

M16C Flash Start

User's manual

mitsubishi electric semiconductor systems corporation

Z1-MSA0806.E Rev.C

Windows 95 and Windows 98 are registered trademarks of Microsoft Corporation, US.
PC/AT is a registered trademark of IBM Corporation, US.

Revisions

Rev.A Published Sep.1999

Rev.B Published Dec.1999

Rev.C Published Jan.2000

Publisher Notes

- (1) Copyright. All rights reserved. No part of this document may be reproduced without the express written permission of MITSUBISHI ELECTRIC SEMICONDUCTOR SYSTEMS CORPORATION.
- (2) The information in this document is subject to change without notice and does not represent a commitment on the part of MITSUBISHI ELECTRIC SEMICONDUCTOR SYSTEMS CORPORATION.
- (3) Should you notice anything incorrect, strange or missing in this document, contact MITSUBISHI ELECTRIC SEMICONDUCTOR SYSTEMS CORPORATION.
- (4) MITSUBISHI ELECTRIC SEMICONDUCTOR SYSTEMS CORPORATION shall assume no responsibility whatsoever for troubles arising from the use of this product, regardless of item (3) above.

For inquiries

MITSUBISHI ELECTRIC SEMICONDUCTOR SYSTEMS CORPORATION
ENGINEERING SECTION E
ENGINEERING DEPARTMENT A
OSAKA SEMICONDUCTOR APPLICATION CENTER

FAX: (06) 6338-5193

E-mail: support@apl.mesc.co.jp

- TABLE OF CONTENTS -

1	OUTLINE.....	1
2	STARTUP.....	3
3	INTERNAL FLASH MEMORY MODE.....	4
	3.1 ID Check.....	4
	3.2 Communications Setup.....	5
	3.3 Device Command.....	6
	• Load (ID)	7
	• Blank	7
	• Read.....	7
	• Status.....	7
	• E.P.R	8
	• B.P.R	8
	• Program	8
	• Erase.....	8
	• Setting.....	8
	• Download	8
	• Version	8
	• Exit.....	8
4	M16C/80 BOOT LOADER MODE.....	9
	4.1 Selecting a File	9
	4.2 Communications Setup.....	9
	4.3 Device Command.....	10
	• Load	11
	• Blank (Note1)	11
	• Read (Note1).....	11
	• Status (Note1)	11
	• E.P.R (Note1)	11
	• B.P.R (Note1)	11
	• Program (Note1).....	11
	• Erase (Note1).....	11
	• Setting.....	11
	• Download	12

- Version 12
- Exit 12

5 APPENDIX 13

5.1 Memory Map.....	13
5.1.1 M30624FGA.....	13
5.1.2 M30800FC	13
5.1.3 M30220FC	14
5.1.4 M30201F6.....	14
5.1.5 M30802SGP	15
5.2 Standard serial I/O Mode.....	16
5.2.1 M30800FCFP	16
5.2.2 M30624FGAFP	17
5.2.3 M30220FC	18
5.2.4 M30220FC	19
5.3 About the ID Check.....	20
5.4 Messages	22
5.5 Example of Target Board Circuit	23
5.5.1 Using High-speed Serial Cable	23
5.5.2 Using RS-232C Cable	24

1 Outline

M16C Flash Start (FlashSta.exe) is the software to operate on M16C microcomputers that contain internal flash memory or those which have external M16C/80 ROM from an Windows version personal computer (PC/AT). It has two modes of operation:

- **Internal Flash Memory Mode**

In this mode, the software operates on an M16C microcomputer that contains internal flash memory to program or erase its internal flash memory.

- **M16C/80 Boot Loader Mode**

It allows you to download into the internal RAM of a microcomputer which comes with external M16C/80 ROM, as well as program and erase the external flash memory (limited to only M5M29T160BVP) mounted on the target system.

If you want to operate on external flash memory other than M5M29T160BVP, please prepare a control program suitable for the flash memory you are using and transfer it into the internal RAM of the microcomputer using the download function.

The following shows the operating environment for **M16C Flash Start**.

- (1) IBM PC/AT-compatible computer running Windows 95 or later
- (2) 1 serial port

M16C Flash Start requires an RS-232C serial communications cable and a voltage converter circuit that can convert voltage to the cable's output level. (Refer to Section 5.5, "Example of Target Board Circuit" on page 23.)

The table below shows the supported types of microcomputers and how to set the related pins required for writing data.

Table 1. Pin Settings

MCU Type Pin Name	Internal Flash			Boot Loader	Function
	M16C/62A M16C/80	M16C/22	M16C/20	M30802SGP	
BUSY(RTS1)	Open	-	-	Open	Operation monitoring pin
CLK1	"L" input	-	-	"L" input	Switch to M16C Flash Start
RxD1	PC TxD	-	-	PC TxD	Serial data input
TxD1	PC RxD	-	-	PC RxD	Serial data output
BUSY(RTS0)	-	Open	-	-	Operation monitoring pin
	-	-	"L" input	-	Switch to M16C Flash Start
CLK0	-	"L" input	-	-	Switch to M16C Flash Start
	-	-	Vcc input	-	Mode entry
RxD0	-	PC TxD	PC TxD	-	Serial data input
TxD0	-	PC RxD	PC RxD	-	Serial data output
CNVss	Vcc input	Vpp input (*2)	Vpp input (*2)	"L" input	Mode entry
CE(*1)	Vcc input	-	-	-	Mode entry
EPM(*1)	"L" input	-	-	-	Mode entry
RESET	Reset input	Reset input	Reset input	Reset input	Reset input
Vcc	Vcc	Vcc	Vcc	Vcc	Power input
Vss	GND	GND	GND	GND	GND

*1: Refer to "5.2 Standard serial I/O Mode" on page 16 for pin assign.

*2: Refer to flash microcomputer datasheets.

M16C Flash Start can communicate with the target microcomputer in the range of main clock input oscillation frequencies shown below.

2 MHz to the maximum input oscillation frequency

2 Startup

Execute **M16C Flash Start (FlashSta.exe)**, and the environment setup screen shown below will appear. Use this screen to choose program mode and serial port (COM1-4).

After selecting the above, go to each program mode.

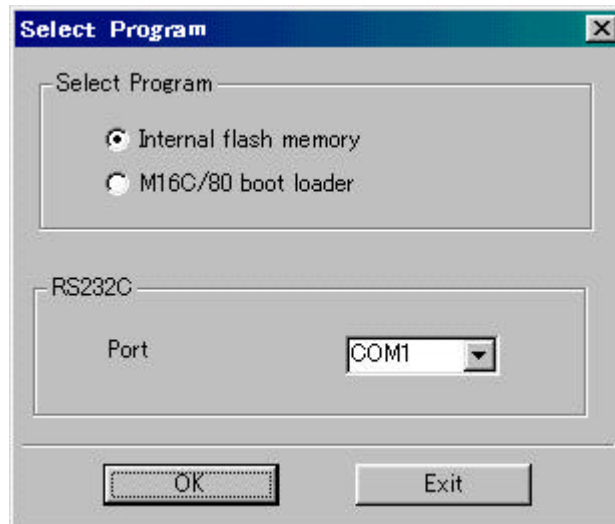


Figure 1. Environment Setup Screen

When select "OK" button, it will take a few seconds until next screen appears.

