NBD Manager

USER'S MANUAL (REV. 2.10)

RealTimeEvaluator

REVISION HISTORY

Date of enforcement	Revision	Chapter	Description
March 18, 1997	1.00		First edition
September 19, 1997	1.01	12.3	Clerical errors corrected, the description of IDB/NBD connector, 25 pins.
September 19, 1997	1.02	6.2.5	The specification of the symfile command was changed.
November 12, 2000	2.00		Some contents were deleted as a result of changing configuration of the manual of the NBD tool.
April 18, 2002	2.10	3.4.2, 3.4.4, 6 5.6	Real-time transmission was added. Section "Real-Time Transmission File" was added.

CONTENTS

1   INSTALLING/UNINSTALLING NBD Manager

1.1   INSTALLING AND STARTING NBD Manager

NBD Manager can be started by copying the files in the disk supplied as an accessory to a folder and executing NBDMAN.EXE. The supplied files are:

NBDMAN.EXE   Main program (NBD Manager)
NBDMANTP.HLP   Help file

1.2   UNINSTALLING NBD Manager

To uninstall **NBD Manager**, delete all the files copied to the folder. Because the NBD Manager program does not create any file that contains default values and a registry, NBD Manager can be uninstalled simply by deleting the files that were copied when it was installed.

In uninstall, it is recommended that additional files (such as a monitor condition setting file, a resulting data file, etc.), which will have been created during the program run, be deleted if they are unnecessary.

1.3   OTHER PREPARATIONS

The following preparations must be made to start **NBD Manager**.
   * Refer to "RTE for WIN32 Installation Manual" and install :rte4win32 from the CD-ROM supplied as an accessory.
   * Refer to "KIT-xxxx-NBD User's Manual" of the CPU used, and set the hardware and initialize rte4win32.
   * Start NBD Manager with power supplied to both the NBD tool and target system.

1.4   NUMERIC REPRESENTATION

The numeric inputs to **NBD Manager** are handled as hexadecimal numbers. Hexadecimal values beginning with A to F must be preceded by 0x or 0 for entry. Hexadecimal values beginning with 0 to 9 can be entered as is. Inputs other than the above are regarded as being symbols. Any symbol information is replaced by the associated numeric value. If a symbol has no associated value, it results in an input error.

<Example>
            1234,01234,0x1234,0FF8000,0xFF8000

2   NBD Manager DISPLAY SCREEN STRUCTURE

Menu bar

Tool bar

NBD Manager						_ □ X
File	Edit	View	Monitor	Options	Window	Help
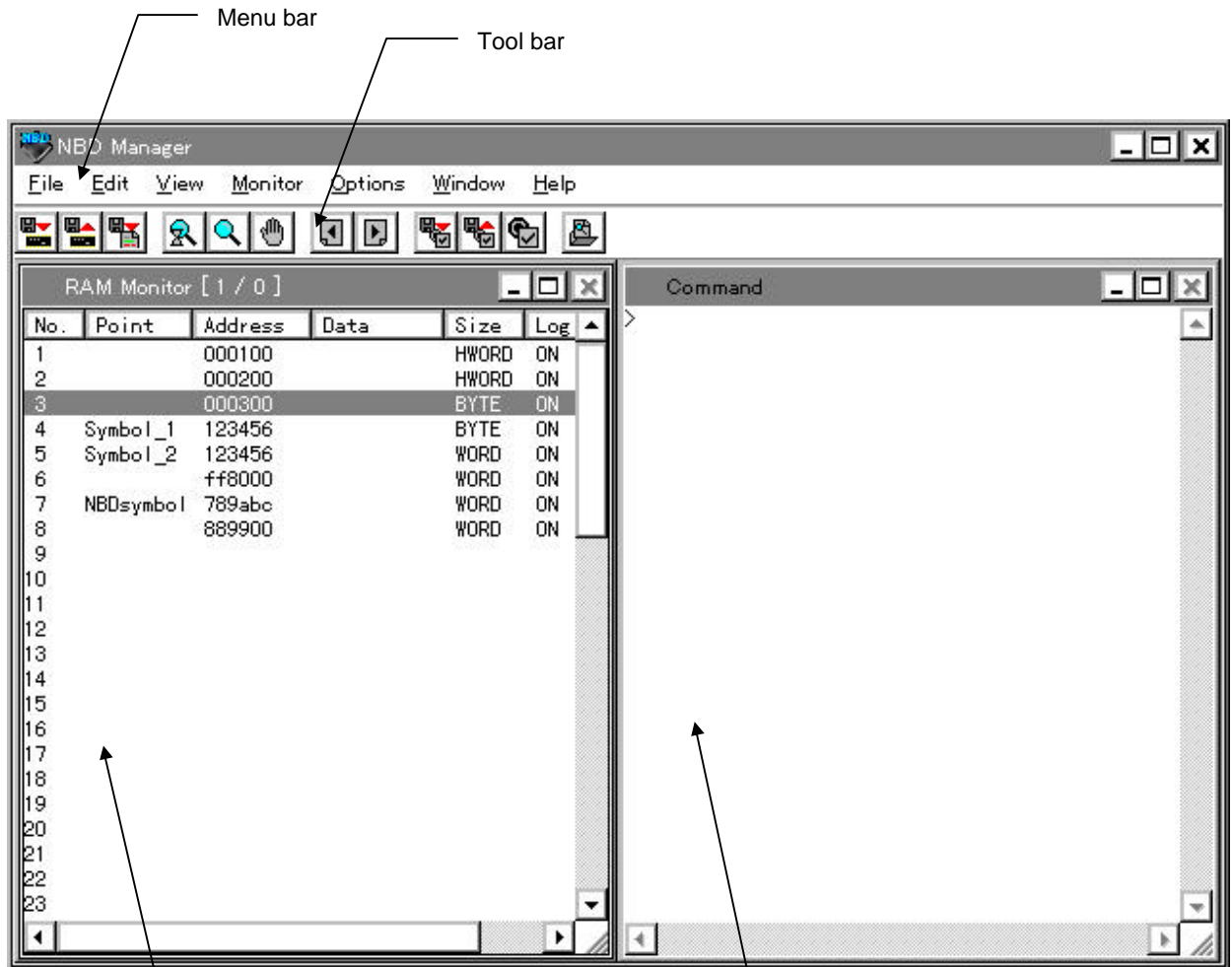
RAM monitor window:
On this window, the result of the
RAM monitor and the set states of
the channels are displayed. This
window also enables the setting of
a channel.

