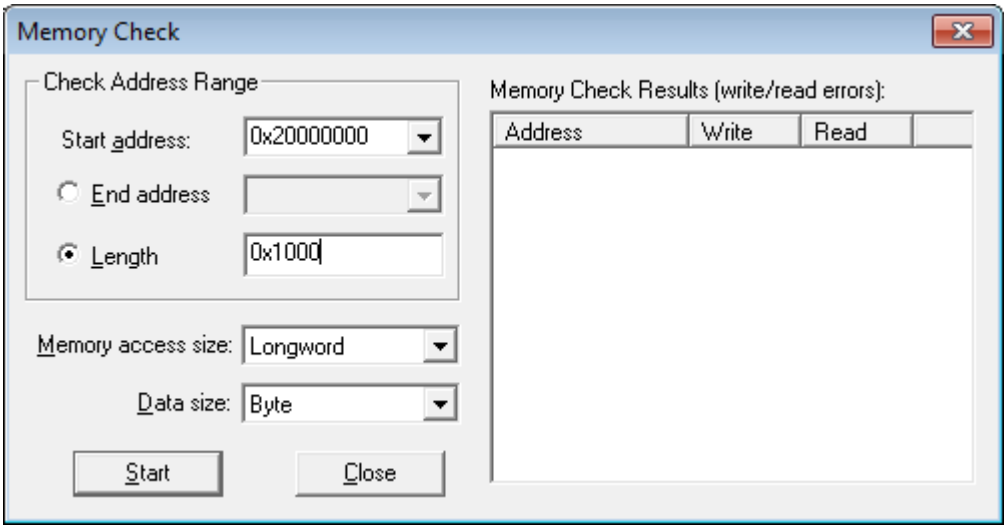


Figure 57

(1) Check Address Range

Set the address range over which a memory check is conducted.

Table 26

Start address	Specify the start address.
End address	Specify the end address.
Length	Specify the range length.

(2) Memory Access Size

Specify the access size when a memory check is conducted.
Sets the default in "Set Default Memory Access Size" in the "Memory" tab in the [**Probe Environment Setup**] dialog box.

(3) Data Size

Select the size of data with which a memory check is conducted.

(4) Memory Check Result

Shows the result of a memory check.
If a large memory range is specified, the following dialog box may appear.
If the operation takes too long, it can be cancelled.

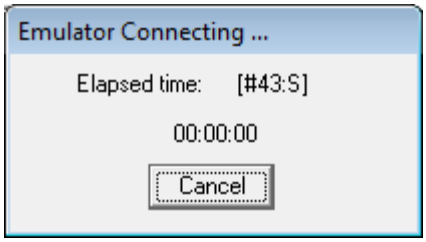


Figure 58

The result also appears in the Command window.

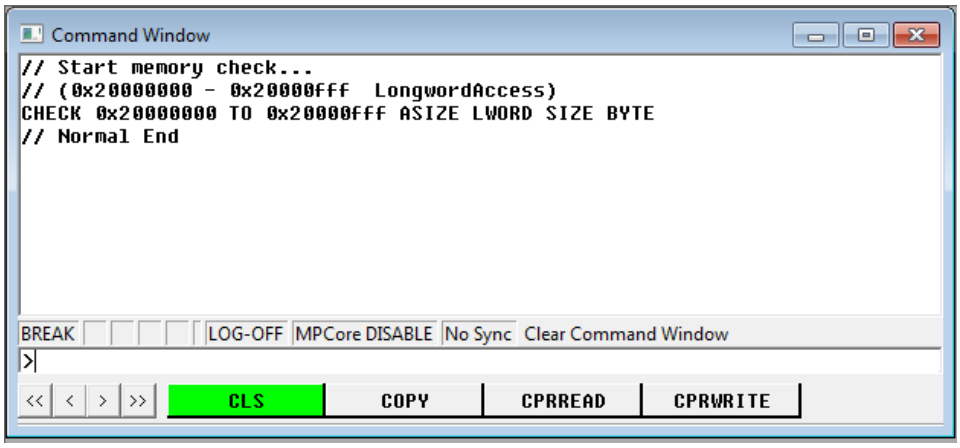


Figure 59

4.4.3. Search Memory

Searches the specified range of memory and shows the addresses containing data that matches or does not match the specified data.
Numerical values or ASCII character strings can be specified as the search data.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Memory/Port** → **Search**	---

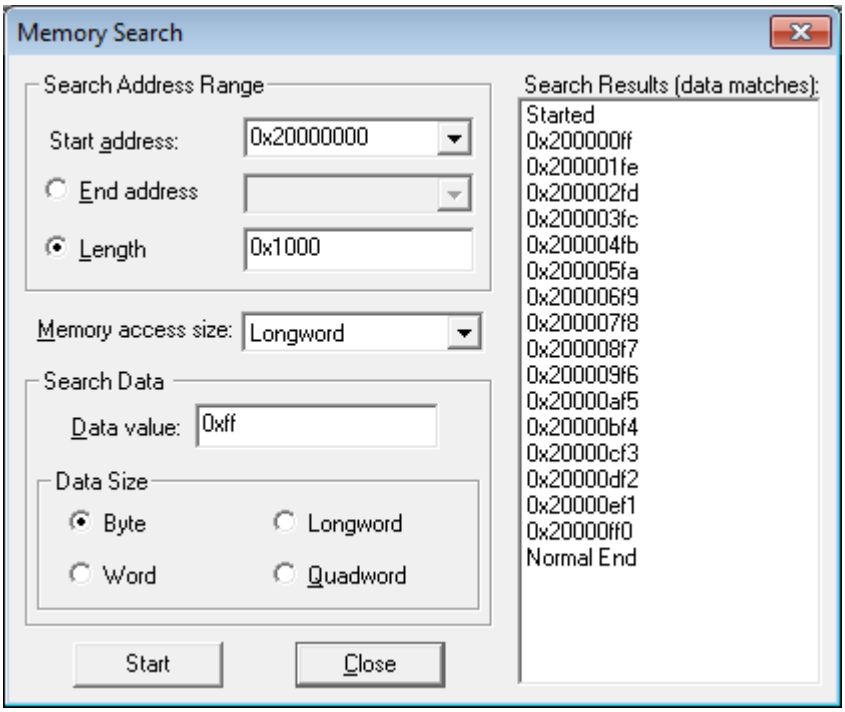


Figure 60

(1) Search Address Range

Set the address range over which a memory check is conducted.

Table 27

Start address	Specify the start address.
End address	Specify the end address.
Length	Specify the range length.

(2) Memory Access Size

Specify the access size when a memory search is conducted.
Sets the default in "Set Default Memory Access Size" in the "Memory" tab in the [**Probe Environment Setup**] dialog box.

(3) Search Data

Table 28

Data value	Specify data to search for. To search for data that does not match the specified data, prefix the search data with an exclamation mark (!). You cannot search for data that does not match a character string. Numerical value: 0x34, 128, !0x56, etc. ASCII character string: ”abcdef,” ”ghijk,” etc.
Data Size	Specify the size of data to search for.

(4) Search Result

Shows the addresses retrieved by a memory search.
The result also appears in the Command window.

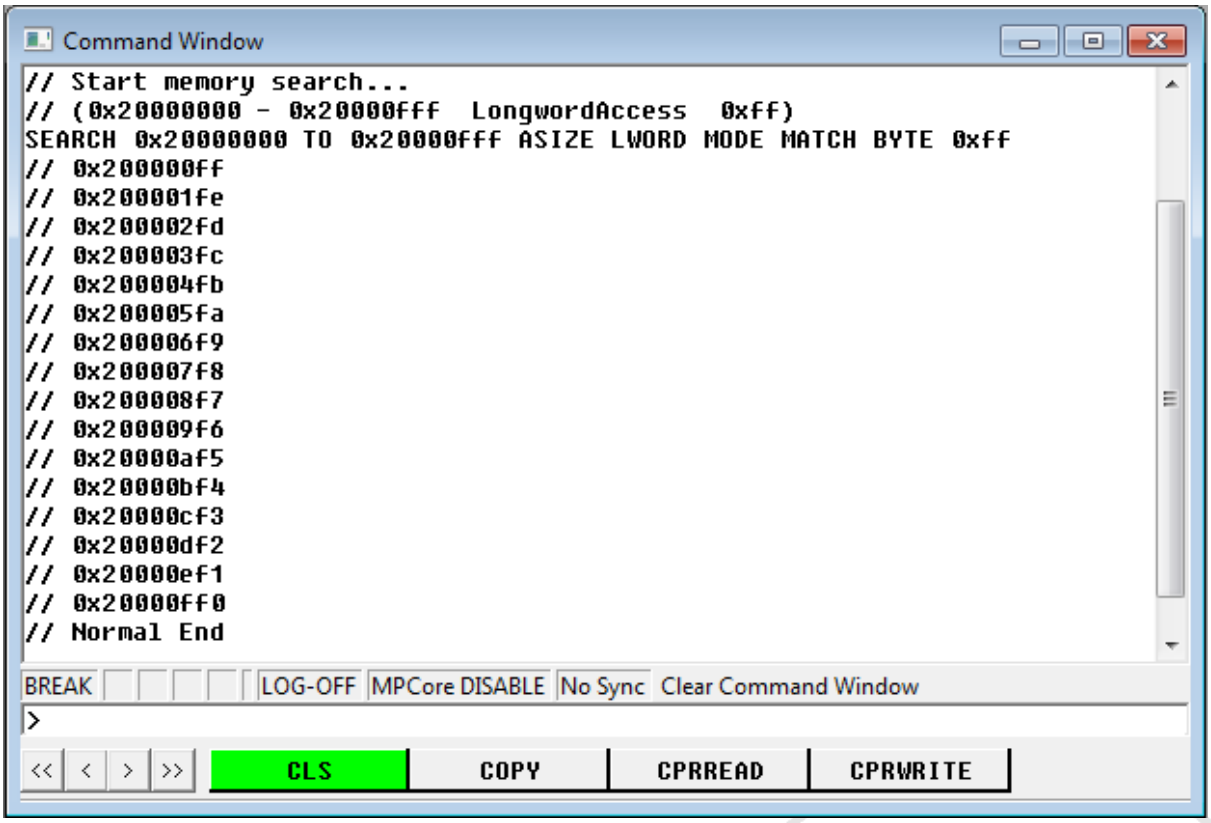


Figure 61

4.4.4. Copy Memory

Copies the specified range of memory.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Memory/Port** → **Copy**	---

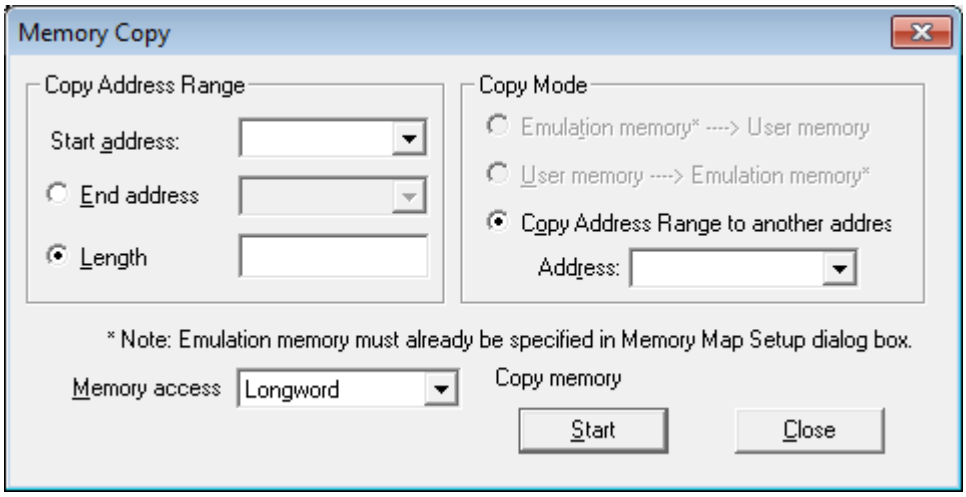


Figure 62

(1) Copy Address Range

Set the address range over which a memory check is conducted.

Table 29

Start address	Specify the start address.
End address	Specify the end address.
Length	Specify the range length.

(2) Copy Mode

Table 30

Emulation Memory --> User Memory	Not usable in this software.
User Memory --> Emulation Memory	Not usable in this software.
Copy Address Range to another address	Specify the start address of the forwarding memory in <Address>.

(3) Memory Access Size

Specify the access size when a memory search is conducted.
Sets the default in "Set Default Memory Access Size" in the "Memory" tab in the [**Probe Environment Setup**] dialog box.

The result also appears in the Command window.

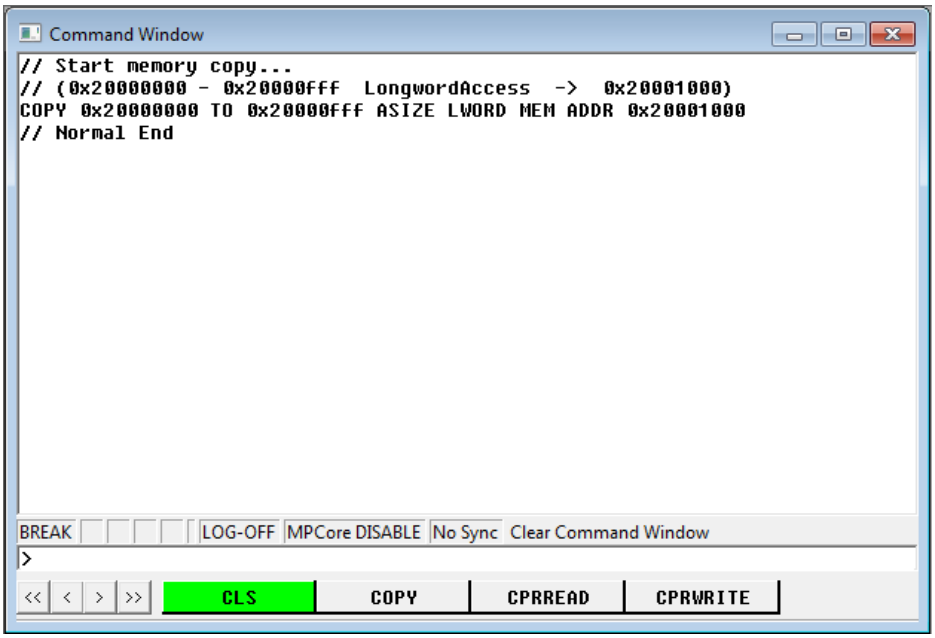


Figure 63

4.5. Flash Memory

4.5.1. Flash memory setup dialog box

This dialog box is used to perform operations related to flash memory.
By switching between the tabs in the upper left of the dialog box, the following seven operations can be performed:

Tool button	Operation on the menu bar	Shortcut key
---	**Resource → Flash Memory → Device Setup**	---

1) Add the flash memory
2) Operate work memory
3) Obtain and show the block information
4) Save/load the configuration file
5) Clear flash memory
6) Fill up flash memory
7) Other settings

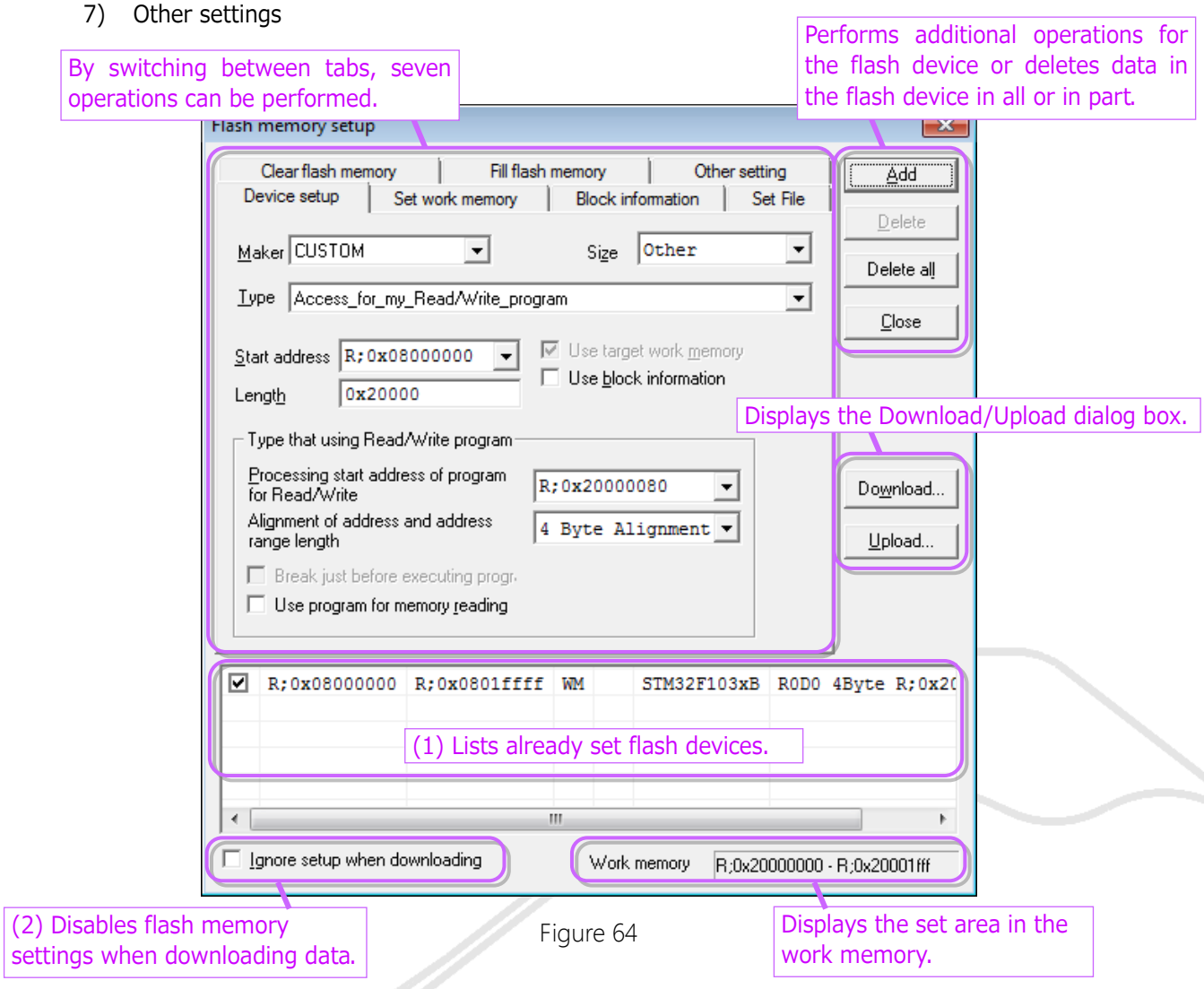


Figure 64

(1) Device list

The settings of the flash memory added are listed.
Each item in the list is shown as in the table below from left to right.

Table 31

Enabled/disabled	Indicates whether the set flash memory is enabled or disabled. The settings of the checkmarked flash memory are enabled, while those of unchecked flash memory are disabled.		
Start address	Indicates the start address of the flash memory.		
End address	Indicates the end address of the flash memory.		
Work memory	"WM" in this column indicates that work memory is used. This column is blank if work memory is not used.		
Block information	"BI" in this column indicates that block information is used. This column is blank if block information is not used.		
Device name	Indicates the device name of the flash memory to be set.		
Other additional information	Standard device	S- P- -BitBus	: Number of serial connections : Number of parallel connections : Bus width
	Device that uses a read/write program	R- D- -Byte 0x--------	: Read mode (0 = OFF, 1 = ON) : Debug mode (0 = OFF, 1 = ON) : Alignment : Address from which processing of the read/write program starts

* The hyphen (-) in the table represents an integer value.

(2) Ignore Settings When Downloading

All the flash memory settings are ignored when downloading an object data file regardless of whether the flash memory is enabled or disabled in the device list.

→ For details about read/write program, refer to “Software users manual - Memory Command Builder.”

4.5.2. Device Setup tab

This tab is used to set (add) flash memory.
The range specified here is treated as flash memory, and automatically operates as flash memory for download or other processing.
Some flash memory supports high-speed writing using work memory. For such flash memory, whether to perform high-speed writing to a set area can also be set in this tab.

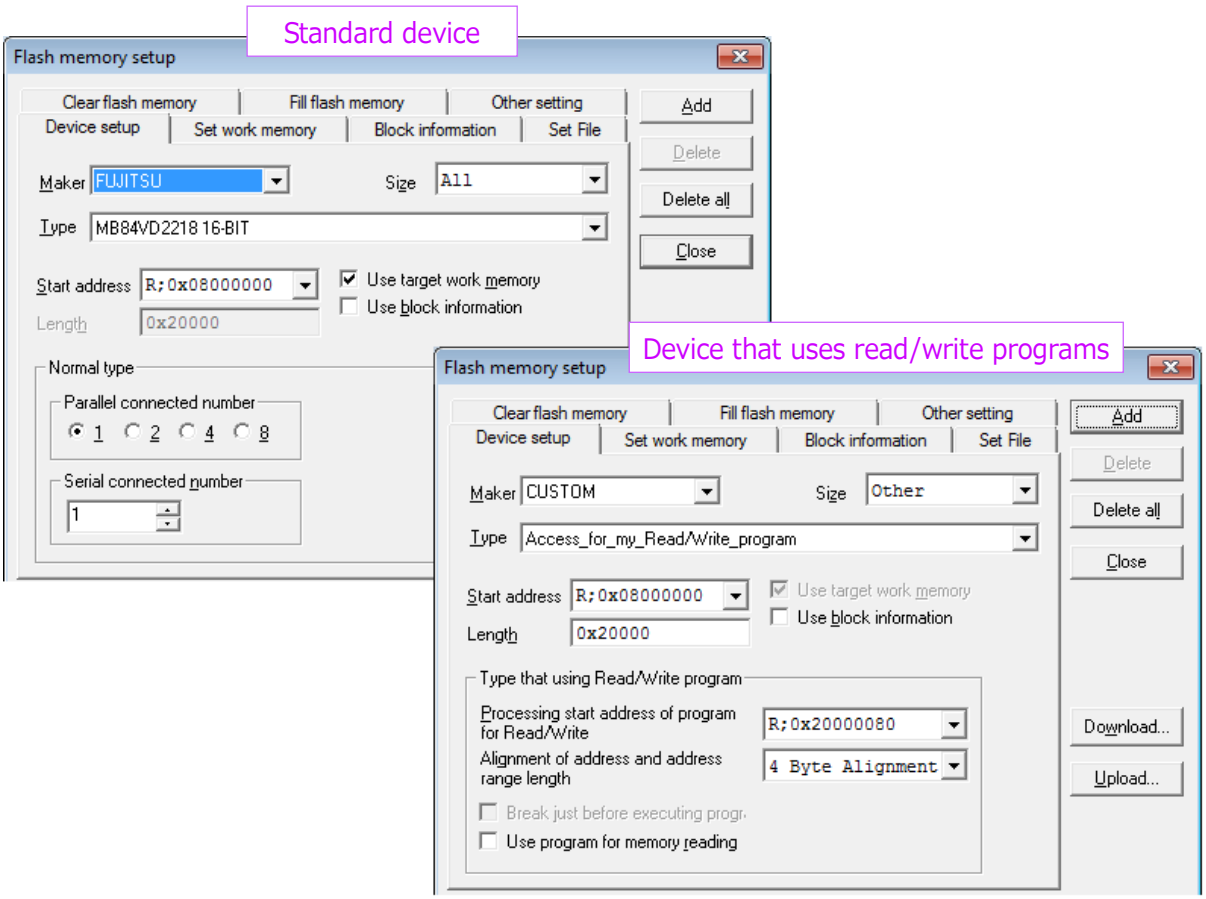


Figure 65

After entering each setting item, clicking the Add [Add] button in the upper right of the [Flash memory setup] dialog box sets (adds) the flash memory.

> If you switch to another tab or close the Device setup dialog box without clicking the [Add] button, the set content is discarded.

Each setting item is described below:

Table 32

Maker	Select the manufacturer of flash memory to be set. The flash memories displayed in the <Type> box are filtered by the manufacturer selected here. CUSTOM uses a read/write program.	
Size	Select the size of the flash memory installed in the target. The flash memories displayed in the <Type> box are filtered by the specified size here.	
Type	Select the flash memory installed in the target.	
Start address	Specify the start address of the flash memory allocated in the target.	
Length	Specify the range of the flash memory allocated in the target. The flash memory whose range cannot be changed is grayed out.	
Use target work memory	Use when performing high-speed writing to the flash memory. The type of flash memory that uses <created read/write program> also uses this area.	
Use block information	Use block information in writing process.	
Normal Type	Parallel connected number	Specifies the number of parallel-connected flash memory on the target. This method assigns flash memory to a single address and increases the bus width.
	Serial connected number	Specifies the number of serial-connected flash memory on the target. This method assigns flash memory to a single bus and increases the address range.
Type that using Read/Write program	Processing start address of program for Read/Write	Set the address from which processing of the read/write program starts. The address set for the last flash memory added is reflected to all settings.* Two or more start addresses cannot be set.
	Alignment of address and address range length	Select the alignment for the address or range length passed to the read/write program. If not found in the list, set your own in the read/write program.
	Break just before executing prog	Not usable in this software.
	Use program for memory reading	Use the read/write program also for reading memory. Please check this checkbox if you made the read sequence in read/write program by "Memory Command Builder".

If flash memory is not allocated in consecutive addresses, register separately in multiple blocks. Work memory for flash memory is shared among the flash memory registered.

4.5.3. Work Memory tab

This tab is used to set a work memory area used in writing to flash memory that supports high-speed writing.

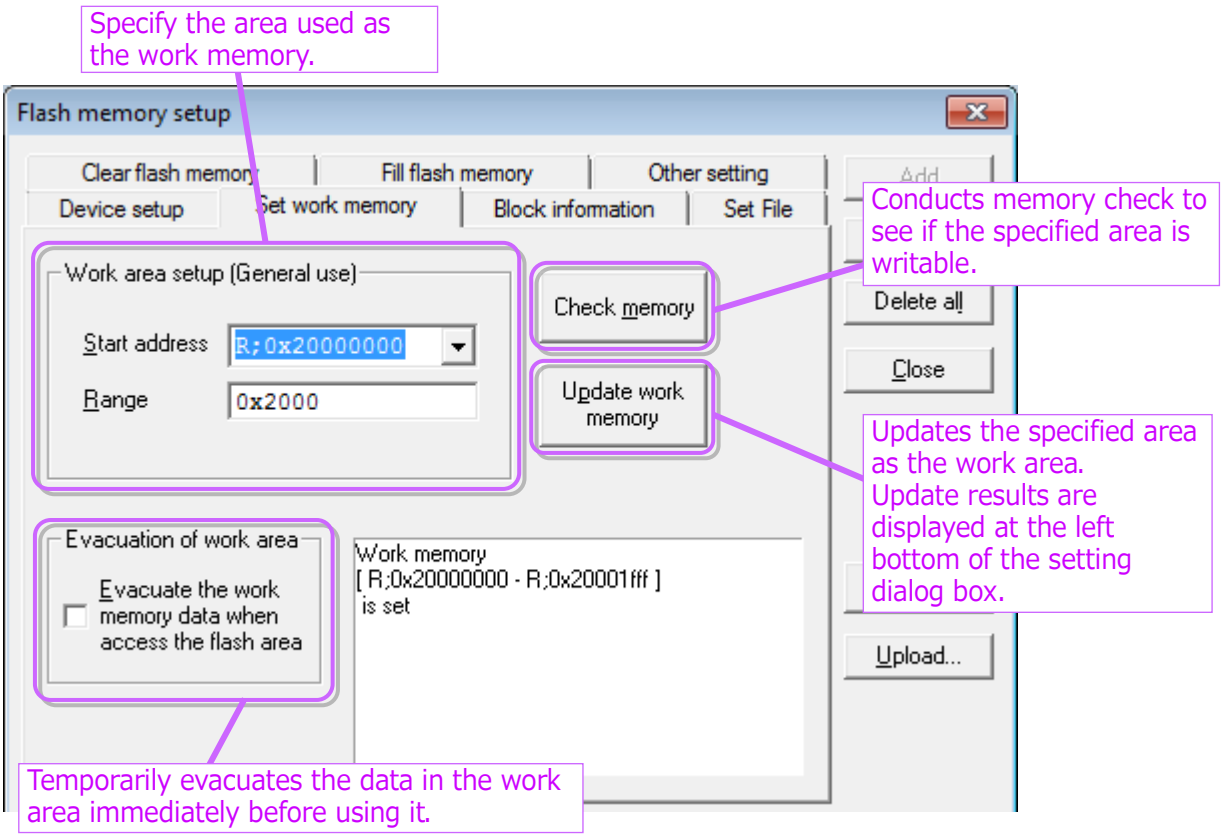


Figure 66

If two or more different types of flash memory are added to the list, a work area is shared among all of them.
To allocate object data in the work area, checkmark the "Evacuate of work area" checkbox so that the data in the work area is temporarily evacuated.

