

**User's Manual****RX78K0R Ver. 4.30****Real-Time Operating System****Debug for CubeSuite Ver.1.20**

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**Target Tool****RX78K0R Ver.4.30**

[MEMO]

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## INTRODUCTION

<b>Readers</b>	This manual is intended for users who design and develop application systems using 78K0R microcontrollers products.				
<b>Purpose</b>	This manual is intended for users to understand the functions of the RX78K0R described the organization listed below.				
<b>Organization</b>	<p>This manual consists of the following major sections.</p> <ul style="list-style-type: none"><li>• GENERAL</li><li>• FUNCTIONS</li></ul>				
<b>How to read this manual</b>	<p>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.</p> <p>To understand the hardware functions of the 78K0R microcontrollers → Refer to the <b>User's Manual</b> of each product.</p> <p>To understand the instruction functions of the 78K0R microcontrollers → Refer to <b>78K0R Microcontrollers Instructions User's Manual</b> (U17792E).</p>				
<b>Conventions</b>	<p>Data significance: Higher digits on the left and lower digits on the right</p> <p><b>Note:</b> Footnote for item marked with <b>Note</b> in the text</p> <p><b>Caution:</b> Information requiring particular attention</p> <p><b>Remark:</b> Supplementary information</p> <p>Numerical representation: Binary...XXXX or XXXXB Decimal...XXXX Hexadecimal...0xXXXX</p> <p>Prefixes indicating power of 2 (address space and memory capacity):</p> <table><tr><td>K (kilo)</td><td><math>2^{10} = 1024</math></td></tr><tr><td>M (mega)</td><td><math>2^{20} = 1024^2</math></td></tr></table>	K (kilo)	$2^{10} = 1024$	M (mega)	$2^{20} = 1024^2$
K (kilo)	$2^{10} = 1024$				
M (mega)	$2^{20} = 1024^2$				

**Related Documents**

Refer to the documents listed below when using this manual.

The related documents indicated in this publication may include preliminary versions.

However, preliminary versions are not marked as such.

**Documents related to development tools (User's Manuals)**

Document Name		Document No.
RX Series	Start for CubeSuite for Ver.1.20	U20041E
	Message for CubeSuite for Ver.1.20	U20042E
RX78K0R Ver.4.30	Coding for CubeSuite	U19443E
	Debug for CubeSuite for Ver.1.20	This document
	Analysis for CubeSuite	U19448E
	Internal Structure for CubeSuite	U19453E
CubeSuite Integrated Development Environment	Start	U19809E
	Analysis	U19816E
	Programming	U19390E
	Message	U19810E
	78K0R Coding	U19382E
	78K0R Build	U19385E
	78K0R Debug	U19814E
	78K0R Design	U20183E

**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

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 NEC Electronics.

This manual describes the task debugging tool. This tool is useful for debugging programs using the "RX78K0R" real-time OS functionality within this integrated program-development process.

### 1.1 Overview

When debugging programs using RX78K0R functionality, it is possible to use the task debugging tool to confirm RX78k0R 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 task debug 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 task debug tool along with operation procedures.

### 2.1 Overview

The task debugging tool can be used to confirm RX78K0R resource information (e.g. system information and memory area information) that changes dynamically as the program executes.

The operating procedures for the task debugging tool are described below.

#### (1) Start CubeSuite

Launch CubeSuite from the [start] menu of Windows.

**Remark** See "CubeSuite Start" for details on "Start CubeSuite".

#### (2) Open project

Open the project to debug.

**Remark** See "CubeSuite Start" for details on "Open project".

#### (3) Select debug tool

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

**Remark** See "CubeSuite Debug" for details on "Select debug tool".

#### (4) Download programs

Download the program to debug.

**Remark** See "CubeSuite 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 RX78K0R functionality is downloaded, this panel opens automatically.
  2. The value will be indeterminate for resource information shown when RX78K0R system initialization is incomplete, because it will not be managed by the RX78K0R.

#### (6) Execute/stop programs

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

**Remark** See "CubeSuite 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

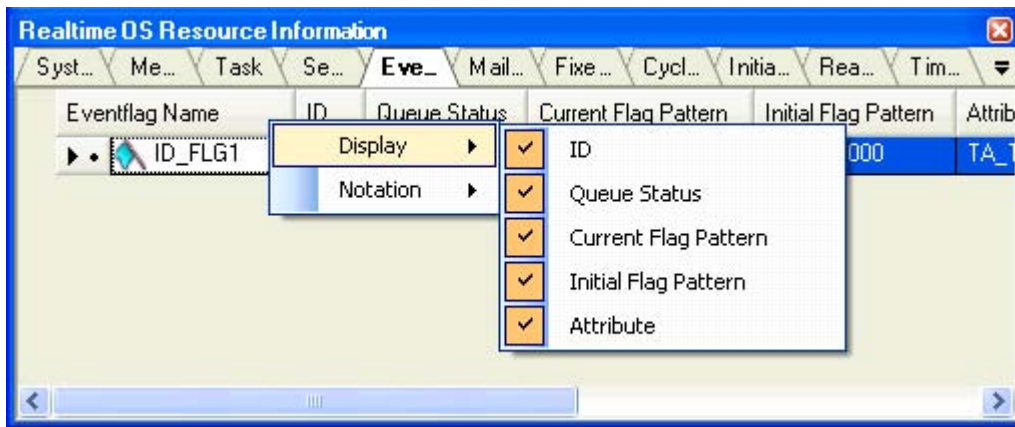
The [Realtime OS Resource Information panel](#) is used to confirm the resource information (e.g. system information and memory area information). This panel opens automatically when a program using the RX78K0R functionality is downloaded.