3 Internal Flash Memory Mode

The following explains how to operate in internal flash memory mode.

3.1 ID Check

After selecting program mode, an **ID Check dialog box** is displayed.

From this dialog box, choose the program file to be operated on, enter ID code, and choose the type of MCU used.

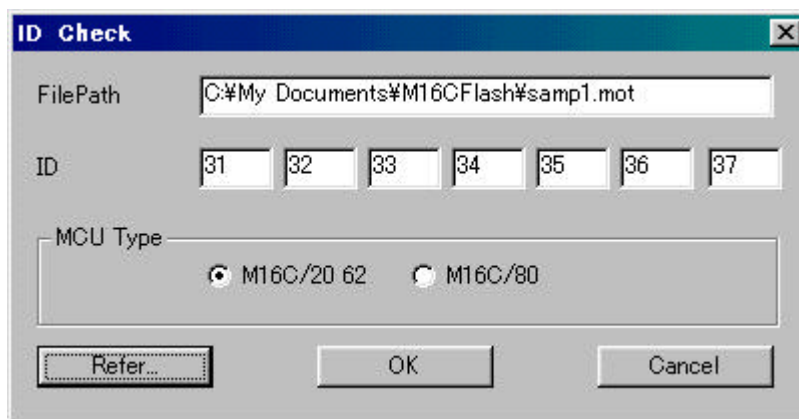


Figure 2. ID Check Dialog Box

Input the file name in the **File Path field box** and the ID code in the **ID field box**. Clicking on the **[Refer...]** button will display file names for your referral and selection. If the ID file is in the same folder (Refer to Section 5.3, "About the ID Check" on page 20), the ID code is loaded when the file is selected. If the microcomputer is a blank product, you do not need to enter ID.

Files in only Motorola S2 format can be selected. Files in any other formats cannot be selected. The ID code you need to enter is the code currently written in flash memory.

After referencing files, choose the **MCU Type**.

Clicking on the **[OK]** button will start the ID check. After the check, the M16C Flash Start window will open up, from where device commands can be executed. If an ID matching error occurs, the M16C Flash Start window will open up just the same, but it will be preceded by an error message and the commands will be inoperable. In such case, recheck your ID code.

Clicking on the **[Cancel]** button will open the M16C Flash Start window without running an ID check. With the M16C Flash Microcomputer, device commands can be used with blank ROMs - that is to say - without performing an ID check.

If communication with the microcomputer results in an error, reset the target system following the messages and then set up communication back again.

3.2 Communications Setup

From the **Set baudrate dialog box**, set the rate with which to communicate with the microcomputer and the time interval at which to send data.

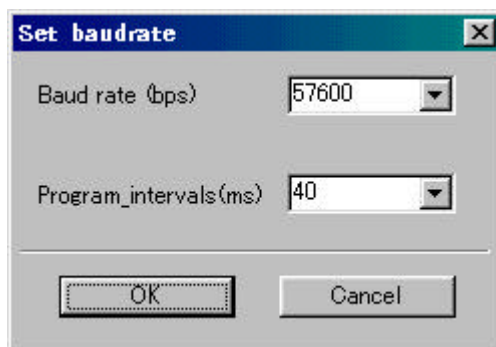


Figure 3. Communications Setup

Set a communication rate for **Baud rate (bps)**. At the **M16C Flash Start** startup, communication status is set at 9600 bps. After that, the previously set baud rate is used. Before exiting the programmer, return MCU communications to 9600 bps. Baud rate can be selected from the below speeds.

9600, 19200, 38400, 57600, *115200 (bps)

*115200 bps is supported for only M16C/80.

Depending on the microcomputer's main clock input oscillation frequency or MCU type, the selected baud rate may result in communication error. In such a case, choose another baud rate.

Table 2. Communicable Baud Rates at Each Frequency (Reference)

Baud rate (bps) \ Xin(MHz)	9600	19200	38400	57600	115200
20	O	O	O	O	O
16	O	O	O	O	
10	O	O	X	O	
8	O	O	O	O	
6	O	O	O	X	
4	O	O	X	X	
3	O	O	O	X	
2	O	X	X	X	

O: Communicable

X: Not communicable

For **Program_intervals (ms)**, set a time interval from one page of data transferred to the next page of data transferred when executing program commands. As you change the time interval, the program commands execution time changes. The time interval is set to 40 ms when the program starts. It can be selected from the values listed below.

5 ms to 50 ms; at intervals of 5 ms

Depending on the microcomputer's operating frequency or MCU type, the time in which data is written to flash memory varies. If a communication error occurs when executing program commands, increase the time interval.

3.3 Device Command

The **Device command dialog box** is for executing device commands.



Figure 4. Device Command Dialog Box

If the flash ROM is blank, the device commands can be used even without running an ID check. With written ROMs, until the ID check is run and completed, only the **[Load (ID)]**, **[Status]**, **[Setting]** and **[Version]** commands can be used.

When the **[Program]** and other commands are selected, the **Input Address dialog box** opens up. Enter the address range to be operated on by the command. The default address input values are the upper-limit and lower-limit addresses in the file that was specified during ID check. (When no file is selected, the start and end addresses of M16C/62A flash memory are assumed.)

Input an address within the setting range. (Refer to Section 5.1, "Memory Map" on page 13.)

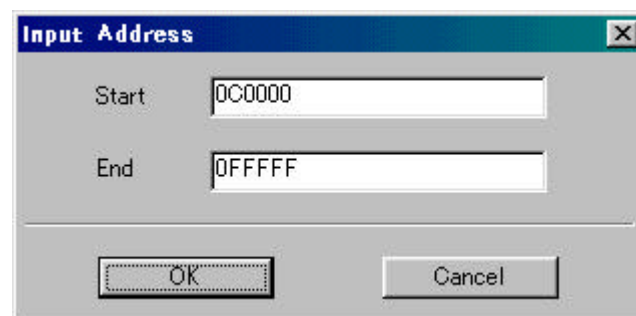


Figure 5. Input Address Dialog Box

- **Load (ID)**
Refer to Section 3.1, "ID Check" on page 4.
- **Blank**
Checks internal flash memory for blank.
- **Read**
Compares the program file specified for Load (ID) with the content written in flash memory.
- **Status**
Displays the status of the flash memory.

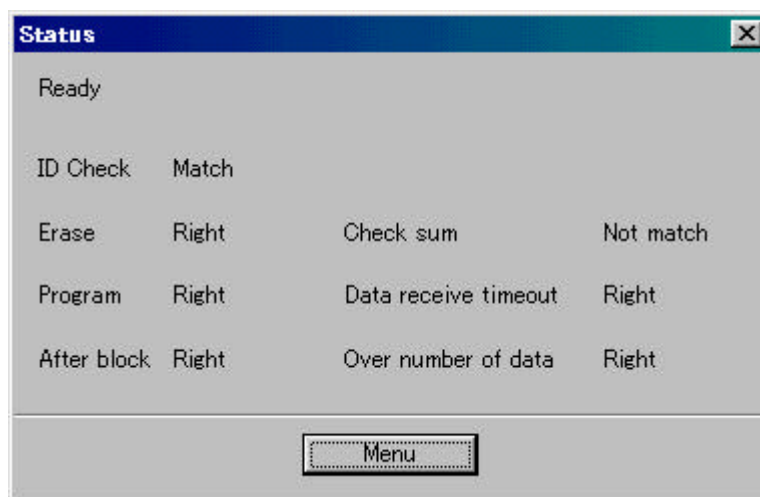


Figure 6. Status Display Screen

The table below lists the content of each item.

