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M16C Flash Starter

User's manual

RENESAS SOLUTIONS CORP

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2 Outline

M16C Flash Starter (FlashSta.exe) is the software to operate on M16C and 38000series microcomputers that contain internal flash memory or those which have external M16C/80 ROM from a Windows version personal computer (PC/AT). It has three modes of operation:

- **Internal Flash Memory Mode**
  In this mode, the software operates on an M16C and 38000series 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 that 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.
- **M16C/10 Internal Flash Memory Mode**
  In this mode, the software operates on an M16C/10 microcomputer that contains internal flash memory to program or erase its internal flash memory.

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

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

(2) 1 serial port

M16C Flash Starter 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 7.5, "**Notes regarding these materials**" on page 54.)

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

Table 1 Pin Settings (M16C family)

MCU Type / Pin Name	Internal Flash				Boot Loader	Function
	M16C/62A M16C/62N M16C/62P M16C/6N M16C/80 M32C/83	M16C/22	M16C/20	M16C/10	M3080XSGP -BL	
BUSY (RTS1)	Open	-	-	-	Open	Operation monitoring pin
CLK1	“L” input	-	-	-	“L” input	Switch to M16C Flash Starter
RxD1	PC TxD	-	-	-	PC TxD	Serial data input
TxD1	PC RxD	-	-	-	PC RxD	Serial data output
BUSY (RTS0)	-	Open	-	Open	-	Operation monitoring pin
	-	-	“L” input	-	-	Switch to M16C Flash Starter
CLK0	-	“L” input	-	“L” input	-	Switch to M16C Flash Starter
	-	-	Vcc input	-	-	Mode entry
RxD0	-	PC TxD	PC TxD	PC TxD	-	Serial data input
TxD0	-	PC RxD	PC RxD	PC RxD	-	Serial data output
CNVss	Vcc input	Vpp input (*2)	Vpp input (*2)	Vcc input	“L” input	Mode entry
$\overline{CE}$ (*1)	Vcc input	-	-	-	-	Mode entry
$\overline{EPM}$ (*1)	“L” input	-	-	-	-	Mode entry
$\overline{RESET}$	Reset input	Reset input	Reset input	Reset input	Reset input	Reset input
Vcc	Vcc	Vcc	Vcc	Vcc	Vcc	Power input
IVCC	-	-	-	(*3)	-	IVCC
Vss	GND	GND	GND	GND	GND	GND

Table 2 Pin Settings (38000series)

MCU Type / Pin Name	Internal Flash		Function
	7516 3850/3851	38C2	
BUSY(*1)	Open	Open	Operation monitoring pin
CLK(*1)	“L” input	“L” input	Switch to M16C Flash Starter
RxD(*1)	PC TxD	PC TxD	Serial data input
TxD(*1)	PC RxD	PC RxD	Serial data output
Vpp(*1)	Vpp input (*2)	Vpp input (*2)	Mode entry
P41(*1)	Vcc input	Vcc input	Mode entry
$\overline{\text{RESET}}$	Reset input	Reset input	Reset input
Vcc	Vcc	Vcc	Power input
Vss	GND	GND	GND

*1: Refer to "7.2 Standard serial I/O Mode" on page 31 for pin assign.

*2: Refer to flash microcomputer datasheets.

*3: Connect a capacitor (0.1uF) between this pin and Vss.

Table 3 Pin Settings (R8C/Tiny series)

MCU Type / Pin Name	Internal Flash	Function
	R8C/10 R8C/11	
RxD(*1)	PC TxD	Serial data input and Switch to M16C Flash Starter
TxD(*1)	PC RxD	Serial data output
MODE	“L” input	Mode entry
CNVSS	“L” input	Switch to M16C Flash Starter
$\overline{\text{RESET}}$	Reset input	Reset input
Vcc	Vcc	Power input
IVcc	(*2)	
Vss	GND	GND

*1: Refer to "7.2 Standard serial I/O Mode" on page 31 for pin assign.

*2: Connect a capacitor (0.1uF) between this pin and Vss.

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

2MHz to the maximum input oscillation frequency

3 Startup

Execute **M16C Flash Starter (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.

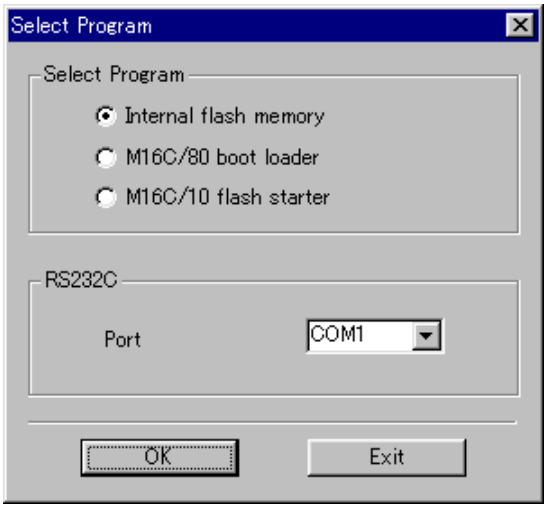


Figure 1 Environment Setup Screen

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

4 Internal Flash Memory Mode

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

4.1 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.

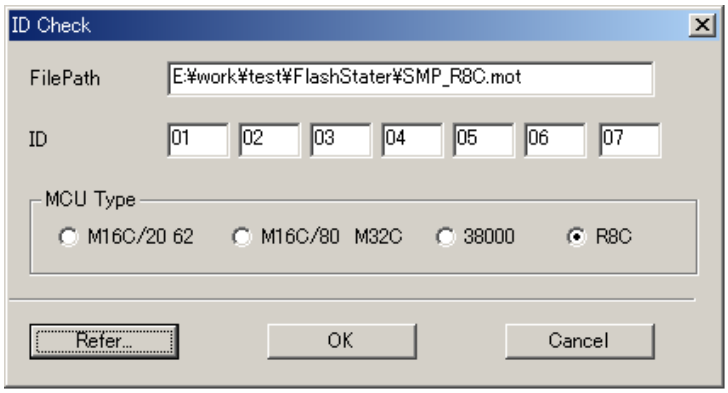


Figure 2 ID Check Dialog Box

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 7.3, "About the ID Check" on page 50), 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. In case of 38000 series, Renesas's assembler SRA74 generates Intel HEX format files. So please convert Intel HEX format into Motorola S2 format. The conversion software "HEXTOS2"(free software) can be downloaded from "Renesas MCU Technical Information homepage ->38000 series ->software". (Refer to Section7.6," Renesas MCU Technical Information")

The ID code you need to enter is the code currently written in flash memory.

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

In case of M16C/6N, choose the "M16C/20 62" of the **MCU Type**.

In case of M32C/83, choose the "M16C/80 M32C" of the **MCU Type**.

Clicking on the **[OK]** button will start the ID check. After the check, the M16C Flash Starter window will open up, from where device commands can be executed. If an ID matching error occurs, the M16C Flash Starter 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 Starter window without running an ID check. When it is canceled, a device command can't be operated.(Refer to Section 4.3," device command")

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

4.2 Communications Setup

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

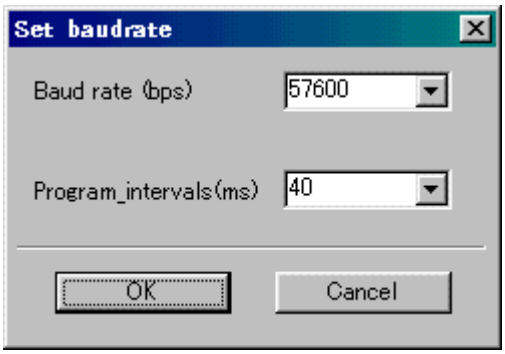


Figure 3 Communications Setup

Set a communication rate for **Baud rate (bps)**. At the **M16C Flash Starter** 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 and M32C/83.

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 4 Communicable Baud Rates at Each Frequency (Reference)

Baud rate (bps) / Xin (MHz)	9600	19200	38400	57600	115200
32	O	O	O	O	O
30	O	O	O	O	O
25	O	O	O	O	O
20	O	O	O	O	O
16	O	O	O	O	
10	O	O	O	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 : 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.

4.3 Device Command

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

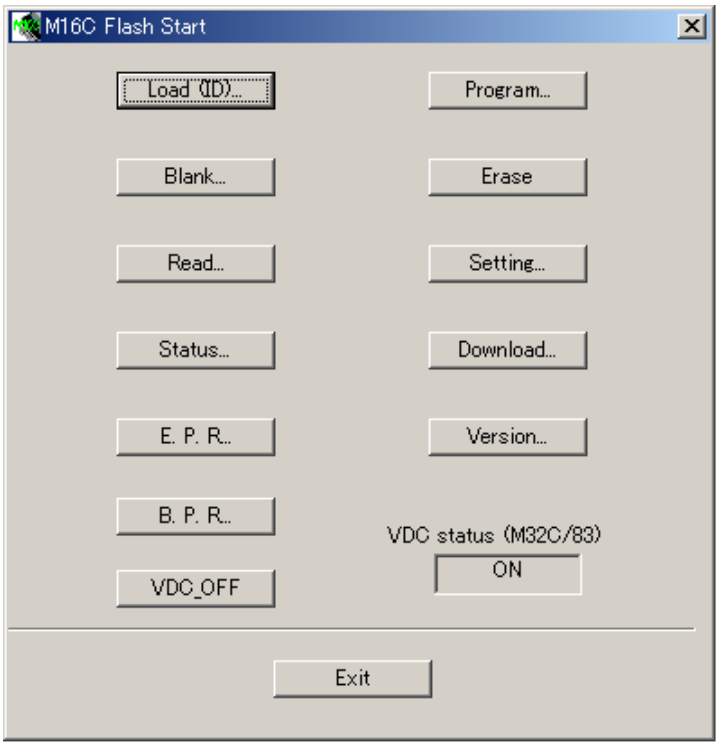


Figure 4 Device Command Dialog Box

If the ID check has not been 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 7.1, "Memory Map" on page 25.)

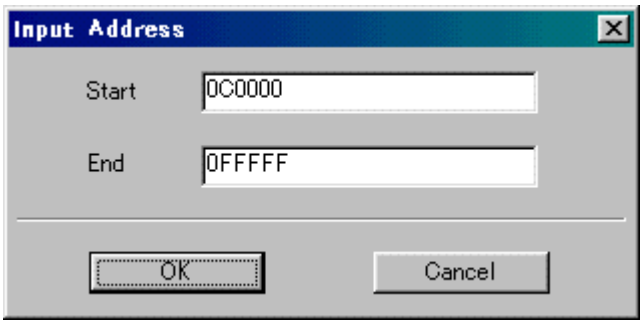


Figure 5 Input Address Dialog Box

- **Load (ID)**

  Refer to Section 4.1, "ID Check" on page 10.

- **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.

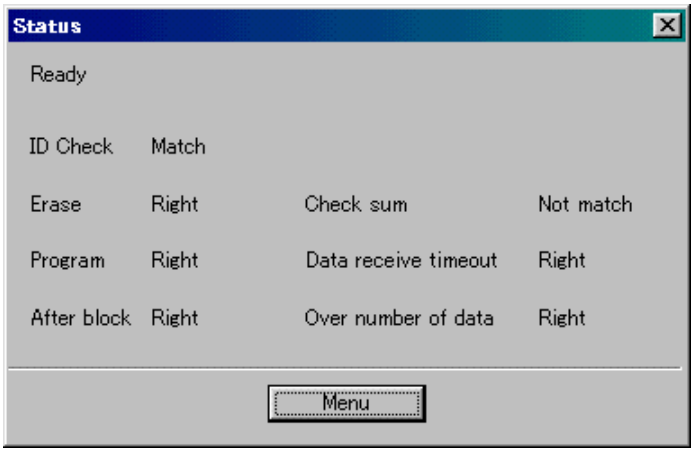


Figure 6 Status Display Screen

The table below lists the content of each item.

Table 5 Contents of Status

	Item	Content of Processing
1	Write state machine status (Sequencer status(*1))	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 (*2)	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

*1 38000series *2 an invalid bit for 38000series

- **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 4.2, "Communications Setup" on page 11.

- **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.

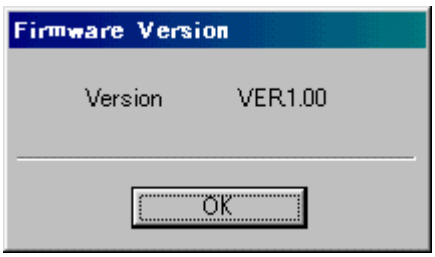


Figure 7 Version Information

- **VDC OFF**

  When rewriting a flash by M32C/83 using the power supply voltage not more than 3.3V, before performing erase and a program, it is necessary to turn off VDC. Execution of this command turns off VDC. The state of VDC is displayed on a command selection dialog. (effective only in the case of M32C/83) Even if it turns off VDC, VDC returns to ON state after reset release of a target. When you turn off VDC, please execute this command again. In addition, as for this command, only M32C / 83 are effective. By M32C/83, except when you rewrite on the power supply voltage not more than 3.3V, please do not use it.

- **Exit**

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

5 M16C/80 Boot Loader Mode

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

5.1 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.

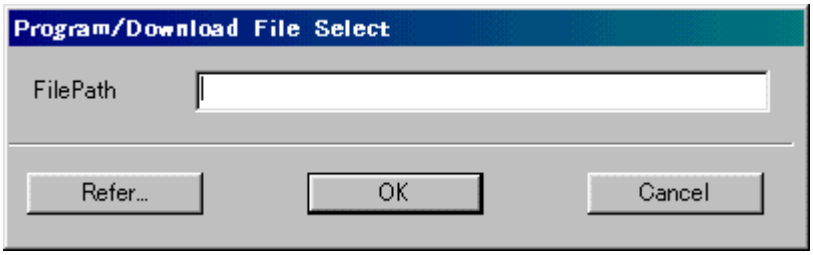


Figure 8 Selecting a File

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.

5.2 Communications Setup

Refer to Section 4.2, "Communications Setup" on page 11.

5.3 Device Command

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

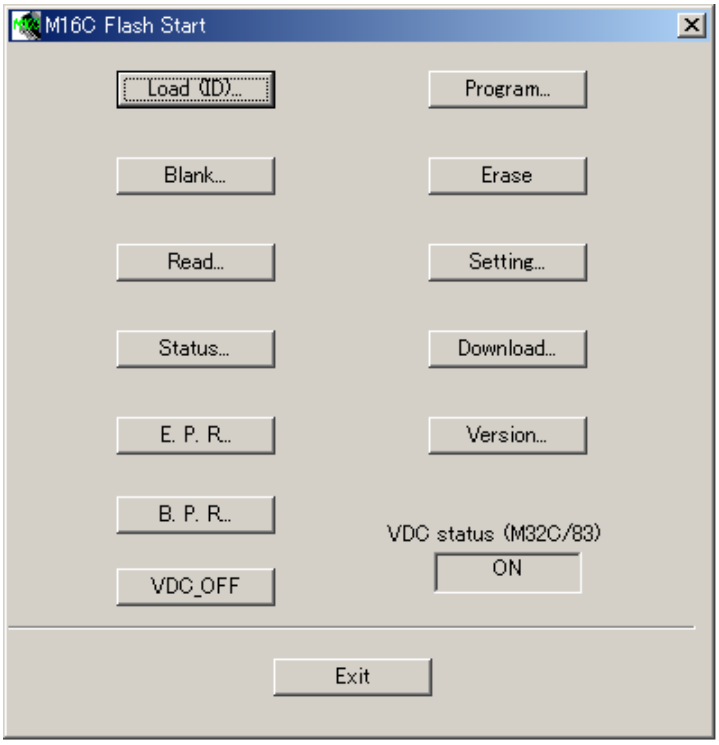


Figure 9 Device Command Dialog Box

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.

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

(Refer to Section 7.1.14, " M30802SGP-BL " on page 30.)

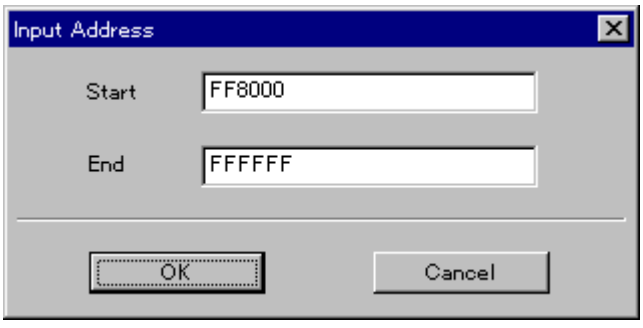


Figure 10 Input Address Dialog Box

- **Load**

  Refer to Section 5.1, "Selecting a File" on page 16.

- **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 4.3, "Status" on page 12.)

- **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 4.2, "Communications Setup" on page 11.

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

- **Download**

  Transfers the file selected in Section 5.1, "Selecting a File," into the internal RAM of the micro-computer. 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). When the download is completed, the micro computer jumps to address 000608h and executes the program. **In addition, please set Stack-Pointer in the download program when stack is used**.

[Example of downloading program]

```
1                                       ;*********************************************************************
2                                       ;*      System Name : M16C/80 Sample Program                         *
3                                       ;*      File Name   : sample.a30                                     *
4                                       ;*      Version     : 0.05                                           *
5                                       ;*      MCU         : M30802SGP-BL                                   *
6                                       ;*      Assembler   : AS308   Ver 2.00 Release1                      *
7                                       ;*      Linker      : LN308   Ver 1.00.01                            *
8                                       ;*      Converter   : LMC308 Ver 1.00.03                             *
9                                       ;*********************************************************************
10                                      ;+++++++++++++++++++++++++++++++++++++++++++++++++++
11                                      ;+          Include Deined file                    +
12                                      ;+++++++++++++++++++++++++++++++++++++++++++++++++++
13                                      .list   off
14                                      .list   on
15                                      ;
16                                      ;+++++++++++++++++++++++++++++++++++++++++++++++++++
17                                      ;+          Symbol Defined                         +
18                                      ;+++++++++++++++++++++++++++++++++++++++++++++++++++
19  00002B00h                           VSTACK  .equ 0002B00h               ; Stack-point(ISP)
20  00000400h                           VRAM    .equ 0000400h               ; Internal RAM Area
                                                                            (0000400h - 00005FFh)
21  00000600h                           VPRO    .equ 0000600h               ; Download Program Area
                                                                            (0000600h - 00029FFh)
22
23                                      ;
24                                      ;+++++++++++++++++++++++++++++++++++++++++++++++++++
25                                      ;+          Version table                          +
26                                      ;+++++++++++++++++++++++++++++++++++++++++++++++++++
27                                      .section    RAMDATA,data
28  000400                              .org        VRAM
29
30  000400                              Prgram_top:
31                                          .section    PROGRAM,code
32  000600                                  .org  VPRO
33  000600  5645522E                        .byte       'VER.0.05'              ; Set Version Number
            302E3035
34                                      ;
35                                      ;+++++++++++++++++++++++++++++++++++++++++++++++++++
36                                      ;+          Main flow                              +
37                                      ;+++++++++++++++++++++++++++++++++++++++++++++++++++
38  000608                              Program_start:
39  000608  D3EF                            fclr        U                       ; Stack select ISP
40  00060A  D7C1002B                        ldc         VSTACK,SP               ; set ISP
41
42  00060E  F6EFE603    Q                   mov.b       #0FFh,PD2
43  000612  F6E1E403    Q                   mov.b       #001h,P2
44  000616                              LOOP:
45  000616  F9AF        Q                   mov.w       #0FFFFh,R0
46  000618                              ..tl0001:
47  000618  F99FFE                          sbjnz.w     #1,R0,..tl0001          ; Wait
48
49  00061B  E6E1E403                        rot.b       #2,P2                   ; Lotate P2
50  00061F  BBF6        B                   jmp         LOOP                    ; LOOP
51
52                                      .END
```

- **Version**

  Outputs version information on the microcomputer's control program.

- **VDC OFF**

  It cannot be used with a boot loader. Please do not use this command.

- **Exit**

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

6 M16C/10 Internal Flash Memory Mode

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

6.1 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.

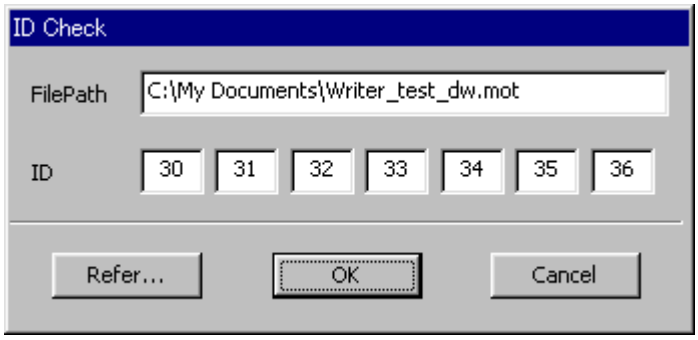


Figure 11 ID Check Dialog Box

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 7.3, "About the ID Check" on page 50), 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.

Clicking on the **[OK]** button will start the ID check. After the check, the M16C Flash Starter window will open up, from where device commands can be executed. If an ID matching error occurs, the M16C Flash Starter 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 Starter window without running an ID check. When it is canceled, a device command can't be operated.(Refer to Section 4.3," Device Command")

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

6.2 Communications Setup

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

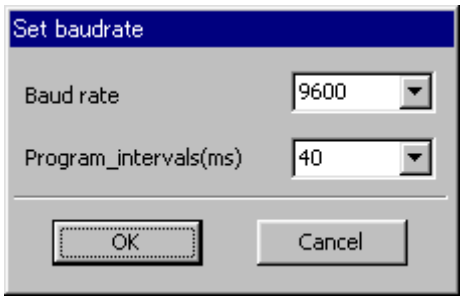


Figure 12 Communications Setup

Set a communication rate for **Baud rate (bps)**. At the **M16C Flash Starter** 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 (bps)

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 6. Communicable Baud Rates at Each Frequency (Reference)

Baud rate (bps) / Xin (MHz)	9600	19200	38400	57600
32	O	O	O	O
30	O	O	O	O
25	O	O	O	O
20	O	O	O	O
16	O	O	O	O
10	O	O	O	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 M3A-t 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.

6.3 Device Command

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

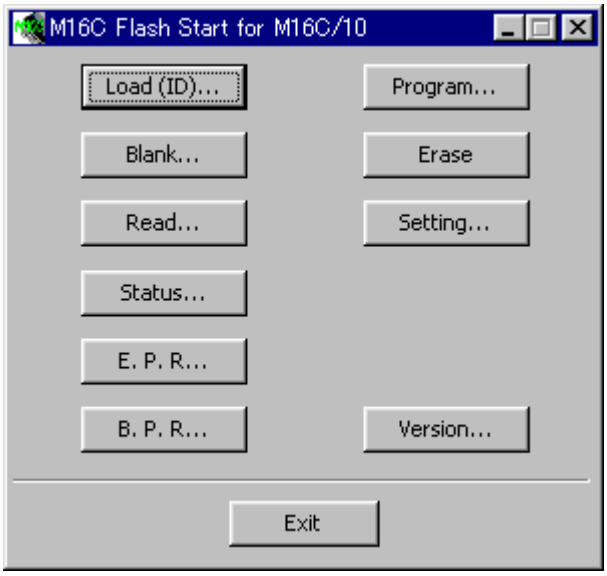


Figure 13 Device Command Dialog Box

If the ID check has not been 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 7.1, "Memory Map" on page 25.)

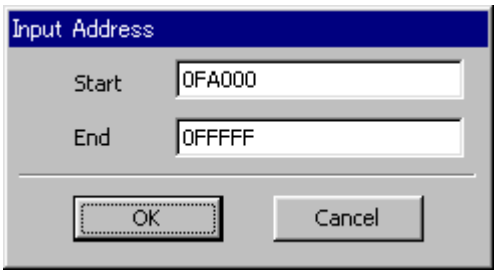


Figure 14 Input Address Dialog Box

- **Load (ID)**

  Refer to Section 4.1, "ID Check" on page 10.

- **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.

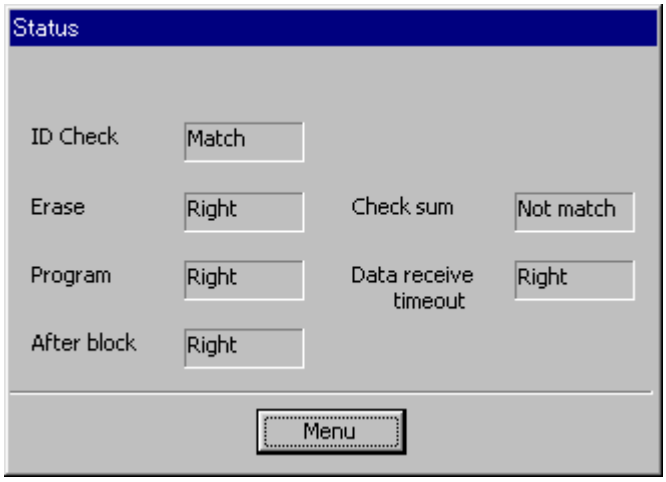


Figure 15 Status Display Screen

The table below lists the content of each item.

Table 7 Contents of Status

	Item	Content of Processing
1	ID check	Shows ID check status of flash memory. [Not Yet] : Not verified [Not match]: Verification mismatch [Match] : Verified
2	Erase	Shows erase status of flash memory. [Error] : Terminated in error [Right] : Terminated normally
3	Program	Shows programming status of flash memory. [Error] : Terminated in error [Right] : Terminated normally
4	After block	Shows excessive write status when writing pages. [Error] : Excessively written [Right] : No excessive write
5	Check sum	Shows boot program transfer result. [Match] : Checksum matched [Not Match]: Checksum mismatched
6	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 4.2, "Communications Setup" on page 11.

- **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.

