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Renesas Electronics Corporation

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RENESAS

USER'S MANUAL

Phase-out/Discontinued

SE-17120

17K SERIES

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USER'S MANUAL

NEC

Phase-out/Discontinued

SE-17120

17K SERIES

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CHAPTER 1 OVERVIEW

The SE-17120 is an SE board for evaluating the μPD17120, μPD17121, μPD17132, μPD17133, μPD17142[Note 1], and μPD17143[Note 1], 4-bit single-chip microcontroller systems.

The SE-17120 mounted on an in-circuit emulator (IE-17K or IE-17K-ET) common to the 17K Series is used to debug a target system, or the SE board is used alone to evaluate a target system.

μPD17120CS-00×, μPD17121CS-00×, μPD17132CS-00×, μPD17133CS-00×, μPD17142CS-00×, or μPD17143CS-00× chips (called the real chips hereafter) are used to interface with the SE-17120 and a target system[Note 2] For this reason, the function of the SE-17120 is equivalent to that of a target system to be evaluated.

An emulation probe, the optional EP-17120CS[Note 3], is required to connect the SE-17120 and a target system.

Note 1. Under development
2. System to be evaluated (created by the user)
3. 24-pin plastic shrink DIP (300 mil) probe

Table 1-1 Development Tools for the SE-17120

SE board	Use	Assembler (AS17K) output file (host machine)	In-circuit emulator	Support software [Note 6]	Emulation probe	Target product
SE-17120	Used when mounted on the in-circuit emulator	ICE file [Note 4] [PC-9800 series / IBM PC/AT™]	IE-17K IE-17K-ET	SIMPLEHOST™	EP-17120CS	μPD17120 μPD17121 μPD17132 μPD17133 μPD17142 μPD17143
	Used alone	PRO file [Note 5] [PC-9800 series / IBM PC/AT]	Not required	Not required		

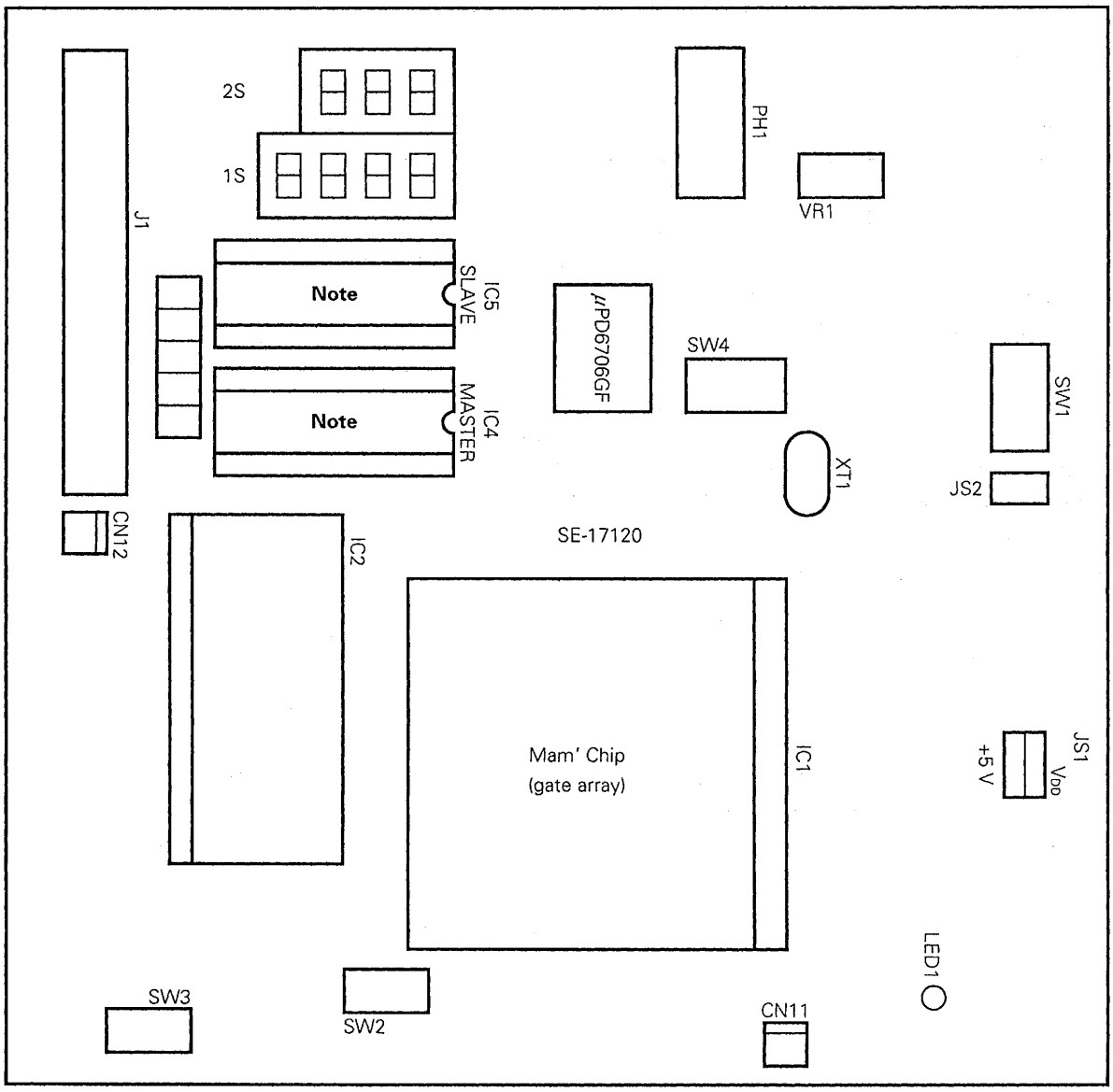
Note 4. ICE file: Automatically output after a source program is assembled.
5. PRO file: Output when an assembler option (/PRO) is specified during assembly of a source program. For details of the ICE and PRO files, refer to the AS17K user's manual.
6. SIMPLEHOST is the software for the man-machine interface with the in-circuit emulator.
The software runs on MS-WINDOWS™, enabling debugging by manipulating the source list, figures, and tables on the CRT display using a mouse.
For details, refer to the SIMPLEHOST user's manual.
It is also possible to interface with the in-circuit emulator using commercially available RS-232-C communications software other than SIMPLEHOST. When using other software systems, the users need to know the baud rate setting and the commands for an in-circuit emulator. For details, refer to the IE-17K or IE-17K-ET user's manual.

CHAPTER 2 SPECIFICATIONS

The specifications of the SE-17120 are shown below:

Product name	:	SE-17120
Program memory	:	• When the SE-17120 is used mounted on in-circuit emulator IE-17K or IE-17K-ET, use the μPD43256AGU mounted on the board. • When the SE-17120 is used alone, write the program in the μPD27C256AD, μPD27C512D, or μPD27C1001D and plug it into socket IC2 on the SE-17120.
Data memory	:	Use the data memory in the chip.
Operating frequency	:	• When evaluating the μPD17120, μPD17132, or μPD17142: 400 kHz to 2.4 MHz (factory-set value: 2 MHz) • When evaluating the μPD17121, μPD17133 or μPD17143: 400 kHz to 8 MHz (factory-set value: 4 MHz)
Instruction cycle	:	8 μs (Factory-set to 2 MHz with the RC oscillation circuit and variable resistor VR1)
Operating temperature	:	+10 °C to +40 °C
Storage temperature	:	–10 °C to +50 °C (no condensation)
Power	:	• For the chip (V_{DD}): +2.7 to +5.5 V The power is supplied from emulation probe EP-17120CS or pin CN12. • For SE-17120 (V_{CC}): +5 V ±5 % When the SE-17120 is used mounted on the in-circuit emulator, the power is supplied from the in-circuit emulator. When the SE-17120 is used alone, it is supplied from pin CN11.
Current	:	150 mA (maximum) (When the μPD27C256AD is used as program memory, without load)
External dimensions	:	150 × 148 × 25 mm

