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Renesas Electronics Corporation

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USER'S MANUAL

RENESAS

Phase-out/Discontinued

SE-17215

μPD17215
μPD17216
μPD17217
μPD17218

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USER'S MANUAL

NEC

Phase-out/Discontinued

SE-17215

μPD17215
μPD17216
μPD17217
μPD17218


Phase-out/Discontinued

Major Revisions in This Version

Section	Description
Whole manual	Addition of products for evaluation (uPD17217, uPD17218)
4-14	Addition of NOTE to (1) "When using crystal resonator" in 4.5 "Changing the Oscillator Frequency".
4-32	Change of initial set values of memory size changeover switches (SW4, 5, 6)

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Phase-out/Discontinued

CHAPTER 1. OUTLINE

The SE-17215 is a system evaluation board (SE board) for the uPD17215 4-bit single-chip microcontroller.

The SE-17215 is used for debugging by mounting it in common 17K series in-circuit emulator (IE-17K, IE-17K-ET), or as a standalone unit for system evaluation.

As an actual chip, a uPD17215GT-00x, uPD17216GT-00x, uPD17217GT-00x or uPD17218GT-00x (referred to below as "the real chip") is used for the interface with the target system*1, the functions of the SE-17215 are identical to those of the product for which evaluation is to be performed.

An emulation probe (EP-17K28CT*2, EP-17K28GT*3 + EV-9500GT-28 (sold separately)) is required to connect the SE-17215 to the target system.

NOTE: When the EP-17134CT*4 is used, pin 14 ($\overline{\text{WDOUT}}$) falls to GND in the probe, and therefore the $\overline{\text{WDOUT}}$ function cannot be used.

*1: This is the system to be evaluated (created by the user).
2: For 28-pin plastic shrink DIP (400 mil)
3: For 28-pin plastic SOP (375 mil)
4: For 28-pin plastic shrink DIP (400 mil) (maintenance product; no longer available for purchase)

□ Table 1-1 SE-17215 Development Tools

SE Board	Use	Assembler (AS17K) Output File (Host Machine)	In-Circuit Emulator	Support Software *3	Emulation Probe	Evaluation Products
SE-17215	When used in combination with in-circuit emulator	ICE file *1 [PC-9800 series, IBM PC/AT™]	IE-17K, IE-17K-ET	SIMPLE-HOST™ *3	EP-17K28CT, EP-17K28GT + EV-9500GT-28 (conversion adapter)	uPD17215, uPD17216, uPD17217*4, uPD17218*4
	When SE-17215 is used in standalone mode	PRO file *2 [PC-9800 series, IBM PC/AT]	Not required	Not required		

*1: ICE file: Output automatically after the source program has been assembled.

2: PRO file: Output if the assembler option (/PRO) is specified when the source program is assembled.

Please refer to the AS17K User's Manual for details of the ICE file and PRO file.

3: SIMPLEHOST is software for the man-machine interface with the in-circuit emulator.
This can be run under Windows™, allowing debugging to be performed by manipulating the source listing, figures and tables displayed on the CRT by means of a mouse.
Please refer to the SIMPLEHOST User's Manual for details.
The interface can be implemented by means of other commercially available RS-232-C communication software instead of using SIMPLEHOST, but this requires a knowledge of the baud rate setting and in-circuit emulator commands.
Please refer to the IE-17K or IE-17K-ET User's Manual for details.

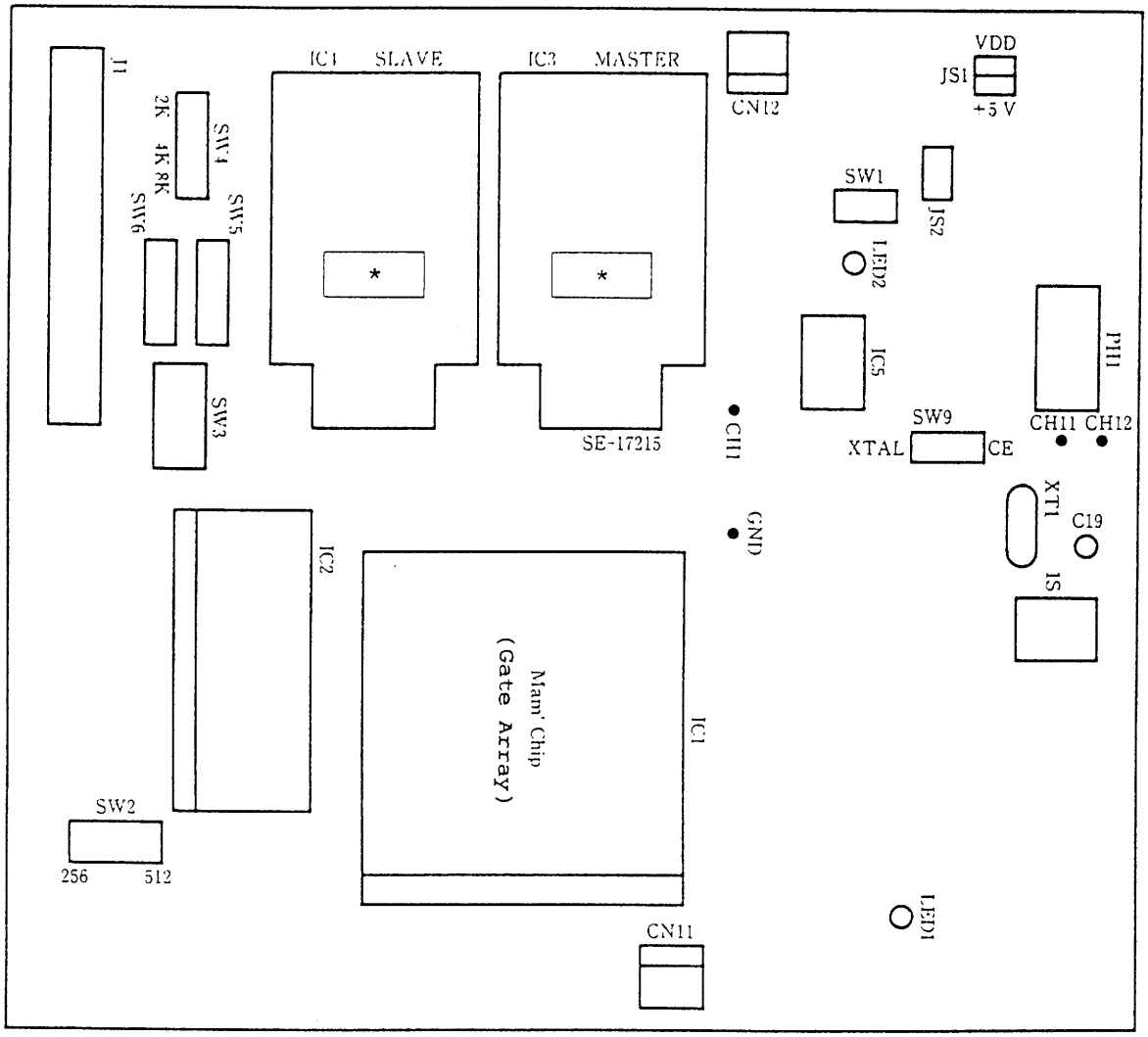
4: Under development

CHAPTER 2. SPECIFICATIONS

The specifications of the SE-17215 are shown below.

Product Name	:	SE-17215
Program Memory	:	● When used in combination with an in-circuit emulator (IE-17K or IE-17K-ET), a uPD43256AGU mounted on the board is used. ● When the SE-17215 is used in standalone mode, the program is written in a uPD27C256AD or uPD27C512D/27C1001D, and fitted in the socket (IC2) on the SE-17215.
Data Memory	:	The memory incorporated in the real chip is used.
Operating Frequency	:	1 to 8 MHz (factory setting: 4 MHz)
Instruction Cycle	:	4 us (high-speed mode) or 8 us (normal mode): at 4 MHz operation
Operating Temperature	:	+10 to +40°C
Storage Temperature	:	-10 to +50°C (no condensation)
Power Supply	:	● Real chip power supply (V_{DD}): +2.7 V to +5.5 V Supplied from the emulation probe or the CN12 pin. ● SE-17215 power supply (V_{CC}): +5 V ±5% When used in combination with an in-circuit emulator, power is supplied from the in-circuit emulator. When the SE-17215 is used as a standalone unit, power is supplied from the CN11 pin.
Consumption Current	:	200 mA (max.) (unloaded, using uPD27C256AD as program memory)
External Dimensions	:	150 x 174 x 37 mm