Table 3. Contents of Status

	Item	Content of Processing
1	Write state machine status	Shows operating status of flash memory. [Ready] : Program/erase ready [Busy] : Program/erase in progress
2	ID check	Shows ID check status of flash memory. [Not Yet] : Not verified [Not match] : Verification mismatch [Match] : Verified
3	Erase	Shows erase status of flash memory. [Error] : Terminated in error [Right] : Terminated normally
4	Program	Shows programming status of flash memory. [Error] : Terminated in error [Right] : Terminated normally
5	After block	Shows excessive write status when writing pages. [Error] : Excessively written [Right] : No excessive write
6	Check sum	Shows boot program transfer result. [Match] : Checksum matched [Not Match] : Checksum mismatched
7	Data receive timeout	Shows time-out occurrence status when receiving data. [Time Out] : Time-out occurred when receiving [Right] : Received data normally

- **E.P.R**
Sequentially executes erase, program, and read commands.
- **B.P.R**
Sequentially executes blank, program, and read commands.
- **Program**
Writes the program file specified for Load (ID) into flash memory.
- **Erase**
Unlocks each block of flash memory and then erases the entire area of flash memory.
- **Setting**
Refer to Section 3.2, "Communications Setup" on page 5.
- **Download**
Upgrades the control program version. The updating control program specified for Load (ID) is downloaded into the internal RAM of the microcomputer. When the download is completed, the program transferred into the internal RAM starts operating.
- **Version**
Outputs version information on the microcomputer's control program.

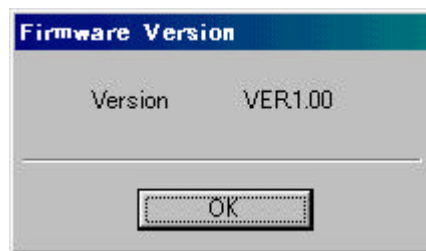


Figure 7. Version Information

- **Exit**
Changes the communication rate to 9600 bps before quitting **M16C Flash Start**.

4 M16C/80 Boot Loader Mode

This section explains how to use M16C/80 boot loader.

4.1 Selecting a File

After selecting program mode, a **Program/Download File Select dialog box** is displayed. Enter the file name to be downloaded into the internal RAM or with which to program external flash memory.

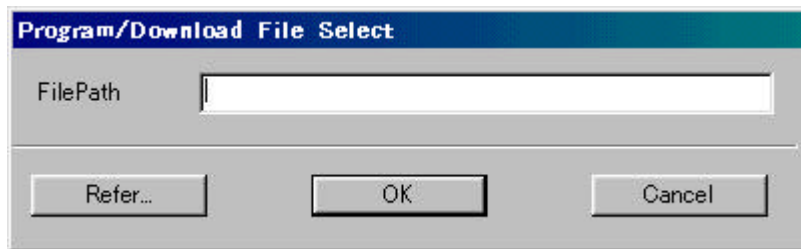


Figure 8. Selecting a File

Input the file name in the **File Path field box**. Clicking on the **[Refer...]** button will display file names for your referral and selection. **Files in only Motorola S2 format can be selected. Files in any other formats cannot be selected.**

Click on **[OK]** button, and a device command dialog box will appear after completing file selection.

When you click on **[Cancel]** button, a device command dialog box is displayed after canceling file selection.

If communication with the microcomputer results in an error, reset the target system following the messages and then set up communication back again.

4.2 Communications Setup

Refer to Section 3.2, "Communications Setup" on page 5.

4.3 Device Command

From the **Device command dialog box**, execute device commands to download files into the internal RAM, program external flash memory, etc.

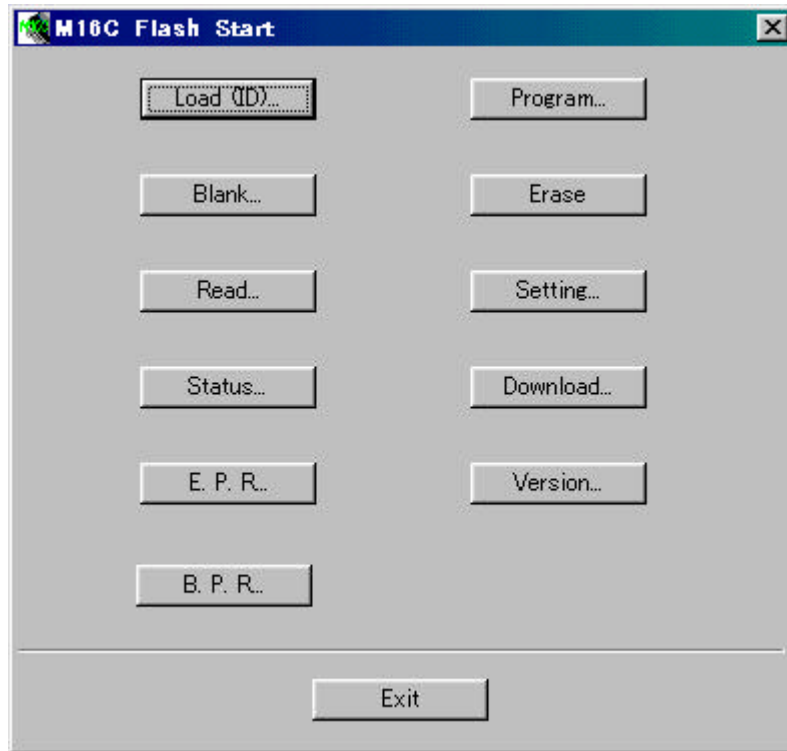


Figure 9. Device Command Dialog Box

When the **[Program]** and other commands are selected, the **Input Address dialog box** opens up. Enter the address range to be operated on by the command. The default address input values are the upper-limit and lower-limit addresses in the file that was specified during ID check. (When no file is selected, the start and end addresses of M16C/62 flash memory are assumed.)

Enter addresses within the range in which external flash memory is located.

(Refer to Section 5.1.5, " M30802SGP" on page 15.)