Command window:
This window allows the user to
enter a character string of a
command and have the result
displayed.

No.	Point	Address	Data	Size	Log
1		000100		HWORD	ON
2		000200		HWORD	ON
3		000300		BYTE	ON
4	Symbol_1	123456		BYTE	ON
5	Symbol_2	123456		WORD	ON
6		ff8000		WORD	ON
7	NBDsymbol	789abc		WORD	ON
8		889900		WORD	ON
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

RAM Monitor [1 / 0]

Command

3   MENU COMMANDS

The menu commands that are present on the menu bar are described below.

3.1   File MENU

3.1.1 Load

The Load command reads objects from a file and writes them into memory.
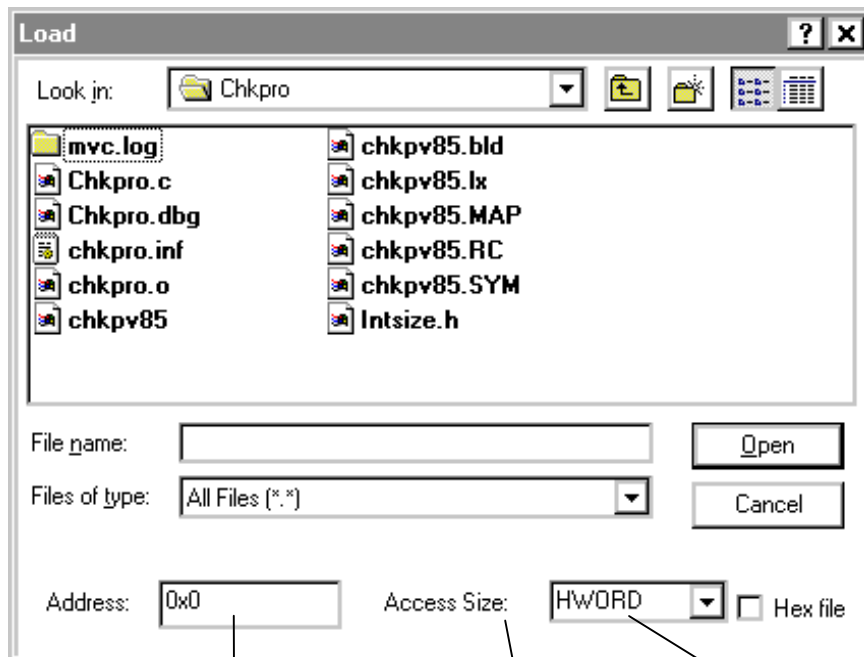
Enter the start address for writing
the file contents into memory.

Select the data size
for accessing
memory.

Select when the file
is HEX format.

Object data in either a binary format file or a HEX format file may be read.

Only the S format can be used as the HEX format.   Only the space defined by the specifications of the NBD interface of the CPU is valid. If writing is not supported by the CPU, this function cannot be used.

3.1.2 Save As

The Save As command reads the contents of memory and writes them into a file. Writing into a file is performed the **only in the binary format**.
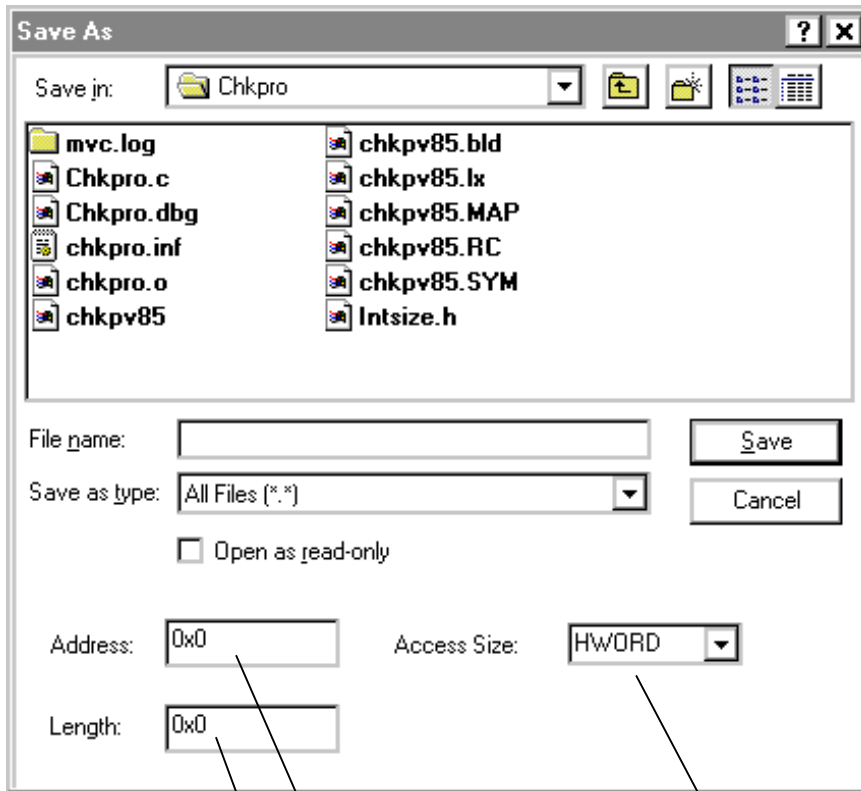

Select the data size for accessing memory.

