

RI850MP V1.00.01

Real-Time Operating System

User's Manual: Debug

Target Device

V850 Microcontroller

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How to Use This Manual

Readers This manual is intended for users who design and develop application systems using V850 microcontrollers products.

Purpose This manual is intended for users to understand the functions of real-time OS "RI850MP" manufactured by Renesas Electronics, described the organization listed below.

Organization This manual consists of the following major sections.

CHAPTER 1 GENERAL
CHAPTER 2 FUNCTIONS
APPENDIX A WINDOW REFERENCE
APPENDIX B INDEX

How to Read This Manual It is assumed that the readers of this manual have general knowledge in the fields of electrical engineering, logic circuits, microcontrollers, C language, and assemblers.

To understand the hardware functions of the V850 microcontroller.
-> Refer to the **User's Manual** of each product.

Conventions

Data significance:	Higher digits on the left and lower digits on the right
Note:	Footnote for item marked with Note in the text
Caution:	Information requiring particular attention
Remark:	Supplementary information
Numeric representation:	Decimal ... XXXX
	Hexadecimal ... 0XXXXX
Prefixes indicating power of 2 (address space and memory capacity):	
K (kilo)	$2^{10} = 1024$
M (mega)	$2^{20} = 1024^2$

Related Documents

The related documents indicated in this publication may include preliminary versions. However, preliminary versions are not marked as such.

Document Name		Document No.
RI Series	Start	R20UT0751E
	Message	R20UT0756E
RI850MP	Coding	R20UT0519E
	Debug	This manual

Caution The related documents listed above are subject to change without notice. Be sure to use the latest edition of each document when designing.

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CHAPTER 1 GENERAL

The CubeSuite+ is an integrated development environment used to carry out tasks such as design, coding, build and debug for developing application systems for microcontrollers manufactured by Renesas Electronics.

This manual describes the resource information tool. This tool is useful for debugging programs using the "RI850MP" real-time OS functionality within this integrated program-development process.

1.1 Overview

When debugging programs using the RI850MP functionality, it is possible to use the resource information tool to confirm the resource information (e.g. system information and memory area information) that changes dynamically as the program executes.

1.2 Features

Below are the features of the resource information tool.

- Confirm resource information

When the program running in the debugging tool is stopped at an arbitrary location, the current status of the resource information appears in the [Realtime OS Resource Information panel](#).

CHAPTER 2 FUNCTIONS

This chapter describes the key functions provided by the resource information tool along with operation procedures.

2.1 Overview

The resource information tool can be used to confirm the resource information (e.g. system information and memory area information) that changes dynamically as the program executes.

The operating procedures for the resource information tool are described below.

(1) Start CubeSuite+

Launch the CubeSuite+ from the [start] menu of Windows.

Remark See "CubeSuite+ Integrated Development Environment User's Manual: Start" for details on "Start CubeSuite+".

(2) Open project

Open the project to debug.

Remark See "CubeSuite+ Integrated Development Environment User's Manual: Start" for details on "Open project".

(3) Select debug tool

Select the type of debugging tool with which to debug the program (IECUBE, MINICUBE2, E1, E20 or Simulator).

Remark See "CubeSuite+ Integrated Development Environment User's Manual: V850 Debug" for details on "Select debug tool".

(4) Download programs

Download the program to debug.

Remark See "CubeSuite+ Integrated Development Environment User's Manual: V850 Debug" for details on "Download programs".

(5) Open Realtime OS Resource Information Panel

Open the [Realtime OS Resource Information panel](#).

- Remarks**
1. When a program using the RI850MP functionality is downloaded, this panel opens automatically.
 2. The value will be indeterminate for the resource information shown when the RI850MP system initialization is incomplete, because it will not be managed by the RI850MP.

(6) Execute/stop programs

Run the program to the location for which you wish to display the resource information.

Remark See "CubeSuite+ Integrated Development Environment User's Manual: V850 Debug" for details on "Execute/stop programs".

(7) Confirm Resource Information

On the [Realtime OS Resource Information panel](#) tabs (e.g. [\[System\] tab](#) and [\[Memory Area\] tab](#)), check the current status of the resource information.

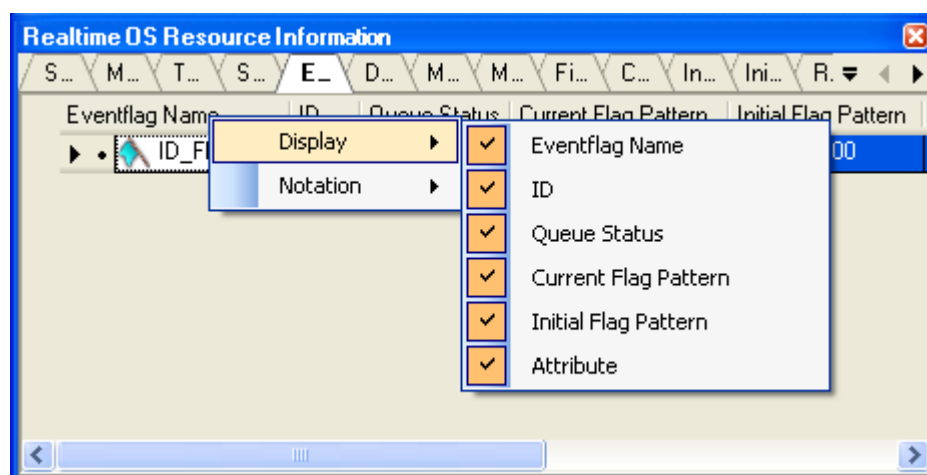
2.2 Open Realtime OS Resource Information Panel

The [Realtime OS Resource Information panel](#) is used to confirm the resource information (e.g. system information and memory area information). This panel opens automatically when a program using the RI850MP functionality is downloaded.

2.2.1 Select item

The resource information tool enables you to select the items to display in the [Realtime OS Resource Information panel](#).

To select which items are displayed, right click on the header (header column or row) in the [Realtime OS Resource Information panel](#), and from the context menu that appears, select "Display".

Figure 2-1. Select Item

Remark Select items to display by selecting their checkboxes.

Table 2-1. Select Item

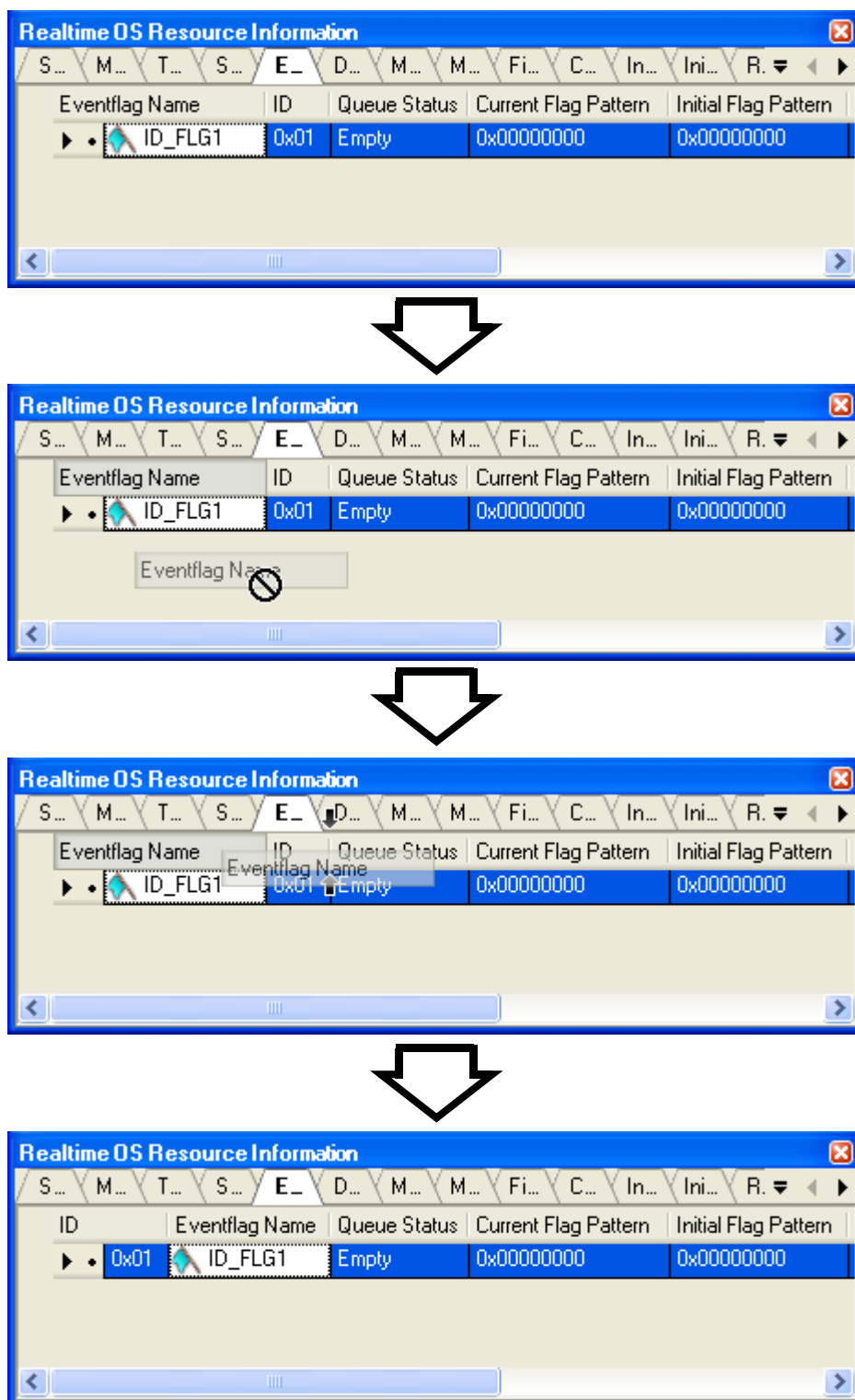
Checked	The item in question will be displayed.
Not checked	The item in question will not be displayed.

2.2.2 Change display order

The resource information tool enables you to change the order of items displayed in the [Realtime OS Resource Information panel](#).

To change the display order, drag the columns in the [Realtime OS Resource Information panel](#), and drop them to the desired position.

Figure 2-2. Change Display Order (Move "ID" Column)



2.3 Confirm Resource Information

Check the resource information when program execution is stopped via the various tabs of the [Realtime OS Resource Information panel](#) (e.g. [\[System\] tab](#) and [\[Memory Area\] tab](#)).

The [Realtime OS Resource Information panel](#) is made up of the following tabs.