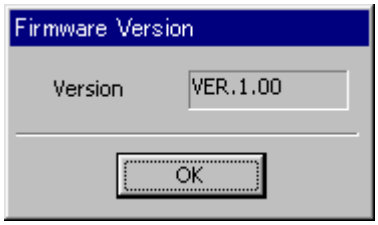


Figure 16 Version Information

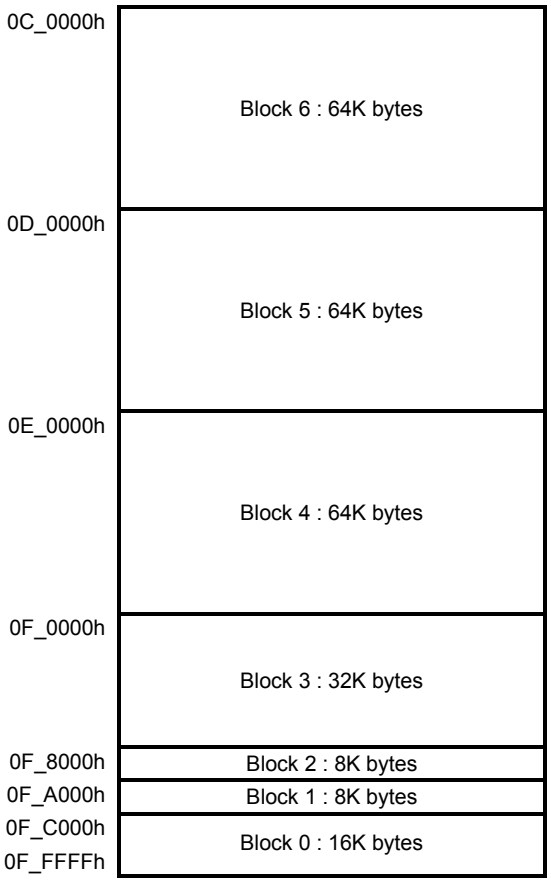
- **Exit**

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

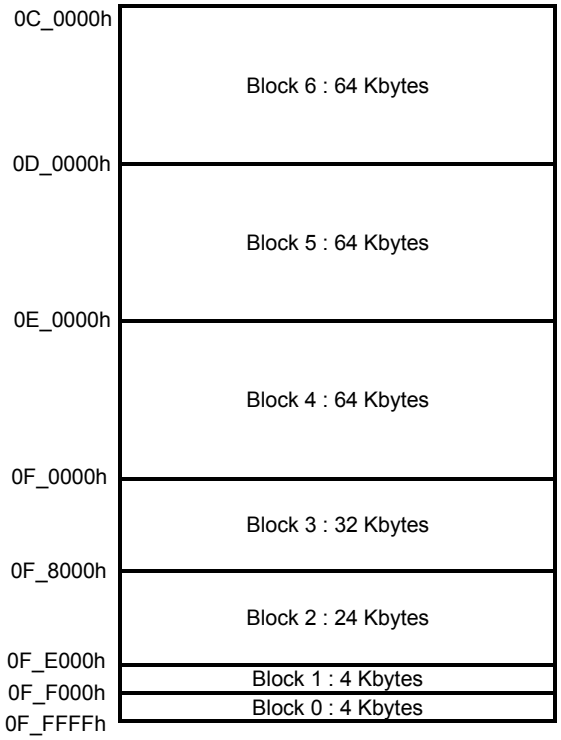
7 Appendix

7.1 Memory Map

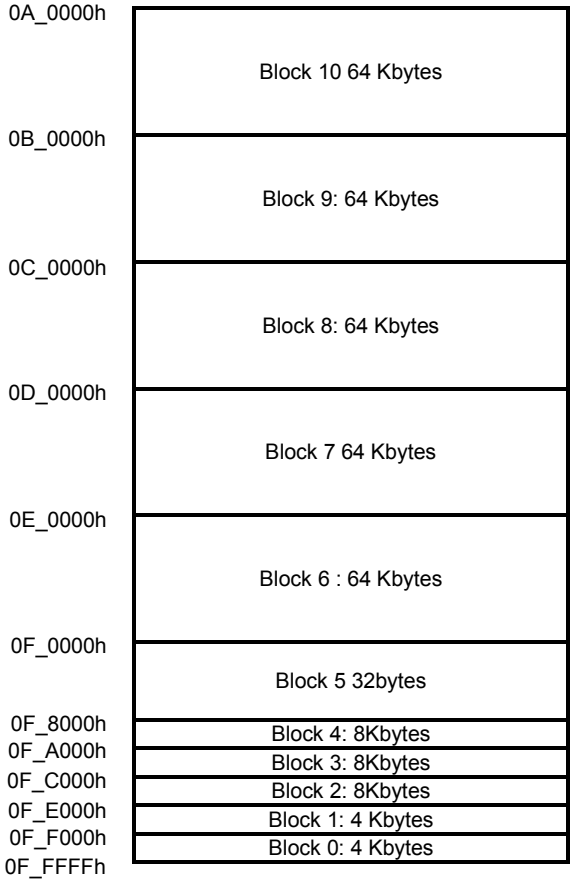
7.1.1 M30624FGA



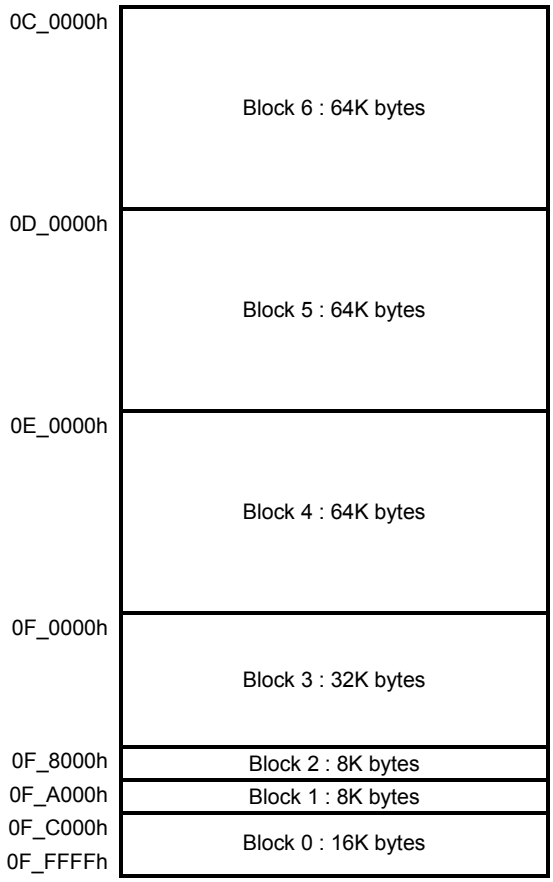
7.1.2 M30624FGN



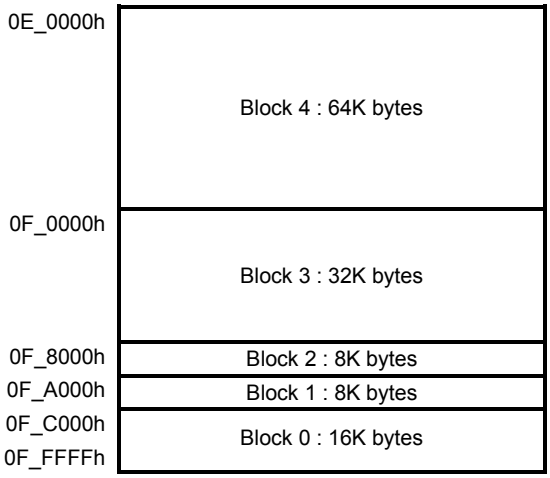
7.1.3 M30626FHPFP/M30627FHPGP



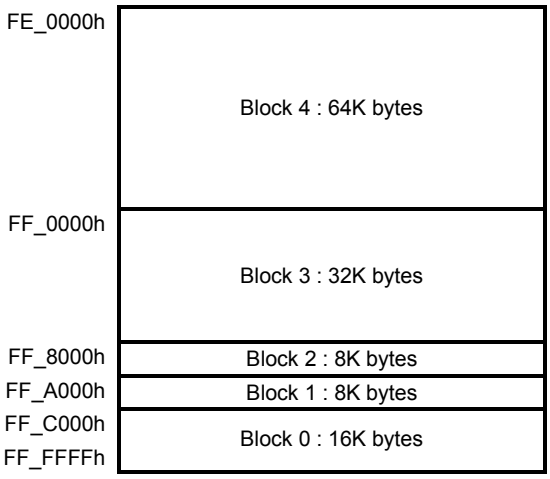
7.1.4 M306NAFGT



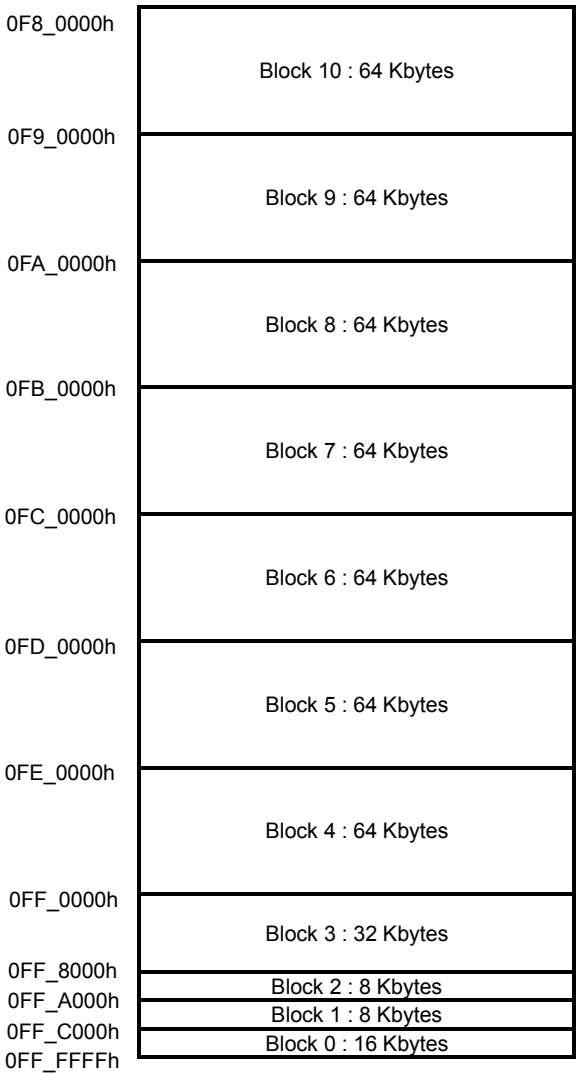
7.1.5 M306NBFCT



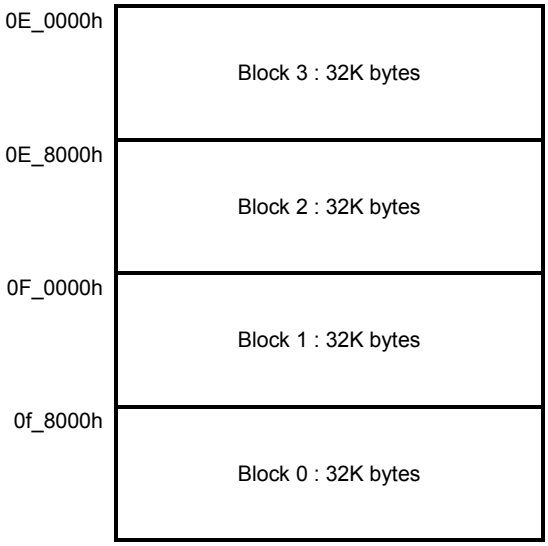
7.1.6 M30800FC



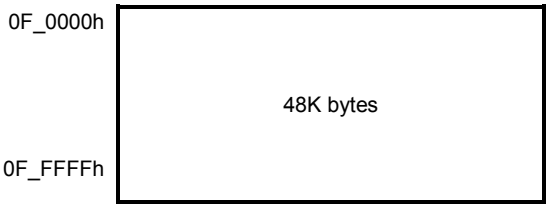
7.1.7 M30833FJ/M30835FJ



7.1.8 M30220FC

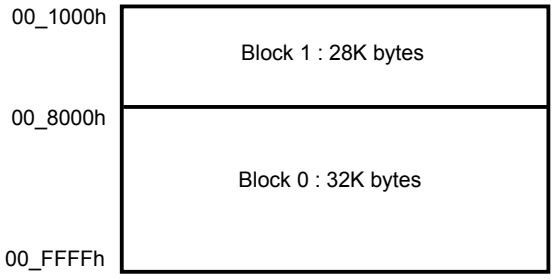


7.1.9 M30201F6

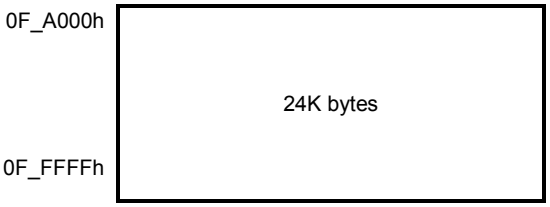


7.1.10 M37516F8/M38507F8/M38517F8

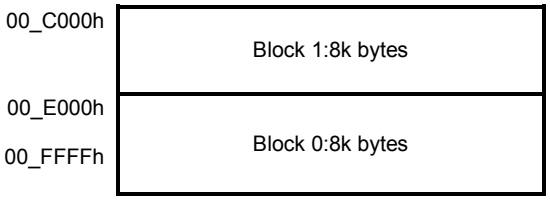
7.1.11 M38C29FF



7.1.12 M30100F3FP/M30100F3TFP/M30102F3FP/M30102F3TFP

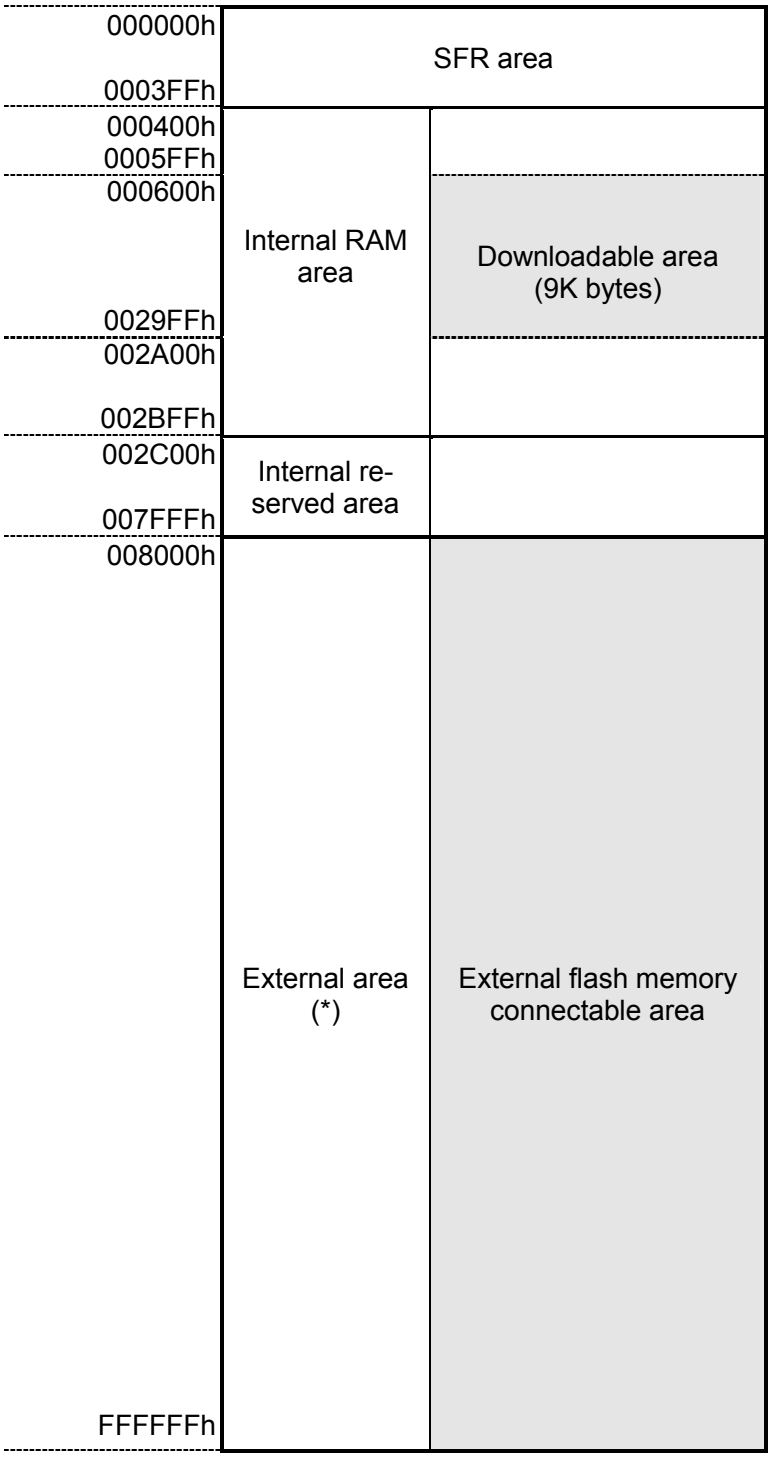


7.1.13 R5F21104FP/R5F21114FP



7.1.14 M30802SGP-BL

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



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

.

7.2 Standard serial I/O Mode

7.2.1 M30624FGA(M)FP

Mode setting

Signal	Value
CNVss	Vcc
$\overline{EPM}$	Vss
$\overline{RESET}$	Vss → Vcc
$\overline{CE}$	Vcc

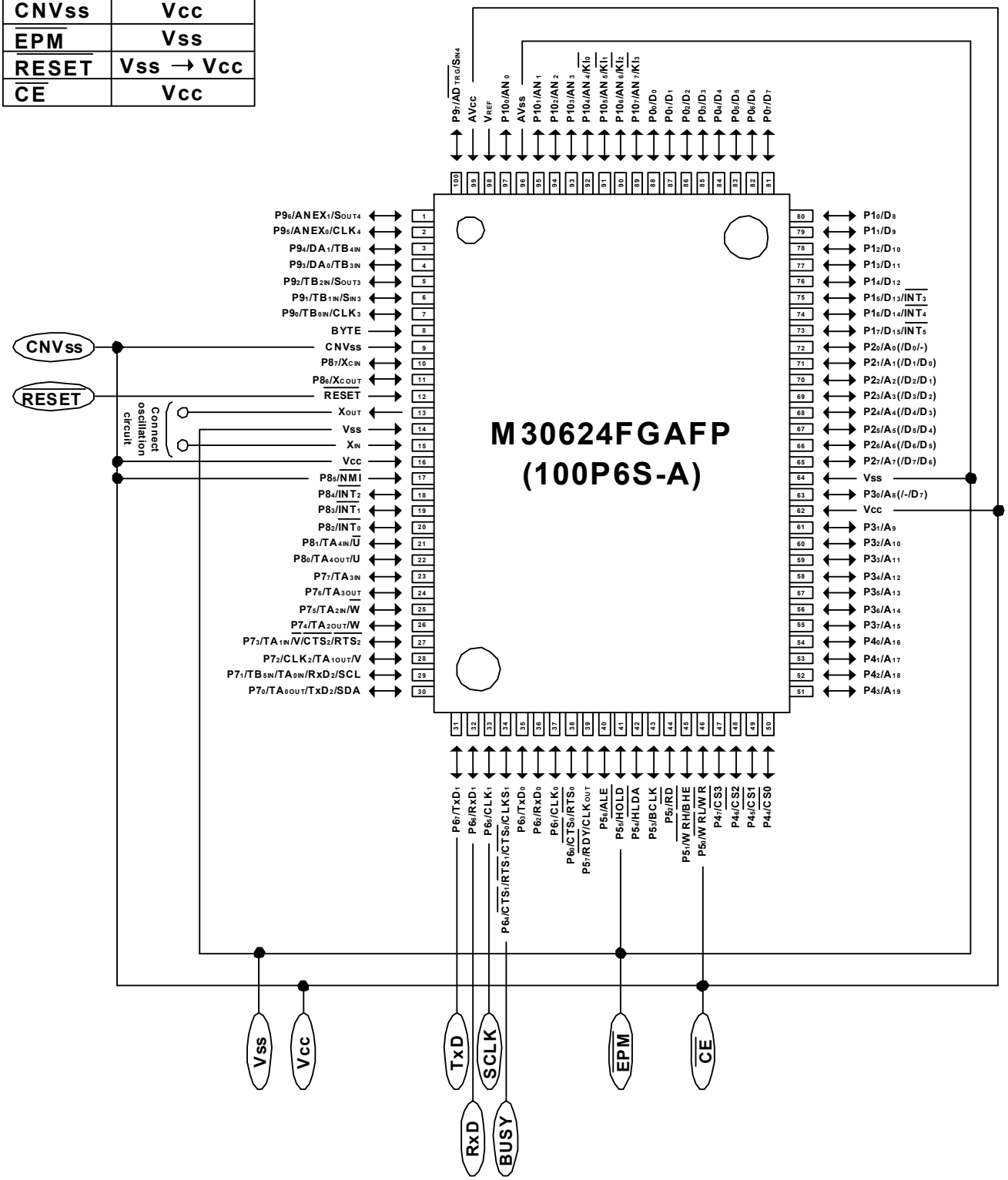


Figure 17 Pin Connections for Serial I/O Mode (1)

7.2.2 M30624FGNFP

Mode setting

Signal	Value
CNVss	Vcc
$\overline{EPM}$	Vss
$\overline{RESET}$	Vss → Vcc
$\overline{CE}$	Vcc

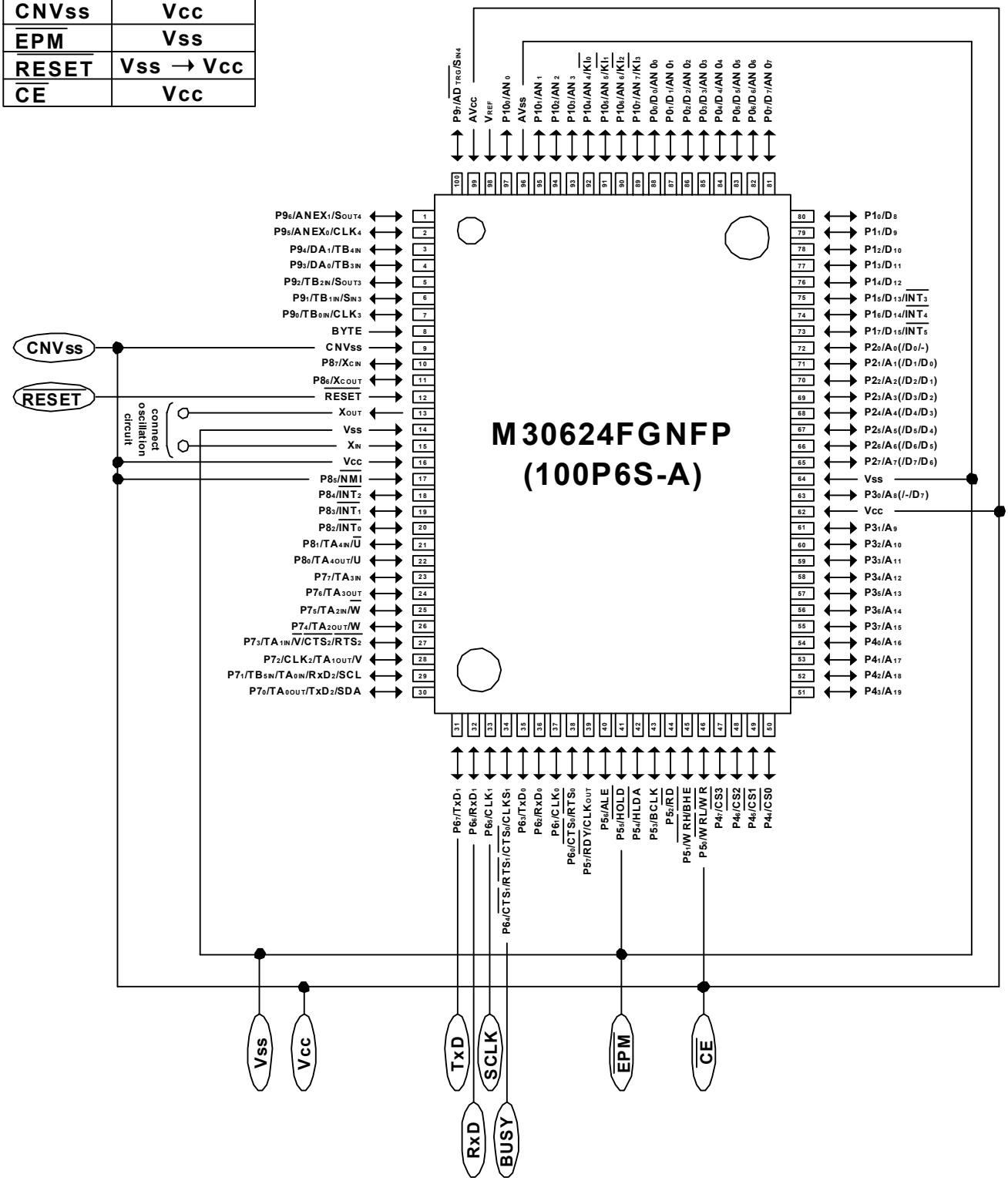


Figure 18 Pin Connections for Serial I/O Mode (2)

7.2.3 M30626FHPFP

Mode setting

Signal	Value
CNVss	Vcc
$\overline{EPM}$	Vss
$\overline{RESET}$	Vss → Vcc
$\overline{CE}$	Vcc

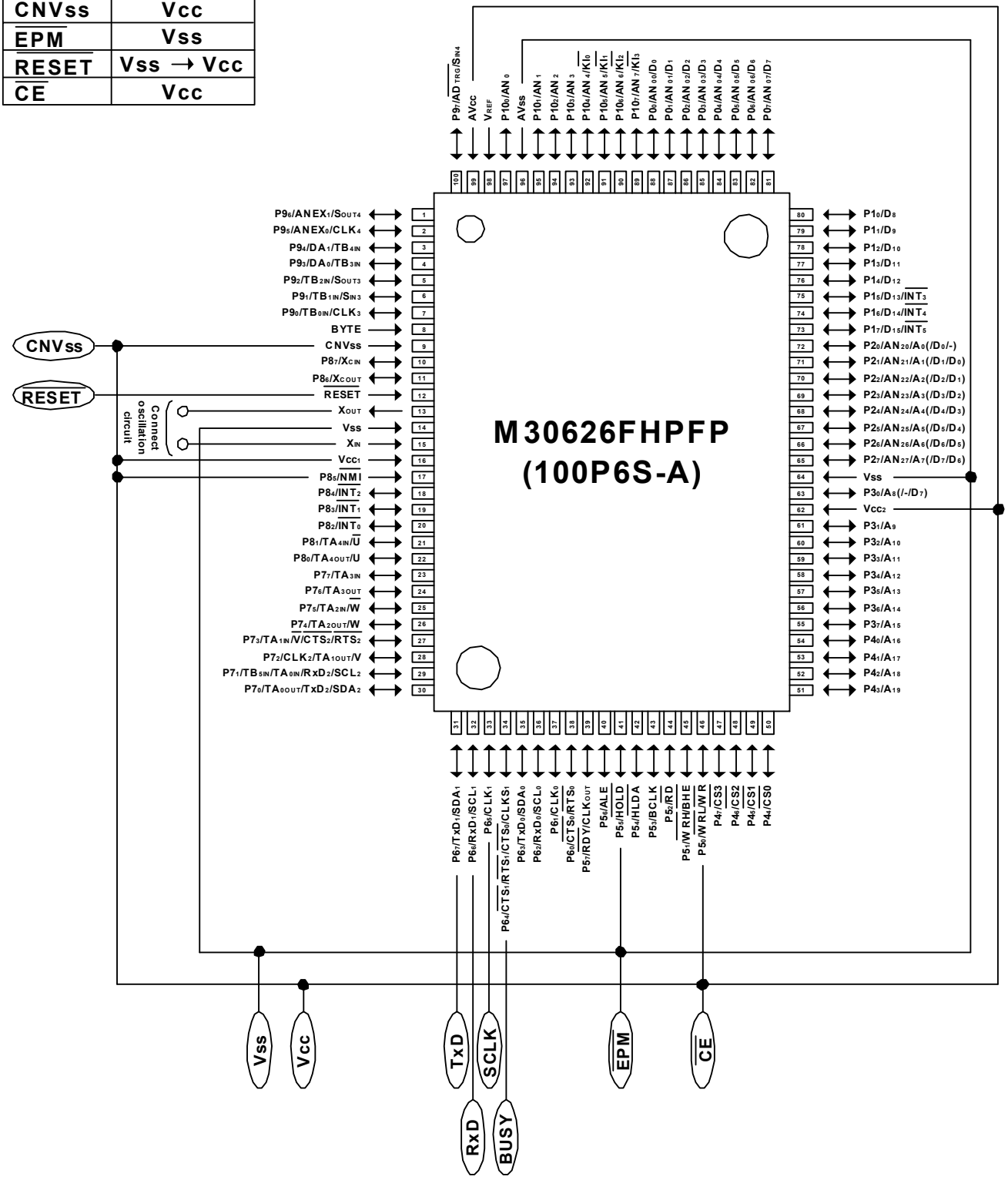


Figure 19 Pin Connections for Serial I/O Mode (3)