Enter the start address in memory from which the contents are to be read.

Enter the range of the memory in units of bytes.

The contents of memory may be read from the built-in ROM space (including a tuning RAM) and the built-in RAM space and written into a file. However, only the space defined by the specifications of the NBD interface of the CPU is valid.

3.1.3 Load Symbol

The Load Symbol command reads the symbol information from a file. The file format shall be *ELF format* in which the GHS tool output is performed. The symbols to be read are limited to **global symbols**.
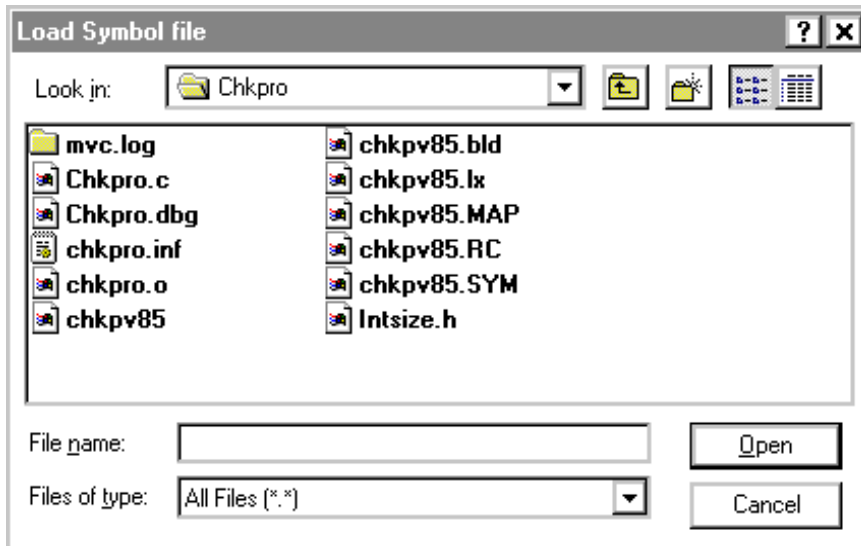
3.1.4 Exit

The Exit command terminates **NBD Manager**.

A prompt appears, asking if you want to exit NBD Manager.

3.2 Edit MENU
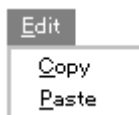
These commands can be used only from the line command window.

The copying or pasting of character strings is performed as desired.

3.3 View MENU

```
View
✓ Toolbar
```

Choose whether the tool bar is displayed.

3.4 Monitor MENU

```
Monitor
Start Refresh mode
Start Monitoring
Stop Monitoring

Previous Scan Page
Next Scan Page
Jump Page

Condition...
Save Condition...
Load Condition...

Save Scan data...
```
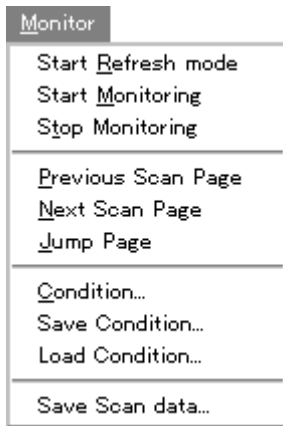
This menu contains the commands used to control the RAM monitor.

3.4.1 Start Refresh mode

The Start Refresh mode command causes the RAM monitor to start in refresh mode. The RAM monitor scans the memory at the refresh time interval that has been set by the Condition command. The scanned data is displayed in the RAM monitor window. The refresh time is the only valid condition set by the Condition command. This mode continues until the Stop Monitoring command is executed.

3.4.2 Start Monitoring

The Start Monitoring command causes the RAM monitor to start in normal mode. Start, scan, and end are performed as set by the Condition command. The display of the result is performed only when the end condition is satisfied. If the end condition is Free Run, however, the result is displayed when the Stop Monitoring command is executed. The hourglass cursor appears to indicate that the RAM monitor is running.

If real-time transmission is specified by the Condition command, a dialog box that is used to specify a file to which real-time transmission data is to be saved is displayed.
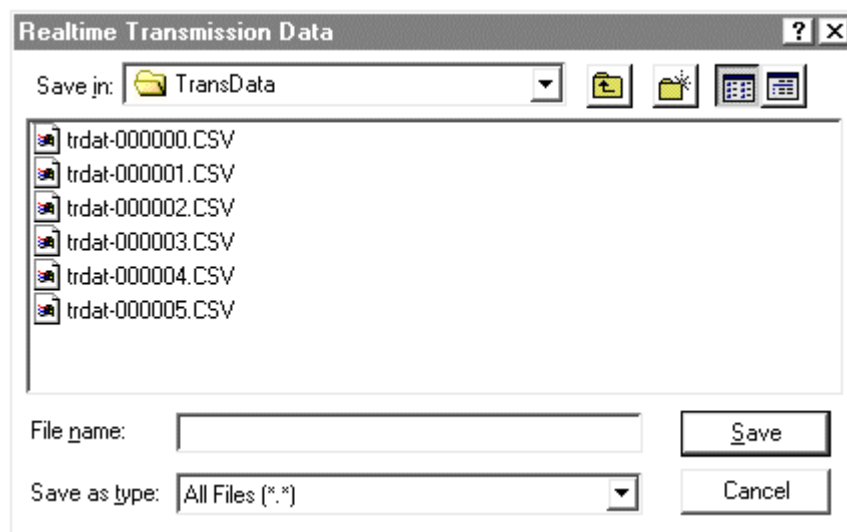
When a file name has been specified, RAM monitor is started, and real-time transmission data is saved to the file. For the file name, see **Section 5.6**.

