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USER'S MANUAL

RENESAS

Phase-out/Discontinued

SE-17106

17K SERIES

Document No. EEU-1418
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Data Published January 1993P
Printed in Japan

USER'S MANUAL

NEC

SE-17106

17K SERIES


Phase-out/Discontinued


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PREFACE

Readers This manual is intended for users who evaluate the μPD17106 system using the SE-17106.

Organization This manual consists of the following six major sections:

- Overview
- Specifications
- Block diagram
- Usage
- Connector pins
- Dimensions of probe and conversion socket

Purpose The SE-17106 is a board for evaluating the μPD17106 .

The purpose of this manual is to help users understand the functions and usage of the SE-17106.

Conventions

Note Explanation of an indicated part of text

Caution Information requesting the user's special attention

Remark Supplementary information

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CHAPTER 1 OVERVIEW

The SE-17106 is an SE board for evaluating the μPD17106, a 4-bit single-chip microcomputer system. The SE-17106 can be used alone, but using the SE-17106 mounted on the IE-17K enables the program to be debugged more efficiently. The IE-17K is the in-circuit emulator common to the 17K Series.

A μPD17106GC-00X chip (hereafter, simply called the chip) is used to interface with the SE-17106 and a target system. For this reason, the SE-17106 function is equivalent to the μPD17106GC-00X function.

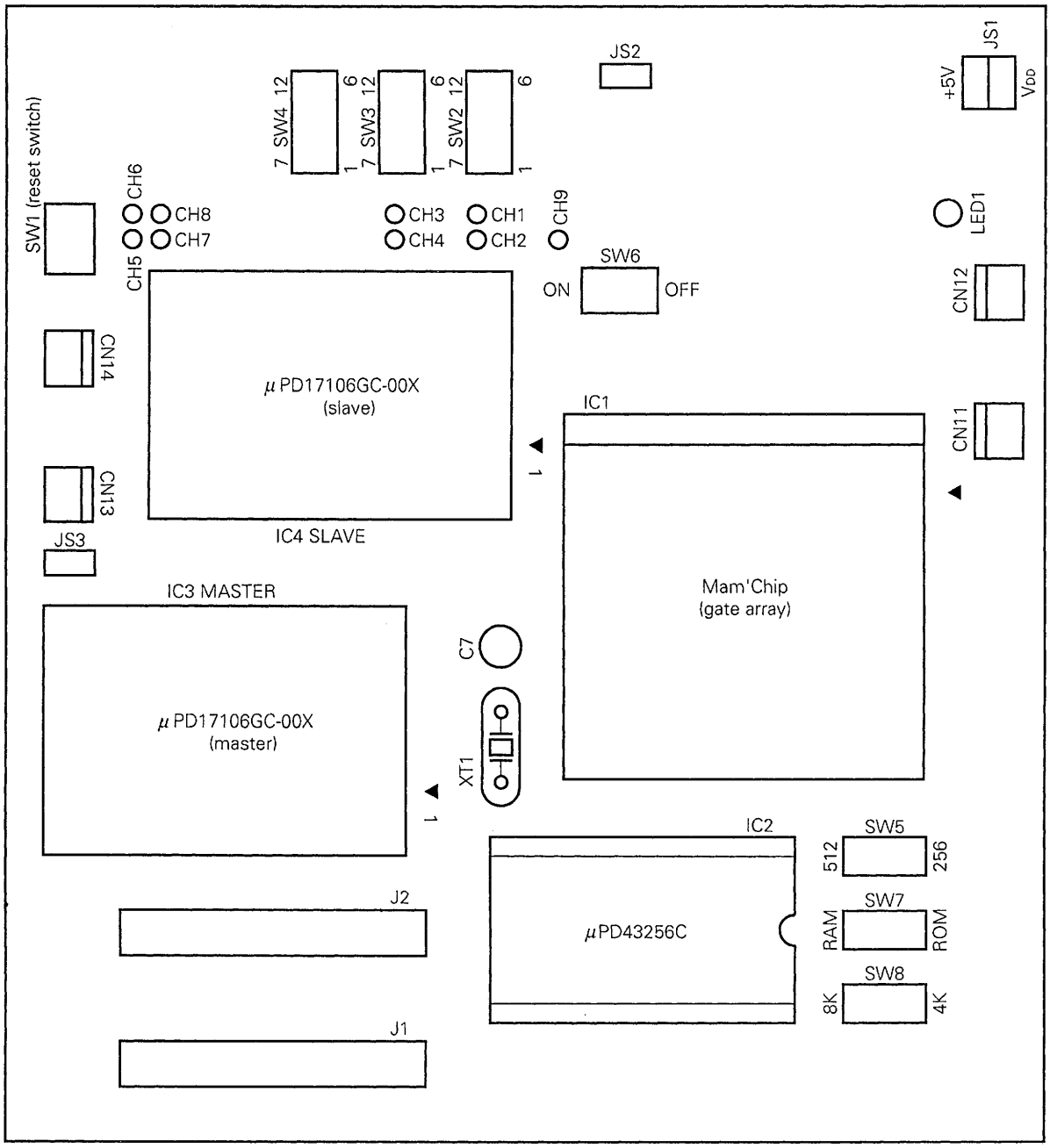
The optional EP-17106GC (64-pin plastic QFP probe for the μPD17106GC), is used to connect the SE-17106 to the target system.

Since a level conversion chip is provided in the SE-17106, the SE-17106 can also evaluate the μPD17106 system even if the μPD17106 power voltage is not +5 V (+3.5 to +5.5 V).

CHAPTER 2 SPECIFICATIONS

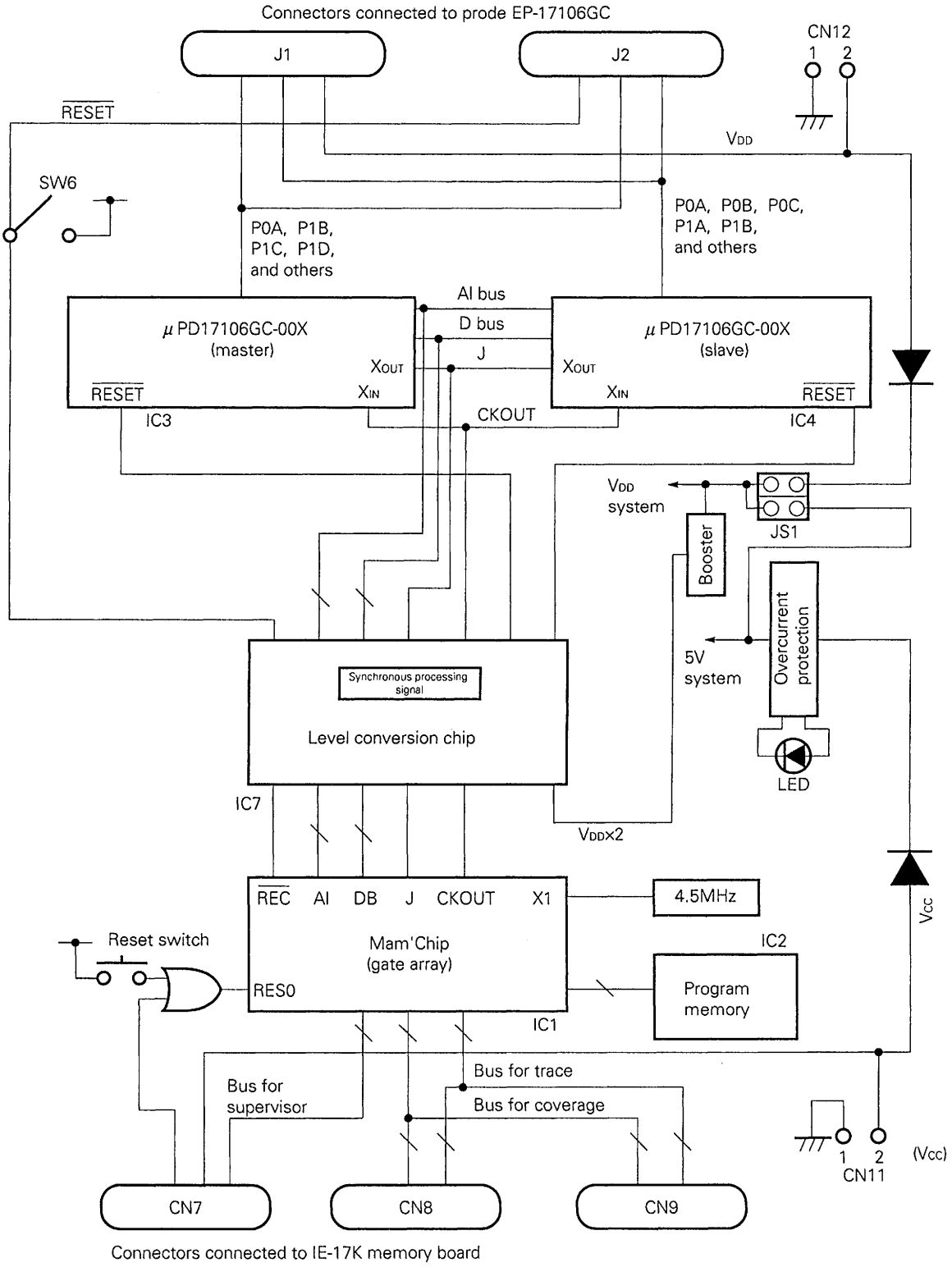
Product name	SE-17106
Program memory	• When the SE-17106 is used mounted on the IE-17K, use a μPD43256AC. • When the SE-17106 is used alone, write the program in the μPD27C256AD or μPD27C512D and mount it on the SE-17106. In a factory, the μPD43256AC is mounted on the SE-17106.
Data memory	Use the data memory in the μPD17106GC chip. (178 × 4 bits)
Oscillator frequency	4.5 MHz
Instruction cycle	4.44 μs
Operating temperature	+10 to 40°C
Storage temperature	-10 to 50°C (no condensation)
Power source	• Power source for μPD17106GC-00X (V_{DD}): +3.5 to +5.5 V This power source is supplied from probe EP-17106GC or pin CN12. • Power source for SE-17106 (V_{CC}): +5 V ±5% When the SE-17106 is used mounted on the IE-17K, this power source is supplied from the IE-17K, this power source is supplied from the IE-17K. When the SE-17106 is used alone, it is supplied from pin CN11.
Current	150mA (maximum) (When the μPD27C512D is used as program memory, without load)
External dimensions	150 × 148 × 35mm