Fig. 2-1 Configuration of SE-17120 Components



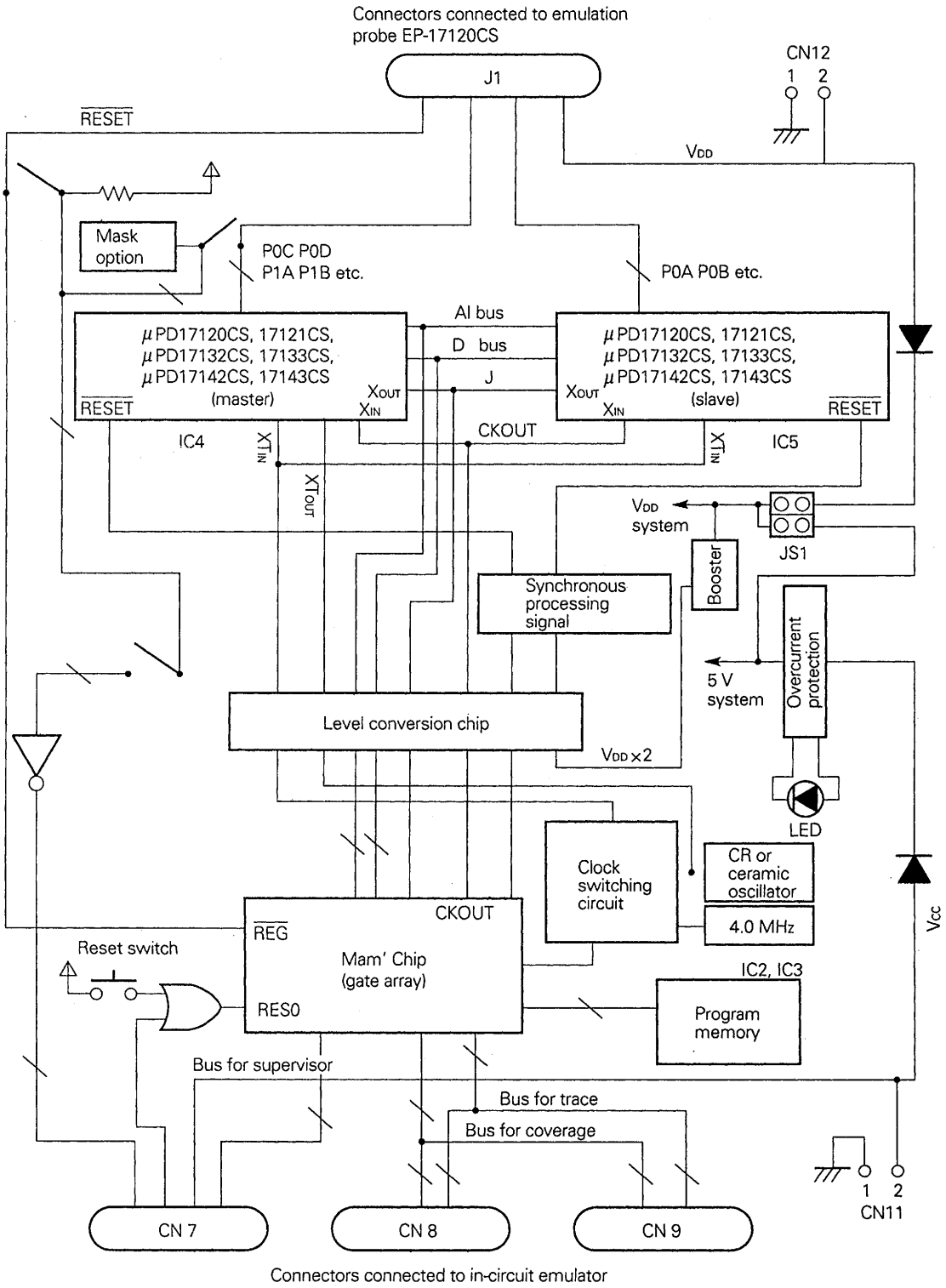
Note Change the chips to be plugged into sockets IC4 (MASTER) and IC5 (SLAVE) corresponding to the products to be evaluated as follows:

When a μPD17120 system is evaluated, plug in μPD17120CS-00× chips.
When a μPD17121 system is evaluated, plug in μPD17121CS-00× chips.
When a μPD17132 system is evaluated, plug in μPD17132CS-00× chips.
When a μPD17133 system is evaluated, plug in μPD17133CS-00× chips.
When a μPD17142 system is evaluated, plug in μPD17142CS-00× chips.
When a μPD17143 system is evaluated, plug in μPD17143CS-00× chips.

The μPD17132CS-00× chips are mounted on the SE board before shipment.

CHAPTER 3 BLOCK DIAGRAM

Fig. 3-1 Block Diagram of SE-17120



CHAPTER 4 USE

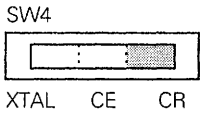
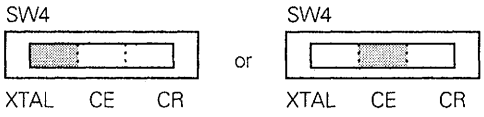
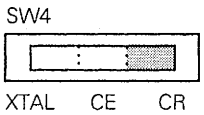
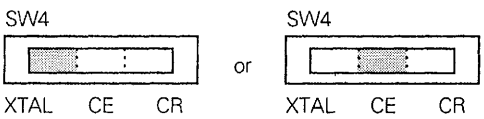
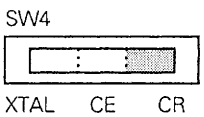
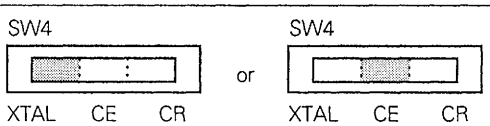
4.1 SETTING THE SE BOARD ACCORDING TO THE μPD17120, μPD17121, μPD17132, μPD17133, μPD17142, AND μPD17143 PRODUCTS

When the products are evaluated using the SE-17120, the real chips corresponding to the product to be evaluated must be plugged into the IC4 and IC5 sockets on the SE board.

Because the SE-17120 is factory-set for evaluating the μPD17132, μPD17132CS-00× chips are plugged into the IC4 and IC5 sockets. The real chips must therefore be replaced when a target product other than the μPD17132 is evaluated.

The setting position of oscillator switch SW4 must be changed according to the type of products to be evaluated.

Table 4-1 Correspondence between the Products to be Evaluated and the Chips

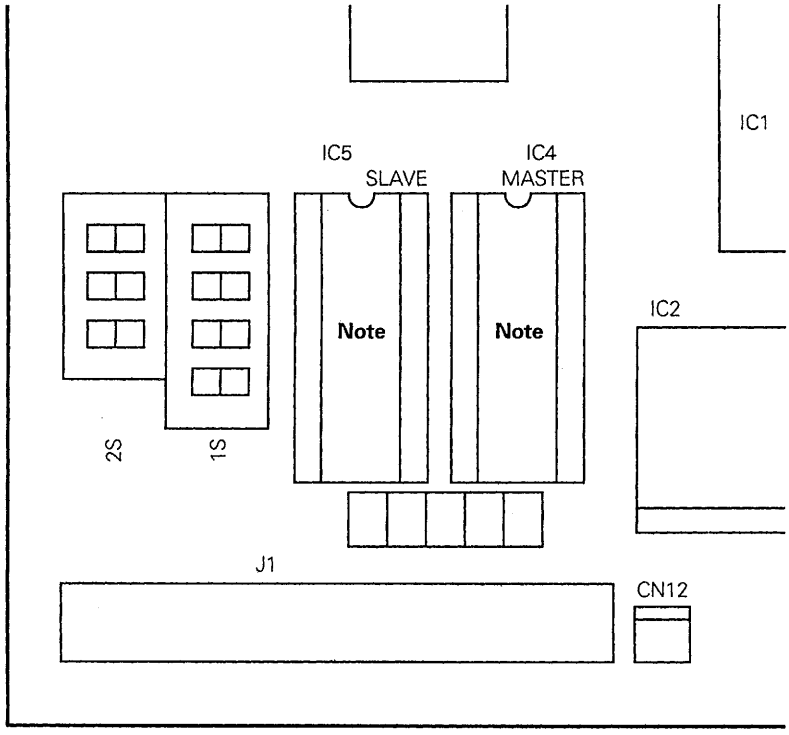
Setting Item / Target product	Chips to be plugged into IC4 and IC5	Setting of oscillator switch SW4	
μPD17120	μPD17120CS-00×		**Note 2**
μPD17121	μPD17121CS-00×		**Note 3**
μPD17132	μPD17132CS-00×		**Note 2**
μPD17133	μPD17133CS-00×		**Note 3**
μPD17142[Note 1]	μPD17142CS-00×		**Note 2**
μPD17143[Note 1]	μPD17143CS-00×		**Note 3**

: Factory-set

Note 1. Under development

2. When SW4 is set to the CR position, the oscillator frequency is factory-set to 2 MHz. For changing the frequency, see **"4.5 CHANGING THE OSCILLATOR FREQUENCY"**.
3. When SW4 is set to the XTAL position, the oscillator frequency is set to 4 MHz. To change the frequency, assemble an oscillation circuit on terminal board PH1 and set SW4 to the CE position. For details, see **"4.5 CHANGING THE OSCILLATOR FREQUENCY"**.