3.4.3 Stop Monitoring

The Stop Monitoring command stops the running RAM monitor. When the RAM monitor stops, the monitor scanned data, if present, is displayed in the RAM monitor window.

3.4.4 Condition

The Condition command allows the user to set the RAM monitor conditions. The set conditions become valid when the RAM monitor starts. For details of each condition, see **Section 5.7**.

Select the start condition.

Select the scan condition.

Select the end condition.

Enter a value for the timer if you selected Timer as the scan condition.

In refresh mode, enter a value for the time interval for refreshing the display on the screen.

If you selected User Event, this button is used to set the user event condition. When you click this button, an event dialog box, like that shown below, will appear.

Check if real-time transmission is executed.

Enter the address of an event.

Select the event condition.

3.4.5 Save Condition

The Save Condition command saves all the conditions for the RAM monitor into a file.

When you select Save Condition, a dialog box like that shown below will appear. You may assign an arbitrary name to the file into which the RAM monitor conditions are saved.
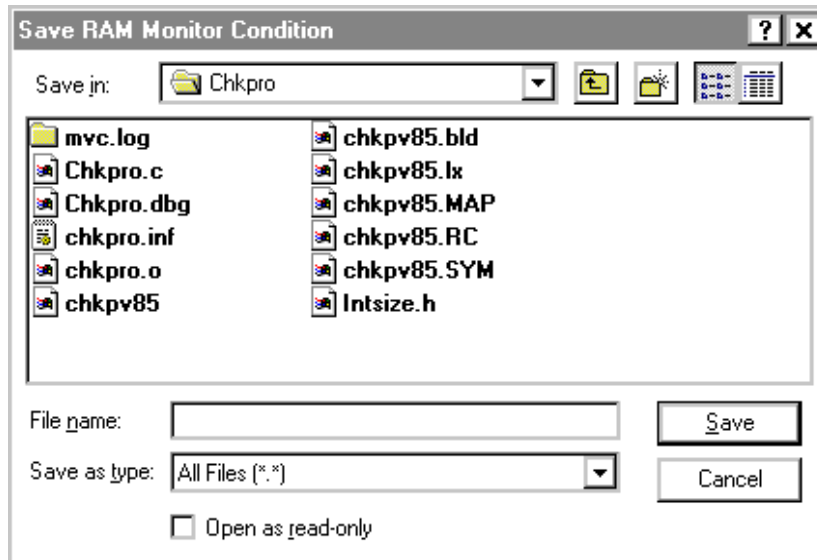
The contents saved into the file are the conditions set by the Condition command and the conditions for channels set in the RAM monitor window. If a symbol name has been set for a channel, then the symbol name will be saved.

3.4.6 Load Condition

The Load Condition command reads the RAM monitor conditions from the file.

The file to be specified **must be one in which the RAM monitor conditions were saved by the Save Condition command**.
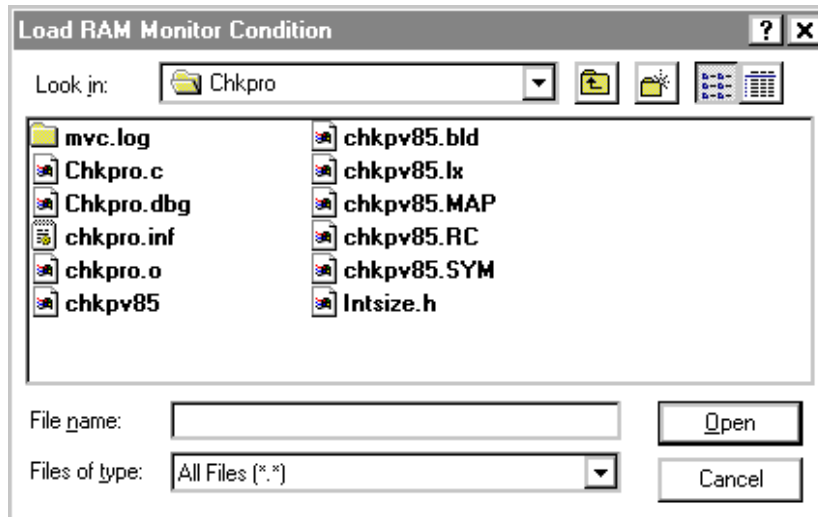
The RAM monitor conditions cannot be read during the execution of the RAM monitor. When the conditions are read, the most recent monitor scanned data is erased.

If a symbol is applied to the channel condition, "**unknown**" may be displayed in the address column. This is because the symbol information has not been saved into the file or because the symbol has no associated value. In such a case, the symbol information should be read, using the Load Symbol command in the File menu. **If there is a channel whose address is unknown, the RAM monitor cannot start.**