4.5.4. Block Information tab

This tab is used to examine block information for the flash memory being set and to display the block information obtained.

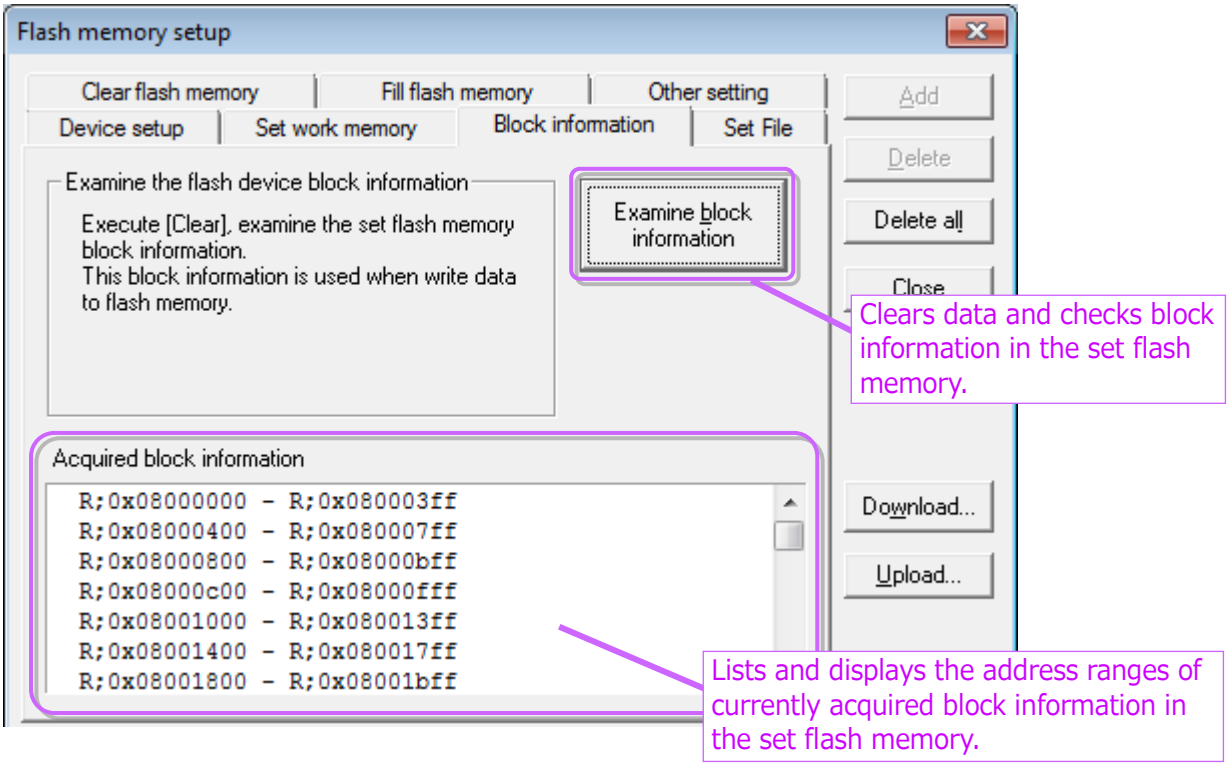


Figure 67

(1) Block information

Block information is the minimum range that must be cleared when writing to the set flash memory. By using this information, this software can minimize the range to be cleared in order to write data faster or to reduce the number of times writing processing is performed.

Use of the block information eliminates the need for the user to clear the flash memory before writing (downloading). If block information is not used or examined, the range of the flash memory in which data is to be written must be cleared manually before writing (downloading).

(2) Points to note about examination of block information

When block information is examined, clearing operation is performed by this software more than one time for all the flash memory registered in the flash memory list. Since the flash memory has been cleared after this examination, the object data that had been written must be written again.

Examined block information is saved in the configuration file for the flash memory. Thus, once the configuration file is loaded, you do not need to examine block information every time this software is started.

4.5.5. Set File tab

This tab is used to save to or load from the flash memory configuration file.
For a new project, the name of the configuration file defaults to {project file name}.fsh.

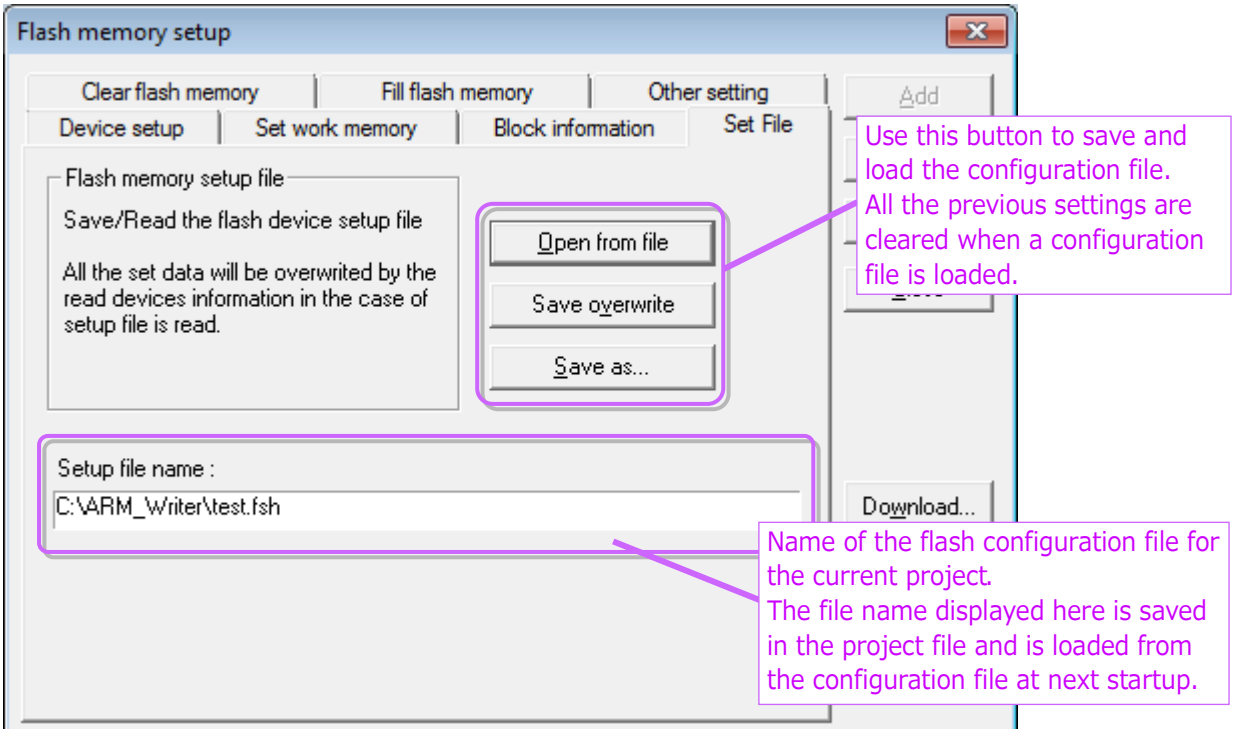


Figure 68

4.5.6. Clear Flash Memory tab

This tab is used to clear the contents of flash memory.

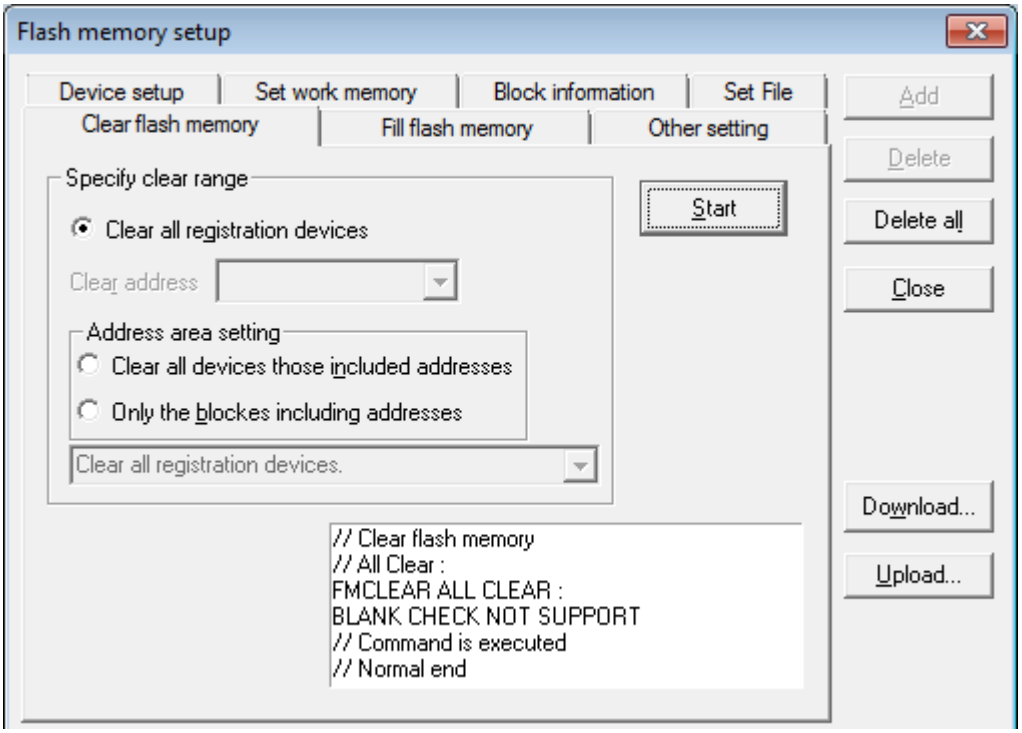


Figure 69

Flash memory can be cleared in the following three ways.

Table 33

Clear All Registration Devices	Clears all of the set flash memory.
Clear all devices those included addresses	Clears the flash memory corresponding to one device containing the address specified in <Clear address>.
Only the blockes including addresses	Clears the flash memory corresponding to one block containing the address specified in <Clear address>.

The image of objective areas is shown in Figure 70.

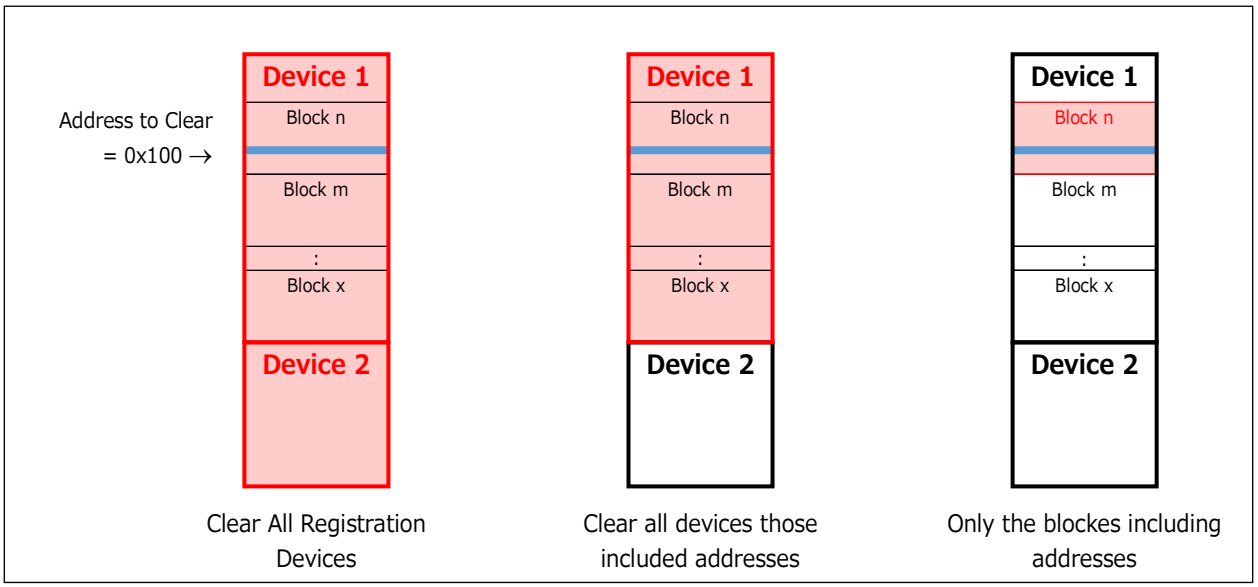


Figure 70

When Clear Whole Device is selected, three methods for clear can be selected.

Table 34

Clear all registration devices.	Clears the flash memory regardless of whether data has been written to it.
Clear all registration devices if it was written in.	Conducts a blank check. Clears the flash memory if data has been written to it.
Clear block if it was written in.	Conducts a blank check. Clears the block where data has been written.

A blank check examines whether data has been written to it in the range of flash memory from the start address to the end address. Data other than 0xFF is considered as data written to the flash memory.

4.5.7. Fill flash memory tab

This tab is used to fill up the specified range of flash memory with any data.
Specifying the address range and fill-up data and clicking the Start button start the fill-up process.
Specify the flash memory settings before filling up the flash memory.

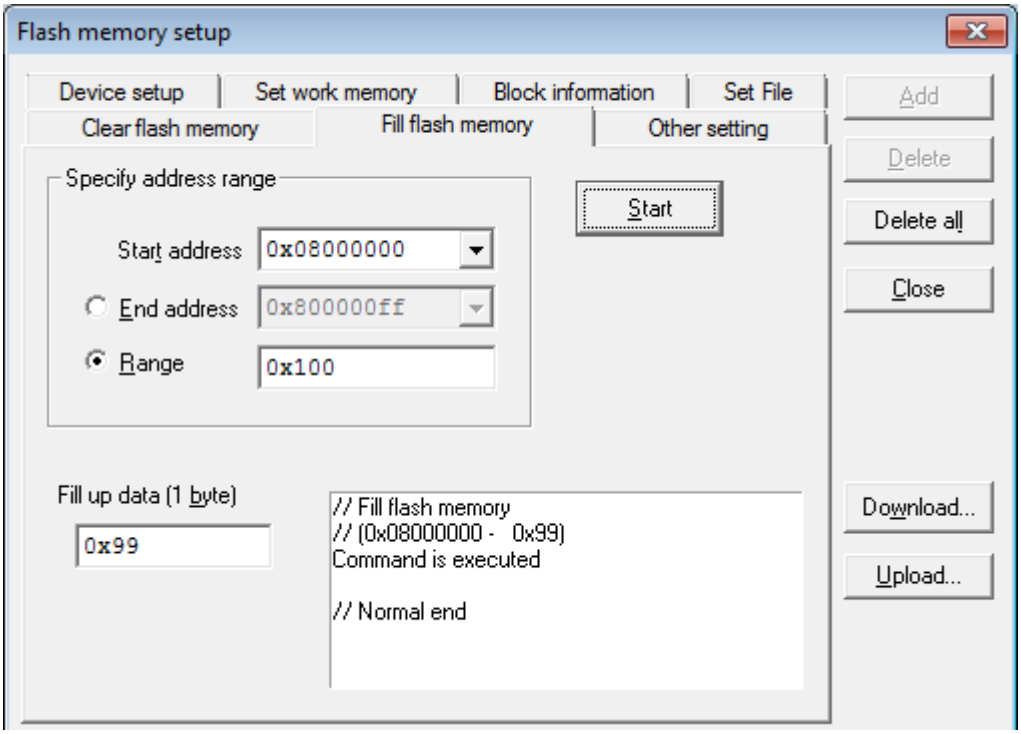


Figure 71

Table 35

Specify Address Range	Start Address: Specify the address of the flash memory from which fill-up starts. End Address: Specify the address of the flash memory where which fill-up ends. Length: Specify the range from the start address.
Fill up Data	Specify data to be written to the flash memory. Only byte-size data can be specified.

5. Windows

This chapter explains the windows of this software.

5.1. Docking of Windows

Child windows of this software can be docked at the top, bottom, right or left edge of the main window or placed outside the main window.

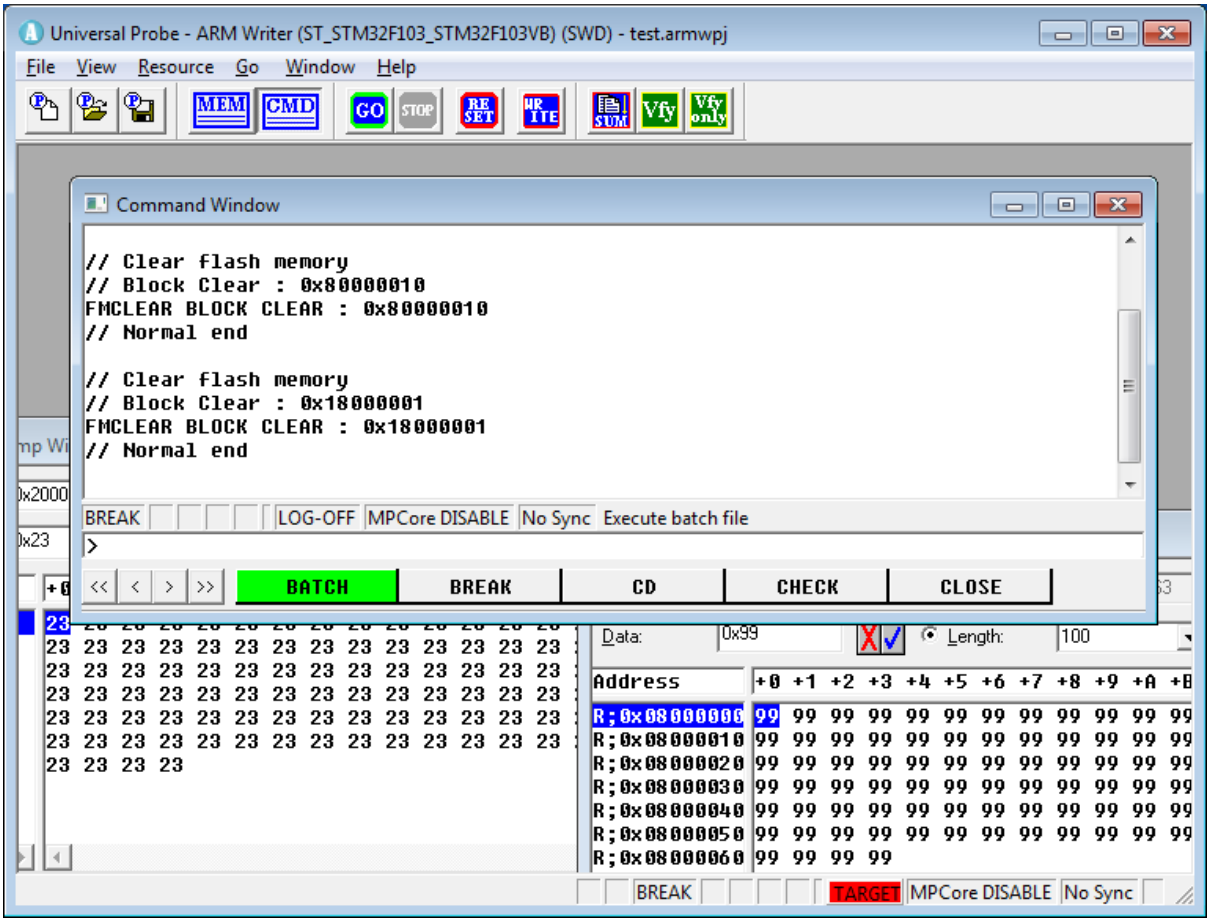


Figure 72

5.1.1. State of Windows

(1) MDI child windows (standard windows)

These are windows that can be moved or scaled freely within the main window of this software.
Each window of this software is opened in this state.

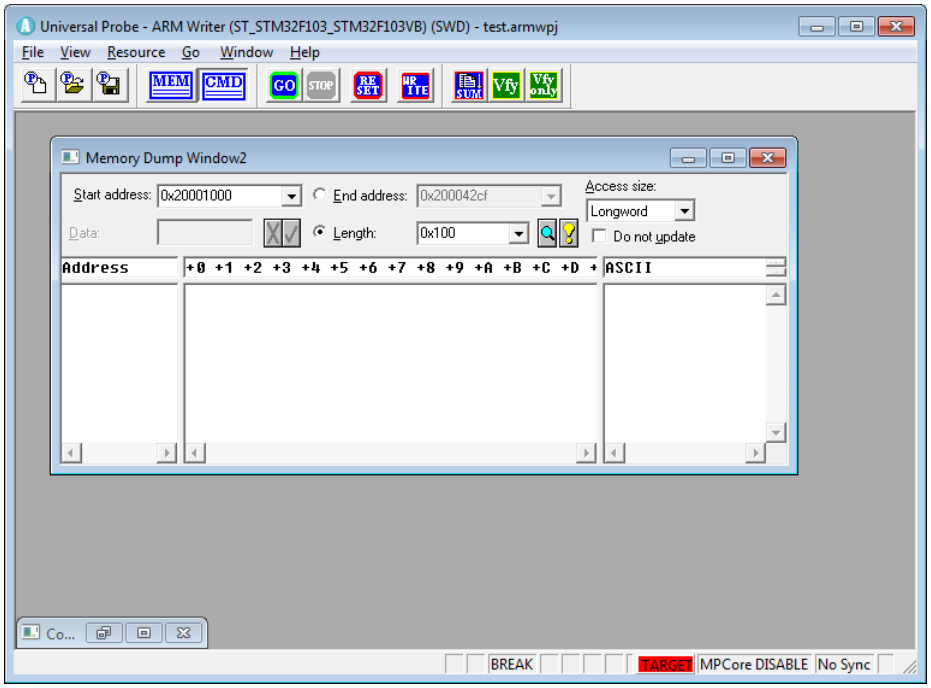


Figure 73

MDI child windows cannot be moved out of the main window.

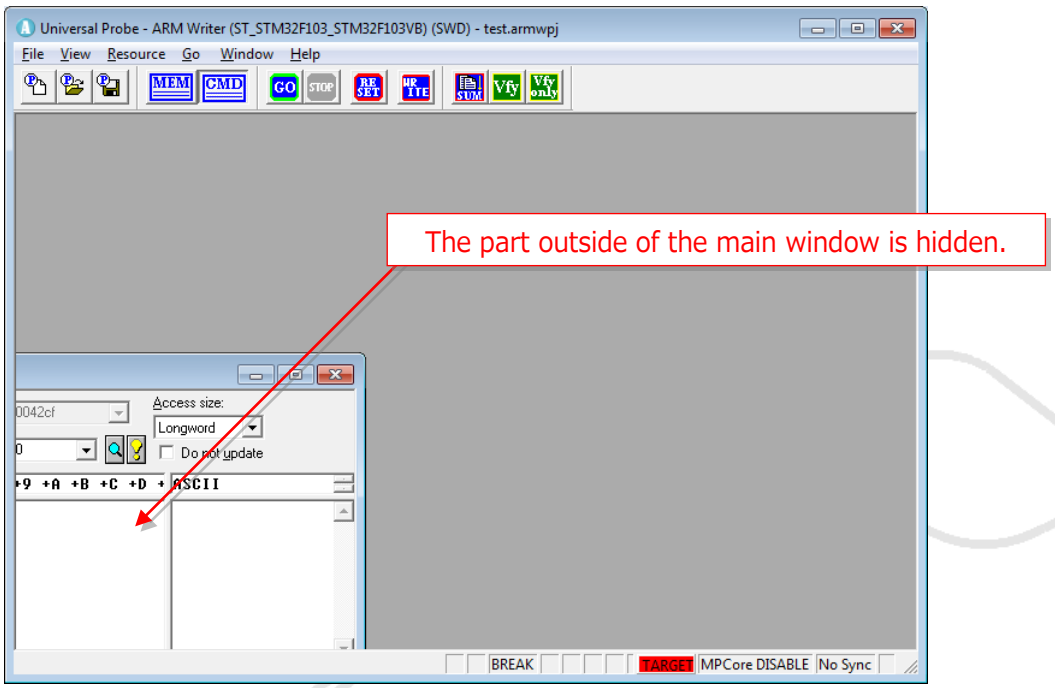


Figure 74

(2) Docked windows

These are windows that are docked at the top, bottom, right or left edge of the main window. (see the figure below).
Docked windows can also be scaled. A docked window can be moved and docked at another edge.

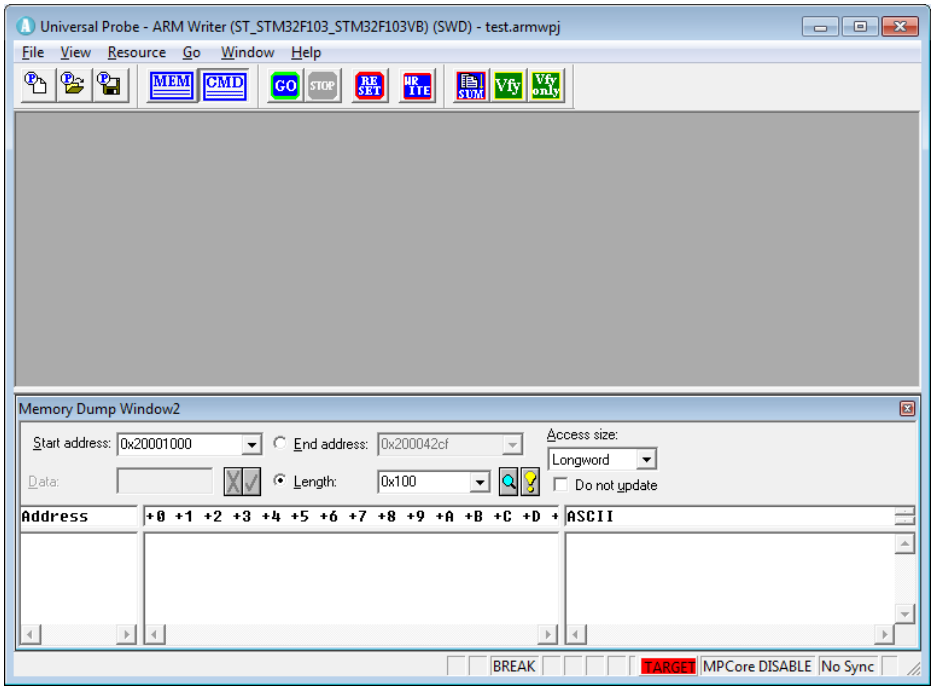


Figure 75

(3) Floating windows

Floating child windows can be moved out of the main window.
However, flowing windows are also closed automatically when this software is exited or the project is closed.

