

OU910  
(MOS PROM)  
PROGRAMMING  
UNIT  
For MODEL 1890A  
OPERATION MANUAL

First Edition in Dec. 1988

MINATO ELECTRONICS INC.

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## 1. GENERAL DESCRIPTION

The MOS Unit OU910 is the programming unit for EPROMs or EEPROMs and should be installed in the Model 1890A PROM Programmer for uses.

## 2. FEATURES

- (1) Can be used for 24 pin through 40 pin devices without changing the socket adapter.
- (2) High-speed read/write processing.
- (3) PROM check function.
- (4) Alternatives for verify conditions (Specifiable Vcc voltage).



### 3. ENVIRONMENT AND ELECTRIC SPECIFICATIONS

- \* Environmental temperature: 5 to 35°C
- \* Humidity: 30 to 80 %
- \* Power supply: From the Model 1890A
- \* Dimensions: 135 (W) x 135 (D) x 45 (H) mm
- \* Weight: 500 g

#### 4. STANDARD MODE

- (1) Available devices: All EPROMs and EEPROMs (See Device Code Table.)
- (2) Operation mode: Copy, Blank, Program, Verify and Continuous
- (3) Test data display: 16 digits x 2, LCD display

## 5. OPERATION

### 5-1. Installation and Removal of Unit

CAUTION: Be sure to unplug the Model 1890A before installing or removing the unit to prevent an accident.

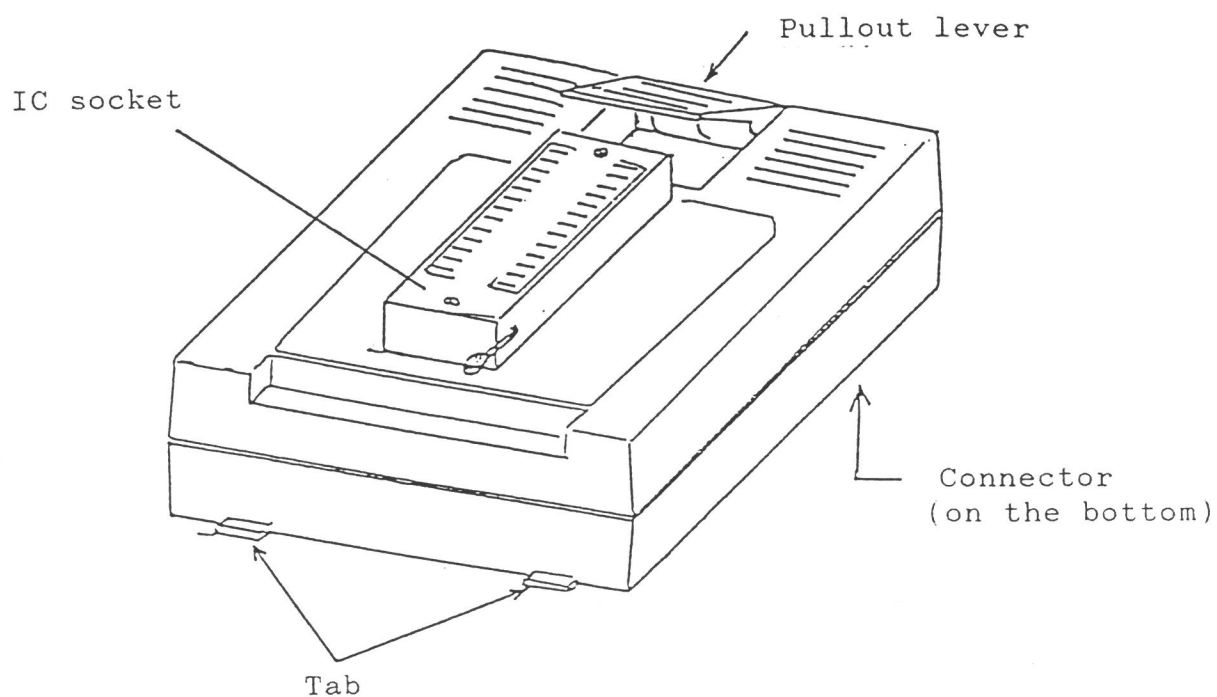
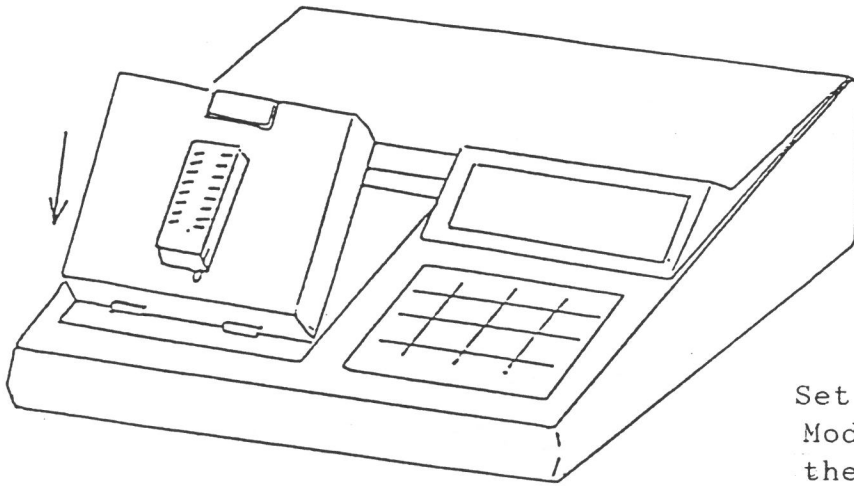
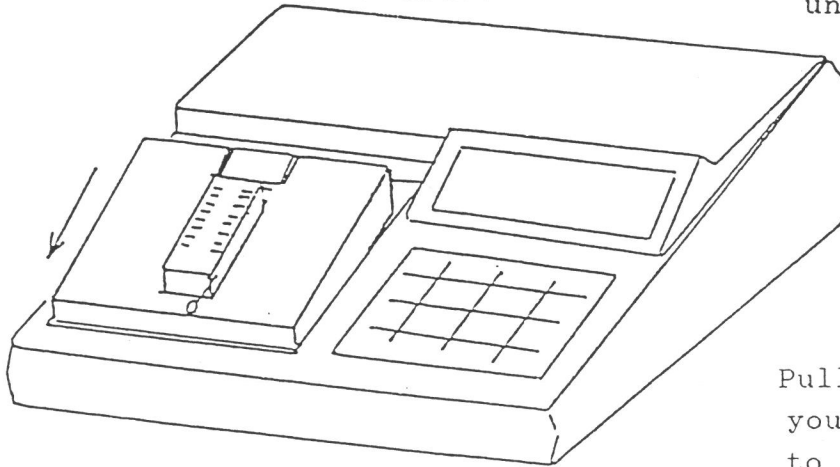