Fig. 4-1 Example of Mounted Chips



Note Chip

Caution Before replacing the real chips, be sure to turn off the power. Pay attention to the mounting locations of pins 1 when plugging other chips into the sockets for the first time.

4.2 USING LEVEL CONVERSION CHIP (μPD6706GF)

(1) Outline of level conversion chip

The level conversion chip is the IC that matches the operating voltage level of the customer's target system with that of the SE board or vice versa ($V_{DD} \neq V_{CC}$, V_{CC} = +5 V) when they differ. This enables smooth single exchange between the target system and SE board even if the operating voltage levels of the target system and the chip differ from the operating voltage level of the SE board.

(2) Using level conversion chip

The level conversion switch is automatically activated when power other than 5 V is applied between the V_{DD} and GND pins of the EP-17120CS emulation probe or to the CN12 pin when the jumper switch (JS1) for selecting how to supply the power to the SE board is set to the V_{DD} position.

Remarks 1. V_{DD} indicates the power voltage of the customer's target system. When setting V_{DD} side, SE-17120 is capable of supplying the power from the target system to the real chips on the SE board through CN12 or the emulation probe, enabling debugging in a much better real environment.

2. V_{CC} is the power that operates the SE board (except for the real chips). +5 V must always be applied to V_{CC}. When the SE-17120 is mounted on the in-circuit emulator, V_{CC} is automatically supplied from the in-circuit emulator. When the SE-17120 is used alone, V_{CC} is supplied from CN11.

4.3 SUPPLYING POWER TO SE BOARD

There are two types of powers to be supplied to the SE board: Vcc that operates the SE board (except for the real chips) and VDD that operates the real chips. +5 V must always be applied to Vcc. +2.7 to +5.5 V, which are the operating voltage range of the real chip, can be supplied to VDD.

(1) Jumper switch (JS1) for selecting the method for supplying power to SE board

Jumper switch JS1 is used to select whether to supply the +5 V power supplied to the SE board to the real chips. JS1 is also used to select whether to apply the voltage supplied from the emulation probe or the CN12 pin to the real chips. Tables 4-2 and 4-3 list the JS1 functions. That is, when the power of the customer's target system is +5 V and the SE-17120 is used alone, +5 V is supplied from the CN11 pin by setting JS1 to +5 V. When the SE-17120 is used mounted on the in-circuit emulator, +5 V is automatically supplied from the in-circuit emulator. This setting enables the power to be supplied in a very simple way.

When the power of the customer's target system is other than +5 V, the voltage of the target system can be applied to the chips from the emulation probe or the CN12 pin by setting JS1 to VDD. This setting enables the SE-17120 to evaluate the μPD17120 system in a much better real environment.

Table 4-2 JS1 Functions When SE-17120 is Used Mounted on In-Circuit Emulator

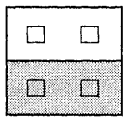
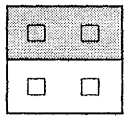
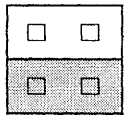
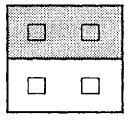
Type of power / JS1 setting	Power (VDD) supplied to the real chips	Power (Vcc) that operates the SE board (except the real chips)
JS1 VDD  +5 V	+5 V is supplied from the in-circuit emulator.	+5 V is supplied from the in-circuit emulator
JS1 VDD  +5 V	Power must be supplied from the emulation probe or the CN12 pin.	

Table 4-3 JS1 Functions When SE-17120 is Used Alone

Type of power / JS1 setting	Power (VDD) supplied to the real chips	Power (Vcc) that operates the SE board (except the real chips)
JS1 VDD  +5 V	+5 V is supplied from CN11.	+5 V is supplied from CN11.
JS1 VDD  +5 V	Power must be supplied from the emulation probe or the CN12 pin.	

The shaded portions indicate the selected switch positions.

(2) Power supply terminals

The SE-17120 has 3 terminals that externally supply the power. Determine which terminal to use according to the environment in which the SE-17120 evaluates the μPD17120 system. Table 4-4 lists the power supply terminals and their functions.

Table 4-4 Power Supply Pins and Their Functions

Terminal name	Type of power (suppliable voltage range)	Function
CN11	V_{CC} (+5 V ±5 %)	Power terminal that operates the SE board (except the real chips) when the SE-17120 is used alone. CN11 must always supply +5 V. When the SE-17120 is used mounted on the in-circuit emulator, the power need not be supplied from CN11 because power is automatically supplied from the in-circuit emulator.
CN12	V_{DD} (+2.7 to +5.5 V)	Power terminal that can apply +2.7 to +5.5 V, which is the operating voltage range of the real chips, to the real chips. Valid when the power of the customer's target system is not V_{CC} = 5 V (for JS1, V_{DD}).
Emulation probe (V_{DD} pin and GND pin)	V_{DD} (+2.7 to +5.5 V)	Same function as CN12. In the SE-17120, since CN12 and the emulation probe are connected, the power must be supplied one of them.

Remark The first pins of CN11 and CN12 are the GND pins and the second pins are the power pins. These terminals are useful when using the attached power cable to supply power.

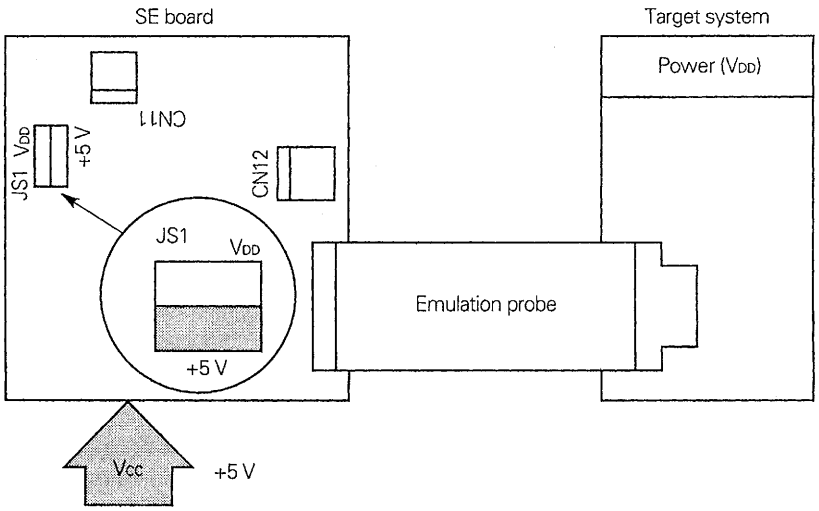
(3) Examples

① When the SE-17120 is used mounted on the in-circuit emulator

(a) When the SE-17120 is used mounted on the in-circuit emulator, and V_{DD} and V_{CC} are +5 V

Set JS1 to +5 V. Vcc and V_{DD} are supplied from the in-circuit emulator. The power need not be supplied from CN11, CN12, or the emulation probe.

Fig. 4-2 Supplying Power When V_{CC} and V_{DD} Are +5 V, with SE-17120 Mounted on In-Circuit Emulator



(b) When the SE-17120 is used mounted on the in-circuit emulator, and V_{DD} and V_{CC} are not the same (V_{CC} = +5 V)

Set JS1 to V_{DD}. Vcc is supplied from the IE-17K. V_{DD} is supplied from CN12 or the emulation probe.