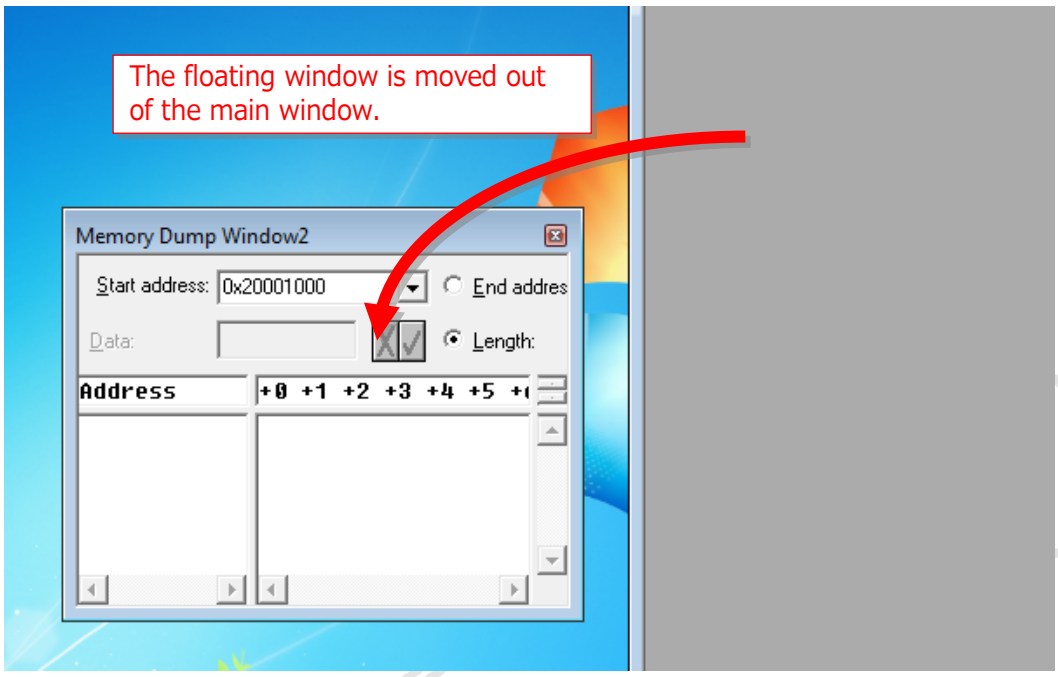


Figure 76

5.1.2. Changing the State of a Child Window

To change the state of a child window, right-click on the title bar of that window.
This will show the context menu as shown below. Then, specify the desired state or the position to which it is to be docked.

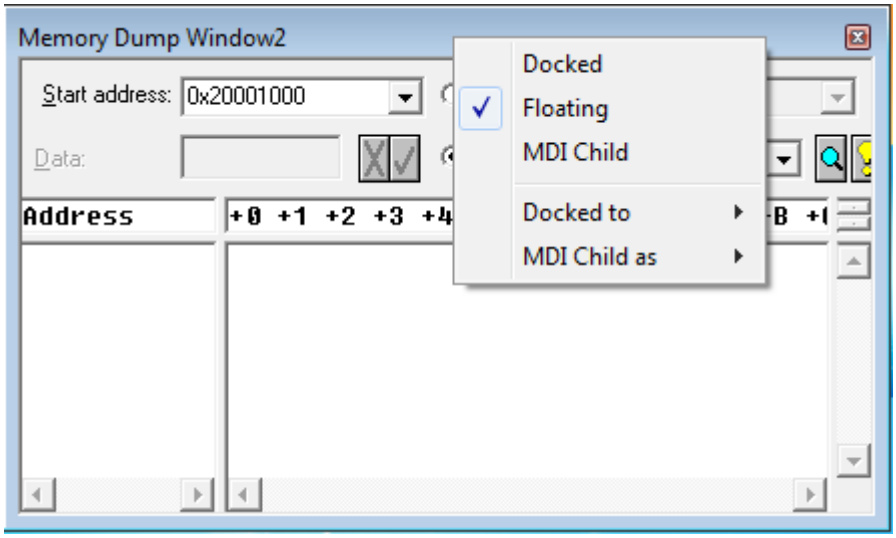


Figure 77

Figures of the menu and descriptions of the menu items are shown below.

Table 36

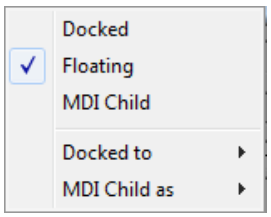
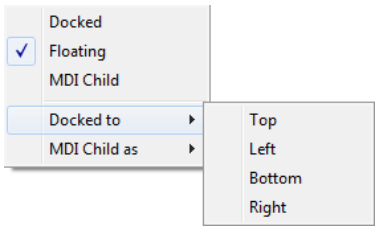
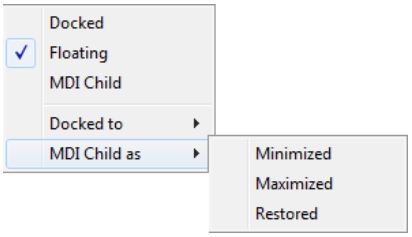
Menu shown by right-click	Menu shown by selecting "Docked to"	Menu shown by selecting "MDI Child as"
		

Table 37

Menu item		Description
Docked		Docks the child window. The edge at which the window is docked is switched among four edges in the order of top, left, bottom and right.
Floating		Makes the child window floating.
MDI Child		Makes the child window an MDI child window. If the child window is floating and placed outside the main window, it is automatically moved back inside the main window.
Docked to	Top	Docks the child window at the top edge of the main window.
	Left	Docks the child window at the left edge of the main window.
	Bottom	Docks the child window at the bottom edge of the main window.
	Right	Docks the child window at the right edge of the main window.
MDI Child as	Minimized	Makes the child window an MDI child window and minimizes it (into an icon).
	Maximized	Makes the child window an MDI child window and maximizes it.
	Restored	Makes the child window an MDI child window and displays it in the standard size.

5.1.3. Changing the Docking State by Drag-and-Drop

(1) Changing the docking edge

A docked or floating child window can be docked at another edge by the method in "**5.1.2. Changing the State of a Child Window**" or by dragging and dropping the title bar of the child window.
Dragging the title bar of the child window to the desired edge of the main window changes the shape of the frame. Then, dropping it changes the location.

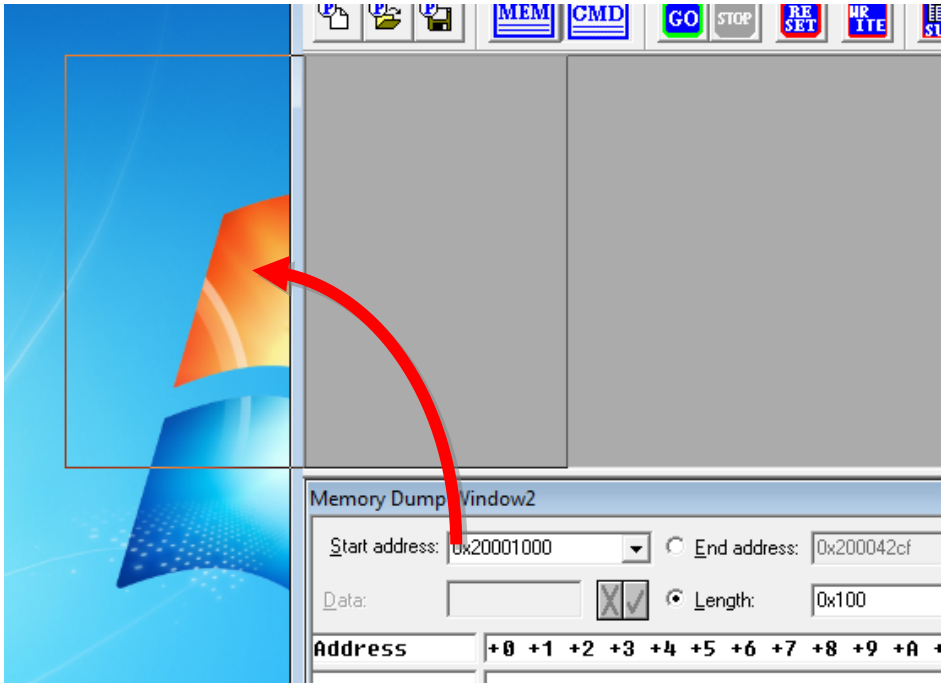


Figure 78

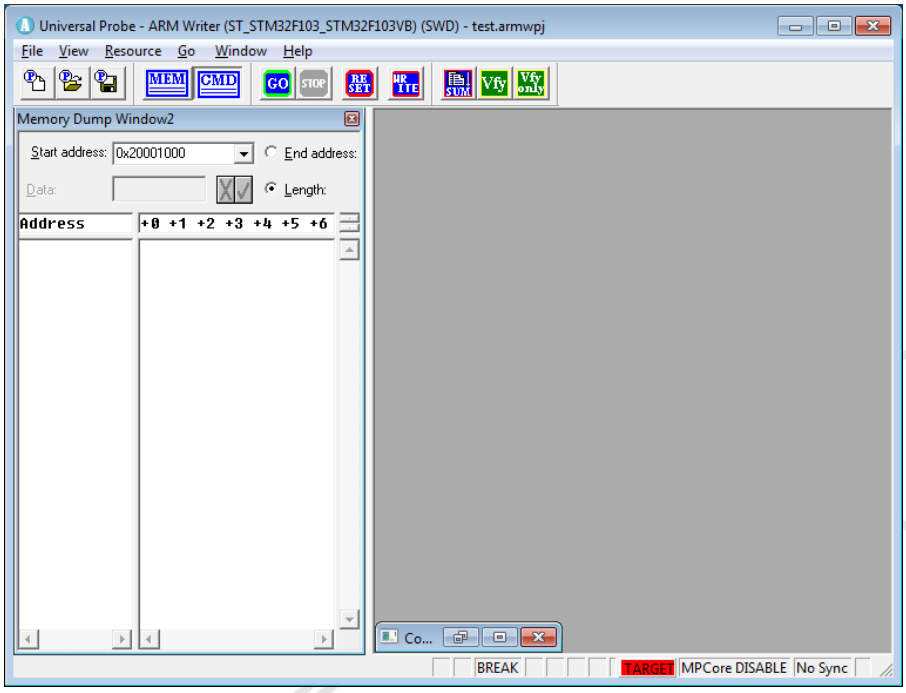


Figure 79

(2) Changing the state of window between docked and floating

Dragging a docked child window outside or near the center of the main window changes the state of child window to floating.
Dragging and dropping a floating child window near an edge of the main window changes the state of the child window to docked.

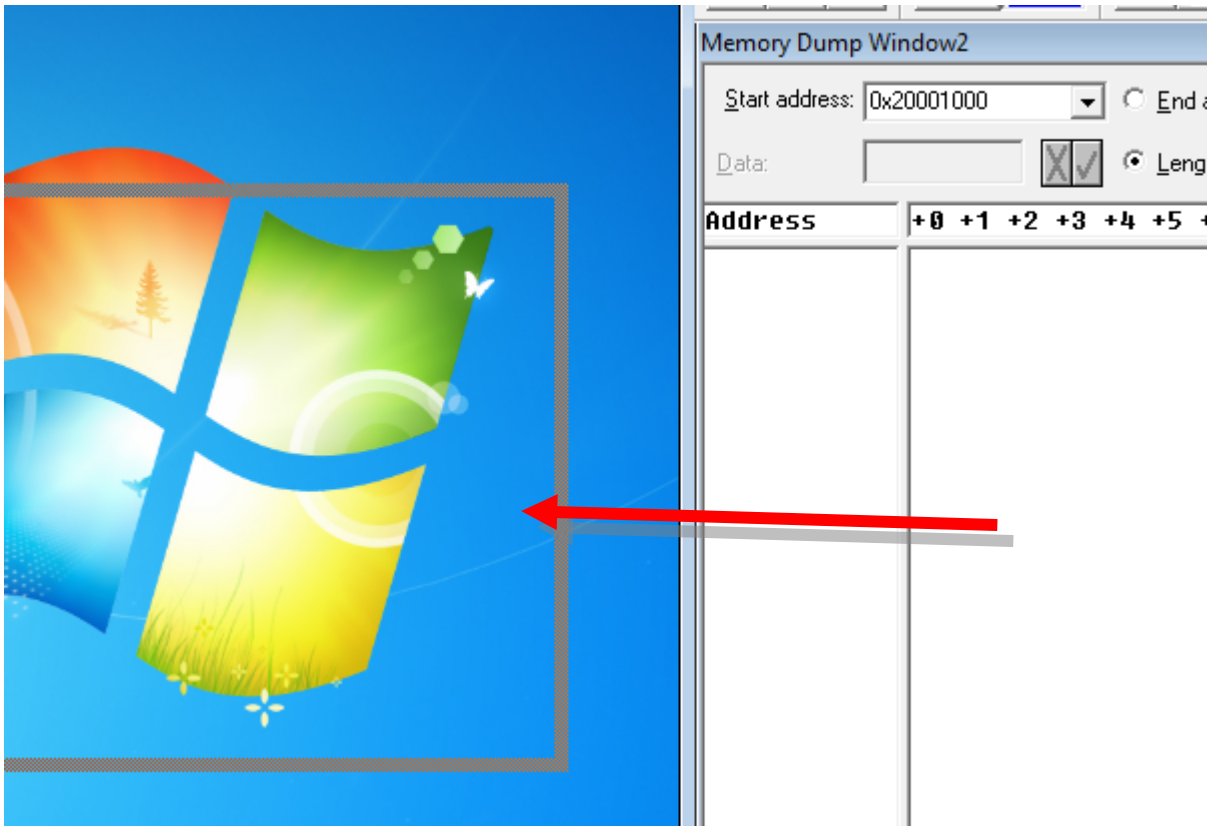


Figure 80

(3) Changing to an MDI child window

A docked or floating child window cannot be changed to an MDI child window by drag-and-drop. To change to an MDI child window state, right-click on the title bar of the child window and select "MDI Child" from the displayed context menu.

5.1.4. Docking Two or More Child Windows at the Same Edge

When two or more child windows are docked at the same edge of the main window, they can be displayed in the following two states:

1) State when docked inside of the an already docked child window
2) State when two or more child windows docked on one edge (docked edge) of the main window

The figure below shows an example of (1).

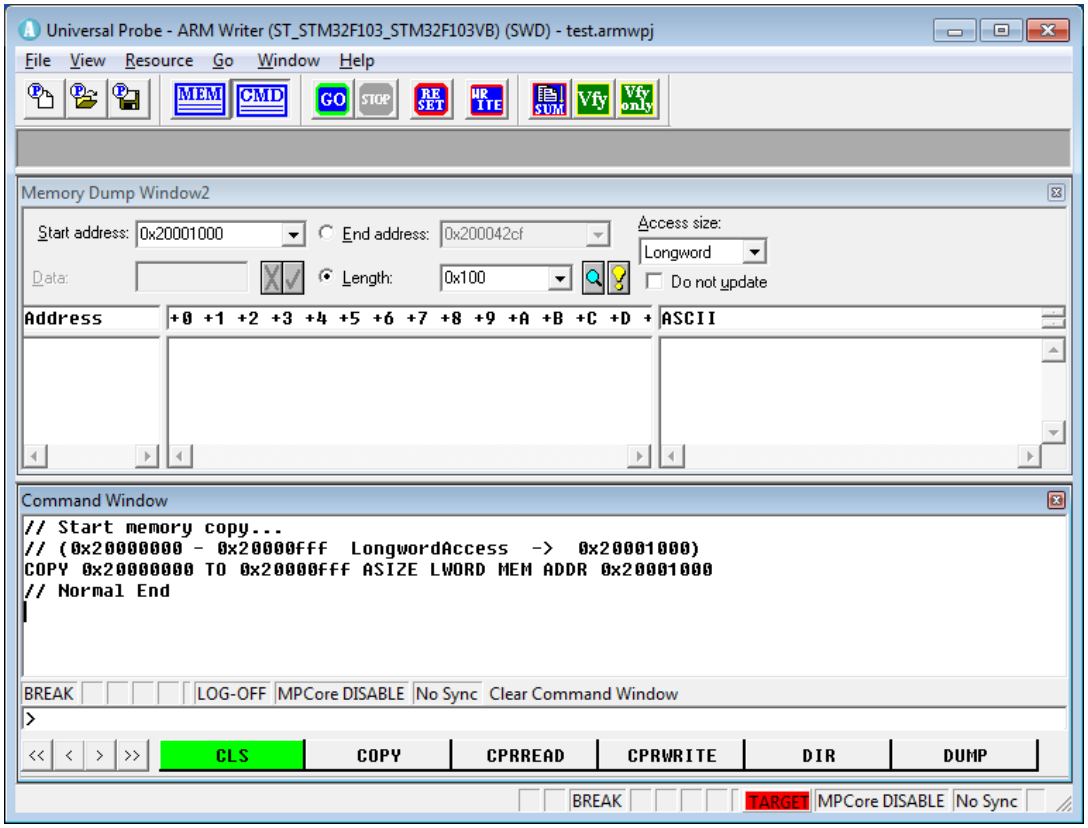


Figure 81

The figure below shows an example of (2).

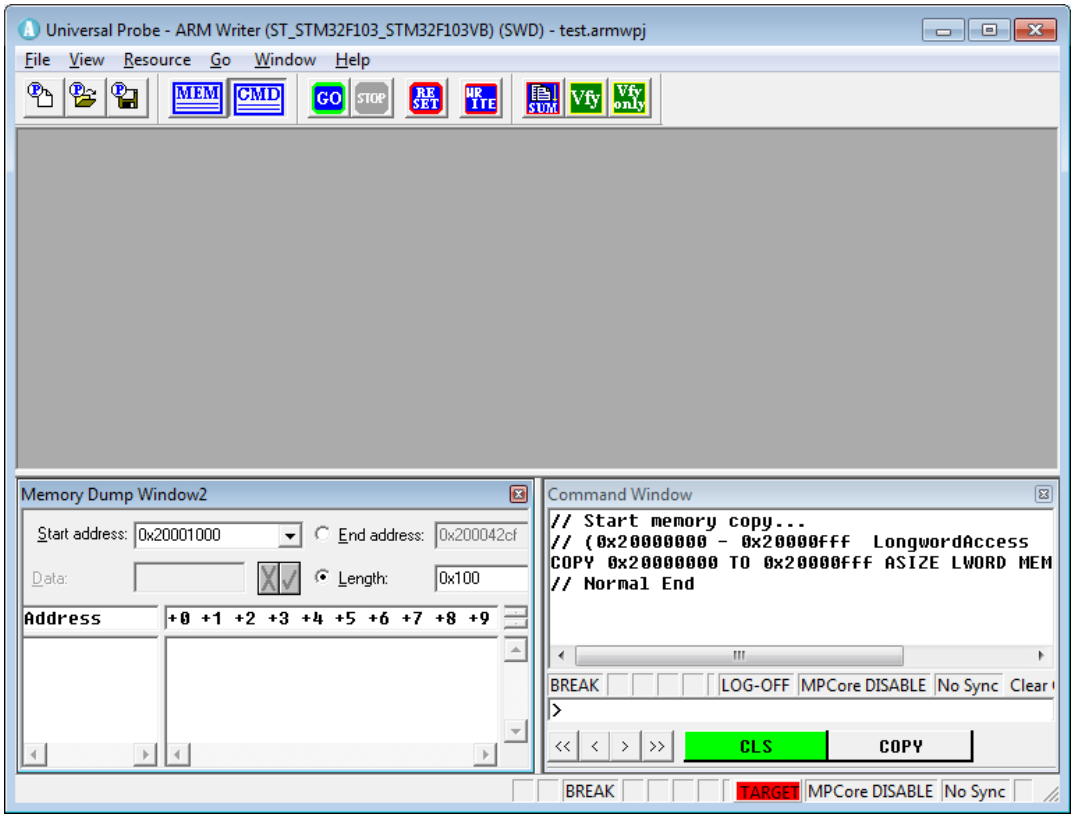


Figure 82

5.1.5. Changing the Size of a Docked Window

The size of a docked child window is changed by dragging the frame around the child window with the mouse cursor.

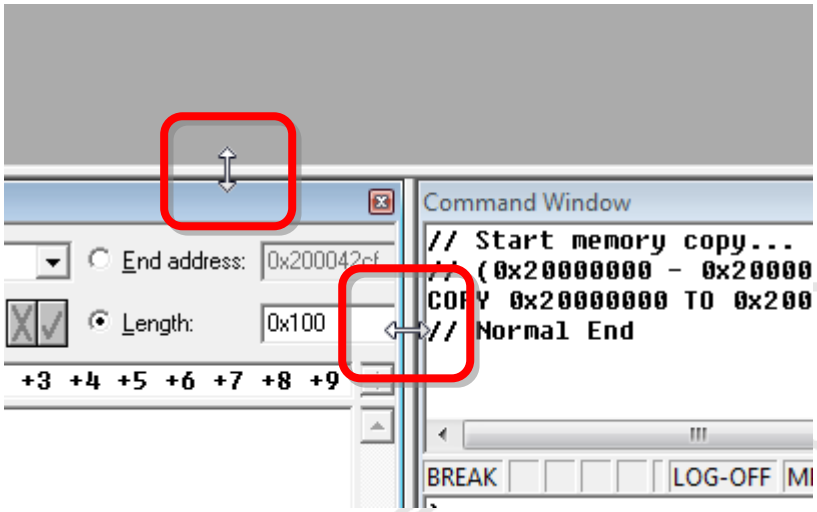


Figure 83

5.2. Memory Dump Window

This window is used to dump and display the contents of memory. Two or more Memory Dump Windows can be opened and they have the following characteristics:

- The data in the specified range of memory is displayed.
- Data can be displayed in various formats.
- Data can be displayed in 1-, 2- or 4-byte signed/unsigned integer format.
- Data can be displayed in 1-, 2- or 4-byte hexadecimal format.
- Data can be displayed in 4-, 8, 10- or 12-byte real number format.
- Data can be changed.
- Read data containing changes from the previous values are displayed in red to make it easily identifiable.
- Data can be displayed in physical/logical addresses.
- The displayed data can be output in CSV format or text format.

Tool button	Operation on the menu bar	Shortcut key
MEM	**View → Memory Dump Window**	---

The size of the address view, data view, and character string view display areas can be changed by dragging the border line with the mouse.

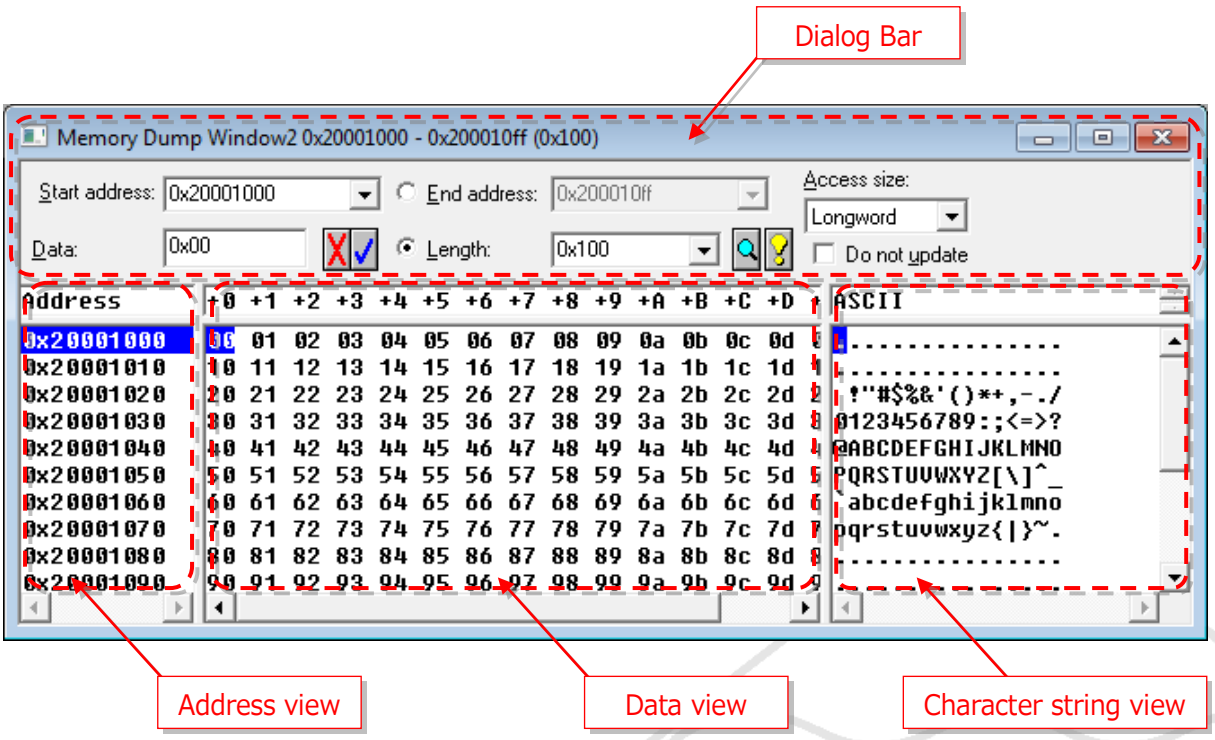
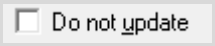


Figure 84

Table 38

Start Address	Indicates the address from which data is displayed.
End Address, Length	Indicates the end address or the range to be displayed. Pressing the Enter key after entering a value displays the contents in the specified memory range.
 (Display button)	Reads the range specified by <Start Address> - <End Address> or < Length> again. If the data read again contains changes from the previous value, the value in the data view is displayed in red.
 (Display of the context menu)	Shows the context menu from which [Address Format], [Data Format], and [Access Size] are changed.
	When this is checkmarked, the displayed content is not updated if read again with the display button.
<Access Size>	Changes the access size of the memory data.
Data	Shows the data at the cursor position. The data is changed by changing the value and pressing the Enter key. Operational expressions can also be used. Example: 0x1+0x10 * In the following display formats, operational expressions containing "/" cannot be used to specify data. • Signed 8-byte integer • Unsigned 8-byte integer • 8-byte hexadecimal number
 (Change button)	Writes the value in <Data> to the memory.
 (Cancel button)	Returns the display of <Data> back to the value currently indicated by the cursor.

5.2.1. Context Menu of the Memory Dump Window

Right-clicking on the area where data is displayed shows the context menu, from which the display format can be selected or data copied.