Figure. External View of OU910

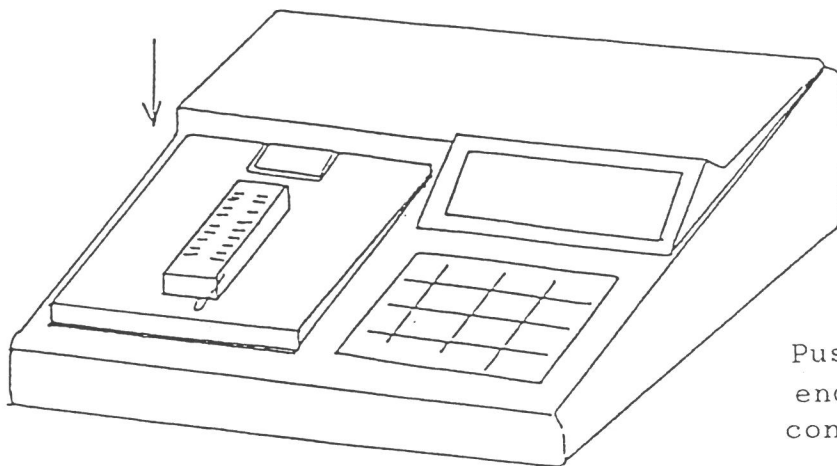
## Installation of unit



Set the tab to the Model 1890A and then install the unit on it.

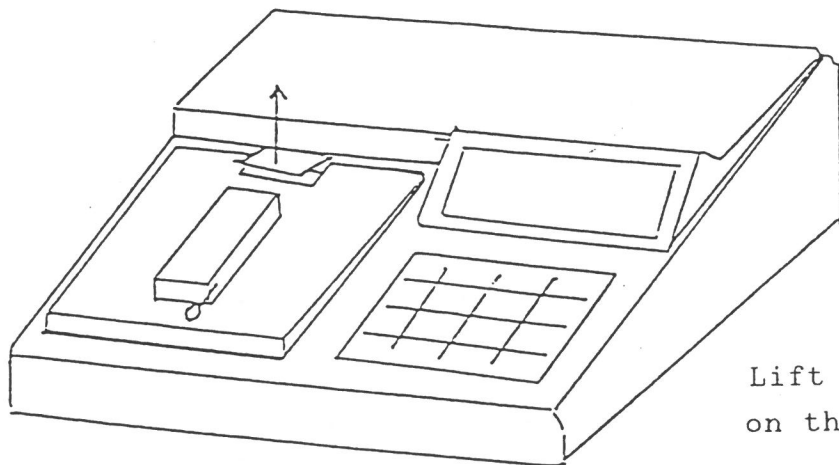


Pull the unit toward you and fix the tab to the Model 1890A.