- [\[System\] tab](#)
- [\[Memory Area\] tab](#)
- [\[Task\] tab](#)
- [\[Semaphore\] tab](#)
- [\[Eventflag\] tab](#)
- [\[Data Queue\] tab](#)
- [\[Mailbox\] tab](#)
- [\[Mutex\] tab](#)
- [\[Fixed-Sized Memory Pool\] tab](#)
- [\[Cyclic Handler\] tab](#)
- [\[Interrupt Handler\] tab](#)
- [\[Initialize Routine\] tab](#)
- [\[Ready Queue\] tab](#)
- [\[Timer Queue\] tab](#)

Remark Switch tabs in the tab selection area of the [Realtime OS Resource Information panel](#).

APPENDIX A WINDOW REFERENCE

This appendix describes the panels of the resource information tool.

A.1 Description

The panels of the resource information tool are listed below.

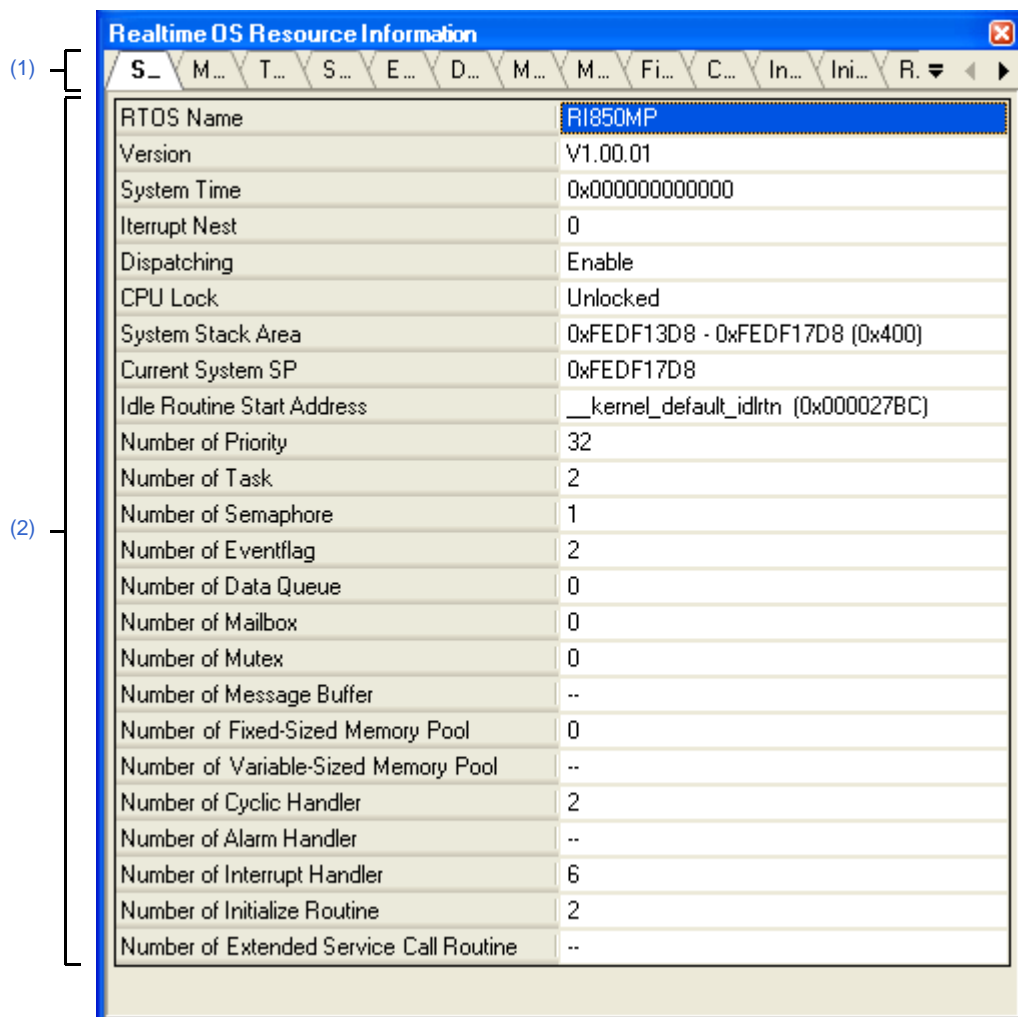
Table A-1. Panel List

Panel Name	Description
Realtime OS Resource Information panel	This panel displays the resource information (e.g. system information and memory area information) of the RI850MP.

Realtime OS Resource Information panel

This panel displays the resource information (e.g. system information and memory area information) of the RI850MP.

Figure A-1. Realtime OS Resource Information Panel



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)

[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]

(1) Tab selection area

Select a tab to switch the content displayed in the [Information display area](#).

This panel has the following tabs:

- [\[System\] tab](#)

- [Memory Area] tab
- [Task] tab
- [Semaphore] tab
- [Eventflag] tab
- [Data Queue] tab
- [Mailbox] tab
- [Mutex] tab
- [Fixed-Sized Memory Pool] tab
- [Cyclic Handler] tab
- [Interrupt Handler] tab
- [Initialize Routine] tab
- [Ready Queue] tab
- [Timer Queue] tab

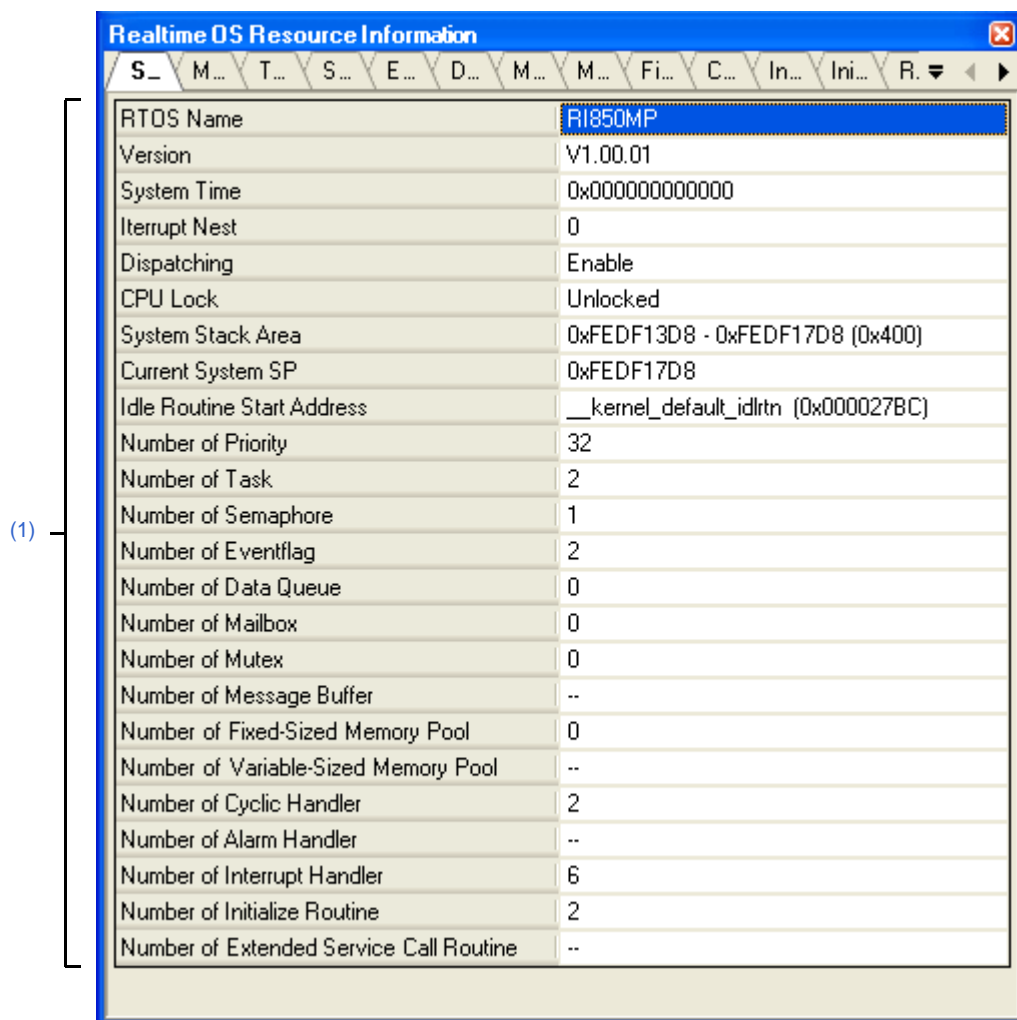
(2) Information display area

This area displays the resource information (e.g. system information and memory area information) of the RI850MP.

[System] tab

This tab displays the system information (e.g. RTOS Name and Version) of the RI850MP.

Figure A-2. [System] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)

[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area**

This area displays the system information (e.g. RTOS Name and Version) of the RI850MP.

This area consists of the following items.

RTOS Name	"RI850MP" is shown.	
Version	The version of the RI850MP is shown.	
System Time	The system time of the RI850MP (in milliseconds) is shown.	
Interrupt Nest	The nesting level of interrupt processes (including CPU exception processes) is shown.	
Dispatching	The system state of the RI850MP is shown.	
	Disable	Dispatch disabled state
	Enable	Dispatch enabled state
CPU Lock	The system state of the RI850MP is shown.	
	Locked	CPU locked state
	Unlocked	CPU unlocked state
System Stack Area	The start address, end address, and size (in bytes) of the system stack are shown in the following format. Start address - End address (Size)	
Current System SP	If the processing program is operating on the system stack, the start address of the system stack is shown. If it is running on the task stack, then the current SP value is shown.	
Idle Routine Start Address	The start address of the idle routine is shown.	
Number of Priority	The maximum priority of the task is shown.	
Number of Task	The total number of tasks is shown.	
Number of Semaphore	The total number of semaphores is shown.	
Number of Eventflag	The total number of eventflags is shown.	
Number of Data Queue	The total number of data queues is shown.	
Number of Mailbox	The total number of mailboxes is shown.	
Number of Mutex	The total number of mutexes is shown.	
Number of Message Buffer	"--" is shown.	
Number of Fixed-Sized Memory Pool	The total number of fixed-sized memory pools is shown.	
Number of Variable-Sized Memory Pool	"--" is shown.	
Number of Cyclic Handler	The total number of cyclic handlers is shown.	
Number of Alarm Handler	"--" is shown.	
Number of Interrupt Handler	The total number of interrupt handlers/CPU exception handlers is shown.	
Number of Initialize Routine	The total number of initialize routines is shown.	
Number of Extended Service Call Routine	"--" is shown.	

