

RX Family C/C++ Compiler Package (CC-RX)

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How to Divide Boot and Flash Areas

Introduction

This document describes the processing necessary to divide a program into boot and flash areas when using the C/C++ compiler for the RX family (CC-RX).

Versions of Tools with which Correct Operation has been Confirmed

The following tools and versions were used for the descriptions in this document.

- C/C++ compiler for the RX family (CC-RX): V3.01.00
- e² studio integrated development environment: V7.3.0
- CS+ for CC integrated development environment: V8.01.00

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1. Overview

1.1 Dividing the Boot and Flash Areas

The purpose of dividing the boot and flash areas is to ensure that only the program in the flash area can be modified without reconfiguring the program in the boot area.



Figure 1 Divided Areas on System

Note: In this document, the boot area is defined as an area that cannot be modified following design of the system while the flash area is defined as an area that can be modified or replaced on the system.

To divide the boot and flash areas, create two projects, one to be used as the boot area project and the other to be used as the flash area project. These projects must satisfy the following conditions.

- The variables and functions in the boot area are accessible from the flash area.
- The linker option -FSymbol should be used for the boot area project so that externally defined symbols will be output in a file.
- The above externally defined symbol file should be specified as a target of building in the flash area project.
- The functions in the flash area can be called from the boot area through a function table.
 - When calling functions in the flash area, the boot area project should call the address of each branch instruction for a function that is specified in the function table.
 - A table of branch instructions for functions to be called from the boot area project should be created in the flash area project.



Figure 2 References to Variables and Functions between the Boot and Flash Areas



1.2 Allocating the Boot and Flash Areas

Allocate the boot and flash areas as follows.



Figure 3 Example of Allocating the Boot and Flash Areas

1.3 Procedures for Creating the Boot Area and Flash Area Projects

Follow the procedures below to create the boot area and flash area projects.

- 1. Creating the boot area project
 - A. Create boot area programs in the source file.
 - B. Specify the necessary linker options.
 - C. Build the boot area project before the flash area project because the boot area project is required for building the flash area project.
- 2. Creating the flash area project
 - A. Create flash area programs in the source files.
 - B. Specify the necessary linker options.



1.4 Overview of Build Processing for the Boot and Flash Areas

Figure 4 shows an overview of build processing for the boot and flash areas.





2. Common Processing for the Boot and Flash Areas

2.1 Creating projects

2.1.1 e² studio

1. Create projects

Create a boot area project and a flash area project by following the procedures given in section 1.3, Procedures for Creating the Boot and Flash Areas.

Place a tick in the "boot" checkbox to configure the flash area project to allow reference to the boot area project from the flash area project when the flash area project is built. In such cases, the boot area project is built before the flash area project.

e ² Properties for flash		- [×
type filter text	Project References	<pre></pre>	< ⇒ •	• •
 Resource Builders C/C++ Build C/C++ General Project References Renesas QE Run/Debug Settings 	Projects may refer to other projects in the workspace. Use this page to specify what other projects are referenced Project references for 'flash':	by the p	project.	
?	Apply and Close	С	ancel	

Figure 5 Setting the Flash Area Project to Allow Reference to the Boot Area Project



2. Exclude the automatically generated files from the targets of building

Exclude the following files from the flash area project.

- intprg.c
- sbrk.c
- sbrk.h
- stacksct.h
- vect.h
- vecttbl.c
- 3. Add files as targets of building
 - A. Add the following files to the boot area project as targets of building.
 - extern_ftable.src
 - ftable.inc
 - B. Add the following files to the flash area project as targets of building.
 - boot.fsy (this file is generated after the boot area project is built)
 - ftable.src
 - ftable.inc
 - int.c
 - sub_mot.txt



Figure 6 Example of Creating Projects with the e² studio



2.1.2 CS+

1. Create projects

Create the flash area project as the main project and the boot area project as a sub-project*.

Note: The build order in CS+ should be [Sub-project] -> [Main project].

The boot area program will not be modified once it is created. Therefore, when creating the secondor a later generation flash area project, the sub-project can be deleted.

