M16C/62

Programming the M16C/62 Flash in Asynchronous Serial Mode

1.0 Abstract

The following article describes using an asynchronous serial port and the FlashStart application to program the user flash memory of the M16C/62 series of microcontrollers. This is referred to in the M16C/62 data sheets as the “Standard Serial I/O Mode 2” method of flash programming.

2.0 Introduction

The Renesas M16C/62 series of microcontrollers is a 16-bit family of MCUs, based on Renesas’ popular M16C CPU core. These parts provide high memory efficiency, power-saving ability, low noise emission, and improved noise immunity. The flash versions of the device contain flash memory that can be rewritten with a single voltage. The M16C/62 flash can be programmed using one of three methods: Parallel I/O Mode, Standard Serial I/O Mode, and CPU Rewrite Mode. Standard Serial I/O Mode can be further divided into a synchronous mode (Standard Serial I/O Mode 1) and an asynchronous mode (Standard Serial I/O Mode 2). The flash memory is divided into two major blocks, a user program area and a boot ROM area. The user program area is for the normal application program and data. Any program in the boot ROM area is accessed only when a special hardware reset sequence is initiated. This boot ROM area has a control program stored in it when shipped from the factory. The program allows asynchronous or synchronous serial programming of the user area of the flash. Changes to the boot area of the flash can only be made using Parallel I/O Mode.

Renesas provides a Windows® based program, FlashStart, to serially download code (in S-record format) to M16C/62 MCUs. The website for downloading the program is listed in section 5.0 Reference

3.0 Hardware Requirements for Asynchronous Serial Programming

The CNVSS pin on the microcontroller is the primary control line that determines whether the user area of the flash or the boot area is accessed after the release of a reset. If the CNVSS pin is low the device will always access the user flash area and will start in single chip mode. To execute the asynchronous serial rewrite program in the boot area of the flash, the pins listed below must be connected as shown when a reset is performed (either during power-up of the microcontroller or by forcing the Reset line low and then setting it high). Figure 1 shows a typical connection.