Figure 2-1 SE-17215 Parts Layout Diagram

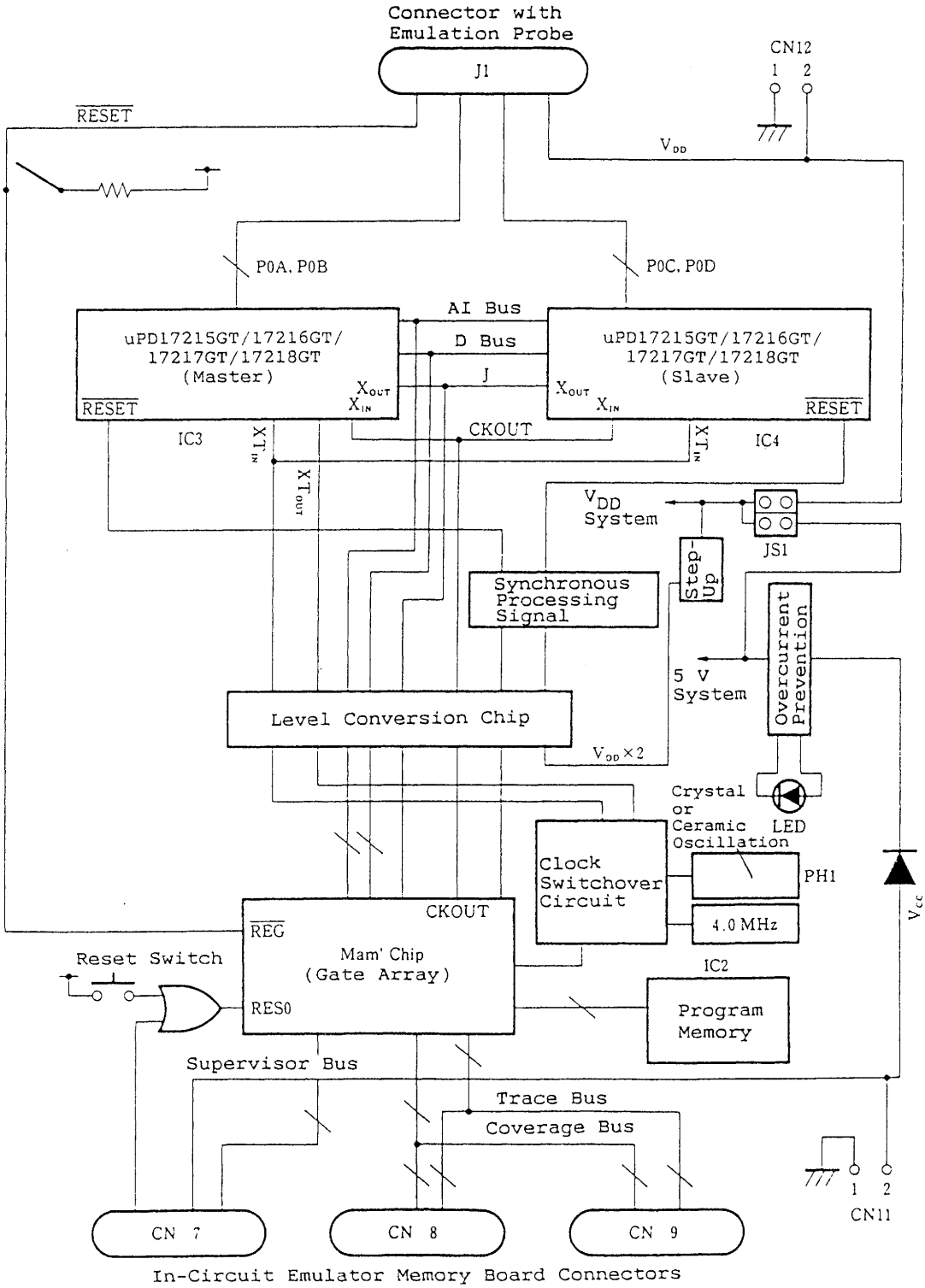


NOTE: The real chips mounted in IC3 (MASTER) and IC4 (SLAVE) vary according to the product to be evaluated.

□ The SE17215 is shipped with the uPD17218GT-00x mounted.

CHAPTER 3. BLOCK DIAGRAM

Figure 3-1 SE-17215 Block Diagram



Phase-out/Discontinued

CHAPTER 4. METHOD OF USE

4.1 SETTING OF SE BOARD FOR uPD17215 SERIES

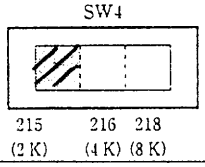
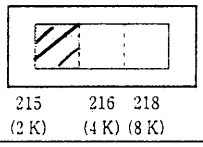
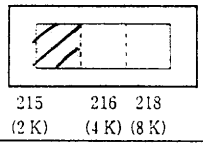
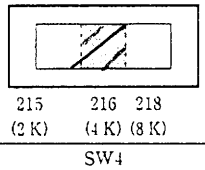
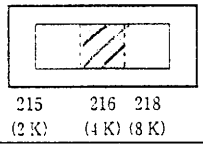
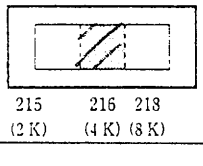
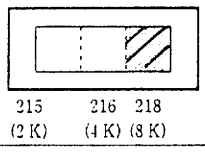
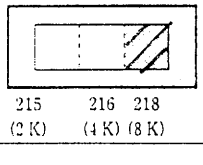
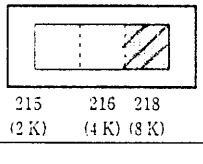
When product evaluation is to be performed using the SE-17215, a real chip corresponding to the product on which evaluation is to be performed must be mounted in the IC3 (MASTER) and IC4 (SLAVE) sockets on the SE board.

When the SE-17215 is shipped, it is set for uPD17218 evaluation, and therefore a uPD17218GT-00x is mounted in IC3 and IC4. Therefore, to evaluate a product other than the uPD17218, different real chips must be mounted.

In this case, the memory size changeover switches (SW4, 5, 6) must be set according to the product to be evaluated.

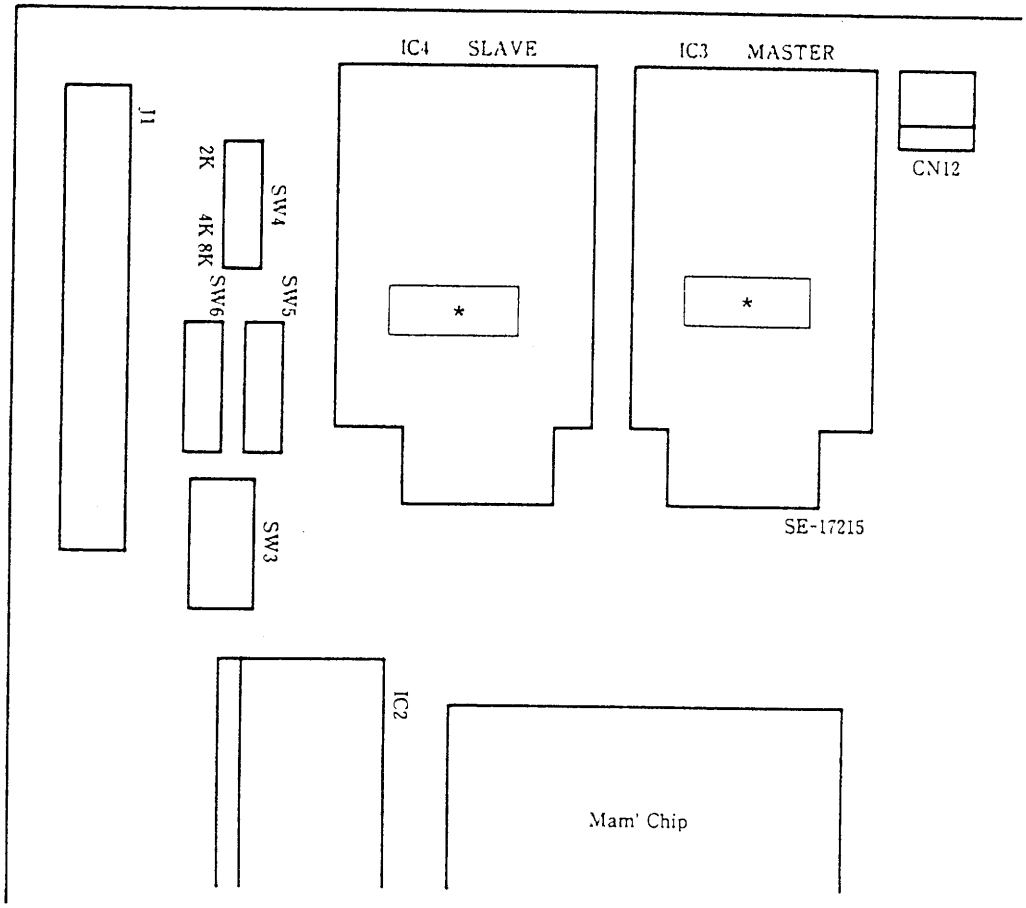
The setting method when evaluating a uPD17215 series product is shown in Table 4-1.

Table 4-1 Correspondence between Product to be Evaluated and Real Chip & Memory Size Changeover Switch

Setting / Target Product	Real Chip Mounted in IC3, IC4	Memory Size Changeover Switch Settings		
		SW4	SW5	SW6
uPD17215	uPD17215 GT-00x			
uPD17216	uPD17216 GT-00x			
uPD17217	uPD17217 GT-00x			
uPD17218	uPD17218 GT-00x			

Remarks: Shading indicates the selected switch position.

Figure 4-1 Example of Real Chip Mounting



*: Real Chip

NOTE: When replacing the real chips, ensure that power is OFF, then insert the real chips making sure that pin 1 is correctly oriented.

4.2 USE OF LEVEL CONVERSION CHIP (uPD6706GF)

(1) Outline of level conversion chip

The level conversion chip is an IC used when the operating voltages of the target system and SE board used are different ($V_{DD} \neq V_{CC}$, V_{CC} = +5 V) in order to convert each of these two different voltage levels to the level at which the other unit is operating. As a result, the target system and SE board can perform signal exchange smoothly even if they have different operating voltages.

(2) Using the level conversion chip

With the SE board power supply method selection jumper switch (JS1) set to the V_{DD} side, the level conversion chip operates automatically when a power supply other than 5 V is applied between the emulation probe V_{DD} and GND pins or to the CN12 pin.

Remarks 1: V_{DD} is the supply voltage of the target system used. The target system power can be supplied from the CN12 pin or the emulation probe to the real chips mounted on the SE board. This allows debugging to be performed in a more realistic environment.

2: V_{CC} is the power supply for operating the SE board (excluding the real chip), and +5 V must always be supplied. When mounted in the in-circuit emulator, this is supplied automatically from the in-circuit emulator, and when the SE board is operated alone, it is supplied from the CN11 pin.

4.3 SUPPLYING POWER TO SE BOARD

There are two power supplies to the SE board: V_{CC} for operation of the SE board (excluding the real chips), and V_{DD} for operation of the real chips.

A voltage of +5 V must always be applied to V_{CC}, and a voltage in the real chip operating voltage range (+2.7 to +5.5 V) is supplied to V_{DD}.

(1) SE board power supply method selection jumper switch (JS1)

Jumper switch JS1 is used to select either the power supplied to the SE board (V_{CC}) or the power supplied from the emulation probe or the CN12 pin (V_{DD}) as the power supply for the real chips.

Tables 4-2 and 4-3 show the JS1 functions when the SE board is mounted in an in-circuit emulator, and when the SE board is used in standalone mode.

When the target system power supply is +5 V, JS1 is set to the +5 V side. When the SE board is used mounted in an in-circuit emulator, +5 V is supplied automatically from the in-circuit emulator. When the SE board is used as a standalone unit, +5 V is supplied from the CN11 pin, offering the advantage of extremely simple power supply provision.