7.2.4 M30627FHPGP

Mode setting

Signal	Value
CNVss	Vcc
$\overline{EPM}$	Vss
$\overline{RESET}$	Vss → Vcc
$\overline{CE}$	Vcc

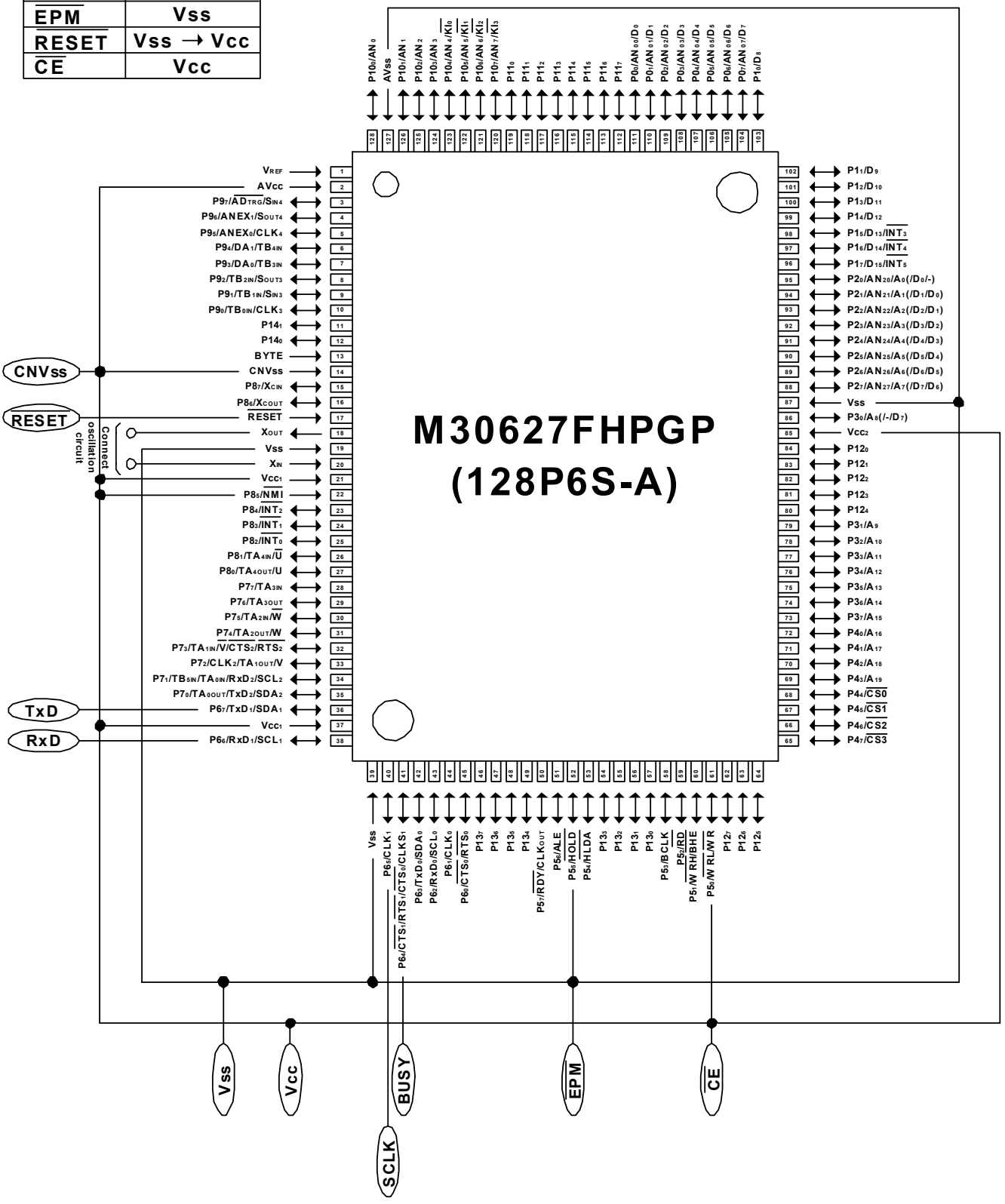


Figure 20 Pin Connections for Serial I/O Mode (4)

7.2.5 M306NAFGT

Mode setup method

Signal	Value
CNVss	Vcc
$\overline{EPM}$	Vss
$\overline{RESET}$	Vss→Vcc
$\overline{CE}$	Vcc
SCLK	Vss

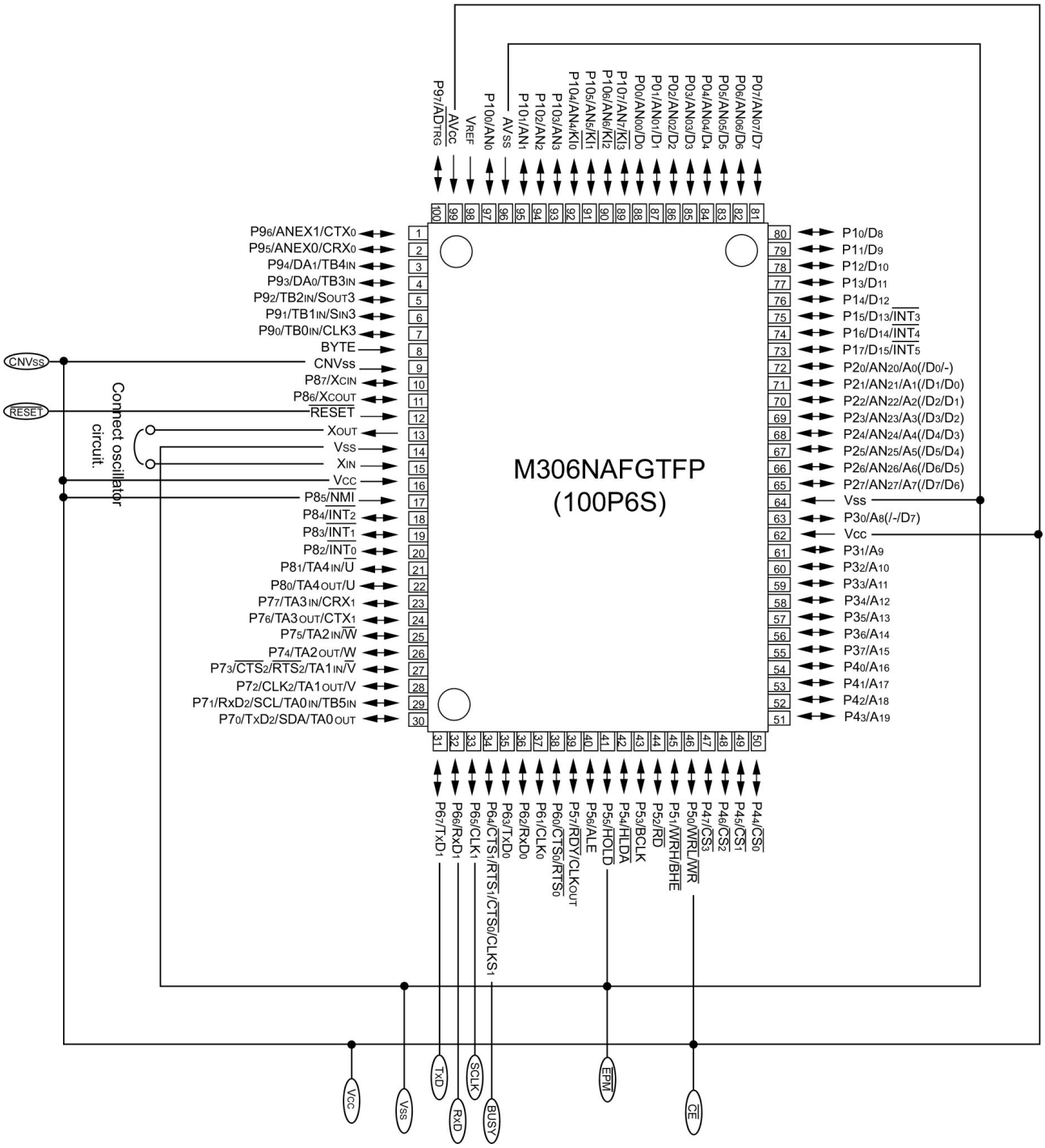


Figure 21 Pin Connections for Serial I/O Mode (5)

7.2.6 M306NBFCT

Mode setup method

Signal	Value
CNVss	Vcc
$\overline{EPM}$	Vss
$\overline{RESET}$	Vss→Vcc
$\overline{CE}$	Vcc
SCLK	Vss

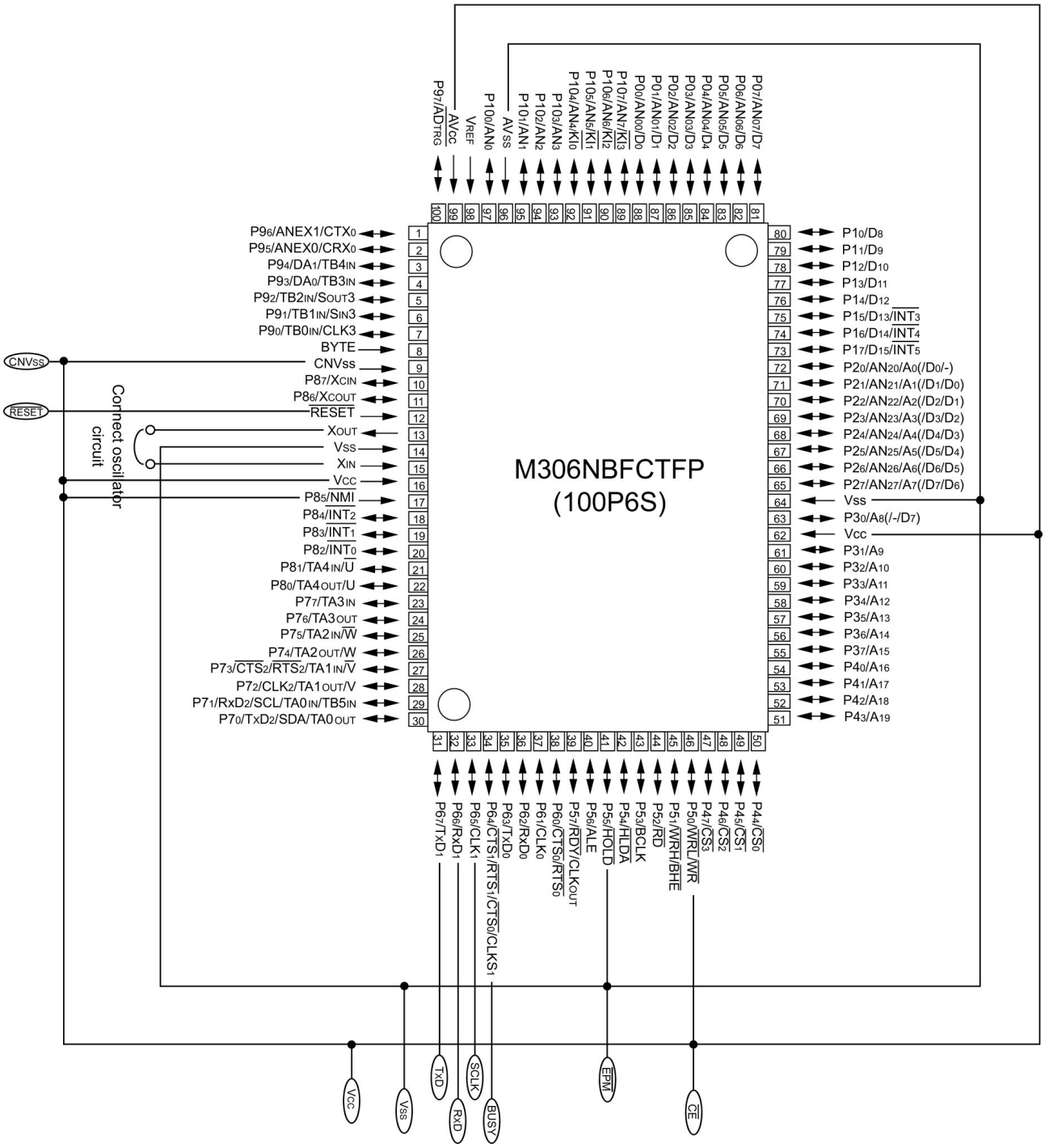


Figure 22 Pin Connections for Serial I/O Mode (6)

7.2.7 M30800FCFP

Mode setting

Signal	Value
CNVss	Vcc
$\overline{EPM}$	Vss
$\overline{RESET}$	Vss → Vcc
$\overline{CE}$	Vcc

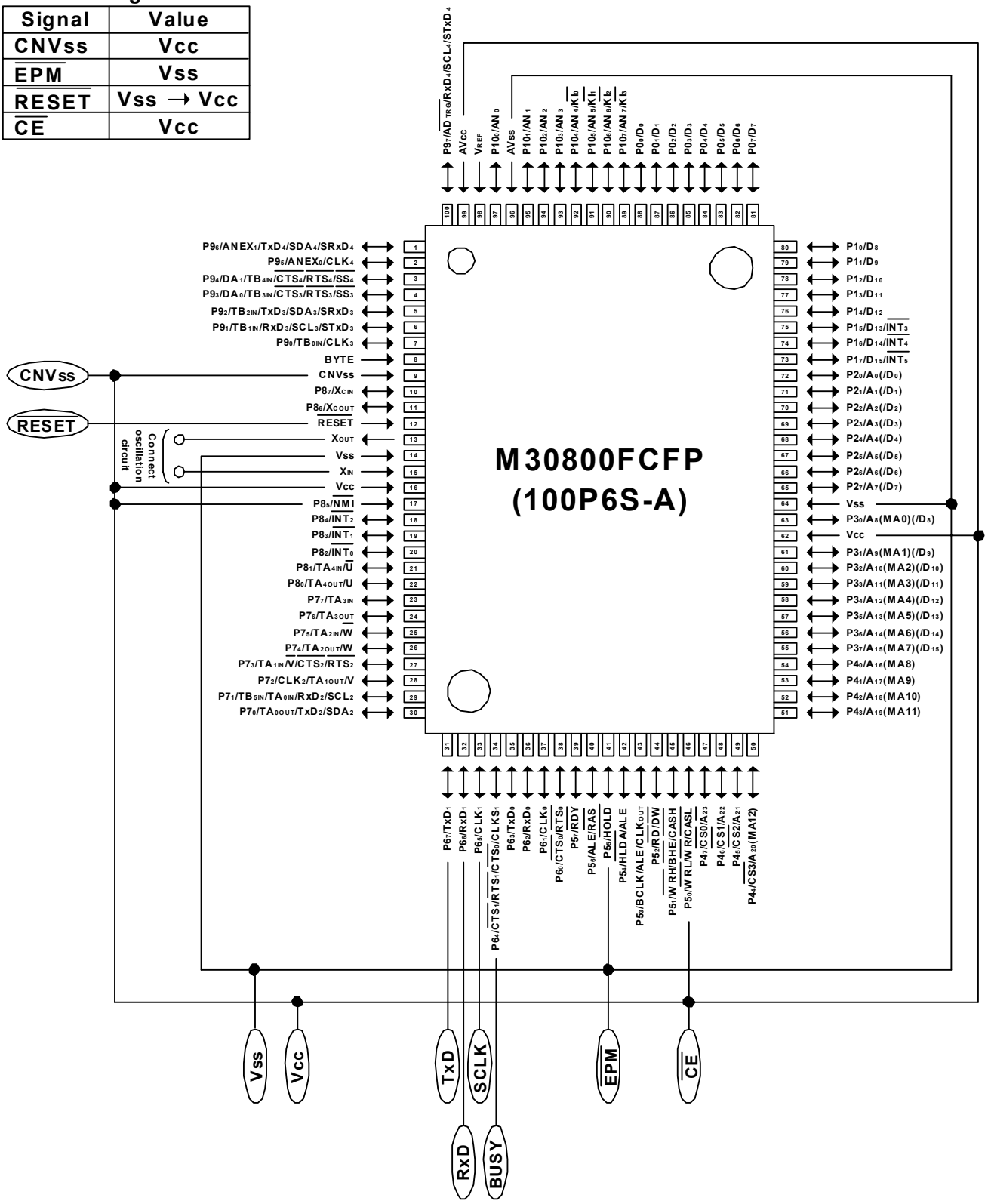


Figure 23 Pin Connections for Serial I/O Mode (7)

7.2.8 M30833FJFP

Mode setting

Signal	Value
CNVss	Vcc
$\overline{EPM}$	Vss
$\overline{RESET}$	Vss → Vcc
$\overline{CE}$	Vcc

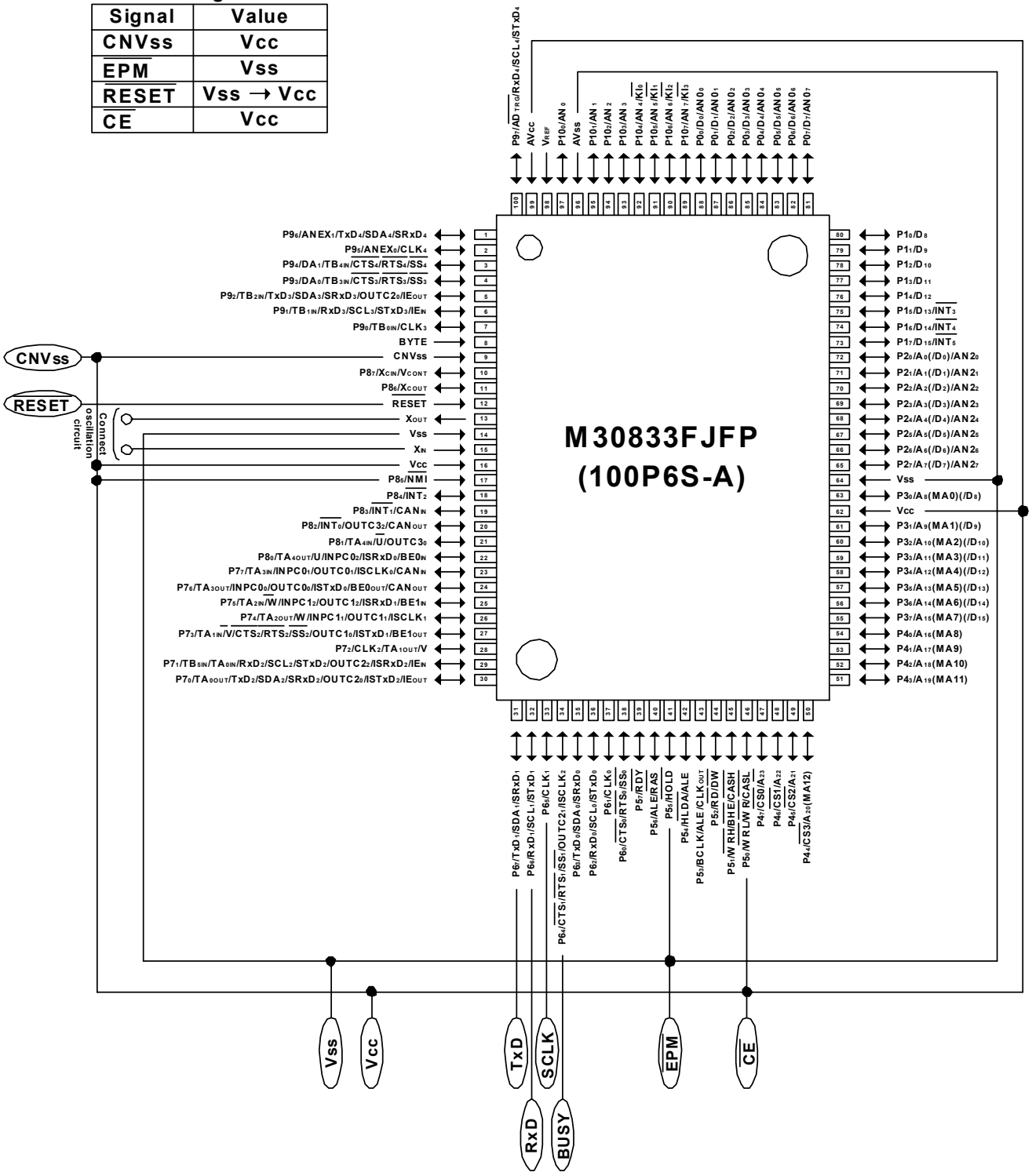


Figure 24 Pin Connections for Serial I/O Mode (8)

7.2.9 M30835FJGP

Mode setting

Signal	Value
CNVss	Vcc
$\overline{EPM}$	Vss
$\overline{RESET}$	Vss → Vcc
$\overline{CE}$	Vcc

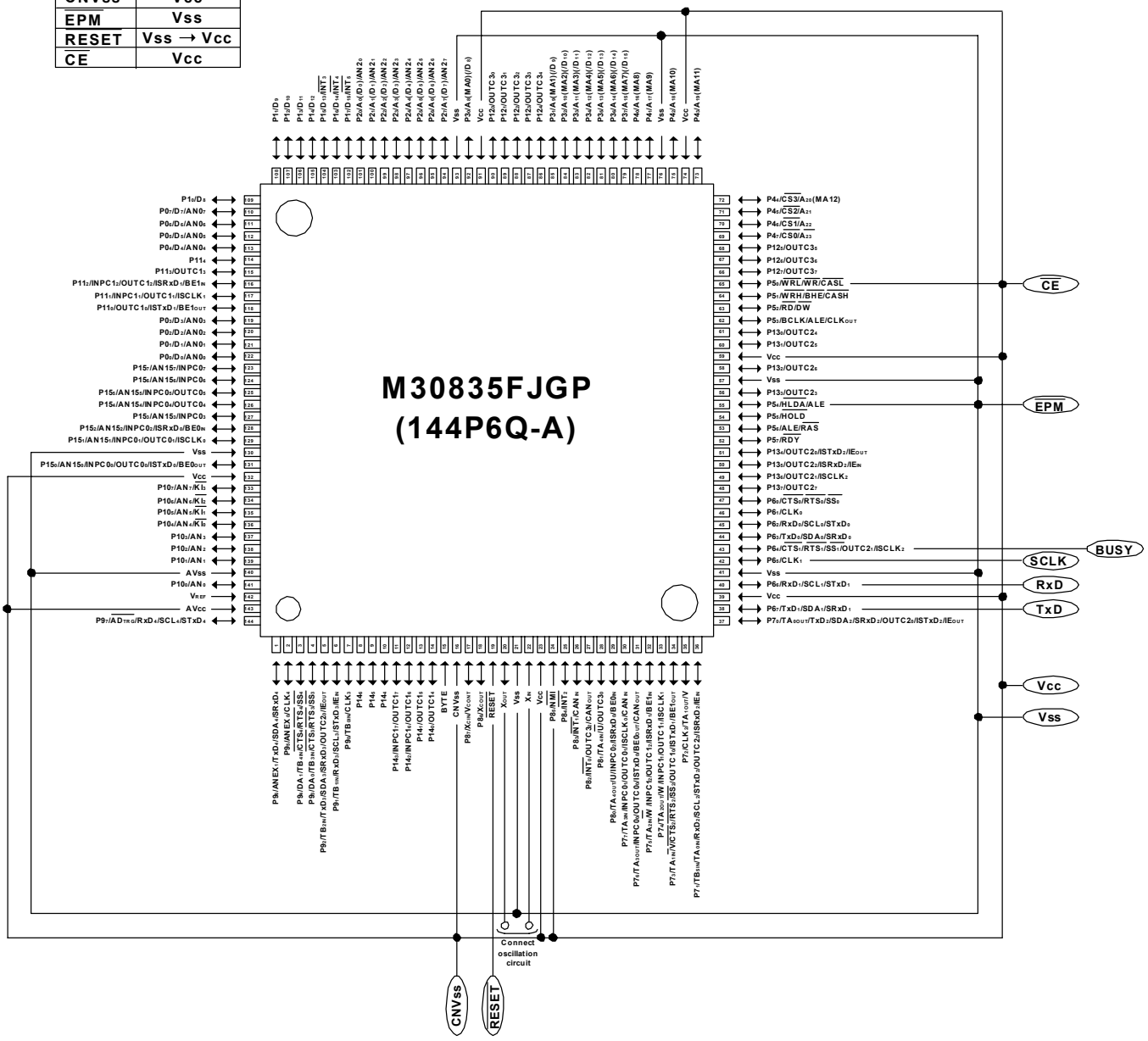
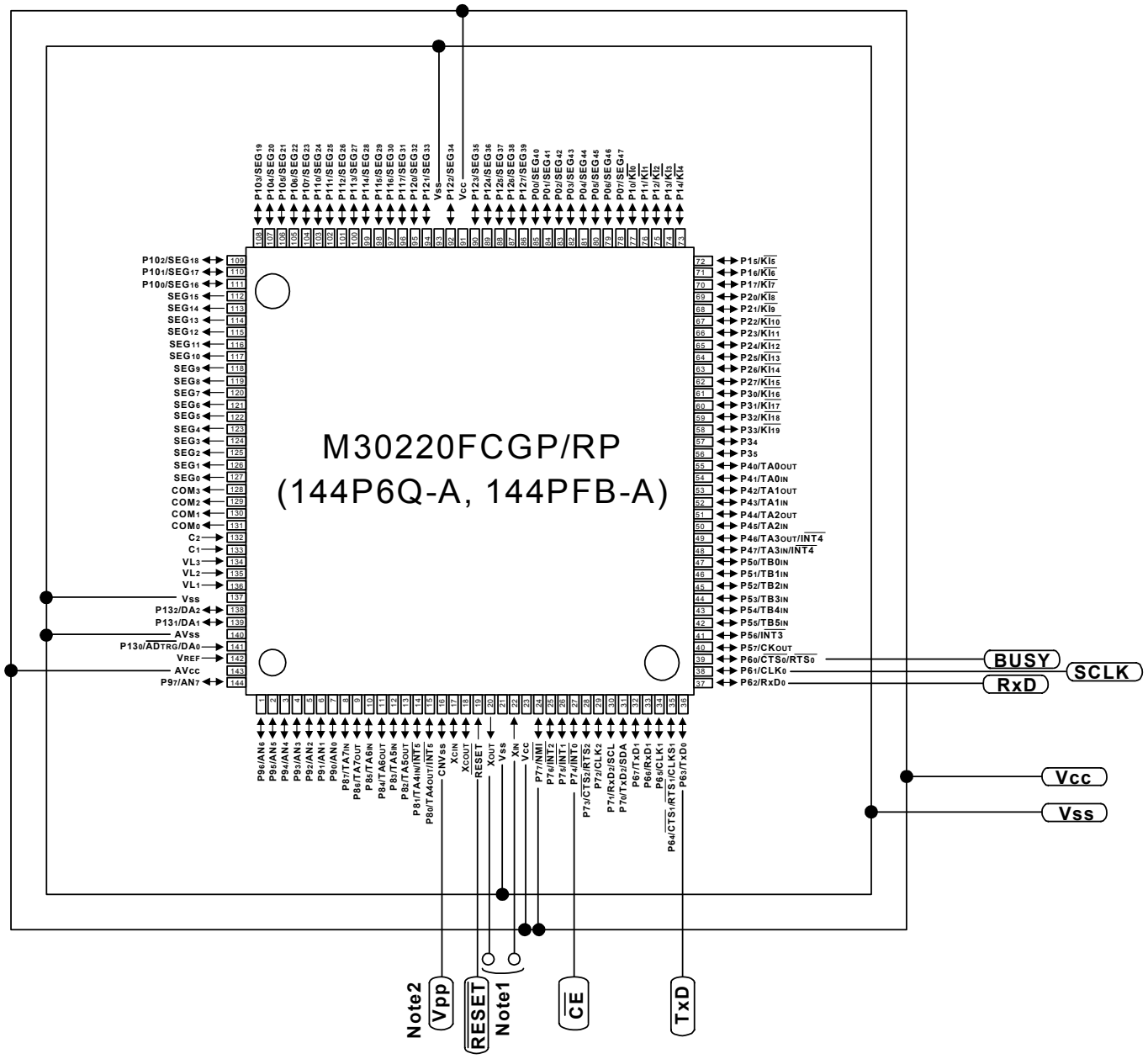


Figure 25 Pin Connections for Serial I/O Mode (9)

7.2.10 M30220FCGP



Mode setup method

Signal	Value
CNVss	4.5 to 5.5V
SCLK	Vss Note3
$\overline{\text{RESET}}$	Vss → Vcc

Note 1: Connect oscillator circuit.
Note 2: Connect to Vcc when Vcc = 4.5V to 5.5V.
Connect to Vpp (= 4.5V to 5.5V) when Vcc = 2.7V to 4.5V.
Note 3: It is necessary to apply Vcc only when reset is released.