Fig. 4-3 Supplying V_{DD} from CN12, with SE-17120 Mounted on In-Circuit Emulator

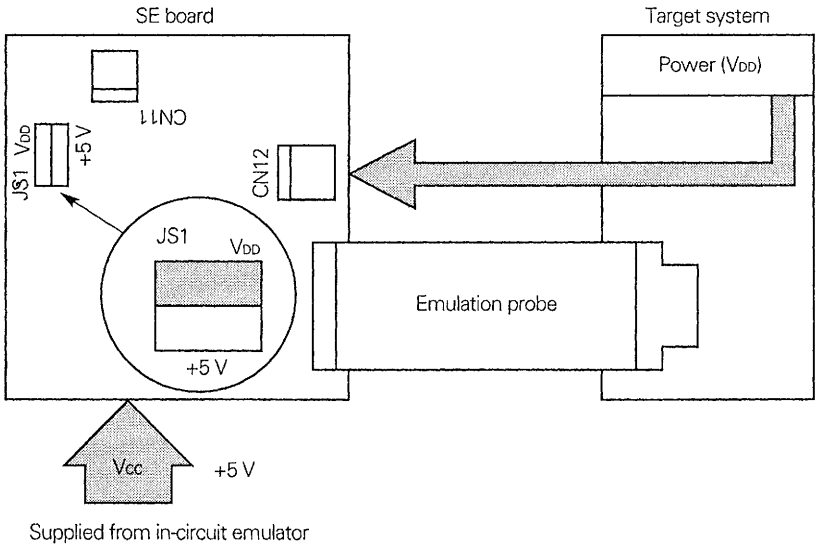
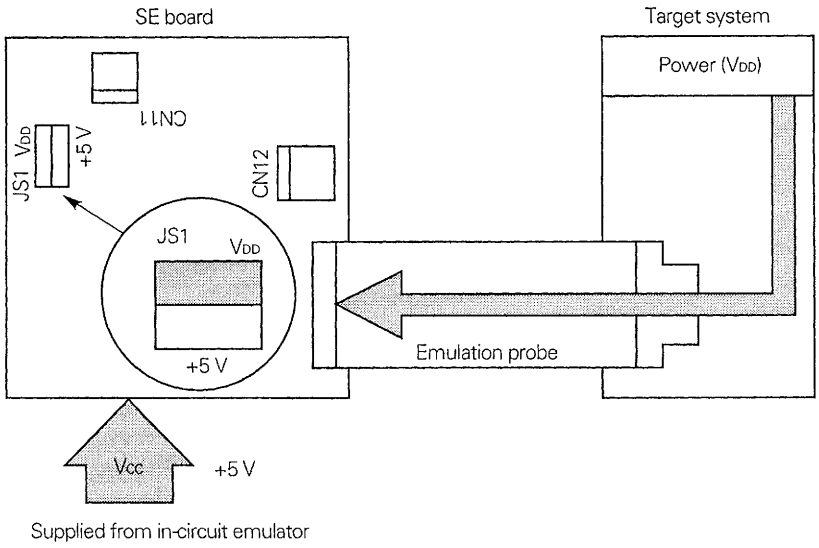


Fig. 4-4 Supplying V_{DD} from Emulation Probe, with SE-17120 Mounted on In-Circuit Emulator

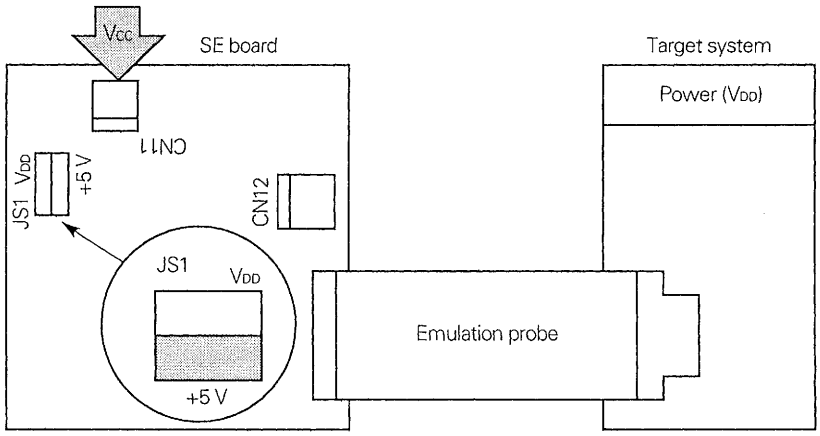


② When the SE-17120 (SE board) is used alone

(a) When the SE-17120 is used alone and V_{DD} and V_{CC} are the same (V_{CC} = +5 V)

Set JS1 to +5 V. Vcc and V_{DD} are supplied from CN11.

Fig. 4-5 Supplying Power When SE-17120 is Used Alone and V_{DD} and V_{CC} Are +5 V



(b) When the SE-17120 is used alone and V_{DD} and V_{CC} are not the same (V_{CC} = +5 V)

Set JS1 to V_{DD}. Vcc is supplied from CN11 and V_{DD} supplied from CN12 or the emulation probe.

Fig. 4-6 Supplying V_{DD} from CN12 When SE-17120 is Used Alone

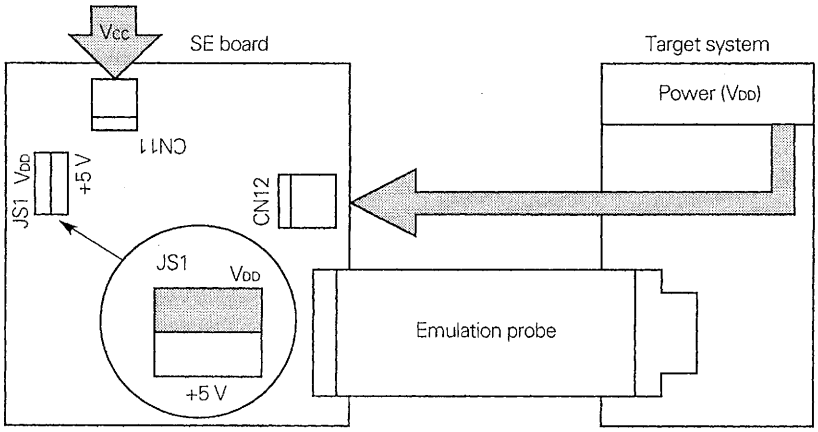
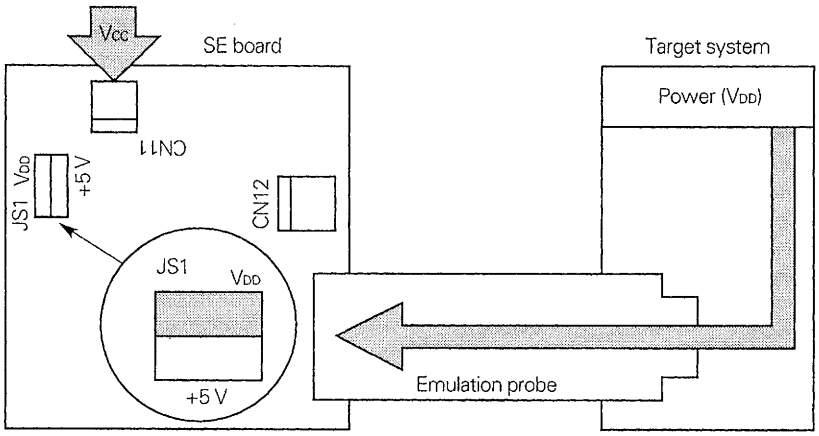


Fig. 4-7 Supplying V_{DD} from the Emulation Probe When SE-17120 is Used Alone



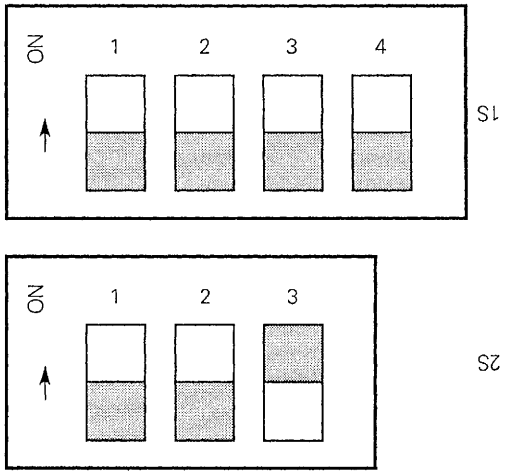
4.4 OPTION SWITCHES

Mask options can be specified for pins $P0D_0$ to $P0D_3$, $P0E_0$, $P0E_1$ and $\overline{RESET}$ of the μPD17120, μPD17121, μPD17132, μPD17133, μPD17142, and μPD17143 in units of bits.

Option switches 1S and 2S are provided for pseudo-repetition of the mask options coded in the source program in the SE-17120 debugging environment.

The following figure shows the option switches (see also Fig. 2-1). Set the option switches according to Fig. 4-8.

Fig. 4-8 Option Switches



The shaded portions indicate the factory settings of the switches.

Table 4-5 Setting of Option Switches

Switch No.		Pin	ON	OFF	Switch code
1S	1	POD_0	Pull-up	No pull-up	0000
	2	POD_1			
	3	POD_2			
	4	POD_3			
2S	1	POE_0	Pull-up	No pull-up	0001
	2	POE_1			
	3	$\overline{RESET}$	Pull-up	No pull-up	0003

If the mask option information specified in the source program and the settings of the option switches on the SE board do not match, the in-circuit emulator outputs the following error message:

? IOS INVALID OPTION SWITCH AT xxxx
xxxx: Switch code

The switch code indicates the location of an invalid option switch on the SE board. In the 17K series assembler (AS17K), mask options are specified in the source program. The in-circuit emulator checks whether the settings of the option switches on the SE-17120 and the settings specified in the program match immediately after the ICE file is loaded with a .LP0 or .LP1 command. If an error message is output, check again whether the option switches are set to the correct positions.

