A New Technology on Embedded Systems: Renesas Processor

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ABSTRACT

In this work, Renesas processor which is developed by Hitachi, Mitsubishi, and NEC corporations is inspected. In the last decade, Renesas processor has the biggest market share in the world. The processor's process time is high and efficient for high level statements. Because of its high performance and low price, the processor is most popular between developers in electronic area. In this paper, first it is mentioned about Renesas details and then HEW (High-Performance Embedded Workshop) which is based on IAR kernel a platform for command is introduced. Lastly, it is mentioned about debug process for written code.

INTRODUCTION

Renesas Electronics Corporation is one of the world's largest Japanese manufacturers of semiconductor systems. Renesas is the largest manufacturer of microcontrollers. Renesas is also known for LCD drivers, RF ICs, and System-on-Chip (SoC) technology.

Major associates and ownership ratio of Renesas Electronics Corporation are shown in Table 1 [1].

Table 1. Ownership ratio of Renesas Electronics Corporation

NEC Corporation (NEC; TSE: 6701)	33.97%
Hitachi, Ltd. (Hitachi; TSE: 6501)	30.62%
Mitsubishi Electric Corporation (Mitsubishi Electric; TSE: 6503)	25.05%
Japan Trustee Services Bank, Ltd. (Note)	1.49%

Renesas processors are better than others like PIC, 8051 microcontrollers in all respects. Especially, high process speed and low power consumption are its prominent characteristic. Renesas processor family is quite large. Therefore, according to design processor selection can be quite flexible. Programming can be done using C programming

language and linear code writing skill is pretty good. One of the most important features of Renesas processor's is stability against electromagnetic noises and humidity. Disruptive effects are problem for processors during their process time. For this reason, processor selection should be done cautiously. When comparing Renesas processor with PIC and 8051 microcontrollers, Renesas processor has high quality skills. It can be say that Renesas processor is more dependable than 8051 and PIC microcontrollers. Renesas processor is a quite processor with its interrupt structures, C programming language compatible, high memory capacity, register structure and other features.

PROGRAMMING AND DEBUG IN RENESAS

Integrated Development Environment (IDE) is a software developing environment which is included various software tools for developing software. During software developing, an editor, and a compiler, and debugger are needed. Software packages are called IDE has this features [2]. Every manufacturer has different IDE's. For instance, Atmel processors use Keil uVision, Texas processors use Texas Instruments Code Composer Studio, Microchip processors use MPLAB IDE.

Figure 8 Renesas Microprocessor and HEW IDE

Renesas processors use High Performance Embedded Workshop (HEW) IDE. Using this IDE debugging and programming can be achieved beside compilation.

To begin a new project in HEW, it should be created a project file and defined project name, directory, and project type like in every IDE. It is shown an example window in Fig.2.
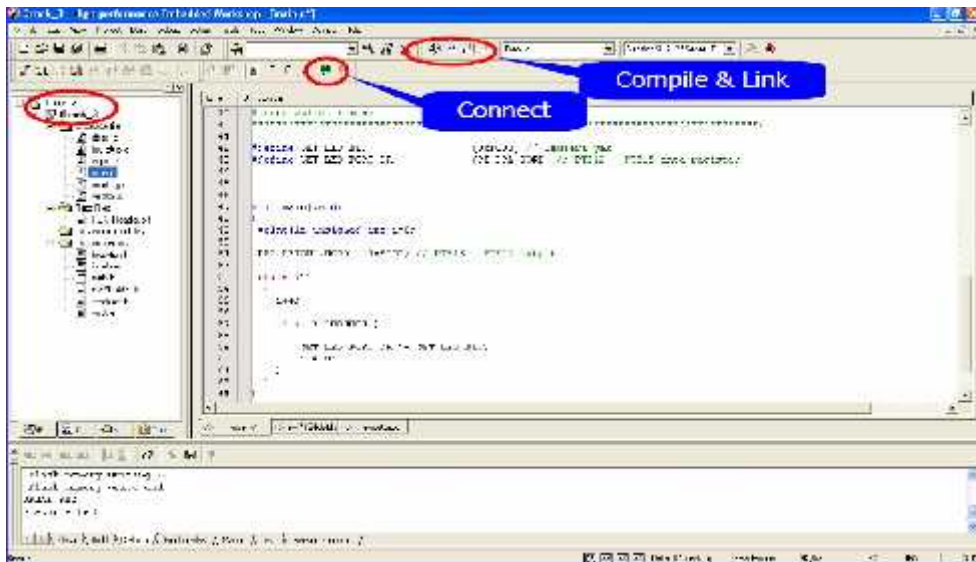
Figure 2 Example window [3]