3.4.7 Save Scan data

The Save Scan data command saves the monitor scanned data into a file.
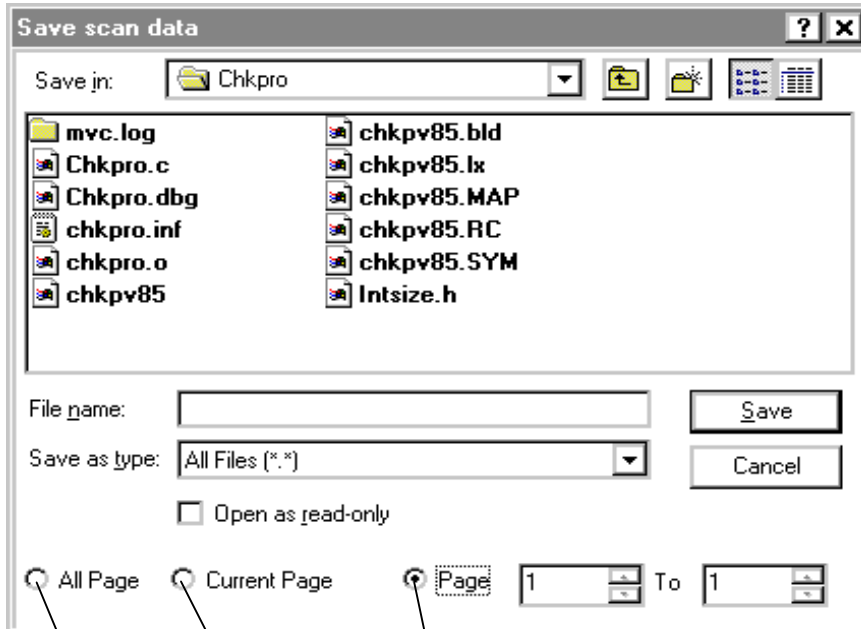
Check this button if you want to specify the pages to be saved. Specify the start page and the end page.

Check this button if the currently displayed page is to be saved.

Check this button if all the pages are to be saved.

Data is saved to a file in the text format of the CSV format, with each item delimited by a comma from the others, so that the data can be edited by using an editor. The data is saved in the following format:

Number of channels, "symbol of channel 1 address", ..., "symbol of channel n address"
Number of channels, "channel 1 address", "channel 2 address", ..., "channel n address"
Number of page number, channel 1 data, channel 2 data, ..., channel n data

Each line is saved as one page.

:
:

[Example] Example of three channels

3,"data1","","data2",   * "" if there is no symbol.
3,"FFFFC204","FFFFC210","FFFFC214",
1,22136,22136,305419896,
2,22136,22136,305419896,
                    :

Data that cannot be monitored will not be output. On the last page, channel data may be lost because it cannot be monitored.

3.4.8 Previous Scan Page, Next Scan Page

The Previous Scan Page command displays the page that precedes the currently displayed page. The Next Scan Page displays the page that follows the currently displayed page.

3.4.9 Jump Page

The Jump Page command allows the user to choose the page to be displayed.
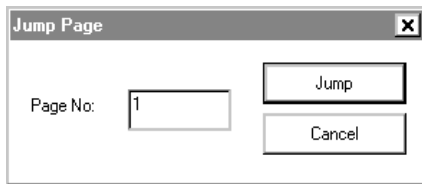
3.5 Option MENU
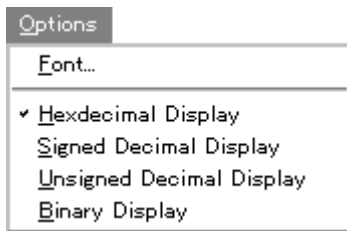
Select the mode in which the memory data will be displayed on the RAM monitor window.

The Font command is used to select the font of the display on the RAM monitor window and the line command window.

3.6 Window MENU
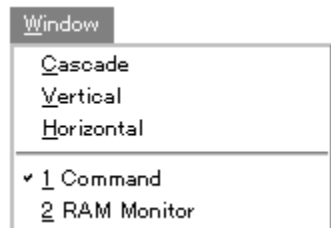
Select the window display.

Changes the active window.

3.7 Help MENU

At present, the RTE-NBD/Win version is displayed.

3.8 POP-UP MENU

In the RAM monitor window, right-clicking causes the pop-up menu shown below to appear.

See the sections on setting and deleting channels in the RAM monitor window.

See the section on the Option menu.

See the section on the Monitor menu.

4   TOOL BAR COMMANDS

      Eleven icon buttons are provided on the tool bar. They are associated with the RAM monitor-related commands of the menu commands. Clicking an icon button selects the associated command.

By clicking this icon button, objects are read from a file and written into memory. This corresponds to the Load... command in the File menu.

By clicking this icon button, the contents of memory are read and written into a file. This corresponds to the Save As... command in the File menu.

By clicking this icon button, symbol information is read from a file. This corresponds to the Load Symbol command in the File menu.

By clicking this icon button, the RAM monitor starts in refresh mode. This corresponds to the Start Refresh mode command in the Monitor menu.

By clicking this icon button, the RAM monitor starts in scan mode. This corresponds to the Start Monitoring command in the Monitor menu.

By clicking this icon button, the RAM monitor stops. This corresponds to the Stop Monitoring command in the Monitor menu.

By clicking this icon button, the monitor scanned data on the previous page is displayed. This corresponds to the Previous Scan Page command in the Monitor menu.

By clicking this icon button, the monitor scanned data on the next page is displayed. This corresponds to the Next Scan Page command in the Monitor menu.

By clicking this icon button, the RAM monitor conditions are read from a file. This corresponds to the Load Condition... command in the Monitor menu.

By clicking this icon button, the RAM monitor conditions are saved into a file. This corresponds to the Save Condition... command in the Monitor menu.

By clicking this icon button, you may set the RAM monitor conditions. This corresponds to the Condition... command in the Monitor menu.

By clicking this icon button, the result of the monitor is saved into a file. This corresponds to the Save Scan data... command in the Monitor menu.

5   RAM MONITOR WINDOW

In the RAM monitor window, the user may set the RAM monitor channels. The result of the monitor is displayed in the data column.