When the target system power supply is other than +5 V, if JS1 is set to the V_{DD} side, the target system voltage can be supplied to the chips from the emulation probe or the CN12 pin, offering the advantage of allowing evaluation to be performed in a more realistic environment.

Table 4-2 JS1 Functions when SE Board is Mounted in In-Circuit Emulator

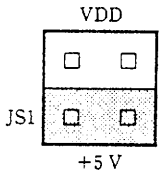
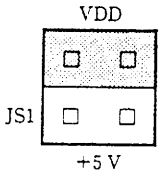
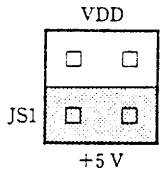
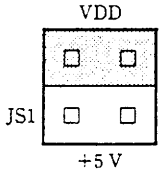
Power Supply / JS1 Setting	Power Supplied to Real Chips (V_{DD})	Power Supplied to SE Board (Excluding Real Chips) (V_{CC})
	+5 V is supplied from in-circuit emulator.	+5 V is supplied from in-circuit emulator.
	Power must be supplied from emulation probe or CN12 pin.	

Table 4-3 JS1 Functions when SE Board is Used as Standalone Unit

Power Supply / JS1 Setting	Power Supplied to Real Chips (V_{DD})	Power Supplied to SE Board (Excluding Real Chips) (V_{CC})
	+5 V is supplied from CN11.	+5 V is supplied from CN11.
	Power must be supplied from emulation probe or CN12 pin.	

Shading indicates the selected switch position.

(2) Power supply pins

The SE board has pins for supplying power from an external source at three locations, and the appropriate one must be used according to the evaluation environment. These pins and their functions are shown in Table 4-4.

Table 4-4 Power Supply Pins and their Functions

Pin Name	Power Supply (Permissible Voltage Range)	Function
CN11	V_{CC} (+5 V ±5%)	The operating power supply pin (excluding the real chips) when the SE board is used as a standalone unit. +5 V must always be supplied. When the SE board is mounted in an in-circuit emulator, supply from the CN11 pin is not necessary.
CN12	V_{DD} (+2.7 to +5.5 V)	The pin which applies a voltage in the operating voltage range of +2.7 to +5.5 V to the real chips when the target system power supply is $V_{CC} \neq 5$ V (JS1 is set to the V_{DD} side).
Emulation probe (V_{DD} pin and GND pin)	V_{DD} (+2.7 to +5.5 V)	Has the same function as the CN12 pin. As the CN12 pin and emulation probe pin power supply pin are connected in the SE board, one or the other should be used as the power supply.

Remarks: With the CN11 and CN12 pins, pin 1 is GND and pin 2 is the power supply. It is convenient to use the power cable provided to supply the power.

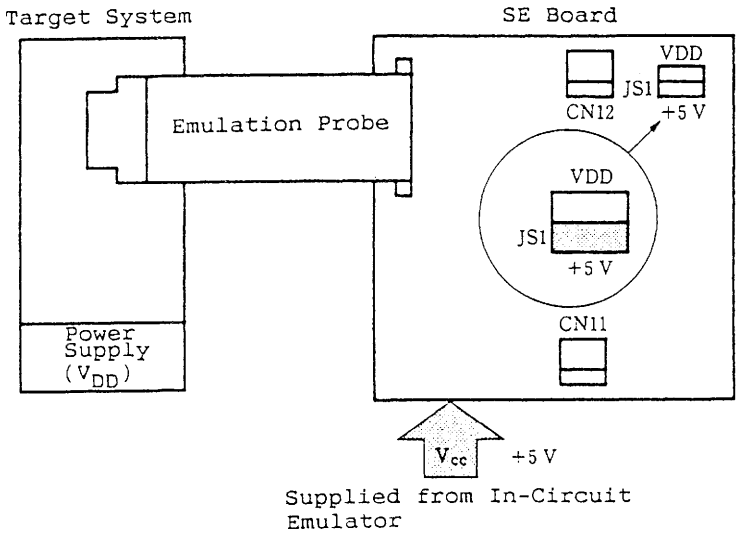
(3) Practical examples

① When mounted in in-circuit emulator

(a) When mounted in in-circuit emulator, and used with $V_{DD} = V_{CC} = +5$ V

JS1 is set to the +5 V side. V_{CC} and V_{DD} are supplied from the in-circuit emulator and power need not be supplied from the CN11 and CN12 pins or the emulation probe.

Figure 4-2 Supply Method when SE Board is Mounted in In-Circuit Emulator and $V_{DD} = V_{CC} = +5$ V



(b) When mounted in in-circuit emulator, and used with $V_{DD} \neq V_{CC}$, $V_{CC} = +5$ V

JS1 is set to the V_{DD} side. V_{CC} is supplied from the in-circuit emulator and V_{DD} is supplied from the CN12 pin or the emulation probe.

Figure 4-3 Method of Supplying V_{DD} from CN12 Pin when SE Board is Mounted in In-Circuit Emulator

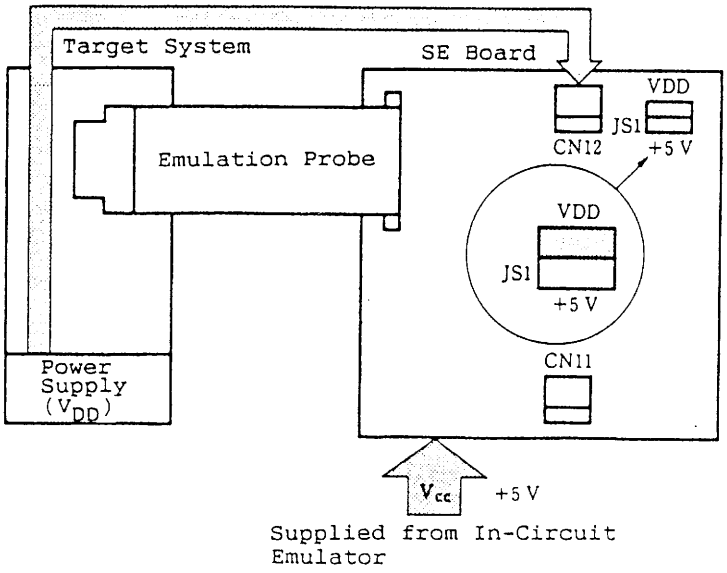
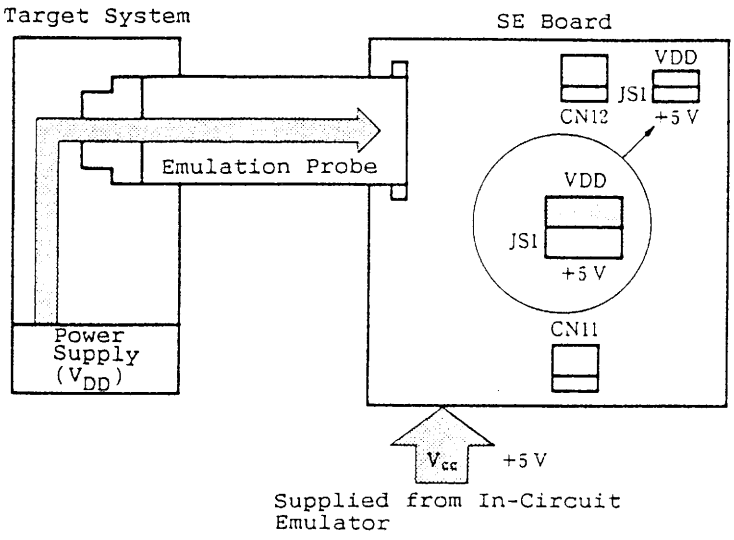


Figure 4-4 Method of Supplying V_{DD} from Emulation Probe when SE Board is Mounted in In-Circuit Emulator



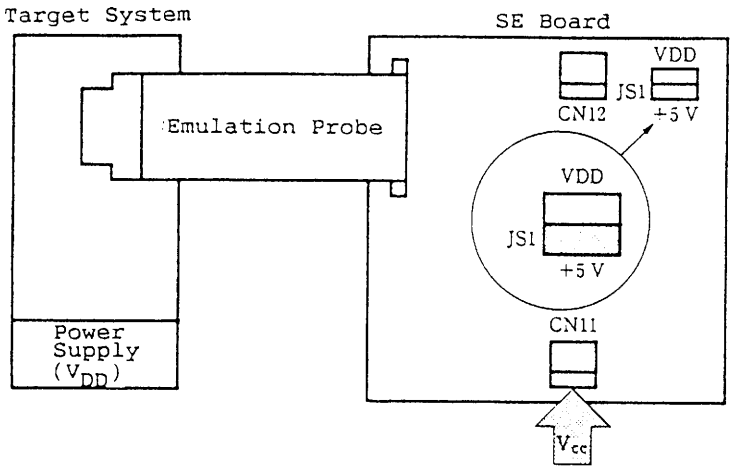
② When used as standalone SE board

(a) When used as standalone SE board, with

$V_{DD} = V_{CC} = +5$ V

JS1 is set to the +5 V side. V_{CC} and V_{DD} are supplied from the CN11 pin.

Figure 4-5 Supply Method when Used as Standalone SE Board with $V_{DD} = V_{CC} = +5$ V



(b) When used as standalone SE board, with $V_{DD} \neq V_{CC} = +5$ V

JS1 is set to the V_{DD} side. V_{CC} is supplied from CN11 and V_{DD} is supplied from the CN12 pin or the emulation probe.