After finishing program, it is compiled and then downloads to processor. There is another opportunity before downloading to processor that the program can be emulated for checking whether it has error or not step by step.

For programming and debugging, Renesas processors have various products. One of them is shown in Fig.3.

Figure 3 Renesas E8a [4]

Using Renesas E8a product to program a Renesas processor, it can be linked like in Fig.4.
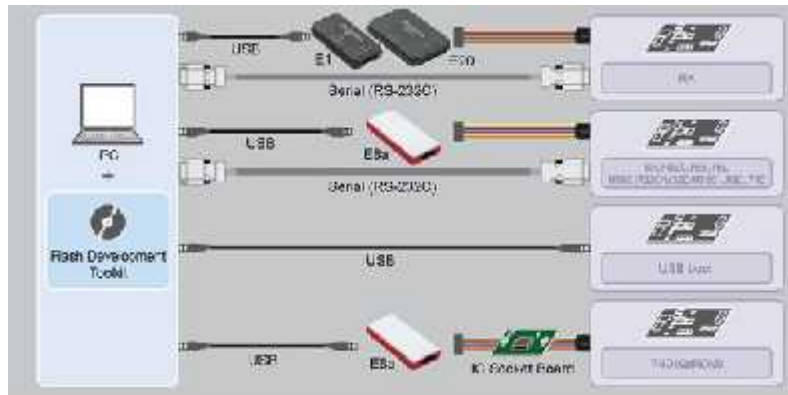
Figure 4 E8a Link types

As for download a program to processor Flash Development Toolkit (FDT) software can be used (Fig.5). In the main window of FDT, first programmer type (e8, e8a, e20 etc.), processor type and program should be chose. And then using a type of link programming can be done.

Figure 5 Flash Development Toolkit

For debugging of program, connect tab should be clicked in the window in Fig.2. After clicking connect tab, the steps are shown in Fig.6 must be executed.
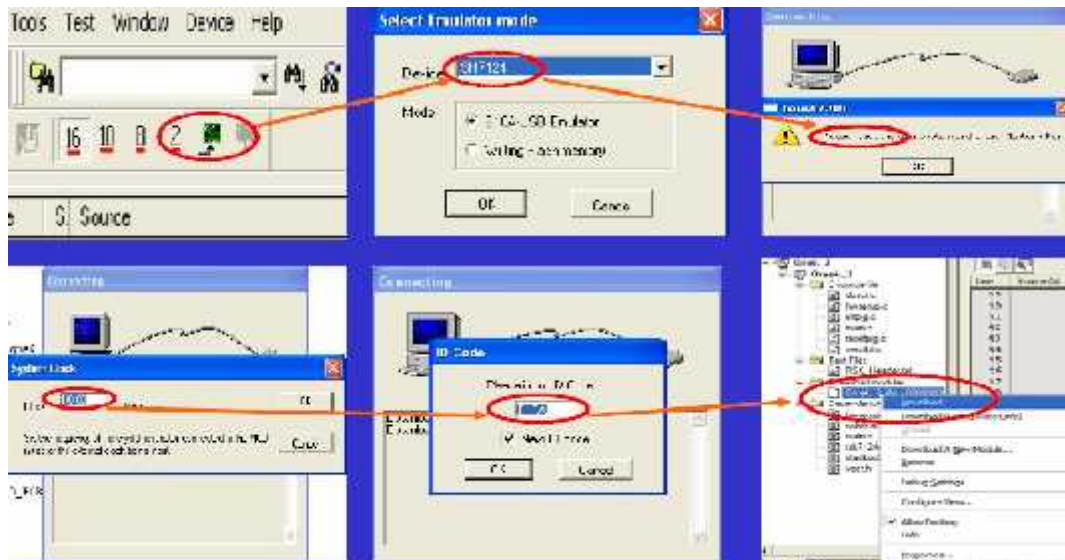
Figure 6 Passing to debugging window [1]

