M16C/62 Group
How to check the Flash Version on M16C/62

1.0 Abstract
The following article introduces and shows an example of how to check the internal Flash Version on M16C/62 group device.

2.0 Introduction
The Flash devices of the M16C/62 group have various types of Flash inside. Depending on the exact typenumber of the microcontroller, different Flash technologies and processes are used. The M16C/62A series has for example DINOR Flash technology inside, whereas the M16C/62P series utilizes HND Flash technology. If more than one series is used in a product and the program needs to be updated in the field, it is required to detect the correct type in order to apply the correct Flash programming algorithm in CPU programming mode.
Here a method is presented how to do this for any M16C series by a “Flash identification register”.

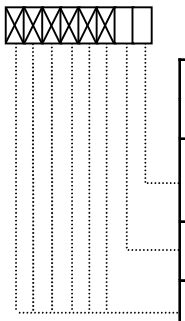
3.0 Contents

3.1 The Flash identification register

The Flash identification register is a register not mentioned in the datasheet.
At M16C/62P series (0.2HND Flash technology) it is located at 01B4h.
At M16C/62A and M16C/62M series (0.5 DINOR Flash technology) it is located at 03B4h.
At M16C/62N series (0.35 HND Flash technology) it is also located at 03B4h.
A special procedure is needed to read out the correct value from this register.

Structure of the Flash identification register:

Flash identification register



Symbol: FIDR
Address: 01B4H (M16C/62P series)
03B4h (M16C/62A, M16C62M, M16C/62N)

Bit Symbol	Bit Name	Function	Read/Write R	Read/Write W
FIDR0	Flash identification value	Flash value output b0 b1 DINOR: 1 1 (Note 1) 0.35 HND: 0 0 0.2 HND: 1 0	0	X
FIDR1			0	X
Nothing is assigned to these bits. In an attempt to write to these bits, please write "0". The value, if read, is indeterminate.			0	X

Note 1: This value is kept on the internal data bus latch. If external memory area or SFR area is accessed during the readout procedure, the data may be changed.
Note 2: Although this register cannot be written, a special writing step is needed in order to read out the correct value

3.2 Readout procedure

The readout procedure is shown in figure 1. This procedure is valid for any M16C/62 series, regardless of the address of the Flash identification register. Before reading out the value of the Flash identification register FIDR, 'FFh' must be written to it.
Please note, that the FIDR value is kept into the internal data bus latch. Therefore, if external memory or SFR area is accessed between writing 'FFh' and reading out the value, the value that is read out, may be changed.
Hence it is required to stop any access of external memory or SFR area between step 1 and step 2 and between step 4 and step 5. Furthermore the interrupts and the DMA must be disabled.