Caution The SE-17120 may cause a malfunction because the reset function of the SE board does not stabilize unless the SE board is connected to a target system via the EP-17120CS emulation probe and unless the option switch for pulling up the $\overline{RESET}$ pin is turned on when the SE board is used mounted on the in-circuit emulator.

4.5 CHANGING THE OSCILLATOR FREQUENCY

The factory-set oscillator frequency of the SE-17120 can be changed to a desired setting.

Table 4-6 Variable Operating Frequency Range

Devices to be plugged into IC4 and IC5	Factory-set frequency	Operating frequency range	How to change the frequency
μPD17120CS-00× μPD17132CS-00× μPD17142CS-00×**Note**	2 MHz (RC oscillator)	400 kHz to 2.4 MHz	Adjustment of variable resistor VR1
μPD17121CS-00× μPD17133CS-00× μPD17143CS-00×**Note**	4 MHz (Crystal oscillator)	400 kHz to 8 MHz	Assembly of an oscillation circuit on terminal board PH1

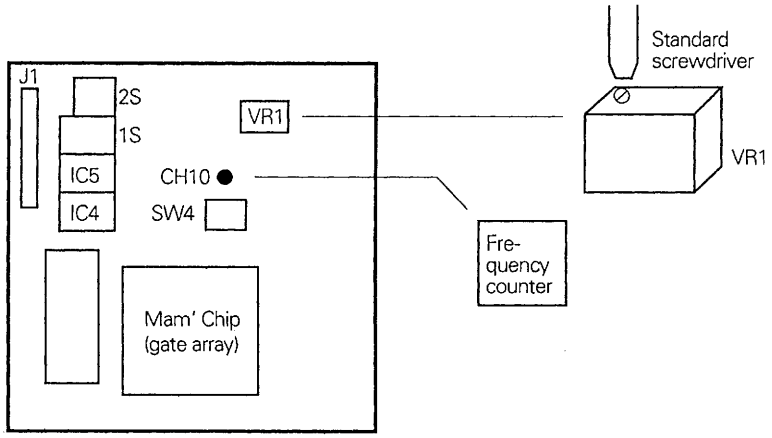
Note Under development

(1) Method for changing the frequency when evaluating the μPD17120, μPD17132, and μPD17142

When oscillator switch SW4 is set to the CR position, the clock of the RC oscillation circuit is supplied to the chips. The frequency of the RC oscillation circuit can be changed with variable resistor VR1. The output waveform is also output to CH10.

To change the oscillator frequency, adjust variable resistor VR1 observing the waveform to be output to CH10 with a measuring instrument such as an oscilloscope.

Fig. 4-9 Adjusting the Frequency of the RC Oscillation Circuit



(2) How to change the frequency when evaluating the μPD17121, μPD17133, and μPD17143

When oscillator switch SW4 is set to the XTAL position, the oscillator frequency is fixed to 4 MHz and its clock is supplied to the real chips from Xtal.

To evaluate the products with an oscillator frequency other than 4 MHz, assemble an oscillation circuit on terminal board PH1 to supply the desired clock.

Fig. 4-10 Initial Condition of Terminal Board PH1

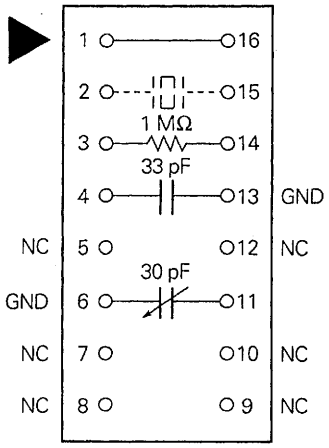
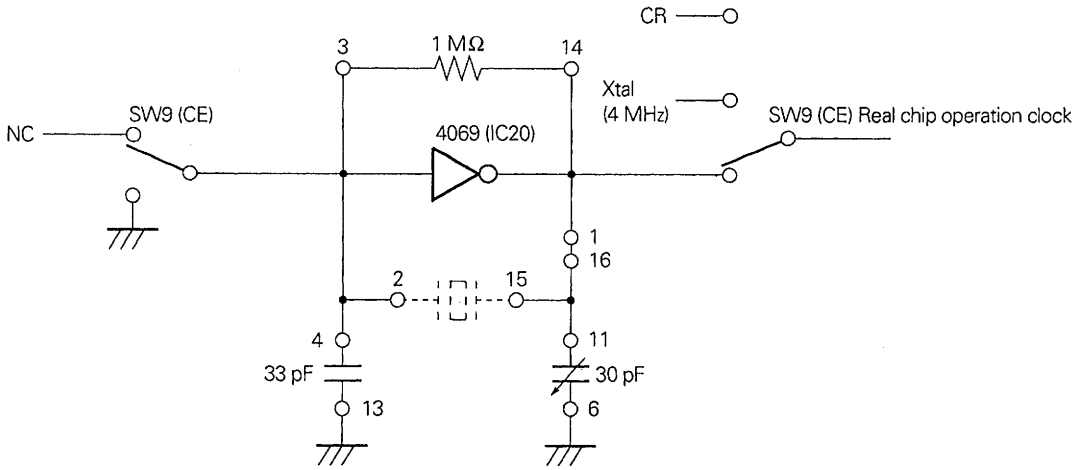


Fig. 4-11 Peripheral Circuits for Terminal Board PH1



Remarks 1. Connect a crystal or ceramic resonator between pins 2 and 15.

2. Change the capacitors between pins 4 and 13 and between pins 6 and 11 when changing oscillation stabilizers (capacitors).

3. Connect a given resistor between pins 1 and 16 when requiring damping resistance.

4.6 SETTING OTHER SWITCHES

(1) Reset switch (SW1)

Reset switch SW1 is valid when the SE-17120 is used alone. See **"4.8 USING SE-17120 ALONE"** for details of SW1.

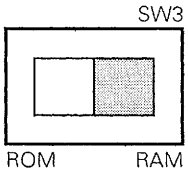
(2) Slide switch for switching between the μPD27C256, μPD27C512, and μPD27C1001

Switch SW2 is used to switch the type of program memory. SW2 is valid when the SE-17120 is used alone. See **"4.8 USING SE-17120 ALONE"** for details of SW2.

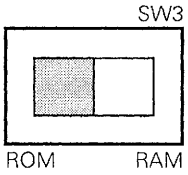
(3) Slide switch for switching between ROM and RAM (SW3)

Fig. 4-12 Setting Slide Switch for Switching between ROM and RAM

① When the SE-17120 is used mounted on the in-circuit emulator



② When the SE-17120 is used alone



The shaded portions indicate the selected switch positions.

(4) Jumper switch (JS2 to JS7)

Use jumper switch in the factory-set position.

(5) Power LED (LED1)

The power LED, LED1, comes on when the power is supplied normally. See **"4.7 USING SE-17120 MOUNTED ON IN-CIRCUIT EMULATOR"** and **"4.8 USING SE-17120 ALONE"** for details.

4.7 USING SE-17120 MOUNTED ON IN-CIRCUIT EMULATOR

The in-circuit emulator is connected to the host machine such as a PC-9800 series and used to debug a target system. For details of operation, refer to the IE-17K or IE-17K-ET user's manual.

(1) Mounting the SE-17120 on the in-circuit emulator and dismounting it from the emulator

Mount the SE-17120 on the in-circuit emulator using the following procedure:

① Open the outside and inside covers of the in-circuit emulator.
② A memory board is under the inside cover. Connect connectors CN7, CN8, and CN9 on the bottom of the SE-17120 to three connectors on the memory board.

Raise the SE-17120 vertically when dismounting it from the in-circuit emulator.