Figure 4-6 Method of Supplying V_{DD} from CN12 Pin when SE Board is Used as Standalone Unit

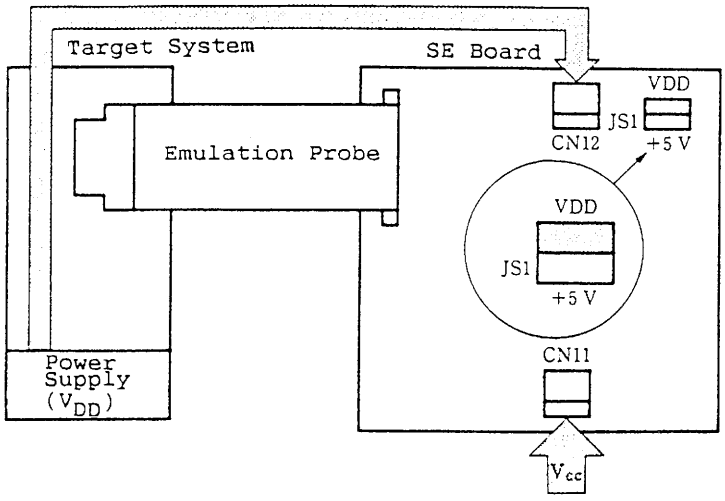
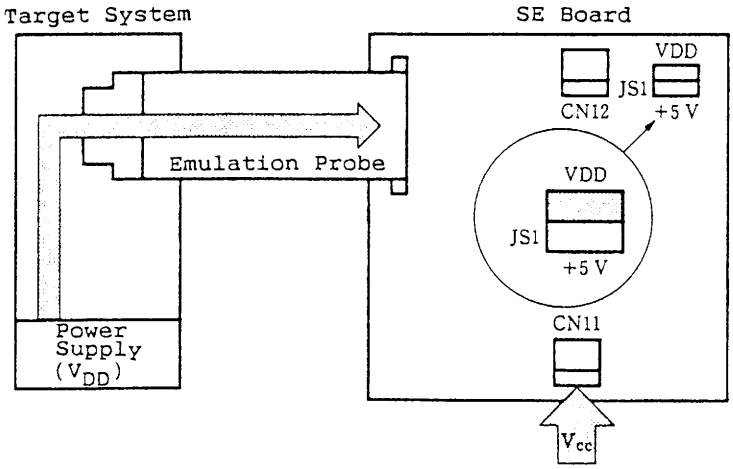


Figure 4-7 Method of Supplying V_{DD} from Emulation Probe when SE Board is Used as Standalone Unit

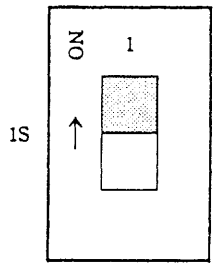


4.4 OPTION SWITCH

Mask options can be set for the uPD17215 series $\overline{\text{RESET}}$ pins.

In the SE-17215 debugging environment, an option switch (1S) is provided to simulate the mask options written in the source program.

Figure 4-8 Option Switch



Shading indicates the factory settings.

Table 4-5 Option Switch Settings

Switch No.	Pin Name	ON	OFF	Switch Code
1S	$\overline{\text{RESET}}$	Pulled up	Not pulled	0000

If the mask option information written in the source program and the SE board option switch settings do not coincide, the in-circuit emulator will output the following warning message.

? IOS INVALID OPTION SWITCH AT **xxxx**
xxxx: Switch code

The switch code indicates the location of the incorrect option switch on the SE board.

With the 17K series assembler (AS17K), the mask option specification is written in the source program. Immediately after the ICE file has been loaded by means of an ".LP0" or ".LP1" command, the in-circuit emulator checks whether the SE board option switch settings agree with the settings specified by the program. If the above message is output, the option switch settings should be rechecked.

NOTE 1: When the SE board is mounted in an in-circuit emulator, if an emulation probe is not used for connection to the target system and the board is used with option switch 1S ($\overline{\text{RESET}}$) in the OFF state, the SE board reset function will be unstable, and there is a risk of misoperation.

2: The low-voltage detection circuit (POC) mask option provided in the real chip cannot be set with the SE-17215. The in-circuit emulator therefore outputs the following warning message when the source program is loaded. Careful checking should be performed in the source program for the low-voltage detection circuit mask option.

[Warning message]
SOME MASK-OPTIONS COULD NOT BE CHECKED BY CLICE.

4.5 CHANGING THE OSCILLATOR FREQUENCY

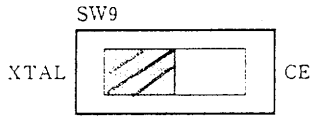
The factory setting for the SE-17215 operating frequency can be changed.

Table 4-6 Settable Operating Frequency Range

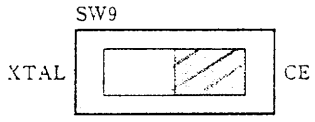
Device Mounted in IC3 and IC4	Factory Setting	Operating Frequency Range	Change Method
uPD17215GT-00x uPD17216GT-00x uPD17217GT-00x uPD17218GT-00x	4 MHz (ceramic oscillation)	1 MHz to 8 MHz	Configure oscillator in component socket (PH1)
	4 MHz (crystal oscillation)	4 MHz fixed	Fine adjustment possible by trimmer capacitor (C19) on SE board

Remarks: Clock oscillation changeover switch setting

① When operating on 4 MHz crystal resonator (XT1) clock



② When operating on clock of resonator mounted on PH1



(1) When using crystal resonator

When the clock oscillation changeover switch (SW9) is set to the "XTAL" position, 4 MHz (fixed (XT1): supplied from the crystal resonator) is obtained as the oscillator frequency supplied to the real chip. If you want to perform fine adjustment of the oscillator frequency, this should be done using the trimmer capacitor (C19) on the SE board.

The oscillator frequency output waveform is also output to the CH11 monitor pin. Therefore, the oscillator frequency can be changed by adjusting C19 while observing the waveform output to CH11 on an oscilloscope, etc.

□ NOTE: Since this clock is also used as the emulation clock, use it fixed at 4 MHz (do not remove it).

(2) When using ceramic resonator (when changing the frequency)

When the clock oscillation changeover switch (SW9) is set to the "CE" position, the clock is supplied from the oscillation configured on the parts holder (PH1). Adjustment of the oscillator frequency should be performed with the trimmer capacitor on PH1.

Any resonator can be connected between pins 1 and 14 of PH1. A 4 MHz ceramic resonator is mounted at the factory. Also, a trimmer capacitor adjusted to 30 pF is mounted between pins 5 and 10 and a 33 pF capacitor between pins 7 and 8. On the assumption of a feedback resistor in a microcomputer, a 1 MΩ resistor is mounted between pins 3 and 12.

The oscillator frequency output waveform is also output to the CH12 monitor pin. Therefore, the oscillator frequency can be changed by adjusting the trimmer capacitor on PH1 while observing the waveform output to CH12 on an oscilloscope, etc.

Figure 4-9 Initial State of Parts Holder (PH1)

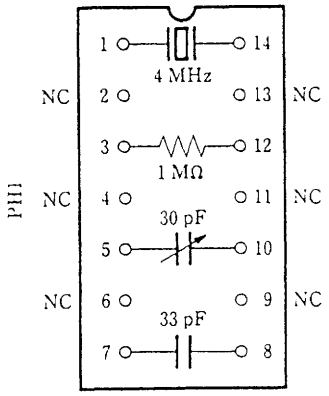
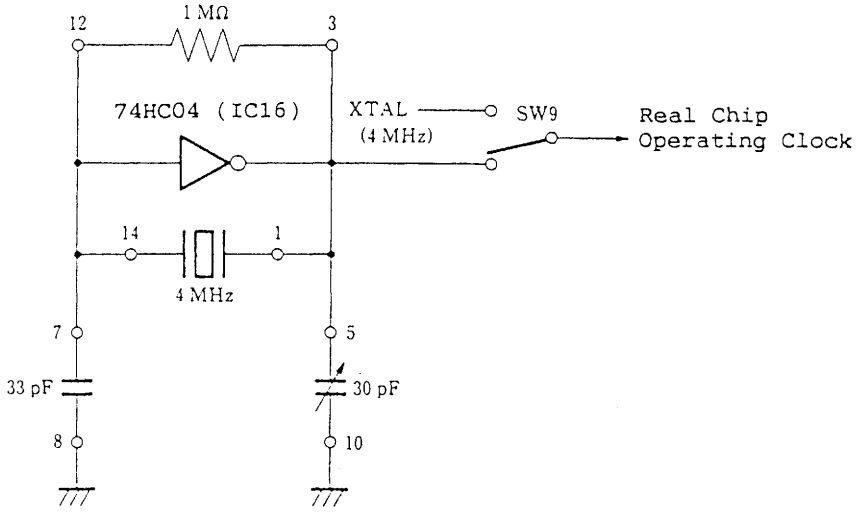


Figure 4-10 Parts Holder (PH1) Peripheral Circuit



Remarks 1: When changing the resonator, a crystal or ceramic resonator of the desired frequency should be connected between pins 1 and 14. If necessary, capacitors and other components should also be replaced.

2: When replacing the oscillation stabilizers (capacitors), the capacitors between pins 5 and 10 and between pins 7 and 8 should be changed.

4.6 USING SE BOARD MOUNTED IN IN-CIRCUIT EMULATOR

The in-circuit emulator is connected to a PC-9800 series or similar host machine for use in debugging the target system. Please refer to the IE-17K or IE-17K-ET User's Manual for details.

4.6.1 MOUNTING IN AND REMOVING FROM IN-CIRCUIT EMULATOR

The method of installing the SE-17215 in the in-circuit emulator is described below.

① Remove the outer and inner covers of the in-circuit emulator.
② When the inner cover is removed, the memory board is exposed. Insert the connectors (CN7, CN8 and CN9) on the underside of the SE-17215 in the three connectors on the surface of the memory board.

When removing the SE-17215 installed in the in-circuit emulator, lift it straight upward.