No.	Point	Address	Data	Size	Log	Info
1		000100	5678	HWORD	ON	
2		000200	5678	HWORD	ON	TOV
3		000300	78	BYTE	ON	
4	Symbol_1	123456	78	BYTE	ON	TOV
5	Symbol_2	123456	12345678	WORD	ON	
6		ff8000	12345678	WORD	ON	TOV
7	NbdSymbol	789abc	12345678	WORD	ON	
8		889900	12345678	WORD	ON	TOV

Cursor

No.:   Displays the channel number. The channels are used in order, starting from the lowest number.
Point: Displays the symbol entered by the user at channel setting.
Address: Address to be monitored.
Data: Displays the data resulting from execution of the RAM monitor. Display is made in the specified display mode. If the width of the display has been altered, the lower portion of the data is displayed.
Size: Data size.
Log: Indicates whether hardware output has been set.
Info: Indicates whether a timeout occurred during the execution of the RAM monitor.

5.1   START AND STOP OF RAM MONITOR

There are two RAM monitor modes:
* Refresh mode

In refresh mode, the RAM monitor scans the memory at a certain interval and displays each scanned data. The RAM monitor repeats scan and display until it has been stopped.
* Scan mode

In scan mode, the RAM monitor scans the memory, provided the specified condition is satisfied. When the end condition is satisfied, the RAM monitor is automatically stopped and the result is displayed.

Monitor start in refresh mode

1. Set the refresh time interval, using the Condition command in the Monitor menu.
2. Set the channels to be monitored.
3. Start the RAM monitor by executing the Start Refresh mode command in the Monitor menu.
4. Stop the RAM monitor by executing the Stop Monitoring command in the Monitor menu.
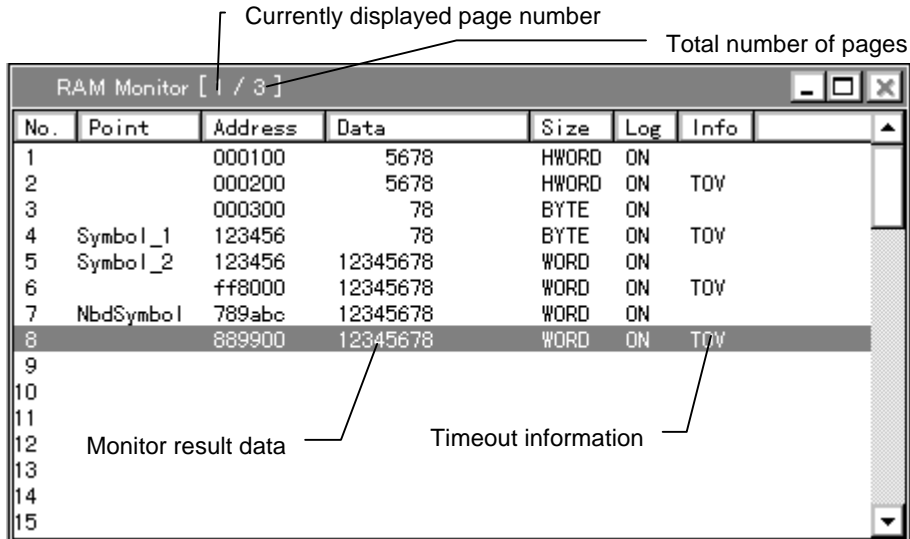
Monitor start in scan mode

1. Set the start, scan, and end conditions, using the Condition command in the Monitor menu.
2. Set the channels to be monitored.
3. Start the RAM monitor by executing the Start Monitoring command in the Monitor menu.
4. The RAM monitor is stopped upon the completion of the monitor. If the end condition is Free Run, however, it is never satisfied. Thus, stop the RAM monitor by executing the Stop Monitoring command in the Monitor menu.

When the monitor starts, the displayed last monitor result is erased and no longer displayed.

Caution	**The correct result of RAM monitor may not be obtained unless the CPU is under execution. If any other tool (such as the IDB tool or ICE) is connected to the CPU, execute the CPU and then start monitoring.**

5.2 RAM MONITOR RESULT DISPLAY

The result of the monitor is displayed in the data column of the RAM monitor window. The resulting data is displayed, according to the size. The display in the data column may be in hexadecimal, signed decimal, unsigned decimal, or binary. (Selection can be made from the Hexadecimal Display, Signed Decimal Display, Unsigned Decimal Display, and Binary Display commands in the Option menu and the pop-up menu which is invoked by right-clicking.)

Currently displayed page number

Total number of pages

RAM Monitor [1 / 3]

No.	Point	Address	Data	Size	Log	Info	
1		000100	5678	HWORD	ON		
2		000200	5678	HWORD	ON	TOV	
3		000300	78	BYTE	ON		
4	Symbol_1	123456	78	BYTE	ON	TOV	
5	Symbol_2	123456	12345678	WORD	ON		
6		ff8000	12345678	WORD	ON	TOV	
7	NbdSymbol	789abc	12345678	WORD	ON		
8		889900	12345678	WORD	ON	TOV	
9							
10							
11							
12							
13							
14							
15							

Monitor result data

Timeout information

The timeout information includes the following three:

TOV   Timeout occurs during scanning.

RST   Reset occurs during scanning.

RTOV   Timeout occurs during real-time transmission.

5.3 MONITOR CHANNEL SETTING

The monitor channel setting includes addition (a new channel is set) and alteration.

To *add* a new channel, double-click a new row position below the last set channel number or click the Add Point command in the pop-up menu. Then, a dialog box like that shown below will appear.

Choose Add when adding the channel after its address has been set.

Choose End to exit from the channel setting dialog.

Check Log out to get the hardware output of the monitor result.

Channels can be added successively until the RAM monitor window has no more empty channel positions and you click the End button. A new channel is added after the last set channel.

To *change* a channel that has already been set, double-click the position of the channel that you want to alter or click the Edit Point command in the pop-up menu. Then, a dialog box like that shown below will appear.

Click OK to save the change.