### 2.2.1 Select item

The task debugging 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**

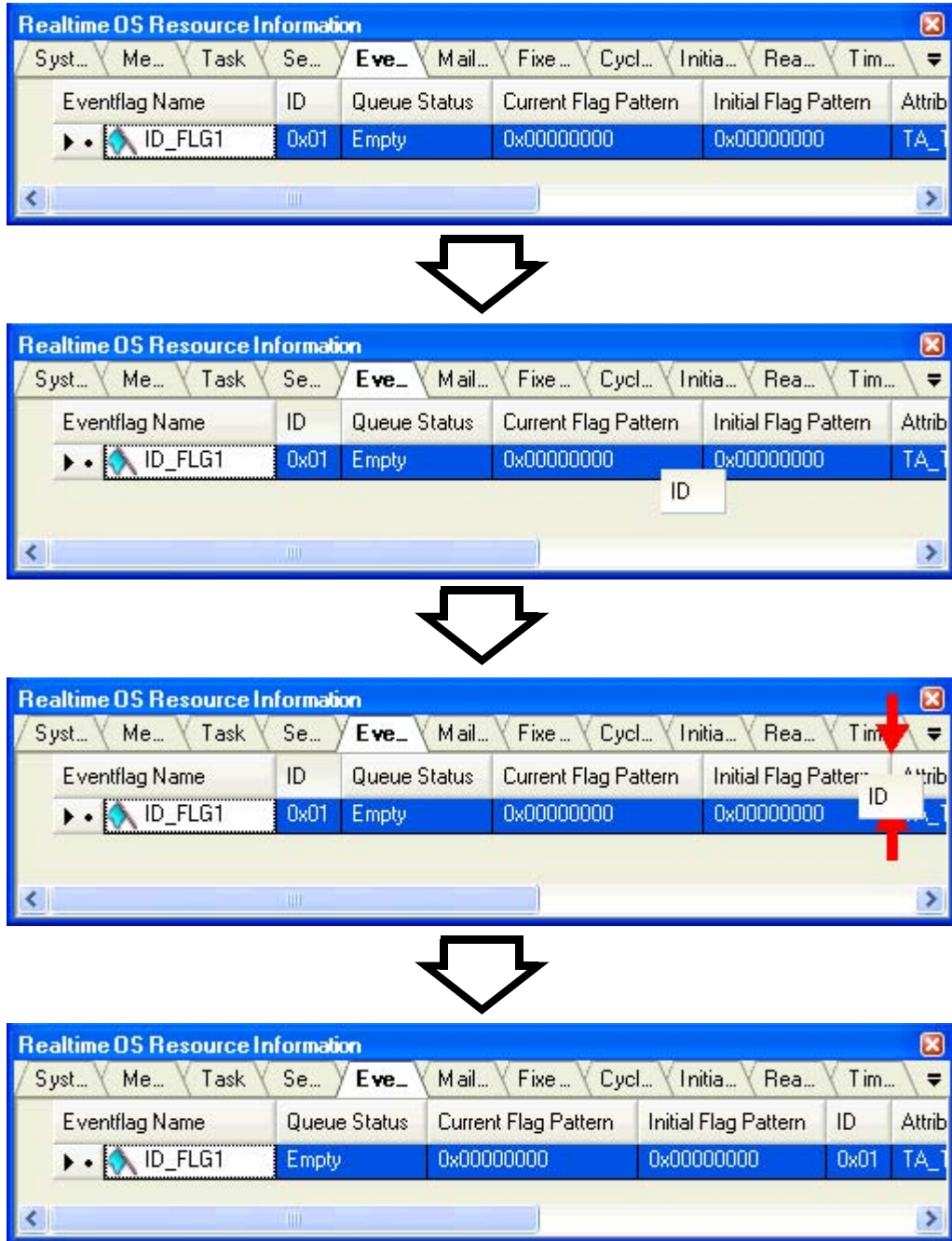
Checked	The item in question will be displayed.
Not checked	The item in question will not be displayed.

2.2.2 Change display order

The task debugging 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](#)
- [\[Mailbox\] tab](#)
- [\[Fixed-Sized Memory Pool\] tab](#)
- [\[Cyclic Handler\] 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 task debugging tool.

### A.1 Description

The panels of the task debugging tool are listed below.