Figure 4-11 External View of IE-17K (With Outer Cover Removed)

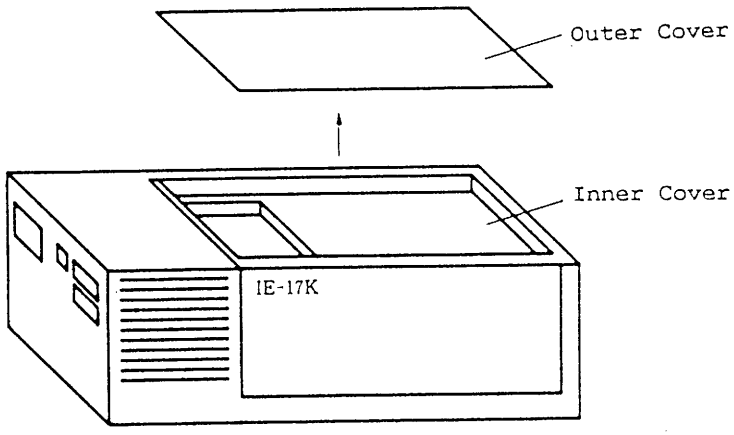
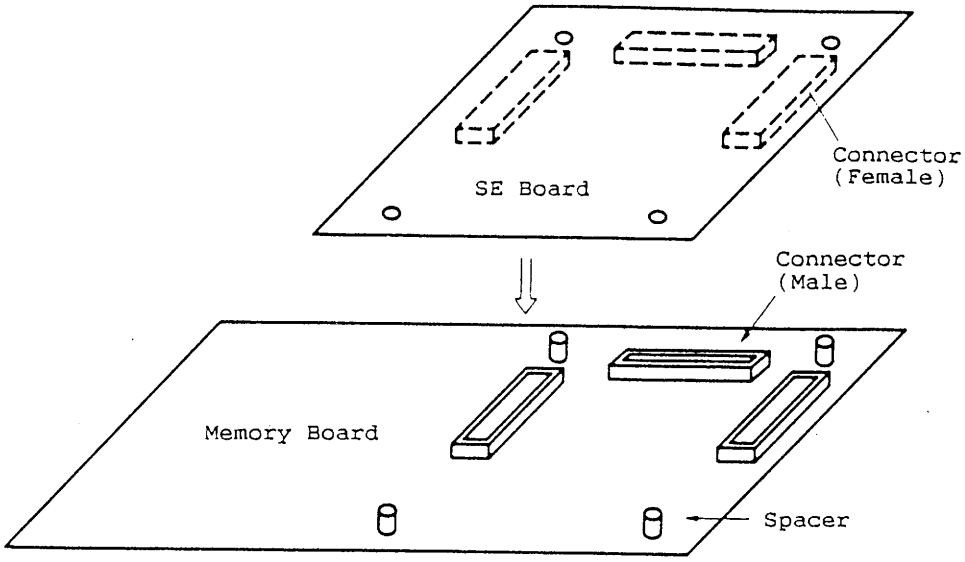


Figure 4-12 Insertion and Removal of SE-17215



Next, to connect the in-circuit emulator to the target system, connect the emulation probe to SE-17215 connector J1.

Finally, mount the inner and outer covers.

4.6.2 POWER SUPPLY

Before mounting the inner and outer covers of the in-circuit emulator after installing the SE-17215, turn on the in-circuit emulator power and check that the LED1 on the SE-17215 lights.

If the power supply of the target system used is not +5 V, the target system supply voltage can be applied to the real chips on the SE board from the CN12 pin or the emulation probe. See 4.2 "Use of Level Conversion Chip (uPD6706GF)" and 4.3 "Supplying Power to SE Board" for details.

If the LED1 does not light, probable causes are as follows:

- The in-circuit emulator power cable is not connected.
- An overcurrent is flowing in the SE-17215 (approx. 500 mA or higher).
- The SE-17215 is not correctly installed.

If the LED1 does not light, turn off the in-circuit emulator power, and install the SE-17215 again. If the LED1 still does not light, a fault should be suspected.

NOTE 1: Power should be turned on to the in-circuit emulator first, followed by the target system.

2: The reset switch (SW1) on the SE board should not be used.
The in-circuit emulator reset switch should be used to reset the in-circuit emulator.

4.6.3 TRANSFER OF ICE FILE TO IN-CIRCUIT EMULATOR

The in-circuit emulator (IE-17K or IE-17K-ET) is connected to a PC-9800 series or similar host machine and used for debugging of the target system hardware and software. Please refer to the IE-17K or IE-17K-ET User's Manual for details.

If SIMPLEHOST is used, please refer to the SIMPLEHOST User's Manual.

The procedure is shown below for checking that the SE-17215 has been correctly installed when using commercially available RS-232-C communication software.

When SIMPLEHOST is used, the "LISTING" screen is displayed if the SE-17215 is correctly connected.

① When the in-circuit emulator is powered on, or, if already powered on, when it is restarted by pressing the reset switch, a prompt (@@@>) is displayed.

② Next, use the .LP0 or .LP1 command to load the ICE file of the program created by the assembler (AS17K) or the ICE file output by the .SP0 or .SP1 command.

The in-circuit emulator will not work until this ICE file is loaded.

If the SE board is correctly connected to the in-circuit emulator, a "BRK>" prompt is displayed as shown in the following example.

Example: When the uPD17216 ICE file is loaded

```
OK
D17216
BRK>
```

If the above message is not displayed, probable causes are as follows:

- The loaded ICE file does not correspond to the real chips mounted on the SE-17215.
- An SE board other than an SE-17215 has been mounted.
- An ICE file other than that for the uPD17215 series has been loaded.
- The option switch settings differ from the program description.
- The SE-17215 has not been fully installed in the in-circuit emulator.

4.6.4 ACTION IN CASE OF NO RESPONSE FROM IN-CIRCUIT EMULATOR

If there is no response from the in-circuit emulator, the following action should be taken.

① The connection between the SE board and the in-circuit emulator may be incomplete. Install the SE board again.

② The target system and SE board may not be correctly connected by the emulation probe.
Check the connected parts again.

③ If JS1 is set to the V_{DD} side, it is possible that power is not being supplied to the real chips from the emulation probe or CN12 pin. Supply power from the emulation probe or the CN12 pin, or set JS1 to the +5 V side.
If JS1 is set to the +5 V side, +5 V is supplied automatically from the in-circuit emulator (see 4.3 "Supplying Power to SE Board").

④ The reset circuit in the target system may not be operating correctly. In this case, the SE board reset state will be unstable, and the in-circuit emulator may be unable to send back a response.
A method of verifying whether this condition exists is to set the mask option switch (1S: $\overline{\text{RESET}}$) to ON, and then start the in-circuit emulator again. A warning message (? IOS INVALID OPTION SWITCH AT xxxx) may be output at this time, but the ICE file load can be performed. If the above condition is found to exist, target system correction or source program correction should be carried out immediately so that no error messages are output.

⑤ Recheck the in-circuit emulator and host machine baud rate settings. See the IE-17K or IE-17K-ET User's Manual for the in-circuit emulator baud rate setting.

⑥ Check if the memory size changeover switch corresponds to the real chip mounted (see Table 4-1 "Correspondence between Product to be Evaluated and Real Chip & Memory Size Changeover Switch." □

4.6.5 ERROR MESSAGES AND REMEDIAL ACTION

If the combination of in-circuit emulator, real chips mounted on the SE board, and loaded ICE file is incorrect, for instance, an error message will be output.

To enable more accurate debugging to be performed, an SE board number is registered on the SE-17215, and a device number on the real chips.

Error messages and the action to be taken are described next.

Table 4-7 Device Numbers and SE Board Number □

Evaluation Device	Device No.	SE Board No.
uPD17215	49	34
uPD17216	4A	
uPD17217	50	
uPD17218	4B	

Remarks 1: The device number is the registration number of each individual real chip.

2: The SE board number is the registration number of the SE board.

Remarks 3: The device number and SE board number are also included in data in the loaded ICE file, and are used by the in-circuit emulator to check the development environment when the ICE file is loaded.

(1) Error message and remedial action if the real chips mounted on the SE-17215 and the loaded ICE file are not compatible

[Error message]

? IDI INVALID DEVICE ID NUMBER [XX- ΔΔ]

Remarks: xx indicates the device number of the real chips actually mounted, and ΔΔ indicates the device number contained in the loaded ICE file.

If this message is output, check whether the real chips mounted on the SE board are correct. If the wrong chips have been mounted, turn the in-circuit emulator power OFF and replace the real chips, then reload the ICE file.

If device file selection at assembly time is incorrect, reassemble the source file using the correct device file, and reload.

(2) Error message and remedial action if an SE board other than an SE-17215 has been mounted

[Error message]

? ISE INVALID SE BOARD NUMBER [□□- ▽▽]

Remarks: □□ indicates the SE board number of the SE board actually mounted, and ▽▽ indicates the SE board number contained in the loaded ICE file.

If this message is output, recheck the SE board and the loaded ICE file.

(3) Warning message and remedial action if the mask option information written in the source program and the option switches on the SE board do not coincide

[Warning message]

? IOS INVALID OPTION SWITCH AT xxxx

Remarks: xxxx represents the switch code which indicates the location of the incorrect option switch on the SE board.

See 4.4 "Option Switch" for the action to be taken if this message is output.

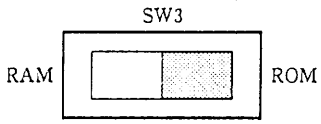
NOTE: If program/data reading or correction, etc. is not successfully carried out, recheck to see if the memory size changeover switch corresponds to the real chip mounted. □

4.7 USING SE BOARD AS STANDALONE UNIT

(1) ROM/RAM changeover slide switch setting

Set the ROM/RAM changeover slide switch (SW3) to the ROM side as shown in Figure 4-13.

Figure 4-13 ROM/RAM Changeover Slide Switch Setting



Shading indicates the selected switch position.

(2) PROM installation

When the SE-17215 is used as a standalone unit, PROM (uPD27C256AD, uPD27C512D, uPD27C1001D) should be installed as the program memory.

The PROM installed should satisfy the following conditions:

- ROM size

  256 bits: uPD27C256AD-12, -15, -20 or equivalent
  512 bits: uPD27C512D-12, -15, -20 or equivalent
  1M bits : uPD27C1001D-12, -15, -20 or equivalent

One of the following output files must be written in the PROM as a program.

- A uPD17215 series PROM file (.PRO) output by the 17K series assembler (AS17K)

- A file output for PROM use by means of an in-circuit emulator command (.XS0 or .XS1).

NOTE 1: An ICE file (.ICE) output to the in-circuit emulator by the AS17K should not be written. When the SE-17215 is used as a standalone unit, it does not operate with an ICE file.

2: The final address (x16 bits) of the uPD17215 series program memory is as follows.

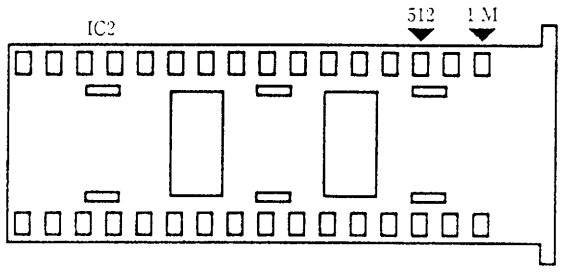
uPD17215	07FFH
uPD17216	0FFFH
uPD17217	17FFH
uPD17218	1FFFH

The PROM is mounted in the socket (IC2) on the SE board. Note that the mounting location depends on the PROM pin count.