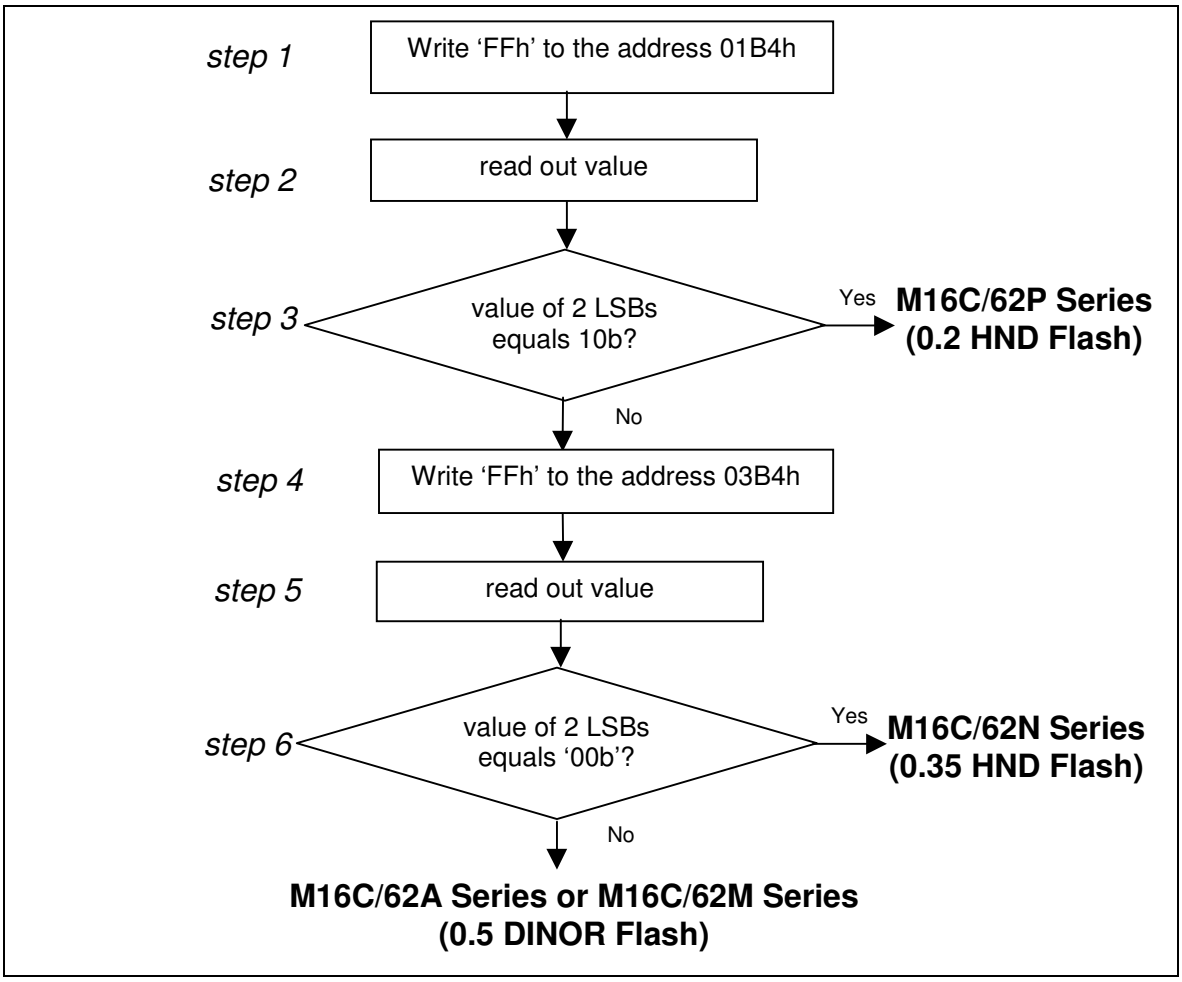


Figure 1: Flow diagram how to check M16C/62 Flash versions

4.0 Reference

Renesas Technology Corporation Semiconductor Home Page
http://www.renesas.com/
Contact for Renesas Technical Support
E-mail: support_apl@renesas.com
Data Sheet
M16C/62A Group
M16C/62M Group
M16C/62N Group
M16C/62P Group
(Use the latest version on the home page: http://www.renesas.com/)
User's Manual
M16C/62A Group
(Use the latest version on the home page: http://www.renesas.com/)

5.0 Programming Code

This example program is a function written in generic C. So it should work with any C compiler. According to the return code the functions for Flash programming in CPU programming mode should be selected. These functions can be derived for example from the appropriate bootloader programs.

```
#define FIDR_ADDR_1          (*(unsigned int *)0x1B4)      // FIDR on M16C/62P series
#define FIDR_ADDR_2          (*(unsigned int *)0x3B4)      // FIDR on M16C/62A,M,N series

#define FLASH_TYPE_M16C62N          0x00                   // value of FIDR for M16C/62N
#define FLASH_TYPE_M16C62P          0x02                   // value of FIDR for M16C/62P
#define FLASH_TYPE_M16C62A_M        0x03                   // value of FIDR for M16C/62A or M16C/62M

#define DUMMY_VALUE                 0xFF                   // value to write to Flash Identification register

#define FIDR_BITMASK                0x03                   // Only 2 LSBs count

unsigned char CheckFlashVersion (void)
{
        unsigned char FlashType;        // return value

        FIDR_ADDR_1 = DUMMY_VALUE;      // write FF to 01B4h
        FlashType = FIDR_ADDR_1;        // read out value
        FlashType &=  FIDR_BITMASK;     // mask out all other bits

        if (FlashType == FLASH_TYPE_M16C62P)
        {
                return (FlashType);             // It is M16C/62P
        }
        else
        {
                FIDR_ADDR_2 = DUMMY_VALUE;      // write FF to 03B4h
                FlashType = FIDR_ADDR_2;        // read out value
                FlashType &=  FIDR_BITMASK;     // mask out all other bits

                if(FlashType == FLASH_TYPE_M16C62N)
                {
                        return(FlashType);    // It is M16C/62N
                }
                else
                {
                        return(FLASH_TYPE_M16C62A_M); // It is M16C/62A or M16C/62M
                }
        }
}
```

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