[Context menu]

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header column

Display	Displays cascade menus for selecting the header items to display.	
<i>Selected item name</i>	The following items are displayed for selection. RTOS Name, Version, System Time, Interrupt Nest, Dispatching, CPU Lock, System Stack Area, Current System SP, Idle Routine Start Address, Number of Priority, Number of Task, Number of Semaphore, Number of Eventflag, Number of Data Queue, Number of Mailbox, Number of Mutex, Number of Message Buffer, Number of Fixed-Sized Memory Pool, Number of Variable-Sized Memory Pool, Number of Cyclic Handler, Number of Alarm Handler, Number of Interrupt Handler, Number of Initialize Routine, Number of Extended Service Call Routine	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
<i>Selected item name</i>	The following items are displayed for selection. System Time, Interrupt Nest, System Stack Area, Current System SP, Idle Routine Start Address, Number of Priority, Number of Task, Number of Semaphore, Number of Eventflag, Number of Data Queue, Number of Mailbox, Number of Mutex, Number of Message Buffer, Number of Fixed-Sized Memory Pool, Number of Variable-Sized Memory Pool, Number of Cyclic Handler, Number of Alarm Handler, Number of Interrupt Handler, Number of Initialize Routine, Number of Extended Service Call Routine	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

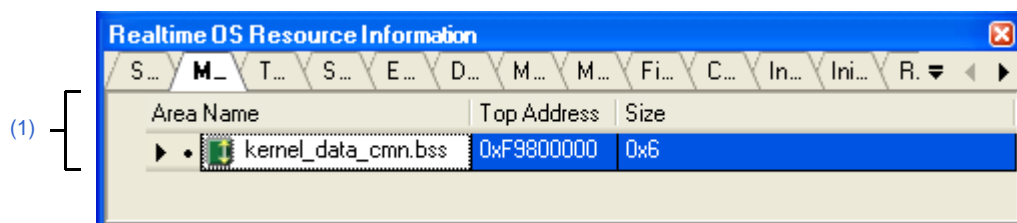
(2) Footer column

Jump to Memory (Current System SP)	Opens the Memory panel, and displays the contents of the Current System SP .
Jump to Source (Idle Routine Start Address)	Opens the Editor panel, and displays the source code of the idle routine.
Jump to Disassemble (Idle Routine Start Address)	Opens the Disassemble panel, and displays the results of disassembling the idle routine.
Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.

[Memory Area] tab

This tab displays the memory area information (e.g. Area Name and Top Address) of the RI850MP.

Figure A-3. [Memory Area] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)

[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area**

This area displays the memory area information (e.g. Area Name and Top Address) of the RI850MP.

This area consists of the following items.

Area Name	The name of the managed memory area is shown.	
	kernel_data_cmh.bss	Area where variable data are to be allocated to OS resource.
Top Address	The start address of the managed memory area is shown.	
Size	The size of the managed memory area (in bytes) is shown.	

[Context menu]

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.	
Selected item name	The following items are displayed for selection. Area Name, Top Address, Size	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	

<i>Selected item name</i>	The following items are displayed for selection. Top Address, Size	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

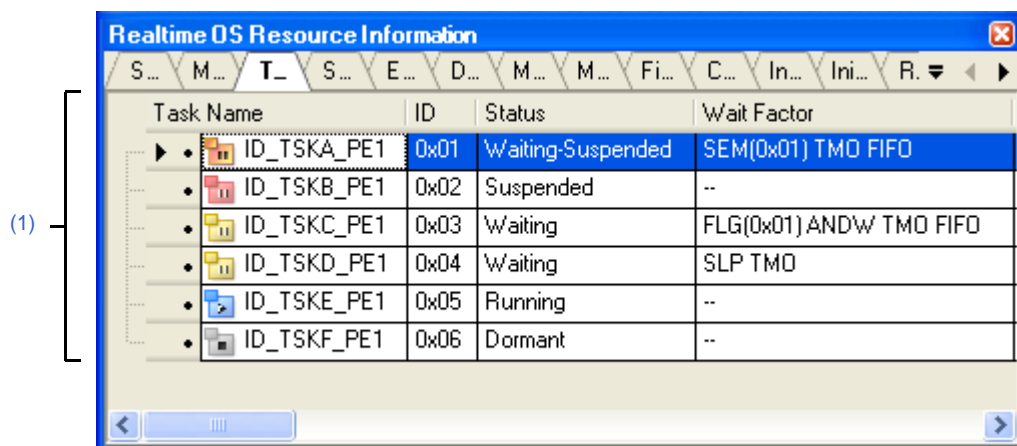
(2) Footer row

Jump to Memory (Top Address)	Opens the Memory panel, and displays the contents of the managed memory area.
Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.

[Task] tab

This tab displays the task information (e.g. Task Name and ID) of the RI850MP.

Figure A-4. [Task] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)

[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area****(a) First layer**

This area displays the task information (e.g. Task Name and ID) of the RI850MP.

This area consists of the following items.

Task Name	<p>An icon indicating the current status of the task and the name of the task are shown in the following format.</p> <p>Icon Name</p> <p>Note that if the name of the task is undefined, the name will appear as "ID".</p> <table border="1"> <tbody> <tr> <td></td><td>DORMANT state</td></tr> <tr> <td></td><td>READY state</td></tr> <tr> <td></td><td>RUNNING state</td></tr> <tr> <td></td><td>WAITING state</td></tr> <tr> <td></td><td>SUSPENDED state</td></tr> <tr> <td></td><td>WAITING-SUSPENDED state</td></tr> </tbody> </table>		DORMANT state		READY state		RUNNING state		WAITING state		SUSPENDED state		WAITING-SUSPENDED state
	DORMANT state												
	READY state												
	RUNNING state												
	WAITING state												
	SUSPENDED state												
	WAITING-SUSPENDED state												

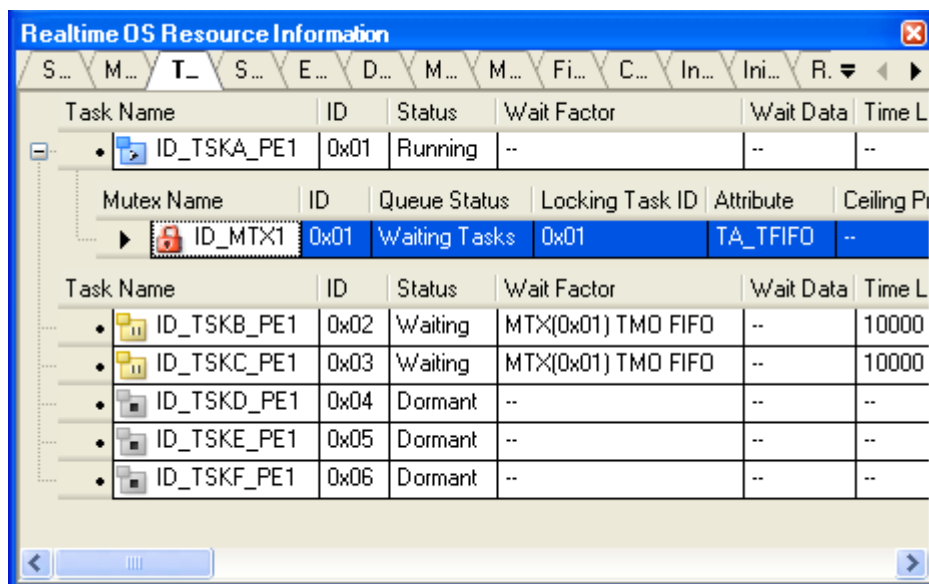
ID	The ID of the task is shown.	
Status	The current state of the task is shown.	
	Dormant	DORMANT state
	Ready	READY state
	Running	RUNNING state
	Waiting	WAITING state
	Suspended	SUSPENDED state
	Waiting-Suspended	WAITING-SUSPENDED state
Wait Factor	<p>The wait factor (type of WAITING state, object ID and attribute of WAITING state) of the task are shown in the following format.</p> <p>Type (ID) Attribute</p> <p>Note that if the current state of the task is other than WAITING state or WAITING-SUSPENDED state, "--" appears.</p> <p>If the WAITING state type is sleeping state or delayed state, then "(Object ID)" is not shown.</p> <p>When the object that caused the task to go into the WAITING state belongs other domain, "(0x00)" appears.</p>	
	[Type of WAITING state]	
	SLP	Sleeping state
	DLY	Delayed state
	SEM	Waiting state for a semaphore resource
	FLG	Waiting state for an eventflag
	SDTQ	Sending waiting state for data queue
	RDTQ	Receiving waiting state for a data queue
	MBX	Waiting state for a mailbox
	MTX	Waiting state for a mutex
	MPF	Waiting state for a fixed-sized memory pool
	[Attribute of WAITING state]	
	ANDW	AND waiting condition
	ORW	OR waiting condition
	TMO	Waiting for timeout
	FIFO	FIFO order
	PRI	Task Priority order
Wait Data	<p>The request conditions triggering the task's transition to WAITING state are shown.</p> <p>Note that if the task's current state is other than waiting state for an eventflag, "-" is shown.</p>	
	Wait bit pattern	Waiting state for an eventflag
	Data element to be sent to the data queue	Sending waiting state for a data queue

Time Left	The time left until the delayed state is released (in milliseconds) is shown. Note that if the task is waiting forever, "TMO_FEVR" appears. If the current state of the task is other than WAITING state or WAITING SUSPENDED state, "--" appears.	
Interrupt	The current interrupt state of the task is shown.	
	Disable	All interrupts are disabled.
	Enable	All interrupts are enabled.
Current Priority	The current priority of the task is shown.	
Task Start Address	The start address of the task is shown.	
Current PC	The current PC value of the task is shown.	
Current Task SP	The current SP value of the task is shown.	
Task Stack Area	The start address, end address, and size (in bytes) of the task stack are shown in the following format. Start address - End address (Size)	
Initial Priority	The initial priority of the task is shown.	
Suspend Count	The suspension count of the task is shown.	
Wakeup Count	The wakeup request count of the task is shown.	
Activate Count	The activation request count of the task is shown.	
Attribute	The attributes of the task (the task's coding language, initial activation state, task type, initial preemption state and initial interrupt state) are shown in the following format. Coding language Initial activation state Initial interrupt state	
	[Coding language of task]	
	TA_HLNG	C language
	TA_ASM	Assembly language
	[Initial activation state of task]	
	TA_ACT	READY state
	Nothing displayed	DORMANT state
	[Initial interrupt state of task]	
	TA_DISINT	All interrupts are disabled at task activation.
	TA_ENAINT	All interrupts are enabled at task activation.
Extended Information	The extended information of the task is shown.	
Tex Start Address	"--" is shown.	
Tex Status	"--" is shown.	
Tex Request Pattern	"--" is shown.	
Tex Executing Pattern	"--" is shown.	
Tex Attribute	"--" is shown.	