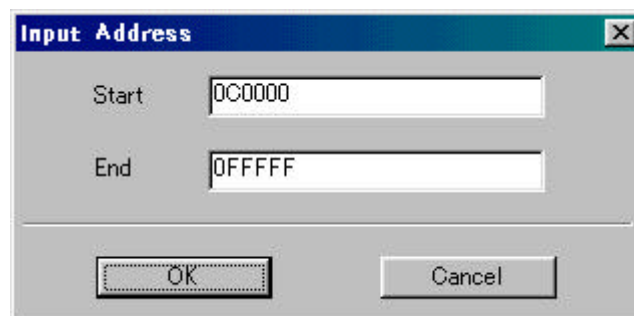


Figure 10. Input Address Dialog Box

- **Load**
Refer to Section 4.1, "Selecting a File" on page 9.
- **Blank (Note1)**
Checks external flash memory for blank.
- **Read (Note1)**
Compares the program file specified for Load (ID) with the content written in external flash memory.
- **Status (Note1)**
Displays the status of the external flash memory(the M5M29T160BVP). (Refer to Section 3.3, "Status" on page 6.)
- **E.P.R (Note1)**
Sequentially executes erase, program, and read commands for external flash memory.
- **B.P.R (Note1)**
Sequentially executes blank, program, and read commands for external flash memory.
- **Program (Note1)**
Writes the program file specified for Load (ID) into flash memory.
- **Erase (Note1)**
Erases the entire area of external flash memory. However, blocks in locked state whose lock bit = 0 are not erased.
- **Setting**
Refer to Section 3.2, "Communications Setup" on page 5.

(Note1) Please do not use this command except when connect specified external flash memory.

- **Download**

Transfers the file selected in Section 4.1, "Selecting a File," into the internal RAM of the microcomputer. When the download is completed, the program transferred into the internal RAM starts operating.

When creating a downloading program, be sure to set a version number (eight characters) at the beginning of the program. Also, set address 000600h for the start address of the program, and make sure the program size is within the downloadable area (000600h to 0029FFh).

[Example of downloading program]

```

; *****
;
;      M16C/80 Flash Micon Test Program.          *
;      CPU           : M16C/80 (Xin=20.0MHZ)      *
;      FUNCTION      : Port2 Rotate Output Test.  *
;      CODED BY      : (Mr.Sawa)1999-05-11        *
; *****
;----- Include Defined. -----
        .LIST    OFF
        .INCLUDE SFR80.INC
        .LIST    ON
;----- Symbol Defined. -----

VSTACK .EQU    0002B00H; Stack-Point (ISP)
VRAM   .EQU    0000400H      ; Internal RAM Area (0000400H - 00005FFH)
VPRO   .EQU    0000600H      ; Download Program Area (0000600H- 00029FFH)

        .SECTION      RAMDATA, DATA
        .ORG    VRAM

        .SECTION      PROGRAM, CODE
        .ORG    VPRO
RESET:
        .byte    "VER.0.05"          ; Set Firmware VersionNO.

        mov.b    #0ffh,    PD2
        mov.b    #001h,    P2

LOOP:
        mov.w    #0FFFFh, R0
?:      sbjnz.w  #1,R0,?-          ; Wait

        rot.b    #1,      P2          ; Rotate P2
        jmp     LOOP          ; Loop

.END

```

- **Version**

Outputs version information on the microcomputer's control program.

- **Exit**

Changes the communication rate to 9600 bps before quitting **M16C Flash Start**.

5 Appendix

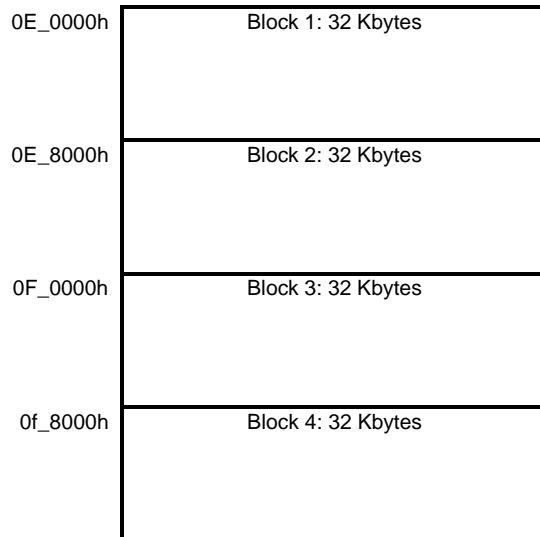
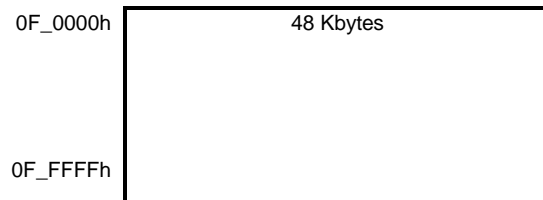
5.1 Memory Map

5.1.1 M30624FGA

0C_0000h	Block 6: 64 Kbytes
0D_0000h	Block 5: 64 Kbytes
0E_0000h	Block 4: 64 Kbytes
0F_0000h	Block 3: 32 Kbytes
0F_8000h	Block 2: 8 Kbytes
0F_A000h	Block 1: 8 Kbytes
0F_C000h	Block 0: 16 Kbytes
0F_FFFFh	

5.1.2 M30800FC

FE_0000h	Block 4: 64 Kbytes
FF_0000h	Block 3: 32 Kbytes
FF_8000h	Block 2: 8 Kbytes
FF_A000h	Block 1: 8 Kbytes
FF_C000h	Block 0: 16 Kbytes
FF_FFFFh	

5.1.3 M30220FC**5.1.4 M30201F6**

5.1.5 M30802SGP

The diagram below shows the area that can be downloaded into M16C/80 flash microcomputers using this program.

000000h	SFR area	
0003FFh		
000400h	Internal RAM area	
0005FFh		
000600h		Downloadable area (9K bytes)
0029FFh		
002A00h	Internal reserved area	
002BFFh		
002C00h		
007FFFh	External area (*)	External flash memory connectable area
008000h		
FFFFFFh		

(*) For details about memory mapping, refer to M16C/80 datasheets.