Fig. 4-13 IE-17K with the Outside Cover Opened

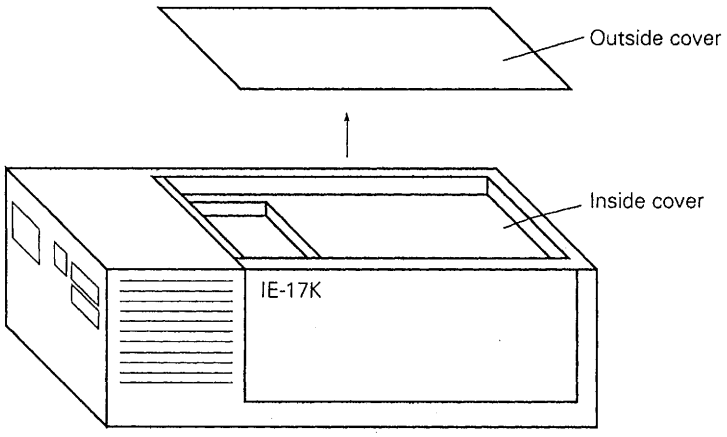
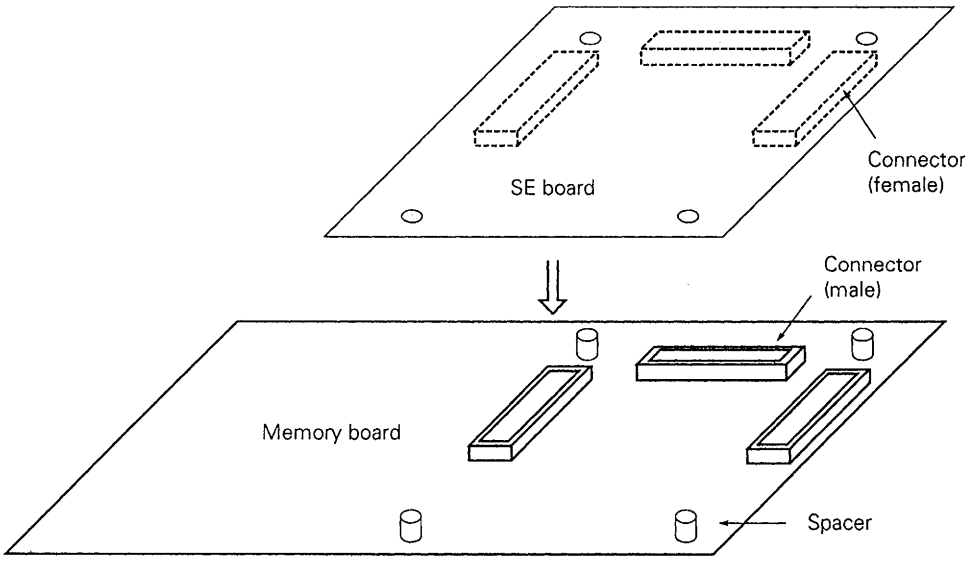


Fig. 4-14 Mounting and Dismounting SE-17120



Next connect emulation probe EP-17120CS to connector J1 of the SE-17120 to connect the SE-17120 to the target system.
Then mount the inside and outside covers.

(2) Supplying power

After mounting the SE-17120 on the in-circuit emulator, turn on the in-circuit emulator power and check that the LED on the SE-17120 comes on. Do this before mounting the inside and outside covers of the in-circuit emulator.

If the power of the customer's target system is not +5 V, the power voltage of the target system can be applied from CN12 or the emulation probe to the chip on the SE board. See **"4.2 USING LEVEL CONVERSION CHIP (μPD6706GF)"** and **"4.3 SUPPLYING POWER TO SE BOARD"** for details.

In the following cases, LED will not come on:

- Power cord of the in-circuit emulator is not connected.
- An overcurrent (about 500 mA or above) passes through the SE-17120.
- The SE-17120 is mounted incorrectly.

If LED does not come on, turn off the in-circuit emulator power, then remount the SE-17120 on the in-circuit emulator. If LED still does not come on, the SE-17120 may be faulty.

(3) Transferring ICE file to the in-circuit emulator

The in-circuit emulator (IE-17K or IE-17K-ET) is connected to the host machine such as a PC-9800 series and used to debug software and hardware of a target system. For details, refer to the IE-17K or IE-17K-ET user's manual.

For how to use SIMPLEHOST, refer to the SIMPLEHOST user's manual.

The following describes the procedure to check whether the SE-17120 is connected normally when commercially available RS-232-C communications software is used.

If the LISTING screen is displayed when using SIMPLEHOST, the SE-17120 is connected normally.

① Turn on the power to the in-circuit emulator, or press the reset switch to start the software when the power is already turned on. Then the prompt @@@> is displayed.
② Execute the .LP0 or .LP1 command to load the ICE file containing the program coded by the AS17K assembler, or the ICE file output with the .SP0 or .SP1 command.

The in-circuit emulator does not operate until the ICE file is loaded.

When the SE-17120 is correctly mounted on the in-circuit emulator, the in-circuit emulator displays the following messages and prompt BRK>.

Example Loading the ICE file for the μPD17132

```
OK
D17132
BRK>
```

In the following cases, the above messages will not be displayed:

- The device number of the chips mounted on the SE-17120 does not correspond to that of the loaded ICE file.
- An SE board other than the SE-17120 is mounted on the in-circuit emulator.
- An ICE file other than the ICE file of the μPD17120, μPD17121, μPD17132, μPD17133, μPD17142, and μPD17143 programs is loaded.
- The settings of the option switches do not correspond to the specifications in the program.
- Mounting the SE-17120 on the in-circuit emulator is incomplete.

(4) Error messages and action to take

The in-circuit emulator and SE-17120 both have a function to display an error message when the combination of the mounted real chips and the loaded ICE file is incorrect.

To ensure accurate debugging, an SE board number is registered in the SE-17120 and each device number registered in the chip.

The following explains the SE board numbers and device numbers to be registered and the action to take corresponding the error messages.

Table 4-7 Device Numbers and SE Board Numbers

Evaluation device	Device number	SE board number
μPD17120	2C	2C
μPD17121	2D	
μPD17132	2E	
μPD17133	2F	
μPD17142	2A	
μPD17143	2B	

Remarks 1. The device number means the registration number assigned to each real chip.

2. The SE board number means the registration number to be assigned to each SE board. 2C is registered in the SE-17120 as the SE board number.

3. The device number and SE board number are also included in the data in the ICE file to be loaded. These numbers are used by the in-circuit emulator to check the development environment. The ICE file assembled by AS17120, for example, contains device number and SE board number 2C.

(a) Error message displayed when the device number of the real chips mounted on the SE-17120 does not correspond to that of the loaded ICE file and action to take.

Example of error message

? IDI INVALID DEVICE ID NUMBER [xx-ΔΔ]

In this error message, xx indicates the device number of the real chips mounted on the SE-17120 and ΔΔ indicates the device number of the loaded ICE file.

If the error message is displayed, recheck whether correct chips are mounted on the SE board or whether the development environment switch (SW7) is correctly adjusted. When the real chips on the SE board are incorrect, turn off the power to the in-circuit emulator, replace the incorrect real chips and adjust the SW7 again, then load the ICE file from the beginning.

If the device file selected during assembling is incorrect, use a correct device file to reassemble the source file and reload the ICE file.

(b) Error message displayed when an SE board other than the SE-17120 is mounted or an ICE file other than the ICE file of the μPD17120, μPD17121, μPD17132, μPD17133, μPD17142, and μPD17143 programs is loaded and action to take.

Example of error message

? ISE INVALID SE BOARD NUMBER [□□-∇∇]

In this error message, □□indicates the SE board number of the mounted SE board and ∇∇ indicates the SE board number of the loaded ICE file. For the SE-17120, □□ indicates 2C. When the ICE file of the μPD17120, μPD17121, μPD17132, μPD17133, μPD17142, and μPD17143 programs is loaded, ∇∇ indicates 2C.

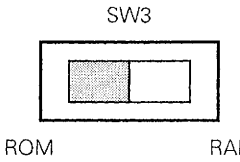
When this error message is displayed, recheck the SE board and the loaded ICE file.

4.8 USING SE-17120 ALONE

(1) Setting slide switch for switching between ROM and RAM

Set slide switch for switching between ROM and RAM (SW3) as shown in Fig. 4-15.

Fig. 4-15 Setting Slide Switch for Switching between ROM and RAM (SW3)



The shaded portion indicates the selected switch position.

(2) Installing PROM

When using the SE-17120 alone, install PROM (μPD27C256AD, μPD27C512D, or μPD27C1001D) as program memory.