2. Exclude the automatically generated files from the targets of building

Exclude the following files from the flash area project.

- intprg.c
- sbrk.c
- sbrk.h
- stacksct.h
- vect.h
- vecttbl.c
- 3. Add files as targets of building
 - A. Add the following files to the boot area project.
 - extern_ftable.src
 - ftable.inc
 - B. Add the following files to the flash area project.
 - ftable.src
 - ftable.inc
 - int.c
 - boot.fsy





Figure 7 Example of Creating Projects with CS+



2.2 Creating a common program for the boot and flash areas

2.2.1 Address definition file for the branch table (assembly language)

- Create ftable.inc, which is the address definition file for the branch table for reference from both the boot and flash areas.
 - FLASH_TABLE: Start address of the branch table
 - INTERRUPT_OFFSET: Size of the interrupt area in the branch table

Example: ftable.inc

FLASH_TABLE	.EQU	0FFF00000H
INTERRUPT_OFFSET	.EQU	100H

2.3 Hex files for the boot and flash areas

File names used in this document are listed below (output procedures are described later).

- Hex file for the boot and flash areas combined: boot_flash.mot
- Hex file for the flash area: flash_fff00000_fff01000.mot
- Hex file for the boot area: boot_fff01000_ffffffff.mot

Note: A load module file (*.abs) is separately generated for each of the boot and flash areas.



Figure 8 Hex Files for the Boot and Flash Areas



2.4 Initialization procedure

Figure 9 shows the initialization procedure.







3. Boot Area

3.1 Creating boot area programs

The following steps are required for boot area programs.

- Modifying the startup routine
- Modifying dbsct.c
- Creating a file for resolving the function addresses in the branch table

3.1.1 Modifying the startup routine (resetprg.c)

Use #pragma inline_asm to add a branch to the startup routine (resetprg.c) as shown below.

Example: Modifying resetprg.c (1/2)

```
#pragma inline_asm jump_flash
static void jump_flash(void) {
  BSR 0FFF00000H ; FLASH_TABLE
}
```

Modify the main function call to the call to the main function for the boot area, and add a branch instruction to the flash area startup routine.

Example: Modifying resetprg.c (2/2)

```
boot_main();
jump flash();
```

3.1.2 Modifying dbsct.c

Modify the section name to exclude it from the target of the -FSymbol option (which is used to output externally defined symbols).

Example: Modifying dbsct.c

```
#pragma section C BOOTC
/*
** CTBL prevents excessive output of L1100 messages when linking.
** Even if CTBL is deleted, the operation of the program does not change.
*/
_UBYTE * const _CTBL[] = {
```



3.1.3 Creating a file for resolving the function addresses in the branch table (extern_ftable.src)

- Define symbols for resolving the addresses for the branch table to be used to call functions in the flash area from the C source.
- Register this file in the project.

Example: Creating extern_ftable.src

```
.INCLUDE ftable.inc

.GLB _f1

_f1 .EQU (FLASH_TABLE + INTERRUPT_OFFSET + (0 * 4))

.GLB _f2

_f2 .EQU (FLASH_TABLE + INTERRUPT_OFFSET + (1 * 4))

.END
```



3.2 Specifying boot area options

Make the following option settings for the boot area.

- Output of a file for the externally defined symbols
- Specify the section allocation
- Specify a vector for branching to the interrupt function in the flash area
- Specify hex file output only to the boot area address range

3.2.1 Output of a file for the externally defined symbols

The externally defined symbols need to be output to a file so that the flash area project has access to the variables and functions in the boot area.

Register all target sections with the -FSymbol option.