Click Cancel to cancel the change.

Choose Delete to delete the channel.

Addition and/or alteration causes all the data of the currently displayed monitor result to be erased.

5.4 DELETING MONITOR CHANNELS

To delete all the monitor channels, choose the All Delete command in the pop-up menu. To delete an optional channel, select a channel to delete (click the channel position with the mouse) and choose the Delete command in the pop-up menu. While holding down the CTRL key, you may select and delete multiple channels. The dialog box for channel alteration may be used to delete channels.

As channel deletion is performed, all the data for the currently displayed monitor result is erased.

5.5 MOVING MONITOR CHANNEL POSITIONS

Set channels may be moved to another position. After selecting a channel to move, move the cursor to a desired position while holding down the left button of the mouse. When the button is released, the selected channel moves to that position. The channel is inserted immediately before the cursor position.   While holding down the CTRL key, you may select and move multiple channels.

As channel positions are moved, all the data for the currently displayed monitor result is erased.

5.6 REAL-TIME TRANSMISSION FILE

5.6.1 File Name

The name of the real-time transmission file is the file name specified at the starting of RAM monitor to which character string "-xxxxxx" suffixed is added. "xxxxxx" is a 6-digit decimal number string that starts from "000000" and is incremented. The extension is CSV. Therefore, the extension of the specified file name is ignored. For example, if file name "sample.dat" is specified, file name "sample-000000.CSV" is created.

The file is created so that its maximum size does not exceed 512 KB. If it does exceed 512 KB, the file name is incremented as described above.

If "-xxxxxx" is suffixed to the specified file name, as "test-000005.CSV", "-xxxxxx" is ignored, and file names are created sequentially, starting from "test-000000.CSV".

5.6.2 File Format

The file is in the text format and CSV format with each item delimited by a comma from the others.

Header information is recorded at the beginning of the file, followed by real-time transmission data.

The header information is in the following format, with six pieces of information recorded. All these pieces of information are recorded to the file.

- Date   **0,"DATE",** *"date and time"*

  The date and time on the personal computer at which the file are created is recorded.

  "date and time" is a character string of ="YYYY-MM-DD hh:mm:ss.xxx", where YYYY indicates the year; MM, the month; DD, the day; hh, the time in 24-hour system; mm, the minutes; ss, the seconds; and xxx, the milliseconds.

  Example: 0,"DATE",="2002-04-19 10:43:10.445"

- Scan time interval   **0,"SCAN_INTERVAL",** *"time"*

  If a timer is used as the scan start condition, the set value of the timer is recorded. "time" is in *ms*. 0 (zero) is recorded if a timer is not used as the scan start condition.

  Example: 0,"SCAN_INTERVAL",100

- Number of channels   **0,"CHANNEL_NUM",** *"number of channels"*

  The number of channels per scan is recorded.

  Example: 0,"CHANNEL_NUM",3

- Symbol   **0,"SYMBOL",** *"ch1 symbol", "ch2 symbol", …*

  "chx symbol" is character string information. A symbol indicating the address of each channel is recorded.

  If there is no symbol at the corresponding address, NULL ("") is recorded.

  Example: 0,"SYMBOL","data1","data2",""

- Address   **0,"ADDRESS",** *"ch1 address", "ch2 address", …*

  "chx address" is character string information. The address of each channel is recorded as a hexadecimal character string.

  Example: 0,"ADDRESS","FFFFC204","FFFFC210","FFFFC214"

- Size   **0,"DATA_SIZE",** *"ch1 size", "ch2 size", …*

  "chx size" is character string information. The data size of each channel is recorded.

  "BYTE" is recorded if the channel size is 8 bits. "HWORD" is recorded if it is 16 bits, and "WORD" is recorded if it is 32 bits.

  Example: 0,"DATA_SIZE","HWORD","WORD","BYTE"

Data is in the following format:

"scan number" ,, "ch1 data", "ch2 data", …, "flag"

"**scan number**" is a numeric value. The data information at the beginning of the file is sequentially incremented from 1. "scan number" returns to 1 again if the file size increases and the file is replaced with a new one.

"**chn data**" is a signed decimal value. It is recorded in accordance with the data size of each channel.

"**flag**" is character string information. Each of the following character strings is recorded if the status it indicates occurs. If two or more statuses occur at the same time, only one is recorded in accordance with the following priority (the status indicated at the top takes the highest priority).

"x:TRANS_OVF"	Real-time host transmission was not performed in time between the data of channel x and the preceding data, and data that has not been recorded exists.
"SCAN_OVF"	The start condition of the current scan was satisfied before the previous scanning is completed, and data that was not recorded by the previous scanning has existed.
"RESET"	The CPU was reset after the first scanning was started and before the current scanning is started, and data that was not recorded by the previous scanning or scanning that was not recorded (the scan start condition was satisfied during reset) has existed.
""	Without above status.

Example: Here is an example of a data field where three channels are specified.

```
1,,-65536,1914364691,43,""
2,,-131071,1914364691,,""
3,,,1914364691,23,"2:TRANS_OVF"
4,,-196606,1914364691,11,""
                :
```
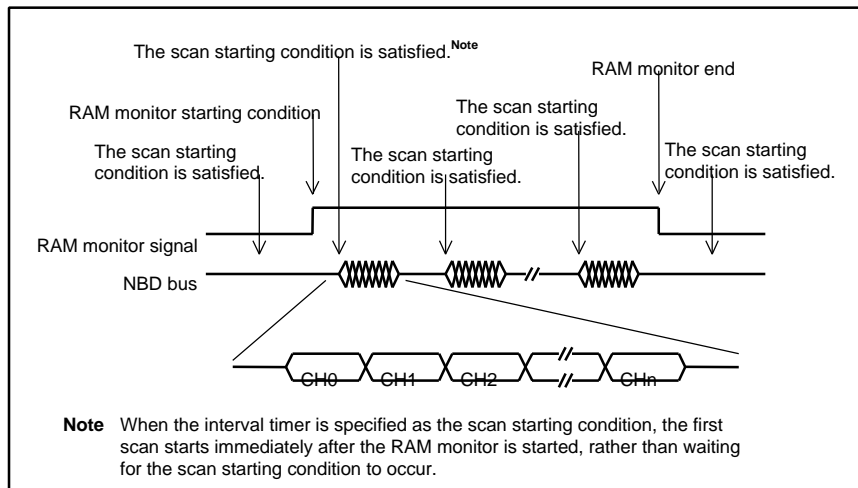
5.7 RAM MONITOR CONDITIONS