Fig. 2-1 Configuration of SE-17106 Components



CHAPTER 3 BLOCK DIAGRAM

Fig. 3-1 Block Diagram of SE-17106



CHAPTER 4 USAGE

4.1 USING LEVEL CONVERSION CHIP (μPD6706GF)

4.1.1 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 signal exchange between the target system, μPD17106GC-00X chip, and SE board even if the operating voltage levels of the target system and the μPD17106GC-00X chip differ from the operating voltage level of the SE board.

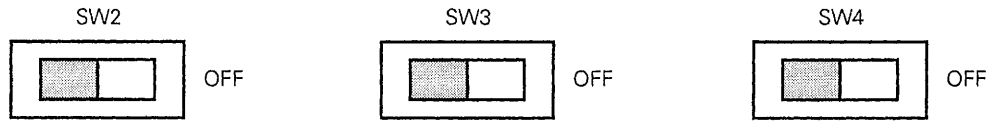
4.1.2 Using Level Conversion Chip

To enable the SE board to use the level conversion chip, set all the slide switches for switching the level conversion chip (SW2, SW3, SW4) to on. When these switches are set to on, the level conversion chip matches the voltage levels of the signals of the μPD17106GC-00X chip with those of the signals of the SE board to which +5 V was applied. The μPD17106GC-00X chip exists on the SE board to which the voltage of the target system was applied. The level conversion chip also interfaces with the μPD17106GC-00X chip and the SE board to which +5 V was applied.

Fig. 4-1 Setting Slide Switches for Switching Level Conversion Chip (SW2, SW3, SW4)

(a) When V_{DD} and V_{CC} and not the same (V_{CC} is always +5 V.)

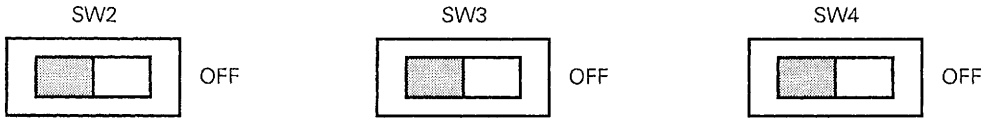
Set SW2, SW3, and SW4, to on and use the level conversion chip.



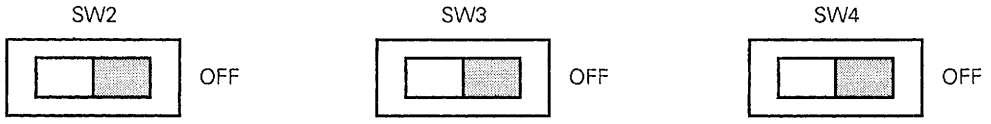
(b) When VDD and VCC are both +5 V

SW2, SW3, and SW4 can be set to on or off.

(1) When SW2, SW3, and SW4 are all set to on



(2) When SW2, SW3, and SW4 are all set to off



Remarks 1. The shaded portions indicate the selected switch positions.

2. V_{DD} indicates the power voltage of the customer's target system. V_{DD} is the power source to be supplied to the μPD17106GC-00X chip. V_{DD} can supply the power source of the target system from CN12 or the probe to the μPD17106GC-00X chip on the SE board, enabling debugging in a much better real environment.

3. V_{CC} is the power source that operates SE boards (except for the PD17106GC-00X chip). +5 V must always be applied to V_{CC}. When the SE-17106 is mounted on the ID-17K, V_{CC} is automatically supplied from IE-17K. When the SE-17106 is used alone, V_{CC} is supplied from CN11.

Caution When V_{DD} and V_{CC} are not the same (V_{CC} is always +5 V, be sure to use the level conversion chip. If the level conversion chip is not used, the SE board may malfunction or may be destroyed.

4.2 SUPPLYING POWER SOURCE TO SE BOARD

There are two types of power sources to be supplied to the SE board: V_{CC} that operates SE boards (except for the μPD17106GC-00X chip) and V_{DD} that operates the μPD17106GC-00X chip. +5 V must always be applied to V_{CC}. +3.5 to +5.5 V, which are the operating voltage range of the μPD17106GC-00X chip, can be supplied to V_{DD}.

4.2.1 Jumper Switch (JS1) for Selecting the Method for Supplying Power Source to SE Board

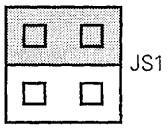
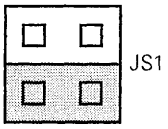
Jumber switch JS1 is used to select whether to supply the +5 V power source supplied to the SE board to the μPD17106GC-00X chip. JS1 is also used to select whether to apply the voltage supplied from the probe or the CN12 pin to the μPD17106GC-00X chip. That is, when the power source of the customer's target system is +5 V and the SE-17106 is used alone, +5 V is supplied from the CN11 pin by setting JS1 to +5 V. When the SE-17106 is used mounted on the IE-17K, +5 V is automatically supplied from the IE-17K. This setting enables the power source to be supplied in a very simple way.

When the power source of the customer's target system is other than +5 V, the voltage of the target system can be applied to the μPD17106GC-00X chip from the probe or the CN12 pin by setting JS1 to V_{DD}. This setting enables the SE-17106 to evaluate the μPD17106 system in a much better real environment.

Tables 4-1 and 4-2 list the JS1 functions.

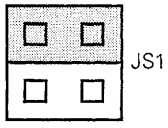
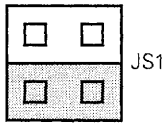
Caution The power voltage (V_{DD}) to be supplied to the μPD17106GC-00X chip must be +3.5 to +5.5 V.

Table 4-1 JS1 Functions When SE-17106 is Used Mounted on IE-17K

JS1 setting \ Type of power source	Power source (V_{DD}) supplied to μPD17106GC-00X	Power source (V_{CC}) that operates SE boards (except μPD17106GC-00X)
+5V  V_{DD}	+5 V is supplied from the IE-17K.	+5 V is supplied from the IE-17K.
+5V  V_{DD}	Power source must be supplied from the probe or the CN12 pin.	

Remark The shaded portions indicate the selected switch positions.

Table 4-2 JS1 Functions When SE-17106 is Used Alone

JS1 setting \ Type of power source	Power source (V_{DD}) supplied to μPD17106GC-00X	Power source (V_{CC}) that operates SE boards (except μPD17106GC-00X)
+5V  V_{DD}	+5 V supplied from CN11 is supplied.	+5 V is supplied from CN11.
+5V  V_{DD}	Power source must be supplied from the probe or the CN12 pin.	

Remark The shaded portions indicate the selected switch positions.

4.2.2 Power Supply Pins

The SE-17106 has three pins that externally supply the power source. Determine which pin to use according to the environment in which the SE-17106 evaluates the μPD17106 system. Table 4-3 lists the power supply pins and their functions.