Example: e² studio

[Properties]→[C/C++ Build]→[Settings]→[Tool Settings] tabbed page

→[Linker]→[Section]→[Symbol file]

→[The specified section that outputs externally defined symbols to the file]



Figure 10 Example of Option Setting with the e² studio



Example: CS+

[CC-RX (Build Tool)]→[Link Options] tabbed page

 \rightarrow [Section] \rightarrow [The specified section that outputs externally defined symbols to the file]

	Property 📓 int.c 📓 ftable.src 📓 boot.fsy 📓 extern_ftable.src	▼ X	¢
Ż	CC-RX Property	a p - +]
~	Section	^]
	Section start address	B_1,R_1,B_2,R_2,B,R,SU,SI/04,PResetPRG/0FFF00000,C_1,C_2,C,C\$DSEC,C\$BSEC,C\$INIT,C\$VTBL,C\$VEC	1
~	The specified section that outputs externally defined symbols to the file	The specified section that outputs externally defined symbols to the file[10]	1
	[00]	B_1	1
	[01]	B_2	1
	[02]	В	1
	[03]	C_1	1
	[04]	C_2	1
	[05]	C	1
	[06]	D_1	i
	[07]	D_2	1
	[08]	D	1
	[09]	P	1
>	Section alignment	Section alignment[0]	1
>	ROM to RAM mapped section	ROM to RAM mapped section[3]	1
Т	e specified section that outputs externally defined symbols to the file		
	Common Options 🖌 Compile Options 🖌 Assemble Options 🚶 Link Options 📈 Hex O	utput Options / Library Generate Options /	,

Figure 11 Example of Option Setting with CS+



3.2.2 Specifying the section allocation

Specify the section allocation in the boot area with the linker option -start. Make sure that the sections do not overlap those in the flash area.

Example: e² studio

$[Properties] \rightarrow [C/C++ Build] \rightarrow [Settings] \rightarrow [Tool Settings] tabbed page$

\rightarrow [Linker] \rightarrow [Section] \rightarrow [Section Viewer]

Properties for boot				
	Settings		<	$\rightarrow \rightarrow \rightarrow \rightarrow$
ype filter text > Resource Builders < C/C++ Build Build Variables Environment Logging Settings Tool Chain Editor > C/C++ General Project References Renesas QE Run/Debug Settings	Configuration: HardwareDebug [Active Tool Settings Toolchain Device Tool Settings Toolchain Device Compiler Section Symbol file Subcommand file Miscellaneous	° Build Steps 🏾 🏪 Build Artifact 🛛 🗟 Binary Pa	Manage Confi rsers Frror Parsers FFF01000, C_1, C_2, C, BOOT X Add Section	
	 User Uibrary Generator Mode Standard Library Object Optimization Advanced Miscellaneous User 	0xFFF01100 C_1 C_2 C BOOTC C\$* D* W* L	New Overlay Remove Section Move Up Move Down	
	 Converter Output Hex format CRC Operation Miscellaneous User 	PIntPRG P 0xFFFFFF80 EXCEPTVECT 0xFFFFFFC RESETVECT	Browse	
?)		Import Export Re-Apply	OK Cancel	Cancel

Figure 12 Example of Option Setting with the e² studio



Example: CS+

[CC-RX (Build Tool)]→[Link Options] tabbed page

→[Section]→[Section start address]



Figure 13 Example of Option Setting with CS+



3.2.3 Specifying a vector for branching to the interrupt function in the flash area

Specify the address in the branch table with the linker option -VECTN.

Example: e² studio

 $[Properties] \rightarrow [C/C++ Build] \rightarrow [Settings] \rightarrow [Tool Settings] tabbed page$

 \rightarrow [Linker] \rightarrow [Output] \rightarrow [Address setting for specified area of vector table]

\rightarrow 3=FFF0000C (to specify 0xFFF0000C for address 3)



Figure 14 Example of Option Setting with the e² studio



Example: CS+

[CC-RX (Build Tool)]→[Link Options] tabbed page

- \rightarrow [Output] \rightarrow [Address setting for specified vector number]
- \rightarrow 3=FFF0000C (to specify 0xFFF0000C for address 3)