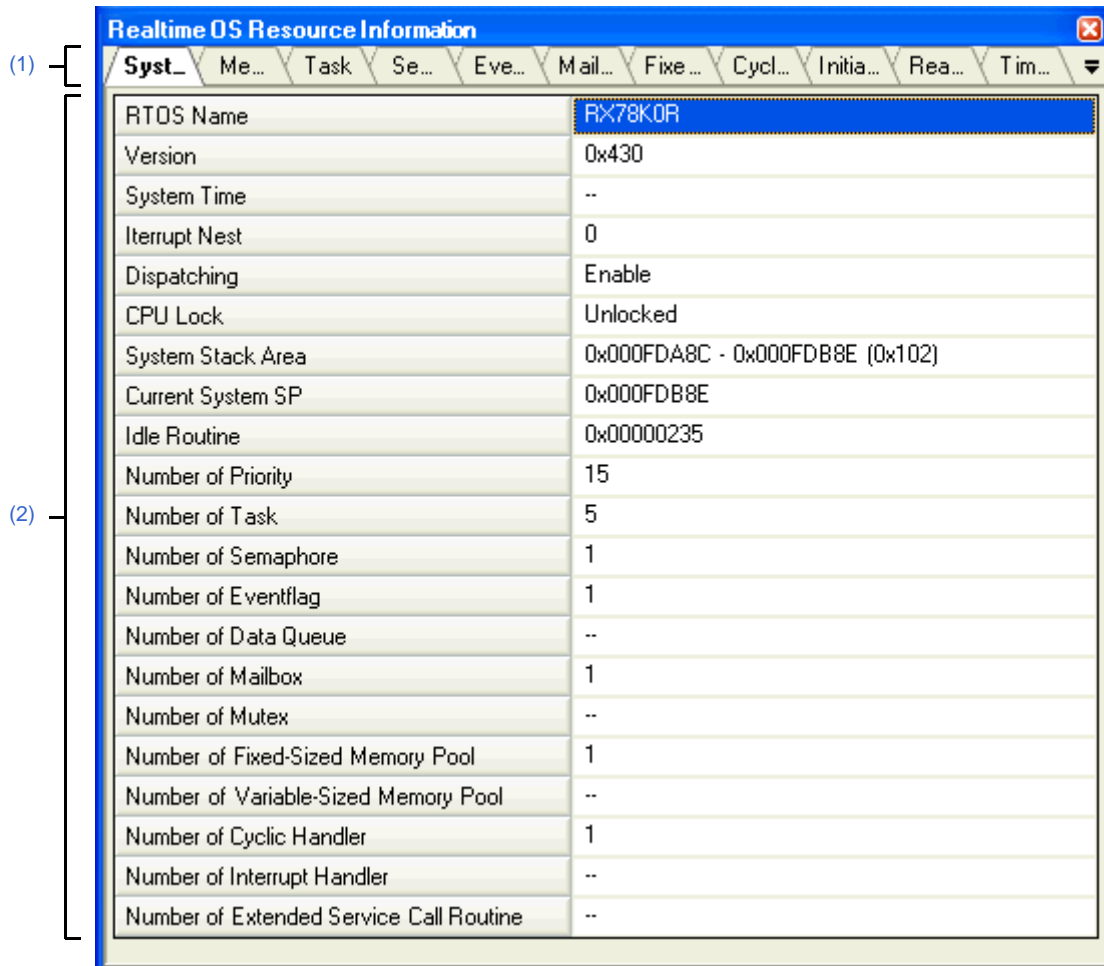
**Table A-1. Panel List**

Panel Name	Description
<a href="#">Realtime OS Resource Information panel</a>	This panel displays the resource information (e.g. system information and memory area information) of the RX78K0R.

## Realtime OS Resource Information panel

This panel displays the resource information (e.g. system information and memory area information) of the RX78K0R.

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
- [Mailbox] tab
- [Fixed-Sized Memory Pool] tab
- [Cyclic Handler] tab
- [Initialize Routine] tab
- [Ready Queue] tab
- [Timer Queue] tab