5.2 Standard serial I/O Mode

5.2.1 M30800FCFP

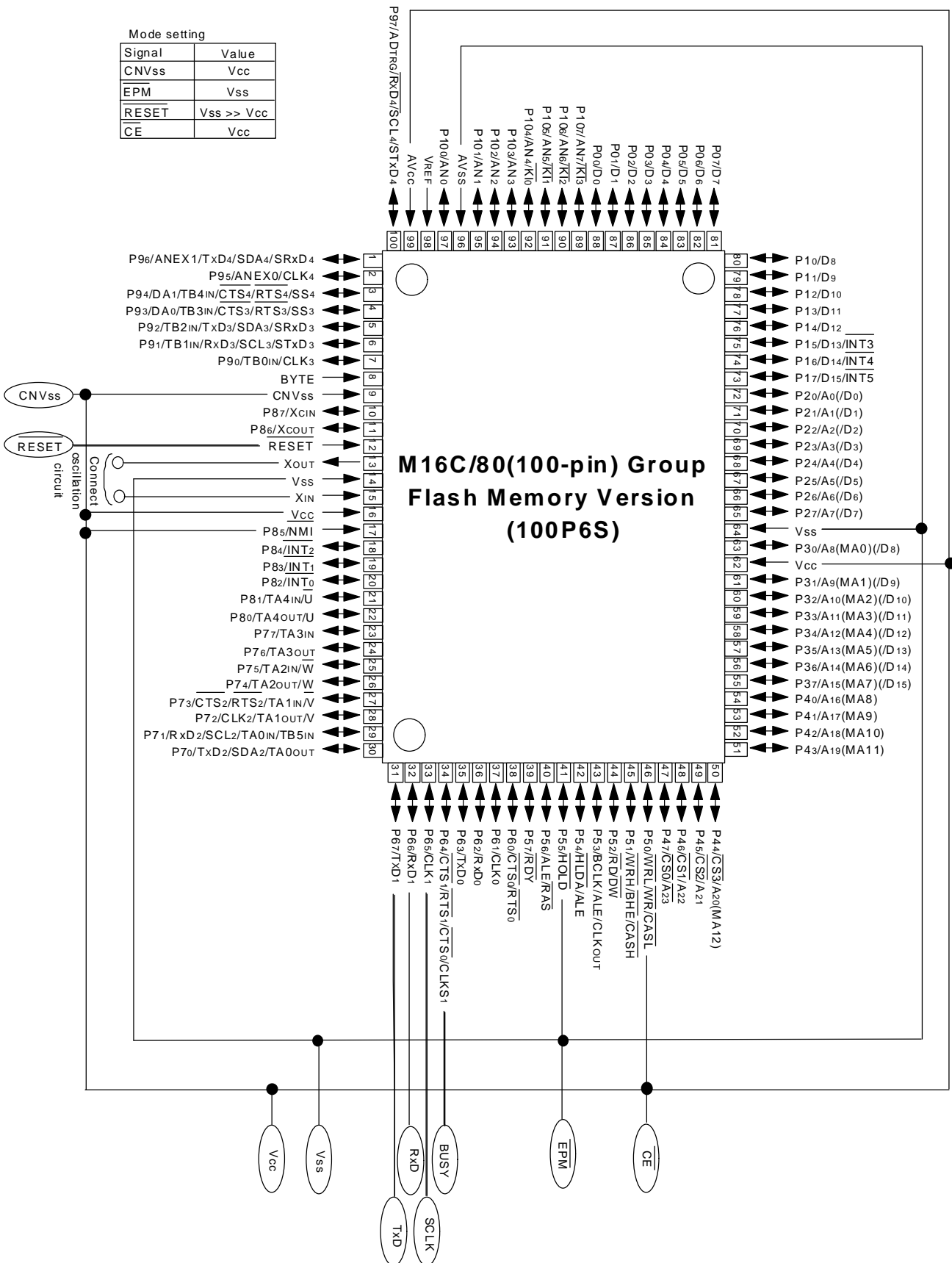


Figure 11. Pin Connections for Serial I/O Mode (1)

5.2.2 M30624FGAFP

Mode setup method

Signal	Value
CNVss	Vcc
EPM	Vss
RESET	Vss to Vcc
CE	Vcc

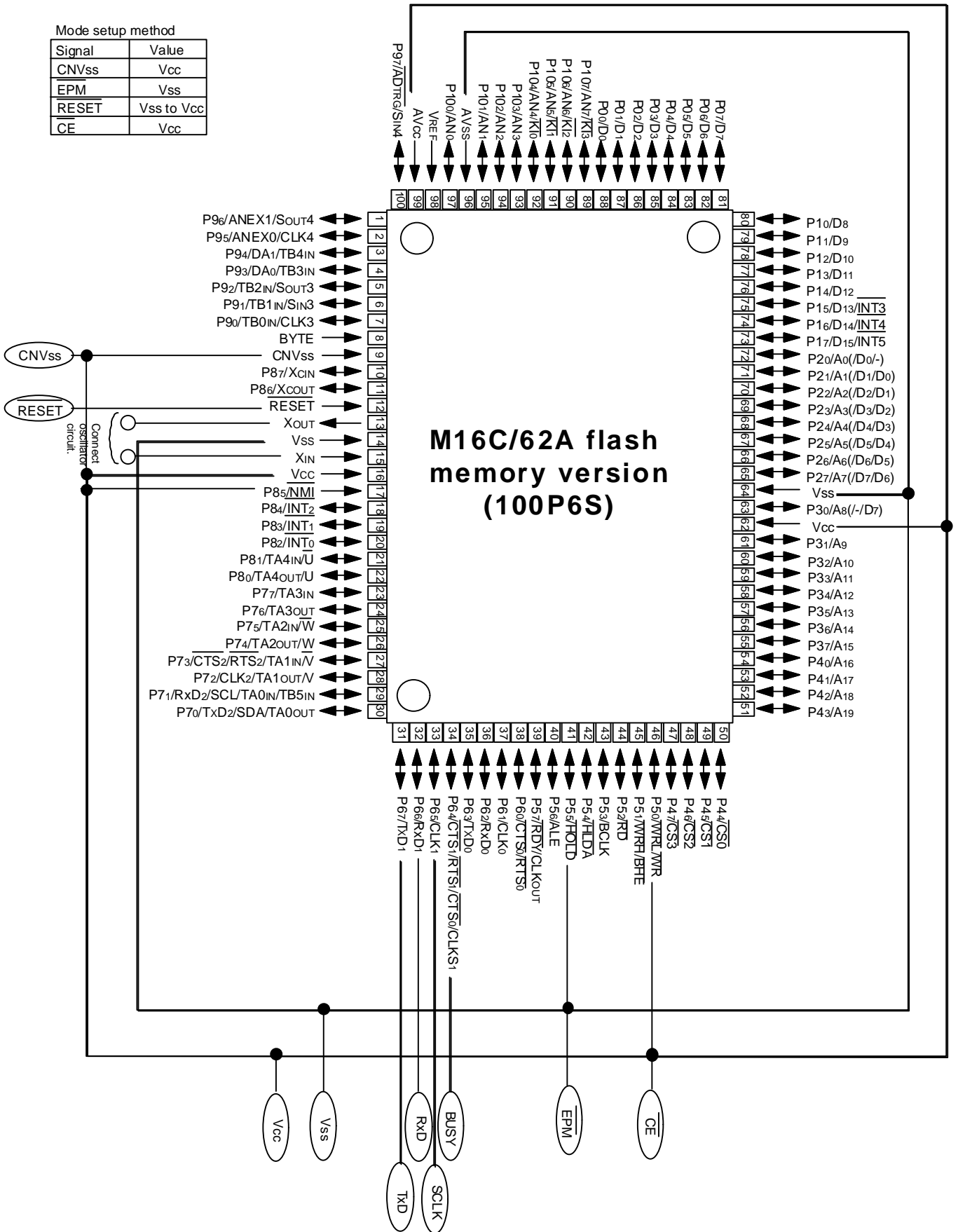
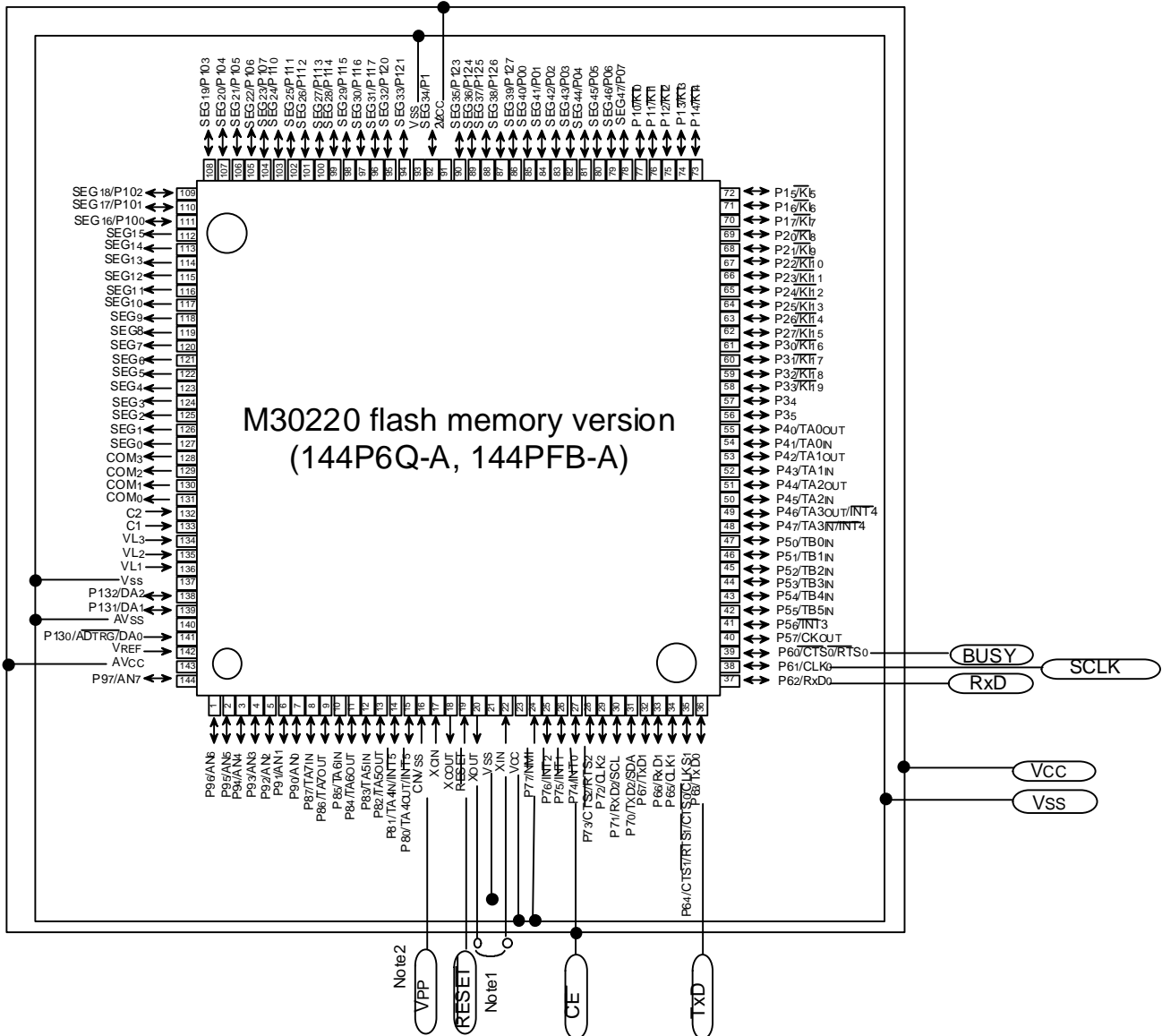