Pin	Required Connection
CNVSS	Vcc
CE (P5-0)	Vcc
EPM (P5-5)	Vss
SCLK1 (P6-5)	Vss

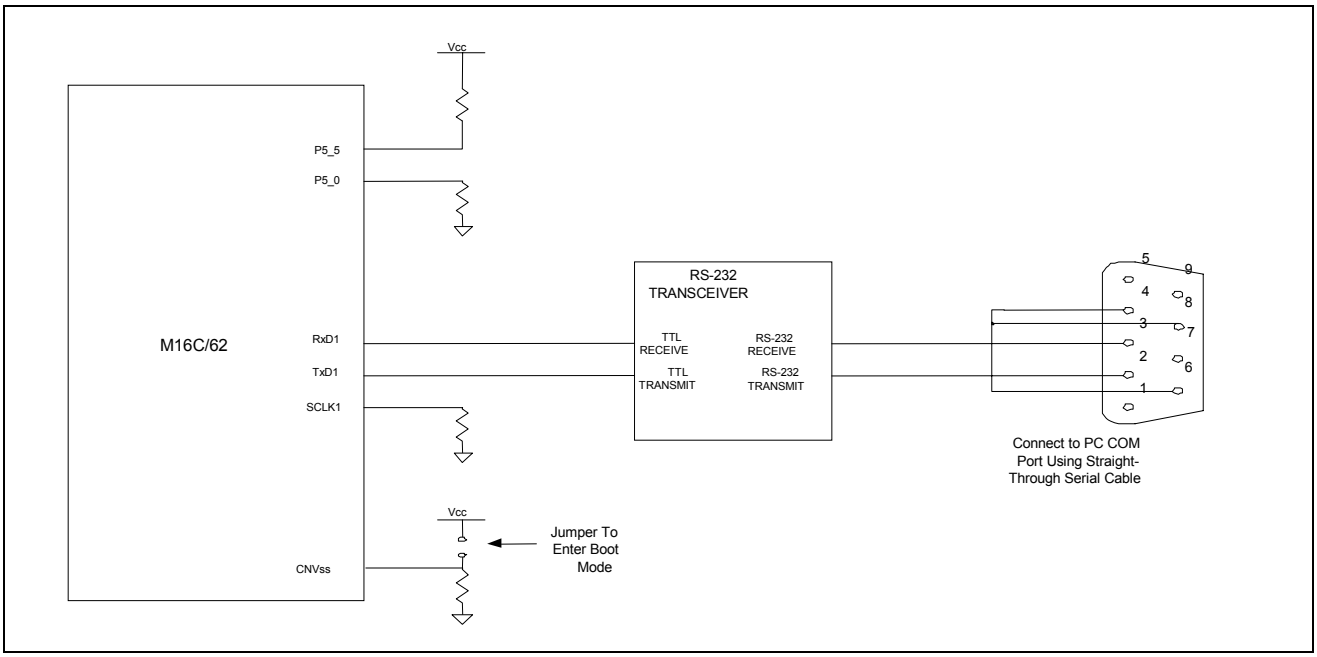

Figure 1 Typical Connection for Asynchronous Serial Programming

4.0 Using the FlashStart Program

4.1 Startup

Selecting ‘flashstart.exe’ will start the program. For the M16C/60 series MCUs, select “internal flash memory” and the COM port that is connected to the hardware. Select “OK”. See Figure 2.

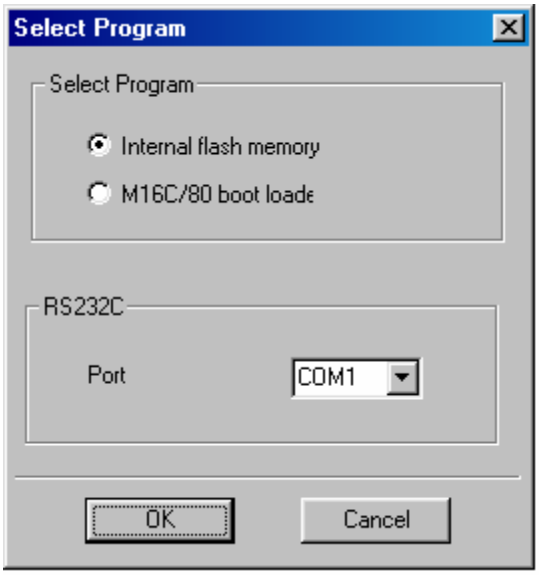

Figure 2 Select Program Dialog Box

Once communications are established, the ID Check dialog box opens. If a communication error occurs, follow the messages to properly set up communications

4.2 Selecting a File and ID Check

The ID Check dialog box is for inputting the name and ID of your work file. The program uses Motorola S2 format. If no ID was previously defined, the ID code would be all zeros or all ones (‘00’ hex or ‘FF’ hex).

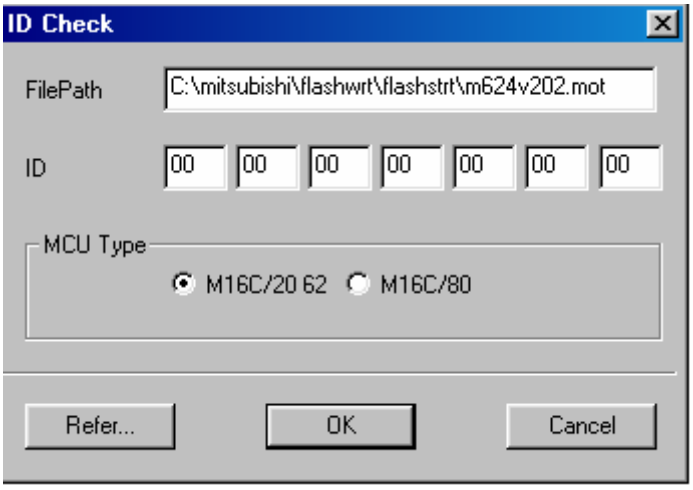

Figure 3 ID Check Dialog Box

Input the path and file name in the FilePath field box and the ID code in the ID field box. Selecting the Refer button will open a browse window to locate the file on your PC. If the ID file is in the same folder (refer to the FlashStart manual), the ID code is loaded when the file is selected. If there is no ID file, a warning message will be shown that indicates the ID file cannot be found. Select "OK" in the warning box and enter the correct ID bytes in the ID boxes or ‘FF’ or ‘00’ in the boxes if there is no ID code being used.