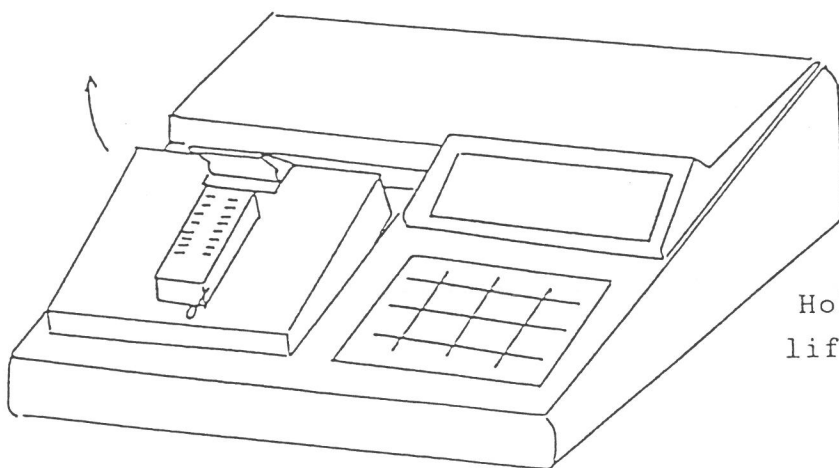
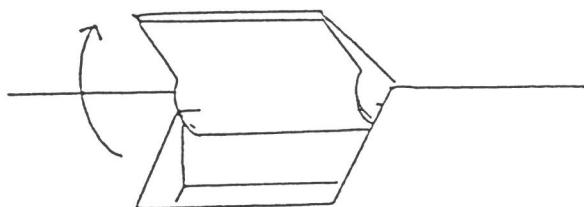
Push the unit at its end to fix the connector.

## Removal of unit



Lift the pullout lever  
on the unit.

## Pullout lever



Hold the lever and  
lift the unit.

### 5-2. Power-In

After installing the unit, turn on the Model 1890A by pressing the switch at the rear side. Then the unit performs the self-check and then gets ready for data entry with the following indication on the screen if no abnormality is found.

```
MODEL 1890  V1.0  
[ 0U900  V  1.0 ]
```

If the self-test detects an error, the unit displays the following indication and comes to a halt.

Pressing the reset switch may resume the self-test, but if an error occurs again, the unit should be repaired.

```
SELF CHECK ERROR  
E-xx
```

### 5-3. Device Select

Any PROM can be selected for read/write process in this mode. Device code can be specified in the following three ways:

- \* Direct Specification of device code.
- \* Code specification by selecting menu.
- \* Specification through silicon signature.

### 5-3-1. Direct specification of device code

Device code can be specified from the Model 1890A keyboard.

-- Sequence of processes --

(1) Press the DEVICE key.

Then the unit enters device select mode and current device codes appear.

```
2716      cdE110
VPP=25.00V  50ms
```

(2) 0 ~ F

Specify four-digit code.

The unit enters device code direct specification mode. When pressing the HEX key, the following display appears:

```
KEY IN -->cd/028
```

Initial value 

(3) Press the ↑ key.

The screen displays the data corresponding to the specified device code.

27256      cdE510  
Vpp=12.50V 1.0ms

You can skip this step if you want.

(4) Press the ENT key.

The device code is specified and then the unit exits the device select mode.

27256      cdE510  
\*\*\* SET END \*\*\*

The unit returns to the code-specification ready state from step (3) or (4) after displaying an error message if no corresponding device code is found. Try the same procedure from step (2) after verifying that you have specified correct device code.

KEY IN -->cd0000  
\*CODE UNDEFINE \*

Entered code

Note: Type code 0000 and press the Enter key to specify the device code with silicon signature.

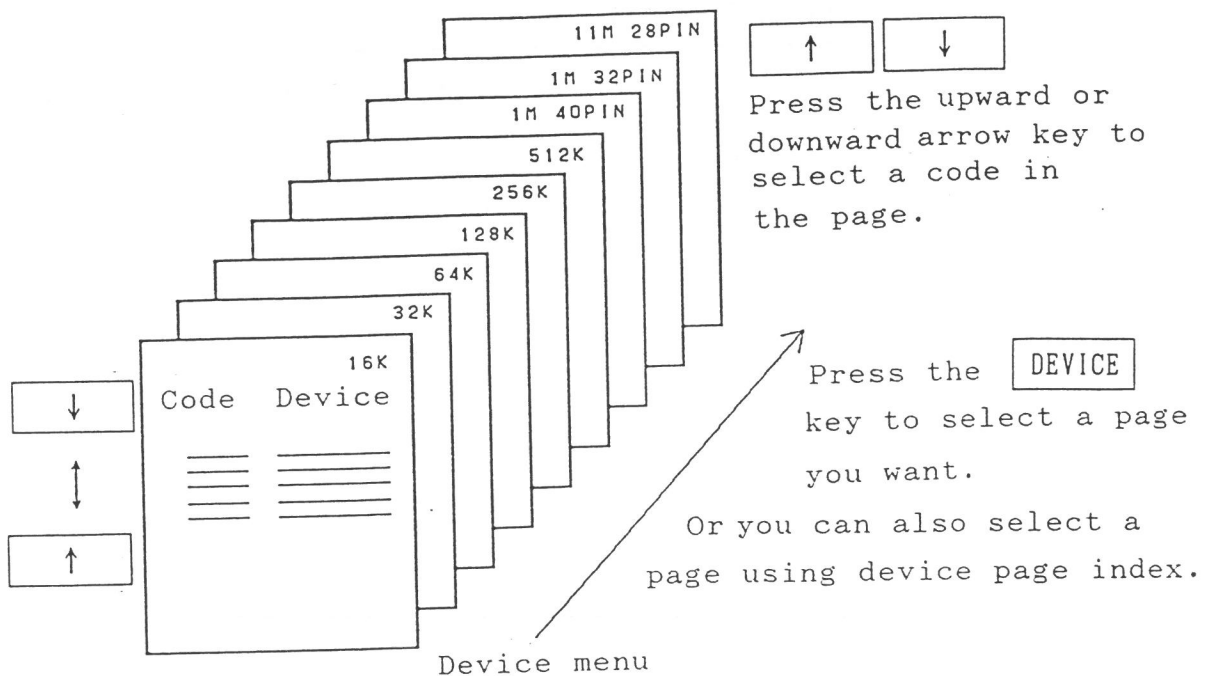
5-3-2. Specification by selecting menu

Device codes can also be specified using the device menu provided



in each unit.