1	CC-RX Property	م ۱	-	+
1	Output			٨
	Output file type	Load module file(-FOm=Absolute)		
	Outputs debugging information	Yes (Outputs to the output file)(-DEBug)		
	Path of the output folder	%BuildModeName%		
	Output file name	%ProjectName%.abs		
	Outputs the external symbol-allocation information file	No		
	Enables information-level message output	No(-NOMessage)		
	Suppresses the number of information-level messages			
	Fills in padding data at the end of a section	No		
1	Address setting for specified vector number	Address setting for specified vector number[1]		
	[0]	3=FFF0000C		
	Address setting for unused vector area			
	Outputs the jump table	No		
	Generate function list used for detecting illegal indirect function call	No		
	Splits vector table sections	No		
1	List			Y
Address setting for specified vector number Specifies the address setting for specified vector number in the format of " <vector number=""> = {<symbol> <address>}", one per line. Specifies a decimal value from 0 to 255 for <vector number=""></vector></address></symbol></vector>				
	Common Options / Compile Options / Assemble Options / Link Options / Hex Ou	utput Options / Library Generate Options /		•

Figure 15 Example of Option Setting with CS+



3.2.4 Specifying hex file output only to the boot area address range

Specify the output file name and output addresses.

Example: e² studio

 $[Properties] \rightarrow [C/C++ Build] \rightarrow [Settings] \rightarrow [Tool Settings] tabbed page$

- →[Converter]→[Output]
- \rightarrow Select the [Output hex file] checkbox.
- \rightarrow Select [Motorola S format file] as the output file format.
- \rightarrow Specify the output file name and output addresses in [Division output file].



Figure 16 Example of Option Setting with the e² studio

Example: CS+

[CC-RX (Build Tool)]→[Hex Output Options] tabbed page

 \rightarrow [Output File] \rightarrow Specify the output file name and output addresses in [Division output file].

\sim	CC-RX Property	- 4 6	+
\sim	Output File		^
	Output hex file	Yes	
	Output folder	%BuildModeName%	
	Output file name	%ProjectName%.mot	
	Load address	HEX	-
\sim	Division output file	Division output file[1]	
	[0]	%BuildModeName%\boot_fff01000_ffffffff.mot=fff01000-ffffffff	
~	Hex Format		
	Hex file format	Motorola S type file(-FOrm=Stype)	
	Unifies record size	No	
	Fills unused areas in the output ranges with the value	No	
	Output hex file with fixed record length from aligned start address	No	
	Specify byte count for data record	No	
	Outputs the calculation result of CRC	No	
	Specify end record	Not specify(No option specified)	
	Output S9 record at the end	No	\checkmark
Spe	10.00 or later and the [Hex file format] property is Intel HEX file or Motorola S-record file.)	Section name>[]]/ <load address="">]", one per line. ([/<load address="">] can be specified in case of CC-RX</load></load>	
C	ommon Options / Compile Options / Assemble Options / Link Option	utput Options / Library Generate Options	-

Figure 17 Example of Option Setting with CS+



4. Flash Area

4.1 Creating flash area programs

The following steps are required for flash area programs.

- Modifying the startup routine
- Creating a branch table program
- Defining an interrupt function

4.1.1 Modifying the startup routine (resetprg.c)

Comment out the initial settings. These initial settings are only to be made in the boot area startup routine; they are not to be made again in the flash area.

1. Comment out #pragma entry.

Example: resetprg.c (1/3)

```
//#pragma entry PowerON_Reset_PC
```

```
void PowerON_Reset_PC(void)
```

2. Comment out the inclusion of the stack size definition and the stack pointer settings.

Example: resetprg.c (2/3)

```
//#include "stacksct.h" // Stack Sizes (Interrupt and User)
    ~ Omitted ~
#if (_RX_ISA_VERSION_ >= 2) || defined(_RXV2)
// set_extb(_sectop("EXCEPTVECT"));
#endif
// set intb(_sectop("C$VECT"));
```

3. Comment out the initial register settings.

Example: resetprg.c (3/3)

```
// set_fpsw(FPSW_init | _ROUND | _DENOM);
    ~ Omitted ~
// set psw(PSW init); // Set Ubit & Ibit for PSW
```



4.1.2 Creating a branch table program (ftable.src)

At the addresses called from the boot area, write instructions for branching to the function addresses in the flash area.