Figure 26 Pin Connections for Serial I/O Mode (10)

7.2.11 M30201F6FP

Mode setup method

Signal	Value
CNVss	VPPH
RESET	Vss ⟶ Vcc
SCLK	Vcc Note1

Note 1: It is necessary to apply Vcc only when reset is released.

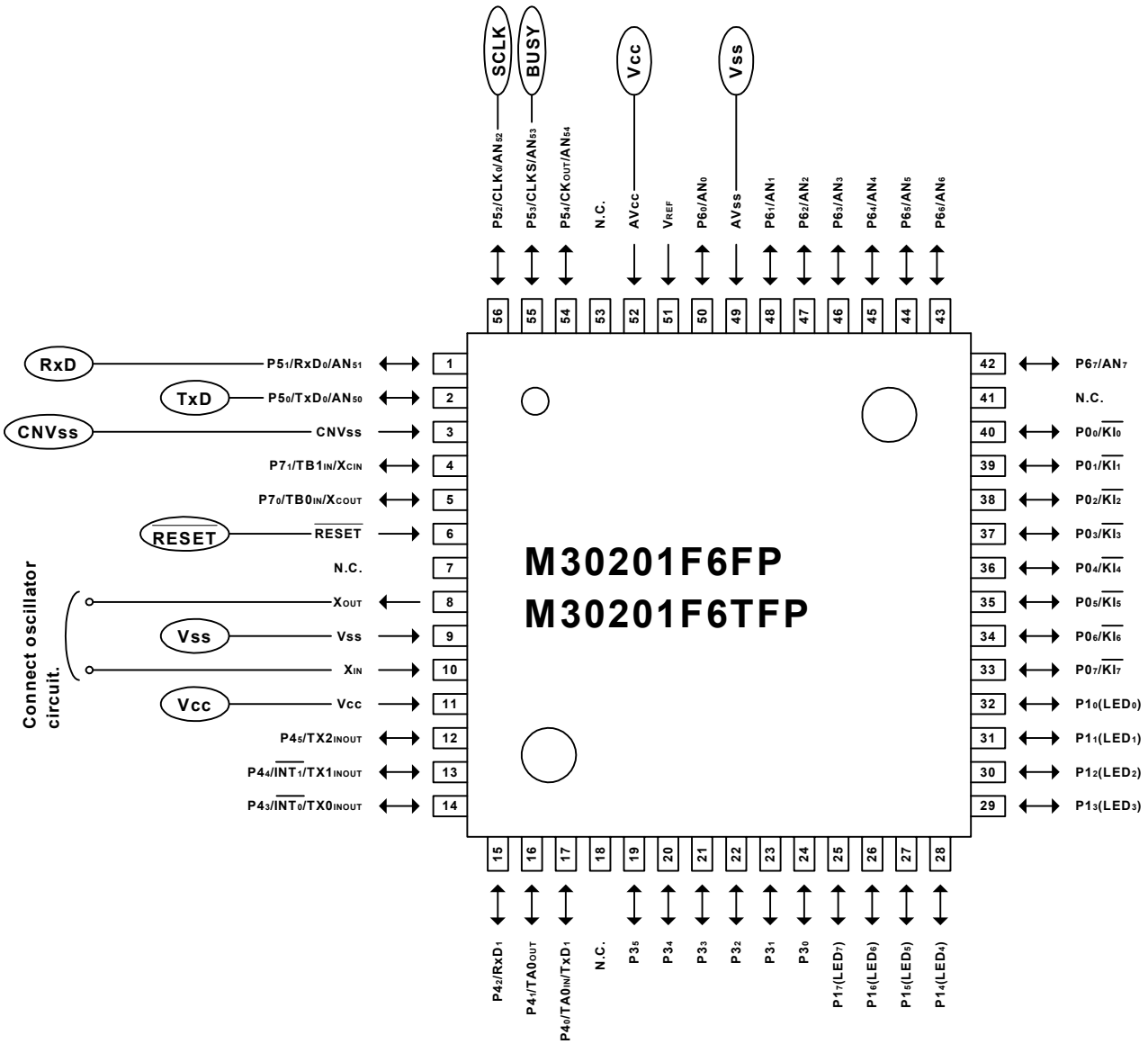
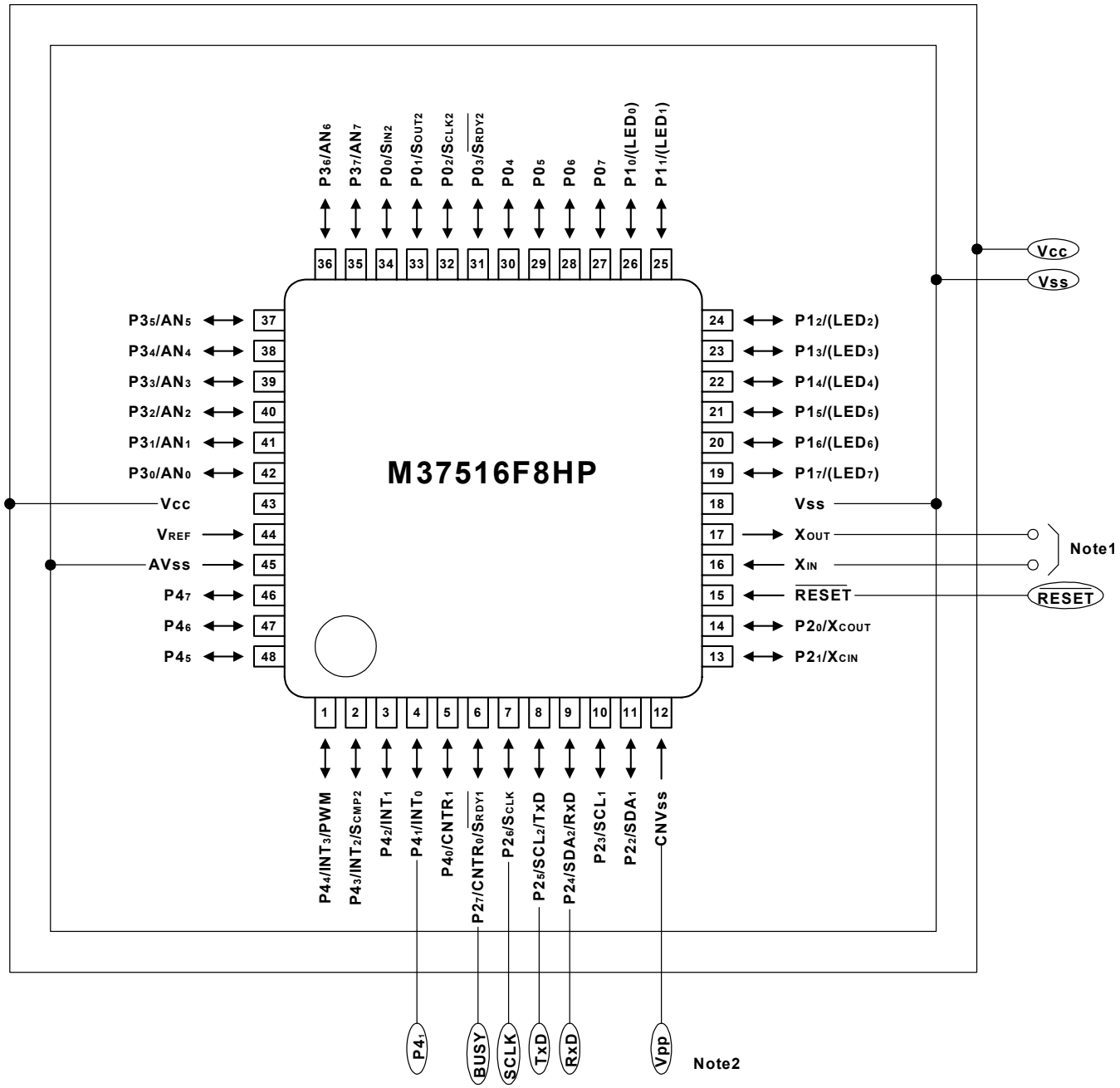


Figure 27 Pin Connections for Serial I/O Mode (11)

7.2.12 M37516F8HP



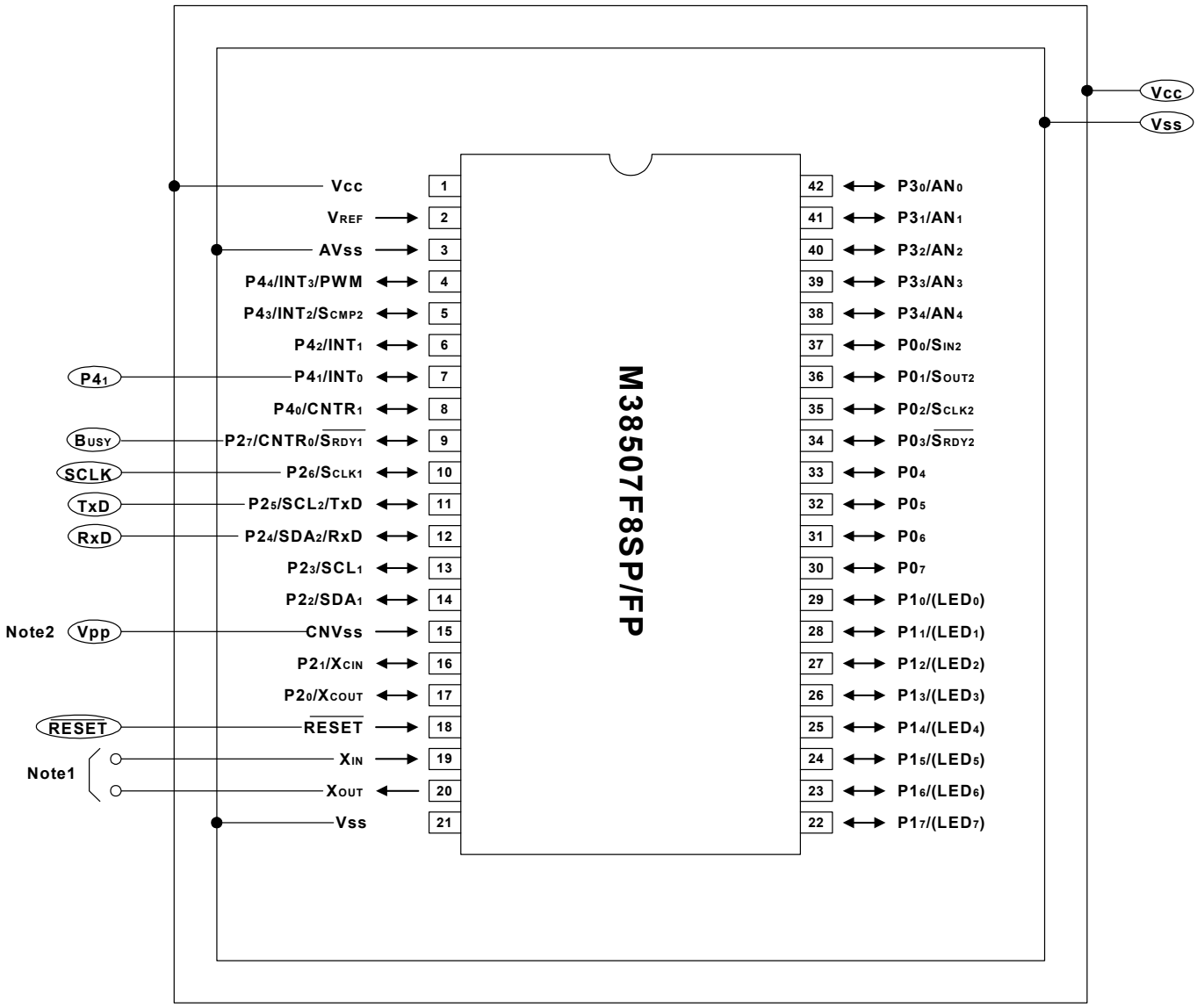
Mode setup method

Signal	Value
CNVss	4.5 to 5.5V
P41	Vcc Note3
RESET	Vss → Vcc
SCLK	Vss

Note 1: Connect oscillator circuit.
Note 2: Connect to Vcc when Vcc = 4.5V to 5.5V.
Connect to Vpp (= 4.5V to 5.5V) when Vcc = 2.7V to 4.5V.
Note 3: It is necessary to apply Vcc only when reset is released.

Figure 28 Pin Connections for Serial I/O Mode (12)

7.2.13 M38507F8SP/FP



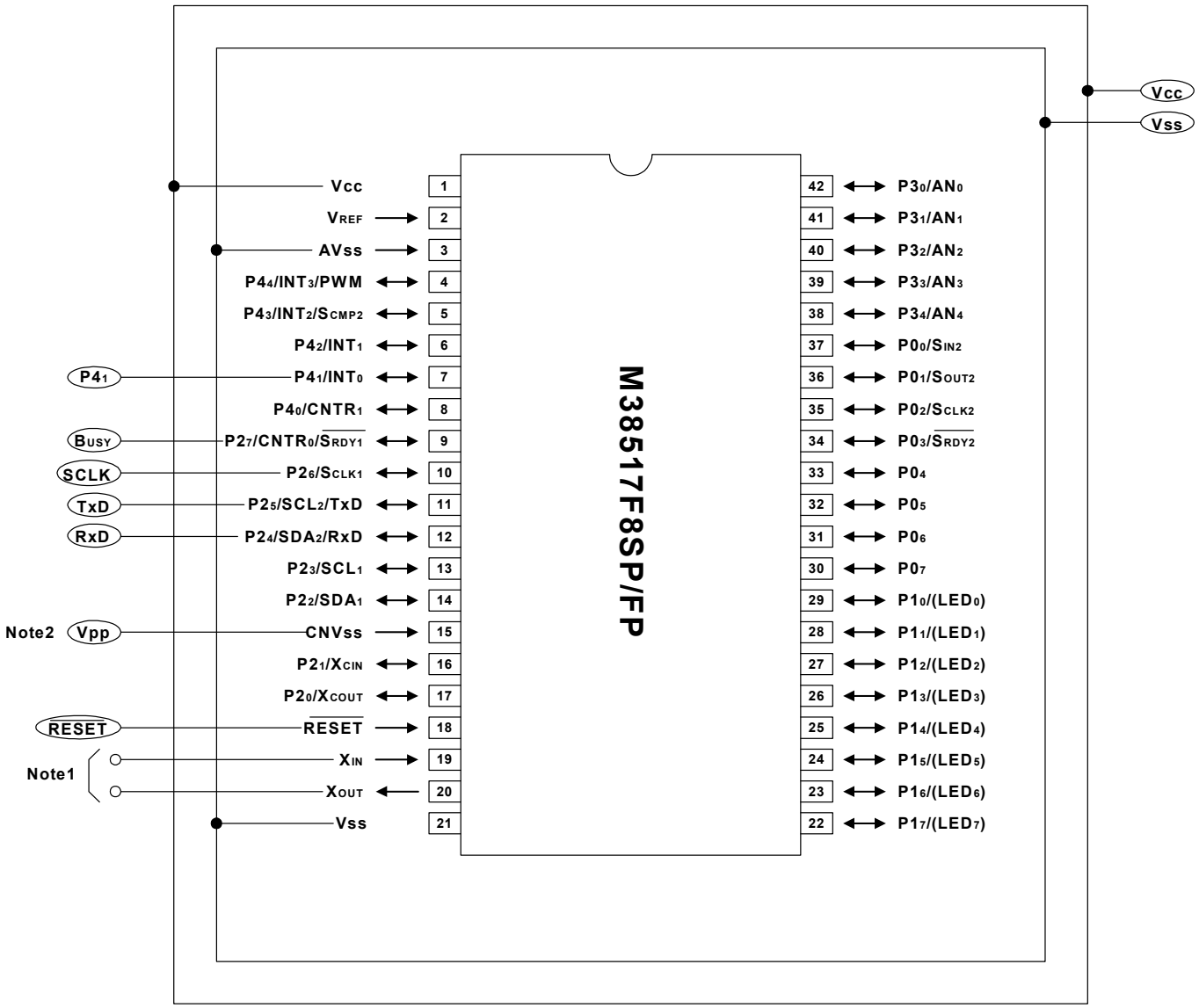
Mode setup method

Signal	Value
CNVss	4.5 to 5.5V
P41	Vcc Note3
RESET	Vss → Vcc
SCLK	Vss

Note 1: Connect oscillator circuit.
Note 2: Connect to Vcc when Vcc = 4.5V to 5.5V.
Connect to Vpp (= 4.5V to 5.5V) when Vcc = 2.7V to 4.5V.
Note 3: It is necessary to apply Vcc only when reset is released.

Figure 29 Pin Connections for Serial I/O Mode (13)

7.2.14 M38517F8SP/FP



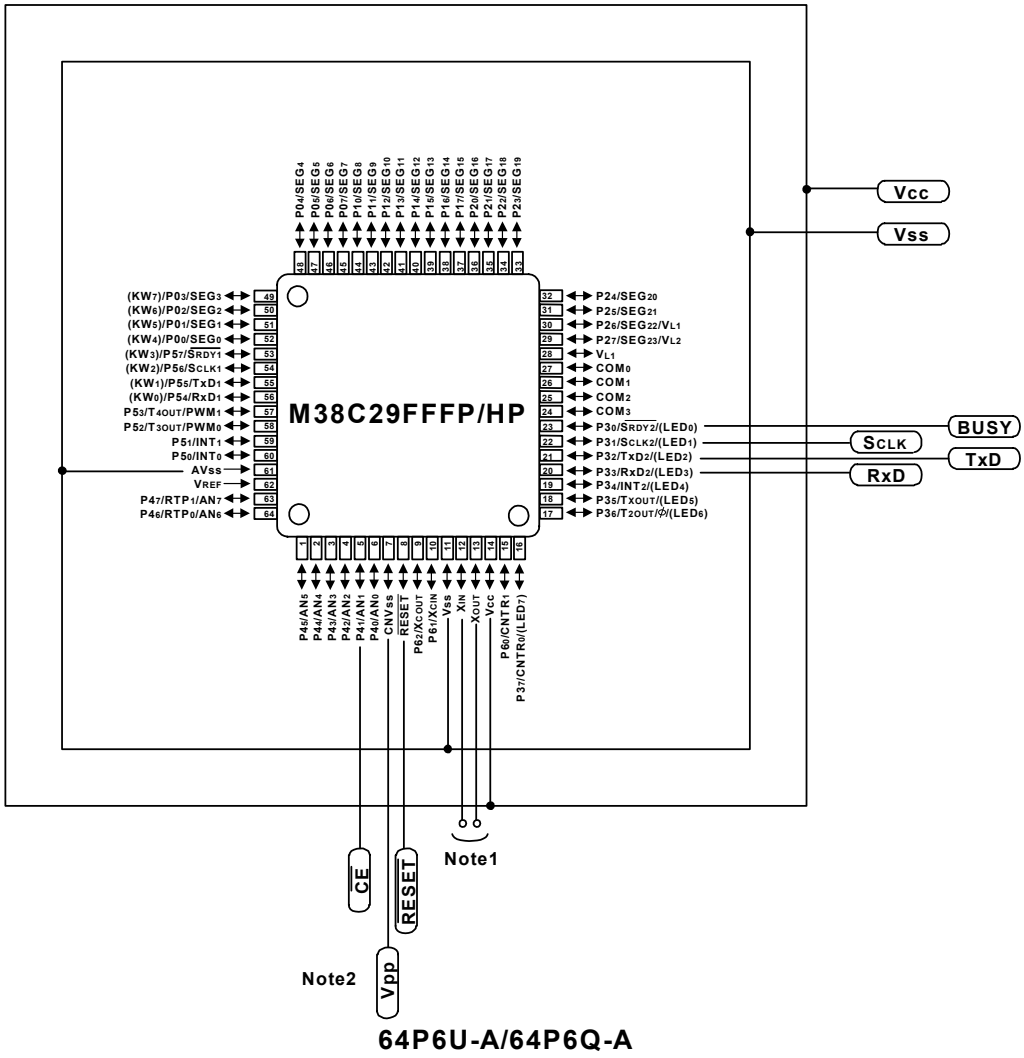
Mode setup method

Signal	Value
CNVss	4.5 to 5.5V
P41	Vcc Note3
RESET	Vss→Vcc
SCLK	Vss

Note 1: Connect oscillator circuit.
Note 2: Connect to Vcc when Vcc = 4.5V to 5.5V.
Connect to Vpp (= 4.5V to 5.5V) when Vcc = 2.7V to 4.5V.
Note 3: It is necessary to apply Vcc only when reset is released.

Figure 30 Pin Connections for Serial I/O Mode (14)

7.2.15 M38C29FFFP/HP



Mode setup method

Signal	Value
CNVss	4.5 to 5.5V
$\overline{CE}$	Vcc
$\overline{RESET}$	Vss → Vcc
SCLK	Vss

Note 1: Connect oscillator circuit.
Note 2: Connect to Vcc when Vcc = 4.5V to 5.5V.
Connect to Vpp (= 4.5V to 5.5V) when Vcc = 3.0V to 4.5V.