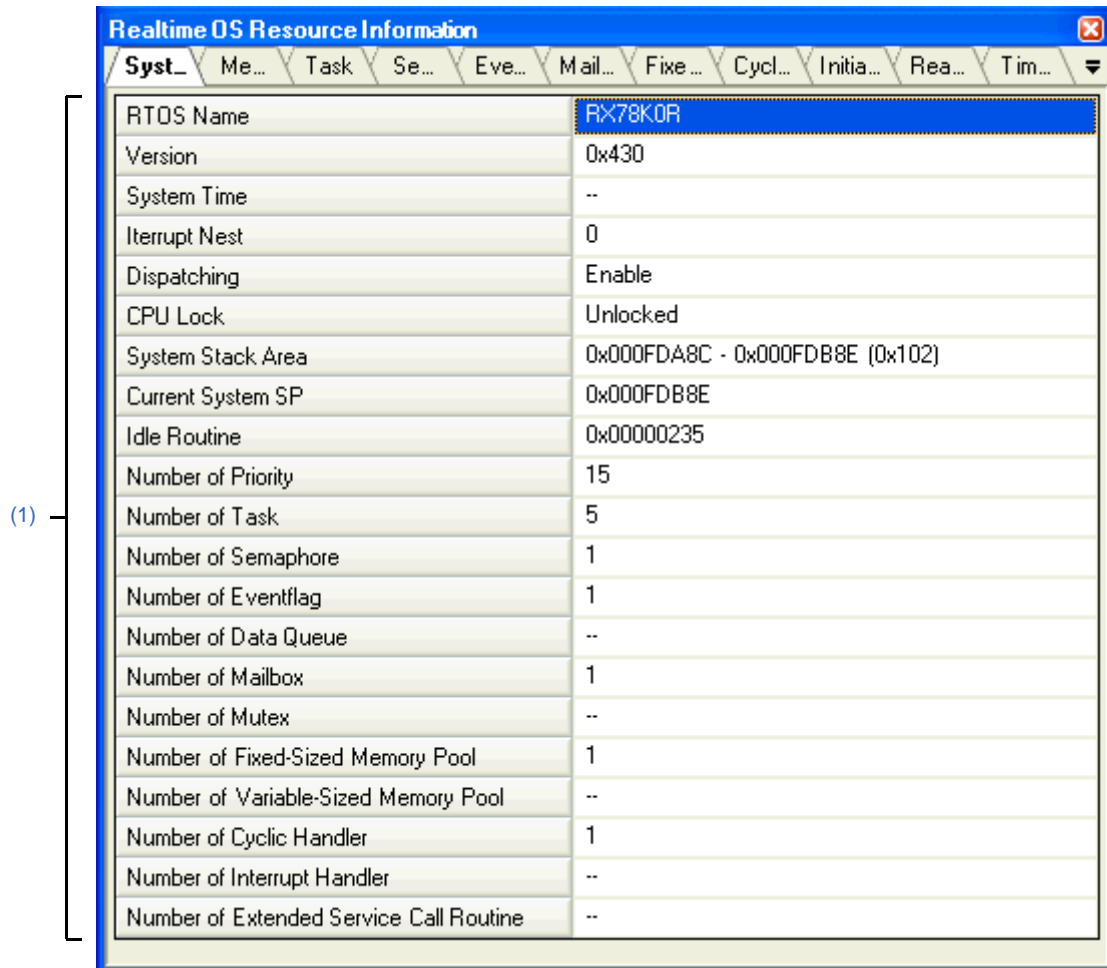
**(2) Information display area**

This area displays the resource information (e.g. system information and memory area information) of the RX78K0R.

**[System] tab**

This tab displays the system information (e.g. RTOS Name and Version) of the RX78K0R.

**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 RX78K0R.

This area consists of the following items.

RTOS Name	"RX78K0R" is shown.
Version	The version number of the RX78K0R is shown.

System Time	"--" is shown.	
Interrupt Nest	The nesting level of interrupt processes (including CPU exception processes) is shown.	
Dispatching	The system state of the RX78K0R is shown.	
	Disable	Dispatch disabled state
	Enable	Dispatch enabled state
CPU Lock	The system state of the RX78K0R 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	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	"--" is shown.	
Number of Mailbox	The total number of mailboxes is shown.	
Number of Mutex	"--" 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 Interrupt Handler	"--" 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. Version, System Time, Interrupt Nest, Dispatching, CPU Lock, Stack Area, Current SP, Idle Routine, Number of Priority, Number of Task, Number of Semaphore, Number of Eventflag, Number of Data Queue, Number of Mailbox, Number of Mutex, Number of Fixed-Sized Memory Pool, Number of Variable-Sized Memory Pool, Number of Cyclic Handler, Number of Interrupt Handler, 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. Version, System Time, Interrupt Nest, Stack Area, Current SP, Idle Routine, Number of Priority, Number of Task, Number of Semaphore, Number of Eventflag, Number of Data Queue, Number of Mailbox, Number of Mutex, Number of Fixed-Sized Memory Pool, Number of Variable-Sized Memory Pool, Number of Cyclic Handler, Number of Interrupt Handler, Number of Extended Service Call Routine	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

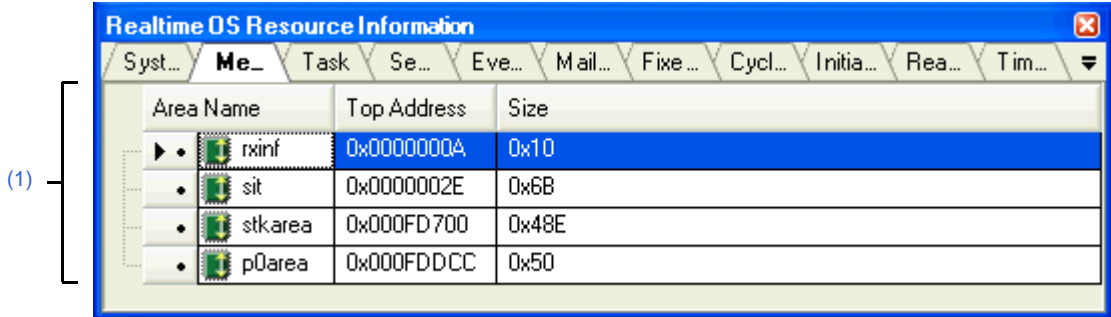
**(2) Footer column**

Jump to Memory (Current SP)	Opens the Memory panel, and displays the contents of the <a href="#">Current System SP</a> .
Jump to Source (Idle Routine)	Opens the Editor panel, and displays the source code of the idle routine.
Jump to Disassemble (Idle Routine)	Opens the Disassemble panel, and displays the results of disassembling the idle routine.

**[Memory Area] tab**

This tab displays the memory area information (e.g. Area Name and Top Address) of the RX78K0R.