Example: ftable.src



4.1.3 Defining an interrupt function

- The interrupt vector should be defined in the boot area project.
- Do not specify the vector address (vect) with the #pragma interrupt directive in the flash area.

Example: int.c

```
#include "iodefine.h"
#pragma interrupt int_INTPO
volatile char f;
void int_INTPO(void)
{
    f = 1;
}
```



4.2 Specifying flash area options

Make the following option settings for the flash area.

- Register the externally defined symbol file with the project
- Specify the section allocation
- Specify hex file output only to the flash area address range
- Combine the hex files for the boot and flash areas

4.2.1 Registering the externally defined symbol file with the project

Register the externally defined symbol file (boot.fsy) created in the boot area with the project to allow access to the variables and functions in the boot area.

Example: e² studio



Figure 18 Example of Option Setting with the e² studio



Example: CS+







4.2.2 Specifying the section allocation

Specify the section allocation in the flash area with the linker option -start.

- Make sure that the sections do not overlap those in the boot area.
- Do not allocate anything to the branch table area.

Example: e² studio

 $[Properties] \rightarrow [C/C++ Build] \rightarrow [Settings] \rightarrow [Tool Settings] tabbed page$

 \rightarrow [Linker] \rightarrow [Section] \rightarrow [Section Viewer]

II ×					
Section Viewer	Section Viewer				
Address	Section Name				
0x0000004	SU				
	SI				
	B_1				
	R_1				
	B_2				
	R_2				
	В	Add Section			
	R				
0xFFF00200	PResetPRG	New Overlay			
0xFFF00300	C_1	Remove Section			
	C_2	Move Up			
	С	-			
	C\$*	Move Down			
	D*				
	W*				
	L				
	PIntPRG				
	Р				
0xFFFFF80	EXCEPTVECT				
0xFFFFFFC	RESETVECT				
Override Linker Scr	Override Linker Scrint				
	·	Browse			
		DIOWSE			
Import Exp	ort Re-Apply				
		OK Cancel			





Example: CS+

[CC-RX	(Build	Tool)]→[Link	Options]	tabbed page
--------	--------	--------------	----------	-------------

 \rightarrow [Section] \rightarrow [Section start address]

Section Settings			×
Address	Section		<u>A</u> dd
0x00000004	B_1		M - 115 -
	R_1		<u>M</u> odify
	B_2		New <u>O</u> verlay
	R_2		<u>R</u> emove
	В		
	R		<u>U</u> p <u>D</u> own
0xFFF00200	PResetPRG		
0xFFF00300	C_1		
	C_2		
	С		
	C\$DSEC		
	C\$BSEC		
	C\$INIT		
	C\$VTBL		
	C\$VECT		
	D_1		
	D_2		
	D		
	P		
	PIntPRG		
	W_1		
	W_2		
	W		
	L		
0x0FFFFFF80	EXCEPTVECT		Import
0x0FFFFFFFC	RESETVECT		Export
	ОК	Cancel	<u>H</u> elp

Figure 21 Example of Option Setting with CS+



4.2.3 Specifying hex file output only to the flash area address range

Specify the output file name and output addresses.

Example: e² studio

 $[Properties] \rightarrow [C/C++ Build] \rightarrow [Settings] \rightarrow [Tool Settings] tabbed page$

- \rightarrow [Converter] \rightarrow [Output]
- \rightarrow Select the [Output hex file] checkbox.
- \rightarrow Select [Motorola S format file] as the output file format.
- \rightarrow Specify the output file name and output addresses in [Division output file].

e ² Properties for flash	— D X
type filter text	Settings 🗘 🔻 🗸
 Resource Builders C/C++ Build Build Variables Environment 	Configuration: HardwareDebug [Active]
Logging Settings	🛞 Tool Settings 🛛 Toolchain Device 🎤 Build Steps 🏆 Build Artifact 🗟 Binary Parsers 🔇 Error Parsers
Tool Chain Editor > C/C++ General Project References Renesas QE Run/Debug Settings	> So Common Output hex file > So Compiler Output file type > So Assembler Output file directory > So Linker Output file directory > So Linker Output file directory > So Converter Division output file > Output Image: Source_Coc:/S{ProjName}/S{ConfigName}} > So Converter Division output file > Output Image: Source_Coc:/S{ProjName} > Miscellaneous Image: Source_Coc:/S{ProjName} > User User
?	Apply and Close Cancel