The devices are filed in the separate pages depending on the capacities in this menu (and the numbers of pins for the 1 MB ERPOM) so that codes can be specified by pressing the keys for page selection and code selection.



-- Sequence of processes --

(1) Press the [DEVICE] key.

The unit enters the device select mode and the current device code is displayed.

2716	cdE110
Vpp=25.00V	50ns

(2) Press the DEVICE key again.

Each time the key is pressed, the device code at the top of each page and their data are displayed in sequence.

2732      cdE210  
VPP=25.00V    50ms

This step can be omitted if you try to change the code in the same page.

The page can also be selected by specifying page index as described below.

(3) Press the ↑ key.

Each time the key is pressed, the device code and their data are displayed.

2732A      cdE211  
VPP=21.00V    50ms

This step can be omitted if the device for specification has already been displayed.

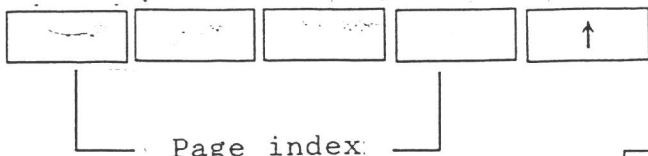
Each time the ↑ key is pressed, the codes are switched counterclockwise and displayed in sequence.

(4) Press the ENT key.

The device code on the display is specified and the unit exits the device select mode.

2732A      cdE110  
\*\*\* SET END \*\*\*

Without using the **DEVICE** key, a page can be selected from the device menu by specifying the page index as follows:



After typing numbers, press the **↑** key to specify them for the page index. The code at the top of the corresponding device page and data will appear.

The following indices are available depending on the capacities and the number of pins:

0	0	1	6	Selects the page for 16 kbit devices.	
0	0	3	2	32K	"
0	0	6	4	64K	"
0	1	2	8	128K	"
0	2	5	6	256K	"
0	5	1	2	512K	"
1	0	2	4	Selects the page for 40 pin 1 M bit devices.	
1	0	0	0	32PIN	"
1	0	2	8	28PIN	"

### 5-3-3. Code specification with silicon signature

In this mode, the unit researches the memory for a signature corresponding to specified device code for specification. This mode is available only on devices storing signatures.

-- Sequence of processes --

(1) Install a device for code specification on the IC socket.

(2) Press the DEVICE key.

The unit enters the device select mode and the current device code is displayed.

```
2716      cdE110
VPP=25.00V  50ms
```

(3) Press the ENT key.

After loading the device signatures, the unit detects the code for specification.

```
27256      cdE510
*** SET END ***
```

(4) The unit displays the following indication and waits for data input if the device is not installed on the IC socket or relevant device code cannot be found in loaded list of signatures.

In this case, specify a device code by entering the code or selecting the corresponding menu.

```
KEY IN -->cd00000
*CODE UNDEFINE*
```

#### 5-4. Read/Write Process

This section outlines the common operation modes provided by the OU910 together with the procedure to specify them. Perform the steps described in 5-5 prior to the steps in this section if special operation such as update of write range is required.

##### 5-4-1. Operation mode

###### (1) COPY

In this mode, device data are loaded into the Model 1890A buffer memory. After copying data, the unit performs the VERIFY operation to check for the loaded data and displays the result of this verification.

###### (2) BLANK

Checks the device for delete.

###### (3) PROGRAM

Writes data from the Model 1890A buffer memory to the device. After completing PROGRAM, the unit performs the VERIFY operation to check for the data and displays the result of this verification.

###### (4) VERIFY

Compares data in the Model 1890A buffer memory with those in the device.

###### (5) CONT

Continuously performs the BLANK, PROGRAM, and VERIFY operation. For the EEPROMs, ERASE mode is also performed preceding the BLANK

operation. But if the EEPROM is allowed to overwrite data, only PROGRAM and VERIFY are performed without ERASE and BLANK. See the comment in the Device Code Table for the detailed types of EEPROM.

(a) CHIPERASE -- In CONT mode. ERASE is performed prior to BLANK.

(a) OVER WRITE -- In CONT mode. Neither ERASE nor BLANK is performed.

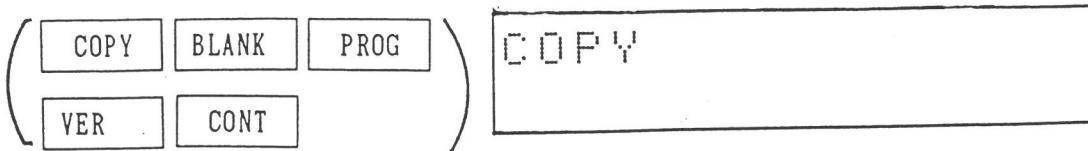
#### (6) ERASE

Erases data and checks for blank data while specifying the EEPROM.