Figure 12. Pin Connections for Serial I/O Mode (2)

5.2.3 M30220FC



Mode setup method

Signal	Value
CNVss	4.5V to 5.5V
RESET	Vss → Vcc
CE	Vcc

Note 1: Connect oscillator circuit.
 Note 2: Connect to Vcc when Vcc = 4.5V to 5.5 V.
 Connect to Vpp (=4.5V to 5.5 V) when Vcc = 2.7V to 4.5 V.

Figure 13. Pin Connections for Serial I/O Mode (3)

5.2.4 M30201F6

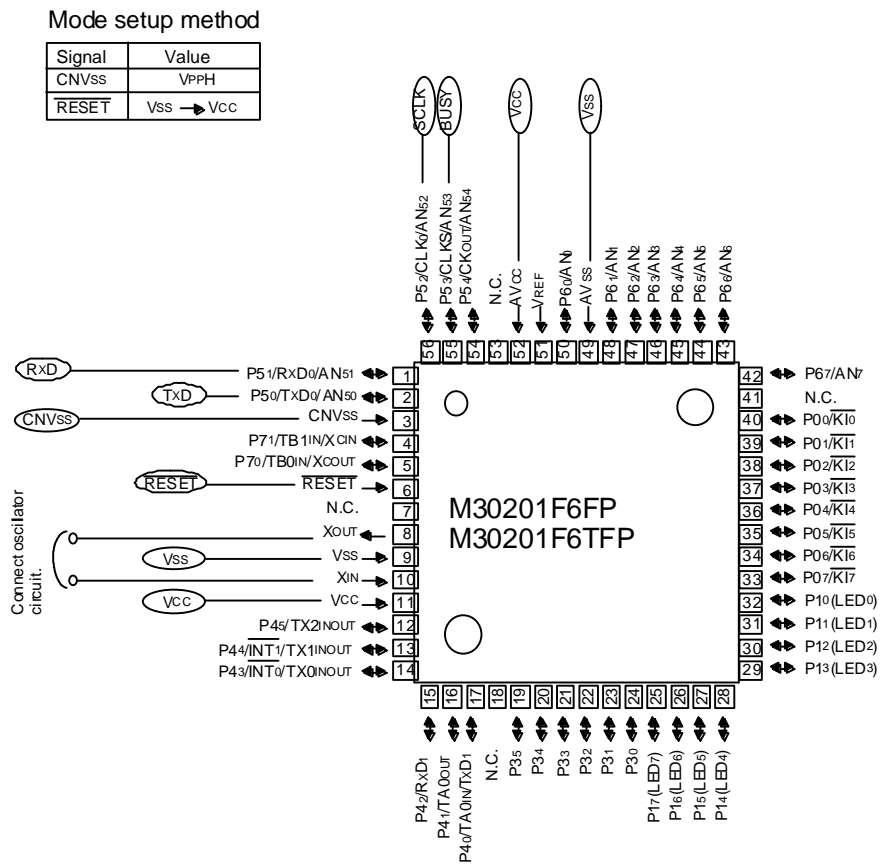


Figure 13. Pin Connections for Serial I/O Mode (3)

5.3 About the ID Check

The ID check compares the ID code stored in the flash ROM against the ID code sent via serial communications. Unless the two ID codes match, certain commands are disabled. The table below lists the areas in which ID code is stored.

Table 4. ID Address

MCU Type	ID Address	ROM code protect information
M16C/62A M16C/20	0FFFDh,0FFFE3h,0FFFEb,0FFFEFh,0FFFF3h,0FFF7h, 0FFFBh	0FFFFh
M16C/80	0FFFDh,0FFFE3h,0FFFEb,0FFFEFh,0FFFF3h, 0FFF7h,0FFFBh	0FFFFh

```
S2140FFFB0E8C5EEC5F4C5FAC500C606C60CC612C619
S2140FFFC018C61EC624C62AC630C636C63CC642C685
S2100FFFD048C64EC654C65AC660C665C664
S2140FFFDCCDC60F0050C70F00D8C70F00CFC80F00E5
S2140FFFE13CA0F005BC80F004DCB0F004ECB0F0084
S2080FFFC18CD0F00F9
S804000000FB
```

Figure 14. Motorola S2 File – ID Address (M16C/62A)

By creating an ID file with an ID code and ROM code protect information (ROM protect during parallel writing), the ID code is automatically loaded when your work file is selected in the ID Check dialog box (Refer to Section 3.1, "ID Check" on page 4).