Table 4-3 Power Supply Pins and Their Functions

Pin name	Type of power source (suppliable voltage range)	Function
CN11	V_{CC} (+5 V ±5%)	Power pin that operates SE boards (except μPD17106GC-00X chip) when the SE-17106 is used alone. CN11 must always supply +5 V. When the SE-17106 is used mounted on the IE-17K, the power source need not be supplied from CN11 because power source is automatically supplied from the IE-17.
CN11	V_{DD} (+3.5 to +5.5 V)	Power pin that can apply +3.5 to +5.5 V, which is the operating voltage range of the μPD17106GC-00X chip, to the μPD17106GC-00X chip. Valid when the power source of the customer's target system is not V_{CC}=5 V (for JS1, V_{DD}).
Probe (VDD pin and GND pin)	V_{DD} (+3.5 to +5.5 V)	Same function as CN12. In the SE-17106, since the power pins of both CN12 and the probe are connected, the power source must be supplied from CN12 or the porbe.

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

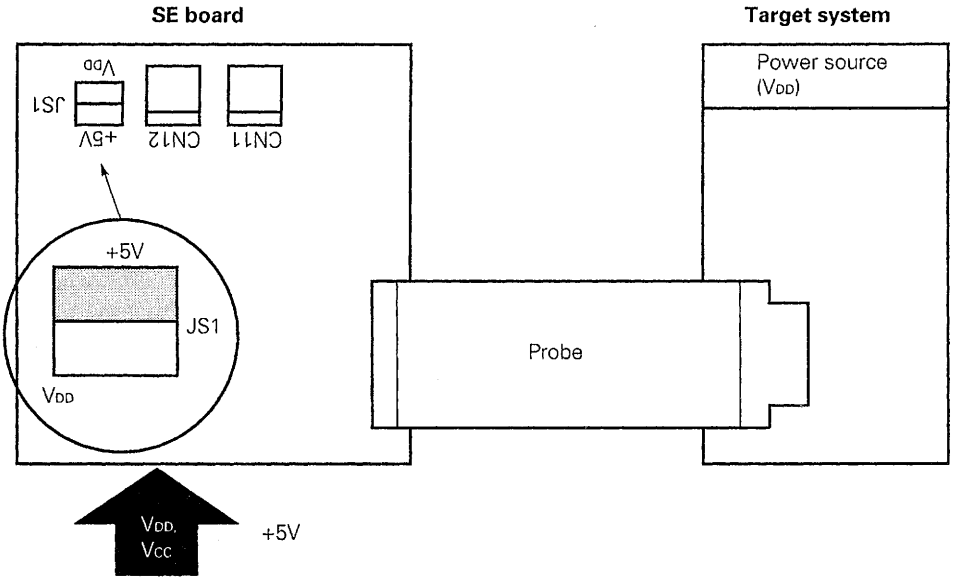
4.2.3 Examples

(1) When the SE-17106 is used mounted on the IE-17K

(a) When the SE-17106 is used mounted on the IE-17K, and V_{DD} and V_{CC} are +5 V

Set JS1 to +5 V. V_{CC} and V_{DD} are supplied from the IE-17K. The power source need not be supplied from CN11, CN12, or the probe.

Fig. 4-2 Supplying Power Source When V_{CC} and V_{DD} are +5 V, with SE-17106 Mounted on IE-17K



(b) When the SE-17106 is used mounted on the IE-17K, and V_{DD} and V_{CC} are not the same (V_{CC}=+5 V)

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

Fig. 4-3 Supplying V_{DD} from CN12, with SE-17106 Mounted on IE-17K

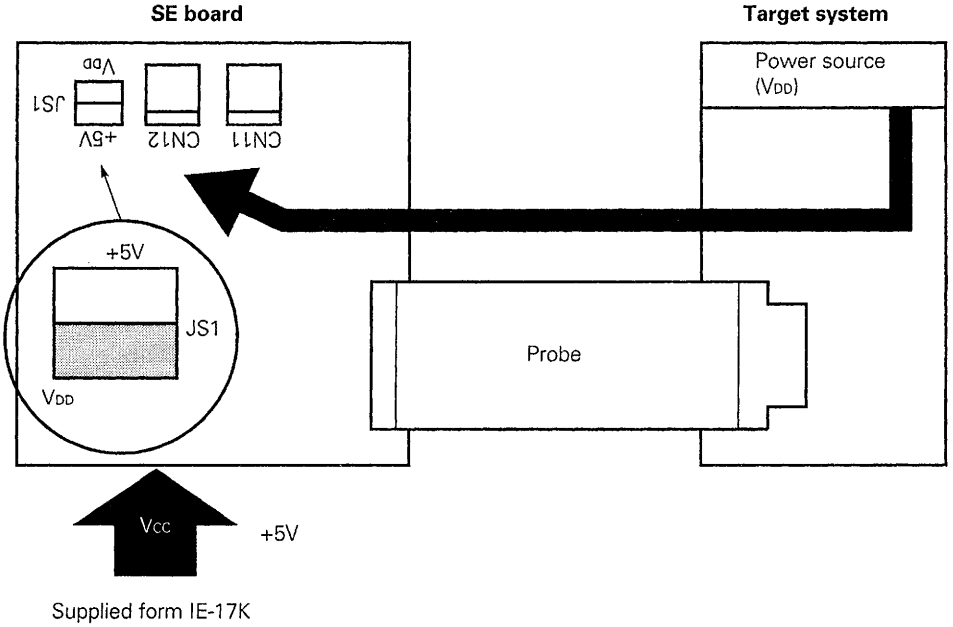
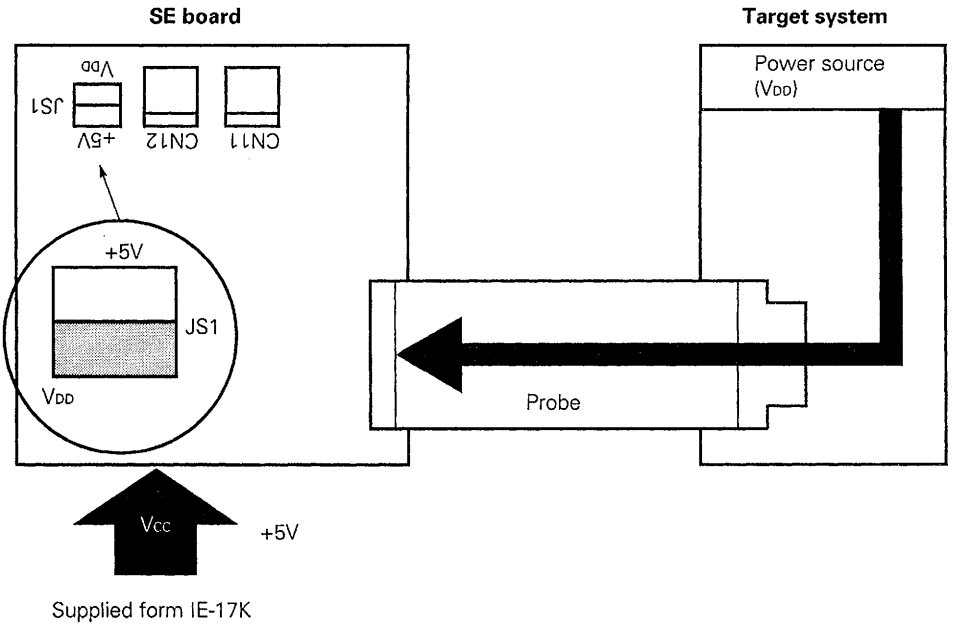


Fig. 4-4 Supplying V_{DD} from Probe, with SE-17106 Mounted on IE-17K

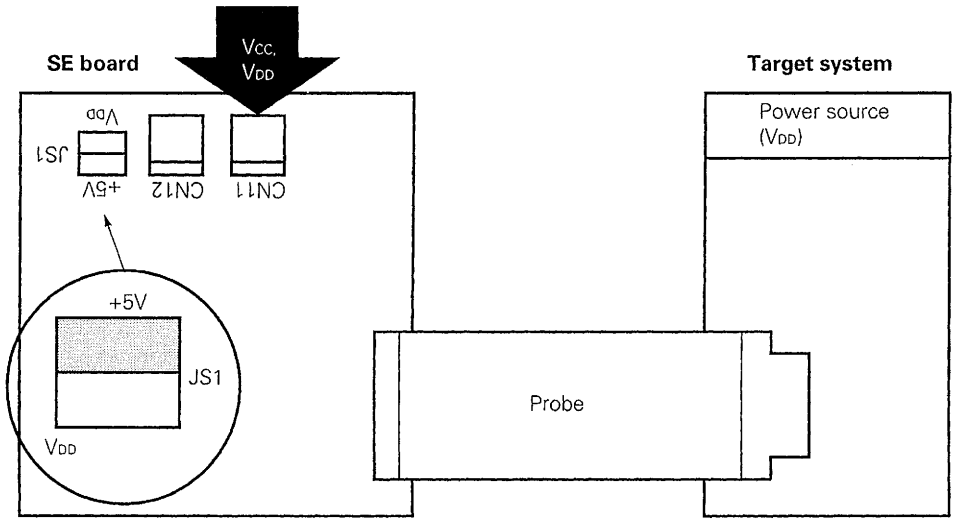


(2) When the SE-17106 (SE board) is used alone

(a) When the SE-17106 is used alone and V_{DD} and V_{CC} are the same (V_{CC}=+5 V)