(b) Second layer

See the [Mutex] tab for details about locking mutex information.

Figure A-5. [Task] Tab (Locking Mutex Information)



[Context menu]

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.	
Selected item name	The following items are displayed for selection. Task Name, ID, Status, Wait Factor, Wait Data, Time Left, Interrupt, Current Priority, Task Start Address, Current PC, Current Task SP, Task Stack Area, Initial Priority, Suspend Count, Wakeup Count, Activate Count, Attribute, Extended Information, Tex Start Address, Tex Status, Tex Request Pattern, Tex Executing Pattern, Tex Attribute	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
Selected item name	The following items are displayed for selection. ID, Wait Factor, Wait Data, Time Left, Current Priority, Task Start Address, Current PC, Current Task SP, Task Stack Area, Initial Priority, Suspend Count, Wakeup Count, Activate Count, Extended Information, Tex Start Address, Tex Request Pattern, Tex Executing Pattern	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

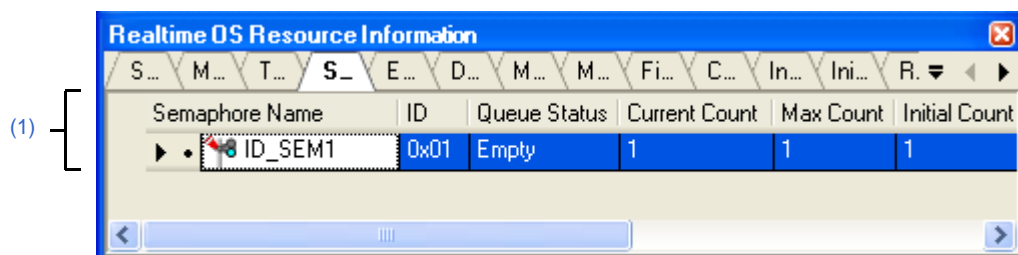
(2) Footer row

Jump to Source (Task Start Address)	Opens the Editor panel, and displays the source code of the task.
Jump to Disassemble (Task Start Address)	Opens the Disassemble panel, and displays the results of disassembling the task.
Jump to Source (Current PC)	Opens the Editor panel, and displays the contents of the Current PC .
Jump to Disassemble (Current PC)	Opens the Disassemble panel, and displays the contents of the Current PC .
Jump to Memory (Current Task SP)	Opens the Memory panel, and displays the contents of the Current Task SP .
Jump to Source (Tex Start Address)	This item will be grayed out.
Jump to Disassemble (Tex Start Address)	This item will be grayed out.
Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.

[Semaphore] tab

This tab displays the semaphore information (e.g. Semaphore Name and ID) of the RI850MP.

Figure A-6. [Semaphore] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)

[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area****(a) First layer**

This layer displays the semaphore information (e.g. Semaphore Name and ID) of the RI850MP.

This layer consists of the following items.

Semaphore Name	An icon indicating the current status of the semaphore and the name of the semaphore are shown in the following format. Icon Name Note that if the name of the semaphore is undefined, the name will appear as "ID".	
		There are waiting tasks.
		There are no waiting tasks.
ID	The ID of the semaphore is shown.	
Queue Status	The current status of the semaphore is shown.	
	Waiting Tasks	There are waiting tasks.
	Empty	There are no waiting tasks.
Current Count	The current resource count of the semaphore is shown.	
Max Count	The maximum resource count of the semaphore is shown.	
Initial Count	The initial resource count of the semaphore is shown.	

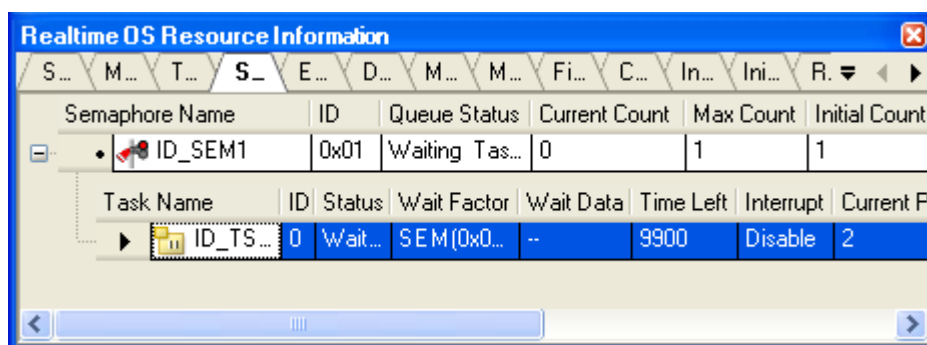
Attribute	The task queuing method is shown.	
	TA_TFIFO	FIFO order
	TA_TPRI	Task priority order

(b) Second layer

The waiting task information (e.g. Task Name and ID) only appears if there are tasks queued in the semaphore's wait queue.

See the [\[Task\] tab](#) for details about waiting task information.

Figure A-7. [Semaphore] Tab (Waiting Task Information)



[Context menu]

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.	
Selected item name	The following items are displayed for selection. Semaphore Name, ID, Queue Status, Current Count, Max Count, Initial Count, Attribute	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
Selected item name	The following items are displayed for selection. ID, Current Count, Max Count, Initial Count	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

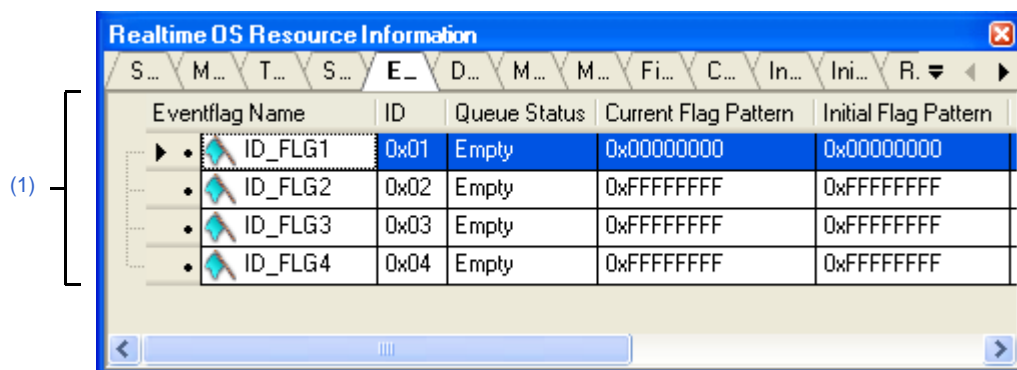
(2) Footer row

Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.
--------------------	---

[Eventflag] tab

This tab displays the eventflag information (e.g. Eventflag Name and ID) of the RI850MP.

Figure A-8. [Eventflag] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)



[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area****(a) First layer**

This layer displays the eventflag information (e.g. Eventflag Name and ID) of the RI850MP.

This layer consists of the following items.

Eventflag Name	An icon indicating the current status of the eventflag and the name of the eventflag are shown in the following format. Icon Name Note that if the name of eventflag is undefined, the name will appear as "ID".	
		There are waiting tasks.
		There are no waiting tasks.
ID	The ID of the eventflag is shown.	
Queue Status	The current status of the eventflag is shown.	
	Waiting Tasks	There are waiting tasks.
	Empty	There are no waiting tasks.
Current Flag Pattern	The current bit pattern of the eventflag is shown.	
Initial Flag Pattern	The initial bit pattern of the eventflag is shown.	

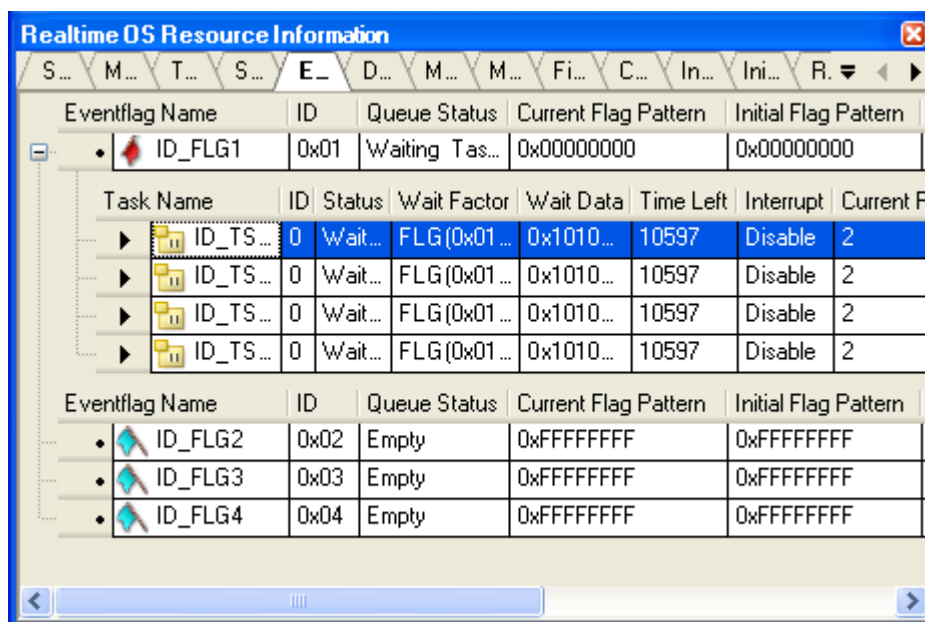
Attribute	The attributes of the eventflag (task queuing method, maximum number of tasks that can be queued and bit pattern clearing flag) are shown in the following format. Queuing method Maximum number Clearing flag	
	[Task queuing method]	
	TA_TFIFO	FIFO order
	TA_TPRI	Task priority order
	[Maximum number of tasks that can be queued]	
	TA_WSGL	Only one task
	TA_WMUL	Multiple tasks
	[Bit pattern clearing flag]	
	TA_CLR	Bit pattern cleared if the request conditions are met.
	Nothing displayed	Bit pattern not cleared if the request conditions are met.

(b) Second layer

The waiting task information (e.g. Task Name and ID) only appears if there are tasks queued in the eventflag's wait queue.

See the [\[Task\] tab](#) for details about waiting task information.