The ID file can be created with the -ID option of LMC30 (LMC308). The ROM code protect can be set with the -protect option.

LMC30 (LMC308) is included in Mitsubishi's NC30 (NC308) compiler and AS30 (AS308) assembler for M16C and are supported in following versions.

LMC30 ; V.3.10.00

LMC308 ; V.1.00.01

It is explained here following how to set IDs, create files and protect data with LMC30.

(1) ID Setting

- The ID code is set with the -ID option. Only capital letters "ID" are accepted.
- Immediately after inputting "-ID", input an ID code as # plus a hexadecimal number or in single-byte alphabetic characters.
- "H" is not needed to indicate the hexadecimal number.
- An error occurs if the ID code exceeds 56 bits.

- To set an ID code as a hexadecimal number, add # after inputting "-ID". Numbered codes can be up to 14 digits long.
- To set an ID code in single-byte alphabet input the text string after inputting "-ID". Lettered codes can be up to seven characters long and must be single-byte ASCII code (30h - 39h, 41h - 5Ah and 61h – 7Ah).

Example: -ID#1234

The ID is 12340000000000. It is stored as "12h" in address FFFDFh, "34h" in address FFFE3h and "00h" in addresses FFFEBh, FFFEf, FFFF3h, FFFF7h and FFFFBh.

Example: -IDCODE

The ID is 434F4445000000. It is stored as "43h" in address FFFDFh, "4Fh" in address FFFE3h, "44h" in address FFFEBh, "45h" in address FFFEf and "00h" in addresses FFFF3h, FFFF7h and FFFFBh.

(2) ID File Output

When the -ID option is input, LMC30 creates a file containing the ID code and ROM code protect information (address FFFFFh), and names it with the HEX file (Motorola S2 format) ".id" extension.

Example: LMC30 -ID#1234 samp

A file with the below contents will be created under the name "samp.id".

-ID1234
FFDF : 12
FFE3 : 34
FFEB : 00
FEF : 00
FFF3 : 00
FFF7 : 00
FFFB : 00
FFFF : FF

Figure 15. ID File Contents

*The ID code input at LMC30 startup is output on the first line, while all of the ID addresses and the code values set for each are output on the following lines.

*If the -protect option has been input, "-protect" is output on the first line.

(3) Protect Option

- The protect function is set using the -protect option. Only small case letters are accepted.
- At LMC30 startup, "30" is set for address FFFFFh if the -protect option is used. Otherwise, "FFh" is set for address FFFFFh.

If LMC30 cannot create an ID file, create one like that in Figure 15.

5.4 Messages

The below messages are displayed when device commands are executed or errors occur.

Table 5. Messages

Type	No.	Message	Description	Remedial action
Communication	1	Can not communicate.	Communications were not established with the target MCU.	Check the following. * That power to the target MCU is ON. * That the communications cable is correctly connected. * Whether SCLK and CNVss are correctly set.
	2	Can not communicate to outside.	Communications with the target MCU are not possible.	
	3	Timeout. Push RESET.	The target MCU did not reply before the communication time limit ran out.	
	4	Communication error. Push RESET.	A communication error other than the above time-out has occurred.	The error could be caused by something other than this programmer.
	5	Can not set baudrate to 9600bps.	The baud rate was not returned to 9600 bps before exiting the programmer.	To continue using this programmer, reset the target MCU.
	6	Can not set default baudrate. Baudrate is last baudrate.	Baud rate could not be set to 9600 when the programmer was started up.	Reset the target MCU as instructed in messages.
	7	Can not set last baudrate. Baudrate is 9600bps. Now.	At startup, the last used baud rate could not be set. Baud rate remains the same 9600 bps for establishing communications.	
	8	Can not set new baudrate. Baudrate is last baudrate now.	The programmer could not update the baud rate.	Use a lower baud rate.
	9	Can not use the Micon. Close this program.	The target MCU did not reply during the communication check run at startup.	See Nos. 1- 3.
	10	This program is already running.0		-
Device command	11	Did not pass ID.	The ID code did not match that of the target MCU.	Run an ID check.
	12	Download Completed.	Downloading the selected file terminated normally.	-
	13	Download not completed. Please retry Download.	Error occurred when downloading the selected file.	Execute downloading the file again.
	14	Erase error.	The programmer could not erase the target MCU.	-
	15	Erase OK.	The programmer has finished erasing the target MCU.	-
	16	Find not blank at address [ADDRESS].	Blank check error. There is an area without an FFh address.	The ROM is already written. Erase it.
	17	Find not match at address [ADDRESS].	Read verify error. The selected content is different from the written content.	-
	18	Not match ID.	The wrong ID code was input.	Input the correct ID code.
	19	Program error.	Programming has failed.	-
	20	Stop downloading.	Download operation has been suspended.	-
	21	Stop programming.	Programming has been suspended.	-
	22	Too higher end address (0x2A00).	The last address of the file to be downloaded exceeds address "2A00h."	Correct the file to be downloaded.
	23	Too small start address.	The start address is larger than the end address.	Set an effective address.
File operation	24	Can not accept this file.	The selected file cannot be loaded.	The file is of the wrong format. Select a Motorola S2 file.
	25	Can not found the ID file.	The ID file was not found during the file check.	Check whether there is an ID file in the folder or not.
	26	Do not input filename.	A file was not selected for the ID check.	Input a file name.
	27	Do not match ID style.	The ID code is of the wrong style.	Input an ID code of the correct style.

5.5 Example of Target Board Circuit

5.5.1 Using High-speed Serial Cable

(When using high-speed serial cable included in the MSA0806)