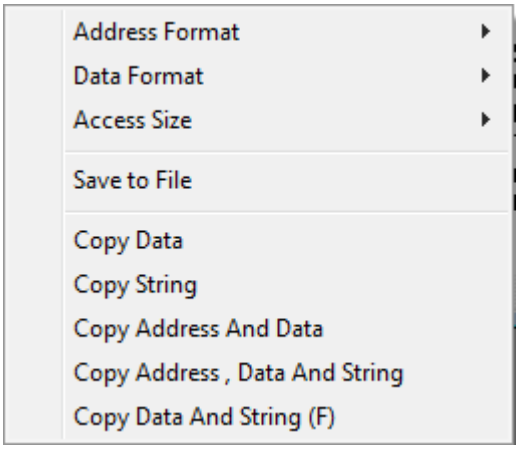


Figure 85

Table 39

Address Format	Change the format of the addresses displayed. Physical Address Display
Data Format	Change the display format of the memory data. Signed Integer (1 byte) Signed Integer (2 bytes) Signed Integer (4 bytes) Signed Integer (8 bytes) Unsigned Integer (1 byte) Unsigned Integer (2 bytes) Unsigned Integer (4 bytes) Unsigned Integer (8 bytes) Hexadecimal (1 byte) Hexadecimal (2 bytes) Hexadecimal (4 bytes) Hexadecimal (8 bytes) Real (4 bytes) Real (8 bytes) Real (10 bytes) Real (12 bytes)
Access Size	Change the access size of the memory data. Byte Word Longword

Save to File	The [Output to File] dialog box appears. The output formats are CSV and text. Options can be specified for CSV format.
Copy Data	Copies the character strings in the selected range in the data view to the clipboard. * The character strings can also be copied by entering Ctrl + C from the keyboard.
Copy String	Copies the character strings in the selected range in the character string view to the clipboard. This item is enabled only when the character string view is displayed.
Copy Address and Data	Copies the character strings in the selected ranges in the address view and data view to the clipboard.
Copy Address, Data and String	Copies the character strings in the selected ranges in the address view, data view, and character string view to the clipboard. This item is enabled only when the character string view is displayed.
Copy Data and String	Copies the character strings in the selected ranges in the data view and character string view to the clipboard. This item is enabled only when the character string view is displayed.

(1) [Save to File] dialog box

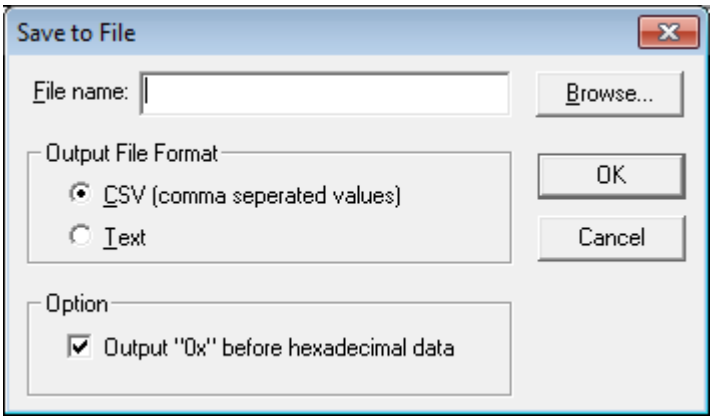


Figure 86

Table 40

File name	Saves the file having the specified name (If CSV Format is selected, add the extension ".CSV").
Output File Format	Either CSV Format or Text Format can be selected.
Option	Select the numeric number format.

(2) Selecting an area

Displayed value can be selected by using the mouse or keyboard.

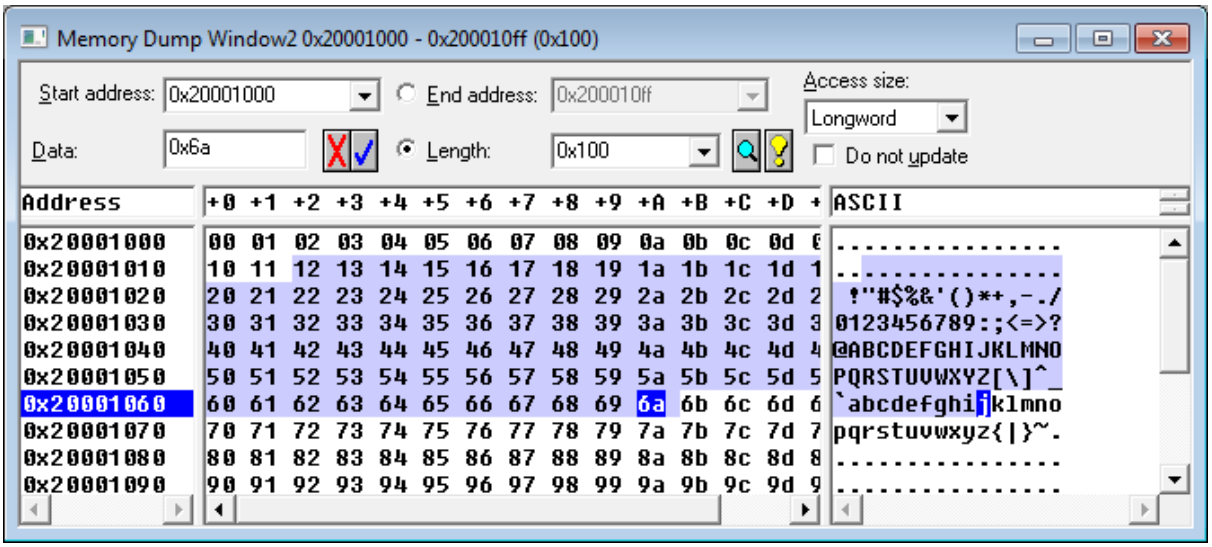


Figure 87

Table 41

Selecting an area by using the mouse	Dragging and dropping in the data view selects that range.
Selecting an area by using the keyboard	Holding the Shift key down and moving the cursor over a range in the data view selects the range.
Deselecting a range	A selected range is deselected by left-clicking the mouse or moving the cursor from the keyboard on the data view.

(3) Copying to the clipboard

Select a range and "Copy (item)" from the context menu, and the data in the selected range will be copied to the clipboard.
Entering "Ctrl + C" from the keyboard functions as "Copy Data."

Table 42

Copy Data	6b f7 1b d6 71 cc 77 4c b1 35 71 46 c3 e2 31 28 b2 54 63 5c 12 ca d3 f3 03 f0 9f ad 36 9e 43 3f d0 2d 47 ef b1 1d f4 80 43 0e 83 64 47 c4 3c 0a b1 1e 11 4e
Copy String	k・ヨqフwLｱ5qF ﾃ・(ｲTc¥.ﾊﾓ・□ｭ 6曚?ﾐ-G・.□C.ヅ Gﾄｸ.ｱ..N
Copy Address and Data	R:0x00a205e0| 6b f7 1b d6 71 cc 77 4c b1 35 71 46 R:0x00a205f0|c3 e2 31 28 b2 54 63 5c 12 ca d3 f3 03 f0 9f ad R:0x00a20600|36 9e 43 3f d0 2d 47 ef b1 1d f4 80 43 0e 83 64 R:0x00a20610|47 c4 3c 0a b1 1e 11 4e
Copy Address, Data and String	R:0x00a205e0| 6b f7 1b d6 71 cc 77 4c b1 35 71 46	k・ヨqフwLｱ5qF R:0x00a205f0|c3 e2 31 28 b2 54 63 5c 12 ca d3 f3 03 f0 9f ad |ﾃ・(ｲTc¥.ﾊﾓ・□ｭ R:0x00a20600|36 9e 43 3f d0 2d 47 ef b1 1d f4 80 43 0e 83 64 |6曚?ﾐ-G・.□C.ヅ R:0x00a20610|47 c4 3c 0a b1 1e 11 4e |Gﾄｸ.ｱ..N * The data lines are wrapped around at the right edge.
Copy Data and String	6b f7 1b d6 71 cc 77 4c b1 35 71 46	k・ヨqフwLｱ5qF c3 e2 31 28 b2 54 63 5c 12 ca d3 f3 03 f0 9f ad |ﾃ・(ｲTc¥.ﾊﾓ・□ｭ 36 9e 43 3f d0 2d 47 ef b1 1d f4 80 43 0e 83 64 |6曚?ﾐ-G・.□C.ヅ 47 c4 3c 0a b1 1e 11 4e |Gﾄｸ.ｱ..N

5.2.2. Displaying Multiple Memory Dump Windows

Every time the following tool button is clicked, a new Memory Dump Window is opened.

Tool button	Operation on the menu bar	Shortcut key
	**View → Memory Dump Window**	---

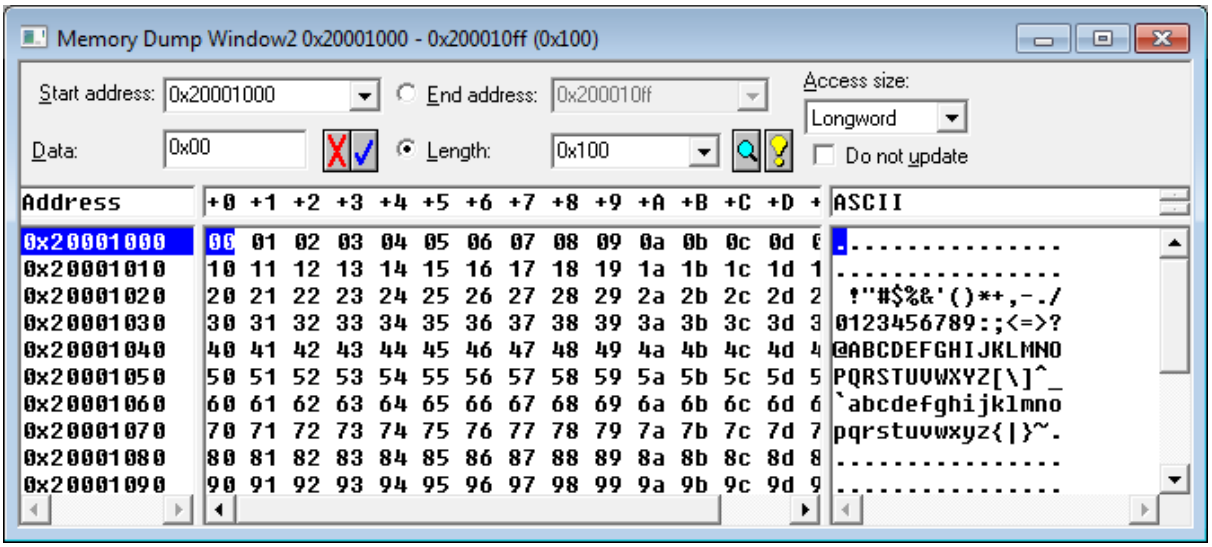


Figure 88

By displaying two windows having the same address range and checkmarking the <Do not update> checkbox in one of them, you can compare the changes in the memory contents.

5.2.3. Entering ASCII Character Strings

In 1-byte display mode, any character string data can be written to the memory from the cursor position following the procedure below:

1) Move the cursor to the first address to which character string data is to be written.

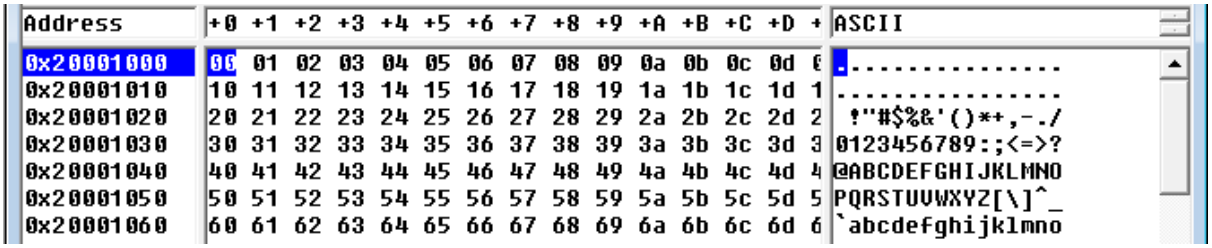


Figure 89

2) Enter a character string enclosed in double quotation marks in the <Data> box, and press the Enter key.

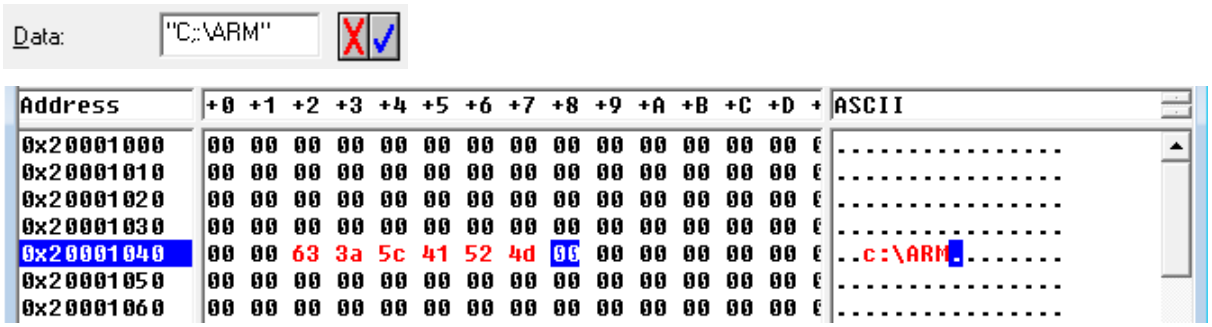


Figure 90

The character string enclosed in double quotation marks is converted to character code and written from the cursor position byte by byte.
When writing character strings, note the following points and restrictions:

- Entered character strings are not converted to code data such as an escape sequence.
- Enter memory data directly for codes that cannot be entered from the keyboard or double quotation marks.
- Up to 256 bytes of a character string including double quotation marks can be entered in the combo box.
- All the data displayed and written are treated as Shift-JIS.
- If the character string to be written extends beyond the display range, data is written only to the display range.

5.3. Command Window

This window is used to for command line entry. This window has the following characteristics.

- The keyboard- and mouse-based **associative selection method** allows quick command operations.
- This window has the ability to display command execution results and **log the commands**.
- **Automatic execution with a batch function** is supported.
- **The function to create a batch file** is supported.

The Command window can be opened by clicking the following tool button.

Tool button	Operation on the menu bar	Shortcut key
	**View → Command Window**	---

Figure 91

→ For details about how to enter commands, refer to "**7. Command Line Interface**."

The status bar shows the current CPU status, the status of different measurement functions, and guidance of the command line interface.

Character strings copied to the clipboard can be executed as a batch file. Right-click on the command input area to open the context menu and select "Paste Batch," or place the mouse cursor on the command input area and enter "Ctrl + B."

6. Keyboard

This section explains the keyboard operations that are non-standard on Windows keyboard.

6.1. All Windows

Following keyboard operation is possible on all windows.

ESC ··· **Break**[*1]
F5 ··· **Start Execution**

*1: While a command is being input in the command window, the command cancel function has the highest priority.

6.2. Memory Dump Window

In the Memory Dump Window, the following keyboard operation is possible.

↑ ↓ ← → ··· Moves the cursor in Data view and Character String view.

6.3. Command Window

In the command window, the following keyboard operation is possible.

↑ ↓ ← → ··· Switches the display of command name and parameter name, and refers to parameters that were input in the past.

Space ··· Confirms command and parameter.

ESC ··· When a command is being input, cancels one command or parameter.
When a command is not input, performs forced break.

Return ··· Confirms and executes the command. For omitted parameters, previously input parameters are set.

7. Command Line Interface

This section explains how to input and operate commands in the command window.
Commands are input on the command line shown in Figure 92.

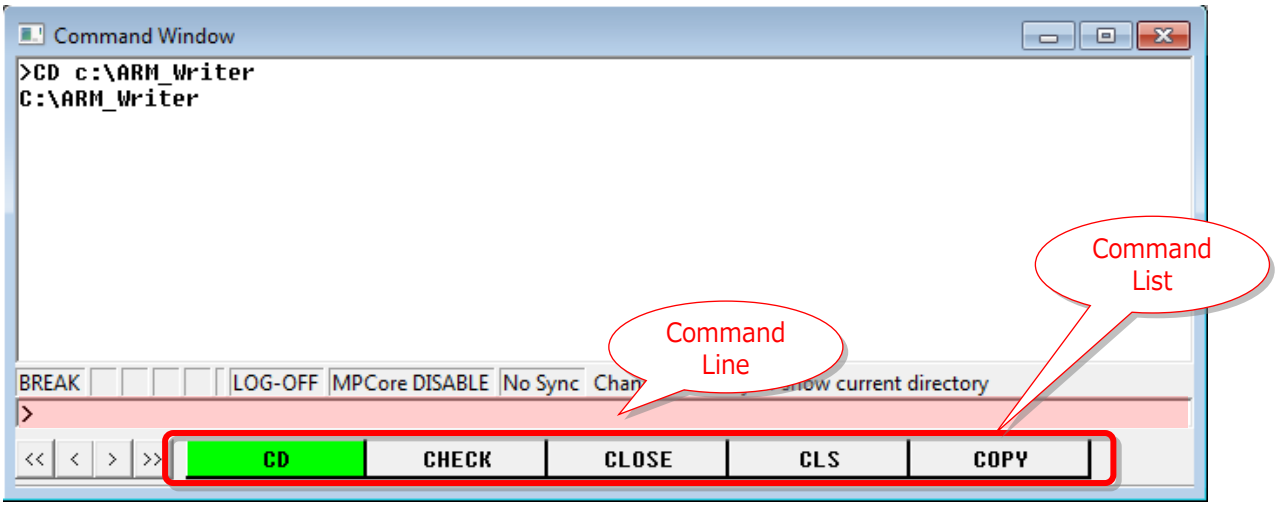


Figure 92

7.1 Operation on the Command Line

Even if you do not remember command names or parameter names, entering the first few characters of a command or parameter displays the corresponding command names and parameter names to choose from, allowing easy input of command and parameter names.

7.1.1. Command Input Method

Click the command line to move the focus.
By inputting a command and pressing the Return key, the command is executed.
Some parameters can be omitted. The previously entered contents are applied to omitted parameters.

7.1.2. Command Input by Associative Selection Method

As you proceed with entry of command, the commands that are displayed in the command list according to the entered characters are narrowed down.
By pressing the Space key, you can enter the command or parameter highlighted in green to the command line.
Also, you can enter a command by selecting it from the command list with the mouse.
The command list scrolls as you click the << < > >> buttons.
When placing the mouse cursor on the command list, a tool tip shows a brief explanation of the command.

7.1.3. Entering Command from History

By pressing the ↑ key on the command line you can display the command history.
By selecting the command you want to execute from the history and pressing the Return key, you can re-execute the past command.

Double-byte characters cannot be entered on the command line.
Entry of the space character is not accepted in file path specification. Therefore, folder names containing the space character cannot be used.

7.2. Explanation of Commands

7.2.1. ASSIGN and Dot (.) (Evaluation of Formula)

This command is used to evaluate formulas specified by parameters.
By using this command, you can refer to and change the memory, I/O data or register data.

● **Format**

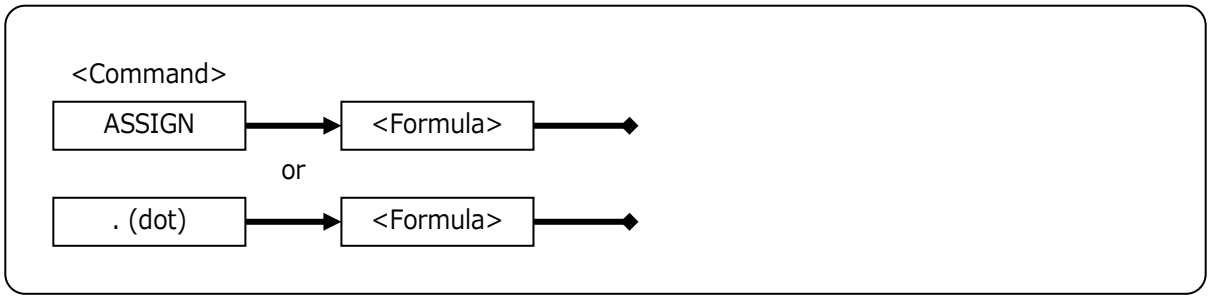


Figure 93

● **<Formula>**

Specify the formula to be evaluated.

● **Example**

Table 43

.[0x4000].B=0x10	Writes 0x10 as 1-byte data to address 0x4000.
.[0x4000].W=0x10	Writes 0x10 as 2-byte data to address 0x4000.
.[0x4000].L=0x10	Writes 0x10 as 4-byte data to address 0x4000.
.[INR:0x4000].B=0x10	Writes 0x10 as 1-byte data to address 0x4000 of built-in I/O register.
.[P;0x4000].B=0x10	Writes 0x10 as 1-byte data to address 0x4000 of I/O address.

For details, refer to "**3.2. Address Expression**" and "**3.4. Reading/Writing Data from/to Memory & I/O Port**."

If you use dot, the corresponding command is not recorded in the history in the command window.

7.2.2. BATCH (Execution of Batch Program)

This command is used to execute the specified batch program.
For details of batch program, refer to [Batch Function].

●Format

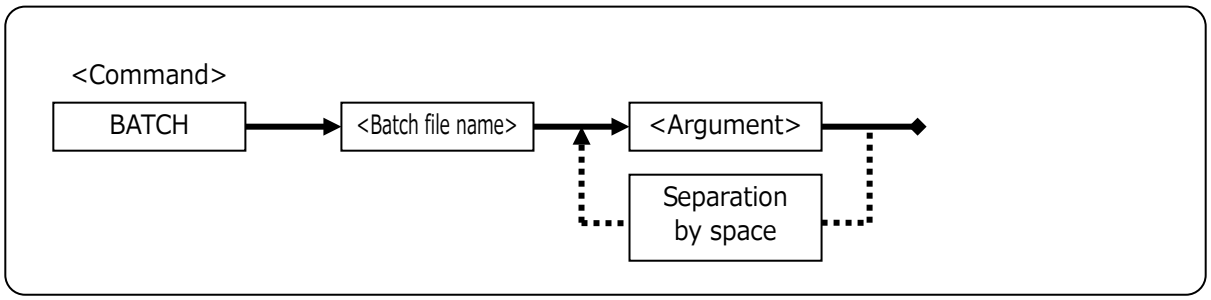


Figure 94

●<Batch file name>

Specify the batch program file name.

●<Argument>

Specify the argument to be passed to the batch program.
Separate each argument with the space character.
Arguments are set to $1 to $9 in the batch program.
$0 represents the whole command.
Tenth and further arguments are ignored.

7.2.3. BREAK (Break)

This command is used to forcibly break the CPU being executed.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
	**Go** → **Break**	ESC

● Format

Figure 95

7.2.4. CD (Change of Folder, Change of Drive, Display of Current Path)

This command is used to move the work folder to the specified path.
If the folder is not specified, the current work folder is displayed.

● Format

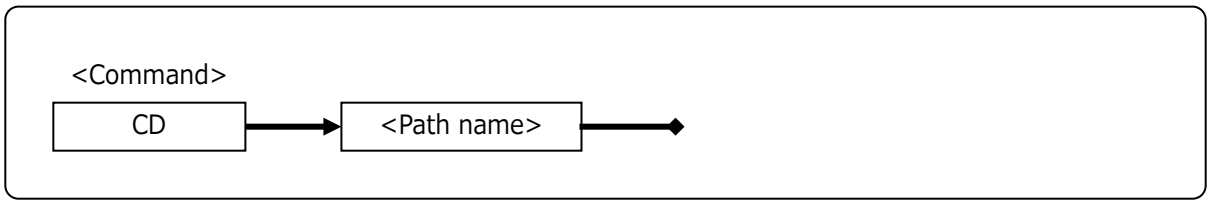


Figure 96

● <Path name>

Specify the path name to change.

● Example

[Display when the folder name is specified]
Displays the work folder after move.

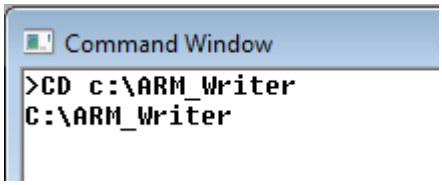


Figure 97

[Display when the folder name is omitted]
Displays the current work folder.

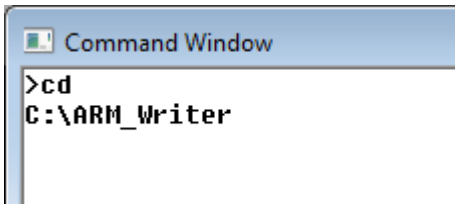


Figure 98

File names and folder names need to be specified in the "8 characters.3 characters" format of the former DOS specification.

7.2.5. CHECK (Check Memory)

This command is used to perform memory check in the specified address range.
After executing the command, the memory check result is displayed.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Memory/Port** → **Check**	---

● **Format**

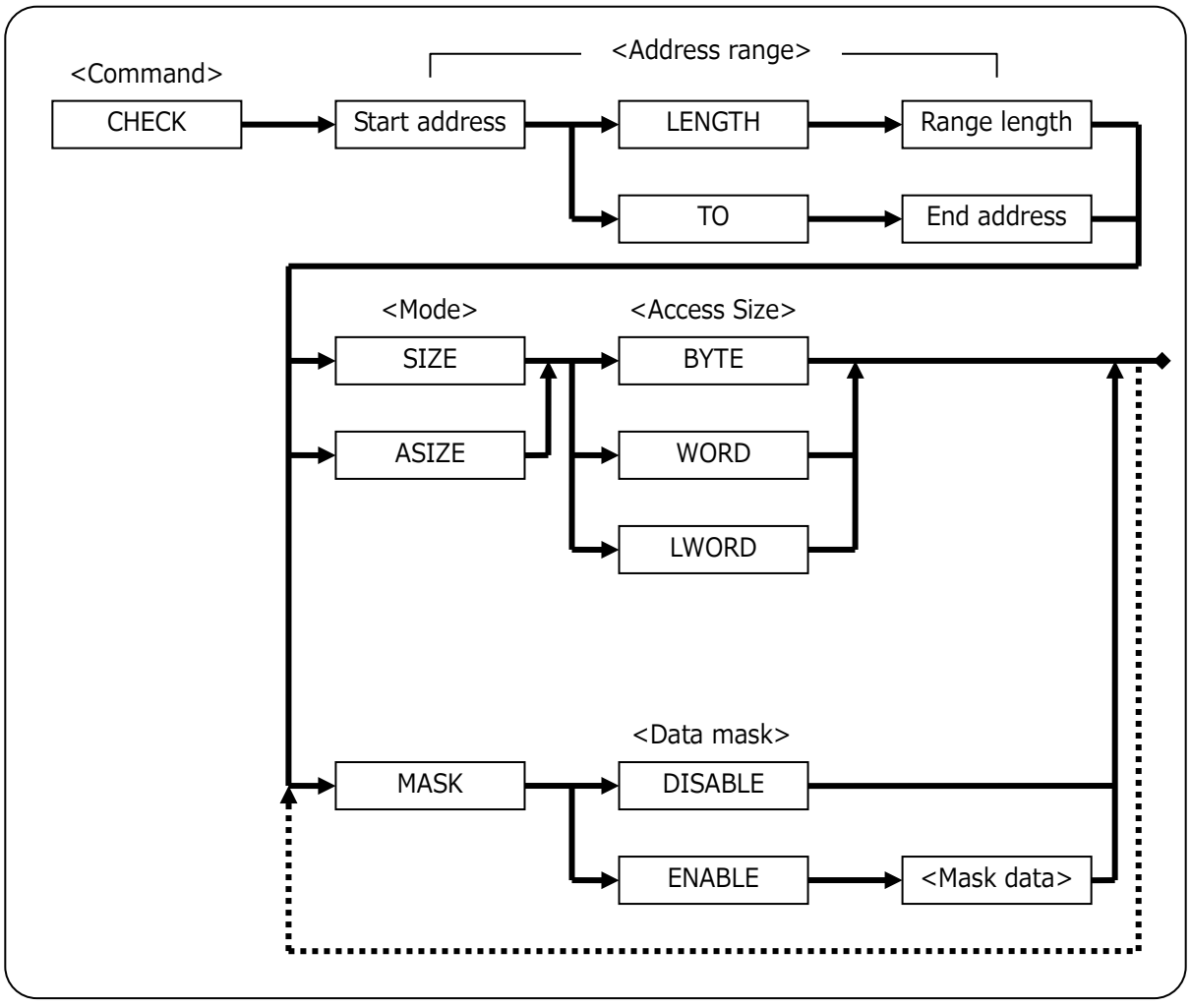


Figure 99

<Range of start address value>

Table 44

Start address	Specify the start address of memory to check.
Range length	Specify the length from the start address in bytes.
End address	Specify the end address.