Figure 31 Pin Connections for Serial I/O Mode (15)

7.2.16 M30802SGP-BL

Mode setting

Signal	Value
CNVss	Vss
$\overline{\text{RESET}}$	Vcc → Vss

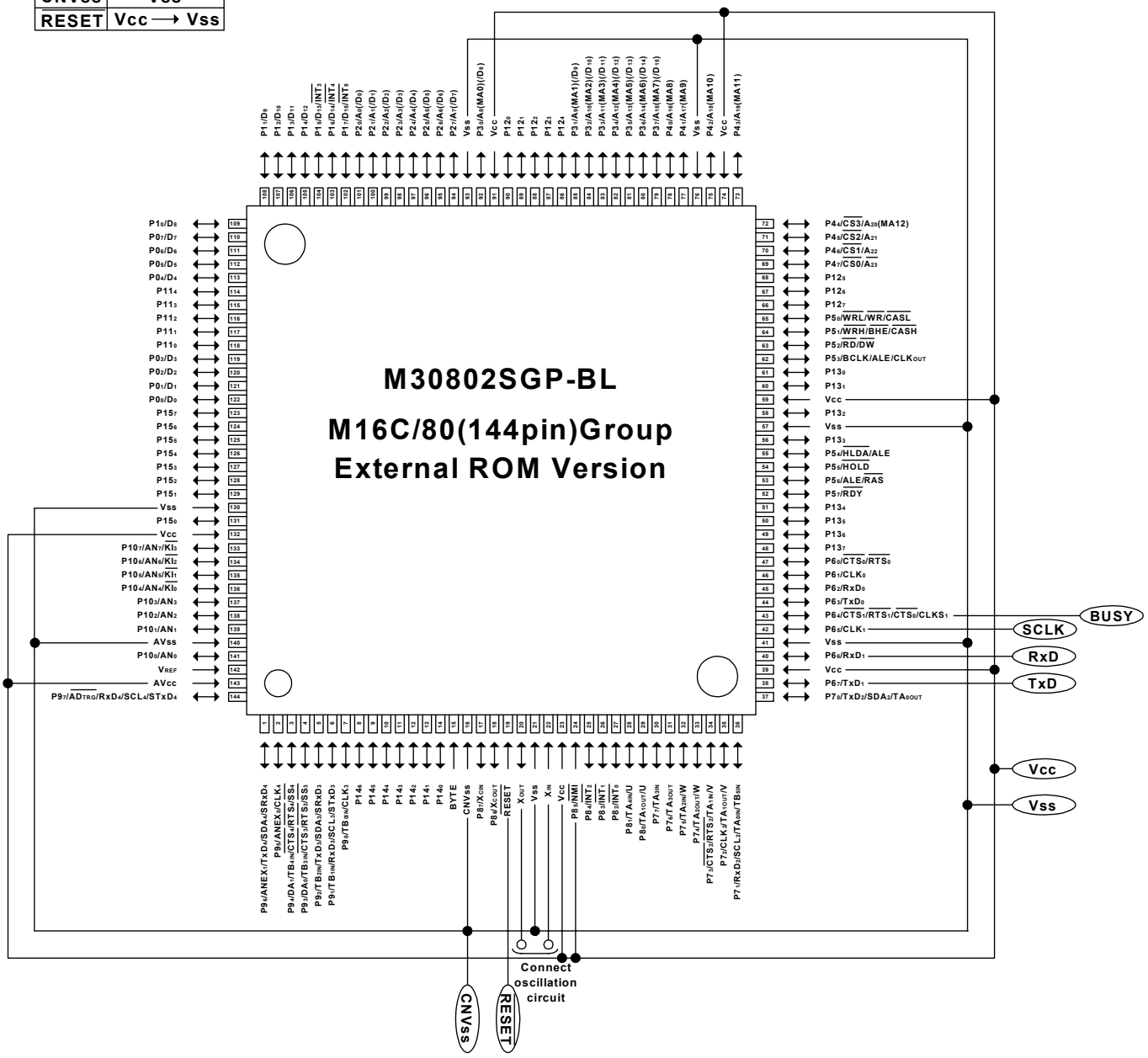


Figure 32 Pin Connections for Serial I/O Mode (16)

7.2.17 M30100F3FP/M30100F3TFP

Mode setting

Signal	Value
CNVss	Vcc
$\overline{\text{RESET}}$	$V_{SS} \rightarrow V_{CC}$

*Vcc=5V±10%

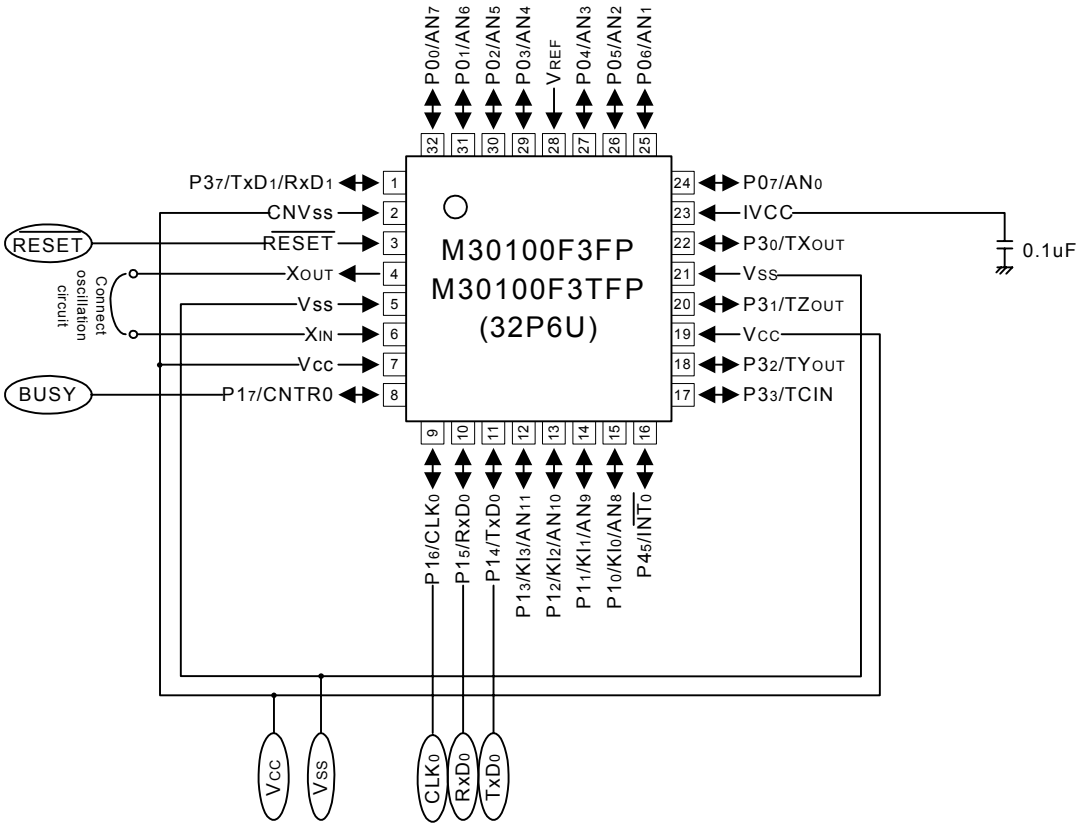


Figure 33 Pin Connections for Serial I/O Mode (17)

7.2.18 M30102F3FP/M30102F3TFP

Mode setting

Signal	Value
CNVss	Vcc
$\overline{RESET}$	Vss → Vcc

*Vcc=5V±10%

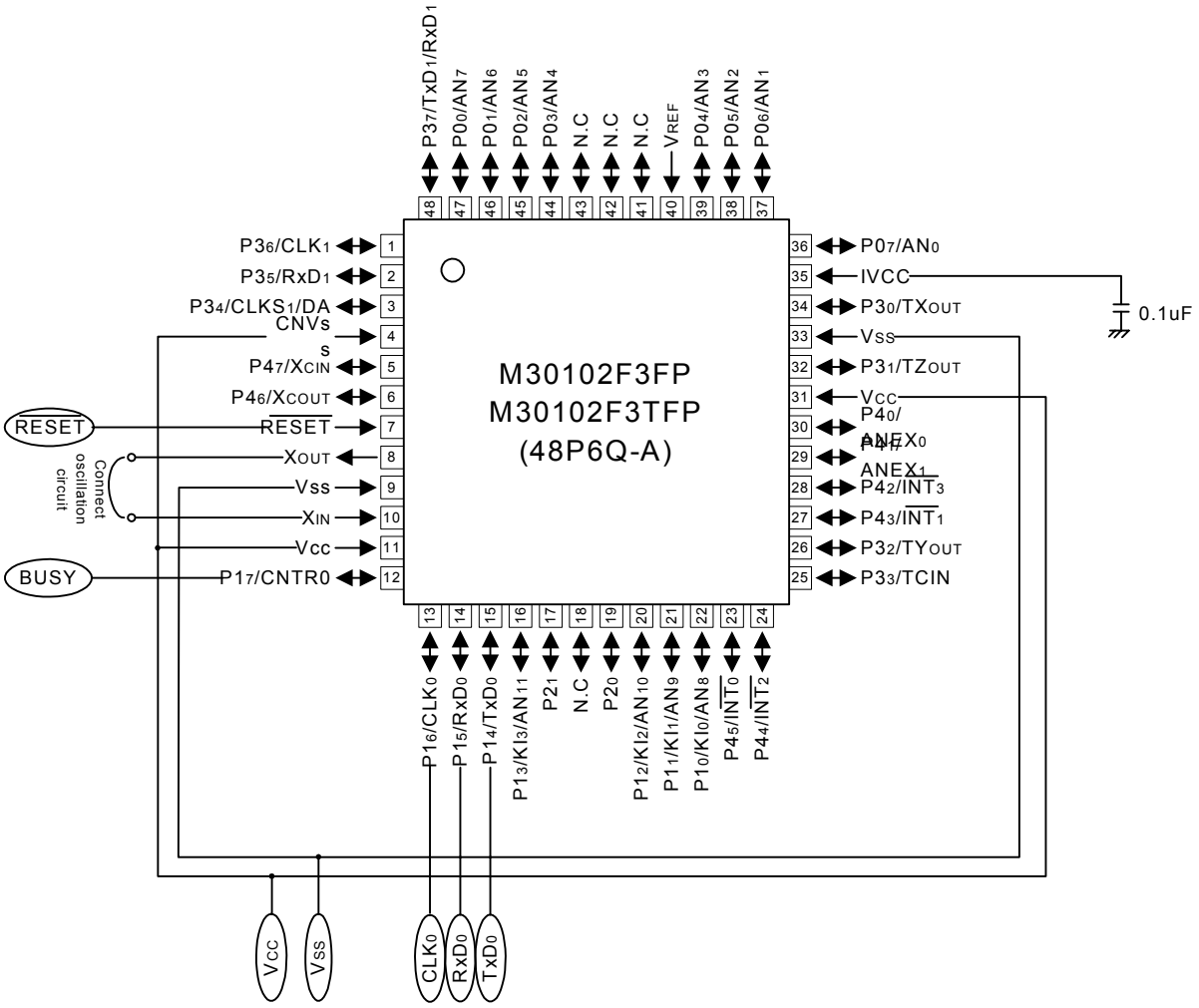
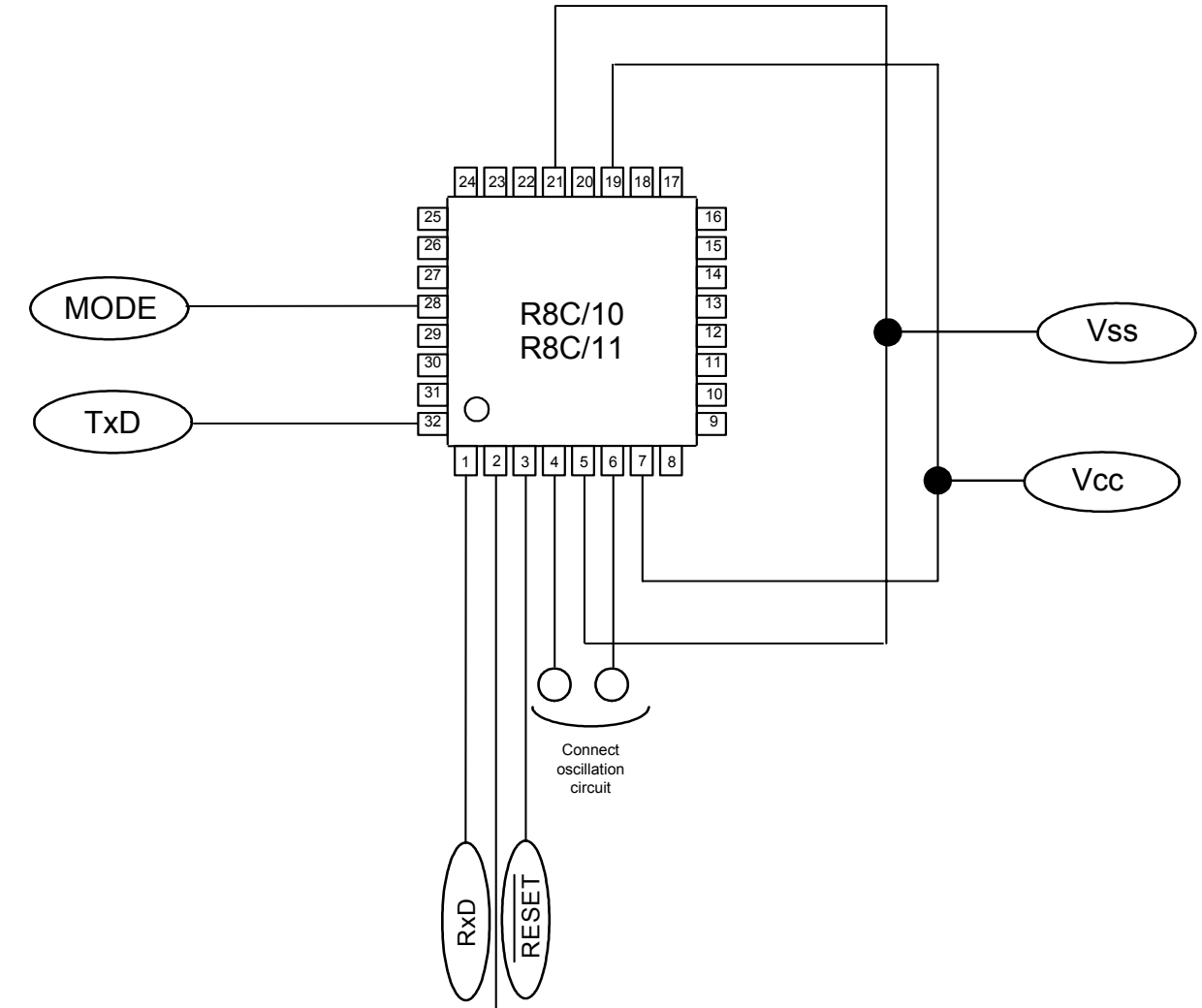


Figure 34 Pin Connections for Serial I/O Mode (18)

7.2.19 R5F21104FP/R5F21114FP



Mode setup method

Signal	value
CNVss	Vss
MODE	Vss
RxD	Vcc
$\overline{\text{RESET}}$	Vss → Vcc

Figure 35 Pin Connections for Serial I/O Mode (19)

7.3 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 8 ID Address

MCU Type	ID Address	ROM code protect information
M16C/62A M16C/62N M16C/62P M16C/6N M16C/20 M16C/10	0FFFDFh,0FFFE3h,0FFFEBh,0FFFEFh,0FFFF3h,0FFFF7h, 0FFFFBh	0FFFFFh
M16C/80 M32C/83	0FFFFDFh,0FFFFE3h,0FFFFEBh,0FFFFEFh,0FFFFF3h, 0FFFFF7h,0FFFFFBh	0FFFFFFh
38000	FFD4h,FFD5h,FFD6h,FFD7h,FFD8h,FFD9h,FFDAh	FFDBh
R8C/10 R8C/11	0FFDFh,0FFE3h,0FFEBh,0FFEFh,0FFF3h,0FFF7h, 0FFFBh	0FFFFh

```
S2140FFFB0E8C5EEC5F4C5FAC500C606C60CC612C619
S2140FFFC018C61EC624C62AC630C636C63CC642C685
S2100FFFD048C64EC654C65AC660C665C664
S2140FFFDCCDC60F0050C70F00D8C70F00CFC80F00E5
S2140FFFEC13CA0F005BC80F004DCB0F004ECB0F0084
S2080FFFFC18CD0F00F9
S804000000FB
```

Figure 36 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 4.1, "ID Check" on page 10).

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 Renesas'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

In case of 38000 series, assembler(SRA74) cannot create an ID file, so please create one like that in Figure 37.