Notes on PROM mounting

- When using a uPD27C256AD or 27C512D (28 pins), mount the PROM with pin 1 aligned with the "▼512" mark on the side of the socket.
- When using a uPD27C1001D (32 pins), mount the PROM with pin 1 aligned with the "▼1M" mark on the side of the socket.

Figure 4-14 PROM (IC2) Mounting Socket



□ (3) Memory size changeover switch settings

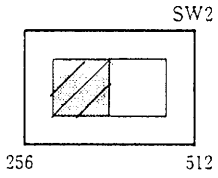
Memory size changeover switch settings should be carried out according to the product to be evaluated, as shown in Table 4-1.

(4) uPD27C256AD/27C512D/27C1001D changeover slide switch setting

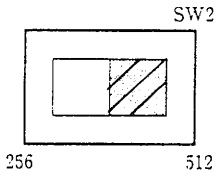
Set the SW2 slide switch as shown in Figure 4-15 according to whether a uPD27C256AD is used, or a uPD27C512D or uPD27C1001D is used.

Figure 4-15 uPD27C256AD/27C512D/27C1001D Changeover Slide Switch Setting

(a) Using uPD27C256AD



(b) Using uPD27C512D or uPD27C1001D



Shading indicates the selected switch position.

(5) Power supply

With the SE-17215, 5V $\pm$5% (V_{CC}) must be supplied to the CN11 pin from an external power supply.

If the power supply of the target system used is not +5 V, the target system supply voltage can be applied to the real chips on the SE board from the CN12 pin or the emulation probe. See 4.2 "Use of Level Conversion Chip (uPD6706GF)" and 4.3 "Supplying Power to SE Board" for details.

When V_{CC} is supplied normally, the LED1 on the SE-17215 lights.
If the LED1 does not light, probable causes are as follows:

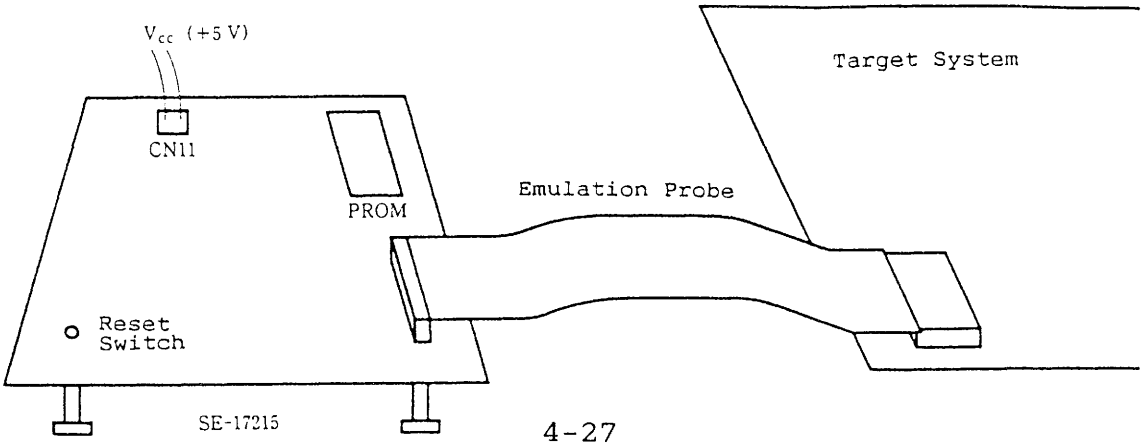
- Power is not being supplied.
- An overcurrent is flowing (approx. 500 mA or higher).

(6) Program execution

The SE-17215 and the target system are connected as shown in Figure 4-16. When the target system power is turned on, power is supplied to the SE-17215 and a power-on reset is performed, and execution starts at address 0H of the program written in the PROM.

Also, if the reset switch on the SE-17215 is pressed a reset is performed forcibly and execution starts at address 0H of the program written in the PROM in the same way as with a power-on reset.

Figure 4-16 Example of Connection when SE-17215 is Used in Standalone Mode



4.8 MONITOR PINS AND LED

(1) Monitor pin

The SE-17215 is provided with monitor pins for checking the status of the following pins on the real chips. The monitor pin names and functions are shown in Table 4-8, and the monitor pin layout in Figure 4-17.

Table 4-8 Monitor Pin Name and Functions

Monitor Pin Name	Function
CH1	Clock frequency monitoring
CH11	Crystal resonator monitoring
CH12	Ceramic resonator monitoring
GND	GND used when monitoring each signal

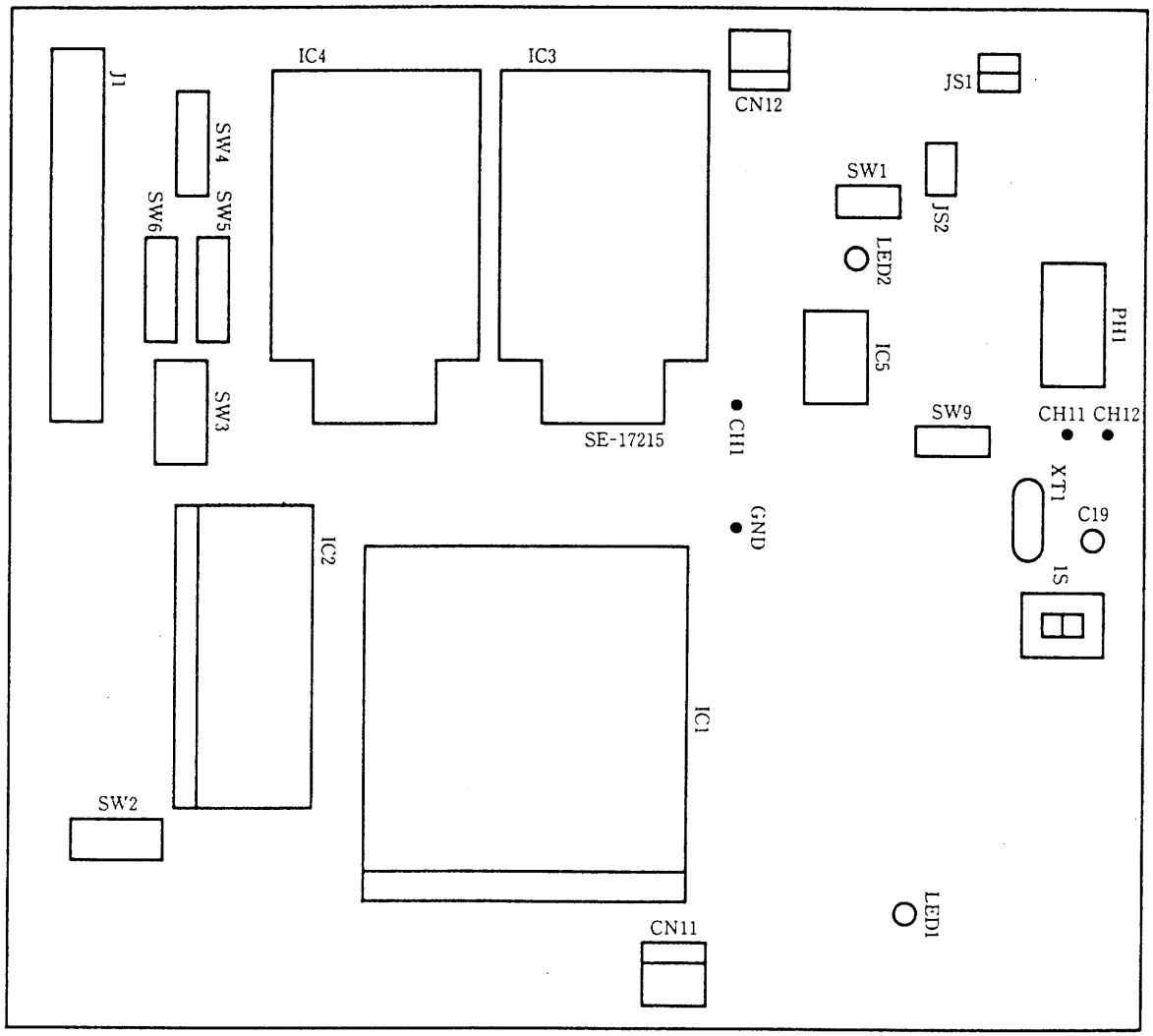
(2) LED1 POWER LED

Lights when power is supplied normally.
See 4.6 "Using SE Board Mounted in In-Circuit Emulator" and 4.7 "Using SE Board as Standalone Unit" for details.

(3) LED2

Usually on. Goes off when the mode is changed to high-speed mode.

Figure 4-17 Monitor Pin and LED Layout



4.9 SETTINGS OF JUMPER SWITCHES AND SLIDE SWITCHES

When the SE-17215 is shipped, the jumper switches, slide switches and resonator are set as shown below.

(1) Resonator

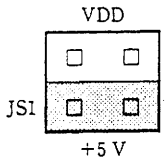
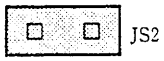
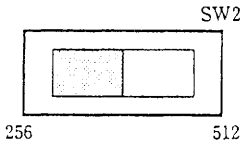
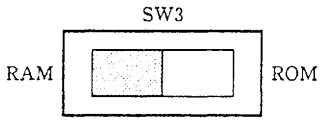
When the SE-17215 is shipped, the clock oscillation changeover switch (SW9) is set to the "CE" position, and the oscillator frequency supplied to the real chip is set to 4 MHz.

You can change to an oscillator frequency other than 4 MHz by changing the SW9 setting and the resonator, capacitor, etc., in the parts holder (PH1) on the SE board (see 4.5 "Changing the Oscillator Frequency)".

(2) Jumper switches and slide switches

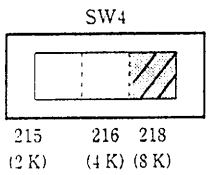
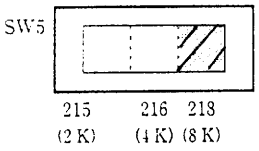
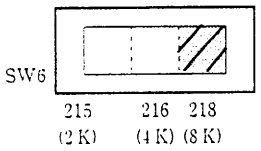
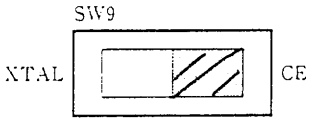
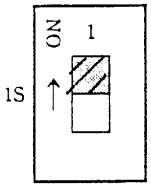
When the SE-17215 is shipped, the jumper switches and slide switches are set as shown in the diagrams in Table 4-9. The setting conditions should be checked before use.