Figure A-9. [Eventflag] Tab (Waiting Task Information)

**[Context menu]**

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.
---------	---

<i>Selected item name</i>	The following items are displayed for selection. Eventflag Name, ID, Queue Status, Current Flag Pattern, Initial Flag Pattern, Attribute	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
<i>Selected item name</i>	The following items are displayed for selection. ID, Current Flag Pattern, Initial Flag Pattern	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

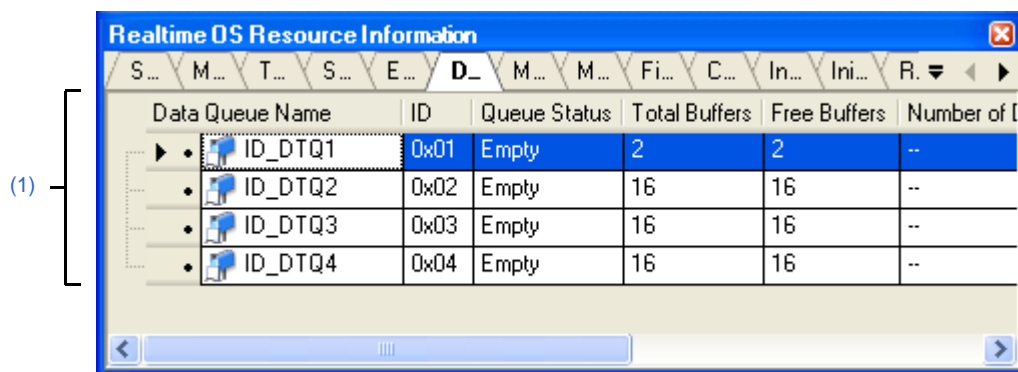
(2) Footer row

Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.
--------------------	---

[Data Queue] tab

This tab displays the data queue information (e.g. Data Queue Name and ID) of the RI850MP.

Figure A-10. [Data Queue] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)

[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area****(a) First layer**

This layer displays the data queue information (e.g. Data Queue Name and ID) of the RI850MP.

This layer consists of the following items.

Data Queue Name	<p>An icon indicating the current status of the data queue and the name of the data queue are shown in the following format.</p> <p>Icon Name</p> <p>Note that if the name of the data queue is undefined, the name will appear as "ID".</p>	
		There are queued tasks (sending waiting tasks).
		There are queued tasks (receiving waiting tasks).
		There are queued data (receiving waiting data).
		There are no queued tasks/data (waiting tasks/receiving waiting data).
ID	The ID of the data queue is shown.	

Queue Status	The current status of the data queue is shown.	
	Waiting Tasks (Send)	There are queued tasks (sending waiting tasks).
	Waiting Tasks (Receive)	There are queued tasks (receiving waiting tasks).
	Waiting Data	There are queued data (receiving waiting data).
	Empty	There are no queued tasks/data (waiting tasks/receiving waiting data).
Total Buffers	Displays the maximum number of data buffers that can be queued.	
Free Buffers	Displays the number of free buffers in the data queue. The number of free buffers is the total number of buffers minus the number of buffers receiving waiting data.	
Number of data	"--" is shown.	
Attribute	Displays the queuing method of the sending waiting tasks. If the queuing method of the receiving waiting tasks is "data reception request order", then the queuing method of the receiving waiting data will be "data send request order".	
	TA_TFIFO	FIFO order
	TA_TPRI	Task priority order

(b) Second layer

<1> Sending waiting task/receive waiting task information

The sending/receiving waiting task information (e.g. Task Name and ID) only appears if there are tasks queued in the data queue's wait queue.

See the [\[Task\] tab](#) for details about sending/receiving waiting task information.

Figure A-11. [Data Queue] Tab (Sending Waiting Task Information)

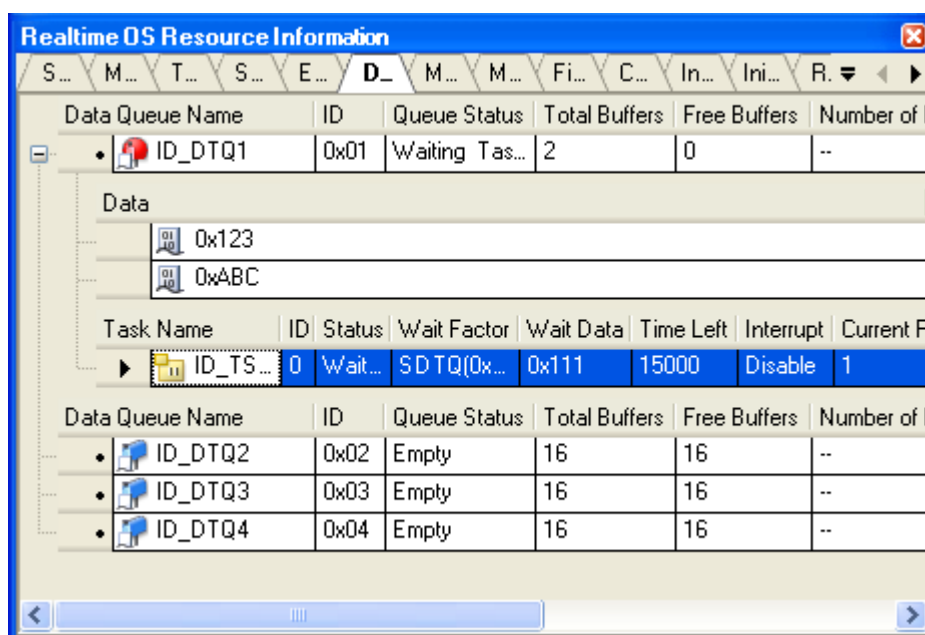
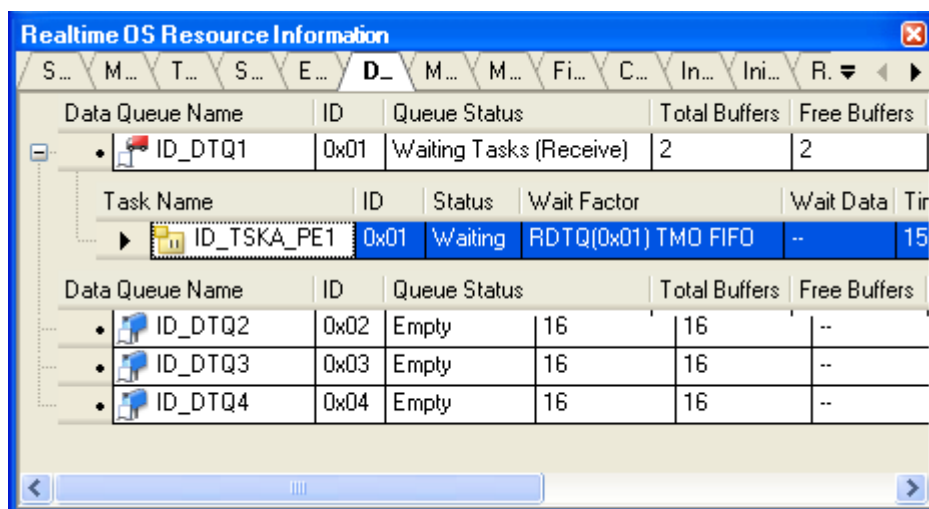
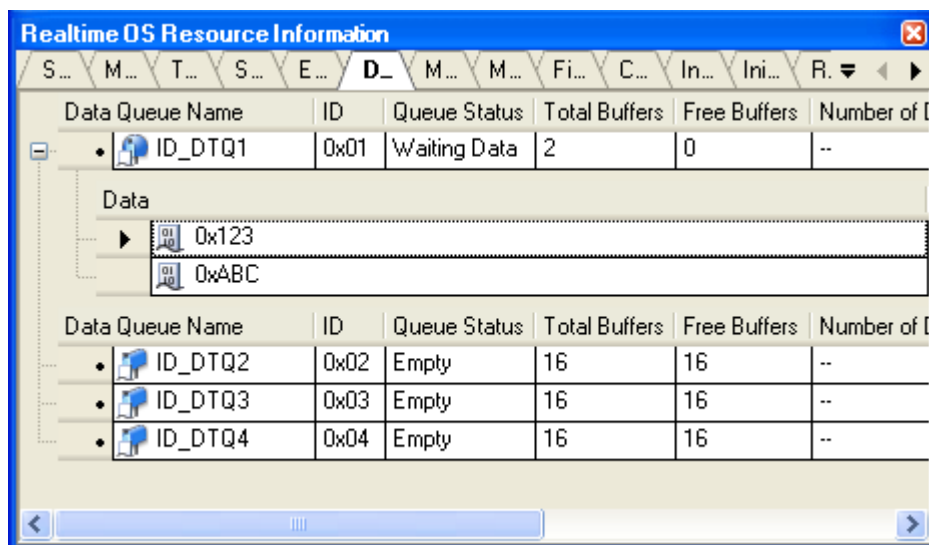


Figure A-12. [Data Queue] Tab (Receiving Waiting Task Information)

**<2> Receiving waiting data information**

The receiving waiting data information (e.g. Data) only appears if there are data queued in the data queue.

Figure A-13. [Data Queue] Tab (Receiving Waiting Data Information)



This area consists of the following items.

Data	the contents of the data is shown.
------	------------------------------------

[Context menu]

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.
---------	---

<i>Selected item name</i>	The following items are displayed for selection. Data Queue Name, ID, Queue Status, Total Buffers, Free Buffers, Number of Data, Attribute	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
<i>Selected item name</i>	The following items are displayed for selection. ID, Total Buffers, Free Buffers, Number of Data	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

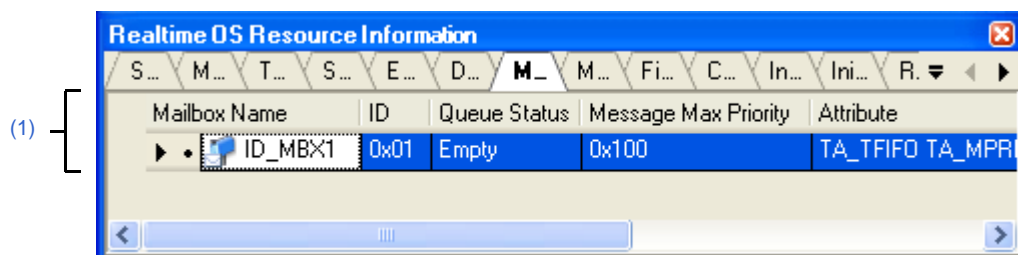
(2) Footer row

Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.
--------------------	---

[Mailbox] tab

This tab displays the mailbox information (e.g. Mailbox Name and ID) of the RI850MP.

Figure A-14. [Mailbox] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)

[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area****(a) First layer**

This layer displays the mailbox information (e.g. Mailbox Name and ID) of the RI850MP.

This layer consists of the following items.