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

Fig. 4-5 Supplying Power Source When SE-17106 is Used Alone and V_{DD} and V_{CC} are +5 V



(a) When the SE-17106 is used alone and V_{DD} and V_{CC} are not the same (V_{CC}=+5 V)

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

Fig. 4-6 Supplying V_{DD} from CN12 When SE-17106 is Used Alone

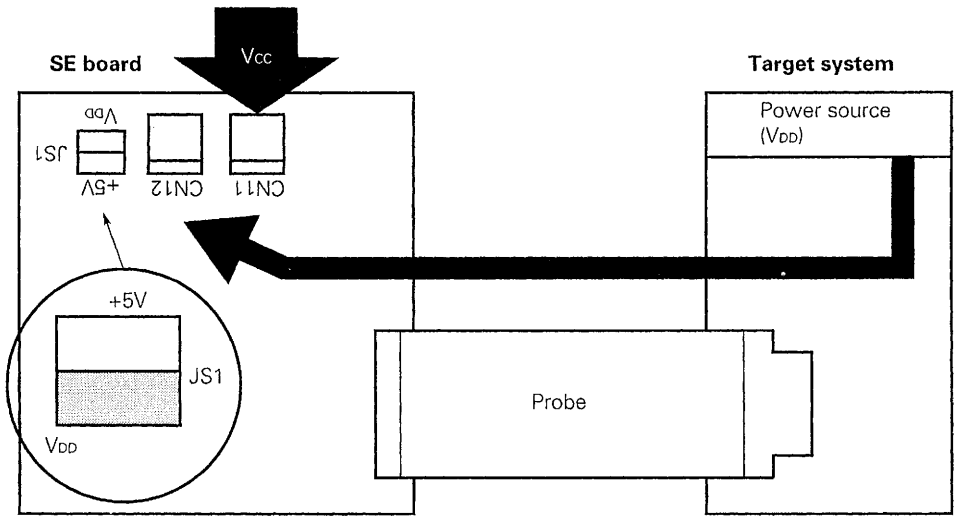
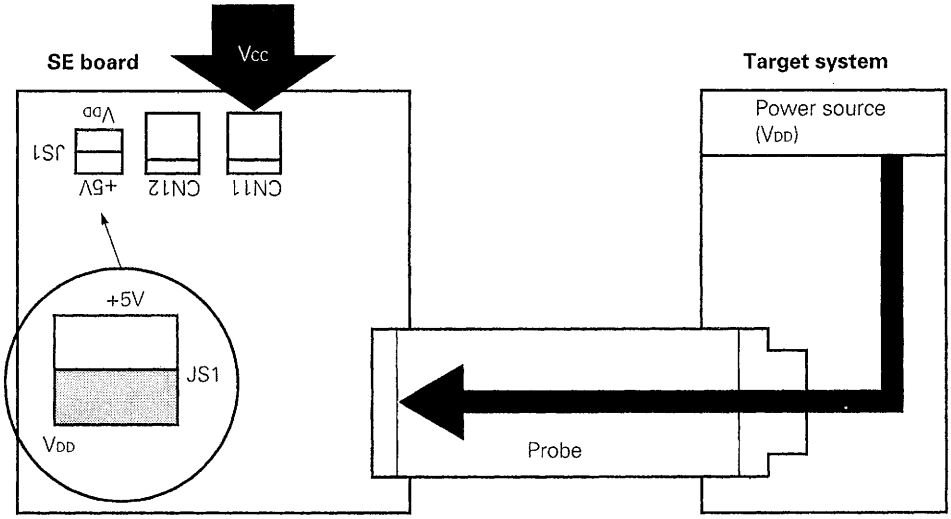


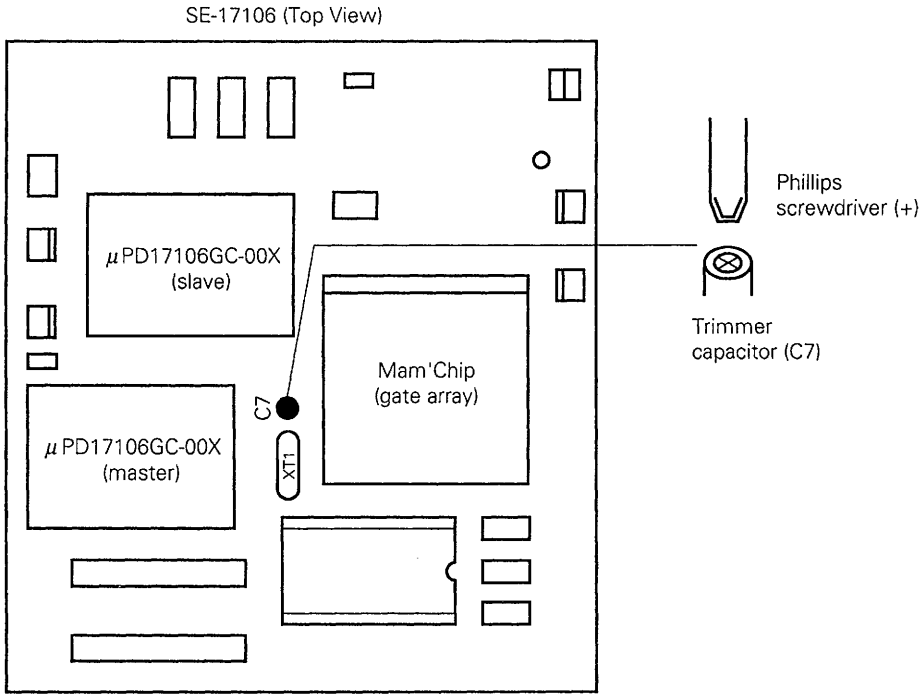
Fig. 4-7 Supplying V_{DD} from the Probe When SE-17106 is Used Alone



4.3 FINE-TUNING OSCILLATOR FREQUENCY

The oscillator frequency is factory-set to 4.5MHz±20 ppm. To fine-tune the oscillator frequency, use trimmer capacitor (C7) shown in Fig. 4-8. If a probe is connected to the X_{OUT} pin or X_{IN} pin, however, the oscillator frequency cannot be tuned correctly due to the capacitance of the probe. For this reason, tune the oscillator frequency while measuring the LCD drive waveform (250Hz) output from the target system.

Fig. 4-8 Tuning Oscillator Frequency of RC Oscillator



4.4 SETTING OTHER SWITCHES

4.4.1 Reset Switch (SW1)

Reset switch SW1 is valid when the SE-17106 is used alone.

See Section 4.6 for details of SW1.

Do not press SW1 when the SE-17106 is used mounted on the IE-17K.

4.4.2 Slide Switch for Switching μPD27C256 to μPD27C512 or Vice Versa (SW5)

Slide switch SW5 is used to switch the type of program memory. SW5 is valid when the SE-17106 is used alone. See Section 4.6 for details of SW5.

SW5 can be set to μPD27C256 or μPD27C512 when the SE-17106 is used mounted on the IE-17K.

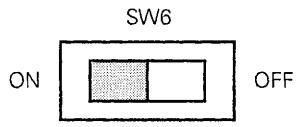
4.4.3 DIP Switch for Connecting CE Pin High with Pull-Up Resistor (SW6)

DIP switch SW6 is used to set whether to connect the CE pin of the μPD17106GC-00X chip high with a pull-up resistor.

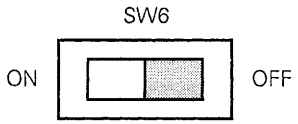
If the SE-17106 is not connected to the target system, be sure to set SW6 to ON to connect the CE pin high with a pull-up resistor.

Fig. 4-9 Setting DIP Switch for Connecting CE Pin High with Pull-Up Resistor (SW6)

(a) When the CE pin is connected high with a pull-up resistor



(b) When the CE pin is not connected high with a pull-up resistor



Remark The shaded portions indicate the selected switch positions.

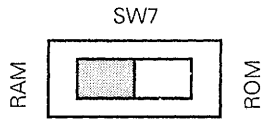
4.4.4 Slide Switch for Switching ROM to RAM or Vice Versa (SW7)

ROM or RAM is used as SE-17106 program memory.

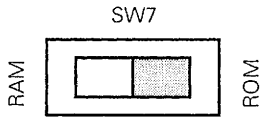
When the SE-17106 is used mounted on the IE-17K, set slide switch SW7 to RAM. When the SE-17106 is used alone, set SW7 to ROM.