● **<Mode>**

Table 45

SIZE	Set the data size.
ASIZE	Set the access size.
MASK	Set the data mask.

● **<Access size>**

Table 46

BYTE	Conducts memory check by byte access.
WORD	Conducts memory check by word access.
LWORD	Conducts memory check by long word access.

● **<Data mask>**

Table 47

DISABLE	Does not specify data mask.
ENABLE <mask data>	Specify mask data. Specify data in which the bit position you want to excluded from the check target is set to "1." The data length is the size specified with SIZE. Example) 0x01 = Does not check the lowermost bit.

7.2.6. CLOSE (Close the Project File)

This command is used to close the project file that is currently open.
When this command is executed, a confirmation dialog box is displayed.
To close without displaying the confirmation dialog box, use the **EXIT command**.

● **Format**

Figure 100

7.2.7. CLS (Clear the Command Window)

This command is used to clear the command window that is currently open.

● **Format**

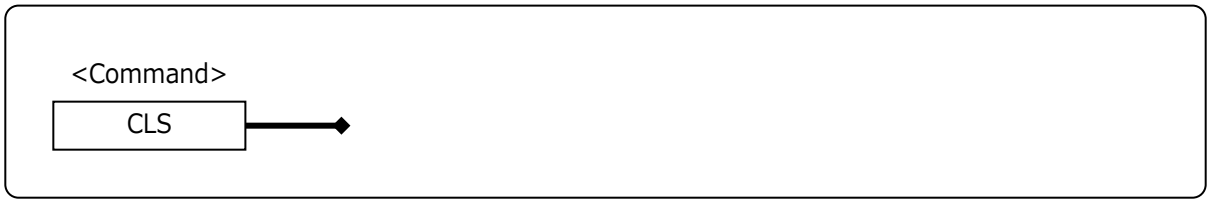


Figure 101

7.2.8. COPY (Copy Memory)

This command is used to copy the memory data in the specified address range to the target memory.
After executing the command, the memory copy result is displayed.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Memory/Port** → Copy	---

● **Format**

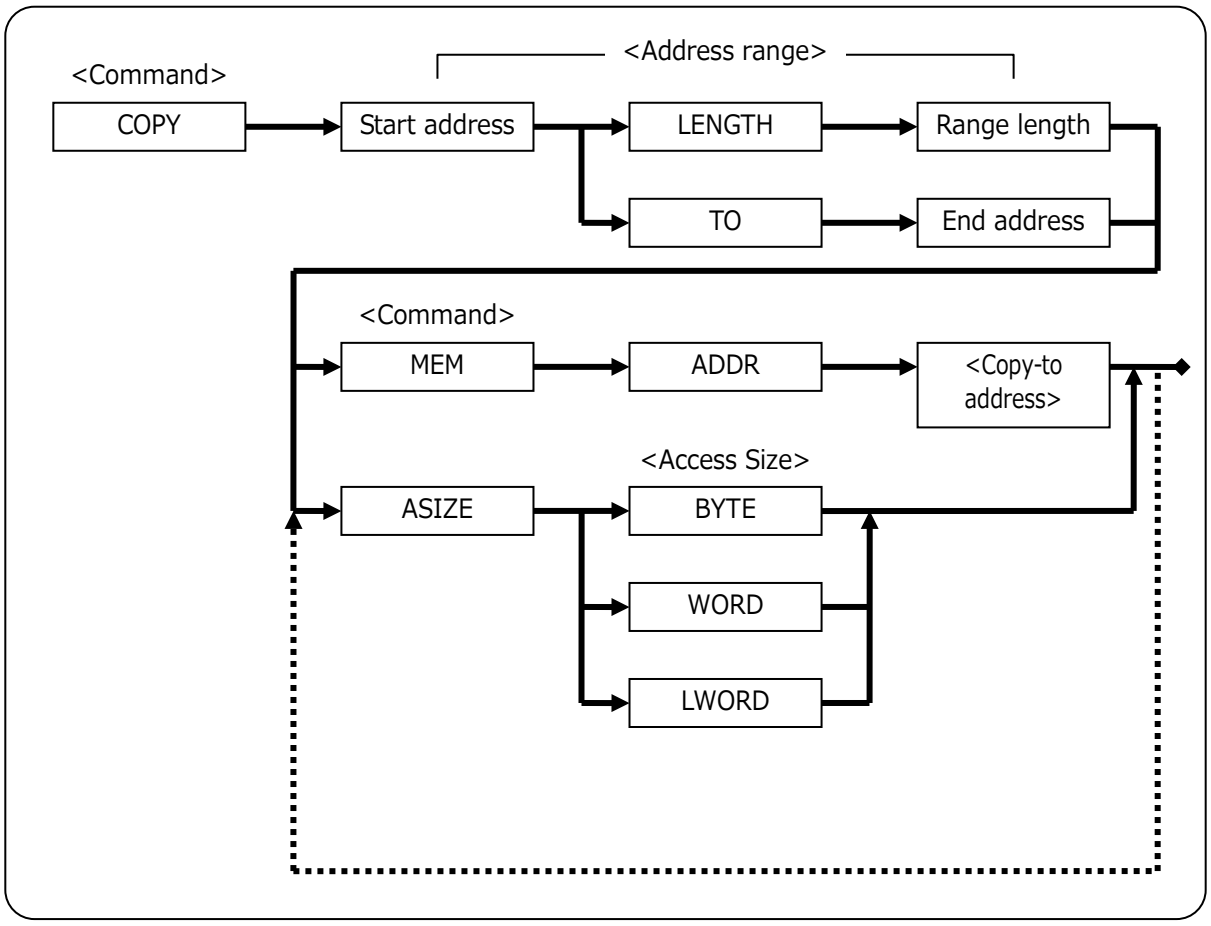


Figure 102

<Range of start address value>

Table 48

Start address	Specify the start address of memory to copy.
Range length	Specify the length from the start address in bytes.
End address	Specify the end address.

●<Command>

Table 49

MEM	Specify the <copy-to address> of the target memory.
ASIZE	Specify the access size.

●<Copy-to address>

Specify the copy-to address.

●<Access size>

Table 50

BYTE	Performs copy by byte access.
WORD	Performs copy by word access.
LWORD	Performs copy by long word access.

7.2.9. DIR (Refer to the Folder Contents)

This command is used to refer to the contents of the specified path.
If the path is not specified, the contents of all files in the current work folder are displayed.
This command has the same function as DIR command of DOS.

● Format

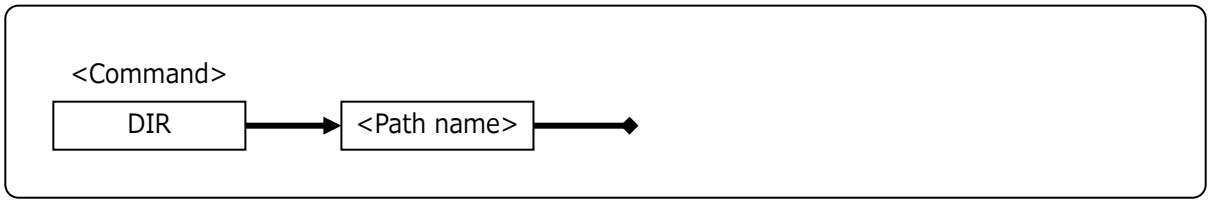


Figure 103

● <Path name>

Specify the path name to refer to.

● Example

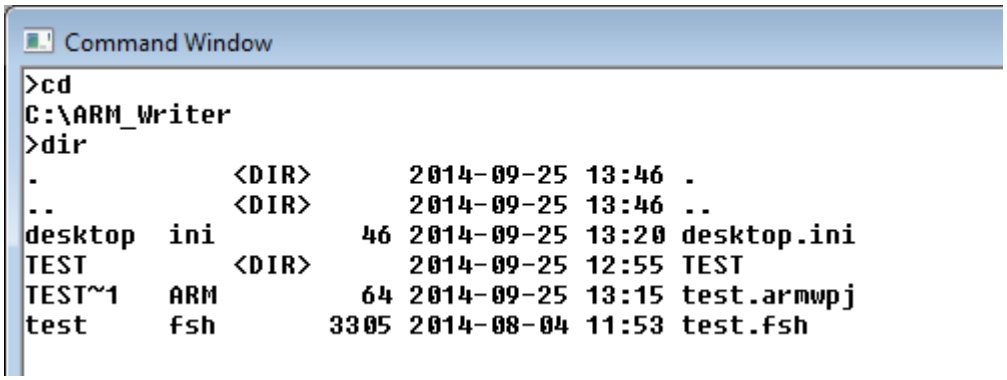


Figure 104

7.2.10. DUMP (Dump Memory)

This command is used to display the memory data in the specified address range in the specified display format.
This command has the same function as operation in the Memory Dump Window.

● **Format**

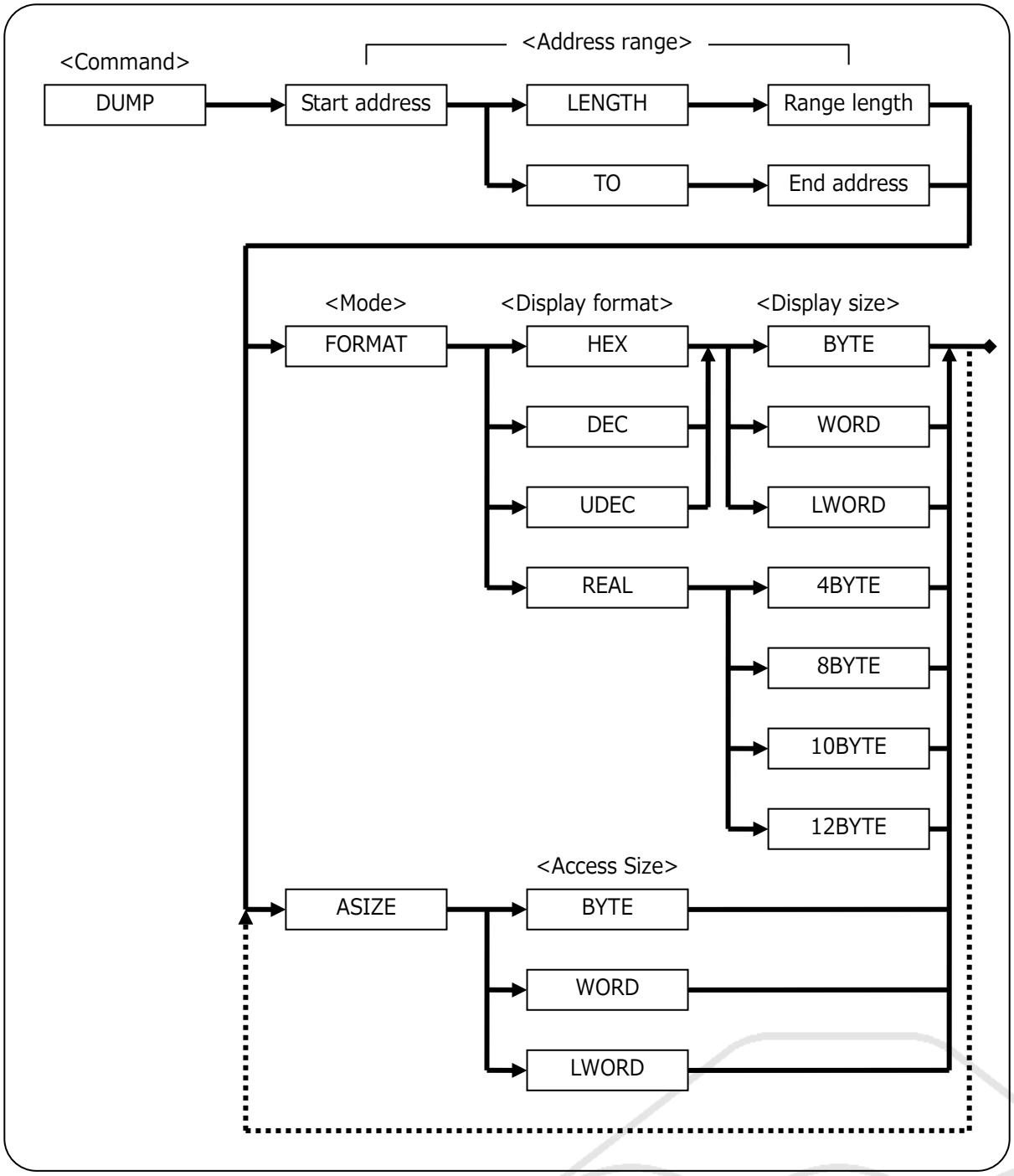


Figure 105

<Range of start address value>

Table 51

Start address	Specify the start address of memory to dump.
Range length	Specify the length from the start address in bytes.
End address	Specify the end address.

● **<Mode>**

Table 52

FORMAT	Specify the display format.
ASIZE	Specify the access size.

● **<Display format>**

Table 53

HEX	Displays in hexadecimal number.
DEC	Displays in decimal number.
UDEC	Displays in unsigned decimal number.
REAL	Displays in real number.

● **<Display size>**

Table 54

BYTE	Displays in byte size.	
WORD	Displays in word size.	
LWORD	Displays in long word size.	
4BYTE	Displays in 4-byte real number format.	Example) -1.073726E+008
8BYTE	Displays in 8-byte real number format.	Example) -9.255963134931E+061
10BYTE	Displays in 10-byte real number format.	Example) -4.7798665708109333850E+0986
12BYTE	Displays in 12-byte real number format.	Example) -4.761268151994454601E+0986

● **<Access size>**

Table 55

BYTE	Reads memory by byte access.
WORD	Reads memory by word access.
LWORD	Reads memory by long word access.

7.2.11. ENV (Set the Probe Environment)

This command is used to specify various probe environment settings.
After the command is executed, the current setting status is displayed.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Probe Environment**	---

● **Format**

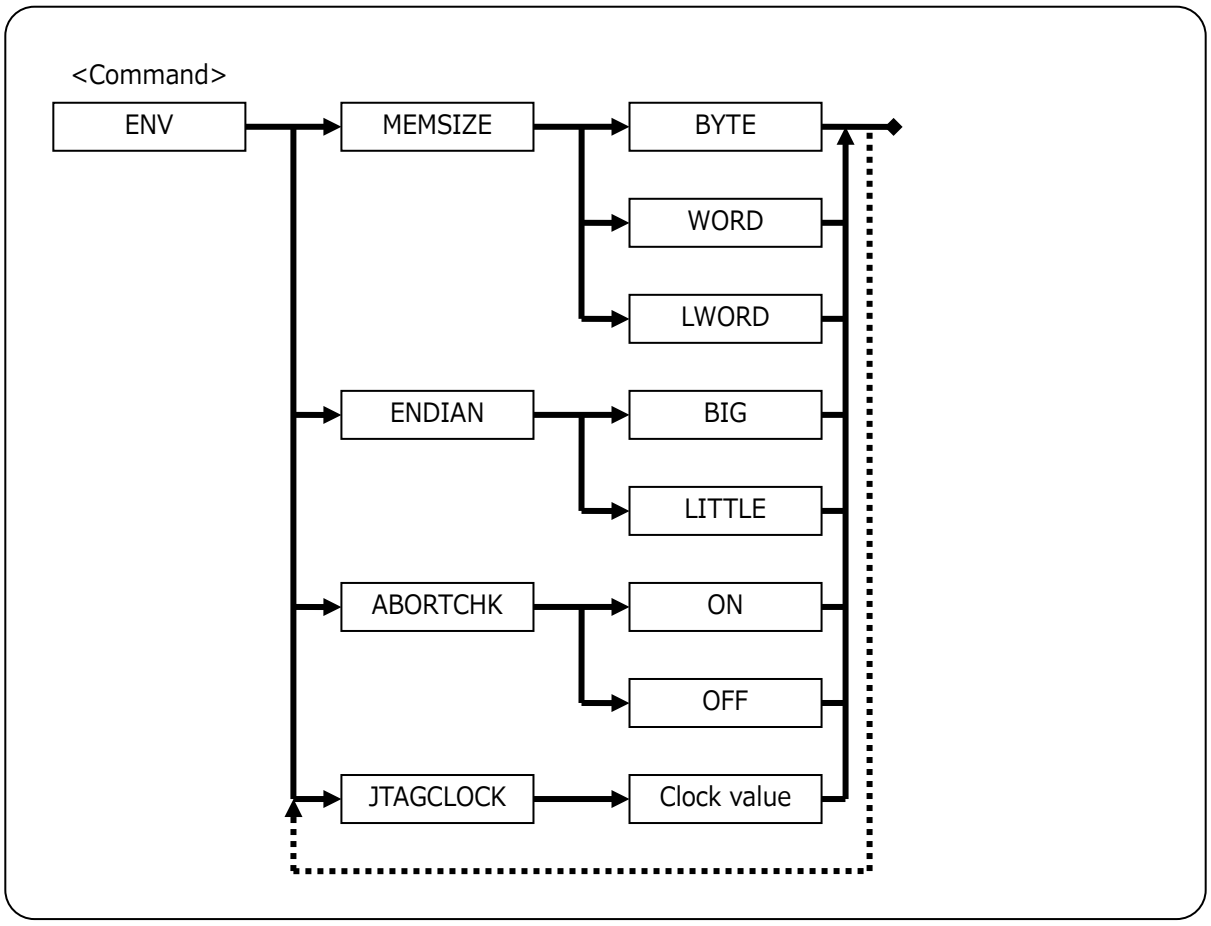


Figure 106

● **<Mode>**

MEMSIZE
Specify the default access size by which the emulator system accesses the memory.

Table 56

BYTE	Accesses in byte size.
WORD	Accesses in word size.
LWORD	Accesses in long word size.

ENDIAN
Specify the endian.

Table 57

BIG	Set the big endian.
LITTLE	Set the little endian.

ABORTCHK
Specify whether to conduct abort check when accessing the memory.

Table 58

OFF	Turns OFF the abort check when accessing the memory.
ON	Turns ON the abort check when accessing the memory.

JTAGCLOCK
Specify the frequency of JTAG/SWD clock.

Table 59

AUTO	Set to automatic.
SLOWCLOCK	Set specific frequency by the following parameter. Enter numeric value only assuming the unit of KHz.
Frequency selection	Specify a value in the range between 1 and 1,000.

7.2.12. ERROR_ECHO (Set Error Message Display)

This command is used to specify the display method of error message.

● **Format**

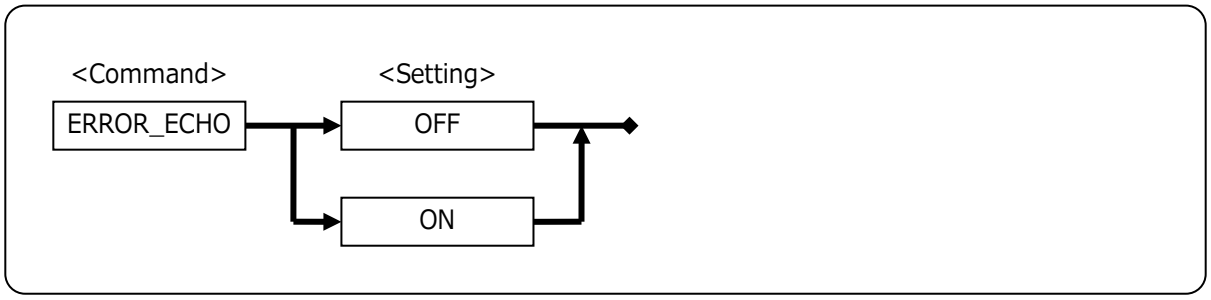


Figure 107

● **<Setting>**

Table 60

OFF	Displays error messages in the message box.
ON	Displays error messages in the command window.

7.2.13. EXIT (Exit This Application)

Exit this software.
This command has the same function as the following operation.

Tool button	Operation on the menu bar	Shortcut key
---	**File → Exit**	---

●Format

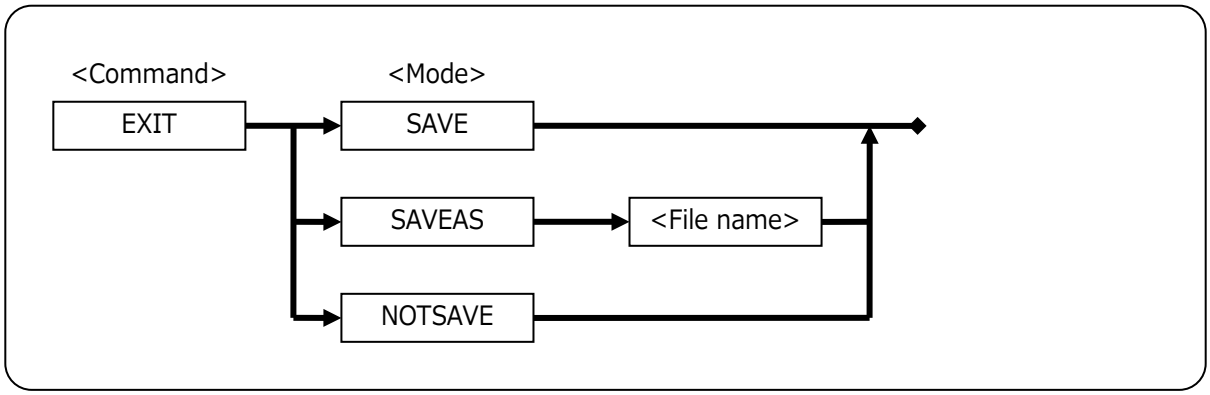


Figure 108

●<Mode>

Table 61

SAVE	Saves (overwrites) the contents of the project to the current project file and exits the software.
SAVEAS	Saves the contents of the project to a project file under a different name and exits the software.
NOTSAVE	Exits the software without saving the contents of the project to a project file.

●<File name>

Enter the name of the file to save. If a file name only is specified, the file is saved in the current work folder.

7.2.14. FILL (Fill up Memory)

This command is used to fill the memory data in the specified address range with the specified data.
After the command is executed, the execution result is displayed.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Memory/Port** → **Fill**	---

● **Format**

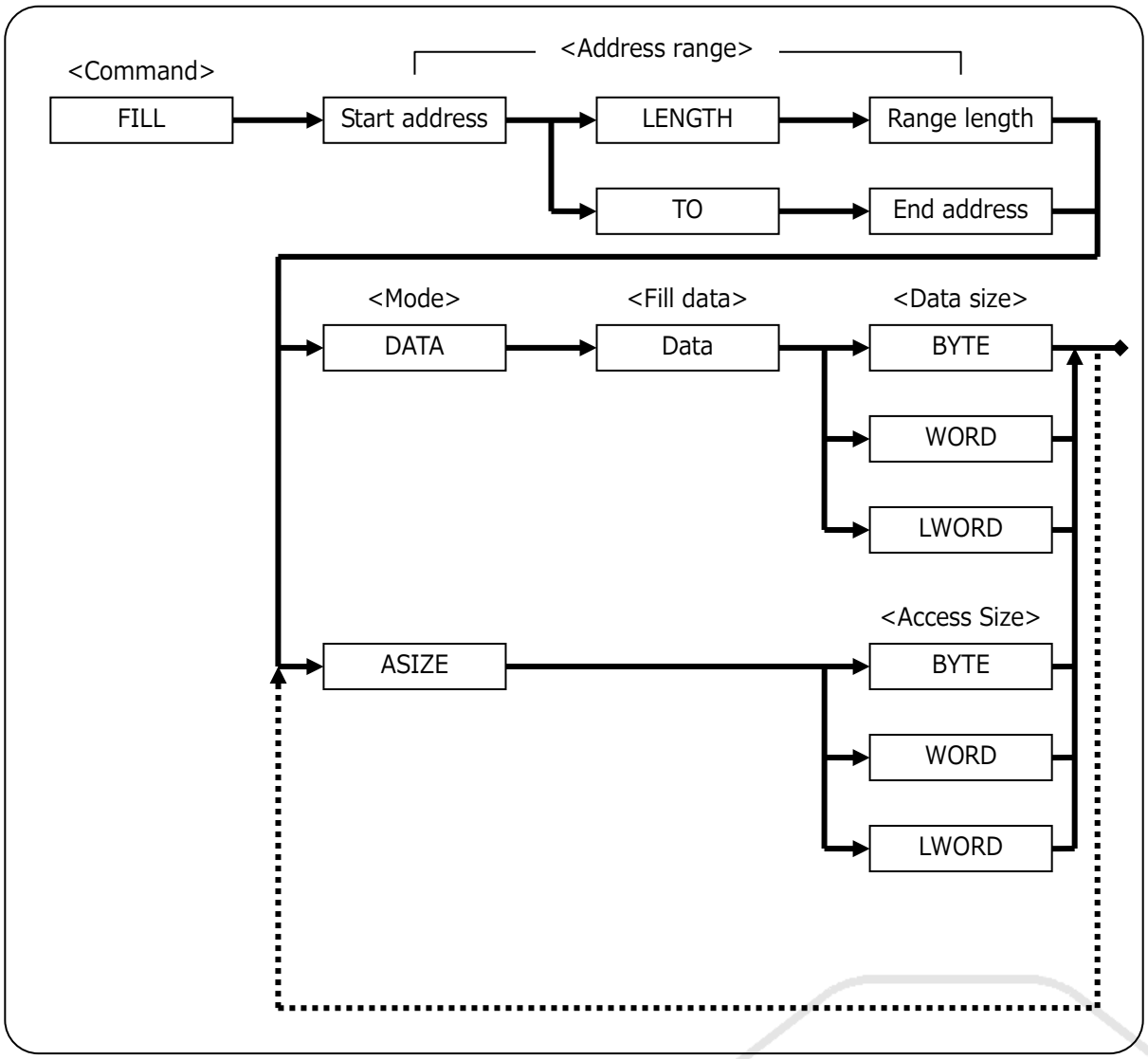


Figure 109

● **<Address range>**

Table 62

Start address	Specify the start address of memory to fill.
Range length	Specify the length from the start address in bytes.
End address	Specify the end address.

● **<Mode>**

Table 63

DATA	Specify the fill data.
ASIZE	Specify the access size.

● **<Fill data>**

Fills up the memory with the data specified here.

● **<Data size>**

Table 64

BYTE	Fills up memory with byte data.
WORD	Fills up memory with word data.
LWORD	Fills up memory with long word data.

● **<Access size>**

Table 65

BYTE	Fills up memory by byte access.
WORD	Fills up memory by word access.
LWORD	Fills up memory by long word access.

7.2.15. FM (Set the Flash Memory)

This command is used to set the flash memory.