Mailbox Name	An icon indicating the current status of the mailbox and the name of the mailbox are shown in the following format. Icon Name Note that if the name of the mailbox is undefined, the name will appear as "ID".	
		There are waiting tasks.
		There are waiting messages.
		There are no waiting tasks/messages.
ID	The ID of the mailbox is shown.	
Queue Status	The current status of the mailbox is shown.	
	Waiting Tasks	There are waiting tasks.
	Waiting Messages	There are no waiting messages.
	Empty	There are no waiting tasks/messages.
Message Max Priority	The maximum priority of the message is shown. Note that if the message queuing method is FIFO order, "--" appears.	

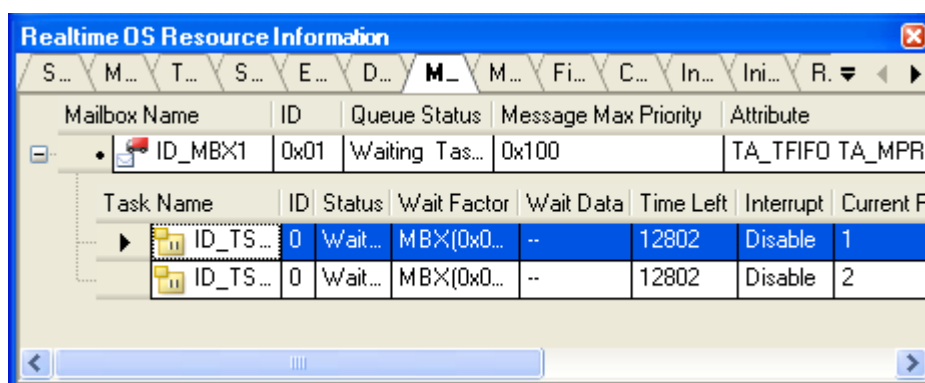
Attribute	The attributes of the mailbox (task queuing method and message queuing method) are shown in the following format.	
	Task Message	
	[Task queuing method]	
	TA_TFIFO	FIFO order
	TA_TPRI	Task priority order
	[Message queuing method]	
	TA_MFIFO	FIFO order
	TA_MPRI	Message priority order

(b) Second layer**<1> Waiting task information**

The waiting task information (e.g. Task Name and ID) only appears if there are tasks queued in the mailbox's wait queue.

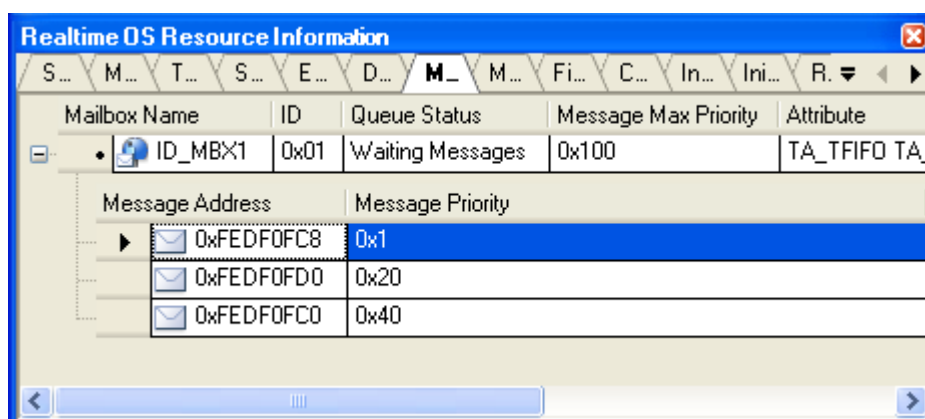
See the [\[Task\] tab](#) for details about waiting task information.

Figure A-15. [Mailbox] Tab (Waiting Task Information)

**<2> Waiting message information**

The waiting message information (e.g. Message Address and Message Priority) only appears if there are messages queued in the mailbox's wait queue.

Figure A-16. [Mailbox] Tab (Waiting Message Information)



This area consists of the following items.

Message Address	The start address of the message is shown.
Message Priority	The priority of the message is shown. Note that if the priority is not assigned, "--" is shown.

[Context menu]

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.	
<i>Selected item name</i>	The following items are displayed for selection. Mailbox Name, ID, Queue Status, Message Max Priority, Attribute	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
<i>Selected item name</i>	The following items are displayed for selection. ID, Message Max Priority	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

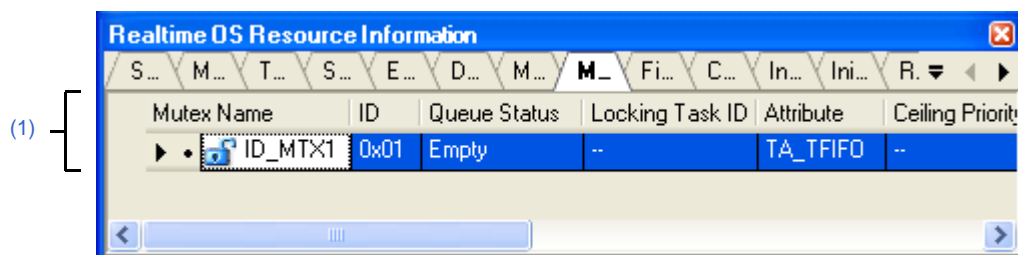
(2) Footer row

Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.
--------------------	---

[Mutex] tab

This tab displays the mutex information (e.g. Mutex Name and ID) of the RI850MP.

Figure A-17. [Mutex] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)

[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area****(a) First layer**

This layer displays the mutex information (e.g. Mutex Name and ID) of the RI850MP.

This layer consists of the following items.

Mutex Name	An icon indicating the current status of the mutex and the name of the mutex are shown in the following format. Icon Name Note that if the name of the mutex is undefined, the name will appear as "ID".	
		There are waiting tasks.
		There are no waiting tasks.
ID	The ID of the mutex is shown.	
Queue Status	The current status of the mutex is shown.	
	Waiting Tasks	There are waiting tasks.
	Empty	There are no waiting tasks.
Locking Task ID	The ID of the locking task is shown.	
Attribute	The task queuing method is shown.	
	TA_TFIFO	FIFO order
	TA_TPRI	Task priority order

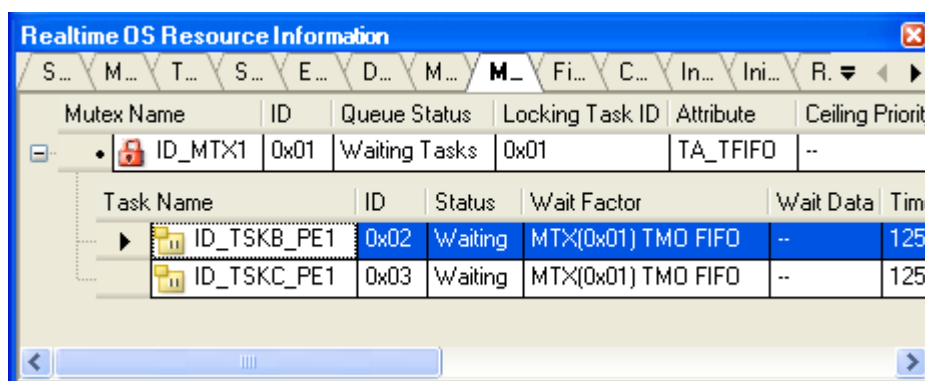
Ceiling Priority	"--" is shown.
------------------	----------------

(b) Second layer

The waiting task information (e.g. Task Name and ID) only appears if there are tasks queued in the mutex's wait queue.

See the [\[Task\] tab](#) for details about waiting task information.

Figure A-18. [Mutex] Tab (Waiting Task Information)

**[Context menu]**

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.	
Selected item name	The following items are displayed for selection. Muxtex Name, ID, Queue Status, Locking Task ID, Attribute, Ceiling Priority	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
Selected item name	The following items are displayed for selection. ID, Locking Task ID, Ceiling Priority	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

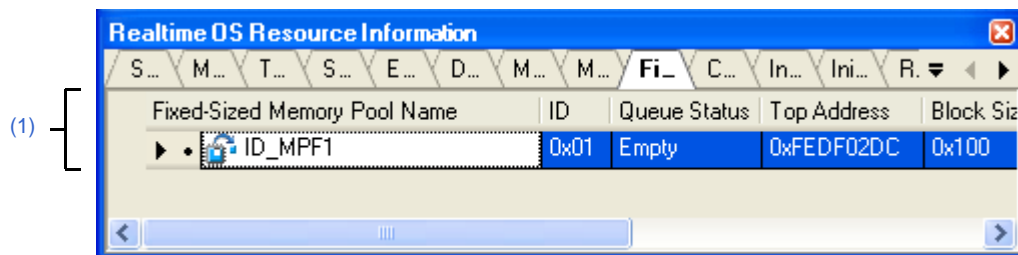
(2) Footer row

Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.
--------------------	---

[Fixed-Sized Memory Pool] tab

This tab displays the fixed-sized memory pool information (e.g. Fixed-Sized Memory Pool Name and ID) of the RI850MP.

Figure A-19. [Fixed-Sized Memory Pool] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)



[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area****(a) First layer**

This layer displays the fixed-sized memory pool information (e.g. Fixed-Sized Memory Pool Name and ID) of the RI850MP.

This layer consists of the following items.

Fixed-Sized Memory Pool Name	An icon indicating the current status of the fixed-sized memory pool and the name of the fixed-sized memory pool are shown in the following format. Icon Name Note that if the name of the fixed-sized memory pool is undefined, the name will appear as "ID".	
		There are waiting tasks.
		There are no waiting tasks.
ID	The ID of the fixed-sized memory pool is shown.	
Queue Status	The current status of the fixed-sized memory pool is shown.	
	Waiting Tasks	There are waiting tasks.
	Empty	There are no waiting tasks.
Top Address	The start address of the fixed-sized memory pool is shown.	
Block Size	The size per block (in bytes) of the fixed-sized memory pool is shown.	

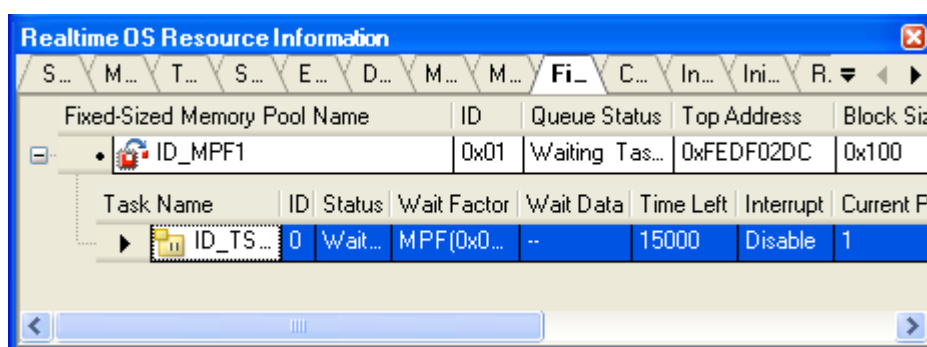
Total Blocks	The block count of the fixed-sized memory pool is shown.	
Free Blocks	The number of free memory blocks is shown.	
Attribute	The task queuing method is shown.	
	TA_TFIFO	FIFO order
	TA_TPRI	Task priority order

(b) Second layer

The waiting task information (e.g. Task Name and ID) only appears if there are tasks queued in the fixed-sized memory pool's wait queue.