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, FFFEFh, 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 FFFEFh 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
FFFDF  :  12
FFFE3  :  34
FFFEB  :  00
FFFEF  :  00
FFFF3  :  00
FFFF7  :  00
FFFFB  :  00
FFFFF  :  FF
```

Figure 37 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 36.

7.4 Messages

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

Table 9 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 baud rate 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 baud rate. Baud rate is last baud rate.	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 obdurate. Baud rate 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 baud rate. Baud rate is last baud rate 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 runninig.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 opera Tion	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.

7.5 Example of Target Board Circuit

7.5.1 Using MF Ten Nine CABLE (M30624FGAFP,M30624FGNFP)

(When using MF Ten Nine CABLE included in the M3A-0806)

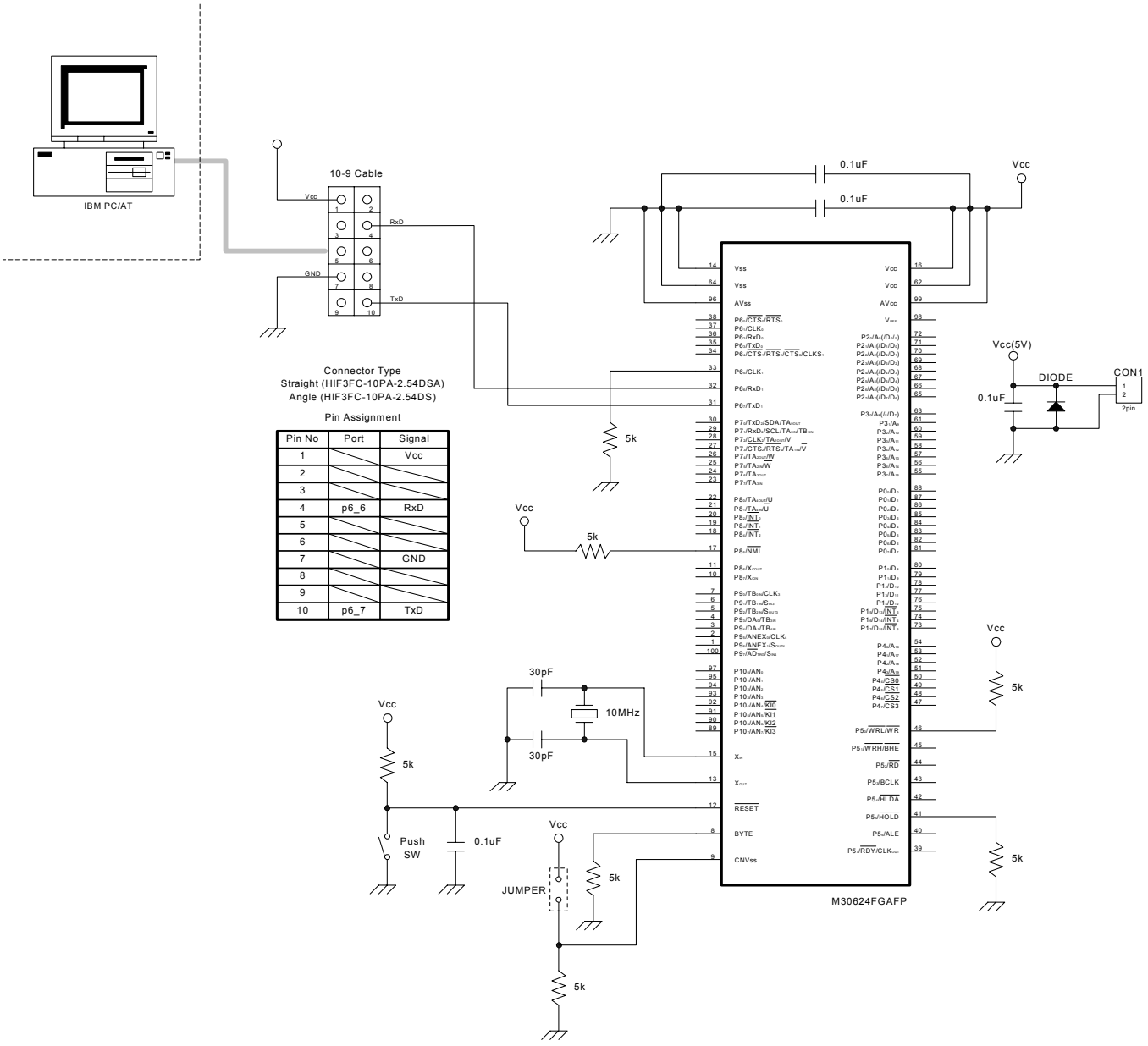


Figure 38 Example of Target Board Circuit (1)

7.5.2 Using RS-232C Cable (M30624FGAFP,M30624FGNFP)

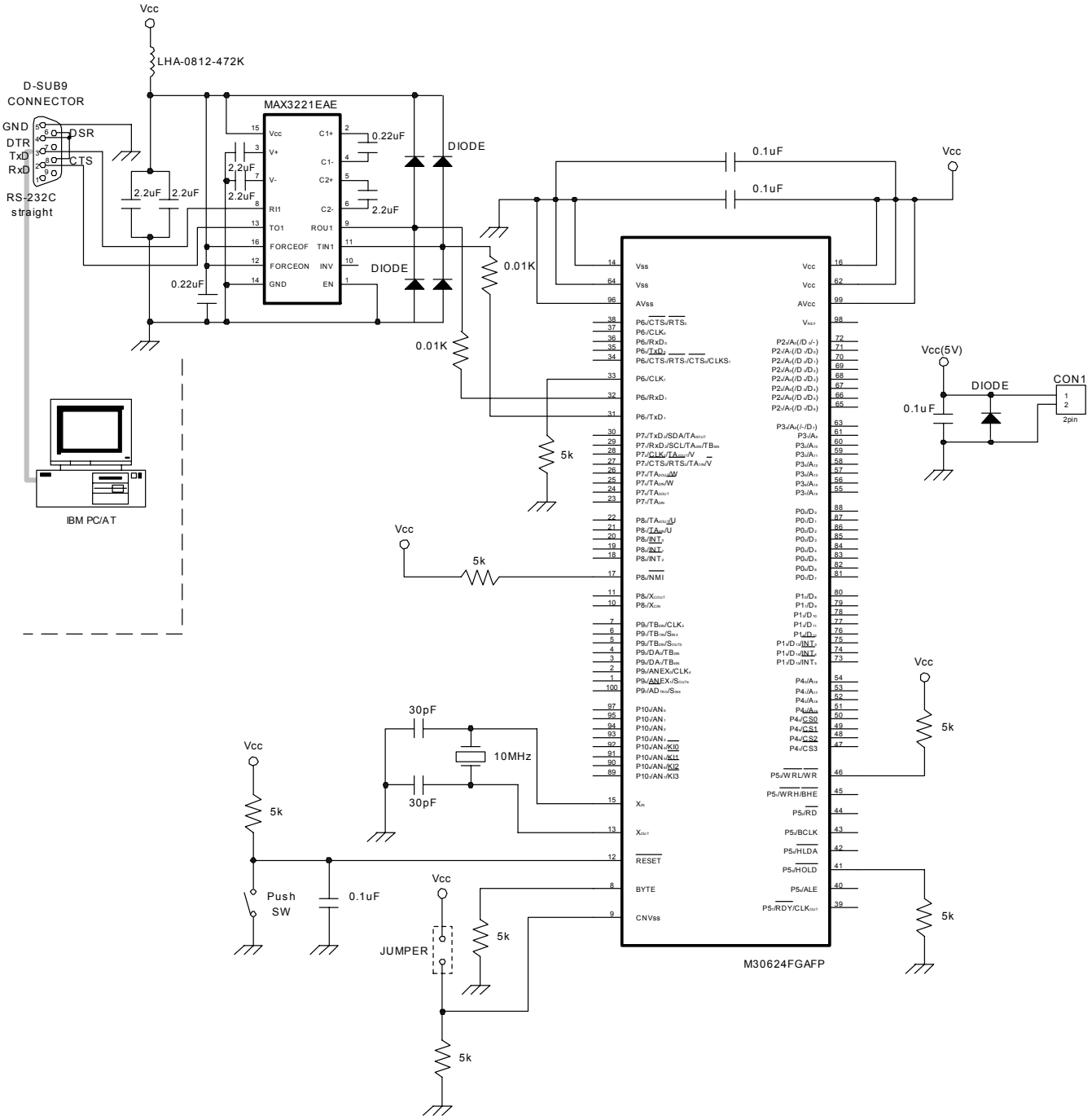


Figure 39 Example of Target Board Circuit (2)

7.5.3 Using MF Ten Nine CABLE (M30626FHPFP)

(When using MF Ten Nine CABLE included in the M3A-0806)

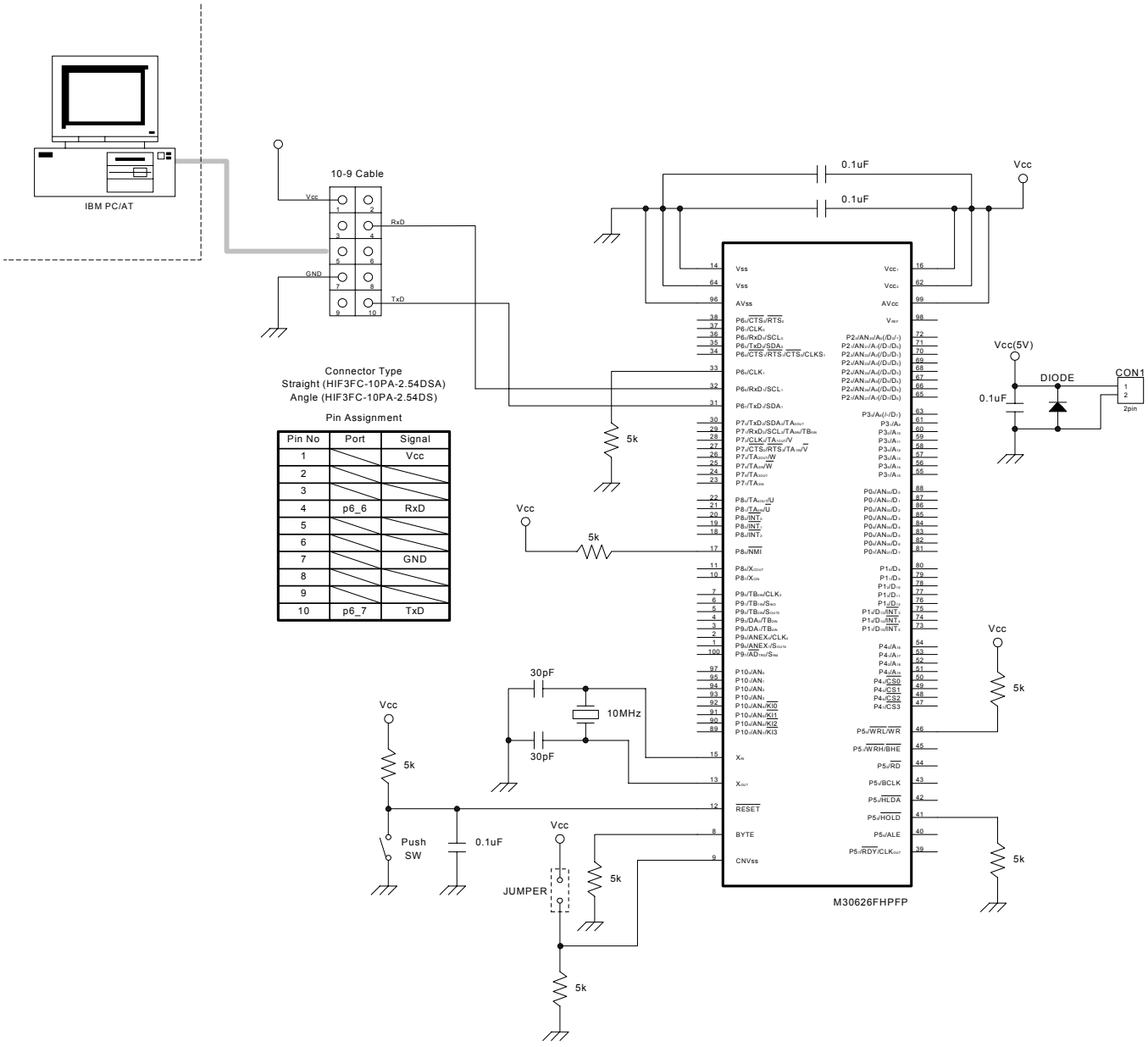


Figure 40 Example of Target Board Circuit (3)

7.5.4 Using RS-232C Cable (M30626FHPFP)

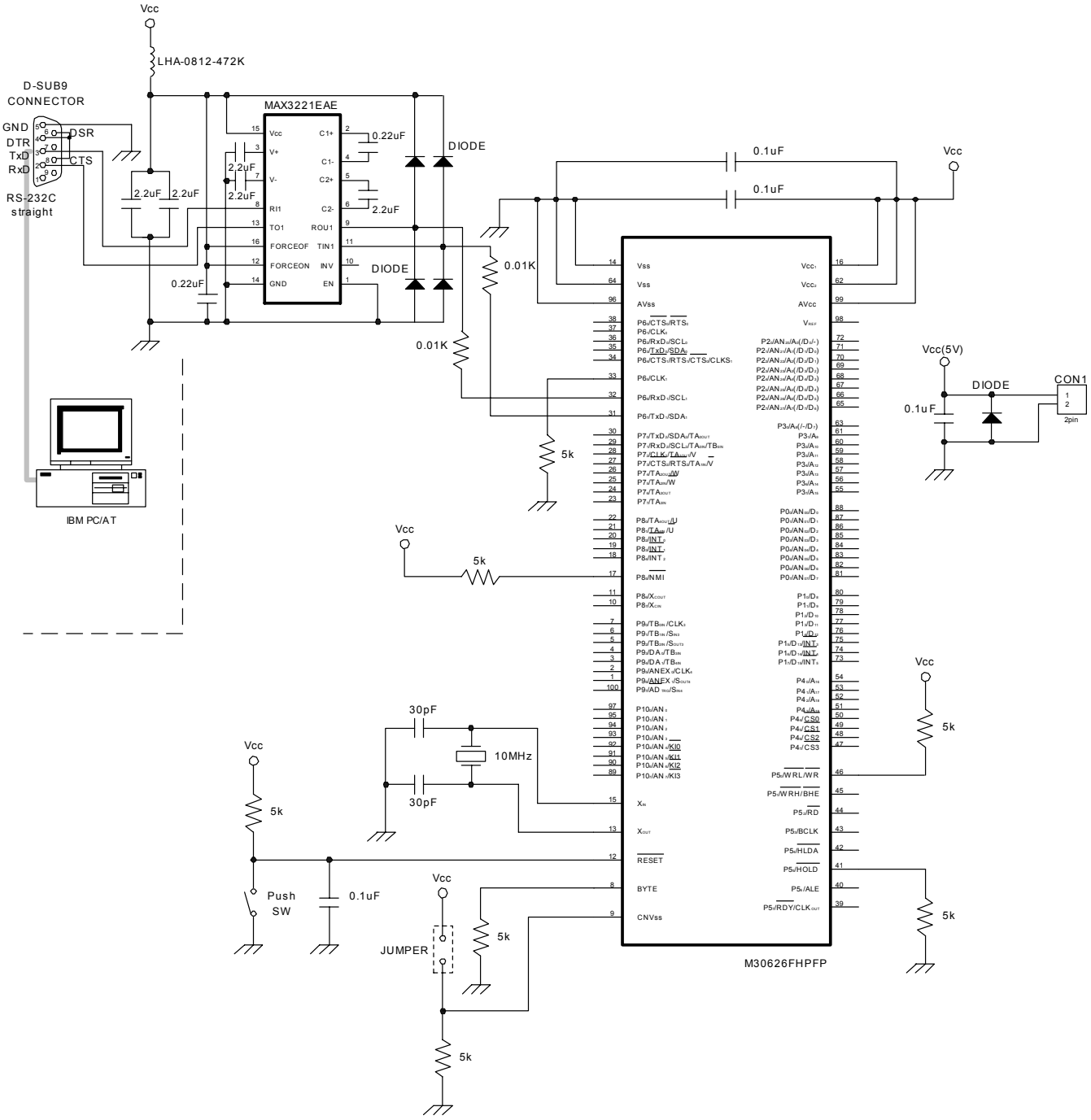


Figure 41 Example of Target Board Circuit (4)

7.5.5 Using MF Ten Nine CABLE (M30627FHPGP)

(When using MF Ten Nine CABLE included in the M3A-0806)

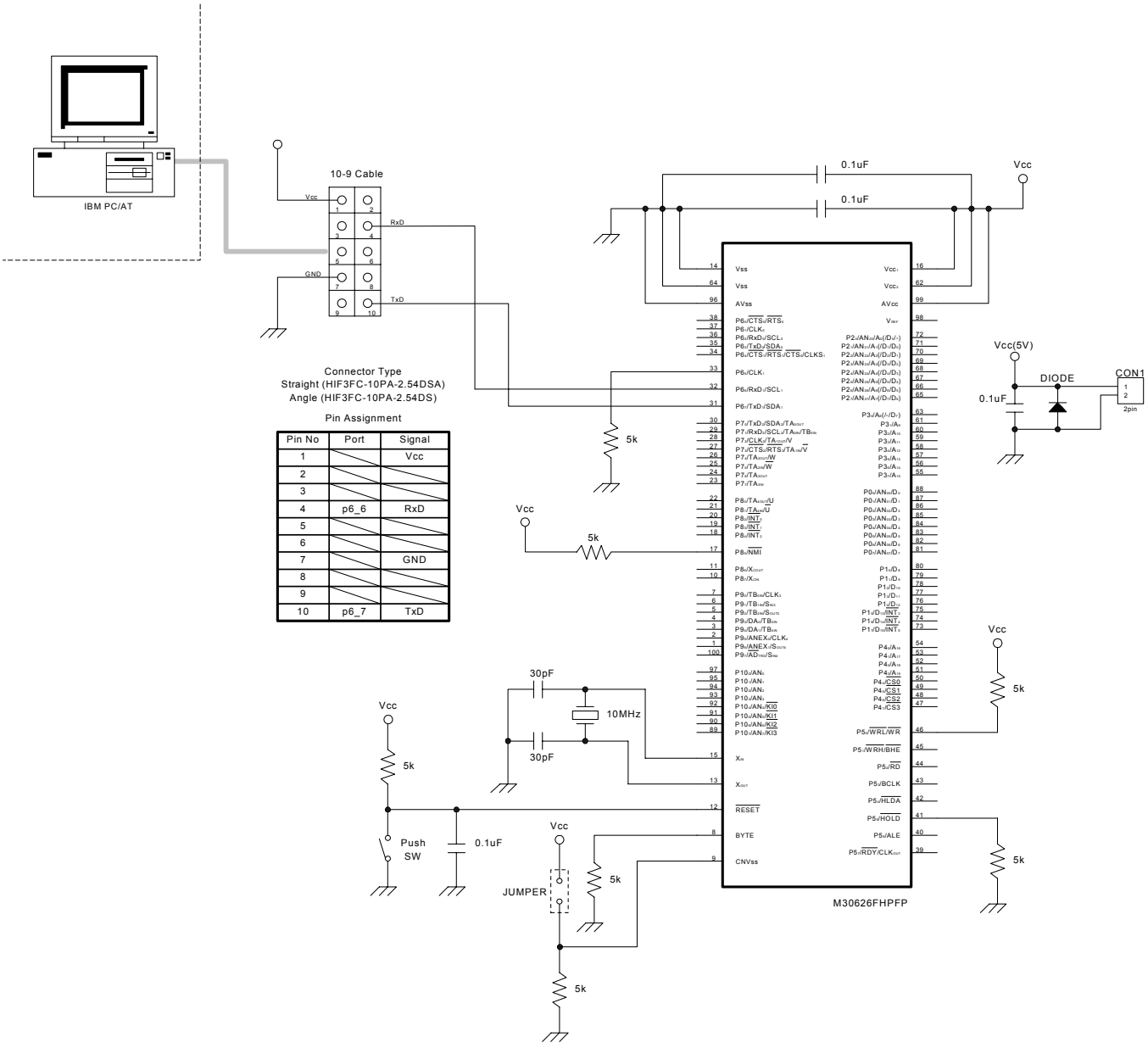


Figure 42 Example of Target Board Circuit (5)