**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 RX78K0R. This area consists of the following items.

Area Name	The name of the managed memory area is shown.	
	rxinf	Area where information items such as the RX78K0R version are to be allocated.
	sit	Area where initial information items related to OS resources that do not change dynamically are allocated as system information tables.
	stkarea	Area where the system stack and the task stack are to be allocated.
	p0area, p1area, p2area, p3area	Area where fixed-sized memory pools are to be allocated.
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.	
<i>Selected item name</i>	The following items are displayed for selection. 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**

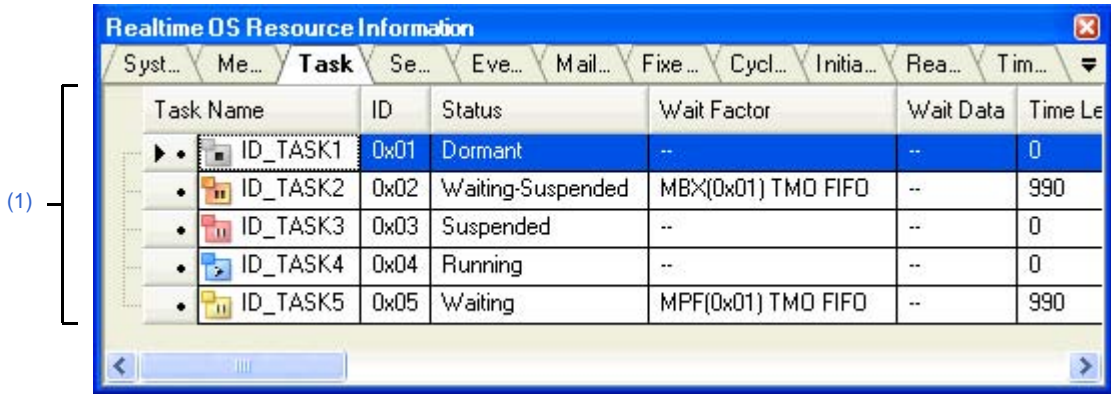
Jump to Memory (Top Address)	Opens the Memory panel, and displays the contents of the managed memory area.
------------------------------	---



**[Task] tab**

This tab displays the task information (e.g. Task Name and ID) of the RX78K0R.

**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**

This area displays the task information (e.g. Task Name and ID) of the RX78K0R.

This area consists of the following items.

Task Name	An icon indicating the current status of the task and the task name are shown in the following format. Icon Task name Note that if the task name is undefined, the name will appear as "ID".	
		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 semaphore is shown.	
	Dormant	DORMANT state
	Ready	READY state
	Running	RUNNING state
	Waiting	WAITING state
	Suspended	SUSPENDED state
	Waiting-Suspended	WAITING-SUSPENDED state
Wait Factor	The task wait factor (type of WAITING state, object ID and attribute of WAITING state) is shown in the format below. Type of WAITING state (Object ID) Attribute of WAITING state Note that if the current state of the task is other than WAITING state or WAITING-SUSPENDED state, "--" appears. If the WAITING state type is sleeping state or delayed state, then "(Object ID)" is not shown.	
	[Type of WAITING state]	
	SLP	Sleeping state
	DLY	Delayed state
	SEM	Waiting state for a semaphore resource
	FLG	Waiting state for an eventflag
	MBX	Waiting state for a mailbox
	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	The request conditions triggering the task's transition to WAITING state are shown. Note that if the task's current state is other than waiting state for an eventflag, "--" is shown.
Wait bit pattern		Waiting state for an eventflag
Time Left	The time left until the delayed state is released (in tick) is shown. Note that if the current state of the task is other than delayed 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 Entry	The start address of the task is shown.	
Current PC	The current PC value of the task is shown.	
Current SP	The current SP value of the task is shown.	
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 Task type Initial preemption 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.
Extend Information	The extended information of the task is shown.	
Tex Entry	"--" is shown.	
Tex Status	"--" is shown.	
Tex Request Pattern	"--" is shown.	
Tex Executing Pattern	"--" is shown.	
Tex Attribute	"--" 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. ID, Status, Wait Factor, Wait Data, Time Left, Interrupt, Current Priority, Task Entry, Current PC, Current SP, Stack Area, Initial Priority, Suspend Count, Wakeup Count, Activate Count, Attribute, Extend Information, Tex Entry, 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.	
<i>Selected item name</i>	The following items are displayed for selection. ID, Wait Factor, Wait Data, Time Left, Current Priority, Task Entry, Current PC, Current Sp, Stack Area, Initial Priority, Suspend Count, Wakeup Count, Activate Count, Extend Information, Tex Entry, Tex Request Pattern, Tex Executing Pattern	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

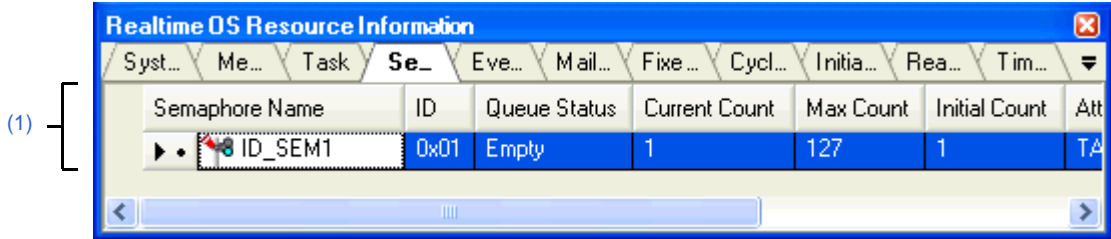
**(2) Footer row**

Jump to Source (Task Entry)	Opens the Editor panel, and displays the source code of the task.
Jump to Disassemble (Task Entry)	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 <a href="#">Current PC</a> .
Jump to Disassemble (Current PC)	Opens the Disassemble panel, and displays the contents of the <a href="#">Current PC</a> .
Jump to Memory (Current SP)	Opens the Memory panel, and displays the contents of the <a href="#">Current SP</a> .
Jump to Source (Tex Entry)	This item will be grayed out.
Jump to Disassemble (Tex Entry)	This item will be grayed out.