● **Format**

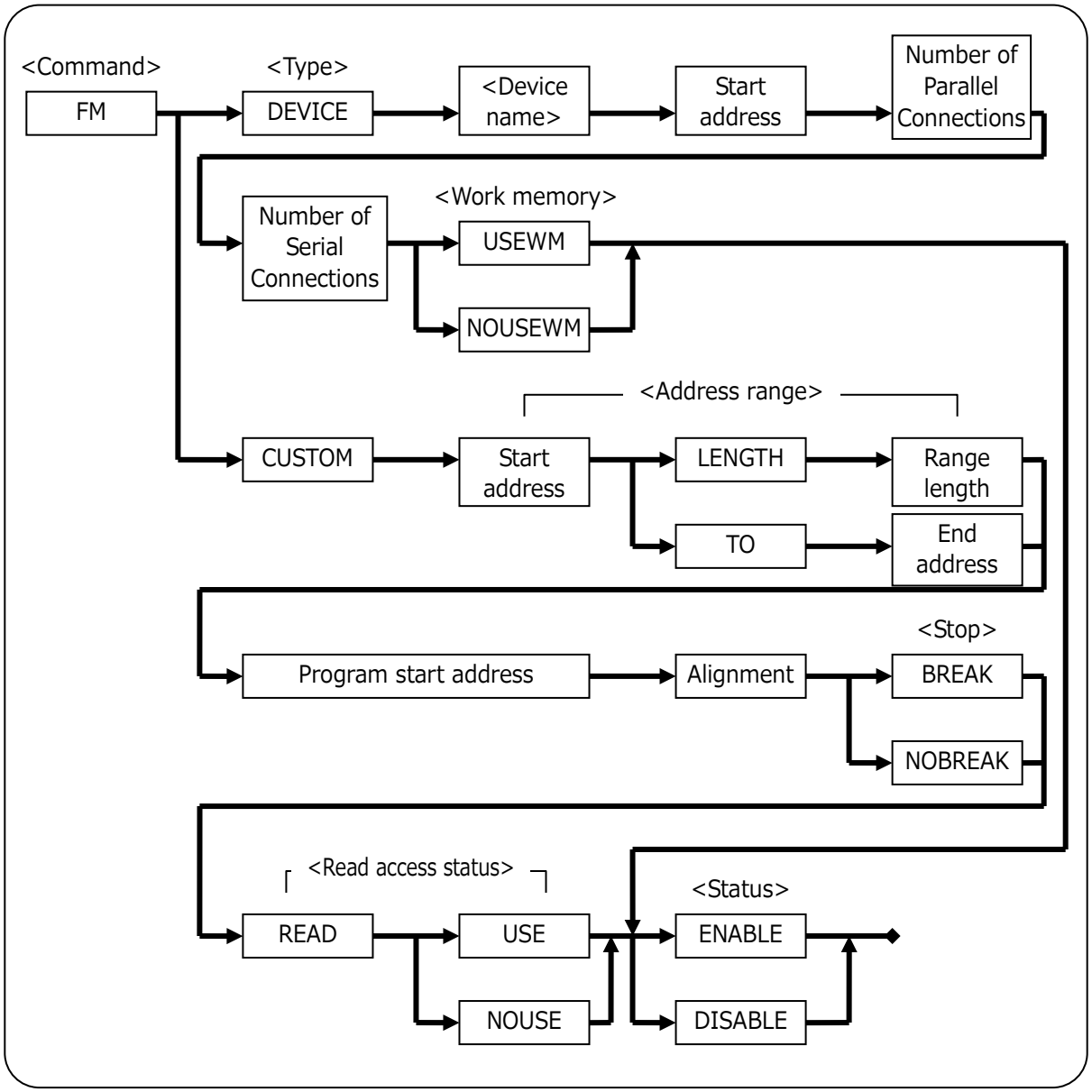


Figure 110

● **Type**

Table 66

DEVICE	Specify the flash memory name.
CUSTOM	An access program is used to access the flash memory.

● **<Device name>**

The device name of the flash memory is expressed in the "manufacturer name_size_model, etc." format.
* In the actual format, the portions expressed by underscore are replaced with space characters.

In <device name>, enter the content (portion encircled by the red line circle below) displayed in (1) device list in **Device setup** by enclosing with double-quotation marks (").

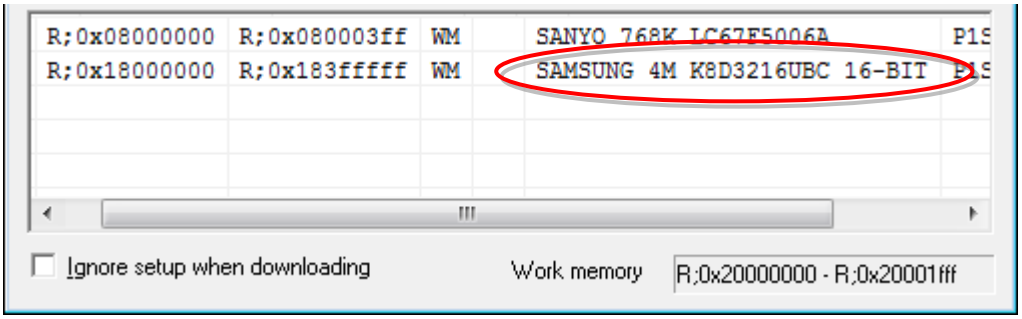


Figure 111

● **<Start address>**

Specify the start address of the flash memory.

● **<Number of parallel connections>**

Specify how many flash memories are connected to the same address.

● **<Number of serial connections>**

Specify how many flash memories are connected in series.

● **<Work memory>**

Specify whether to use the work memory when writing.

Table 67

USEWM	Uses the work memory when writing.
NOUSEWM	Does not use the work memory when writing.

● **<Address range>**

Specify the range of the flash memory that is accessed by using a read/write program.

Table 68

Start address	Specify the start address of the flash memory.
Range length	Specify the length from the start address in bytes.
End address	Specify the end address.

● **<Program start address>**

Specify the start address of the read/write program.

● **<Alignment>**

Select the alignment for the address or range length passed to the read/write program.
If the desired alignment is not found in the following list, adjust the alignment in the read/write program.

Table 69

NOALIGN	Does not adjust the alignment.
2	Aligns to 2 bytes.
4	Aligns to 4 bytes.
8	Aligns to 8 bytes.
16	Aligns to 16 bytes.
32	Aligns to 32 bytes.
64	Aligns to 64 bytes.
128	Aligns to 128 bytes.
256	Aligns to 256 bytes.
512	Aligns to 512 bytes.
1024	Aligns to 1024 bytes.

● **<Stop>**

Specify whether to stop the program immediately before the start of read/write program.

Table 70

BREAK	Not usable in this software.
NOBREAK	Run the read/write program without stopping.

● **<Read access status>**

Specify whether to use the read/write program even for read access.

Table 71

READ USE	Uses the read/write program for read access.
READ NOUSE	Does not use the read/write program for read access.

● **<Status>**

Specify whether to enable the setting for the flash memory that is currently being entered.

Table 72

ENABLE	Enable the setting.
DISABLE	Disable the setting.

7.2.16. FMCLEAR (Clear the Flash Memory)

This tab is used to clear the contents of flash memory.

● **Format**

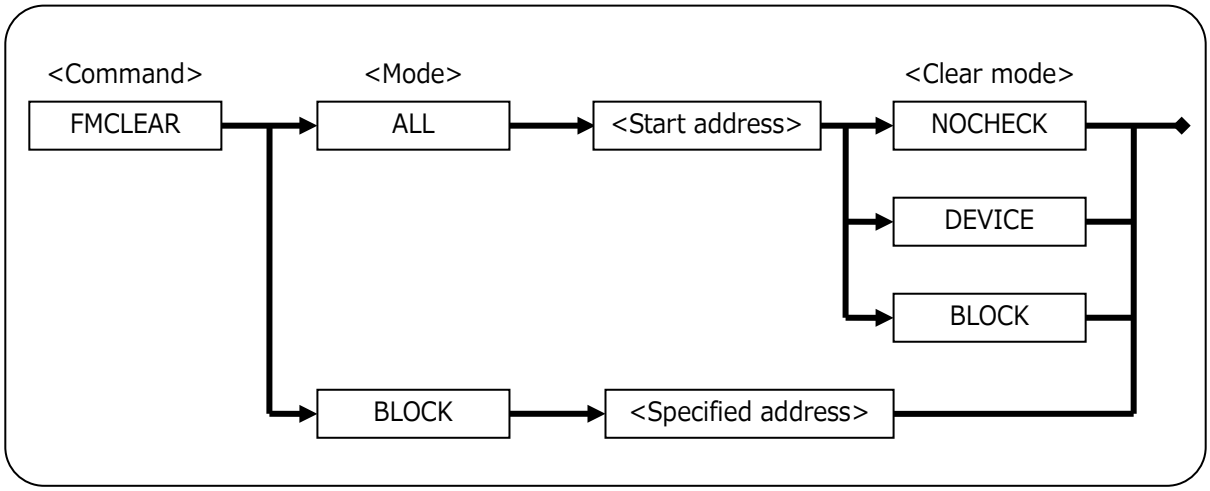


Figure 112

● **<Mode>**

Specify the clearing range.

Table 73

ALL	Clears all sectors of the device including <start address>.
BLOCK	Clears the block that includes <specified address>.

● **<Start address>**

Specify the start address of memory to clear.

● **<Specified address>**

Specify an address in the case processing is performed by specifying a specific address.

● **<Clear mode>**

Select the clearing method when clearing of all sectors of device.

Table 74

NOCHECK	Clears all of the flash memory.
DEVICE	Clears all blocks of the written flash memory.
BLOCK	Clears the written blocks of the flash memory only.

7.2.17. FMDEL (Delete the Flash Memory Settings)

This command is used to delete the flash memory settings.

● Format

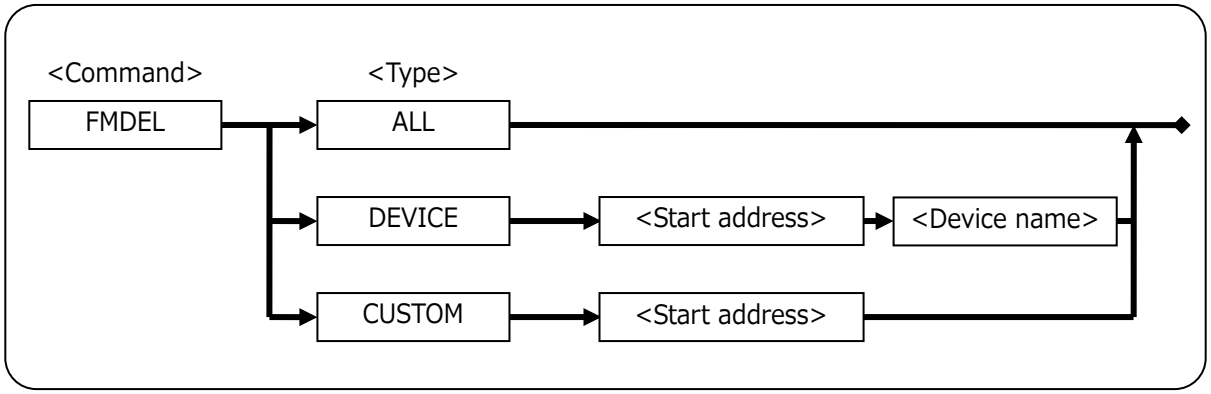


Figure 113

● <Type>

Specify the type of the flash memory to delete.

Table 75

ALL	Deletes the settings of all registered flash memories.
DEVICE	Deletes flash memory by specifying the device name.
CUSTOM	Deletes the flash memory settings by using the read/write program.

● <Start address>

Specify the start address of the flash memory to delete.

● <Device name>

Specify the device name of the flash memory to delete in the format of "manufacturer name_size_model, etc."
* In the actual format, the portions expressed by underscore are replaced with space characters.

7.2.18. FMLOAD (Switch Download to the Flash Memory)

This command is used to change the program download destination by temporarily switching the setting of the flash memory between enable and disable.
The same setting as specified by this command can be changed by operating the menu as follows and changing the setting of <Ignore setting during download> in the displayed window.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Flash Memory** → Set Device	---

● **Format**

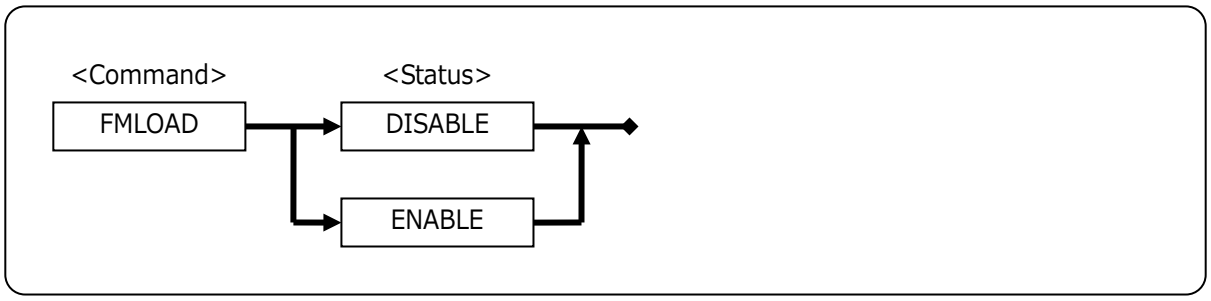


Figure 114

● **<Status>**

Specify enable/disable of download to flash memory.

Table 76

DISABLE	Does not download to flash memory.
ENABLE	Downloads to flash memory.

7.2.19. FMFILL (Fill up the Flash Memory)

This command is used to fill up the flash memory in the specified address range with the specified data.
After the command is executed, the execution result is displayed.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Flash Memory** → **Fill**	---

● **Format**

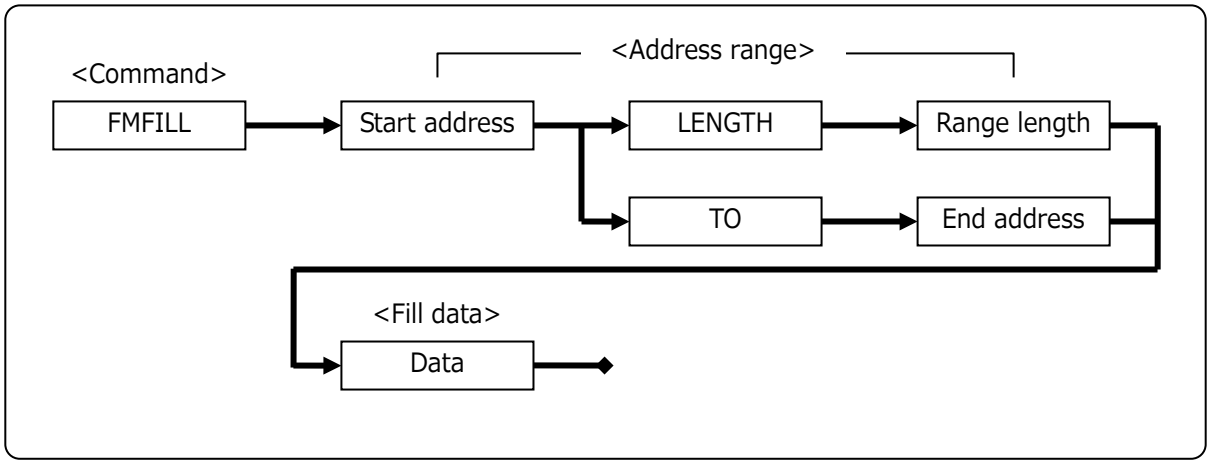


Figure 115

● **<Address range>**

Table 77

Start address	Specify the start address of memory to fill.
Range length	Specify the length from the start address in bytes.
End address	Specify the end address.

● **<Fill data>**

Fills up the flash memory with the data specified here.

7.2.20. FMWORKAREA (Set Work Memory of the Flash Memory)

This command is used to specify work memory of the flash memory.

● Format

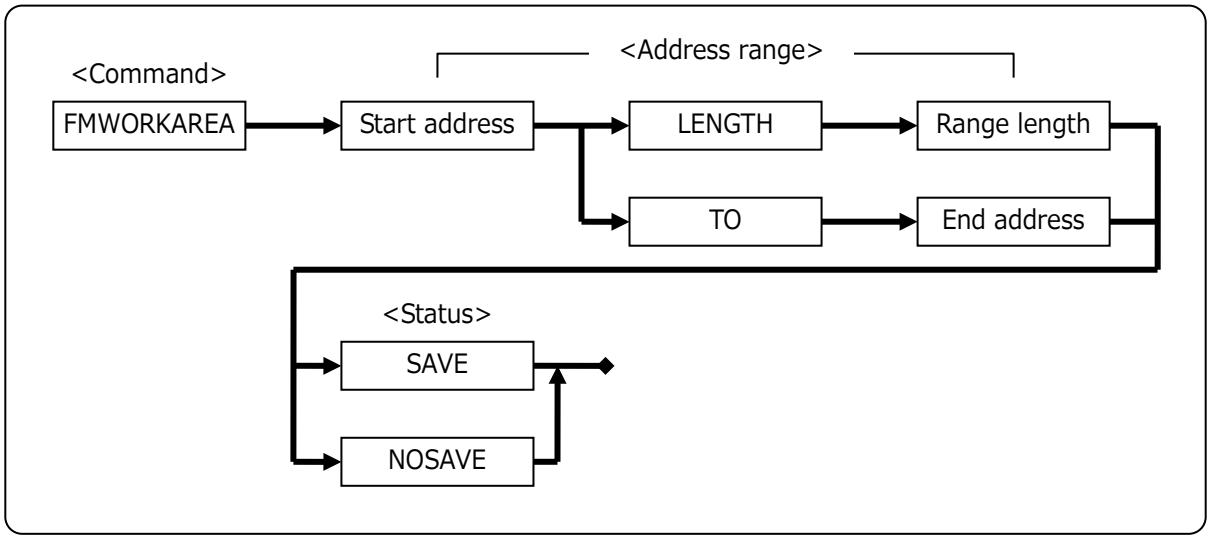


Figure 116

● <Address range>

Table 78

Start address	Specify the start address of work memory of the flash memory.
Range length	Specify the range of work memory of the flash memory.
End address	Specify the end address.

● <Status>

Specify whether to save data when using the work memory.

Table 79

SAVE	Saves data.
NOSAVE	Does not save data. When the flash memory is accessed by using work memory, the data in the range of the work memory is overwritten.

7.2.21. GO (Execute the CPU)

This command is used to start the execution of CPU from the specified start position.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
	**Go → Go**	F5

● Format

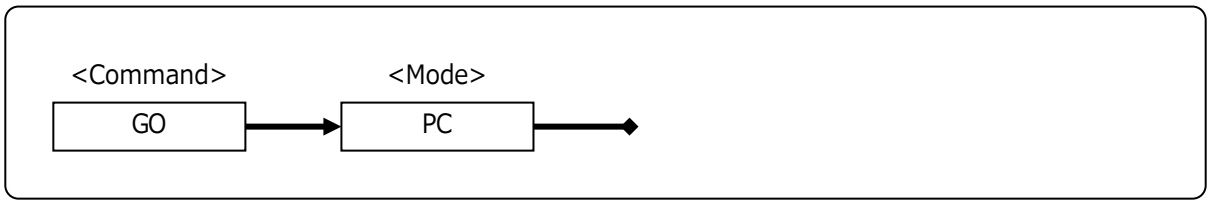


Figure 117

● <Mode>

Start the position from which execution is started.

Table 80

PC	Executes CPU from the current PC.

7.2.22. LOAD (Load the Object Data)

This command is used to download the object data of the specified file.
In the reload mode, files in the specified download list are downloaded again.
In the delete mode, the file having the specified list number is deleted from the download list.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Download**	---

● Format

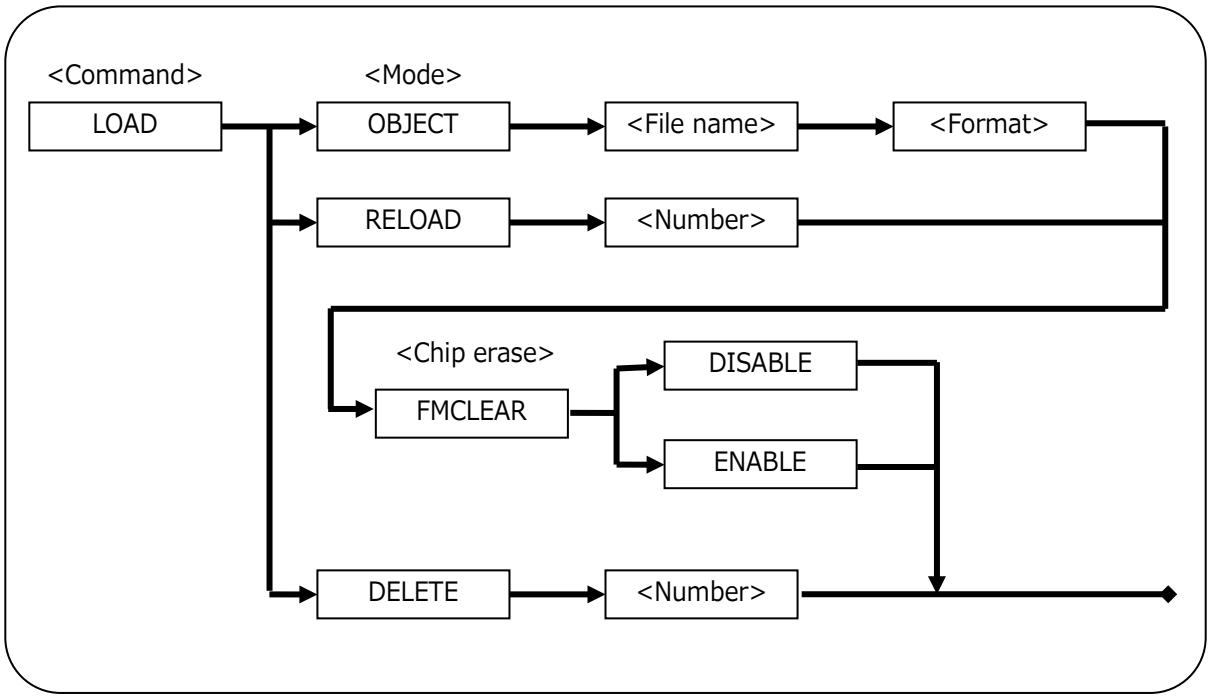


Figure 118

● <Mode>

Specify the download mode.

Table 81

OBJECT	Downloads the specified object data file.
RELOAD	Downloads again from the file of the specified number.
DELETE	Deletes the file having the specified number from the download list.

● <File name>

Specify the name of the object data file to download.

● **<Number>**

Specify the number starting from 1 that are registered in the module list.
You can check the number with the LOAD parameter of the **QUERY command**.

● **<Format>**

Specify the format name of the file to download.
Normally, specify AUTO.
The format names that can be specified are as follows:

Table 82

Format name	Summary
AUTO	Automatically recognizes the file format.
COFF	Specifies COFF format.
ELF	Specifies ELF format.
IHEX	Specifies Intel HEX format.
MHEX	Specifies Motorola HEX format.
SHF	Specifies the original high-speed download format.
SAUF	Specifies SAUF format.
BINARY <start address>	Downloads from <start address> as binary data.

● **<Chip erase>**

Table 83

ENABLE	Execute chip erase automatically before performing the download.
DISABLE	Not Execute chip erase automatically before performing the download.

The supported file formats differ depending on the target CPU, etc.
This software can be used for those supporting OBJECT.

Up to **1KByte** of object data can be downloaded with the size limited version.

7.2.23. LOADPARAM (Supplement of LOAD Command Parameters)

This command is used to supplement the parameters of LOAD command.

● **Format**

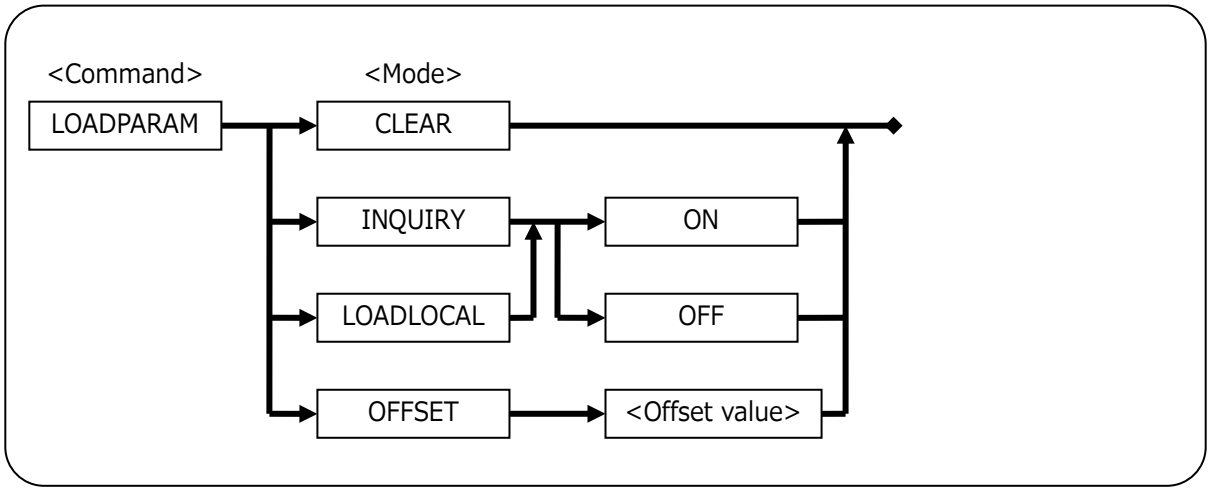


Figure 119

● **<Mode>**

Table 84

CLEAR	Initializes the parameter supplement data for the LOAD command.
INQUIRY	Not usable in this software.
LOADLOCAL	Not usable in this software.
OFFSET	Sets the offset value of the object data. If the module to be loaded is in binary format, the offset of LOAD command is used. The default <offset value> is 0.

7.2.24. LOG (Control the Logging of the Command Window)

This command is used to set whether to perform logging (saving to file) of the display contents in the Command window.
The logging function saves the display contents after inputting ON or ADD to a file.

●Format

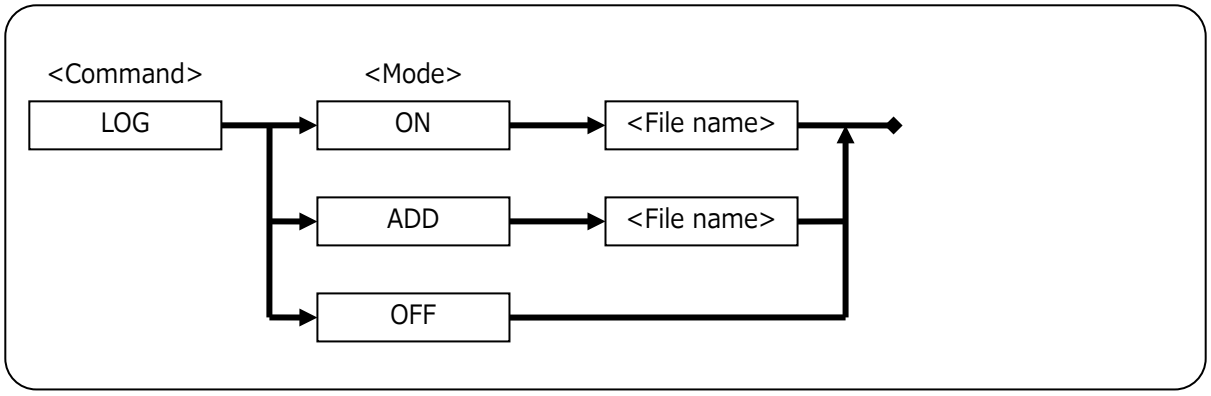


Figure 120

●<Mode>

Specify the recording mode.