7.5.6 Using RS-232C Cable (M30627FHPGP)

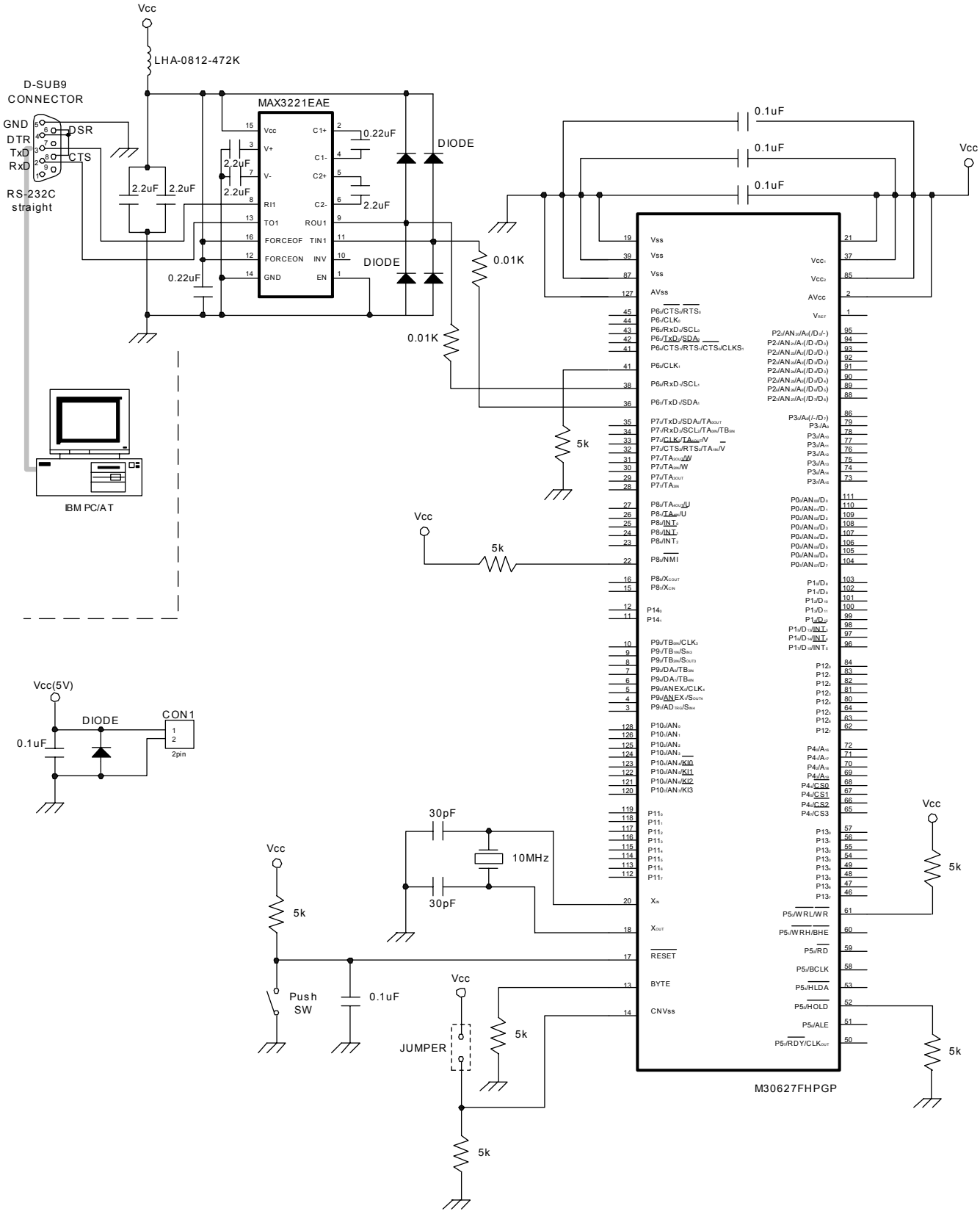


Figure 43 Example of Target Board Circuit (6)

7.5.7 Using MF Ten Nine CABLE (M306NAFGTFP)

(When using MF Ten Nine CABLE included in the M3A-0806)

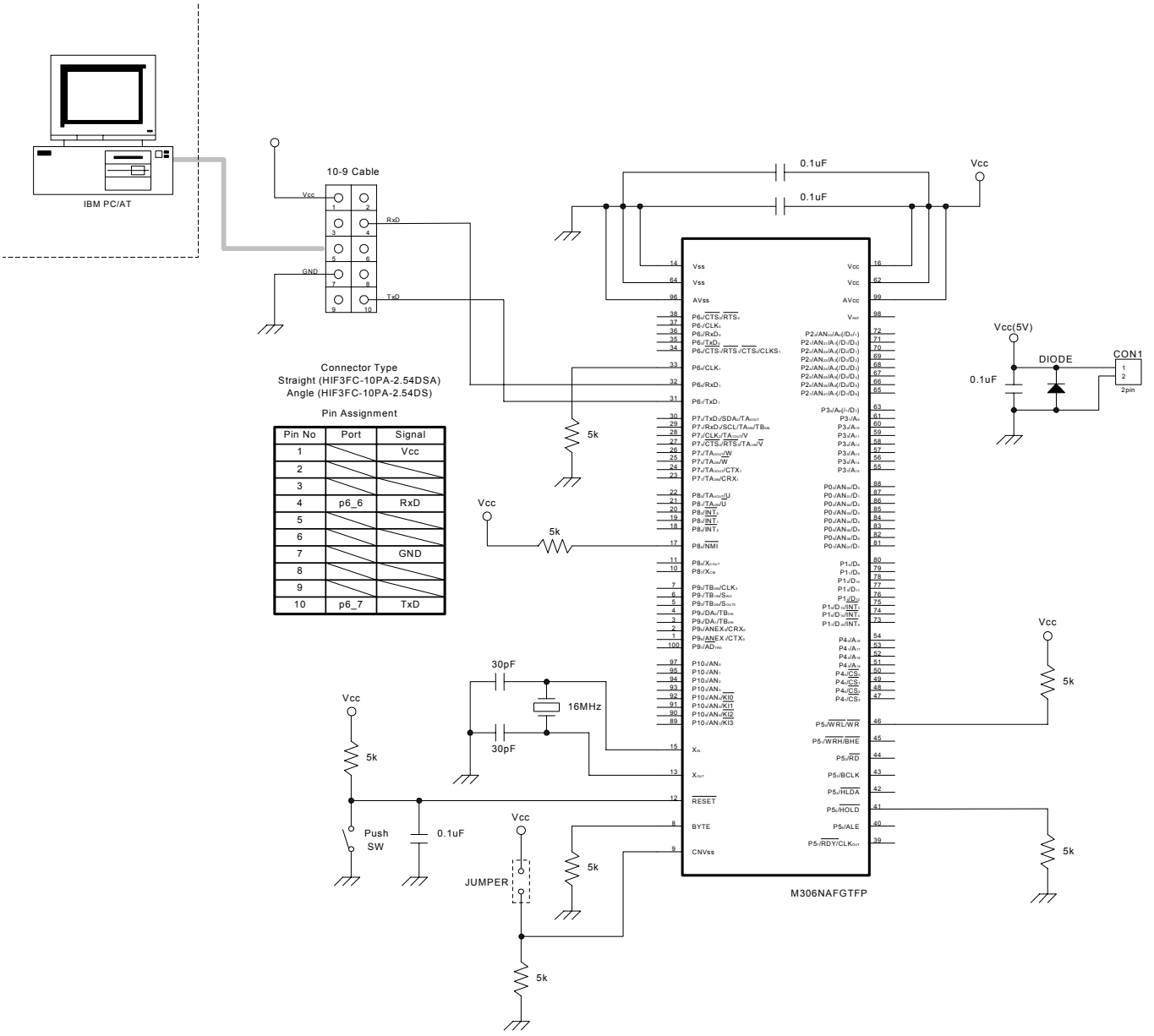


Figure 44 Example of Target Board Circuit (7)

7.5.8 Using RS-232C Cable (M306NAFGTFP)

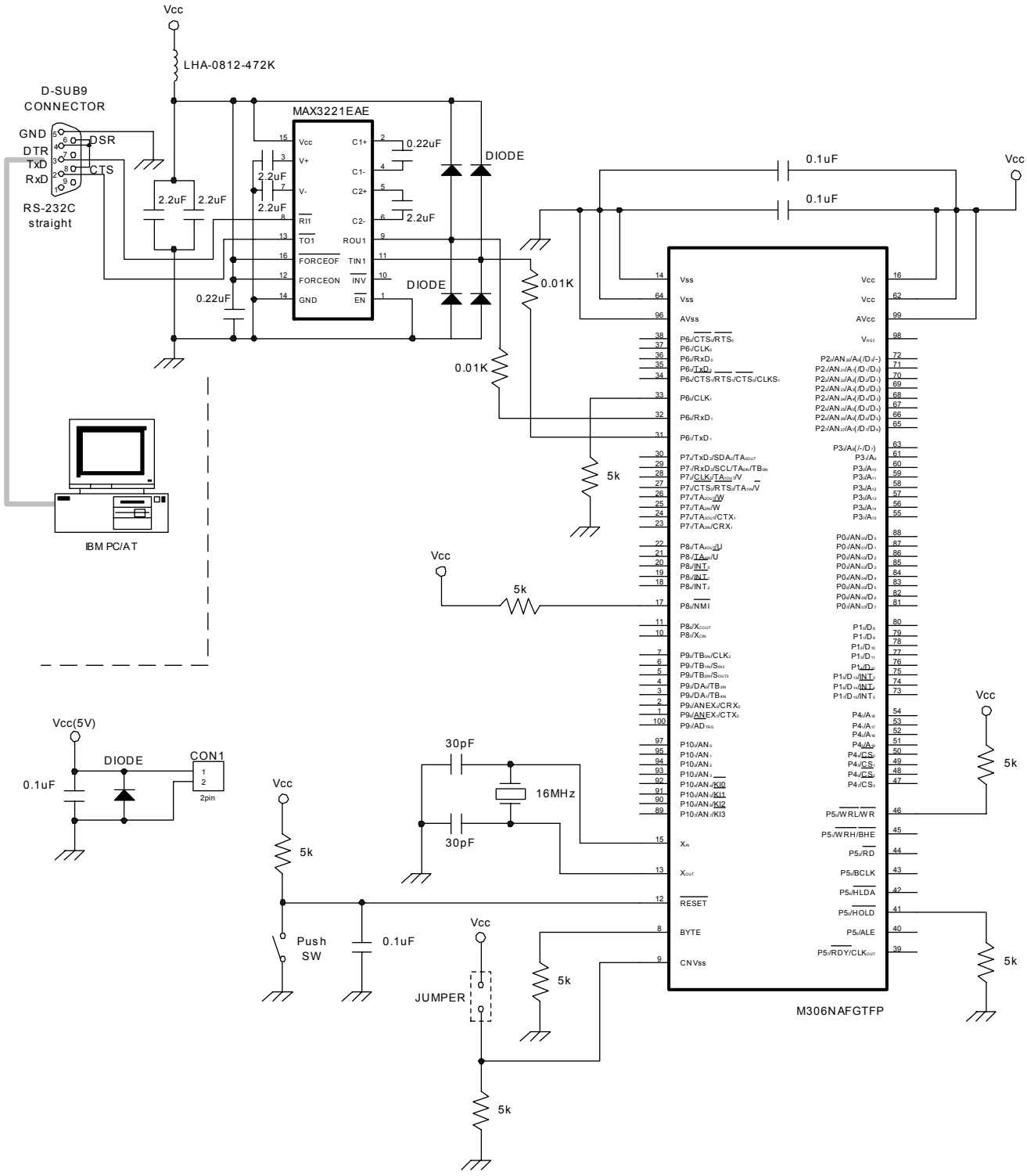


Figure 45 Example of Target Board Circuit (8)

7.5.9 Using MF Ten Nine CABLE (M30800FCFP,M30833FJFP)

(When using MF Ten Nine CABLE included in the M3A-0806)

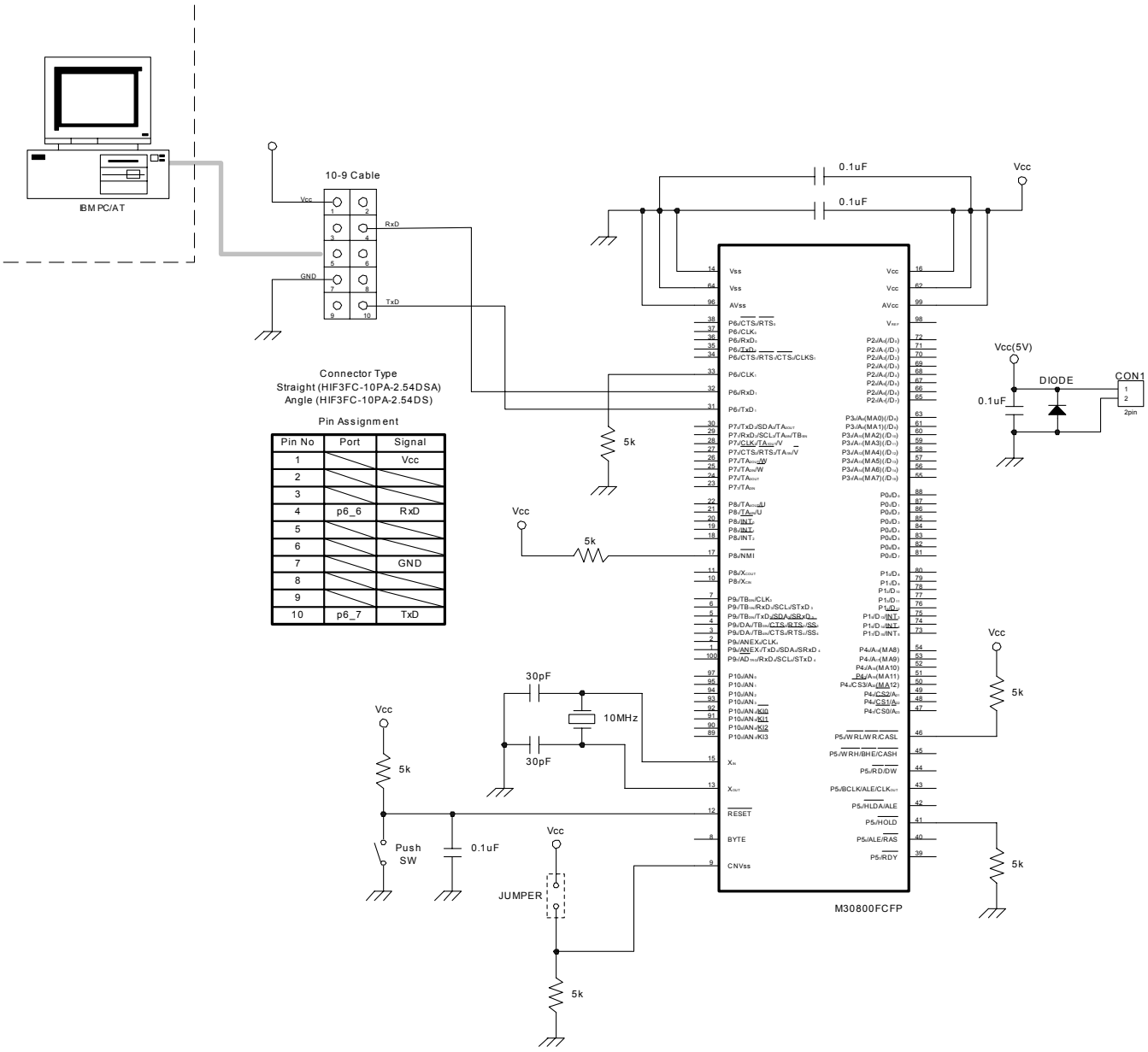


Figure 46 Example of Target Board Circuit (9)

7.5.10 Using RS-232C Cable (M30800FCFP,M30833FJFP)

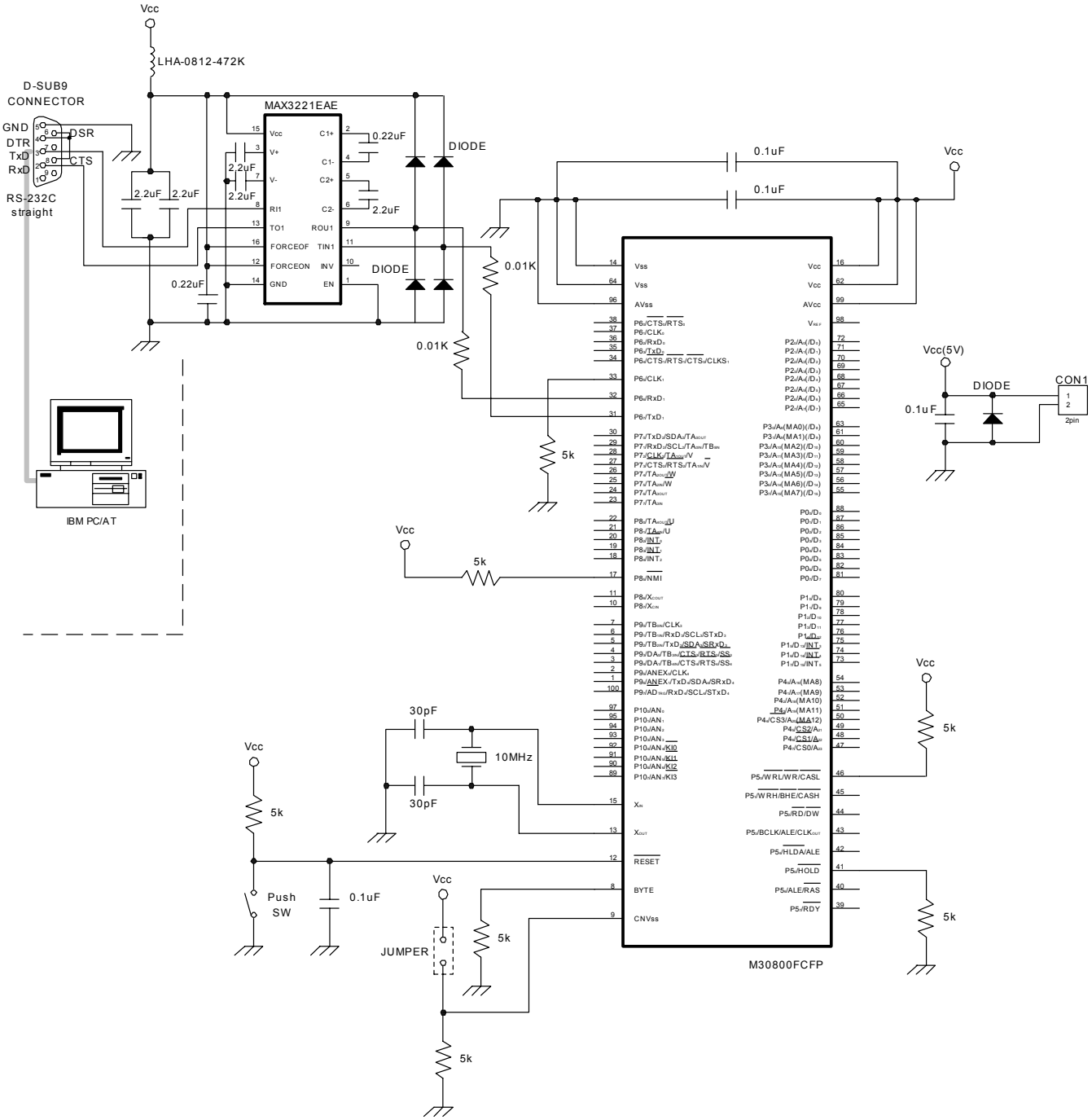
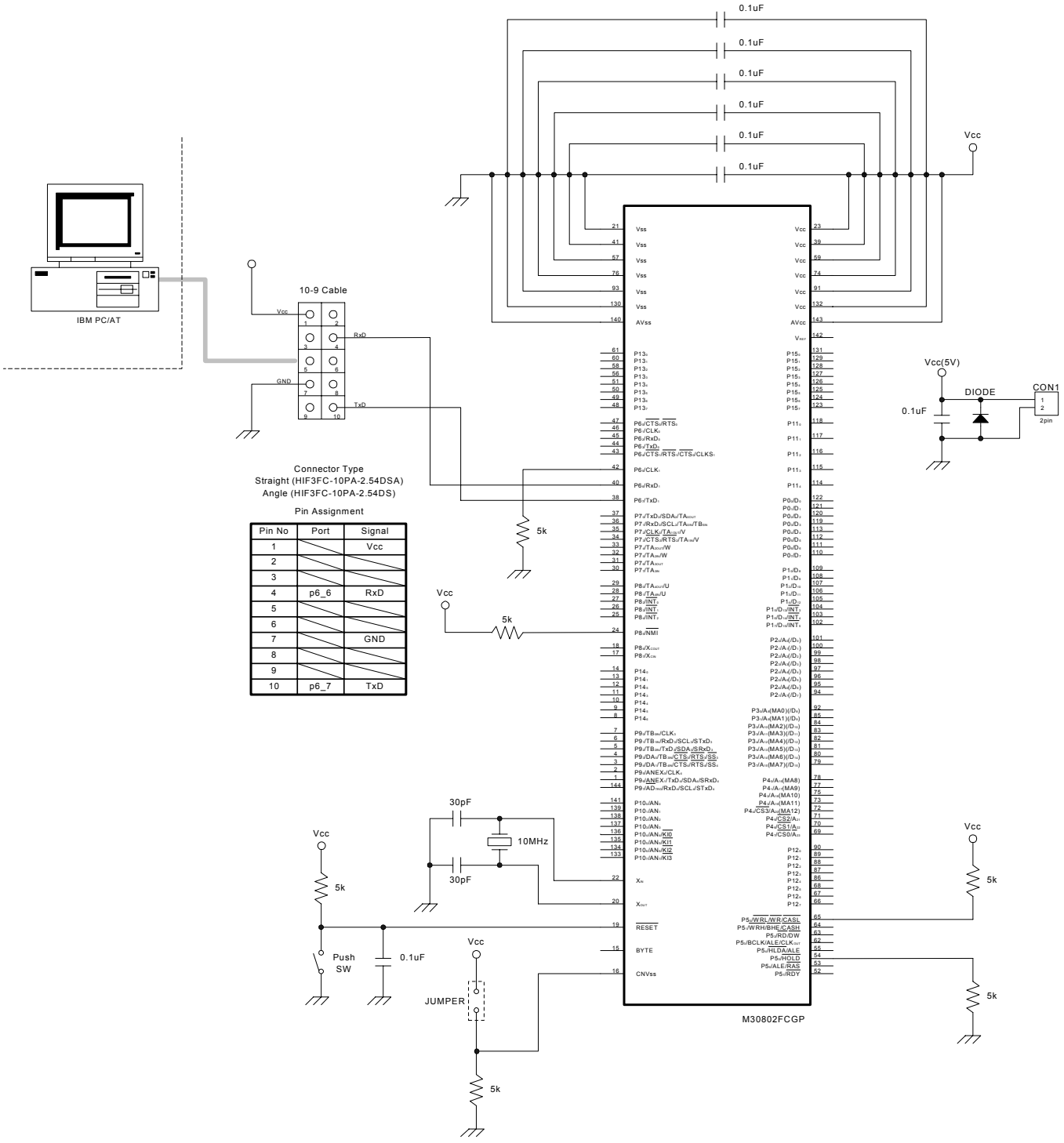


Figure 47 Example of Target Board Circuit (10)

7.5.11 Using MF Ten Nine CABLE (M30802FCGP,M30835FJGP)

(When using MF Ten Nine CABLE included in the M3A-0806)



Pin No	Port	Signal
1		Vcc
2		
3		
4	p6_6	RxD
5		
6		
7		GND
8		
9		
10	p6_7	TxD

Figure 48 Example of Target Board Circuit (11)

7.5.12 Using RS-232C Cable (M30802FCGP,M30835FJGP)

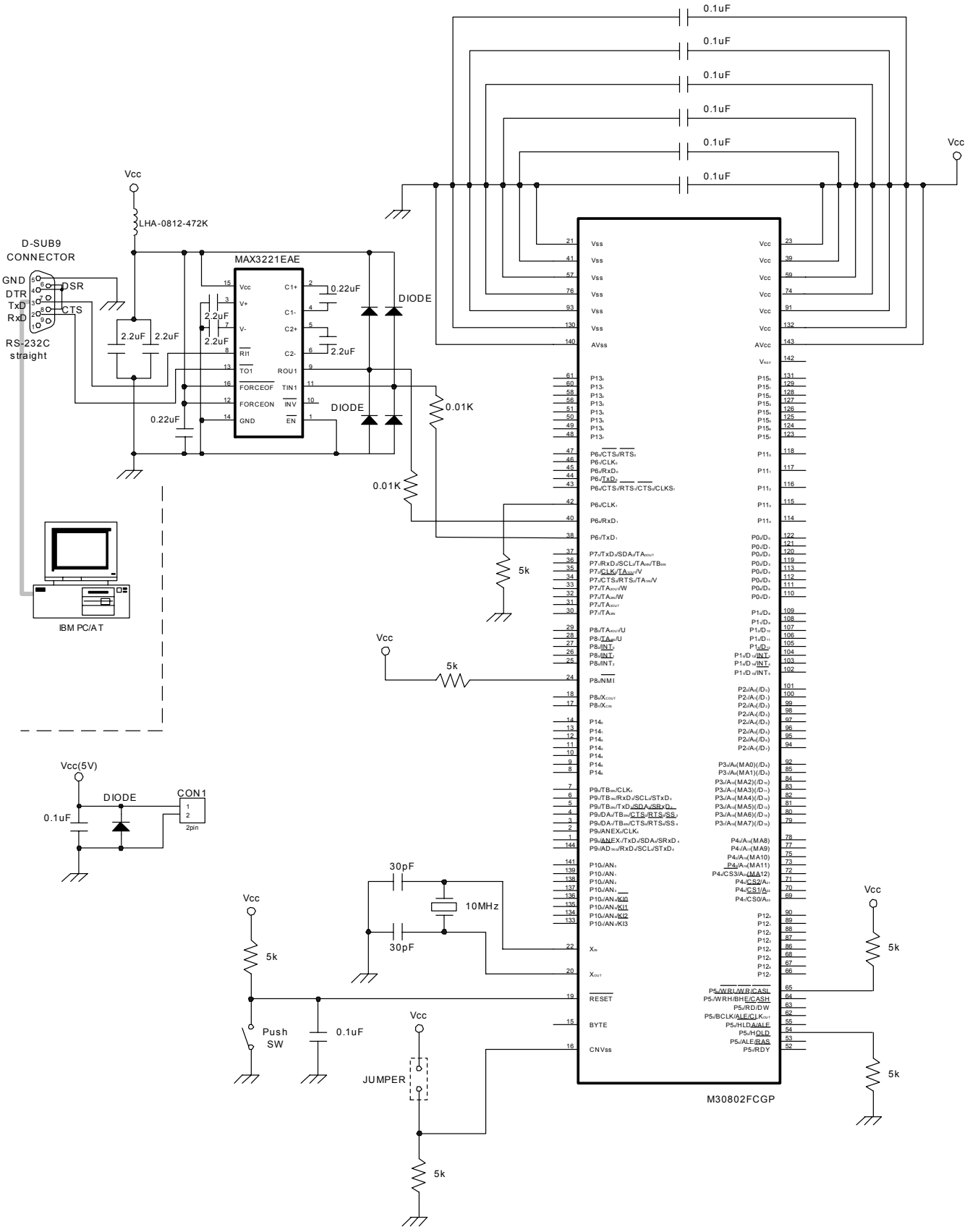


Figure 49 Example of Target Board Circuit (12)

7.5.13 Using MF Ten Nine CABLE (M30201F6FP)

(When using MF Ten Nine CABLE included in the M3A-0806)

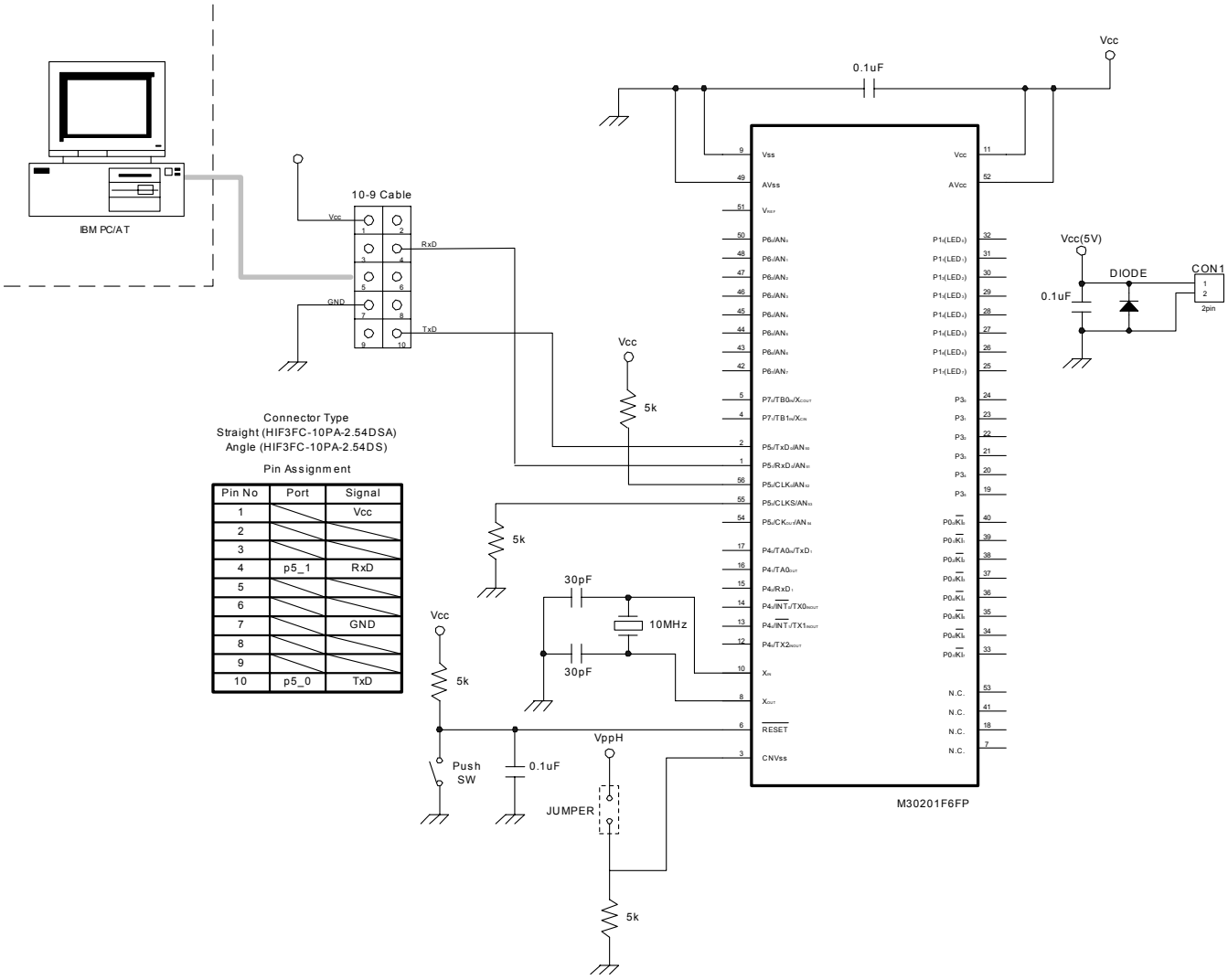


Figure 50 Example of Target Board Circuit (13)

7.5.14 Using RS-232C Cable (M30201F6FP)

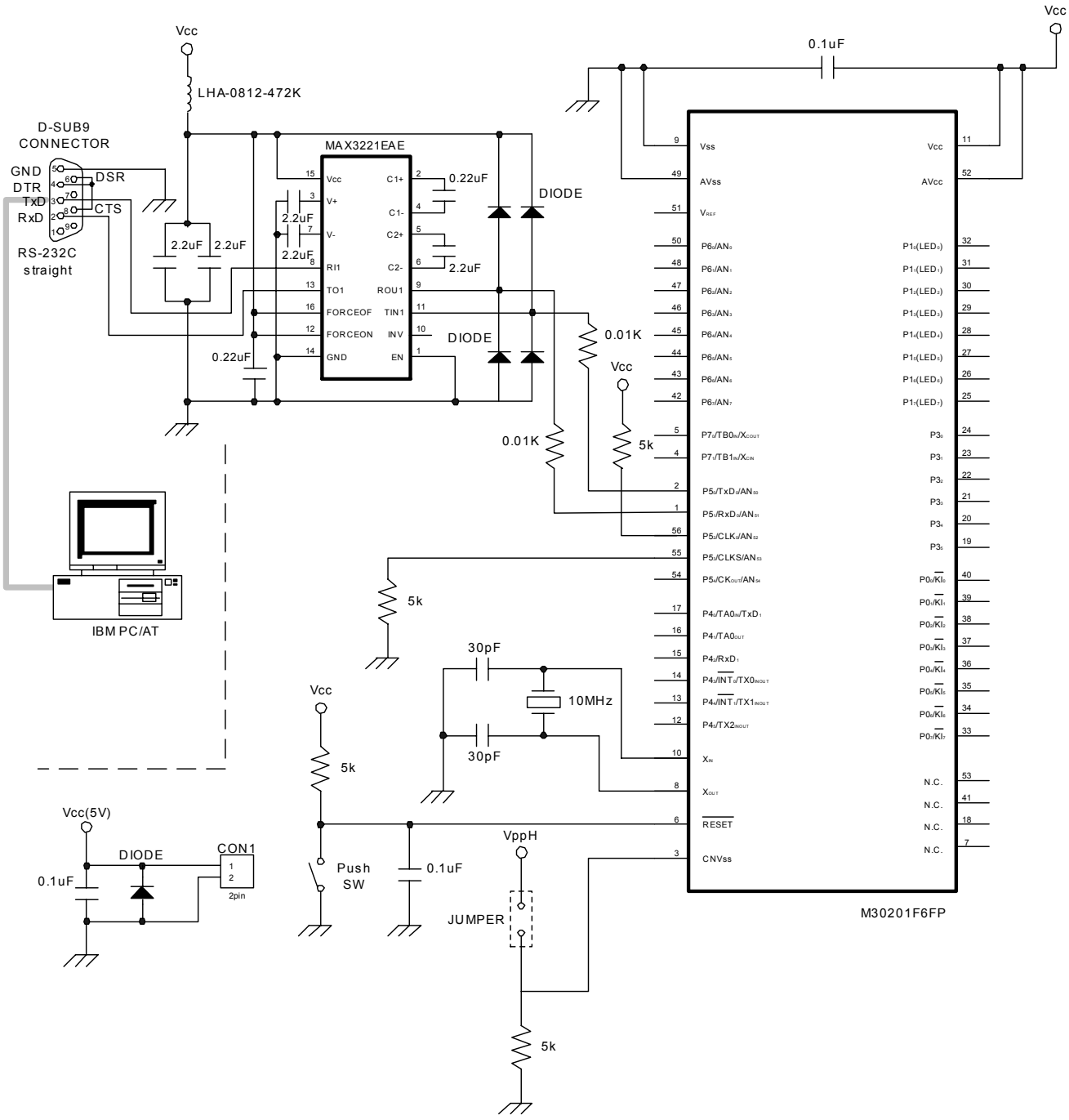


Figure 51 Example of Target Board Circuit (14)

7.5.15 Using MF Ten Nine CABLE (M37516F8HP)

(When using MF Ten Nine CABLE included in the M3A-0806)

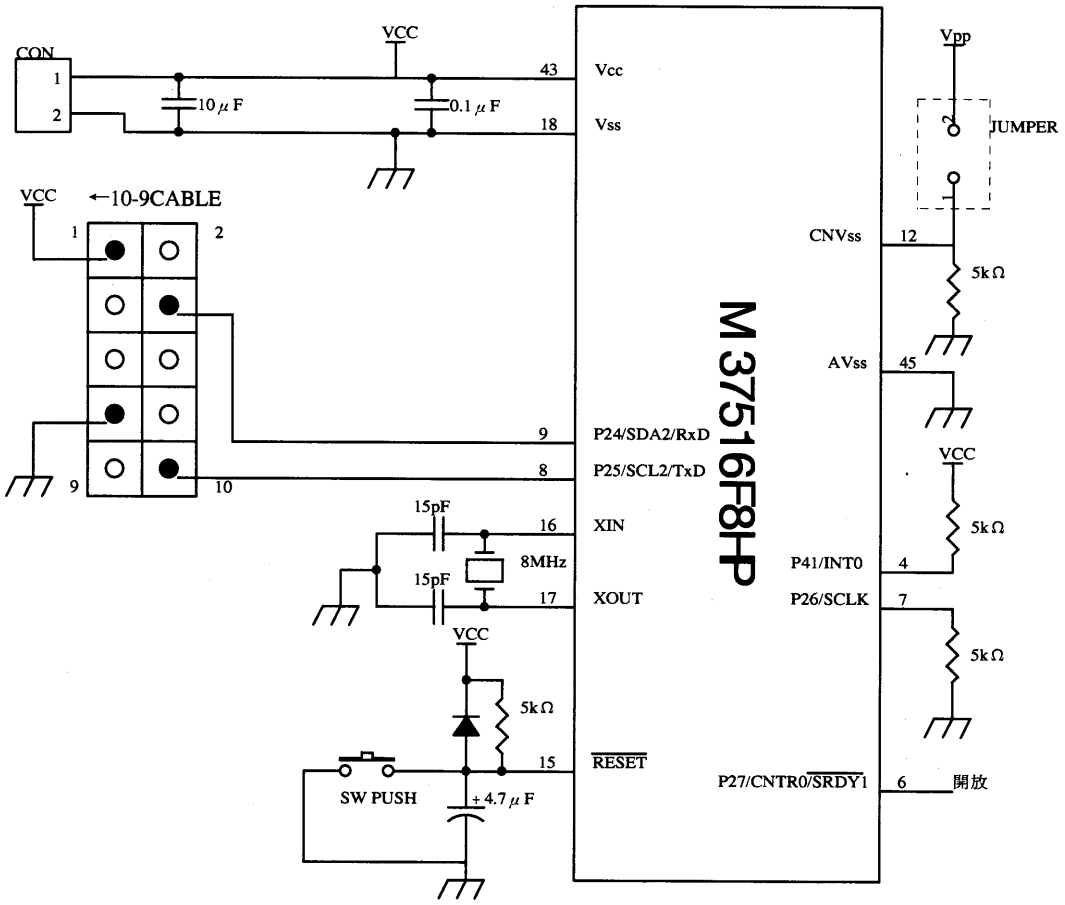


Figure 52 Example of Target Board Circuit (15)

7.5.16 Using MF Ten Nine CABLE (M38507F8FP/SP,M38517F8FP/SP)

(When using MF Ten Nine CABLE included in the M3A-0806)