**[Semaphore] tab**

This tab displays the semaphore information (e.g. Semaphore Name and ID) of the RX78K0R.

**Figure A-5. [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 RX78K0R. This layer consists of the following items.

Semaphore Name	An icon indicating the current status of the semaphore and the semaphore name are shown in the following format. Icon Semaphore name Note that if the semaphore name 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

**(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-6. [Semaphore] Tab (Waiting Task Information)**



**[Context menu]**

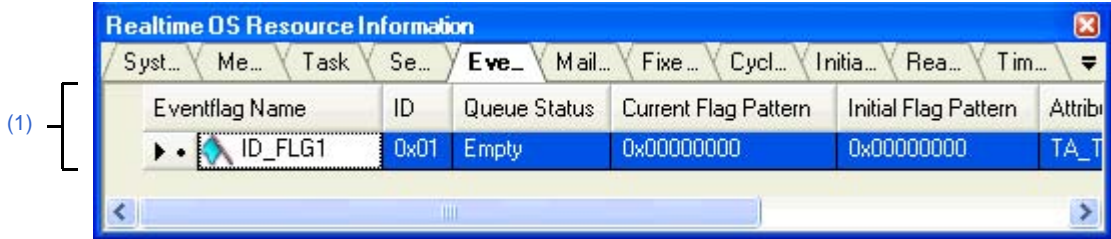
The following context menu appears when the header row is right clicked with the mouse.

Display	Displays cascade menus for selecting the header items to display.	
<i>Selected item name</i>	The following items are displayed for selection. 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.	
<i>Selected item name</i>	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.

**[Eventflag] tab**

This tab displays the eventflag information (e.g. Eventflag Name and ID) of the RX78K0R.

**Figure A-7. [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 RX78K0R.  
 This layer consists of the following items.

Eventflag Name	An icon indicating the current status of the eventflag and the eventflag name are shown in the following format. Icon Eventflag name Note that if the eventflag name 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, and maximum number of tasks that can be queued, and bit pattern clearing flag) are shown.	
	[Task queuing method]	
	TA_TFIFO	FIFO order
	[Maximum number of tasks that can be queued]	
	TA_WSGL	Only one task
	[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-8. [Eventflag] Tab (Waiting Task Information)**



**[Context menu]**

The following context menu appears when the header row is right clicked with the mouse.

Display	Displays cascade menus for selecting the header items to display.	
<i>Selected item name</i>	The following items are displayed for selection. 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.



**[Mailbox] tab**

This tab displays the mailbox information (e.g. Mailbox Name and ID) of the RX78K0R.

**Figure A-9. [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 RX78K0R.  
 This layer consists of the following items.

Mailbox Name	An icon indicating the current status of the mailbox and the mailbox name are shown in the following format. Icon Mailbox name Note that if the mailbox name 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.	

Attribute	The attributes of the mailbox (task queuing method and message queuing method) are shown.	
	[Task queuing method]	
	TA_TFIFO	FIFO 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-10. [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-11. [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.

**[Context menu]**

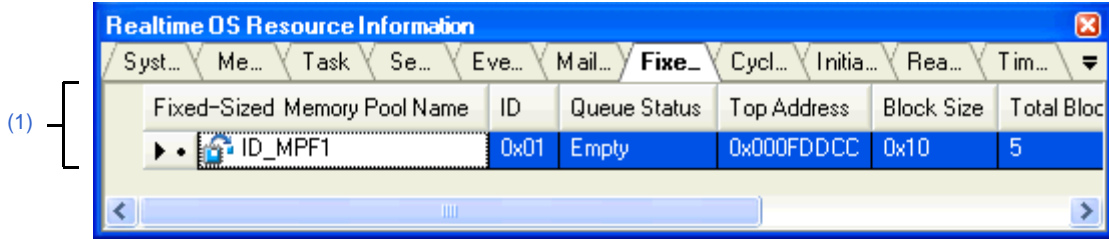
The following context menu appears when the header row is right clicked with the mouse.

Display	Displays cascade menus for selecting the header items to display.	
<i>Selected item name</i>	The following items are displayed for selection. 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.

**[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 RX78K0R.

**Figure A-12. [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 RX78K0R.

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 fixed-sized memory pool name are shown in the following format. Icon Fixed-sized memory pool name Note that if the fixed-sized memory pool name 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

**(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-13. [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.	
<i>Selected item name</i>	The following items are displayed for selection. 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.	
<i>Selected item name</i>	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.