This mode should be specified in the different way from other modes since no specific key is assigned for this mode.

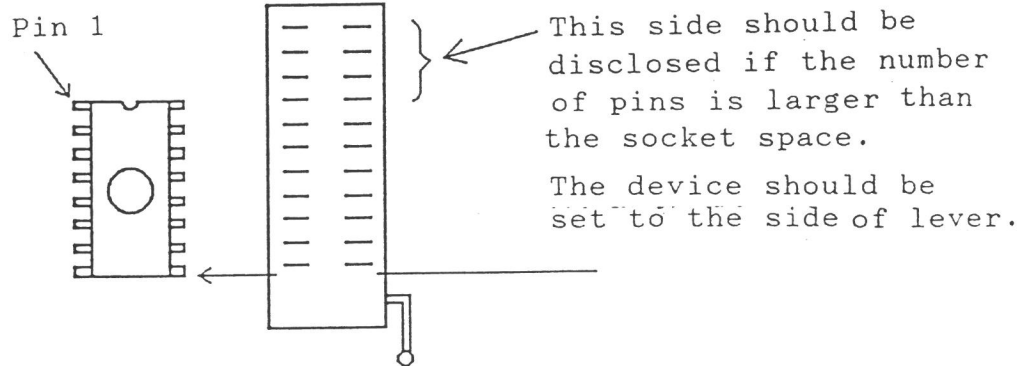
#### 5-4-2. Sequence of specification (except ERASE)

(1) Press the mode key. An operations mode will be displayed.



(2) Insert a device into the IC socket.

Be careful for the orientation of device.



(3) Press the **START** button.

On the start of operation, the device address is displayed.

COPY    xxxxxx : ---

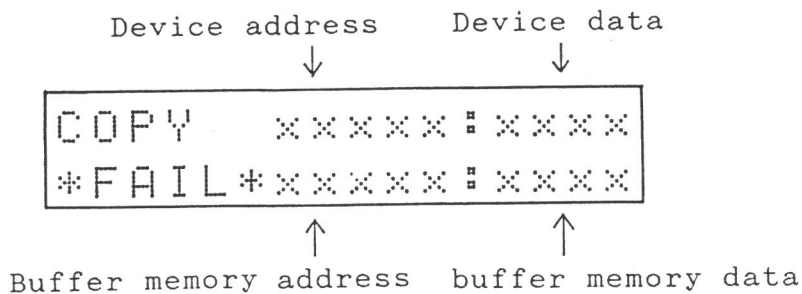
Address

(4) The unit displays the PASS signal and the checksum of device if no abnormality is found.

Checksum display

COPY    SUM△△△△ : △△  
\*\*\*\*    PASS    \*\*\*\*

If an error is detected during checking, the unit is terminated while displaying an error message. If an failure occurs during read/write procedure, the unit displays "FAIL" along with the details such as device address and device data, or buffer memory address and buffer memory data. (No buffer memory details, however, are displayed in BLANK mode.)



\* The display for device data and buffer memory data depends on the data size of devices as shown below:

8 bit device: 2 digit in Hexadecimal numbers.

16 bit device: 4 digit in hexadecimal numbers.

\* The unit restarts the operation from the following address if the START key is pressed in the state described above.

\* After restarted, the unit may not display the PASS and checksum when it normally completes the operation.

\* In CONT mode, the unit doesn't restart the operation as described above.

COPY    xxxxxx : ----  
\*\*\*\* FAIL    xxxxx



### 5-4-3. Sequence of processes (except ERASE)

(1) Press the S.COM and 1 keys, and the operation mode will be displayed.

ERASE

START?

(2) Install a device in the IC socket.

(3) Press the START key, and the unit confirms the absence of data after erasing data.

Note: If any other devices than the EEPROMs are selected, the unit displays the following error message and no erase operation is enabled.

\*\* NOT EE-ROM \*\*

## 5-5. Setup of Operation Range

If the device is selected, the range for device read/write and starting address of buffer memory are initialized.