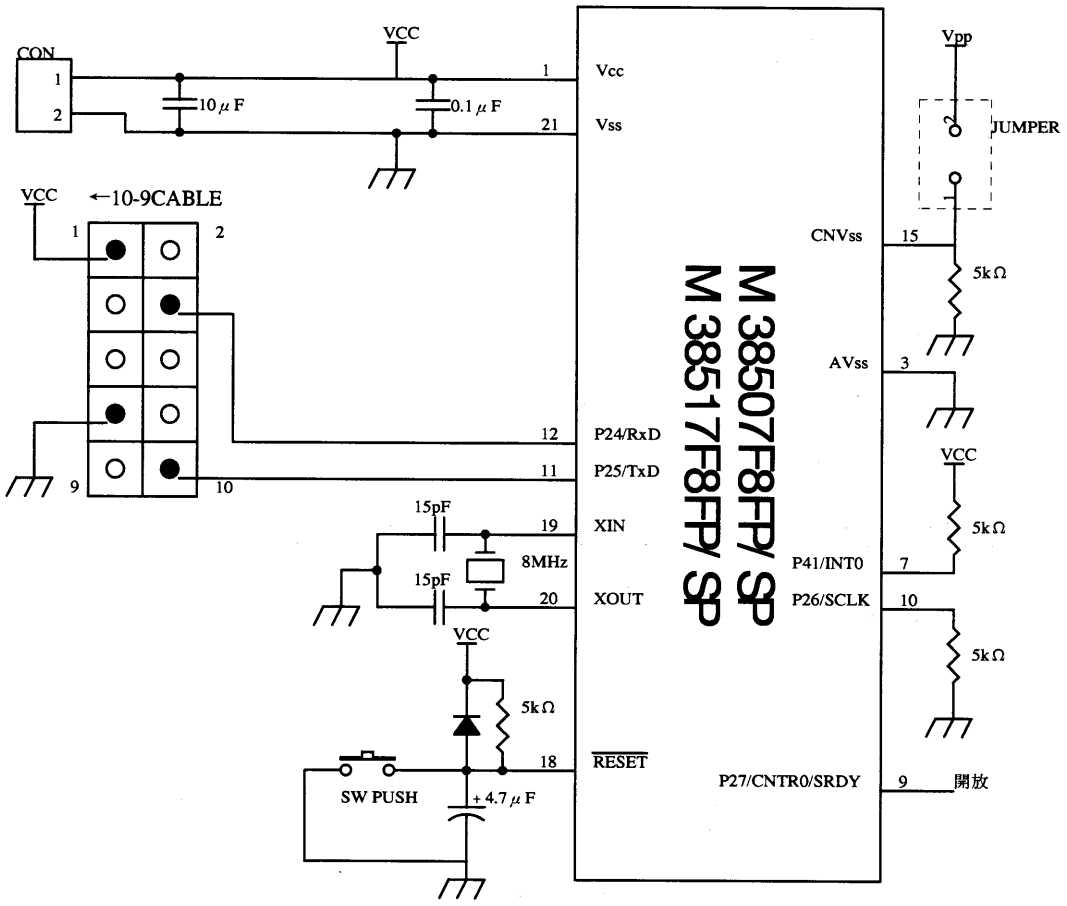


Figure 53 Example of Target Board Circuit (16)

7.5.17 Using MF Ten Nine CABLE (M38C29FFFP/M38C29FFHP)

(When using MF Ten Nine CABLE included in the M3A-0806)

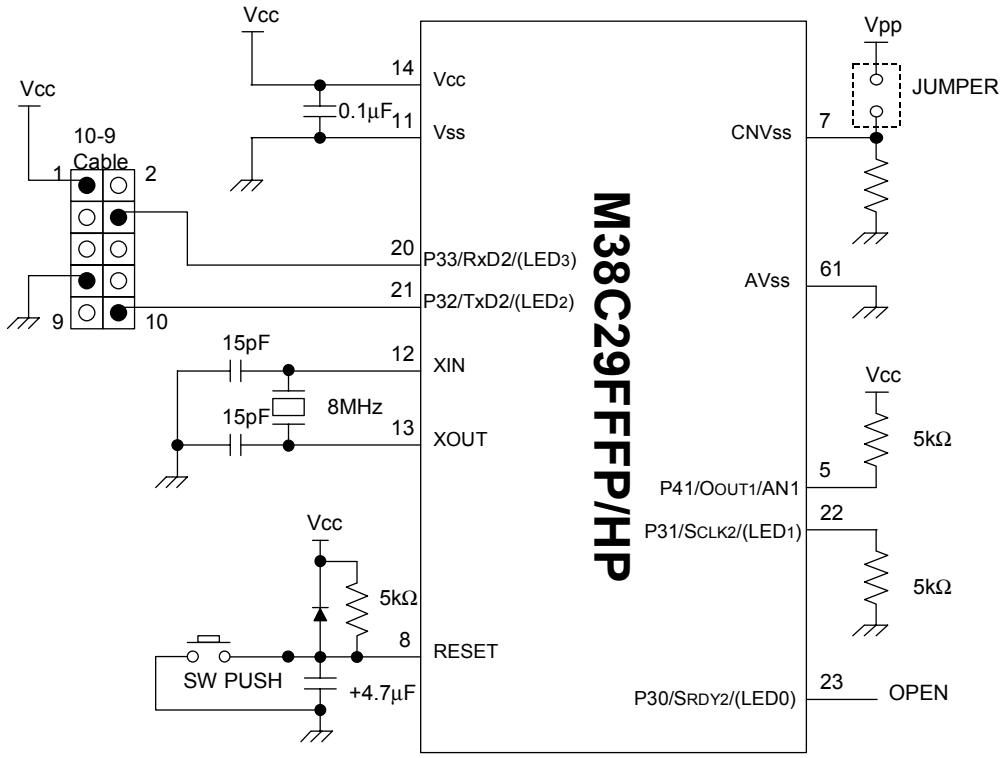


Figure 54 Example of Target Board Circuit (17)

7.5.18 Using MF Ten Nine CABLE (M30100F3FP,M30100F3TFP)

(When using MF Ten Nine CABLE included in the M3A-0806)

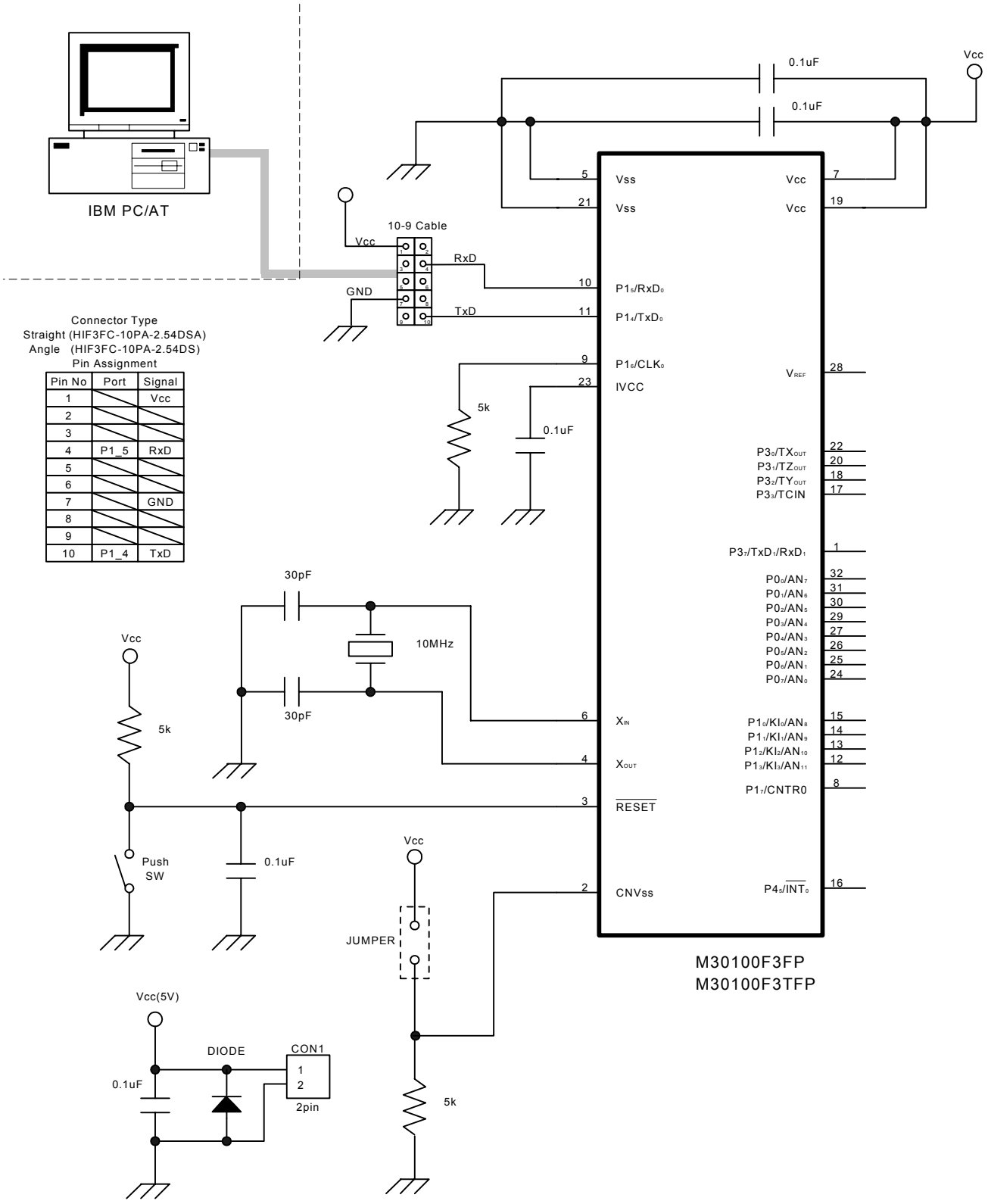


Figure 55 Example of Target Board Circuit (18)

7.5.19 Using RS-232C Cable (M30100F3FP,M30100F3TFP)

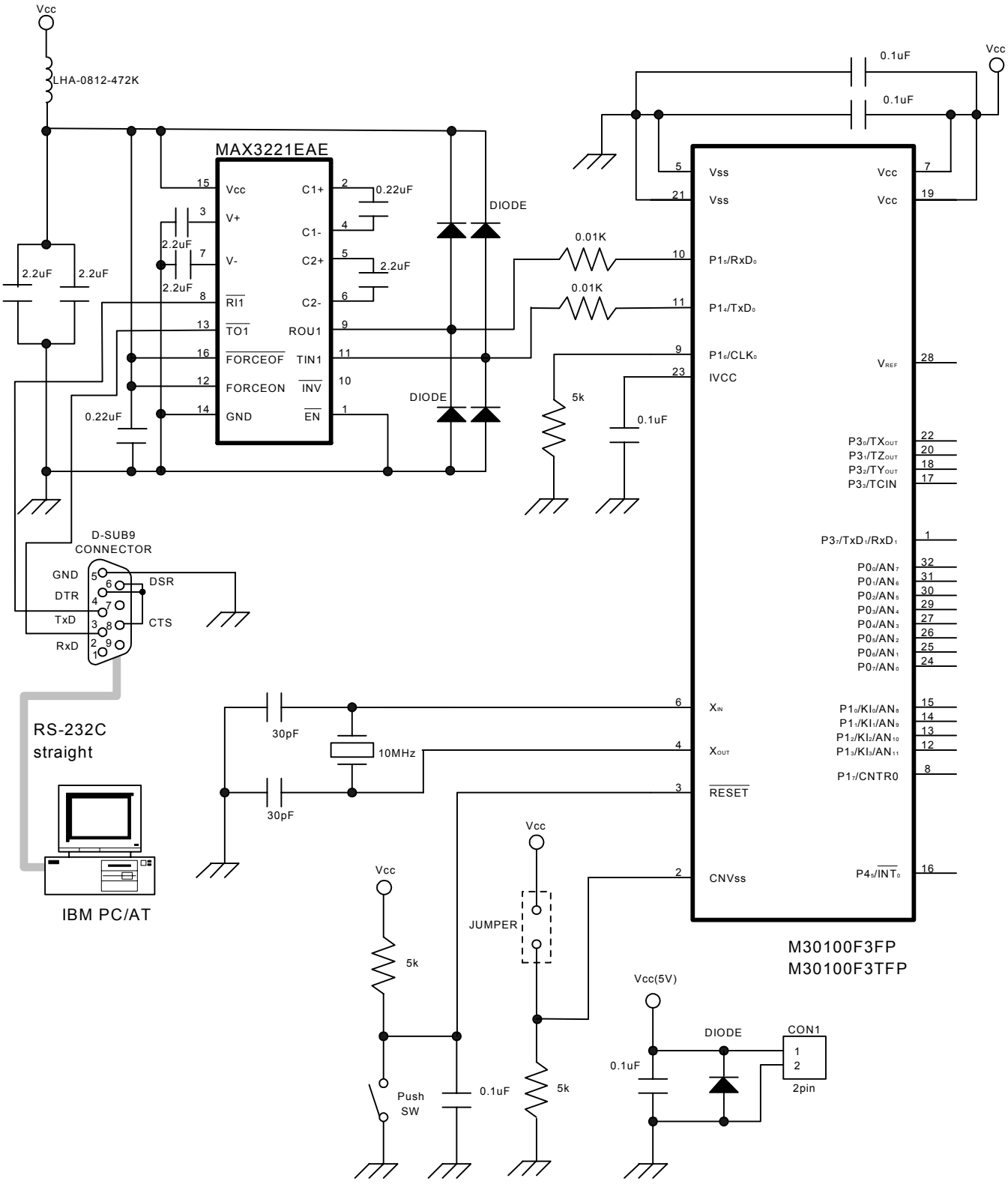


Figure 56 Example of Target Board Circuit (19)

7.5.20 Using MF Ten Nine CABLE (M30102F3FP,M30102F3TFP)

(When using MF Ten Nine CABLE included in the M3A-0806)

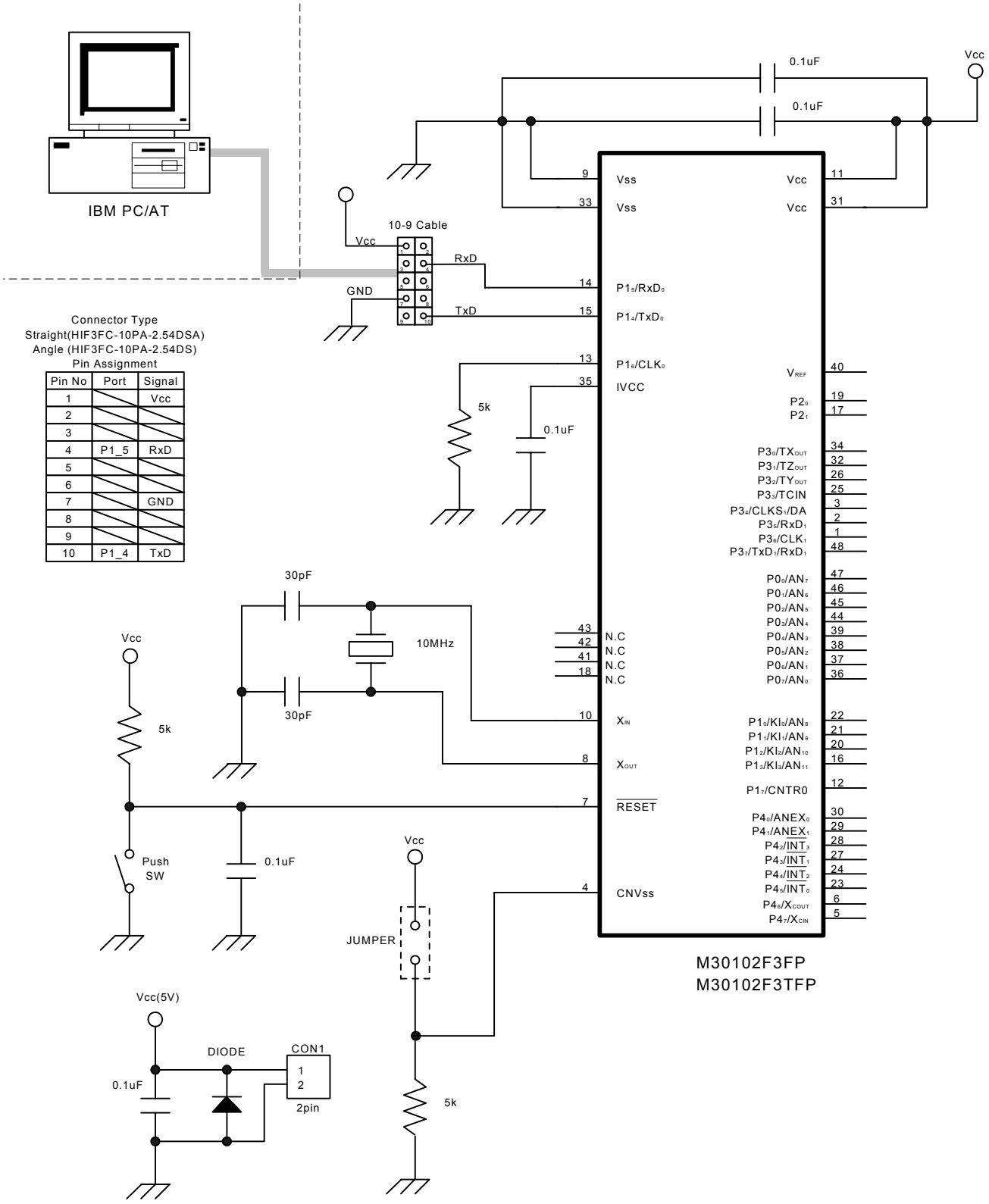


Figure 57 Example of Target Board Circuit (20)

7.5.21 Using RS-232C Cable (R5F21104FP)

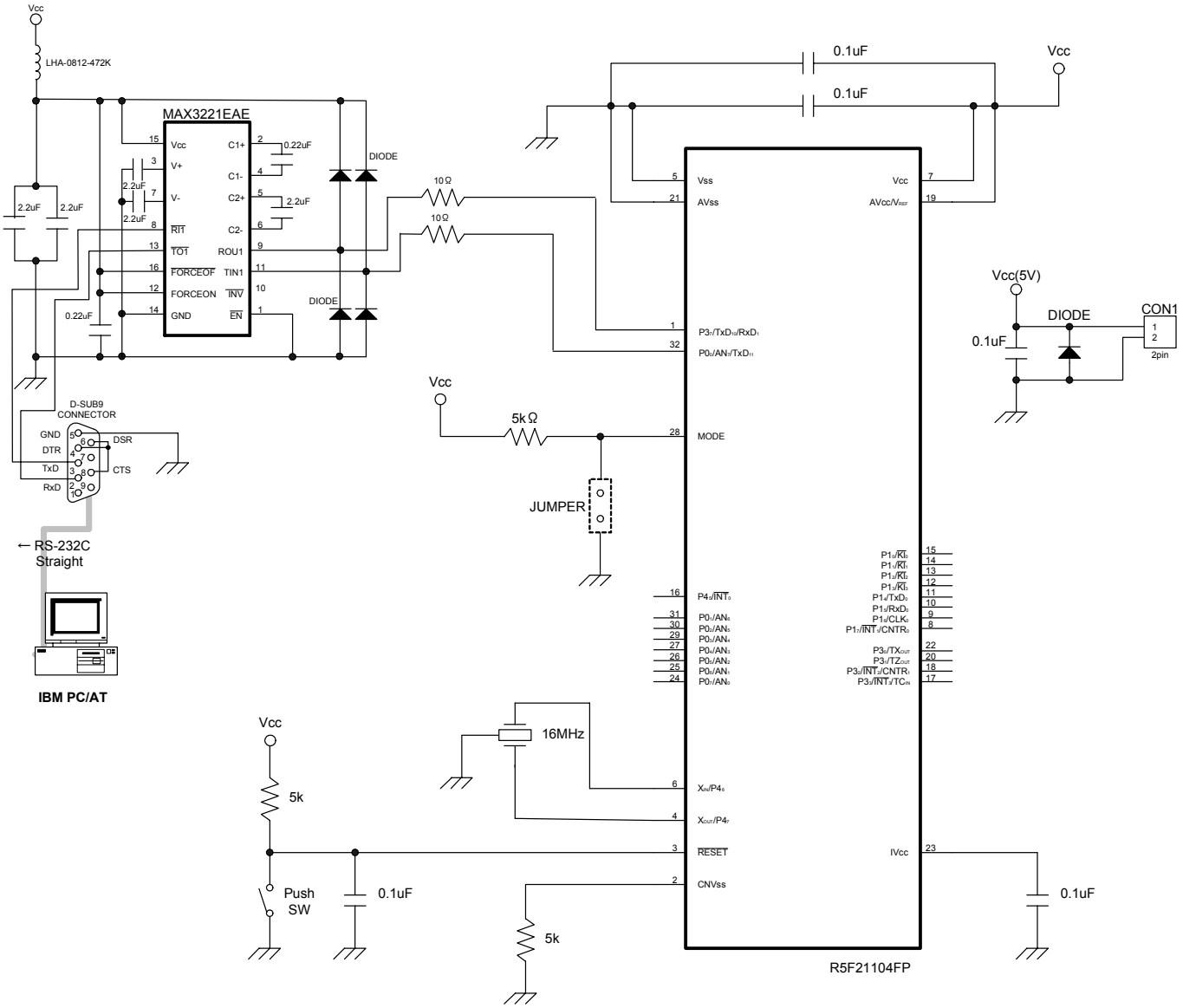


Figure 58 example of Target Board Circuit (21)

7.5.22 Using MF Ten Nine CABLE (R5F21104FP)

(When using MF Ten Nine CABLE included in the M3A-0806)

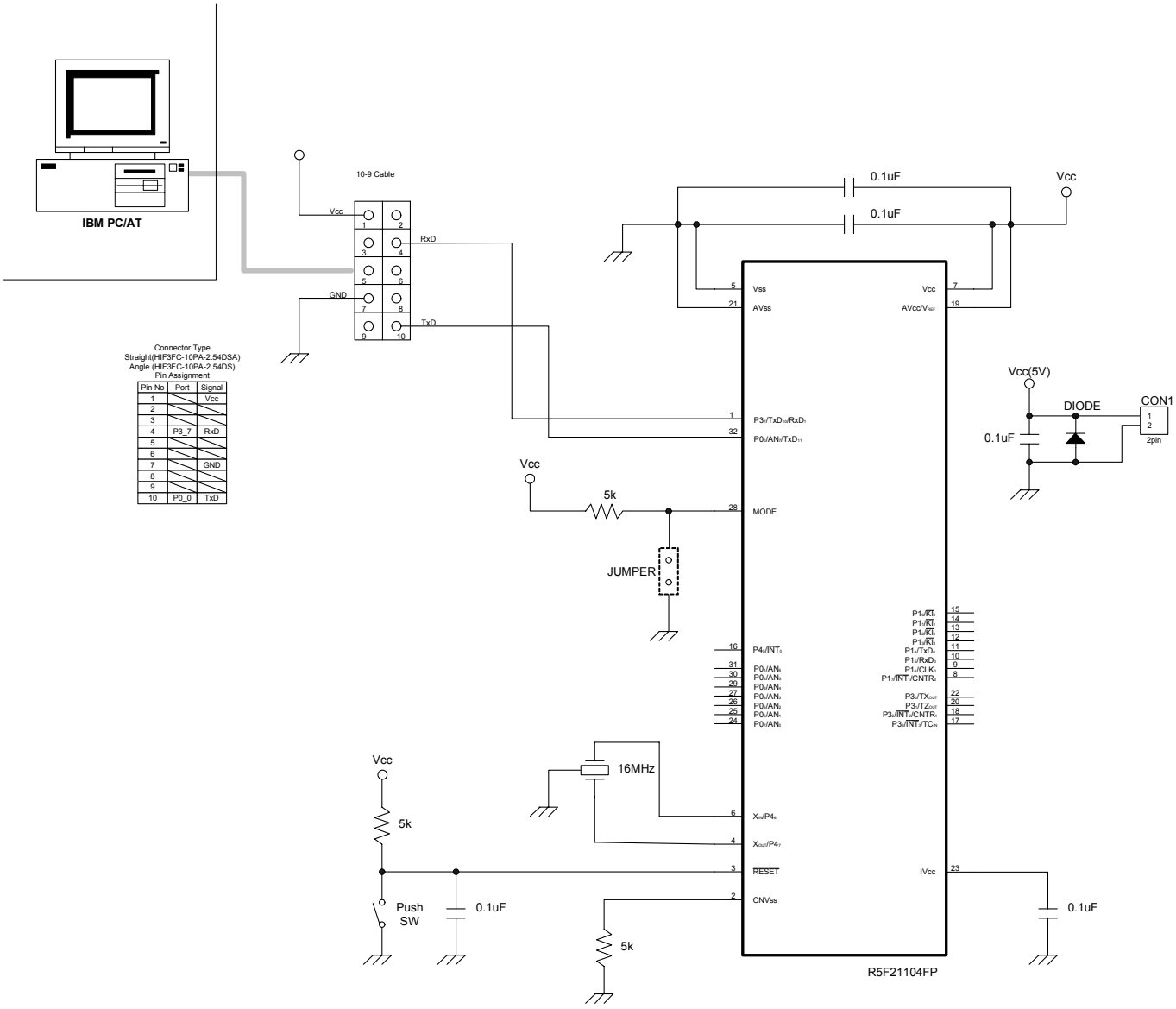


Figure 59 Example of Target Board Circuit (22)

7.5.23 Using RS-232C Cable (R5F21114FP)

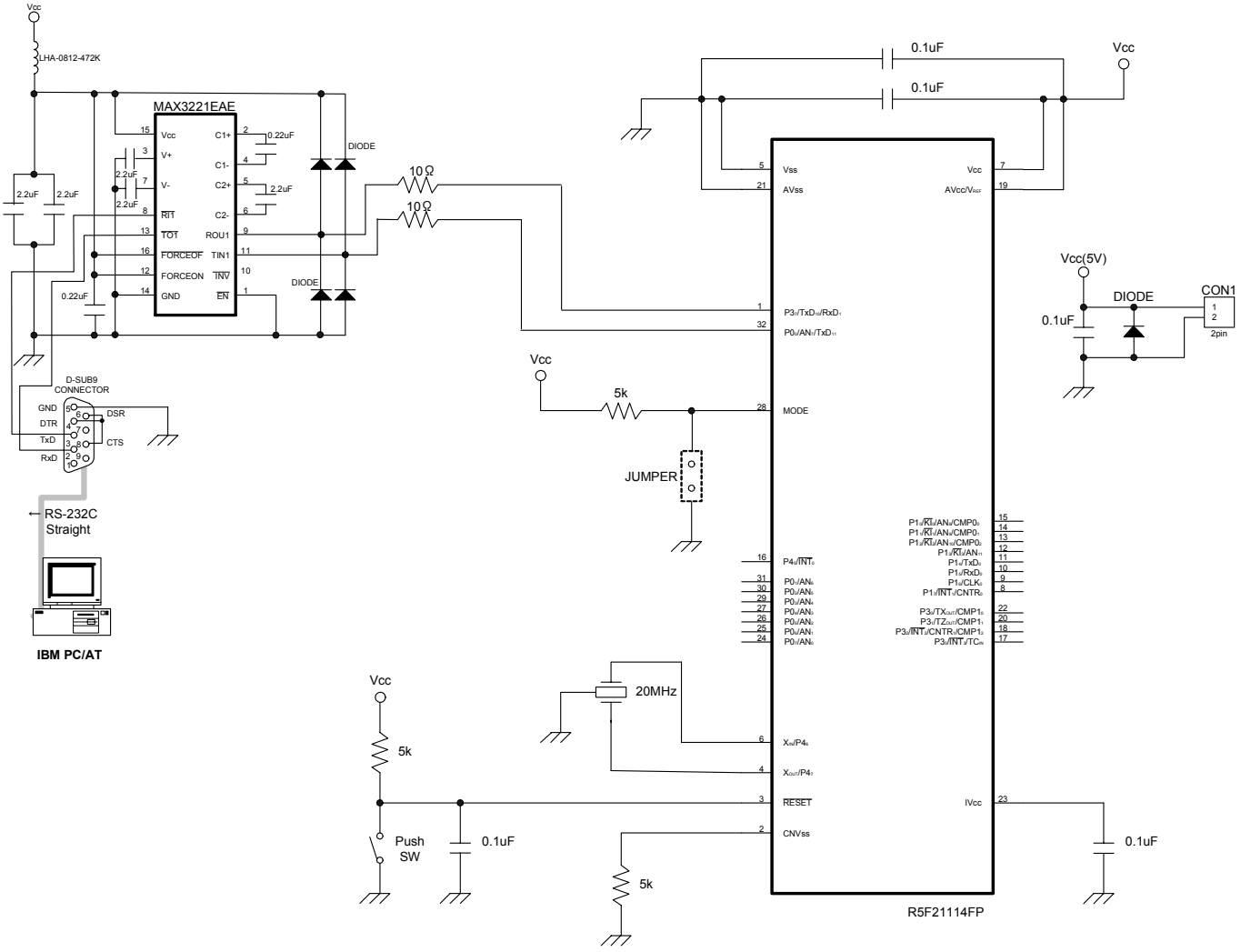


Figure 60 Example of Target Board Circuit (23)

7.5.24 Using MF Ten Nine CABLE (R5F21114FP)

(When using MF Ten Nine CABLE included in the M3A-0806)

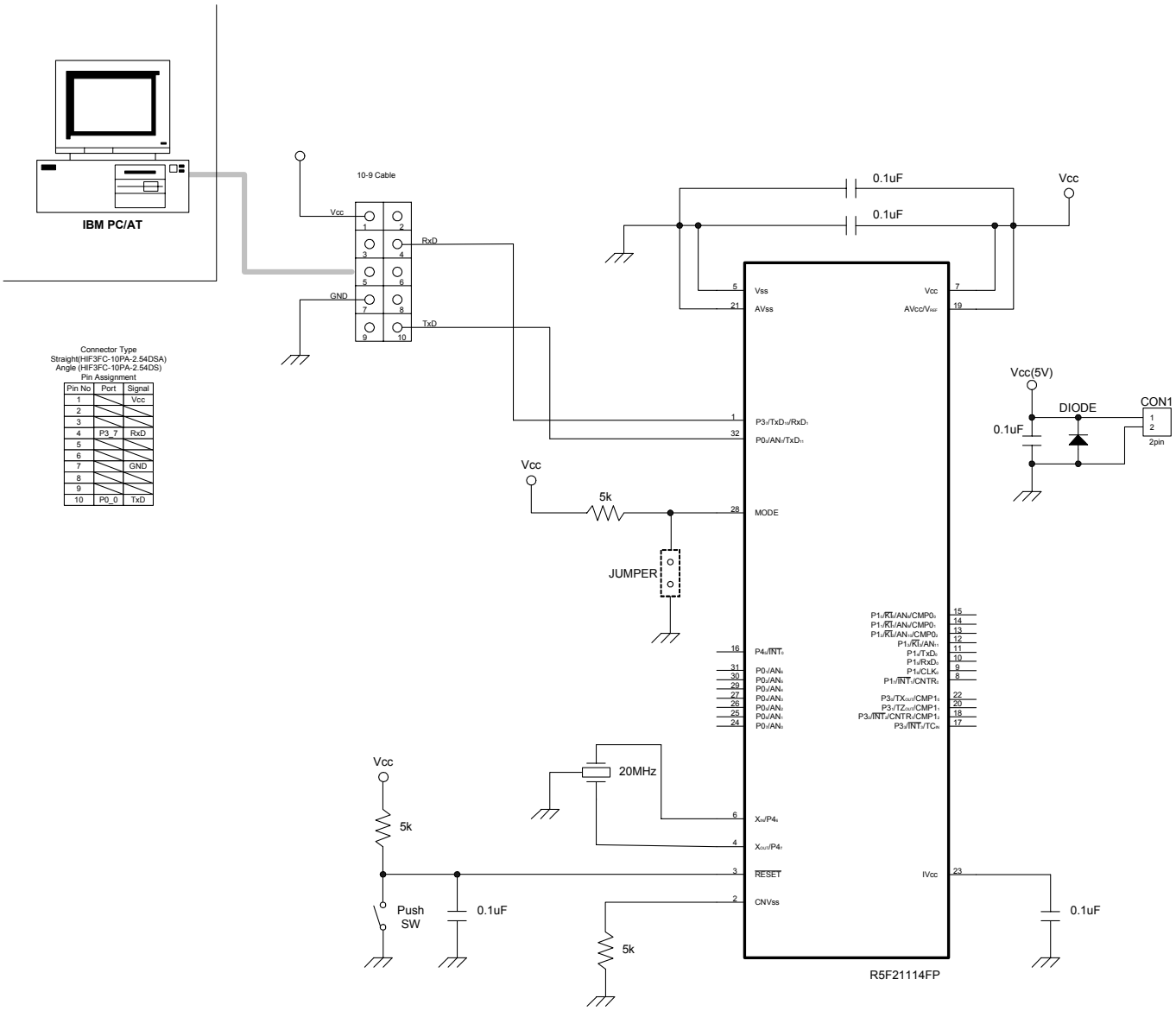


Figure 61 Example of Target Board Circuit (24)

7.6 Renesas MCU Technical Information

For information about **M16C Flash Starter** and Renesas MCU, please refer to “Renesas MCU Technical Information” Homepage.

M16C family

http://www.renesas.com/eng/products/mpumcu/16bit/m16c/index.html

38000 series

http://www.renesas.com/eng/products/mpumcu/8bit/38000/index.html

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