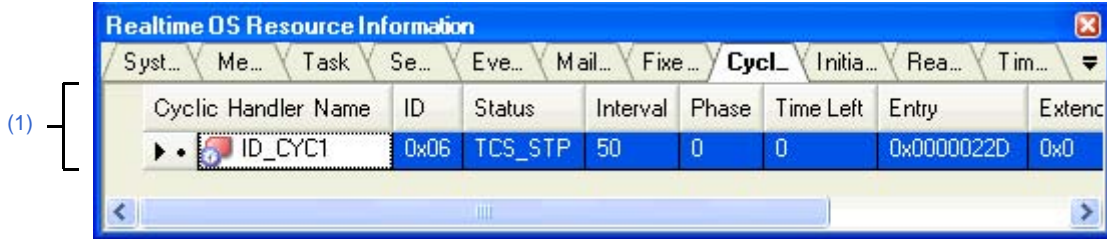
**(2) Footer row**

Jump to Memory (Top Address)	Opens the Memory panel, and displays the contents of the fixed-sized memory pool.
------------------------------	---

**[Cyclic Handler] tab**

This tab displays the cyclic handler information (e.g. Cyclic Handler Name and ID) of the RX78K0R.

**Figure A-14. [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 RX78K0R.

This area consists of the following items.

Cyclic Handler Name	An icon indicating the current status of the cyclic handler and the cyclic handler name are shown in the following format. Icon Cyclic handler name Note that if the cyclic handler name 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.	
	TCS_STP	Non-operational state (STP state)
	TCS_STA	Operational state (STA state)
Interval	The activation cycle (in tick) of the cyclic handler is shown.	
Phase	The initial activation phase (in tick) of the cyclic handler is shown.	
Time Left	The time left before the next activation (in tick) of the cyclic handler is shown.	
Entry	The start address of the cyclic handler is shown.	
Extend Information	The extended information of the cyclic handler is shown.	

Attribute	The attributes of the cyclic handler (the cyclic handler's coding language, initial activation state) are shown in the following format. Coding language Initial activation state	
	[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)

**[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. ID, Status, Interval, Phase, Time Left, Entry, Extend 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, Entry, Extend Information	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

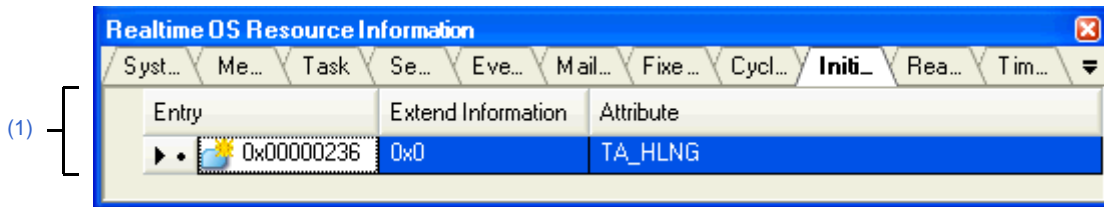
**(2) Footer row**

Jump to Source (Entry)	Opens the Editor panel, and displays the source code of the cyclic handler.
Jump to Disassemble (Entry)	Opens the Disassemble panel, and displays the results of disassembling the cyclic handler.

**[Initialize Routine] tab**

This tab displays the initialize routine information (e.g. Entry and Extend Information) of the RX78K0R.

**Figure A-15. [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. Entry and Extend Information) of the RX78K0R. This area consists of the following items.

Entry	The start address of the initialize routine is shown.	
Extend 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. Extend 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. Entry, Extend Information	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

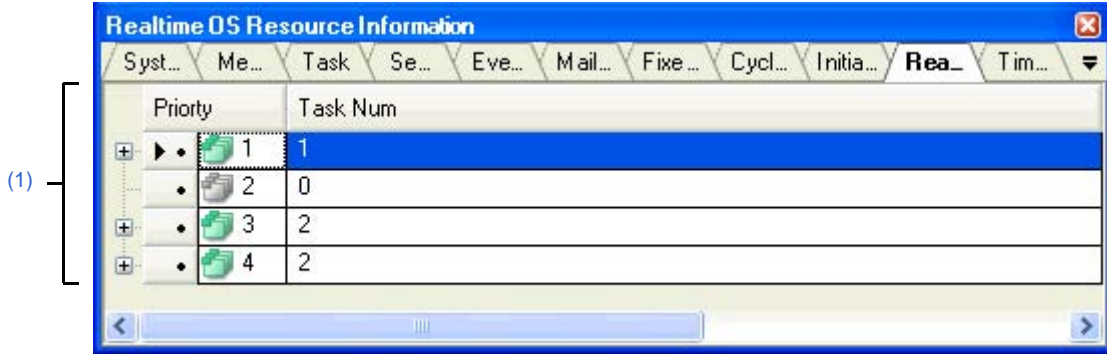
**(2) Footer row**

Jump to Source (Entry)	Opens the Editor panel, and displays the source code of the initialize routine.
Jump to Disassemble (Entry)	Opens the Disassemble panel, and displays the results of disassembling the initialize routine.

**[Ready Queue] tab**

This tab displays the ready queue information (e.g. Priority and Task Num) of the RX78K0R.

**Figure A-16. [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 Task Num) of the RX78K0R.  
This layer consists of the following items.