Table 85

ON	Starts logging by creating a new file.
ADD	Starts logging by adding the display contents to an existing file.
OFF	Ends logging.

●<File name>

Specify the name of the file to which log is saved.

If you use the NEWBATCH command with this command, do not specify the same file for both commands.

7.2.25. MEMATTR (Set the Memory Access Area)

This command is used to set the memory access area under the conditions specified in the parameters.
After the command is executed, the current setting status of the memory access area is displayed.
This command has the same function as the following menu.

● **Format**

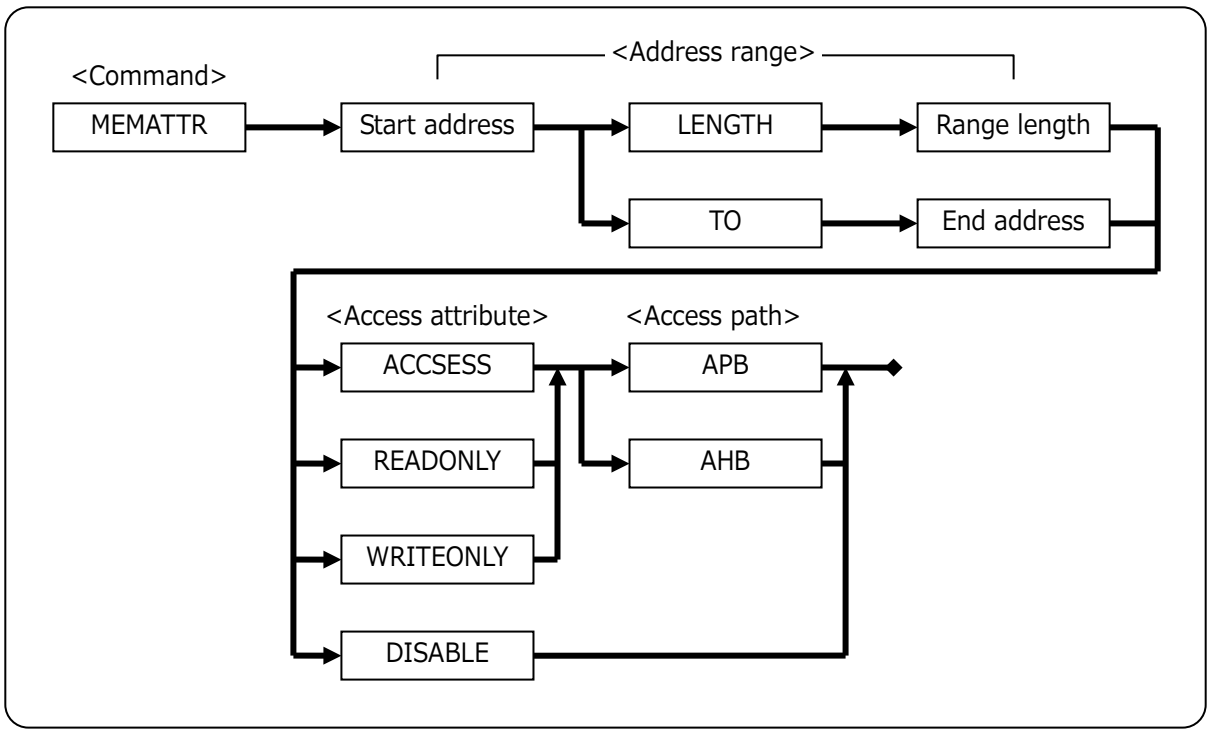


Figure 121

● **<Address range>**

Table 86

Start address	Specify the start address of memory to which memory access area is allocated.
Range length	Specify the length from the start address in bytes.
End address	Specify the end address.

● **<Access attribute>**

Table 87

ACCESS	Set read/write permission to the range specified by <address range>.
READONLY	Set read permission/write prohibition to the range specified by <address range>.
WRITEONLY	Set read prohibition/write permission to the range specified by <address range>.
DISABLE	Set read/write prohibition to the range specified by <address range>.

● **<Access path>**

Table 88

APB	Set to perform access in the APB method to the range specified by <address range>.
AHB	Set to perform access in the AHB method to the range specified by <address range>.

7.2.26. MESSAGEBOX (Show/Hide the User System Message Box)

This command is used to specify the show/hide setting of the message box about user system power ON/OFF.

● **Format**

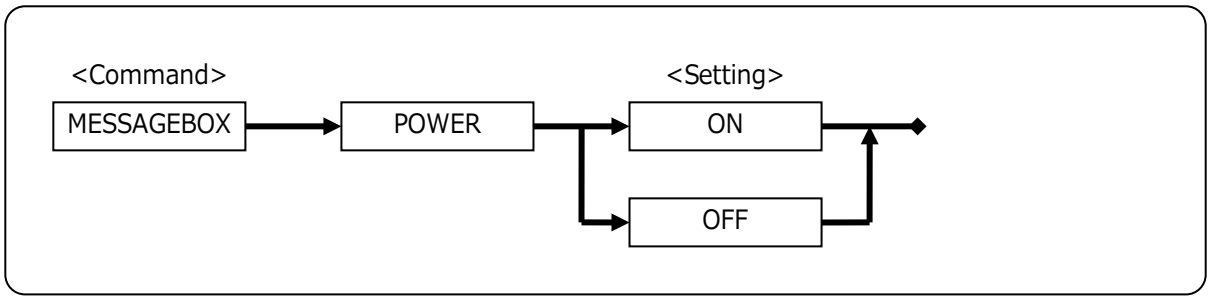


Figure 122

● **<Setting>**

Table 89

ON	Displays the message box.
OFF	Does not display the message box.

7.2.27. MKDIR (Create a Folder)

This command is used to create a folder in the specified path.
This command has the same function as MKDIR command of DOS.

● **Format**

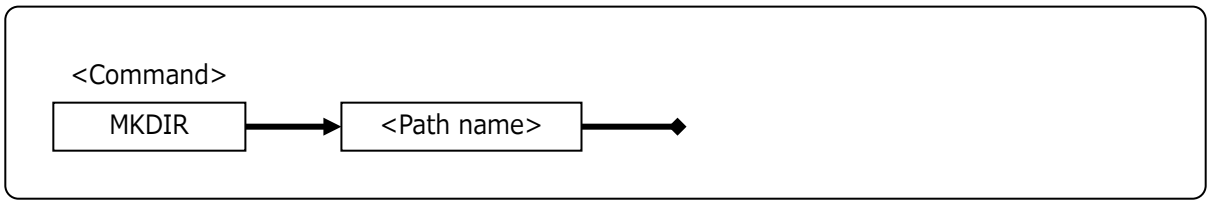


Figure 123

● **<Path name>**

Specify the path of a folder to create.

7.2.28. NEWBATCH (Create a Batch File)

This command is used to create a new batch file or add a batch file to the existing file.
Commands that are input after the start of creation of a batch file by this command will be checked for parameters, but will not be actually executed. The character string in the command line will be saved in the file.
Setting the OFF mode ends creation of batch file.

● Format

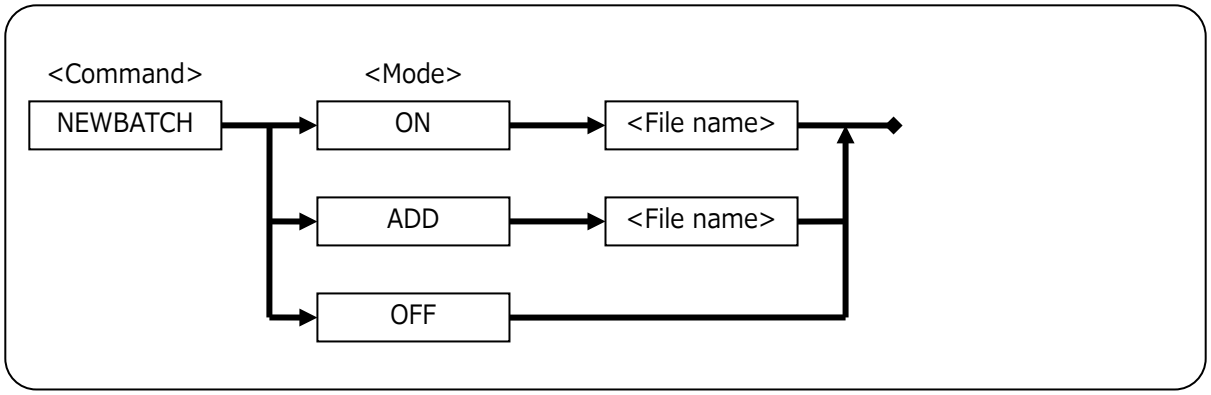


Figure 124

● <Mode>

Specify the recording mode.

Table 90

ON	Creates a new batch file and start recording of commands.
ADD	Adds commands to the existing batch file and starts recording of commands.
OFF	Ends creation of a batch file.

● <File name>

Specify the name of a batch file that is newly created or to which commands are added.

If you use the LOG command or the SAVEWIN command with this command, do not specify the same file for both commands.

7.2.29. OPTION (Set Options of the Command Window)

This command is used to set options of the Command window.
When MORE is turned on, display of the list of command execution results temporarily stops each time the list exceeds a single screen.
When MORE is turned off, all execution results are displayed without stopping.

● Format

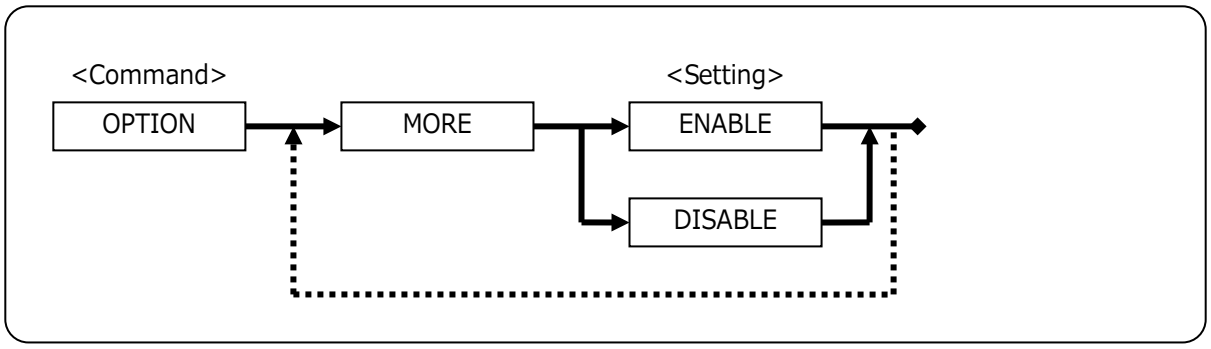


Table 91

● <Mode>

Specify the MORE function when executing the commands.

Table 92

ENABLE	Stops the result display temporarily when it exceeds a single screen.
DISABLE	Scrolls the result display without stopping when it exceeds a single screen.

● Example

```
>OPTION MORE DISABLE
[DISABLE]  MORE CONTROL
```

7.2.30. QUERY (Refer to Various Setting Status)

This command is used to refer to various status of settings.

● Format

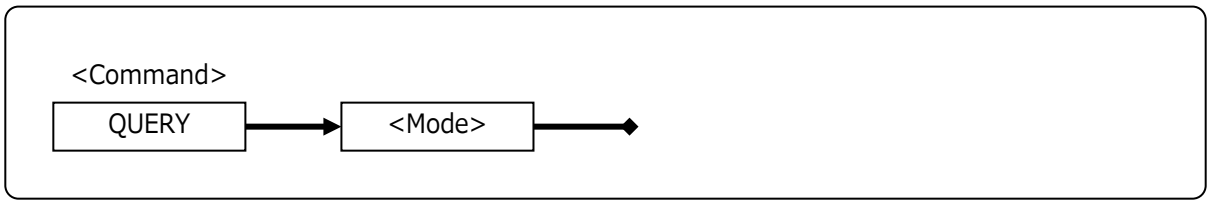


Table 93

● <Mode>
Specify the type of modes to refer to.

Table 94

Mode	Description
ENV	Refers to the current status of probe environment setting. This command has the same function as the following menu. **Resource** → **Probe Environment**
FM	Refers to the device information of flash memory.
LOAD	Refers to the download list currently registered. This command has the same function as the following menu. **Resource** → **Download**
LOADPARAM	Refers to the setting that set in LOADPARAM command.
MESSAGEBOX	Refers to the show/hide setting of the user system message box.
RADIX	Refers to the setting of input radix.
OPTION	Refers to the setting status of options of the current command window.

The modes that can be referred to differ depending on the product or the product configuration.
Executing the QUERY command enables to check the list of executable modes.

7.2.31. RADIX (Set the Input Radix)

This command is used to set the input radix.
This setting does not affect the output radix.

●Format

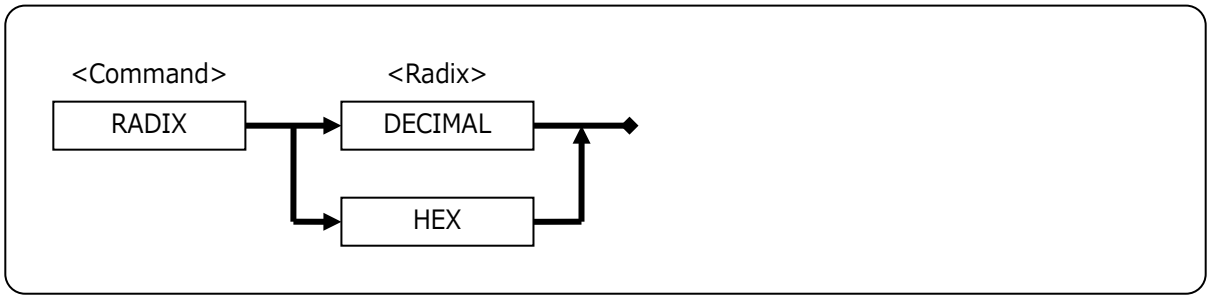


Figure 125

●<Radix>

Specify if radix is input in decimal or hexadecimal.

Table 95

DECIMAL	Input radix in decimal.
HEX	Input radix in hexadecimal. With this radix, it is not possible to input a decimal. To handle a decimal number, switch to decimal by the RADIX command. Also, when handling a hexadecimal number, be sure to append "0x" to the beginning of the numeric value.

7.2.32. RESET (Reset the CPU)

This command is used to reset the CPU.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
	**Go → Reset**	---

● Format

<Command>

RESET

Figure 126

7.2.33. SAVEWIN (Output the Command Window to File)

This command is used to output the history of the Command window currently open to a file.
Unlike LOG command, displayed contents of commands that have already been executed are saved.

● Format

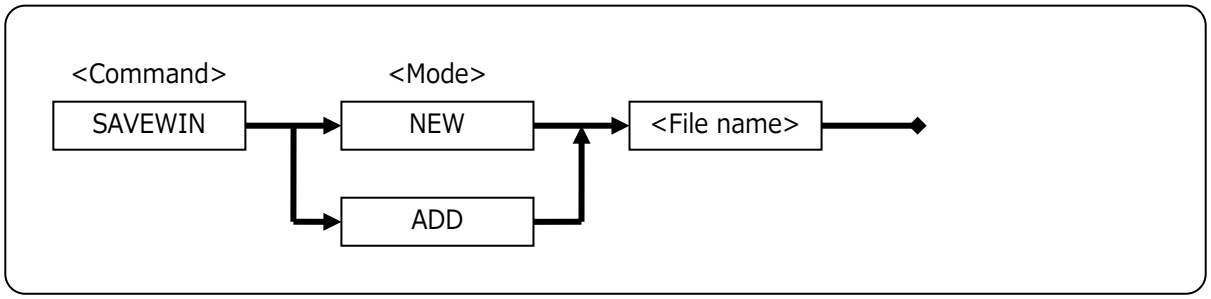


Figure 127

● <Mode>

Table 96

NEW	Saves the history by creating a new file.
ADD	Saves the history by adding to the existing file.

● <File name>

Specify the name of the file to save.

● Example

```
>SAVEWIN NEW C:¥ARM_Writer¥test.log
Log New <C:¥ARM_Writer¥test.log>

>SAVEWIN ADD C:¥ARM_Writer¥test.log
Log Add <C:¥ARM_Writer¥test.log>
```

If you use the NEWBATCH command with this command, do not specify the same file for both commands.

7.2.34. SEARCH (Search Memory)

This command is used to search the specified memory range for the specified data.
After the command is executed, the execution result is displayed.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Memory/Port** → **Search**	---

● **Format**

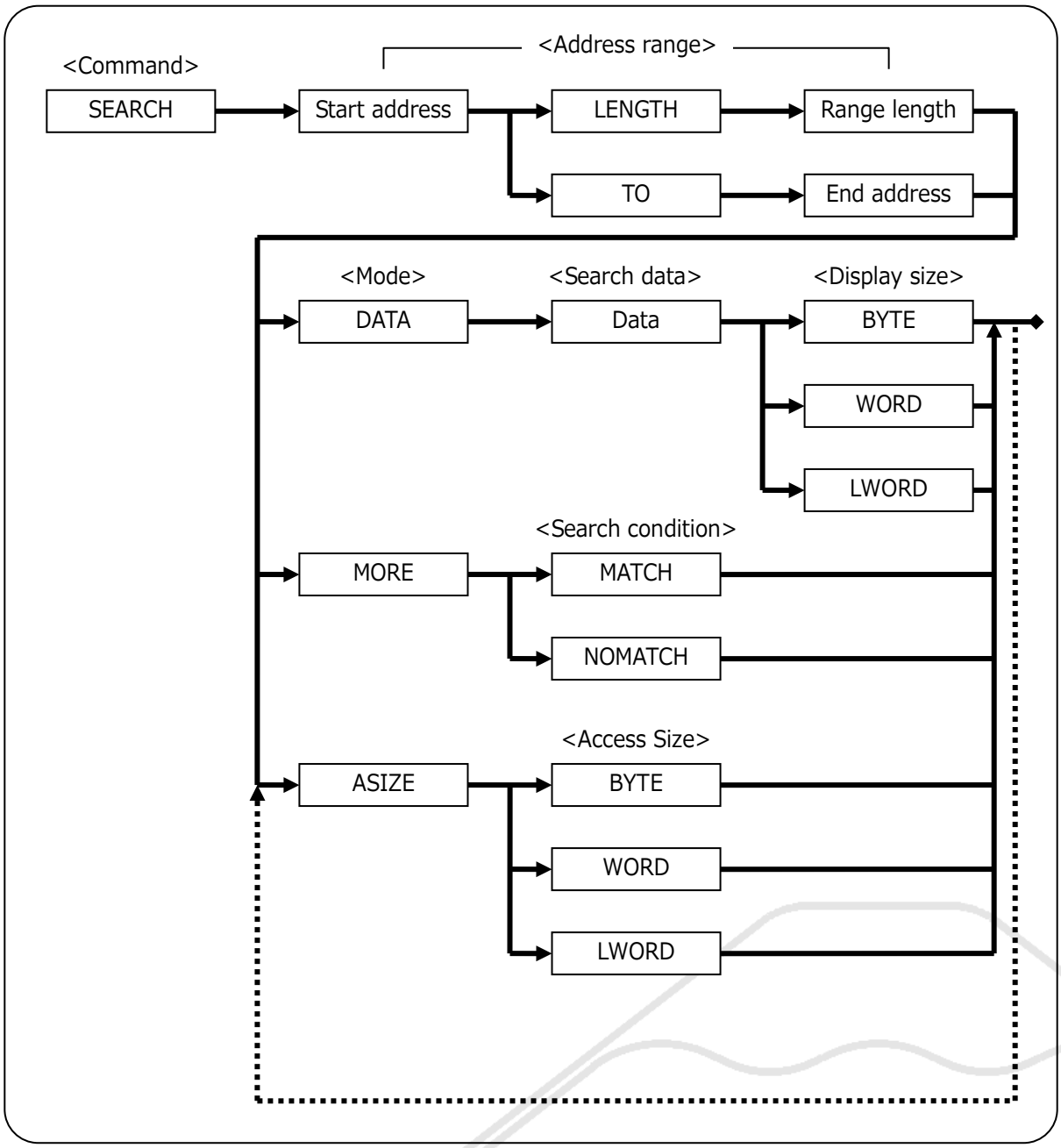


Figure 128

● **<Address range>**

Table 97

Start address	Specify the start address of the range where memory is searched.
Range length	Specify the length from the start address in bytes.
End address	Specify the end address.

● **<Search data>**

Specify the data to search memory for.
To search for a character, enclose it with single quotation marks (').
To search for a character string, enclose it with double quotation marks (").
It is not possible to directly insert such characters as space character and tab character in the character string, but they can be specified in formats such as (¥x20) and (¥x09).

● **<Display size>**

Specify the size of memory search.
When a character string is specified as a search data, the specified size becomes invalid and the search is conducted with the size of the character string.

Table 98

BYTE	Conducts memory search by byte data.
WORD	Conducts memory search by word data.
LWORD	Conducts memory search by long word data.

● **<Search condition>**

Specify the search condition.
MATCH search is performed by moving forward through addresses by one byte.
NOMATCH search is performed from the <start address> by the search data size.

Table 99

MATCH	Searches for data that match the search data.
NOMATCH	Searches for data that do not match the search data. It is not possible to specify a character string as search data. If a character string is specified, search is conducted assuming the data of the first single character of the character string is valid.

● **<Access size>**

Specify the access size.

Table 100

BYTE	Conducts search by byte access.
WORD	Conducts search by word access.
LWORD	Conducts search by long word access.

7.2.35. SHELLEXE (Execute a File)

This command is used to execute the specified file.

● Format

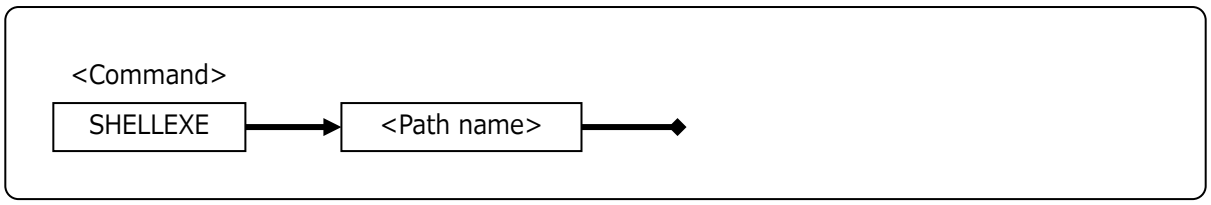


Figure 129

● <Path name>

Specify the path of the file to execute.

● Example

```
>SHELLEXE C:¥ARM_Writer¥test.exe
```

7.2.36. UPLOAD (Upload the Object Data)

This command is used to upload the specified object data.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
---	**Resource** → **Upload**	---

● **Format**

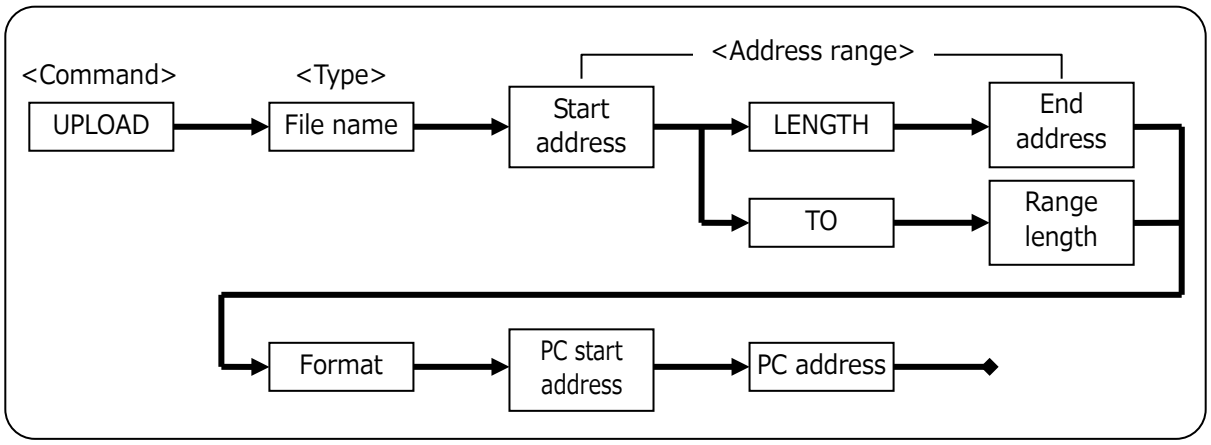


Figure 130

● **<File name>**

Specify the name of the file to upload.

● **<Address range>**

Table 101

Start address	Specify the start address of the data to upload.
Range length	Specify the length from the start address in bytes.
End address	Specify the end address.

● **<Output format>**

Specify the output format.

Table 102

IHEX64K	Outputs in Intel HEX 64K format.
IHEX1M	Outputs in Intel HEX 1M format.
IHEX4G	Outputs in Intel HEX 4G format.
MHEX64K	Outputs in Motorola HEX 64K format.
MHEX16M	Outputs in Motorola HEX 1M format.
MHEX4G	Outputs in Motorola HEX 4G format.
SHF	Outputs in Sophia high-speed download format.
BINARY	Outputs in binary format.

●<PC start address>

Specify whether to output the PC start address value.
When the output format is Motorola HEX or Intel HEX, select whether to include the PC value in the HEX file.
This command is disabled in binary format.

●<PC address value>

Specify the address value when the output format is Motorola HEX or Intel HEX and the PC start address is output.
This command is disabled in binary format.

● Example

```
UPLOAD c:¥ARM_Writer¥updata1.hex 0x1200 LENGTH 0x100 MHEX64K ENABLE_PC 0x5678

Output file name: c:¥ARM_Writer¥updata1.hex
Start address: 0x1200
Range length: 0x100 (the end address can be set up to 0x12FF)
Format: Motorola HEX (64K byte length)
PC address value: to be output; value is 0x5678.


UPLOAD updata2.hex 0x40000200 TO 0x400045FF IHEX4G DISABLE_PC

Output file name: updata2.hex (to be output to current folder)
Start address: 0x40000200
End address: 0x400045FF (range length is 0x4400 bytes)
Format: Intel HEX (4G byte length)
PC address value: not to be output
```

7.2.37. VERIFY (Set Verification)

This command is used to enable or disable verification.
This command has the same function as the following menu.

Tool button	Operation on the menu bar	Shortcut key
	**Go** → **Verify (Compare when writing)**	---
	**Go** → **Verify Only (Compare without writing)**	---

●Format

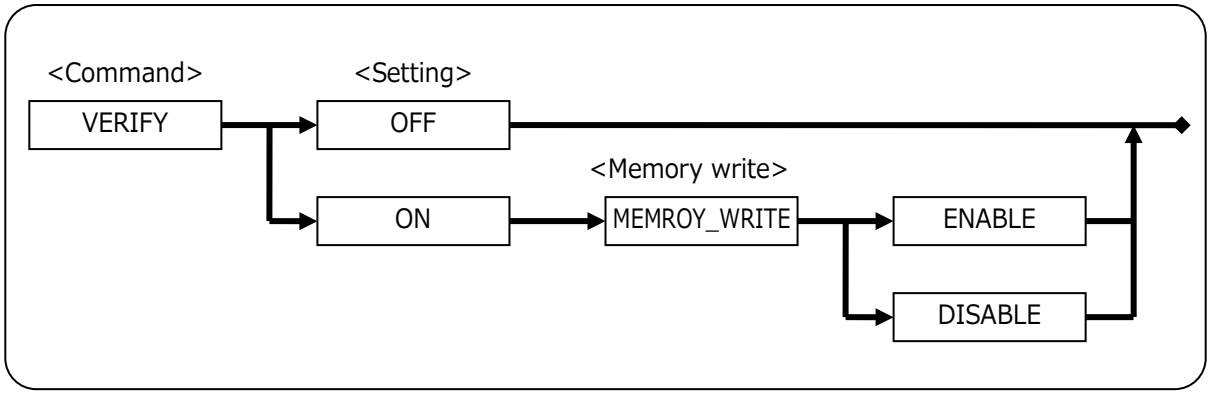


Figure 131

●<Setting>

Enable or disable verification.