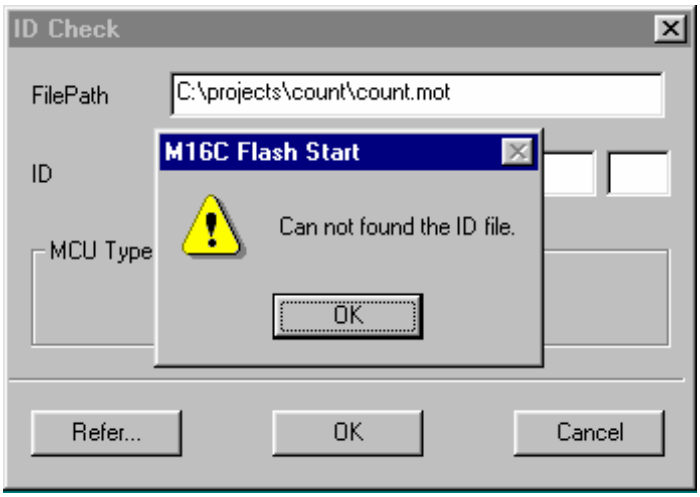

Figure 4 ID Check Dialog Box

Once the ID code has been entered, selecting the OK button will start the ID check and opens the FlashStart Programmer window. This allows the device commands to be executed. If an ID matching error occurs, the FlashStart Programmer window will still open; however, the user will be unable to execute the commands. In this case, recheck the ID code.
Selecting the Cancel button will open the FlashStart Programmer window without running an ID check. The FlashStart allows device commands to be used with cleared flash without performing an ID check.

4.3 FlashStart Programming Window

The FlashStart Programming window executes device commands. If the flash MCU is cleared, the device commands can be used without running an ID check. However, if the flash is written, only the Load (ID), Status, and Setting commands can be used until the ID check is run. Once the correct ID check is completed, all of the following commands are available:

- Load (ID) Selects a file and checks the ID code.
- Blank Checks if a selected area of Flash ROM is blank.
- Read Compares the contents of the Flash ROM with the selected file.
- Status Displays the current status of the Flash ROM.

- E.P.R Erases the Flash, followed by a Program cycle, followed by a Read verify check.
- B.P.R. Runs a Blank check, followed by a Program cycle, followed by a Read verify check.
- Program Programs the device with the selected file (note that the program area must beblank).
- Erase Erases the entire user Flash ROM area.
- Setting Is used to change the Baud rate.
- Download Loads control program file selected into RAM and executes file.

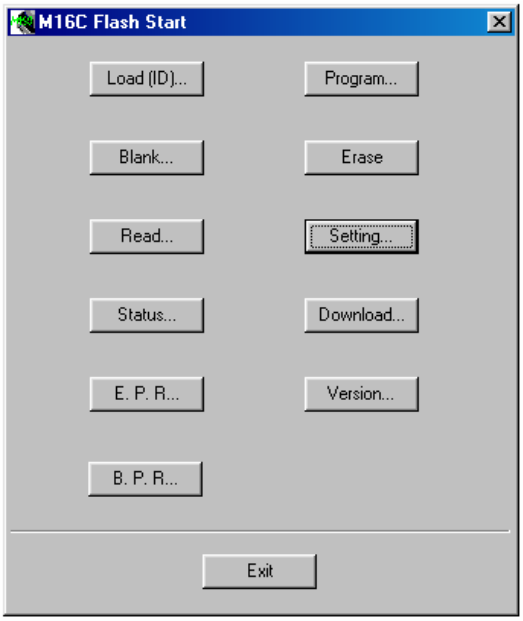

Figure 5 ID Check Dialog Box

When Program and other commands are selected, the Input Address dialog box opens. The default addresses are the low and high addresses of the file that was selected in the ID Check dialog box. If a file is not selected, the start and end addresses of the M16C/62 are used.

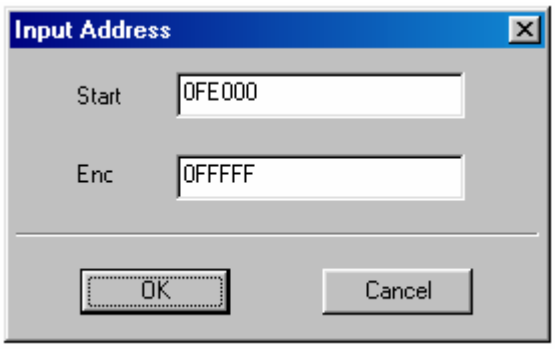

Figure 6 Input Address Dialog Box

5.0 Reference

Renesas Technology Corporation Semiconductor Home Page

http://www.renesas.com

E-mail Support

support_apl@renesas.com

Data Sheets

- M16C/62 datasheets:62aeds.pdf

User's Manual

- FlashStart Programmer Manual

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