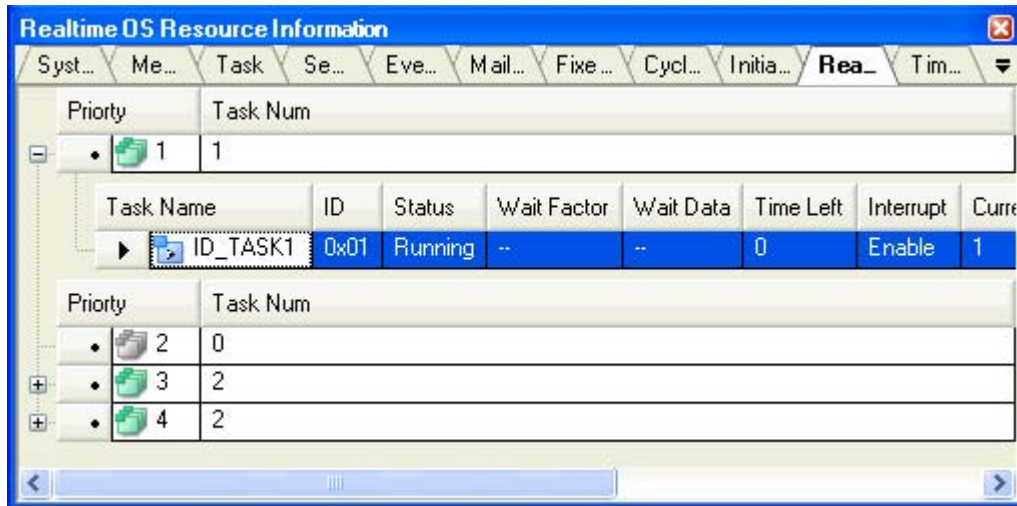
Priority	An icon indicating the current status of the ready queue and the task priority are shown in the following format.	
	Icon Task priority	
		There are queued tasks.
		There are no queued tasks.
Task Num	The total number of queued tasks (tasks with of READY state or RUNNING state) is shown.	

**(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-17. [Ready Queue] Tab (Executing Task Information)



**[Context menu]**

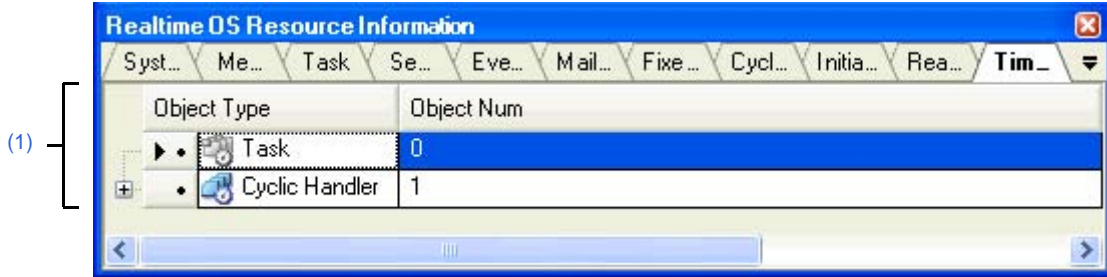
The following context menu appears when the header row is right clicked with the mouse.

Display	Displays cascade menus for selecting the header items to display.	
Selected item name	The following items are displayed for selection. Task Num	
	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, Task Num	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

**[Timer Queue] tab**

This tab displays the timer queue information (e.g. Object Type and Object Num) of the RX78K0R.

**Figure A-18. [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 Object Num) of the RX78K0R.

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
Object Num	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-19. [Timer Queue] Tab (Waiting Task Information)

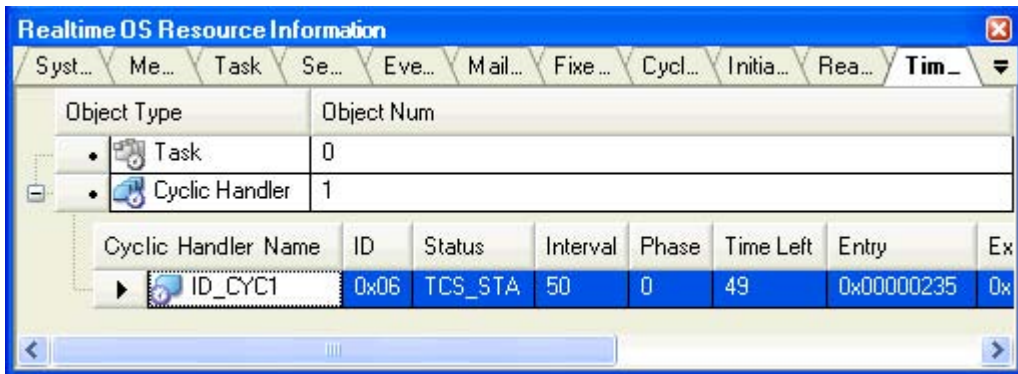


<2> **Cyclic handler information**

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-20. [Timer Queue] Tab (Cyclic Handler Information)



**[Context menu]**

The following context menu appears when the header row is right clicked with the mouse.

Display	Displays cascade menus for selecting the header items to display.	
<i>Selected item name</i>	The following items are displayed for selection. Object Num	
	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. Object Num	
	DEC	Displays value in signed decimal number.
	HEX	Displays value in hexadecimal number.

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