Table 103

ON	Set the verification setting to "Verify (Compare after writing)" or "Verify Only (Compare without writing)."
OFF	Disable the verification setting.

●<Memory write>

Specify "Verify" or "Verify Only."

Table 104

MEMORY_WRITE	ENABLE	Set "Verify (Compare after writing)."
MEMORY_WRITE	DISABLE	Set "Verify Only (Compare without writing)."

● **Example**

```
>VERIFY ON MEMORY_WRITE DISABLE
[ON        ] VERIFY
[DISABLE   ] VERIFY WRITE

>VERIFY ON MEMORY_WRITE ENABLE
[ON        ] VERIFY
[ENABLE    ] VERIFY WRITE

>VERIFY OFF
[OFF       ] VERIFY
```

7.2.38. WAITBREAK (Wait Until CPU Breaks)

This command is used to wait until the CPU breaks.
When this command is executed, subsequent commands are not executed until any of the following conditions are met:

- CPU breaks.
- The specified time has passed.
- Command is canceled. (The cancelling method is described later.)

When this command is executed by specifying the execution time, if the CPU does not break even after the specified time has passed, this command is terminated. If the CPU breaks before reaching the specified time, this command is terminated when the CPU breaks.

If this command is executed when the CPU has broken, this command terminates immediately.

If it takes 3 seconds or longer for the CPU to break after executing this command, the dialog box as shown below is displayed indicating that the program is waiting for the CPU to break.

If you click the Cancel button (or press ESC the key) at this point, you can interrupt the command.

*CPU continues execution.

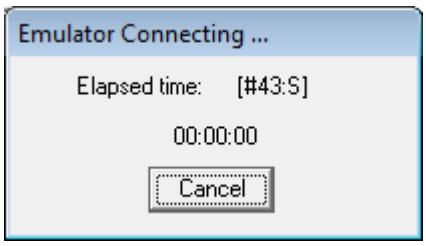


Figure 132

●Format

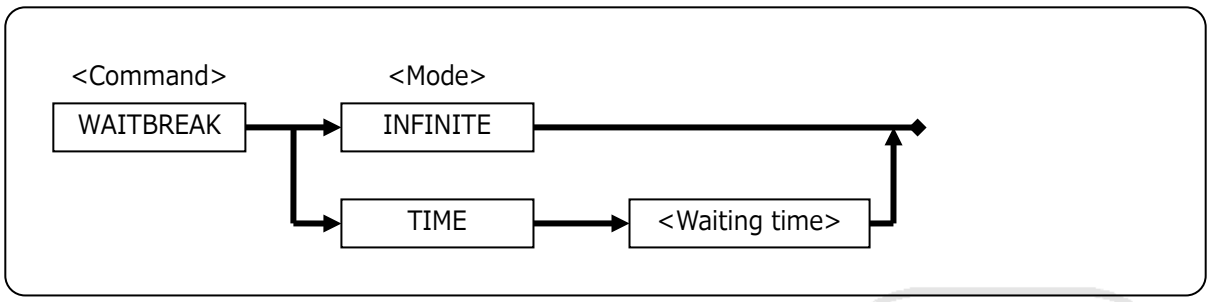


Figure 133

● **<Mode>**

Select whether to wait indefinitely until CPU breaks or time out when the specified time has passed.

Table 105

INFINITE	Waits indefinitely until the CPU breaks.
TIME <waiting time>	Waits for CPU to break for the specified wait time (unit: ms). The time you can specify ranges from 0 to 65534 (ms). If 65535 or more is set, it will be rounded off to 65534.

● **Example**

```
Executes CPU and waits indefinitely until CPU breaks.

>GO
>WAITBREAK INFINITE

Executes CPU and waits 500ms until CPU breaks.

>GO
>WAITBREAK TIME 500
```

8. Batch Functions

This software allows the batch program to batch process all commands that can be executed in the command line.
Also, it is possible to conduct execution control of batch program by using work variables, system variables, and the execution control functions.

The batch functions execute the commands (commands, definitions of variables, etc) described in the batch file line by line.
To execute a command, the new-line character needs to be inserted at the end of the line.

The batch program of this software executes the next command without waiting for the result of the executed command.
For example, to execute the next command after CPU breaks, describe as follows.

●Example: Execute “print PC” if CPU breaks

When CPU breaks, display PC (Program Counter) by "print PC" to get out of the FOR loop.
When CPU does not break even after checking the CPU condition ten times, execute the next command without displaying PC.

```
FOR $A=0 TO $A<10 STEP 1     // Loop 10 times.
 IF CPUSTATUS==0             // Check if CPU has broken.
  print PC                   // Display PC.
  FBREAK                     // Get out of FOR loop.
 ENDIF
 wait 1                      // Wait for 1 second.
NEXT $A
```

The Command window is equipped with the **NEWBATCH command** for facilitating creation of batch file as well as a function to save commands entered to the Command window in a batch file.

A batch programs can also call other batch programs. Though the upper limit of nest is not set, nesting is restricted to the range of the Windows resource.

Parameters can be omitted as on the command line, but its method slightly differs from that of the command line.

[Example of omission in memory check]
When a <mode> item ("SIZE," "MASK" or "ASIZE") is input, subsequent items such as <access size> and <data mask> that are related to <mode> cannot be omitted.

Commands are case insensitive.

8.1. Work Variables

As work variables to be used in batch program, "**batch argument**" that is passed as a parameter when a batch program starts up, "**local variable**" that is valid only for a single batch program, and "**global variable**" that is valid for all batch programs are available.
Figure 134 shows an image of the scope of variables.
Batch argument is a global variable that can be referred to only.

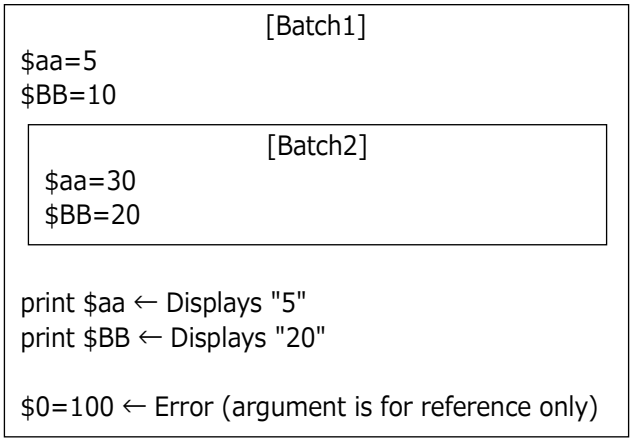


Figure 134

● **Usable work variables**

Table 106

Types of variable	Name and contents of variable	Example
Batch argument	$0: character string of the whole command line $1 to $9: 1st to 9th batch arguments	$0
Global variable	$ (character string beginning with an upper case alpha letter)	$GLOBAL
Local variable	$ (character string beginning with a character other than upper case alpha letters)	$local

Valid characters that can be used for variable name are as follows:
A to Z, a to z, 0 to 9, _ (underscore)

● **Example**

```
.$a=0x10                    // Assigns 0x10 to local variable $a.
.$abc=0x50                  // Assigns 0x50 to local variable $abc.
.$B0=[0x40000].W            // Assigns the word data in address 0x4000 to global variable $B0.
if($001==0x1234)            // True when the value of local variable $001 is 0x1234.
```

8.2. System Variables

In this software, system variables used in batch program are defined as shown in Table 107.
These can be referred to in the batch program.

Table 107

Variable name	Value and meaning
CPUSTATUS	0: breaking 1: running

● **Example**

```
if(CPUSTATUS==1)              // True when CPU is executed.
```

8.3. Labels

This function is used to define the labels that are used for branch destinations or the like in batch program.
The label starts with colon (:) at the beginning of the line.
Commands cannot be described on the label line.

● **Example**

```
:COME_HERE
```

8.4. Comment

This is used to write comment lines in batch program.
Specify a comment by inserting two slashes (//) in succession at the beginning or middle of the line.
Characters after // are treated as a comment.
Comment lines do not affect the execution of batch program.

● **Example**

```
// This is Comment Line
if ($a==0x1234)   //  if $a equals to 0x1234
```

INFO

For the following commands, it is not possible to write a comment on the same line as the command (i.e., after the command).
batch, check, copy, dump, exit, fill, mkdir, newbatch, option, print, search, upload

For example, the following description causes an error.
batch test.bat // comment

8.5. Operators Usable in Numeric Operation

8.5.1. Operators

Operators that can be used in numeric operation including address formula are shown in Table 108.

Table 108

Type	Sign	Meaning
Algebraic operators	+	Addition
	–	Subtraction
	*	Multiplication
	/	Division
	%	Remainder
Comparative operators	==	Equal to
	!=	Not equal to
	<	Less than
	>	Greater than
	<=	Less than or equal to
	>=	Greater than or equal to
Shift operators	<<	Shift left
	>>	Shift right
Logical operators	&&	AND
	||	OR
	&	AND by bit
	|	OR by bit
	^	XOR by bit
	~	NOT
Assignment operators	=	Assign right side to left side. (* Following assignment operators may also be used.) +=, -=, *=, /=, %=, <<=, >>=, &=, |=
Others	()	Parenthesis

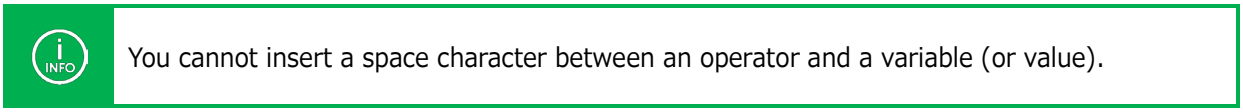
8.5.2. Priority and Evaluation Order

The priority is almost the same as in C language, but assignment operators are unique.
* Commas (,) in the operator column are delimiters.

Table 109

Operator	Connection rule
+ (sign), - (sign), ~, ! (same process as ~)	From left to right
*, *=, /, /=, %, %=	From left to right
+, +=, -, -=	From left to right
<<, <<=, >>, >>=	From left to right
<, <=, >, >=	From left to right
==, !=	From left to right
&, &=	From left to right
^, ^=	From left to right
|, |=	From left to right
&&	From left to right
||	From left to right

You can group formulas by using a parenthesis.
For example, when conducting a bit test, you can enclose formulas with parentheses such as if((x&mask)==0).



8.6. Reading/Writing Data from/to Memory and I/O

For details, refer to "**3.4. Reading/Writing Data from/to Memory & I/O Port**."

8.7. Execution Control

8.7.1. FOR, FBREAK, NEXT (Repetitive Execution with Counter)

This is used to execute a series of commands from FOR line to NEXT line as long as the <conditional expression> is satisfied.
When FBREAK is executed between FOR and NEXT, the program immediately gets out of the FOR-NEXT loop.

● **Format**

FOR <work variable>=<initial value> TO <conditional expression> [STEP <step value>]
  Command....
[FBREAK]
  Command....
NEXT <work variable>

Table 110

Parameter	Description
<Work variable>	Specify a counter variable for repetitive processing. **Specify work variables from 52 work variables ranging from $A to $Z and from $a to $z.** The work variable specified for NEXT must be the same work variable as specified for FOR.
<Initial value>	Specify an initial value to be set to work variable in signed integer.
<Conditional expression>	Specify a conditional expression for controlling repetitive processing. For conditional expression, the following can be used: • Operator • Work variable • System variable • Memory and I/O data • Numerical value
<Step value>	Specify a value to increment a work variable when a single repetitive processing has finished in signed integer. When STEP is omitted, "1" is assumed.

● **Example**

```
FOR $A=10 TO $A<100 STEP 10
  IF $A==50
    FBREAK
  ENDIF
  DUMP 0 LENGTH $A
NEXT $A
```

8.7.2. WHILE, WBREAK, WEND (Repetitive Execution)

These are used to repetitively execute a series of commands between WHILE and WEND while the <conditional expression> is true (i.e., other than 0).
If <conditional expression> is false (0), loop is terminated.
When WBREAK is executed between WHILE and WEND, the program immediately gets out of the WHILE-WEND loop.

● Format

```
WHILE <conditional expression>
  Command....
[WBREAK]
  Command....
WEND
```

Table 111

Parameter	Description
<Conditional expression>	Specify a conditional expression for controlling repetitive processing.

● Example

```
.$A=0
WHILE $A<100
  IF $A==50
    WBREAK
  ENDIF
  DUMP 0 LENGTH $A
  .$A+=10
WEND
```

8.7.3. GOTO (Unconditional Branch)

This is used to branch the batch program to the <label> line.

● Format

GOTO <label>

Table 112

Parameter	Description
<Label>	Specify the label name at the destination of branch in the batch program.

● Example

```
:LOOP
  Command
GOTO LOOP
```

8.7.4. IF, ELSEIF, ELSE, ENDIF (Conditional Judgment)

These are used to execute commands up to ELSEIF, ELSE, or ENDIF line when <conditional expression> is true (i.e., other than 0). You can specify as many ELSEIFs as you like.

● Format

IF<conditional expression>
  Command....
[ELSEIF <conditional expression>]
  [Command....]
[ELSE]
  [Command....]
ENDIF

Table 113

Parameter	Description
<Conditional expression>	Specify a conditional expression for controlling execution.

● Example

```
IF $A>$B
  DUMP 0 LENGTH $A
ELSEIF $A==$B
  DUMP 0x10 LENGTH $A
ELSEIF $A<$B
  DUMP 0x20 LENGTH $B
ELSE
  DUMP 0x30 LENGTH $B
ENDIF
```

8.7.5. END (Exit All Batch Programs)

This is used to exit all batch programs including nested batch programs that are currently executed.

● Format

END

● Example

```
IF $A>$B
  END
ENDIF
```

8.7.6. QUIT (Exit Current Batch Program)

This is used to exit the batch program that is currently executed.
When the batch program is nested, only the current batch program is terminated and control returns to the calling source program.

● Format

QUIT

● Example

```
IF $A>$B
  QUIT
ENDIF
```

8.8. ECHO (Switch Show/Hide of Batch Commands)

This is used to switch between displaying and hiding commands in batch program.

● **Format**

ECHO {ON|OFF}

● **Example**

```
IF $A>$B
  ECHO ON
ELSE
  ECHO OFF
ENDIF
```

8.9. KEYIN (Input from the Keyboard)

If <character string> is specified, <character string> is displayed in the status bar of the command window as a guide character string and the program waits for input from the keyboard. When a work variable is specified, this command assigns the character string input from the keyboard to a work variable.

Input of character string from the keyboard is terminated once the Return character (Enter) is input.

When both of <character string> and <work variable> are not specified, the input character string is evaluated as a formula and the evaluation result is displayed.
At this point, if an assignment formula or the like is specified, the result of the formula on the right side is assigned to the formula on the left side.

● Format

KEYIN [<character string> [<work variable>]]

Table 114

Parameter	Description
<Character string>	Specify the guide character string that is displayed in the status bar of the Command window.
<Work variable>	Specify the work variable to set a value that is input from the keyboard.

● Example

```
KEYIN "A=" $A      // Displays "A=" in the Command window and waits for key input.
```

8.10. PRINT (Display the Character String)

This command is used to evaluate the specified <numeric expression> and display it in the Command window in the format specified by <format> .
When <character string> is specified, it is displayed in the Command window before <numeric expression> is displayed.
As many <character string> and <numeric expression> parameters as you like may be specified by separating them with a space character.

●Format
PRINT {[<character string>] [<numeric expression>][<Format>]} +

Table 115

Parameter	Description
<Character string>	Specify the guide character string that is displayed in the command window.
<Numeric expression>	Specify the work variable to set a value that is input from the keyboard.
<Format>	Specify the format in which numeric expression is displayed.

●<Format>

Table 116

Format	Description
None	Default display format. Displays a 4-byte hexadecimal value and a signed decimal value enclosed in parentheses.
.#B	Displays in 2-byte binary value.
.#LB	Displays in 4-byte binary value.
.#D	Displays in 2-byte signed decimal value.
.#LD	Displays in 4-byte signed decimal value.
.#U	Displays in 2-byte unsigned decimal value.
.#LU	Displays in 4-byte unsigned decimal value.
.#H	Displays in 2-byte hexadecimal value.
.#LH	Displays in 4-byte hexadecimal value.

● Example

```
PRINT "abcdefg"
    abcdefg                                          // Execution result
PRINT "$A=" 1+2+3 " $B=" 1*2*3
    $A=0x00000006 (6) $B=0x00000006 (6)              // Execution result
.$A=0xffffffff
PRINT "$A=" $A
    $A=0xffffffff (-1)                               // Execution result
PRINT "$A=" $A.#B
    $A=1111 1111 1111 1111                           // Execution result
PRINT "$A=" $A.#LB
    $A=1111 1111 1111 1111 1111 1111 1111 1111       // Execution result
```

8.11. BEEP (Beep)

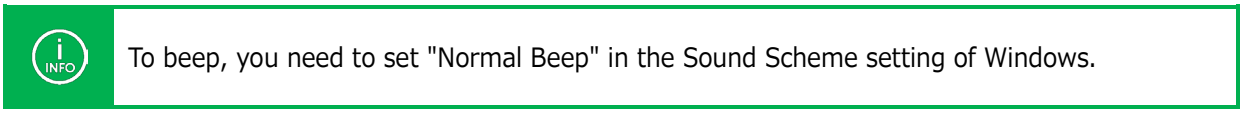
This is used to beep.

● **Format**

BEEP

● **Example**

```
IF $A > $B
  BEEP
ENDIF
```



8.12. WAIT (Stop a Batch Program Temporarily)

This command is used to stop a batch program for the specified seconds.

● **Format**

WAIT <seconds>

Table 117

Parameter	Description
<seconds>	Specify the time in seconds for which the batch program is stopped.

● **Example**

```
IF $A > $B
  WAIT 10          // Waits for 10 seconds.
ENDIF
```

9. Stand-alone Functions

The stand-alone action records written data and writing procedure in a probe and executes recorded procedure later by itself by pressing the RUN button of the probe while power is supplied, even not connected to a host PC.

1) **Recording of written data and writing procedure**

Connect to the host PC and perform data write to the target in normal procedures.
At this point, record the written data and the writing procedure in the probe.

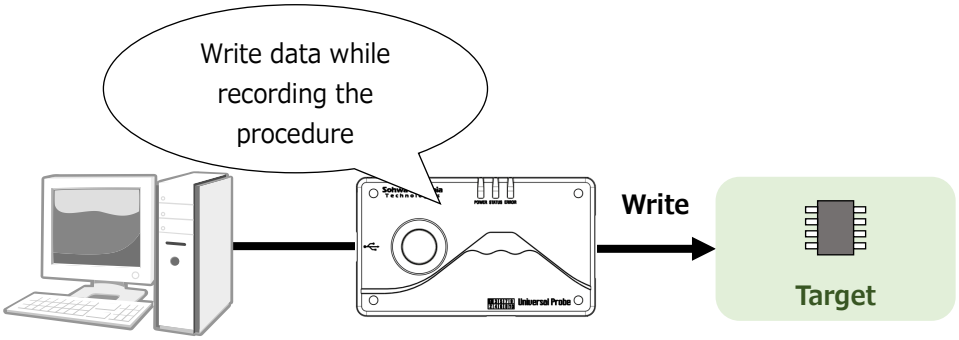


Figure 135

2) **Disconnect the probe from the host PC**

Disconnect the probe from the host PC and connect with the target.

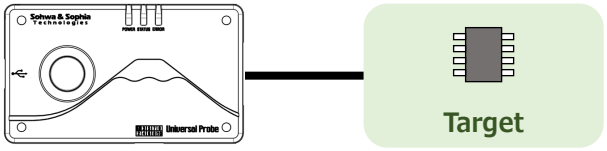


Figure 136

3) **Connect with power supply and press RUN button**

Supply power from a rechargeable battery, for example, and after confirming that the POWER LED of the probe is lit, press the RUN button.

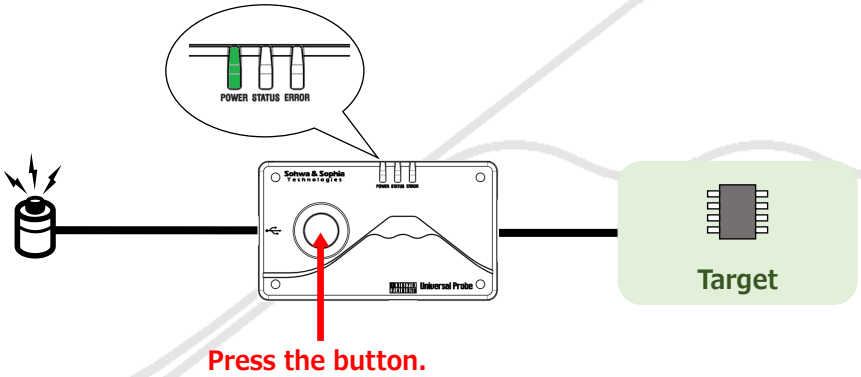


Figure 137

4) **Perform writing**

During writing, the STATUS LED blinks.

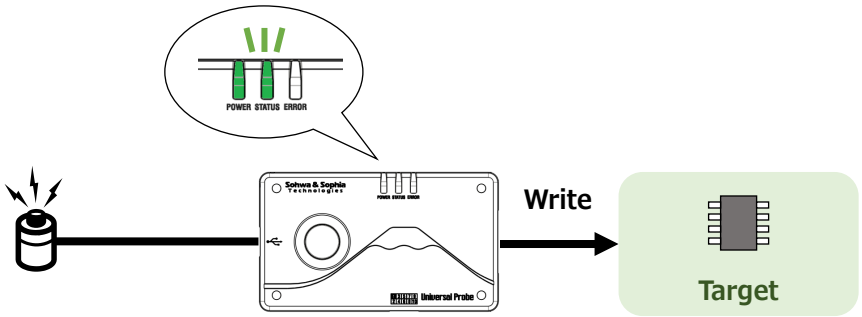
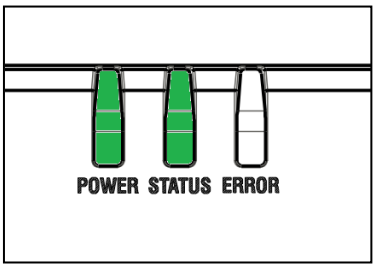


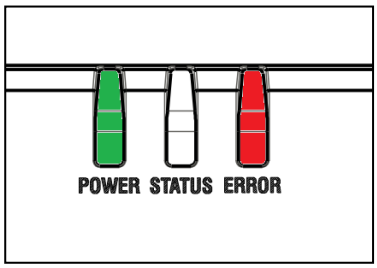
Figure 138

5) **When writing ends, the LED indicates the result of writing**

When writing finishes normally, the STATUS LED lights in green and when the writing failed, the ERROR LED lights in red.



[When finished normally]



[When failed]

Figure 139

9.1. Recording of Procedure

When this software starts, the following screen is displayed.
If the button indicated by a red-line circle below is clicked, the mode changes to the mode for recording the operation procedure.
Open (or create) a project file in this condition and **execute writing to flash memory once**.

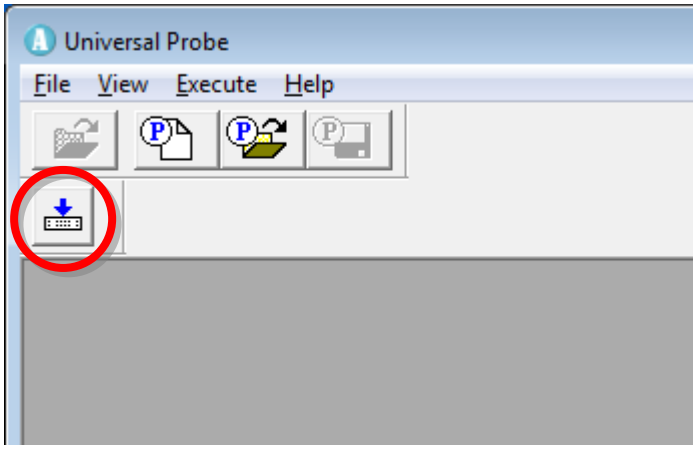


Figure 140

During recording, "Short-press recording" is displayed in the window title bar.

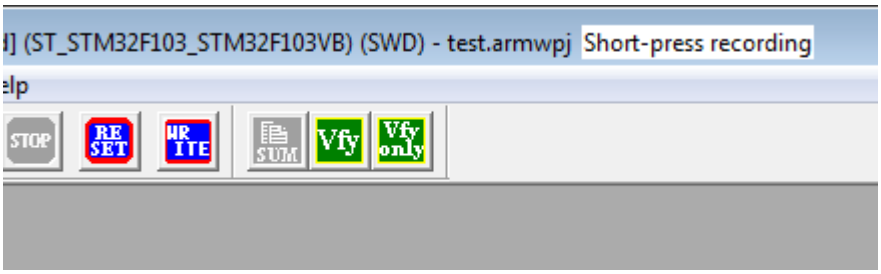


Figure 141

9.2. End of Recording

To end recording, exit this software or close the project.

9.3. Backup and Restoration of Recorded Procedure

You can back up the recorded procedure in the host PC.
You can also restore the backed up procedure.
Procedure can be restored to other probes as well. However, if the License Code of this software is not registered in the restoring probe, pressing the RUN button causes an error.

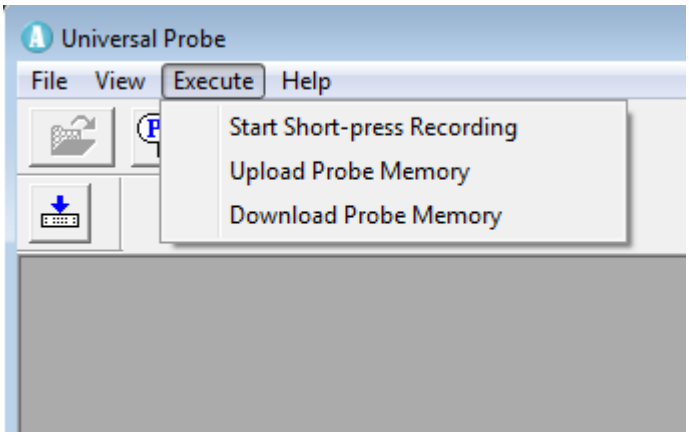


Figure 142

Table 118

Menu	Description
Start Short-press Recording	When this menu is selected, the mode changes to the step recording mode.
Upload Probe Memory	Uploads (backs up) the procedure recorded in the probe to the host PC.
Download Probe Memory	Downloads (restores) the procedure uploaded (backed up) in the host PC to the probe.

INFO

The stand-alone function and the procedure backup/restoration function are convenient in the following cases:

- Writing is performed in parallel in the factory.
- The contents of memory are frequently restored due to maintenance and repair.

Revision History

Ver. No.	Revision date	Content of revision
01	09/30/2014	Initial Release.
02	10/20/2014	Revised 7.2.22. LOAD Format.
03	11/17/2014	Correction of typographical errors.

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