Fig. 4-10 Setting Slide Switch for Switching ROM to RAM or Vice Versa (SW7)

(a) When the SE-17106 is used mounted on the IE-17K



(b) When the SE-17106 is used alone



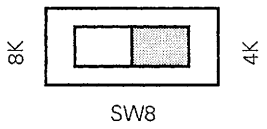
Remark The shaded portions indicate the selected switch positions.

4.4.5 Switch for Switching 4K to 8K or Vice Versa (SW8)

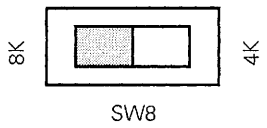
Switch SW8 is used to switch the program memory capacity to 4K to 8K.

Fig. 4-11 Setting SW8

(1) When SW8 is set to 4K



(2) When SW8 is set to 8K



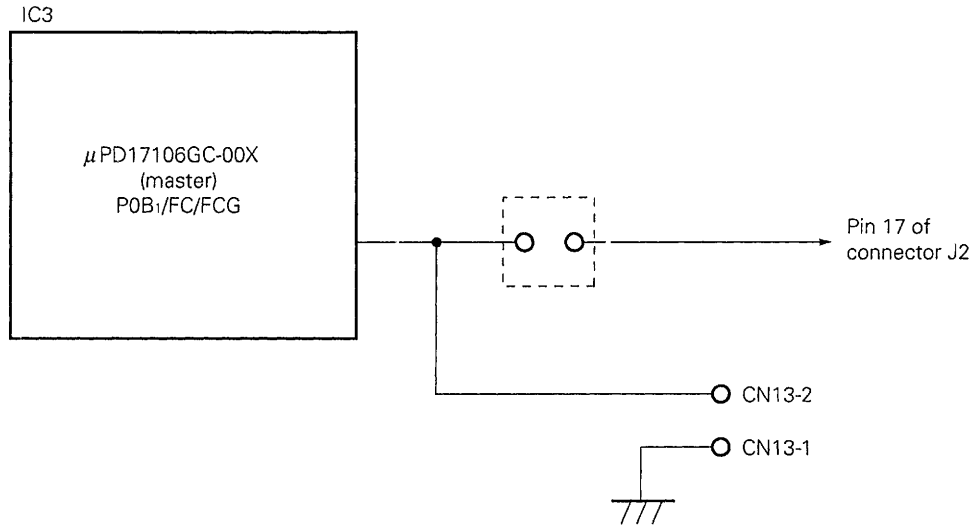
4.4.6 Jumper Switch (JS2)

Use jumper switch JS2 in the factory-set position.

4.4.7 Jumper Switch (JS3)

Jumper switch JS3 is used to switch the $P0B_1$, FC, and FCG pins. To use the pin as the$P0B_1$ pin (port), set JS3 to on. To use the pin as the I/O pin operating in the frequency measuring mode or pulse width measuring mode for the frequency counter and external gate counter, set JS3 to off.

Fig. 4-12 Peripheral Circuits of JS3 and CN13



4.4.8 Power LED (LED1)

The power LED, LED1, comes on when power source is supplied normally. See **4.5 USING SE-17106 MOUNTED ON IE-17K** and **4.6 USING SE-17106 ALONE** for details.

4.4.9 Connector for FC/FCG (CN13)

CN13 is the connector for the input pins operating in the frequency measuring mode pulse width measuring mode for the frequency counter and external gate counter. See Fig. 4-12.

4.4.10 Connector for Supplying LCD Power Source (CN14)

CN14 is the connector for supplying LCD power source. CN14-1 is the GND pin and CN14-2 is the V_{LCD} pin. Supply a voltage from +3.5 to +12V to V_{LCD}.

4.5 USING SE-17106 MOUNTED ON IE-17K

4.5.1 Installing RAM in IE-17K

Install RAM (μPD43256AC) in the IE-17K as SE-17106 program memory. RAM, however, is mounted on the IE-17K at the factory.

When using RAM other than the RAM mounted on the IE-17K, install the μPD43256AC equivalent satisfying the following condition:

t_{ACC} < (instruction cycle time/4)

t_{ACC}: Address setting → data output delay

μPD43256AC-10, μPD43256AC-12, or μPD43256AC-15 can be used when the oscillator frequency is 4.5MHz.

4.5.2 Mounting and Dismounting SE-17106 on and from IE-17K

To mount the SE-17106 on the IE-17K, first open the inside cover of the IE-17K. Fig. 4-13 shows the IE-17K when the outside cover is opened.

When the inside cover is opened, the memory board appears. There are three connectors on top of the memory board. By inserting the three connectors (CN7, CN8, and CN9) at the bottom of the SE-17106 into the connectors on the memory board, the SE-17106 can be mounted on the IE-17K.

Vertically push in the SE-17106 so that CN7, CN8, and CN9 are firmly inserted into the connectors on the memory board.

The SE-17106 can be dismounted from the IE-17K by lifting it vertically.

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

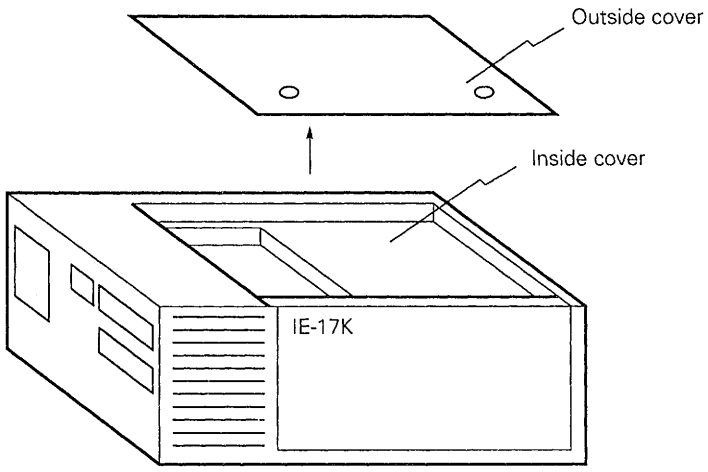
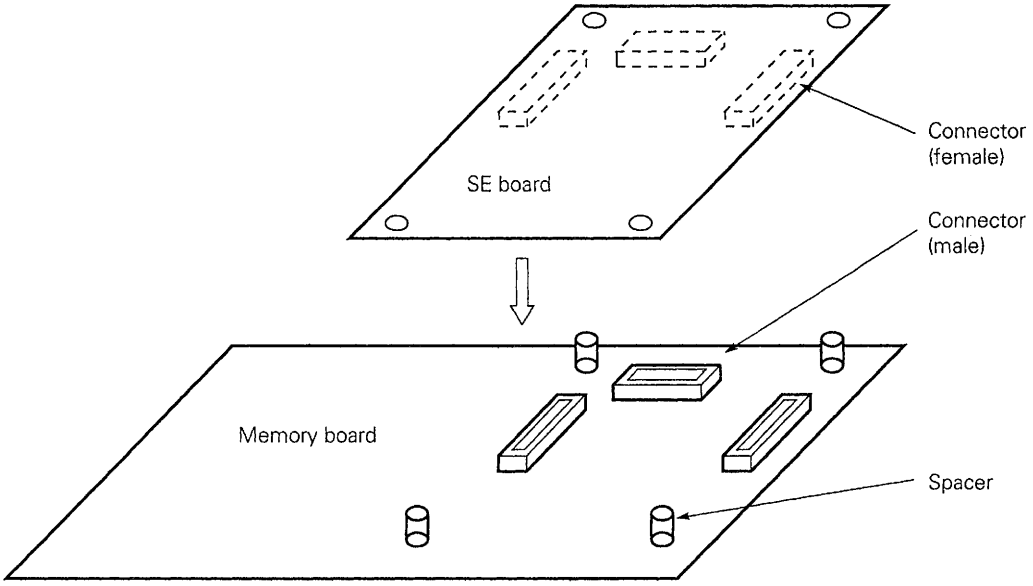


Fig. 4-14 Mounting and Dismounting SE-17106



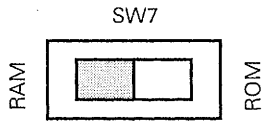
Next connect probe EP-17106GC to connectors J1 and J2 of the SE-1706 to connect the SE-17106 to the target system.

Then mount the inside and outside covers.

4.5.3 Setting Slide Switch for Switching ROM to RAM or Vice Versa (SW7)

Set SW2 to ROM, as shown in Fig. 4-15.

Fig. 4-15 Setting Slide Switch for Switcning ROM to RAM or Vice Versa (SW7) (When SE-17106 is Mounted on IE-17K)



Remark The shaded portion indicates the selected switch position.

4.5.4 Supplying Power Source

After mounting the SE-17106 on the IE-17K, turn on the IE-17K power and check that the LED1 on the SE-17106 comes on. Do this before mounting the inside and outside covers of the IE-17K.