During debugging, program is inspected step by step and errors can be debugged.

As shown in Fig.7, some features can be controlled such as input – output pins, variable conditions, memory information. In this way, errors which are unpredicted are debugged.
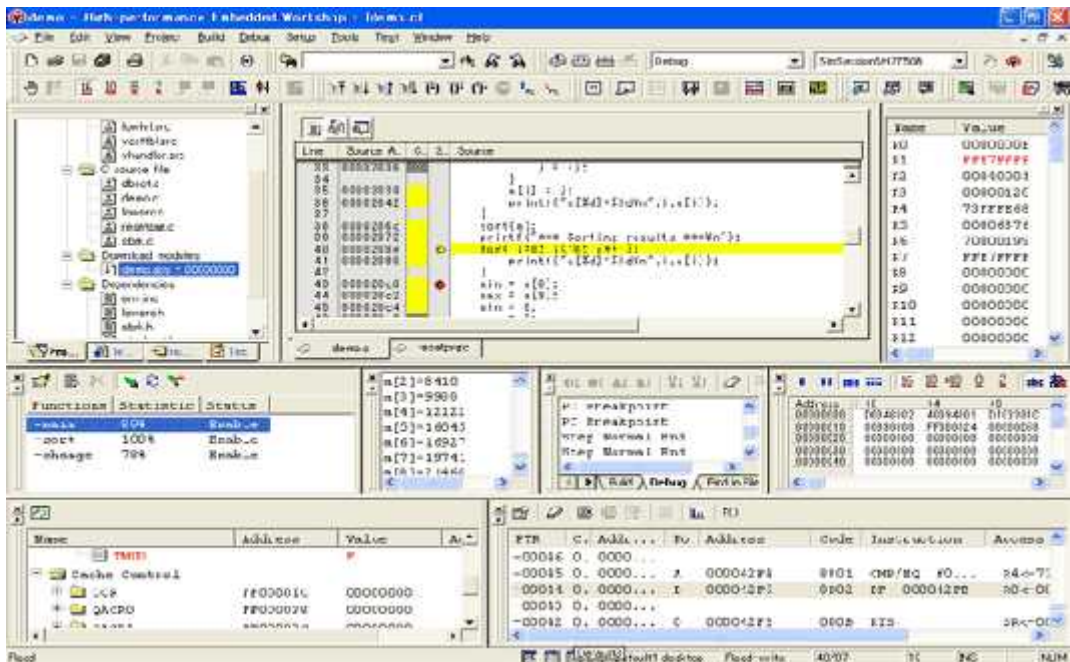

Figure 7 An example for debugging window

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CONCLUSION

In this paper, we have mention about a new processor which is called Renesas. The processor has various flexibilities according to other microcontrollers. Although the processor's stability is better than other processors. Another big altitude is the Renesas processor has the largest market ratio. The paper's aim is to show Renesas processor's advantages and flexibilities.

REFERENCES

[1]   http://en.wikipedia.org/wiki/Renesas (Access time: 19 April 2011)

[2]   Turan, S. IDE Integrated Development Environment (Tümle ik Geli tirme Ortamı) Temelleri ve Uygulama Örnekleri, Kocaeli Üviversitesi, Mayıs 2008.

[3]   http://www.picproje.org/index.php?topic=9072.0;wap

[4]   http://www.renesas.com/products/tools/emulation_debugging/ onchip_debuggers/e8a/e8a_tools_product_landing.jsp