Install the PROM satisfying the following conditions:

- ROM size
  256K bits: μPD27C256AD-12, μPD27C256AD-15, μPD27C256AD-20, or the equivalent
  512K bits: μPD27C512D-12, μPD27C512D-15, μPD27C512D-20, or the equivalent
  1M bit: μPD27C1001D-12, μPD27C1001D-15, μPD27C1001D-20, or the equivalent

Any of the following output files must be written in PROM as the program in advance:

- μPD17120, μPD17121, μPD17132, μPD17133, μPD17142, and μPD17143 PROM files (.PRO) output by 17K series assembler (AS17K)

  Caution Do not write the ICE file (.ICE) AS17K outputs to the in-circuit emulator

- PROM file output by the in-circuit emulator .XS0 or .XS1 command

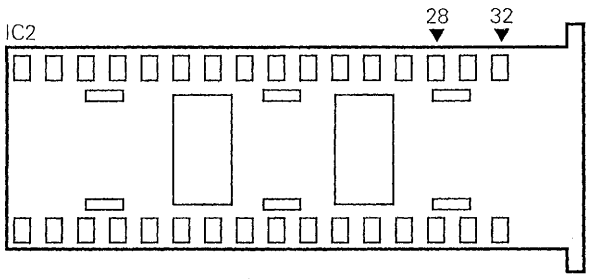
  Caution Take the following precaution during programming on PROM.
  - **The last address of the program memory for the μPD17120 and μPD17121 is 02FFH.**
  - **The last address of the program memory for the μPD17132, μPD17133, μPD17142, and μPD17143 is 03FFH.**

When the PROM device is plugged into the socket on the SE board, note that the mounting location varies according to the number of pins the PROM device has.

Notes on installing PROM

- When installing the μPD27C256AD or μPD27C512D (with 28 pins), align pin 1 with mark ▼28 at the side of the socket.
- When installing the μPD27C1001D (with 32 pins), align pin 1 with mark ▼32 at the side of the socket.

Fig. 4-16 PROM (IC2) Socket

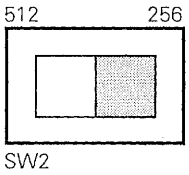


(3) Setting slide switch for switching between the μPD27C256, μPD27C512, and μPD27C1001D

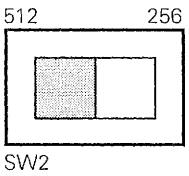
Set slide switch (SW2), as shown in Fig. 4-17. The setting of SW2 depends on whether the μPD27C256AD, μPD27C512D, or μPD27C1001D is used.

Fig. 4-17 Setting Slide Switch for Switching between the μPD27C256AD, μPD27C512D, and μPD27C1001D

(a) When the μPD27C256AD is used



(b) When the μPD27C512D or μPD27C1001D is used



The shaded portions indicate the selected switch position.

(4) Supplying power

For the SE-17120, be sure to supply +5 V ±5 % (Vcc) from the external power to the CN11 pin.

If the power of the customer's target system is not +5 V, the power voltage of the target system can be applied from CN12 or the emulation probe to the chips on the SE board. See **"4.2 USING LEVEL CONVERSION CHIP (μPD6706GF)"** and **"4.3 SUPPLYING POWER TO SE BOARD"** for details.

When Vcc is supplied normally, LED on the SE-17120 comes on.

In the following cases, LED will not come on:

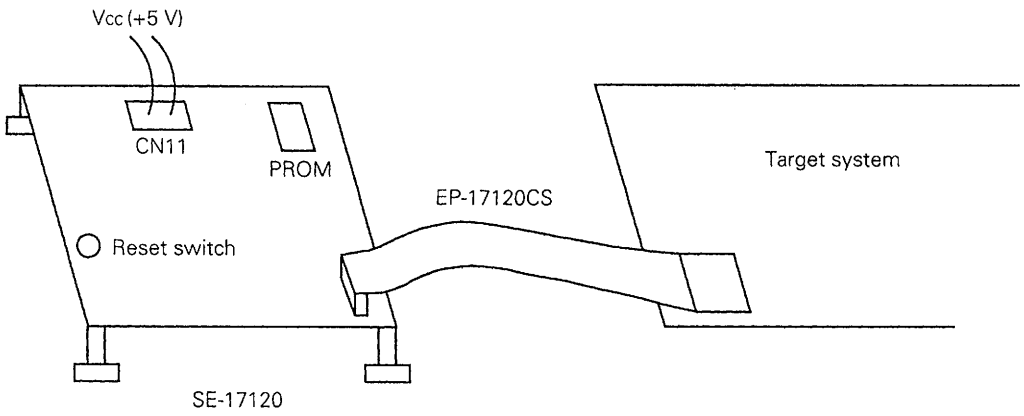
- The power is not supplied.
- An overcurrent (about 500 mA or above) is flowing.

(5) Executing program

The SE-17120 and target system are connected as shown in Fig. 4-18. When the target system power is turned on, the power is supplied to the SE-17120, causing power-on reset to be activated. When power-on reset is activated, the program written in PROM is executed, starting at address 0.

When reset switch SW1 on the SE-17120 is pressed, the SE-17120 is forcibly reset and the program in PROM is executed, starting at address 0, as in power-on reset.

Fig. 4-18 Example of Connection When SE-17120 is Used Alone



4.9 MONITOR PINS

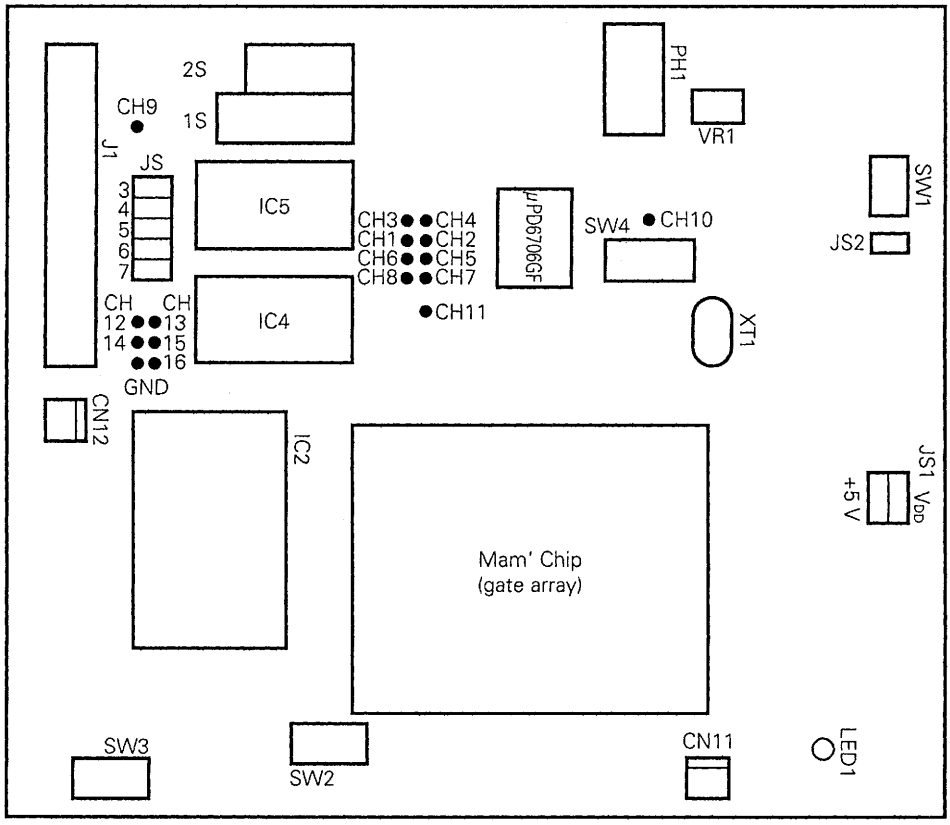
The monitor pins for checking the pin status of the real chip are provided on the SE-17120. Table 4-8 lists the monitor pins and their functions. Fig. 4-19 shows the monitor pin layout.

Table 4-8 Monitor Pins and Their Function

Monitor pin name	Function
CH1	For $P0E_1$ pin monitor
CH2	For $P0C_3$ pin monitor
CH3	For $P0C_2$ pin monitor
CH4	For $P0C_1$ pin monitor
CH5	For $P0C_0$ pin monitor
CH9	For $\overline{RESET}$ pin monitor
CH10	For the real chip oscillation frequency monitor
G	GND

Fig. 4-19 Monitor Pin Layout

SE-17120 (Top View)



4.10 SETTING JUMPER AND SLIDE SWITCHES

The jumper and slide switches and resonators of the SE-17120 are factory-set as follows:

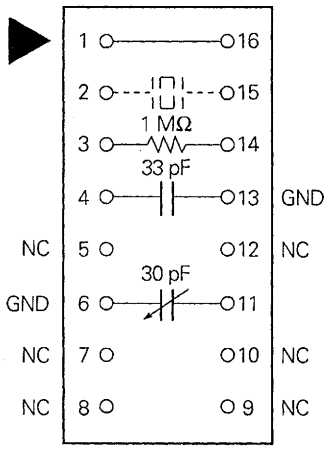
(1) Resonators

① When the oscillator switch (SW4) is set to CR, a clock of 2 MHz ±20 ppm is supplied from the RC oscillation circuit containing a variable resistor (VR1).