If the power source of the customer's target system is not +5 V, the power voltage of the target system can be applied from CN12 or the porbe to the μPD17106GC-00X chip on the SE board. See **4.1 USING LEVEL CONVERSION CHIP (μPD6706GF)** and **4.2 SUPPLYING POWER SOURCE TO SE BOARD** for details.

In the following cases, LED1 will not come on:

- The IE-17K power code is not connected.
- An overcurrent (about 500mA or above) passes through the SE-17106.
- The SE-17106 is mounted incorrectly.

If LED1 does not come on, turn off the IE-17K power, then remount the SE-17106 on the IE-17K. If LED1 still does not come on, the SE-17106 may be faulty.

4.5.5 Transferring HEX File to IE-17K

The IE-17K can be used to debug the hardware and software of the target system by connecting it to such host machines as a PC-9800 series. Refer to "**IE-17K USER'S MANUAL**" for how to operate the IE-17K.

This seciton explains only the procedure for checking whether the SE-17106 was correctly mounted on the IE-17K.

The IE-17K is started when the power is turned on. If the power is already on, the IE-17K is started by pressing the IE-17K reset switch. When started, the E-17K displays the prompt @@@> indicating that commands can be entered. When this prompt is displayed, enter the .LP0 or .LP1command to load the HEX file (.HEX) of the μPD17106 program written in assembler (AS17K) or the HEX file output by the .SP0 or .SP1 command. The IE-17K does not operate until the HEX file is loaded. When the SE-17106 is correctly mounted on the IE-17K, the IE-17K displays the following messages and prompt BRK>. At this point, the IE-17K becomes the in-circuit emulator dedicated to the μPD17106 system.

```
OK
D17106
BRK>
```

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

- The device number of the μPD17106GC-00X chip mounted on the SE-17106 does not correspond to that of the loaded HEX file.
- An SE board other than the SE-17106 is mounted on the IE-17K.
- A HEX file other than the HEX file of the μPD17106 program is loaded.
- Mounting the SE-17106 on the IE-17K is incomplete.

4.5.6 Error Messages and Action to Take

The IE-17K and SE-17106 both have a function to diaplay an error message when the combination of the mounted μPD17106GC-00X chip and the loaded HEX file is incorrect.

To ensure accurate dubugging, an SE board number is registered in the SE-17106 and a device number registered in the μPD17106GC-00X chip.

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

Table 4-4 Device Number and SE Board Number

Evaluation device	Device Number	SE board number
μPD17106	10	10

Remarks 1. The device number means the registration number assigned to each μPD17106GC-00X chip.

2. The SE board number means the registration number to be assigned to each SE board. 10 is registered in the SE-17106 as the SE board number.

3. The device number and SE board number are also included in the data in the HEX file to be loaded. These numbers are used by the IE-17K to check the development environment.

The HEX file assembled by AS17106, for example, contains device number 10 and SE board number 10.

(1) Error message displayed when the device number of the μPD17106GC-00X chip mounted on the SE-17106 does not correspond to that of the loaded HEX 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 μPD17106GC-00X chip mounted on the SE-17106 and ΔΔ indicates the device number of the loaded HEX file.

When this error message is displayed, recheck the μPD17106GC-00X chip mounted on the SE-17106. If the chip is incorrect, turn off the IE-17K power, replace the chip, and reload the HEX 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 HEX file.

(2) Error message displayed when an SE board other than the SE-17106 is mounted or a HEX fiel other than the HEX file of the μPD17106 program 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 HEX file. For the SE-17106, □□ indicates 10. When the HEX file of the μPD17106 program is loaded, ∇∇ indicate 10.

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

(3) When no response is made from the IE-17K

(a) Mounting the SE-17106 on the IE-17K may be incomplete. Remount the SE-17106 firmly and correctly.

(b) The customer's target system and SE board may not be connected correctly by probe EP-17106GC. Recheck each connection section.

(c) The reset circuit in the customer's target system may be malfunctioning. If the reset circuit is malfunctioning, the reset status of the SE board becomes unstable. This unstable reset status may cause the IE-17K to be unable to respond.

When any of (1) to (3) is detected, promptly correct the customer's target system or the source program so that the error message disappears.

4.5.7 Notes

- For power-up, first turn on the IE-17K power and then the target system power.
- Do not use reset switch SW1 on the SE-17106. To reset the SE-17106, use the reset switch on the IE-17K.

4.6 USING SE-17106 ALONE

4.6.1 Installing PROM

When using the SE-17106 alone, install PROM (μPD27C256AD or μPD27C512D) in the IC2 socket as program memory.

Install the PROM satisfying the following conditons:

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

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

- μPD17106 PROM file (.PRO) output by 17K series assembler (AS17K)
  However, do not write the HEX file (.HEX) AS17K outputs to the IE-17K.
- PROM file output by the IE-17K .XS0 or .XS1 command

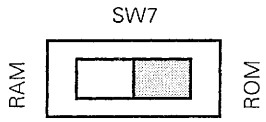
Notes on PROM creation

The last address of program memory in the μPD17106 in OFFFH for 4K bits and 1FFFH for 8K bits.

4.6.2 Setting Slide Switch for Switching ROM to RAM or Vice Versa (SW7)

Set SW7 to ROM, as shown in Figure 4-16.

Fig. 4-16 Setting Slide Switch for Switching ROM to RAM or Vice Versa (SW7) (When SE-17106 is Used Alone)



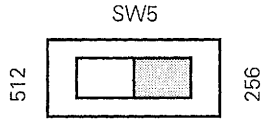
Remark The shaded portion indicates the selected switch position.

4.6.3 Setting Slide Switch for Switching μPD27C256AD to μPD27C512D or Vice Versa (SW5)

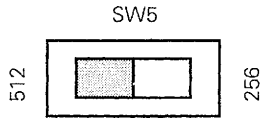
Set SW5, as shown in Fig. 4-17. The setting of SW5 depends on whether the μPD27C256AD or μPD27C512D is used.

Fig. 4-17 Setting Slide Switch for Switching μPD27C256AD to μPD27C512D or Vice Versa (SW5)

(a) When the μPD27C256AD is used



(b) When the μPD27C512D is used



Remark The shaded portions indicate the selected switch position.

4.6.4 Supplying Power Source

For the SE-17106, be sure to supply +5 V ±5% (Vcc) from the external power source to the CN11 pin.

If the power source of the customer's target system is not +5 V, the power voltage of the target system can be applied from CN12 or the probe to the μPD17106GC-00X chip on the SE board. See **4.1 USING LEVEL CONVERSION CHIP (μPD6706GF)** and **4.2 SUPPLYING POWER SOURCE TO SE BOARD** for details.

When Vcc is supplyed normally, LED1 on the SE-17106 comes on.

In the following cases, LED1 will not come on:

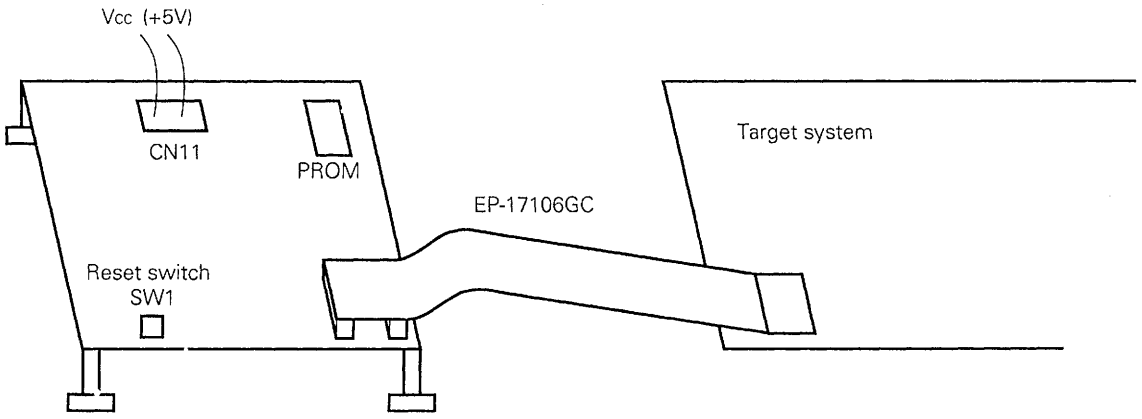
- The power source is not supplied.
- An overcurrent (about 500mA or above) is flowing.