Figure 22 Example of Option Setting with the e² studio

Example: CS+

[CC-RX (Build Tool)]→[Hex Output Options] tabbed page

 \rightarrow [Output File] \rightarrow Specify the output file name and output addresses in [Division output file].

~	CC-RX Property	- 0	- +
~	Output File		^
	Output hex file	Yes	
	Output folder	%BuildModeName%	
	Output file name	%ProjectName%.mot	
	Load address	HEX	_
\sim	Division output file	Division output file[1]	
	[0]	%BuildModeName%\flash_fff00000_fff01000.mot=fff00000-fff01000	
\sim	Hex Format		
	Hex file format	Motorola S type file(-FOm=Stype)	
	Unifies record size	No	
	Fills unused areas in the output ranges with the value	No	
	Output hex file with fixed record length from aligned start address	No	
	Specify byte count for data record	No	
	Outputs the calculation result of CRC	No	
	Specify end record	Not specify(No option specified)	
	Output S9 record at the end	No	~
Sp V3	00.00 or later and the [Hex file format] property is Intel HEX file or Motorola S-record file.)		
	common Options 🖌 Compile Options 🤺 Assemble Options 🤺 Link Options 👌 Hex O	Output Options / Library Generate Options	•

Figure 23 Example of Option Setting with CS+



4.2.4 Combining the hex files for the boot and flash areas

To combine the hex files for the boot and flash areas into one file, add the linker execution step after the build processing.

Example: e² studio

 $[Properties] \rightarrow [C/C++ Build] \rightarrow [Settings] \rightarrow [Build Steps] tabbed page \rightarrow [Post-build steps] \rightarrow Add the command to execute the linker (rlink.exe -subcommand=..4src4sub_mot.txt) to [Command(s):].$

e ² Properties for flash	— 🗆 X
type filter text	Settings $\bigcirc \checkmark \bigcirc \checkmark \checkmark$
 > Resource Builders > C/C++ Build Build Variables Environment Logging Settings Tool Chain Editor > C/C++ General Project References Renesas QE Run/Debug Settings 	Configuration: HardwareDebug [Active] Manage Configurations Build Steps Build Artifact B Binary Parsers Error Parsers Pre-build steps Command(s): Post-build steps Command(s): rlink.exe -subcommand=\src\sub_mot.txt Description: V
	· · · · · · · · · · · · · · · · · · ·
?	Apply and Close Cancel

Figure 24 Example of Option Setting with the e² studio

Example: CS+

[CC-RX (Build Tool)]→[Common Options] tabbed page→[Others]

 \rightarrow Add the command to execute the linker ("%MicomToolPath%¥CC-RX¥V3.01.00¥bin¥rlink.exe" - subcommand=sub_mot.txt) to [Commands executed after build processing].

~	CC-RX Property		م 🔒	-	+
>	Frequently Used Options(for Hex Output) Build Method				^
	Build simultaneously	Yes			
	Build in parallel	No			
	Handling the source file includes non-existing file	Re-compile/assemble the source file			
	Ensure compatibility of paths and linkage order	No			
>	Version Select				
>	Notes				
\sim	Others				
	Output message format	%TargetFiles%			
	Format of build option list	%TargetFiles% : %Program% %Options%			
>	Commands executed before build processing	Commands executed before build processing[0]		_	
\sim	Commands executed after build processing	Commands executed after build processing[1]			
	[0]	"%MicomToolPath%\CC-RX\V3.01.00\bin\rlink.exe" -subcommand=sub_mot.txt			
	Other additional options				
					\checkmark
Spe	nmands executed after build processing cifies the command to be executed after build processing. In specifying a batch file, use a call instruction like "call a.bat". When described "#python"	in the first line, the contents from the second line to the last line are executed as a Python co	mmand		
\ C	mmon Options / Compile Options / Assemble Options / Link Options / Hex O	utput Options / Library Generate Options /			•





Specify the input hex files, their format, and the output file name in the subcommand file for input to the linker.