See the [\[Task\] tab](#) for details about waiting task information.

Figure A-20. [Fixed-Sized Memory Pool] Tab (Waiting Task Information)

**[Context menu]**

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.	
Selected item name	The following items are displayed for selection. Fixed-Sized Memory Pool Name, ID, Queue Status, Top Address, Block Size, Total Blocks, Free Blocks, Attribute	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
Selected item name	The following items are displayed for selection. ID, Top Address, Block Size, Total Blocks, Free Blocks	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

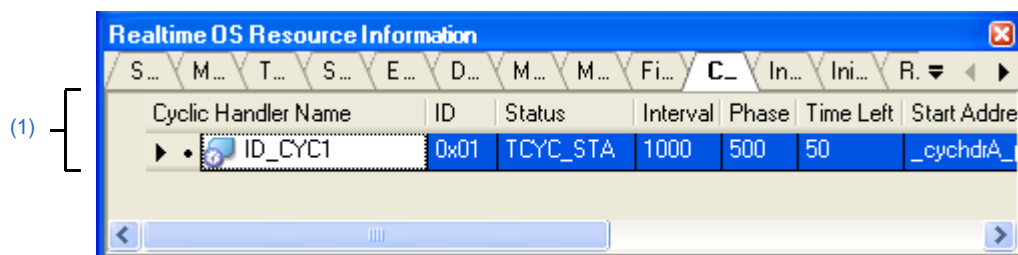
(2) Footer row

Jump to Memory (Top Address)	Opens the Memory panel, and displays the contents of the fixed-sized memory pool.
Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.

[Cyclic Handler] tab

This tab displays the cyclic handler information (e.g. Cyclic Handler Name and ID) of the RI850MP.

Figure A-21. [Cyclic Handler] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)

[How to open]



- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]

(1) Information display area

This area displays the cyclic handler information (e.g. Cyclic Handler Name and ID) of the RI850MP.

This area consists of the following items.

Cyclic Handler Name	An icon indicating the current status of the cyclic handler and the name of the cyclic handler are shown in the following format. Icon Name Note that if the name of the cyclic handler is undefined, the name will appear as "ID".	
		Non-operational state (STP state)
		Operational state (STA state)
ID	The ID of the cyclic handler is shown.	
Status	The current status of the cyclic handler is shown.	
	TCYC_STP	Non-operational state (STP state)
	TCYC_STA	Operational state (STA state)
Interval	The activation cycle (in milliseconds) of the cyclic handler is shown.	
Phase	The initial activation phase (in milliseconds) of the cyclic handler is shown.	
Time Left	The time left before the next activation (in milliseconds) of the cyclic handler is shown. Note that if the current state of the cyclic handler is non-operational state, "--" appears.	

Start Address	The start address of the cyclic handler is shown.	
Extended Information	The extended information of the cyclic handler is shown.	
Attribute	The attributes of the cyclic handler (coding language of cyclic handler, initial activation state of cyclic handler and existence of saved activation phases) are shown in the following format. Coding language Initial activation state Existence	
	[Coding language of cyclic handler]	
	TA_HLNG	C language
	TA_ASM	Assembly language
	[Initial activation state of cyclic handler]	
	TA_STA	Operational state (STA state)
	Nothing displayed	Non-operational state (STP state)
	[Existence of saved activation phases]	
	TA_PHS	There are saved activation phases.
	Nothing displayed	There are no saved activation phases.

[Context menu]

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.	
<i>Selected item name</i>	The following items are displayed for selection. Cyclic Handler Name, ID, Status, Interval, Phase, Time Left, Start Address, Extended Information, Attribute	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
<i>Selected item name</i>	The following items are displayed for selection. ID, Interval, Phase, Time Left, Start Address, Extended Information	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

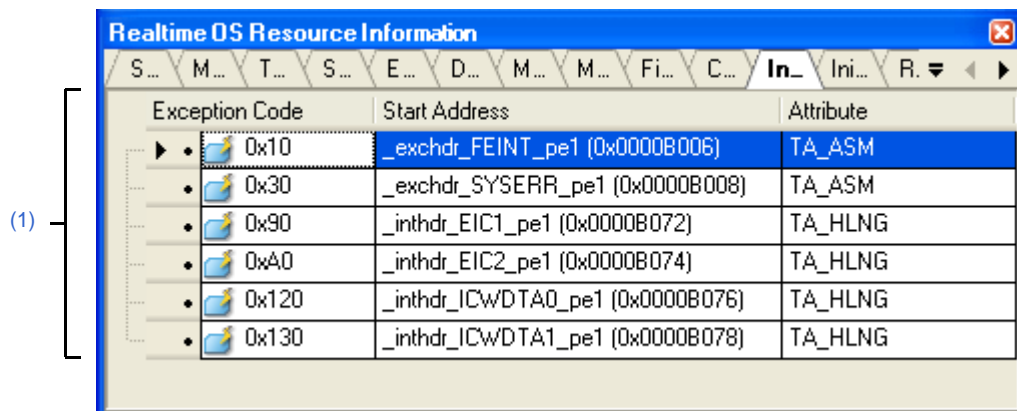
(2) Footer row

Jump to Source (Start Address)	Opens the Editor panel, and displays the source code of the cyclic handler.
Jump to Disassemble (Start Address)	Opens the Disassemble panel, and displays the results of disassembling the cyclic handler.
Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.

[Interrupt Handler] tab

This tab displays the interrupt handler/CPU exception handler information (e.g. Exception Code and Start Address) of the RI850MP.

Figure A-22. [Interrupt Handler] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)

[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area**

This area displays the interrupt handler/CPU exception handler information (e.g. Exception Code and Start Address) of the RI850MP.

This area consists of the following items.

Exception Code	The exception code of the interrupt handler/CPU exception handler is shown.	
Start Address	The start address of the interrupt handler/CPU exception handler is shown.	
Attribute	The coding language of the interrupt handler/CPU exception handler is shown.	
	TA_HLNG	C language
	TA_ASM	Assembly language

[Context menu]

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.	
<i>Selected item name</i>	The following items are displayed for selection. Exception Code, Start Address, Attribute	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
<i>Selected item name</i>	The following items are displayed for selection. Exception Code, Start Address	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

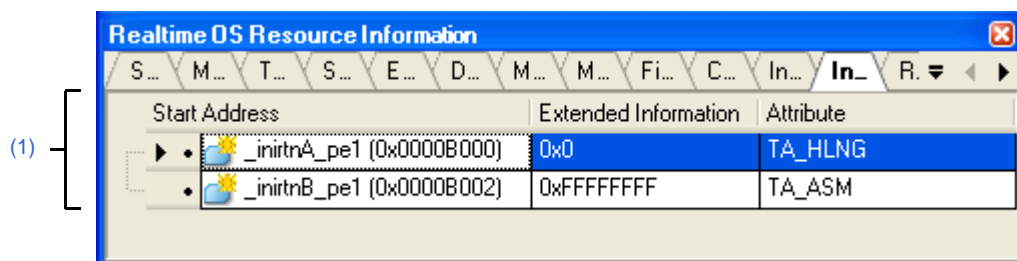
(2) Footer row

Jump to Source (Start Address)	Opens the Editor panel, and displays the source code of the interrupt handler/CPU exception handler.
Jump to Disassemble (Start Address)	Opens the Disassemble panel, and displays the results of disassembling the interrupt handler/CPU exception handler.
Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.

[Initialize Routine] tab

This tab displays the initialize routine information (e.g. Start Address and Extended Information) of the RI850MP.

Figure A-23. [Initialize Routine] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)

[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area**

This area displays the initialize routine information (e.g. Start Address and Extended Information) of the RI850MP.

This area consists of the following items.

Start Address	The start address of the initialize routine is shown.	
Extended Information	The extended information of the initialize routine is shown.	
Attribute	The coding language of the initialize routine is shown.	
	TA_HLNG	C language
	TA_ASM	Assembly language

[Context menu]

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.	
<i>Selected item name</i>	The following items are displayed for selection. Start Address, Extended Information, Attribute	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.

Notation	Displays cascade menus for selecting the display notation.	
<i>Selected item name</i>	The following items are displayed for selection. Start Address, Extended Information	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

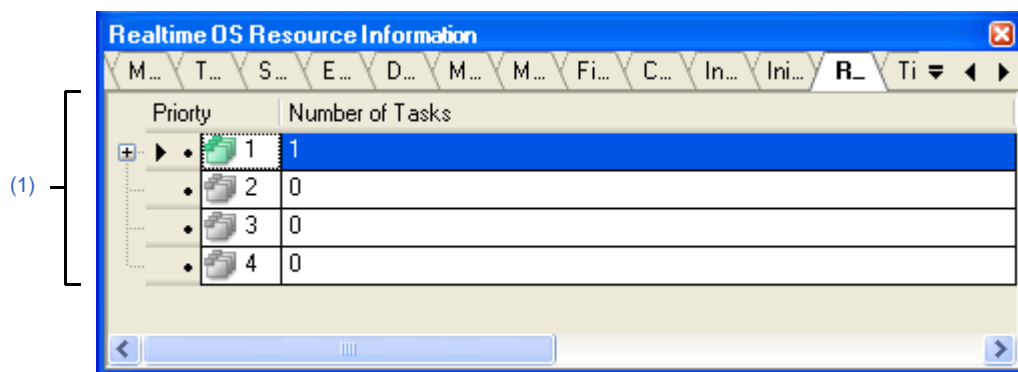
(2) Footer row

Jump to Source (Start Address)	Opens the Editor panel, and displays the source code of the initialize routine.
Jump to Disassemble (Start Address)	Opens the Disassemble panel, and displays the results of disassembling the initialize routine.
Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.

[Ready Queue] tab

This tab displays the ready queue information (e.g. Priority and Number of Tasks) of the RI850MP.

Figure A-24. [Ready Queue] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)



[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]**(1) Information display area****(a) First layer**

This layer displays the ready queue information (e.g. Priority and Number of Tasks) of the RI850MP.

This layer consists of the following items.