Table 4-9 Jumper Switch and Slide Switch Settings

Switch No.	Jumper Switch/Slide Switch	Setting Condition		Setting Position
JS1		See 4.2 "Use of Level Conversion Chip (uPD6706GF)" and 4.3 "Supplying Power to SE Board".		
JS2		Mounted when shipped.		Do not remove.
SW1		Should only be used when the SE board is used alone (see 4.7 "Using SE Board as Standalone Unit". This switch must on no account be used when the in-circuit emulator is used.		
SW2		When evaluation is performed with SE board incorporated in in-circuit emulator.		256 side
		When evaluation is performed with standalone SE board.	NOTE 1	256 side
			NOTE 2	512 side
			NOTE 3	
SW3		When using with SE board incorporated in in-circuit emulator.		RAM side
		When evaluation is performed with standalone SE board.		ROM side

(to be continued)

Table 4-9 Jumper Switch and Slide Switch Settings (cont'd)

Switch No.	Jumper Switch/Slide Switch	Setting Condition	Setting Position
SW4		When uPD17215 is mounted	All in 215(2K) position
SW5		When uPD17216 is mounted	All in 216(4K) position
SW6		When uPD17217 is mounted When uPD17218 is mounted	All in 218(8K)
SW9		When operating on 4 MHz crystal resonator clock	XTAL position
		When operating on clock of resonator mounted on PH1	CE position
1S		See 4.4 "Option Switch" for details.	

Remarks: Shading indicates the factory setting.

NOTE 1: uPD27C256AD
2: uPD27C512D
3: uPD27C1001D

CHAPTER 5. CONNECTOR PIN TABLE

Table 5-1 J1 Connector Pins

J1 Pin No.	Pin Name (IC Pin No.)	J1 Pin No.	Pin Name (IC Pin No.)	J1 Pin No.	Pin Name (IC Pin No.)
1	GND	21	GND	41	GND
2	POD_1 (28)	22	POC_0 (23)	42	POA_3 (18)
3	GND	23	GND	43	GND
4	POD_2 (1)	24	POE_2 (6)	44	X_{IN} (11)
5	GND	25	GND	45	GND
6	POD_0 (27)	26	POB_3 (22)	46	POA_2 (17)
7	GND	27	GND	47	GND
8	POD_3 (2)	28	POE_3 (7)	48	GND (12)
9	GND	29	GND	49	GND
10	POC_3 (26)	30	POB_2 (21)	50	POA_1 (16)
11	GND	31	GND	51	GND
12	INT (3)	32	REM (8)	52	$\overline{RESET}$ (13)
13	GND	33	GND	53	GND
14	POC_2 (25)	34	POB_1 (20)	54	POA_0 (15)
15	GND	35	GND	55	GND
16	POE_0 (4)	36	V_{DD} (9)	56	$\overline{WDOUT}$ (14)
17	GND	37	GND	57	GND
18	POC_1 (24)	38	POB_0 (19)	58	NC
19	GND	39	GND	59	GND
20	POE_1 (5)	40	X_{OUT} (10)	60	NC

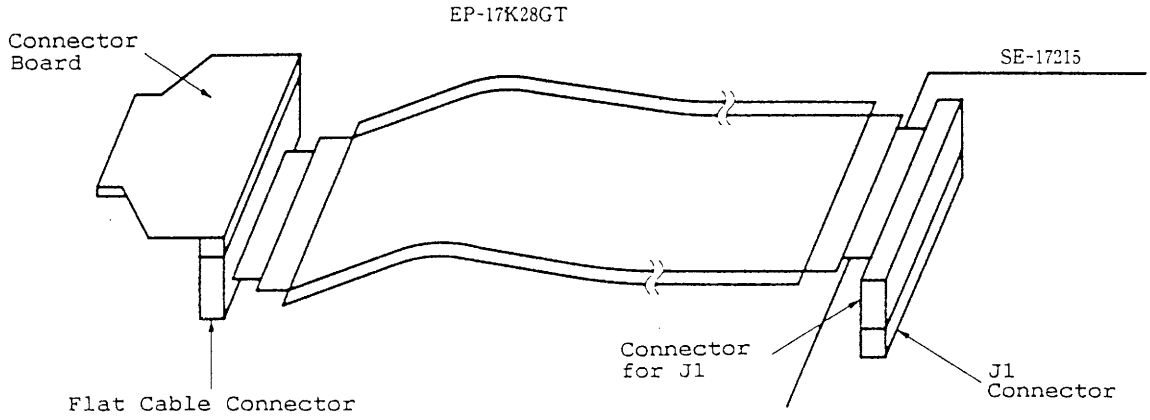

Phase-out/Discontinued

CHAPTER 6. CAUTIONS ON USE OF EMULATION PROBE

When using the uPD17215 series (GT) EP-17K28GT emulation probe to connect the SE-17215 to the target system, the following method should be used.

① Connecting EP-17K28GT to SE-17215

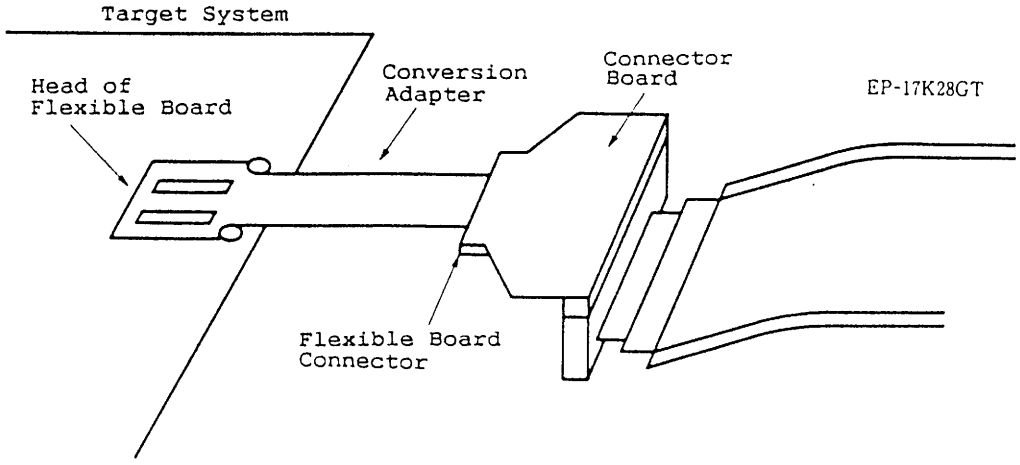
Connect the EP-17K28GT connector marked "J1" to the J1 connector on the SE-17215. When the EP-17K28GT is shipped, a flat cable is connected to the connector board (can be disconnected).



② Connecting EP-17K28GT to target system

Connect the EP-17K28GT connector board to the conversion adapter (EV-9500GT-28).

Next, solder the head of the flexible board of the conversion adapter to the target system.

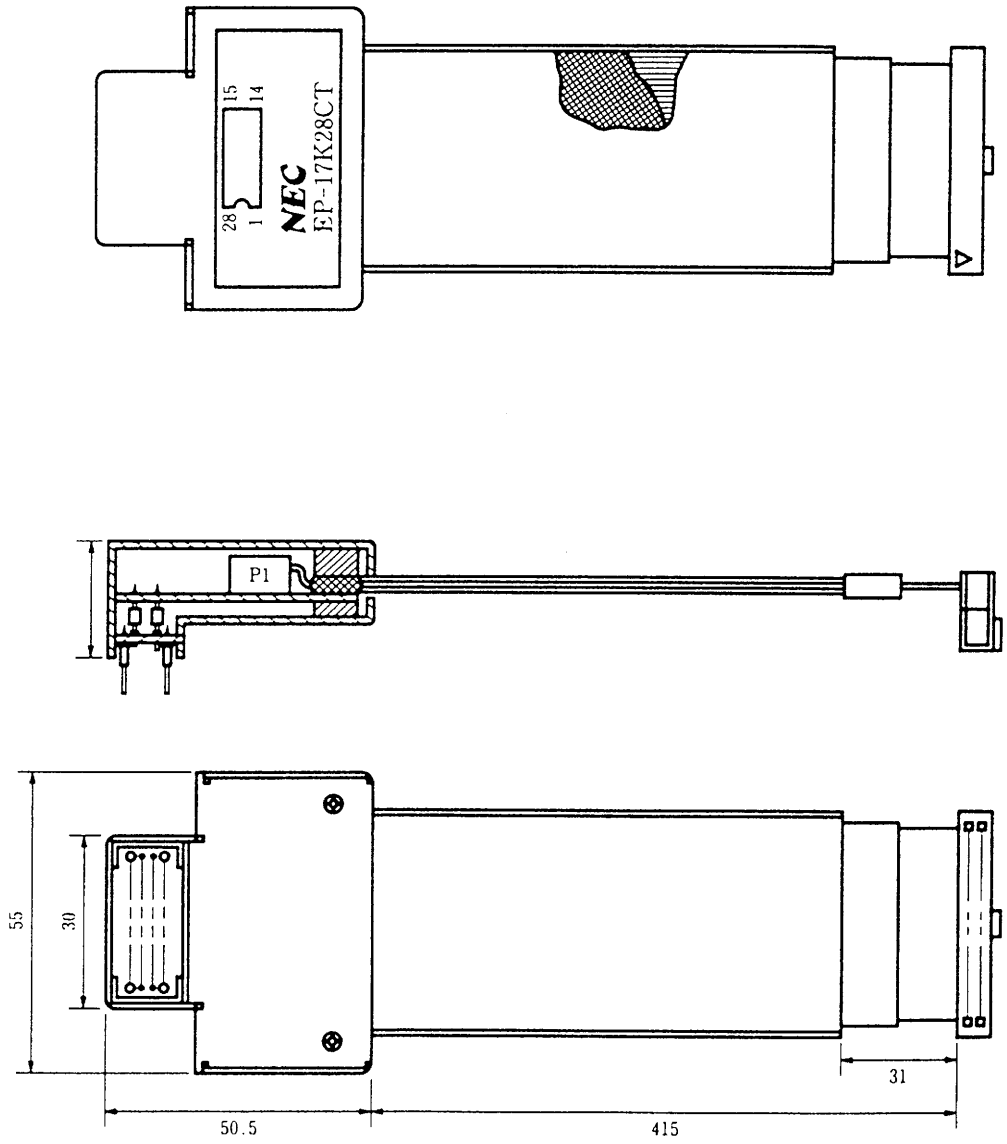


CHAPTER 7. EXTERNAL VIEW OF EMULATION PROBE AND CONVERSION ADAPTER

7.1 EXTERNAL VIEW OF EMULATION PROBE

Product name: EP-17K28CT

Figure 7-1 External View of Emulation Probe



Product name: EP-17K28GT

Figure 7-2 External View of Emulation Probe (Cable Unit)