This chapter explains the conditions that can be set in connection with the RAM monitor.

5.7.1 Starting and Ending Conditions

There are three items for which conditions can be set.

Item	Description
RAM monitor start (Start Condition)	When the specified RAM monitor starting condition is satisfied, the RAM monitor circuit is activated and waits for the scan starting condition to occur.
Scan start (Scan Condition)	When the specified scan starting condition is satisfied while the RAM monitor circuit is active, the RAM circuit performs one scanning cycle and records the scan results.
RAM monitor end (End Condition)	When the specified RAM monitor ending condition is satisfied while the RAM monitor circuit is active, the RAM circuit is deactivated and stops data recording.

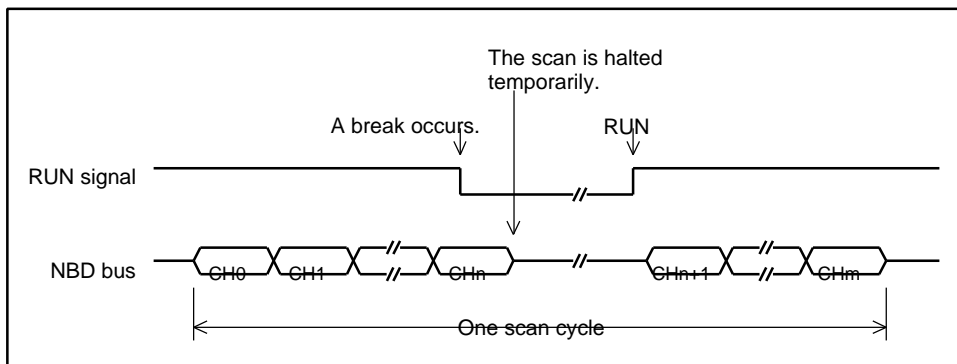### 5.7.2 RAM Monitor Starting Condition

The following table shows the conditions that can be set in relation to the activation of the RAM monitor circuit. Only one of the conditions can be specified at a time.

Condition	Description
Forced start (Force)	The RAM monitor circuit is activated immediately after the command is input.
User event (User Event)	Match detection trigger of the NBD event detection function
External input Positive Edge Negative Edge	When the external input signal (RAMMONITOR_EXT) goes low or high

5.7.3 Scan Starting Condition

The following table shows the conditions that can be set in relation to the start of the scan. Only one of the conditions can be specified at a time. Also, if a break occurs, the scan stops as soon as the bus cycle being scanned comes to an end, regardless of which condition is specified.

Condition	Description
Interval timer (Timer)	The scan is started at specified intervals, ranging from 4 to 2147385345 ms. Upon the start of the RAM monitor, the first scan is started immediately. The second and subsequent scans are executed at specified intervals.
User event (User Event)	Match detection trigger of the NBD event detection function
External input Positive Edge Negative Edge	When the external input signal (RAMMONITOR_EXT) goes low or high

5.7.4 RAM Monitor Ending Condition

The following table shows the conditions that can be set in relation to the end of the RAM monitor. Only one of the conditions can be specified at a time.

Condition	Description
User event (User Event)	Match detection trigger of the NBD event detection function
External input Positive Edge Negative Edge	When the external input signal (RAMMONITOR_EXT) goes low or high
One shot (One Shot)	The RAM monitor ends upon the completion of one scan cycle.
Full memory (Data Full)	The RAM monitor ends when the record memory becomes full. Unlike the other conditions, if this condition is satisfied, the monitor stops, even if in the middle of the scan.

6   REAL-TIME TRANSMISSION

The function to transmit data during RAM monitor to the host and to save it is called a real-time transmission function. To execute real-time transmission, check "Realtime Transmission" on the Condition dialog box, and check Free Run as End Condition (see **Section 3.4.4**).

The quantity of the data that can be transmitted to the host is limited. The upper-limit value is shown below for your reference, but this value is not guaranteed. The data quantity substantially varies depending on the environment of the host. If an overflow occurs, either decrease the number of points or increase Interval Time.

Recommended host environment

OS: Windows 2000
CPU: Pentium 2 550 MHz or higher
Host interface: RTE-PCIIF (PCI-IF)

Quantity of data that can be transmitted (guideline)

Number of points ÷ Interval Time (ms) < 64 (k word/s)
Example:
64 points * 1 ms
16 points * 250 ms

<Caution>
The following environment is necessary for using this function.
Rte4Win32:   Use Ver5.06 or later.
NBD Manager: Use Ver1.40 or later.
NBD tool: Use RTE-NBD2.

7   COMMAND WINDOW

The line command defined for each CPU can be used on the command window. For the line command that can be used, refer to the manual of the kit corresponding to the CPU used.

8   CAUTION

Some CPUs do not support some functions of NBD Manager. NBD Manager displays the functions that cannot be used in gray on the selection menu. For details, refer to the manual of the kit.

Memo