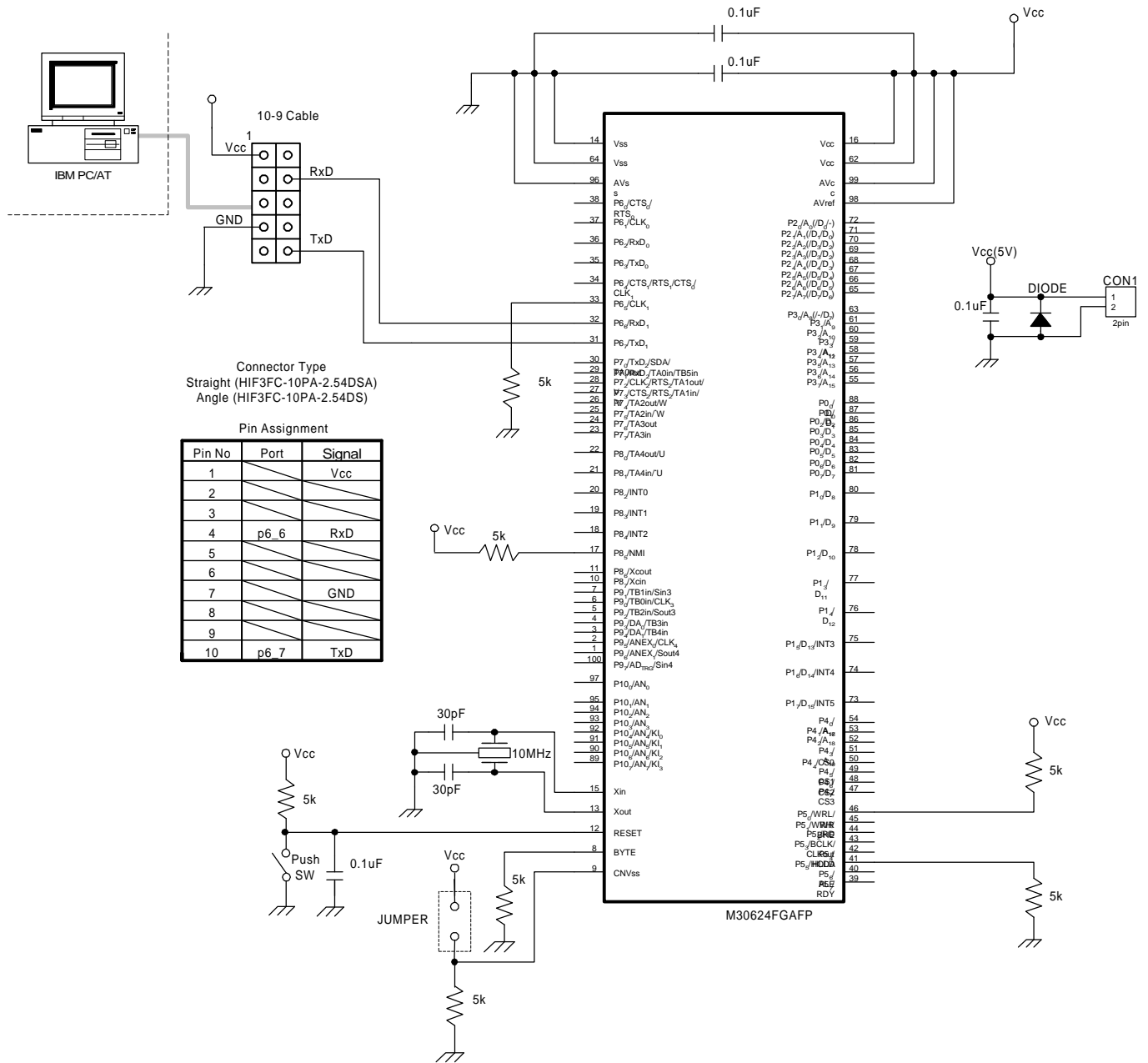


Figure 16. Example of Target Board Circuit 1

5.5.2 Using RS-232C Cable

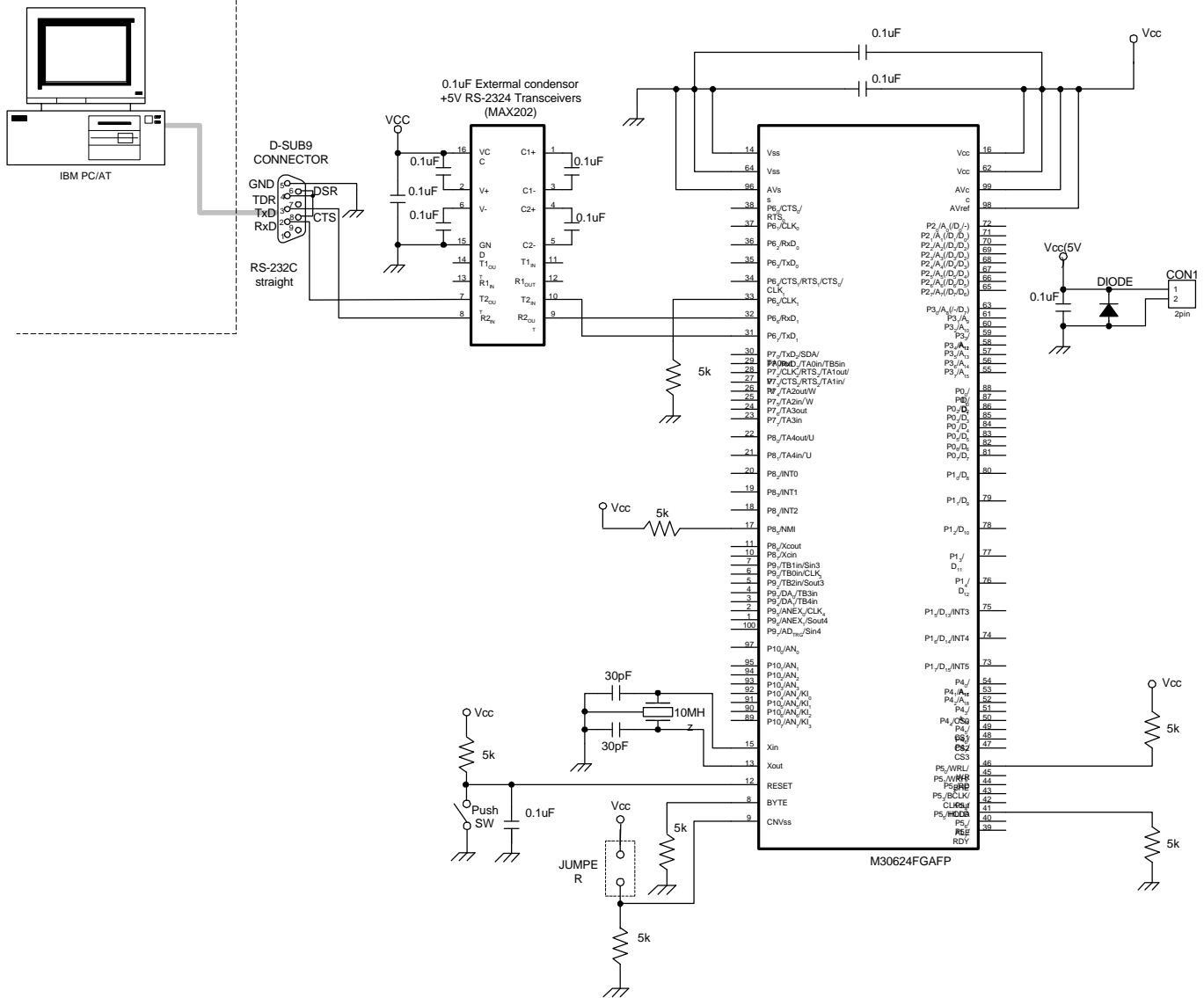


Figure 17. Example of Target Board Circuit 2

M16C Flash Start User's manual Rev.C

Published Jan. 2000

Edited by
MITSUBISHI ELECTRIC SEMICONDUCTOR SYSTEMS CORPORATION

Published by
MITSUBISHI ELECTRIC SEMICONDUCTOR SYSTEMS CORPORATION

This book, or parts thereof, may not be reproduced in any form without permission of Mitsubishi Electric Semiconductor Systems Corporation.

©1999 MITSUBISHI ELECTRIC SEMICONDUCTOR SYSTEMS CORPORATION