Example: sub_mot.txt (e² studio)

```
-input=..\.\Loot\HardwareDebug\ boot_fff01000_ffffffff.mot
-input=flash fff00000 fff01000.mot
-form=stype
-output=boot flash.mot
```

Example: sub_mot.txt (CS+)

```
-input=.¥boot¥DefaultBuild¥boot fff01000 ffffffff.mot
-input=.¥DefaultBuild¥flash fff00000 fff01000.mot
-form=stype
-output=.¥DefaultBuild¥boot flash.mot
```



5. Debugging Tool

5.1 Downloading to Debugging Tool

Two load module files (*.abs) are generated; one for each of the boot and flash areas. Download both of the load module files to the debugging tool.

Example: e² studio

[Debug]→[Debug Configurations]→[flash HardwareDebug]→[Startup] tabbed page

 \rightarrow [Load image and symbols]

Add the load module file for the boot area to the project for the flash area.

)C	
[] 🗎 🗶 📄 井 ▼		Name: flash HardwareD	ebug				
type filter text		📄 Main 🟇 Debugger	🕞 Startup 📃 🔲 <u>C</u> on	nmon) 🦆 Sour	rce		
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🚙 Launch Group 🍉 Launch Group (Deprecated)		Load image and symbols					
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Figure 26 Example of Option Setting with the e² studio



Example: CS+

[RX Simulator (Debug Tool)]→[Download File Settings] tabbed page

 \rightarrow [Download] \rightarrow [Download files]

Add the load module file for the boot area to the project for the flash area.

RX Simulator Property					م	- +
V Download						
> Download files	[2]					
CPU Reset after download						
Automatic change method of event setting position	Download File	s				×
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Execute to the specified symbol after CPU Reset		ы.	1			
Specified symbol	flash.abs		Up	Download file information		
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The upper limit size of the memory usage [MBytes]				Hie type	Yes	
				Download object		
				Download symbol information		
					No	
				Generate the information for in	Yes	
Download files						
Specifies the file to be downloaded. The download file dialog box is opened by pressing						
				File		
Connect Settings / Debug Tool Settings / Download File Settings / Hook				Specify the file to be downloaded		-
	Add	Remove				
Output						×
[EOF]					OK Cancel Help	
					Cancel Help	

Figure 27 Example of Option Setting with CS+



6. Sample Programs

The following pages show examples of boot and flash area programs that were created through the procedures described in earlier sections.

6.1 Sample program for the boot area (boot.c)

```
#include "iodefine.h"
#pragma interrupt int boot(vect=4) /* Interrupt definition in the boot area
*/
int boot a = 0x12;
int boot b = 0x34;
extern int f1(int); /* Prototype declaration of a function in the flash area
*/
extern int f2(int); /* Prototype declaration of a function in the flash area
*/
void boot main(void) /* Main function in the boot area \ */
{
 /* Main processing in the boot area */
}
void boot func (void)
{
 boot_a = f1(boot_a); /* Call of a function in the flash area */
 boot_b = f2(boot_b); /* Call of a function in the flash area */
}
void int boot(void) /* Interrupt processing in the boot area */
{
 boot a = 1;
}
```



6.2 Sample program for the flash area (flash.c)

```
#include "iodefine.h"
int flash_a, b;
extern int boot_a, boot_b; /* Functions defined in the boot area */
extern void boot_func(void); /* Function defined in the boot area */
int f1(int a)
{
return (++a);
}
int f2(int b)
{
return (--b);
}
{
boot_a++;  /* Access to a variable in the boot area */
boot_b++;  /* Access to a variable in the boot area */
 boot func(); /* Access to a variable in the boot area */
}
```



Revision History

		Description	
Rev.	Date	Page	Summary
1.00		-	New release



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