Range of read/write address: 0 through last address

Starting address of memory: Address 0

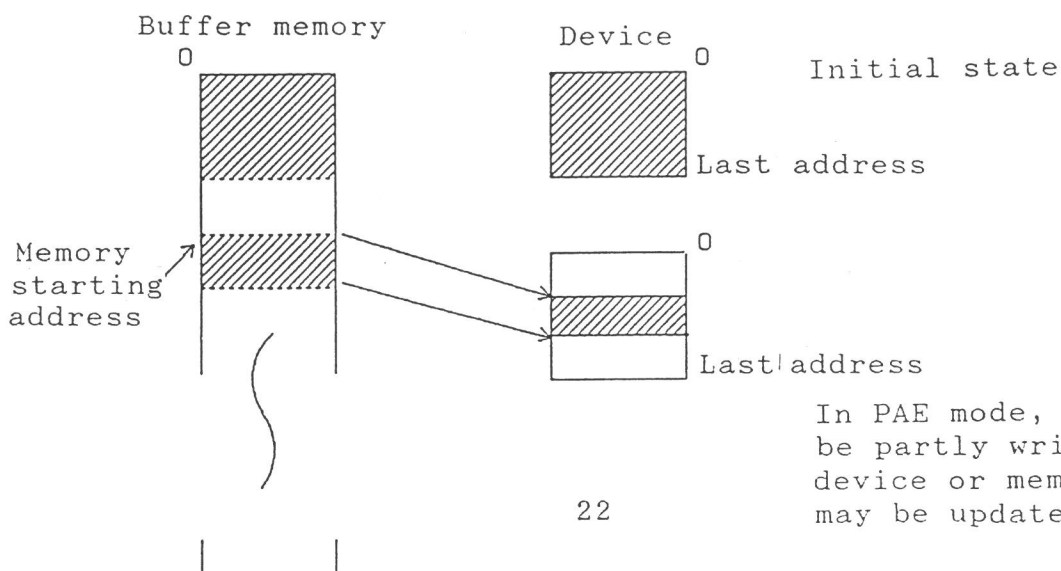
Address mode: NORMAL (See 5-5-3.)

This unit provides for the write and update of the area corresponding to the specific memory addresses by pressing the keys in sequence as follows:

- \* Specify the range for operation by using the **PAE** key.
- \* Specify the operation range in BLOCK mode.
- \* Specify the operation range by pressing the **A.MODE** key.

### 5-5-1. Operation range specification with **PAE** key

The **PAE** key can be used to write data into the part of device or change data at the starting address and addresses corresponding to the device.



-- Sequence of process --

(1) Press the  key.

The current starting address for device is displayed.

EDIT	ADD	ENTRY
BEGIN	ADD	xxxxxx

(2)  Specify the starting address of device using five digit hexadecimal numbers and then press the  key.

(Press the  key if no update is required.)

Then, the input value is specified for the starting address of the device and the ending address of device is displayed.

EDIT	ADD	ENTRY
END	ADD	xxxxxx

(3) Specify the ending address of the device in the same way as step (2).

The input value is specified for the ending address for device and the unit displays the starting address of the buffer memory.

EDIT	ADD	ENTRY
BUF	ADD	xxxxxx

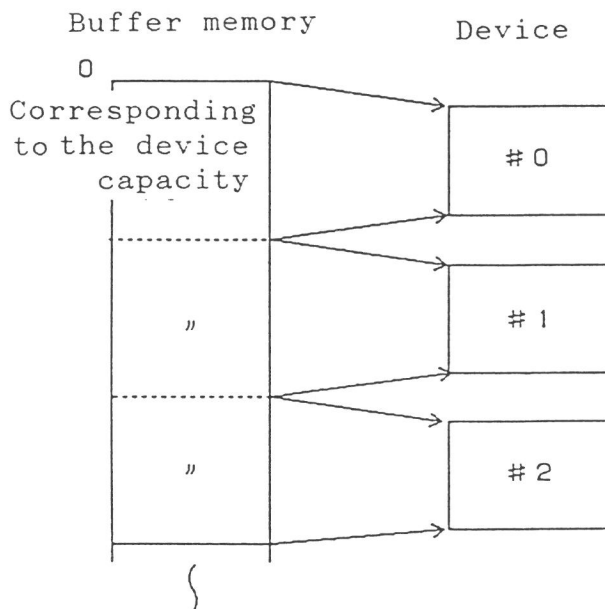
(4) Specify the starting address of the buffer memory in the same way as step (2).

The input value is specified for the starting address of buffer memory and the unit completes the process.

EDIT    ADD ENTRY COMPLETE
-------------------------------

#### 5-5-2. BLOCK mode

In this mode, the unit can divide the consecutive data into several separate devices for read/write operation. The addresses for the top of memory should be usually specified with the PAE key, but they should be the block number in this mode.



Divides the buffer memory depending on the device capacity starting from address 0 and assigns the number from address 0.  
To write data into a device, add this number to automatically specify the memory start address.

-- Sequence of process --

(No specific key is available to specify this mode.)

(1) Press a specific key to specify any mode from: COPY

BLANK PROG VERIFY CONY

(2) Press the BLOCK number. (0 through 7) 0-7

(3) Press the START key.

\* See 5-4 for the details of operation.

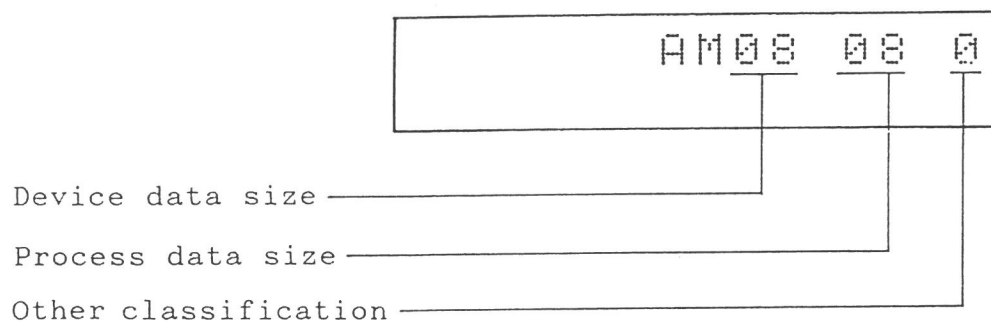
\* All range of addresses specified with the PAE key are ignored.