4.6.5 Executing Program

The SE-17106 and target system are connected as shown in Fig. 4-18. When the target system power is turned on, the power source is supplied to the SE-17106, 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-17106 is pressed, the SE-17106 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-17106 is Used Alone



4.7 MONITOR PINS

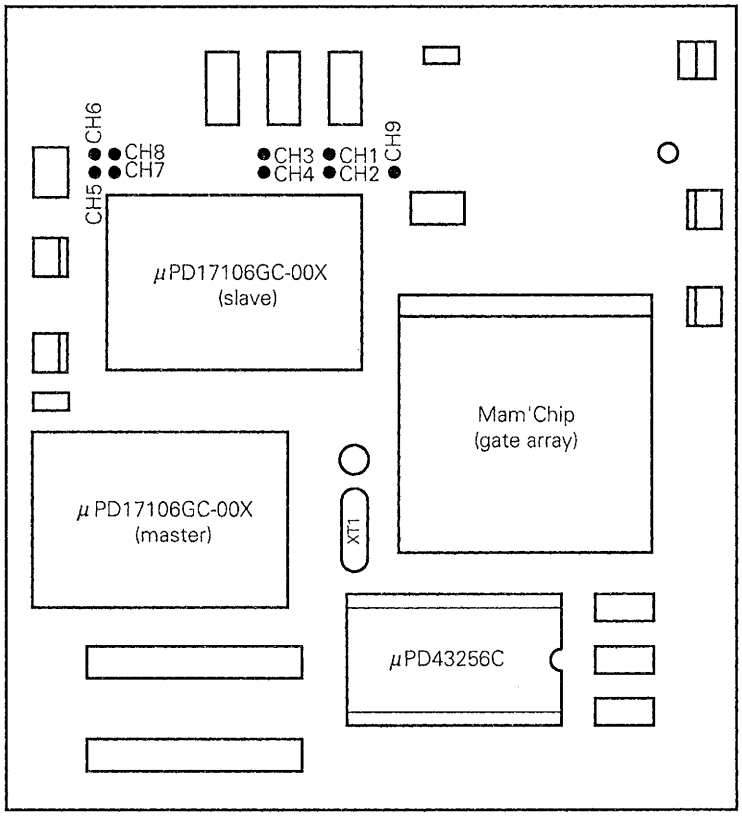
The monitor pins for checking the pin status of the μPD17106GC-00X chip are provided on the SE-17106. Table 4-5 lists the monitor pins and their functions. Fig. 4-19 shows the monitor pin layout.

Table 4-5 Monitor Pins and Their Functions

Monitor pin name	Function
CH1	For $P0A_0$ pin monitor
CH2	For $P0A_1$ pin monitor
CH3	For $P0A_2$ pin monitor
CH4	For $P0A_3$ pin monitor
CH5	For $P0B_0$ pin monitor
CH6	For $P0B_1$ pin monitor
CH7	For $P0B_2$ pin monitor
CH8	For $P0B_3$ pin monitor
CH9	For CE pin monitor

Fig. 4-19 Monitor Pin Layout

SE-17106 (Top View)



4.8 FACTORY SETTINGS OF SE-17106

The program memory (IC2), crystal resonator, jumper switches, and slide switches of the SE-17106 are factory-set as follows:

(1) Program memory (IC2)

RAM (μPD43256AD) is installed.

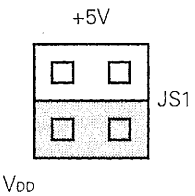
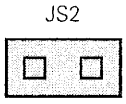
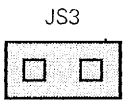
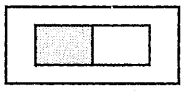
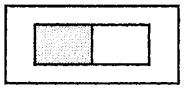
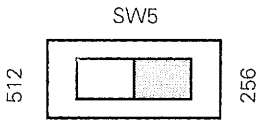
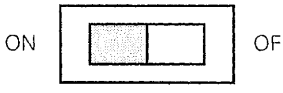
(2) Crystal resonator

A 4.5MHz crystal resonator is mounted on XT1.

(3) Jumper switches and slide switches

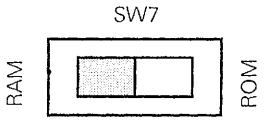
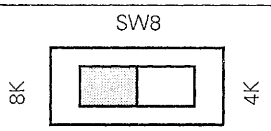
The jumper and slide switches are factory-set as shown in Table 4-6. Use these switches after checking the appropriate conditions for the settings.

Table 4-6 Setting Jumper Switches and Slide Switches (1/2)

Switch number	Jumper and Slide switches	Setting conditions		Position
JS1		See **4.2 SUPPLYING POWER SOURCE TO SE BOARD**		
JS2		JS2 is factory-set. Do not dismount it.		
JS3		When JS3 is used as a port		On
		When JS3 is used as the I/O pin operating in frequency or pulse width measuring mode		Off
SW2		$V_{DD} \neq V_{CC}$ (V_{CC} = +5V)		On (Use the level conversion chip.)
SW3				
SW4		$V_{DD} = V_{CC}$ = +5V		On or off can be set.
SW5		When SE-17106 is mounted on the IE-17K to evaluate μPD17106		Can be set to 256 or 512.
		When SE-17106 is used alone to evaluate μPD17106	Use of μPD27C256AD	256
			Use of μPD27C512D	512
SW6		When CE pin is connected high with a pull-up resistor		On
		When CE pin is not connected high with a pull-up resistor		On

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

Table 4-6 Setting Jumber Switches and Slide Switches (2/2)

Switch number	Jumper and Slide switches	Setting conditions	Position
SW7		When SE-17106 is mounted on the IE-17K to evaluate μPD17106	RAM
		When SE-17106 is used alone to evaluate μPD17106*	ROM
SW8		When 4K is used	4K
		When 8K is used	8K

* Also set SW5.

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

Phase-out/Discontinued

CHAPTER 5 CONNECTOR PINS

5.1 CONNECTOR FOR 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	LCD_{27} (53)
2	V_{DD}	22	LCD_{12}/KS_{12} (4)	42	GND
3	GND	23	LCD_{14}/KS_{14} (2)	43	NC
4	$P0A_1$ (19)	24	GND	44	$LCD_{28}/P1D_0$ (52)
5	$P0A_2$ (18)	25	LCD_{15}/KS_{15} (1)	45	GND
6	GND	26	NC	46	$LCD_{29}/P1D_1$ (51)
7	NC	27	GND	47	$LCD_{31}/P1D_3$ (49)
8	LCD_9/KS_9 (7)	28	LCD_{16} (64)	48	GND
9	GND	29	LCD_{19} (61)	49	$LCD_{32}/P1C_0$ (48)
10	LCD_2/KS_2 (14)	30	GND	50	NC
11	LCD_3/KS_3 (13)	31	LCD_{22} (58)	51	GND
12	GND	32	LCD_{21} (59)	52	$LCD_{33}/P1C_1$ (47)
13	LCD_5/KS_5 (11)	33	GND	53	$LCD_{35}/P1C_3$ (45)
14	NC	34	LCD_{23} (57)	54	GND
15	GND	35	LCD_{24} (56)	55	$LCD_{37}/P1B_1$ (43)
16	LCD_7/KS_7 (9)	36	GND	56	$LCD_{36}/P1B_0$ (44)
17	LCD_0/KS_0 (16)	37	LCD_{25} (55)	57	GND
18	GND	38	NC	58	$LCD_{38}/P1B_2$ (42)
19	NC	39	GND	59	$LCD_{34}/P1C_2$ (46)
20	LCD_{11}/KS_{11} (5)	40	LCD_{26} (54)	60	GND