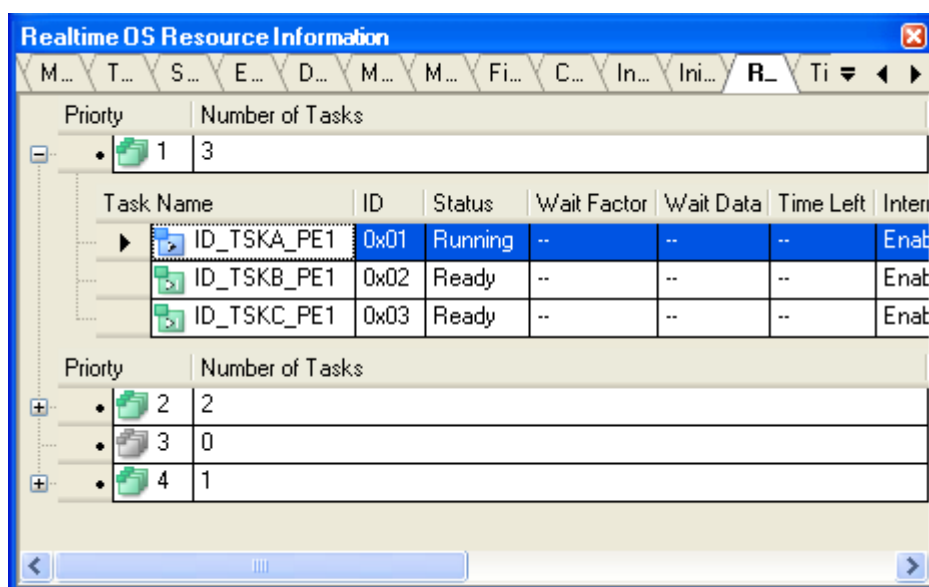
Priority	An icon indicating the current status of the ready queue and the task priority are shown in the following format.	
	Icon Task priority	
		There are queued tasks.
		There are no queued tasks.
Number of Tasks	The total number of queued tasks (tasks with of READY state or RUNNING state) is shown.	

(b) Second layer

The executing task information (e.g. Task Name and ID) only appears if there are tasks queued in the ready queue.

See the [\[Task\] tab](#) for details about executing task information.

Figure A-25. [Ready Queue] Tab (Executing Task Information)

**[Context menu]**

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.	
Selected item name	The following items are displayed for selection. Priority, Number of Tasks	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
Selected item name	The following items are displayed for selection. Priority, Number of Tasks	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

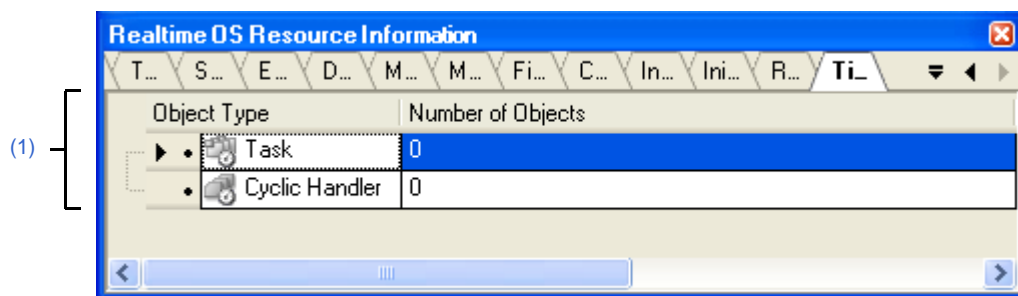
(2) Footer row

Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.
--------------------	---

[Timer Queue] tab

This tab displays the timer queue information (e.g. Object Type and Number of Objects) of the RI850MP.

Figure A-26. [Timer Queue] Tab



The following items are explained here.

- [\[How to open\]](#)
- [\[Description of each area\]](#)
- [\[Context menu\]](#)

[How to open]

- From the [Debug] menu, select [Download].
- From the [View] menu, select [Realtime OS] >> [Resource Information].

[Description of each area]

(1) Information display area

(a) First layer

This layer displays the timer queue information (e.g. Object Type and Number of Objects) of the RI850MP. This layer consists of the following items.

Object Type	An icon indicating the current status of the timer queue and the object type are shown in the following format.	
	Icon Object type	
	[Icon]	
		There are queued tasks.
		There are no queued tasks.
		There are queued cyclic handlers.
		There are no queued cyclic handlers.
	[Object type]	
	Task	Task
	Cyclic Handler	Cyclic handler
Number of Objects	The total number of queued objects (tasks and cyclic handlers) is shown.	

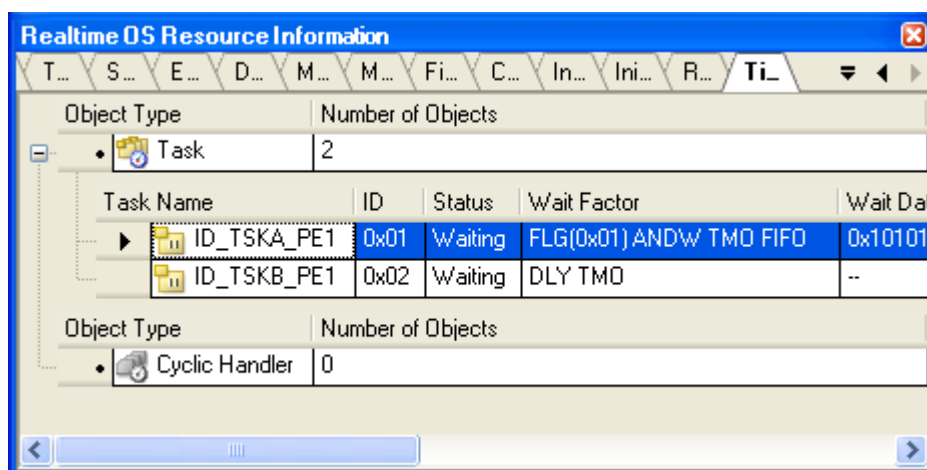
(b) Second layer

<1> Waiting task information

The waiting task information (e.g. Task Name and ID) only appears if there are tasks queued in the timer queue.

See the [\[Task\] tab](#) for details about waiting task information.

Figure A-27. [Timer Queue] Tab (Waiting Task Information)

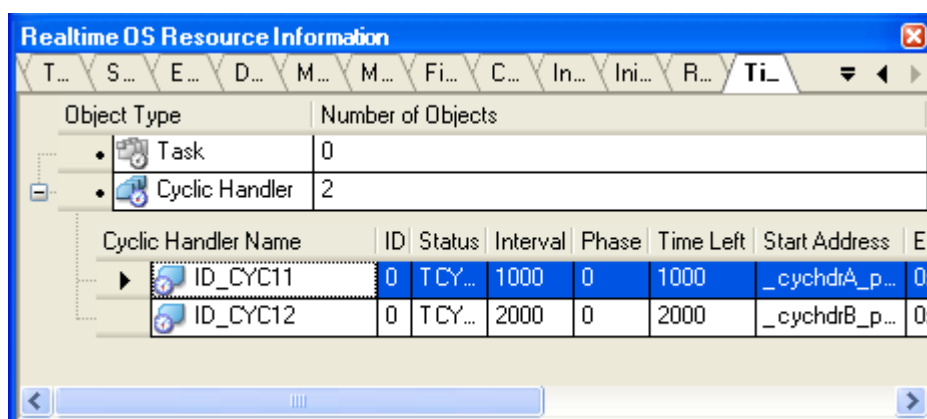


<2> Cyclic handler information

The cyclic handler information (e.g. Cyclic Handler Name and ID) only appears if there are cyclic handlers queued in the timer queue.

See the [\[Cyclic Handler\] tab](#) for details about cyclic handler information.

Figure A-28. [Timer Queue] Tab (Cyclic Handler Information)



[Context menu]

The context menu displayed in response to a right mouse click differs as follows depending on the area clicked.

(1) Header row

Display	Displays cascade menus for selecting the header items to display.
---------	---

<i>Selected item name</i>	The following items are displayed for selection. Object Type, Number of Objects	
	Checked	The item in question will be displayed.
	Not checked	The item in question will not be displayed.
Notation	Displays cascade menus for selecting the display notation.	
<i>Selected item name</i>	The following items are displayed for selection. Number of Objects	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

(2) Footer row

Reset Display Item	The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.
--------------------	---

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Revision Record

Rev.	Date	Description	
		Page	Summary
1.00	Oct 01, 2011	-	First Edition issued
1.01	Apr 01, 2012	16	<p>[System] tab</p> <p>Added the following: the sentence in the "[Context menu]" column - item "(2)".</p> <p>Reset Display Item</p> <p>The display item (e.g. whether or not to display header items, display notation, display order and display width) is reset.</p>
		21	<p>[Task] tab</p> <p>Changed as follows: the sentence in the "[Description of each area]" column - item "(1)" - "(a)" - "Time Left".</p> <p>Note that if the current state of task is other than delayed state, "0" appears.</p> <p>--></p> <p>Note that if the task is waiting forever, "TMO_FEVR" appears.</p> <p>If the current state of the task is other than WAITING state or WAITING-SUSPENDED state, "--" appears.</p>
		33	<p>[Mailbox] tab</p> <p>Changed as follows: the sentence in the "[Description of each area]" column - item "(1)" - "(a)" - "Message Max Priority".</p> <p>... , "0x0" appears.</p> <p>--></p> <p>... , "--" appears.</p>
		37	<p>[Mutex] tab</p> <p>Changed as follows: the sentence in the "[Description of each area]" column - item "(1)" - "(a)" - "Ceiling Priority".</p> <p>"0" is shown.</p> <p>--></p> <p>--" is shown.</p>
		40	<p>[Cyclic Handler] tab</p> <p>Changed as follows: the sentence in the "[Description of each area]" column - item "(1)" - "Time Left".</p> <p>... is non-operational state, "0" appears.</p> <p>--></p> <p>... is non-operational state, "--" appears.</p>

RI850MP V1.00.01 User's Manual:
Debug

Publication Date: Rev.1.00 Oct 01, 2011
Rev.1.01 Apr 01, 2012

Published by: Renesas Electronics Corporation



SALES OFFICES

Renesas Electronics Corporation

<http://www.renesas.com>

Refer to "<http://www.renesas.com/>" for the latest and detailed information.

Renesas Electronics America Inc.

2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited

1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH

Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.

7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.

Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited

Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.

13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.

1 harbourFront Avenue, #06-10, keppel Bay Tower, Singapore 098632
Tel: +65-6213-0200, Fax: +65-6278-8001

Renesas Electronics Malaysia Sdn.Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.

11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141

RI850MP V1.00.01