### 5-5-3. Address mode

The Model 1890A processes data in the buffer memory as 8 bit data for control. But in address mode, it can virtually process them as 16 bit or 32 bit data if specified. (This mode is available only for read/write process.)

-- Sequence of process --

(1) Press the A.MODE key.



(2) Press the  key.

The unit displays the corresponding address mode.

(3) Press the  key.

Display and functions:

AM08080: Common mode to write 8 bit data into an 8 bit device.

This mode is specified if you select 8 bit device during device selection.

AM0816X: In this mode, the unit writes the most or least significant 8 bits into an 8 bit device.

X = 0: 16 bit data corresponding to D0-7 data.

X = 1: 16 bit data corresponding to D8-15 data.

AM08332X: In this mode, the unit writes 8 bits of 32bit data into an 8 bit device.

X = 0: 32 bit data corresponding to D0-7 data.

X = 1: 32 bit data corresponding to D8-15 data.

X = 2: 32 bit data corresponding to D16-23 data.

X = 3: 32 bit data corresponding to D24-31 data.

AM16160: Common mode to write 16 bit data into a 16 bit device.

This mode is specified if you select 16 bit device during device selection.

AM16161: In this mode, the unit replaces D0-7 data by D8-15 data and vice versa for writing.

AM1632X: In this mode, the unit writes the corresponding 32 bit data into a 16 bit device.

X = 0: Processes D0-15 data of 32 bit data.

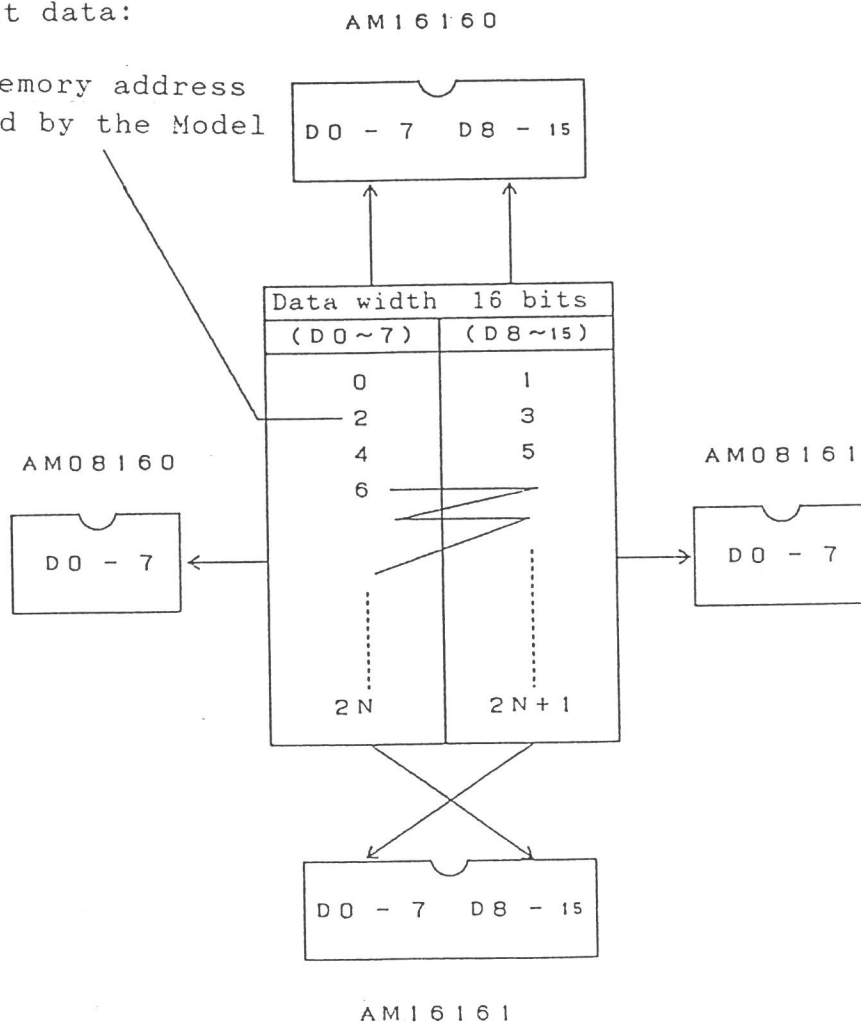
X = 1: Processes D16-31 data of 32 bit data.

X = 2: Replaces the least significant D0-15 data of 32 P.24  
bit data by the most significant data and vice  
versa for writing.

