

Special Function Register

APPLICATION NOTE

Introduction

Within the microcomputer, there exists the on-chip peripherals hardware special function registers or SFR. These register supports specific function and are manipulated during the operation of the on-chip peripherals. This application note aims to briefly explain where to locate these SFR registers within CubeSuite+, the latest integrated development environment offered by Renesas. This application note does not set out to describe the file structure system within CubeSuite+ and it also assumes users have some knowledge about CubeSuite+ IDE.

Target Device

For all Renesas microcomputer family supported on CubeSuite+

Contents

1.	SFR header file	. 2
2.	Connect to debug tool	. 2
3.	SFR panel	. 4





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1. SFR header file

Special function registers are hardware registers of the on-chip peripherals. It is located at the top of memory space of the microcomputer (FFF00H-FFFFFH). These registers are manipulated during the operation of the on-chip peripherals. In other microcomputer family of Renesas such as H8, SuperH etc., a separate SFR header file is generated during project creation.

Unlike the above mentioned microcomputer family, the microcomputer family supported by CubeSuite+ does not generate the SFR header file during the project generation and user can access to these registers after establishing connection to a debugger is performed.

2. Connect to debug tool

After project creation and successful compilation, user mostly proceeds debugging as a next step in the development phase.

Prior to establish with a debug tool in the CubeSuite+, all debug options in [View] menu are not available to users. Figure 1 show the options available to support debugging as disabled.



Figure 1 Some options are unavailable when no connection to debug tool

To debug, user needs to establish a connection with debugger supporting its targeted microcomputer under development.



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To debug, user needs to establish a connection with debugger supporting its targeted microcomputer under development.



1. User establishes connection with a debug tool by clicking on the "Connect to Debug Tool" option in the [Debug] menu. Figure 2 shows how to connect to debug tool.

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LCD Controller/D	Hes	Restart		R5F2LA88A

Figure 2 Connect to Debug Tool option

2. When the connection to debug tool is established, user observes that the various options in [View] menu is active and allows user to select the options. Figure 3 shows the options available for user's selection.



Figure 3 Options available to support debugging



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Figure 3 Options available to support debugging



3. SFR panel

The SFR panel is only displayed after connecting to debug tool. The SFR panel allows user to display the registers, access type, data size, create categories (similar to folder), edit and save the SFR register values into files. Figure 4 shows the SFR panel.

1. After successfully connecting with the debug tool, user may click on the option "SFR" in [View] menu to invoke the SFR panel.

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SFR	Value	Type(Byte Size)	Address	/
PO	0x00	SFR[R/W 1.8](1)	0xfff00	
Pl Pl	0x00	SFR[R/W 1.8](1)	OxfffOl	
P2	0x00	SFR[R/W 1.8](1)	0xfff02	
P3	0x00	SFR[R/W 1.8](1)	0xfff03	
P4	0x00	SFR[R/W 1.8](1)	Oxfff04	
P5	0x00	SFR[R/W 1.8](1)	Oxfff05	
P6	0x00	SFR[R/W 1.8](1)	0xfff06	
P7	0x00	SFR[R/W 1.8](1)	Oxfff07	
P12	0x00	SFR[R/W 1.8](1)	0xfff0c	
P13	0x00	SFR[R/W 1.8](1)	OxfffOd	
FI P14	0x00	SFR[R/W 1.8](1)	0xfff0e	
🚮 SDROO	0x0000	SFR[R/W 16](2)	Oxfff10	
31 SI000	0x00	SFR[R/W 8](1)	Oxfff10	
TXD0	0x00	SFR[R/W 8](1)	Oxfff10	
🚮 SDRO1	0x0000	SFR[R/W 16](2)	Oxfff12	
🚮 RXDO	0x00	SFR[R/W 8](1)	Oxfff12	
31 SI001	0x00	SFR[R/W 8](1)	Oxfff12	
🚮 TDROO	0x0000	SFR[R/W 16](2)	Oxfff18	
TDRO1	0x0000	SFR[R/W 16](2)	Oxfffla	
TDRO1L	0x00	SFR[R/W 8](1)	Oxfffla	
TDRO1H	0x00	SFR[R/W 8](1)	Oxffflb	
ADCR	0x0000	SFR[R 16](2)	Oxfffle	
ADC RH	0x00	SFR[R 8](1)	Oxffflf	12

Figure 4 SFR panel invoke in CubeSuite+

- 2. In the SFR panel, user is able to view and edit all the hardware registers of the on-chip peripherals of the targeted microcomputer under debugging.
- 3. During the course of debugging, user can save the content of the SFR register into a text file or CSV file, which allows user to examine the values of SFR register.

For details on the SFR panel and description of the supported function, please refer to "*CubeSuite+ Integrated Development Environment User's Manual*" for the targeted debug tool.



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<pre>%</pre>	Value	Tume (Bute Size)	Address	~
2 PO	0×00	SFR(R/M 1 81/1)	Oxfff00	
P 1	0×00	SFR(R/M 1 81(1)	0xfff01	
P2	0×00	SFR(R/M 1 81(1)	Oxfff02	
P 3	0x00	SFR[R/W 1.8](1)	Oxfff03	
P4	0x00	SFR[R/W 1.8](1)	Oxfff04	
P5	0x00	SFR[R/W 1.8](1)	0xfff05	
P6	0x00	SFR[R/W 1.8](1)	0xfff06	
P7	0x00	SFR[R/W 1.8](1)	0xfff07	
P12	0x00	SFR[R/W 1.8](1)	0xfff0c	
P13	0x00	SFR[R/W 1.8](1)	OxfffOd	
P14	0x00	SFR[R/W 1.8](1)	0xfff0e	
🚮 SDROO	0x0000	SFR[R/W 16](2)	0xfffl0	
31 SI000	0x00	SFR[R/W 8](1)	0xfffl0	
TXD0	0x00	SFR[R/W 8](1)	0xfffl0	
🚮 SDRO1	0x0000	SFR[R/W 16](2)	0xfffl2	
RXDO	0x00	SFR[R/W 8](1)	0xfffl2	
31 SI001	0x00	SFR[R/W 8](1)	0xfffl2	
🚮 TDROO	0x0000	SFR[R/W 16](2)	Oxfff18	
TDRO1	0x0000	SFR[R/W 16](2)	Oxfffla	
TDRO1L	0x00	SFR[R/W 8](1)	Oxfffla	
TDRO1H	0x00	SFR[R/W 8](1)	Oxfflb	
ADC R	0x0000	SFR[R 16](2)	Oxfffle	
adc RH	0x00	SFR[R 8](1)	Oxffflf	123

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