② When the oscillator switch (SW4) is set to XTAL, a clock is supplied from a 4 MHz crystal resonator.

③ When the oscillator switch (SW4) is set to CE, a clock is supplied from the oscillation circuit assembled on the PH1 terminal board. A given resonator can be connected between pins 2 and 15.
A trimmer capacitor adjusted to 30 pF is installed between pins 6 and 11. A 33 pF capacitor is installed between pins 4 and 13. A jumper wire is connected between pins 1 and 16. A 1 MΩ resistor is installed between pins 3 and 14 for feedback resistance in microcomputer.

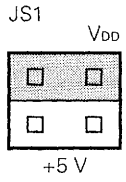
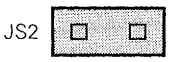
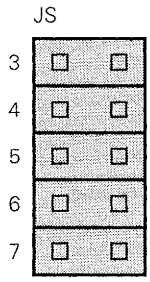
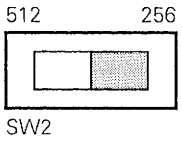
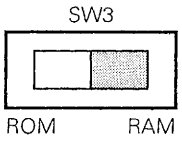
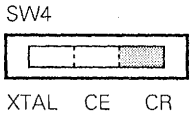
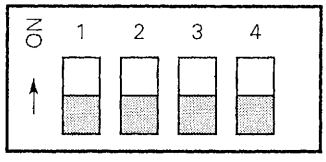
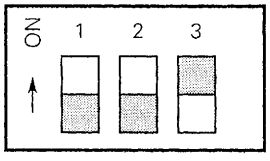
Fig. 4-20 Initial Condition of the PH1 Terminal Board



(2) Jumper and slide switches

The jumper and slide switches are set as shown in Table 4-9. Before setting, check the setting conditions.

Table 4-9 Setting Jumper Switches and Slide Switches

Switch number	Jumper and slide switches	Setting condition		Position
JS1		See **"4.2 USING LEVEL CONVERSION CHIP (μPD6706GF)"** and **"4.3 SUPPLYING POWER TO SE BOARD"**.		
JS2		JS2 is factory-set.		Do not dismount it.
JS3 to JS7		JS3 to JS7 are factory-set.		Do not dismount it.
SW2		When the SE-17120 is used mounted on the in-circuit emulator		Any position
		When the SE-17120 is used alone	μPD27C256AD	256
			μPD27C512D	512
			μPD27C1001D	
SW3		When the SE-17120 is used mounted on the in-circuit emulator		RAM
		When the SE-17120 is used alone		ROM
SW4		When the μPD17120, μPD17132, or μPD17142 is used	400 kHz to 2.4 MHz	CR
		When the μPD17121, μPD17133, or μPD17143 is used	400 kHz to 8 MHz	CE
			Always 4 MHz	XTAL
1S		See **"4.4 OPTION SWITCHES"**.		
2S				

Remark The shaded portions indicate the factory settings of the switches.

CHAPTER 5 CONNECTOR PINS

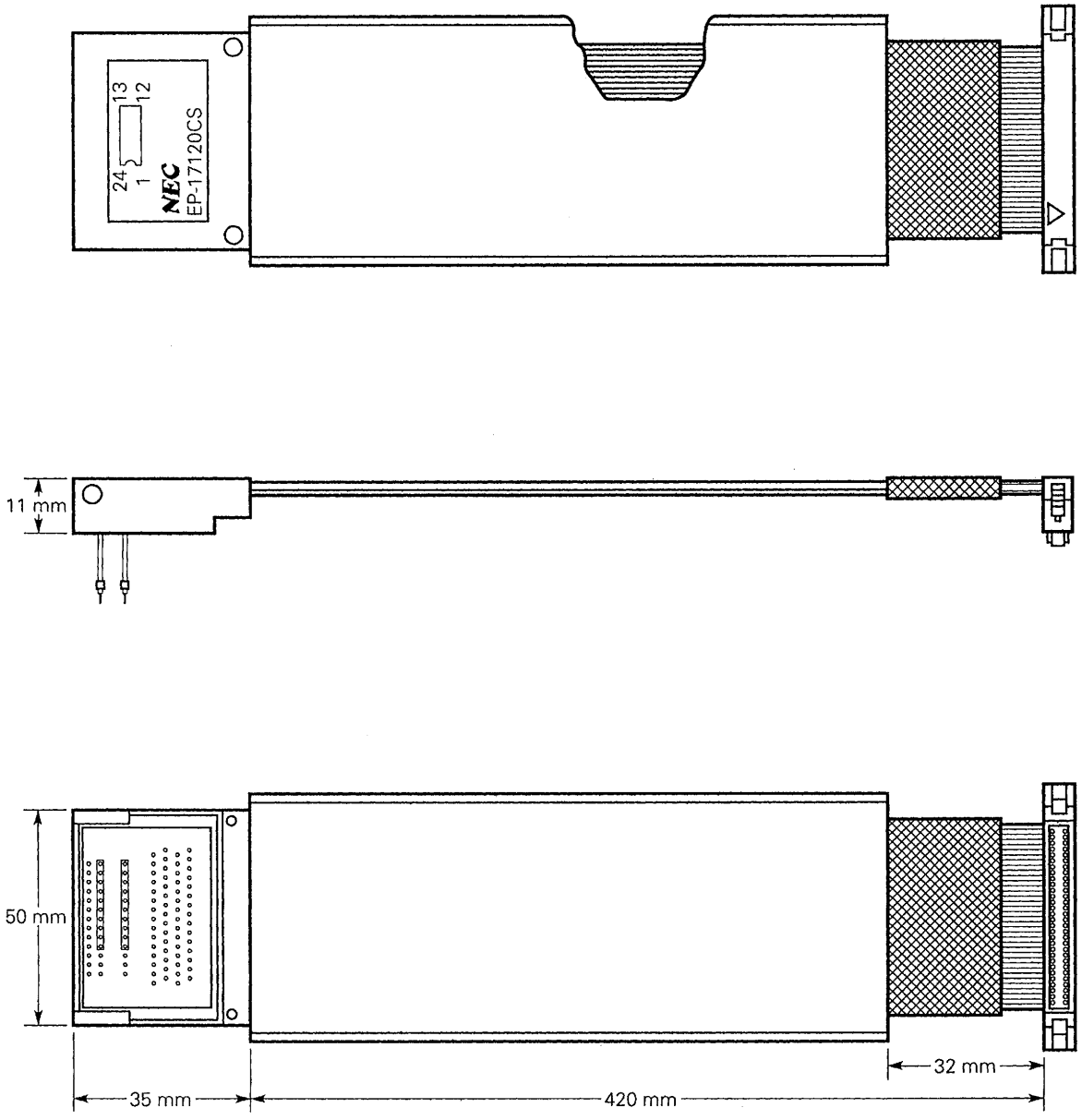
- **Connector for emulation probe (J1)**

J1 pin number	Pin name (IC pin number)	J1 pin number	Pin name (IC pin number)	J1 pin number	Pin name (IC pin number)
1	GND	21	GND	41	GND
2	V_{DD} (24)	22	$P0D_1$ (19)	42	$P0C_1$ (14)
3	GND	23	GND	43	GND
4	GND (1)	24	$P0A_1$ (6)	44	$P0B_2$ (11)
5	GND	25	GND	45	GND
6	$P0E_1$ (23)	26	$P0D_0$ (18)	46	$P0C_0$ (13)
7	GND	27	GND	47	GND
8	NC	28	$P0A_2$ (7)	48	$P0B_3$ (12)
9	GND	29	GND	49	GND
10	$P0E_0$ (22)	30	INT (17)	50	NC
11	GND	31	GND	51	GND
12	NC	32	$P0A_3$ (8)	52	NC
13	GND	33	GND	53	GND
14	$P0D_3$ (21)	34	$P0C_3$ (16)	54	NC
15	GND	35	GND	55	GND
16	$\overline{RESET}$ (4)	36	$P0B_0$ (9)	56	NC
17	GND	37	GND	57	GND
18	$P0D_2$ (20)	38	$P0C_2$ (15)	58	NC
19	GND	39	GND	59	GND
20	$P0A_0$ (5)	40	$P0B_1$ (10)	60	NC

CHAPTER 6 EMULATION PROBE DIMENSIONS

Part name: EP-17120CS

Fig. 6-1 Emulation Probe Dimensions



Phase-out/Discontinued

NEC