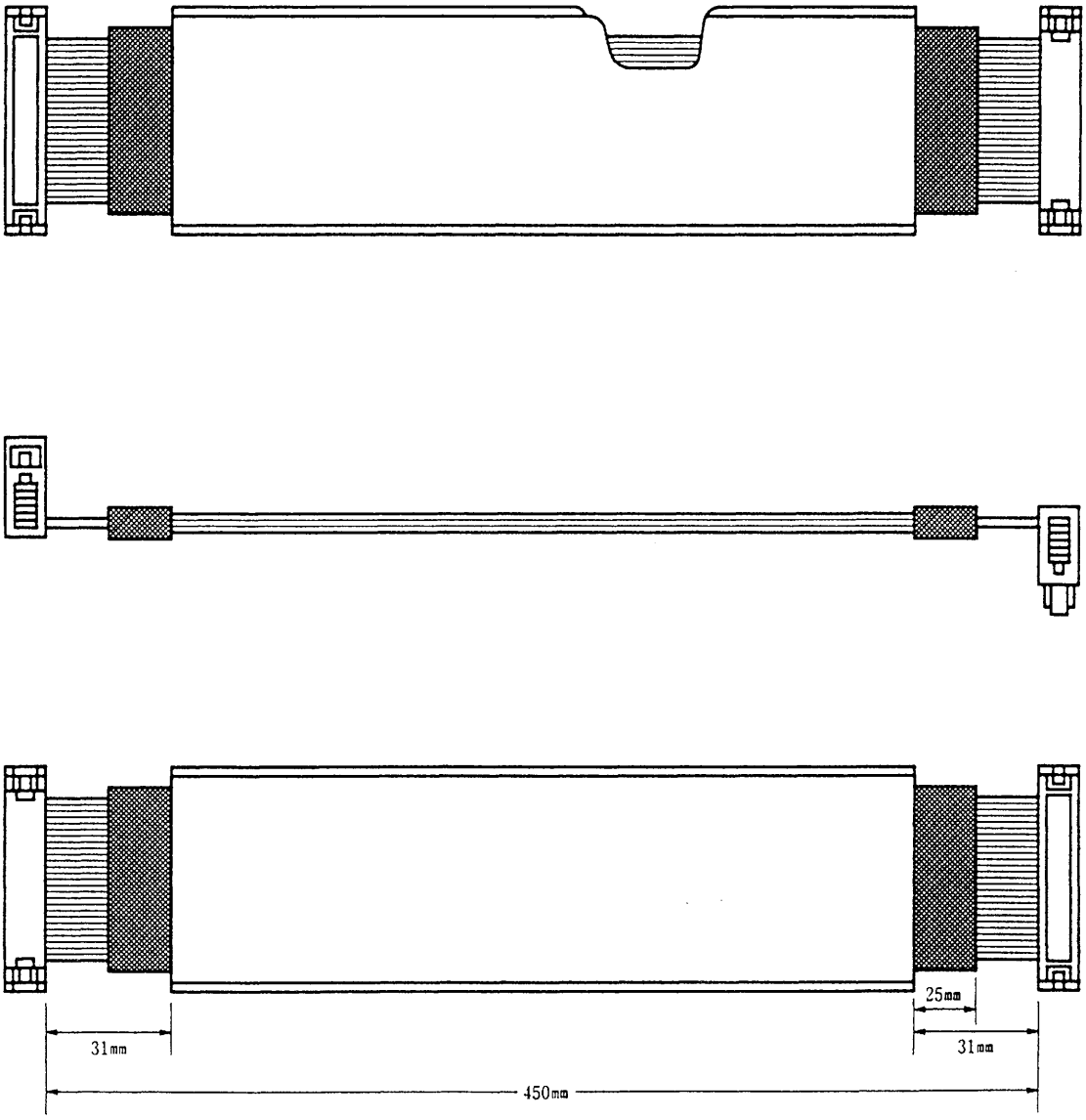
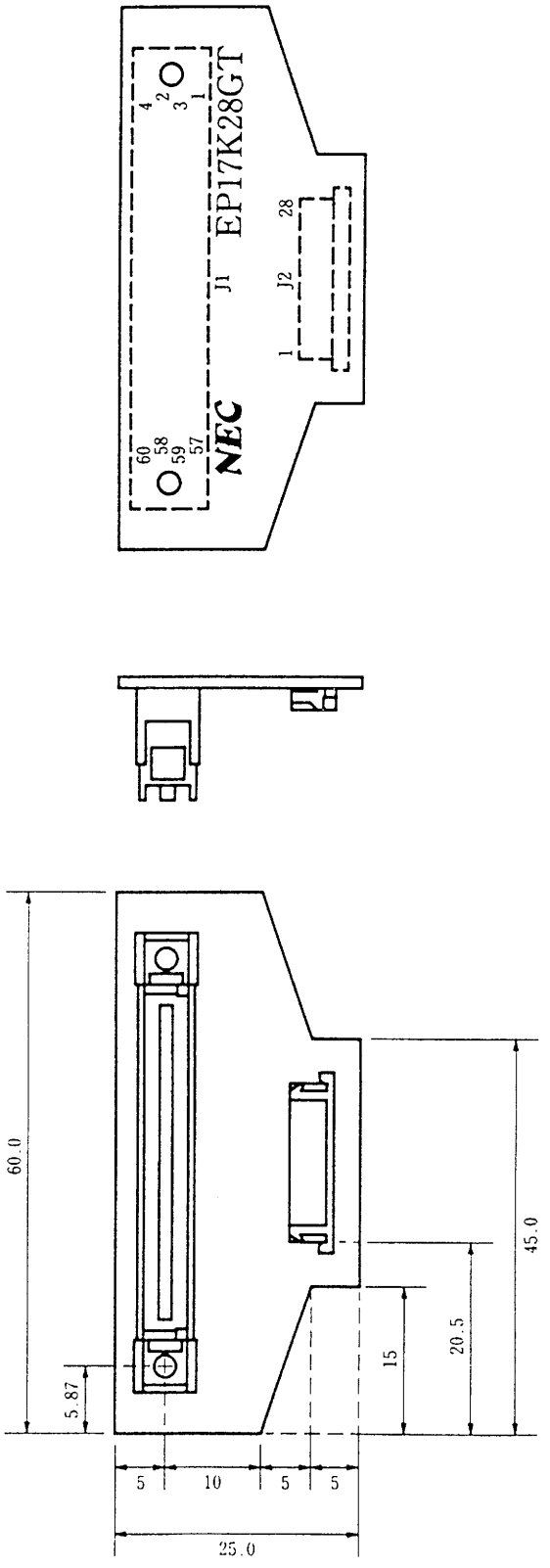


Figure 7-3 External View of Emulation Probe (Connector Board)

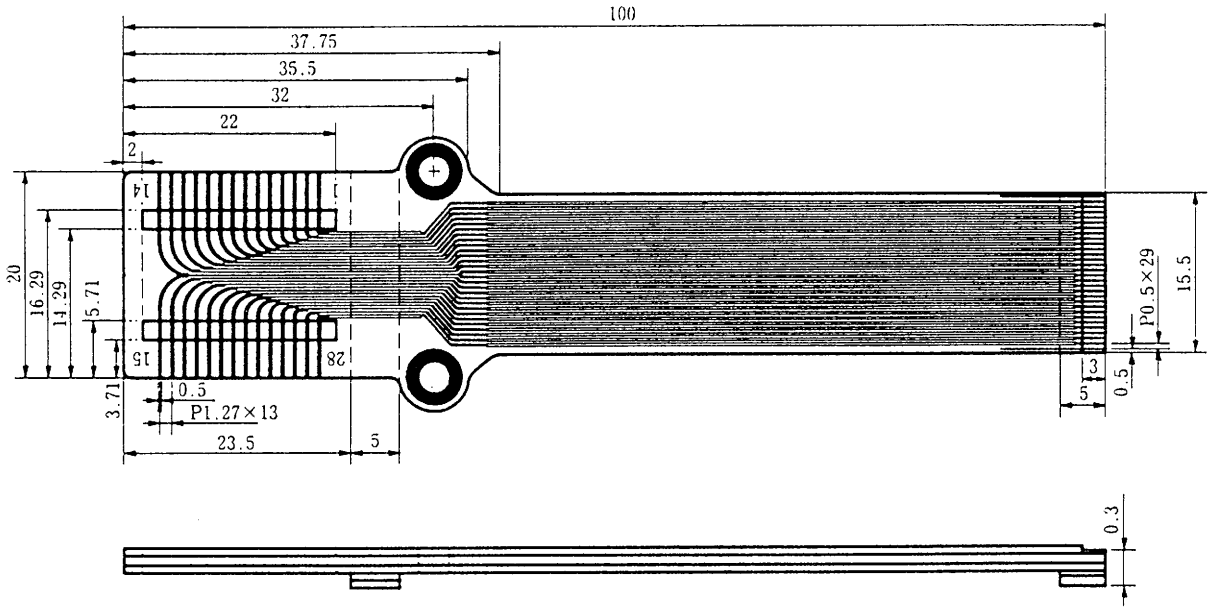


(Unit: mm)

7.2 EXTERNAL VIEW OF CONVERSION ADAPTER

Product name: EV-9500GT-28

Figure 7-4 External View of Conversion Adapter



(Unit: mm)

Phase-out/Discontinued