5.2 CONNECTOR FOR PROBE (J2)

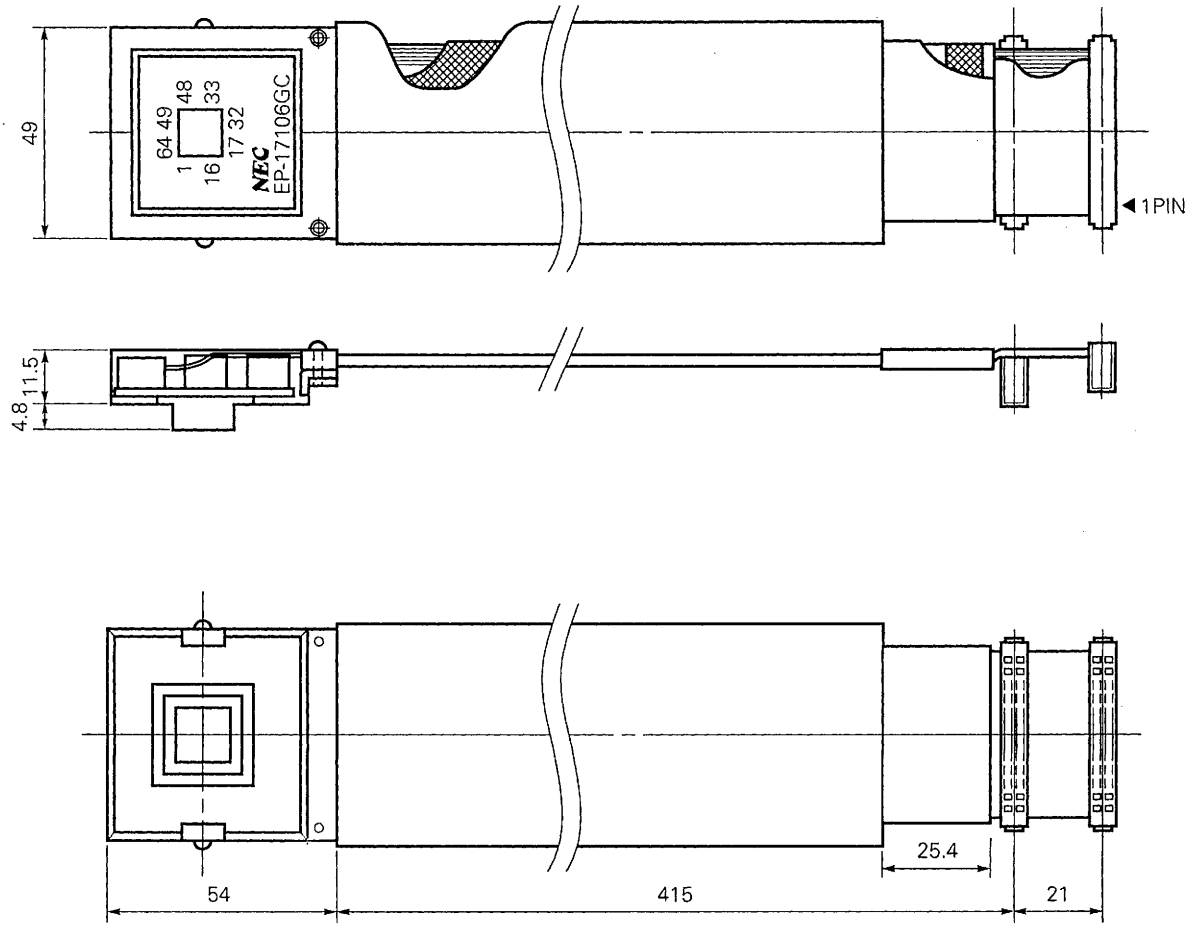
J2 pin number	Pin name (IC pin number)	J2 pin number	Pin name (IC pin number)	J2 pin number	Pin name (IC pin number)
1	$P0A_0$ (20)	21	GND	41	$LCD_{42}/P1A_2$ (38)
2	$P0A_3$ (17)	22	$P0B_0$/CGP (25)	42	GND
3	GND	23	LCD_{17} (63)	43	NC
4	LCD1/KS1 (15)	24	GND	44	LCD_{45}/COM_2 (35)
5	CE (22)	25	LCD_{18} (62)	45	GND
6	GND	26	NC	46	COM_0 (33)
7	NC	27	GND	47	X2
8	LCD_4/KS_4 (12)	28	LCD_{20} (60)	48	GND
9	GND	29	X1	49	$P0C_0/SO_0$ (31)
10	INT (21)	30	GND	50	NC
11	LCD_6/KS_6 (10)	31	NC	51	GND
12	GND	32	$LCD_{39}/P1B_3$ (41)	52	$P0C_2/\overline{SCK}$/SCL (29)
13	LCD_8/KS_8 (8)	33	GND	53	COM_1 (34)
14	NC	34	NC	54	GND
15	GND	35	$LCD_{41}/P1A_1$ (39)	55	V_{LCD} (32)
16	LCD_{10}/KS_{10} (6)	36	GND	56	$P0C_1/SI_0$/SDA (30)
17	$P0B_1$/FC/FCG (24)	37	$LCD_{40}/P1A_0$ (40)	57	GND
18	GND	38	NC	58	LCD_{44}/COM_3 (36)
19	NC	39	GND	59	$LCD_{30}/P1D_2$ (50)
20	LCD_{13}/KS_{13} (3)	40	$LCD_{43}/P1A_3$ (37)	60	GND

CHAPTER 6 DIMENSIONS OF PROBE AND CONVERSION SOCKET

6.1 PROBE DIMENSIONS

Part name: EP-17106GC

Fig. 6-1 Probe Dimensions



6.2 DIMENSIONS OF CONVERSION SOCKET (EV-9200GC-64) AND RECOMMENDED PATTERN FOR INSTALLING CIRCUIT BOARD

Fig. 6-2 Dimensions of EV-9200GC-64

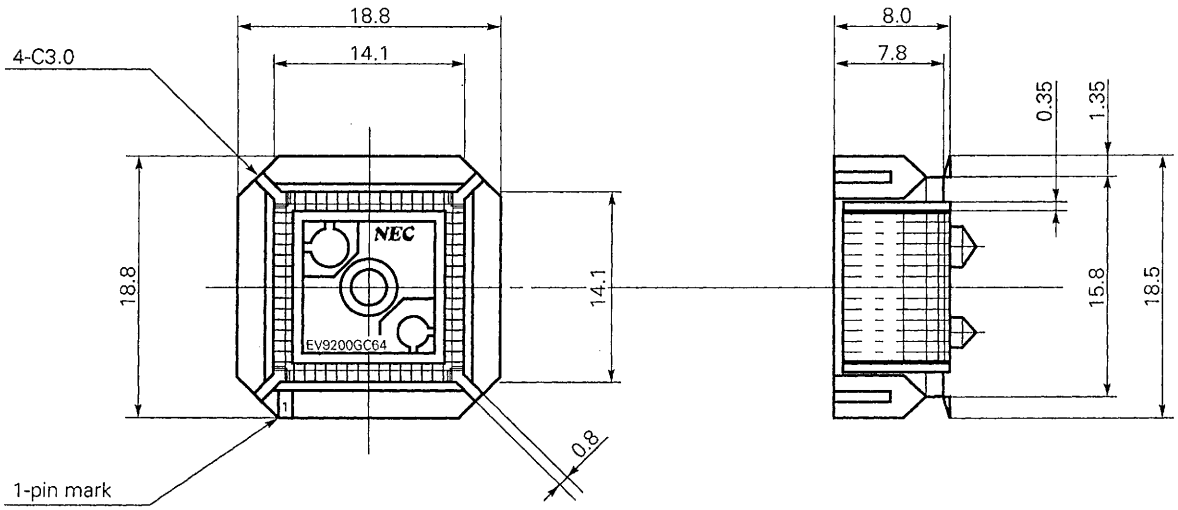
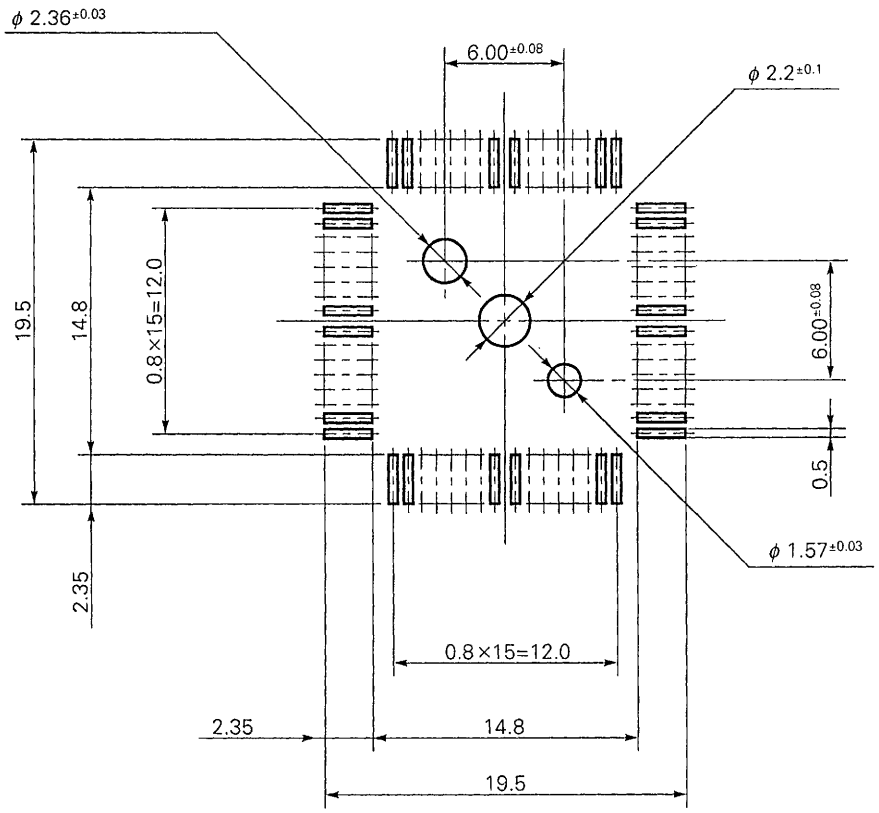


Fig. 6-3 Recommended Pattern for Installing EV-9200GC-64 Circuit Board




Phase-out/Discontinued