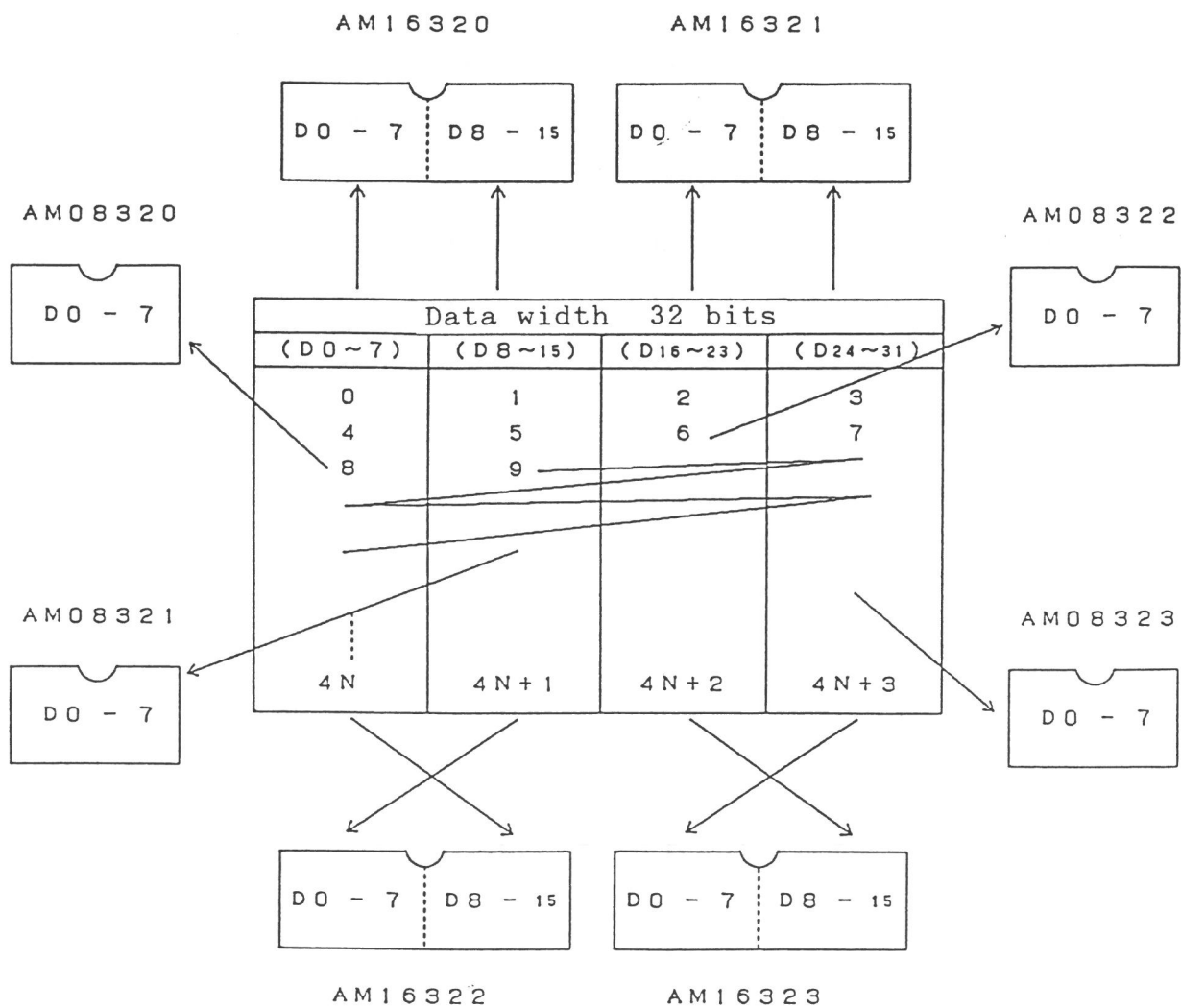
X = 3: Replaces the least significant D16-31 data of 32  
bit data by the most significant data and vice  
versa for writing.

16 bit data:

Buffer memory address  
displayed by the Model  
1890A.



32 bit data:





## 5-6. Other Settings

The OU910 provides for optional Vcc setting in VERIFY mode and enables/disables the device check.

These modes are reset when a device is selected.

### 5-6-1 Verify mode setting

The OU910 sets the default Vcc to 5.40/5.50 V in VERIFY mode and four optional setup values are provided.

Four optional setup values are as follows:

\* Vcc = 4.7/5.25 V

\* Vcc = 4.50/5.50 V

\* Vcc = 4.50/6.00 V

\* Vcc = 4.50/6.50 V

-- Sequence of processes --

(1) Press the  and  key.

The unit enters the VERIFY mode and displays the current voltage setting.

READ Vcc SELECT  
Vcc=4.50/5.50V

(2) Press the  key.

Each time the key is pressed, the Vcc setting value is switched.

(3) Press the ENT key.

Then voltage level on the display is specified for Vcc level and the unit enters the device check on/off mode.

\* If you need not update the Vcc setting, press the ENT key without pressing the ↑ key.

#### 5-6-2 Device check on/off mode

The device check mode is provided to detect the device misalignment with the IC socket when installed, but some devices may cause an error message due to their characteristics although aligned with the IC socket.

The OU910 can ignore the device check mode to process such devices. (The device check is performed even if off mode is specified.)

-- Sequence of process --

(1) After specified for VERIFY mode, the unit displays the current device check status.

DEVICE CHECK  
- ON -

(2) Press the ↑ key.

Each time the key is pressed, the display switches between "ON" and "OFF".

DEVICE CHECK  
- OFF -

(3) Press the ENT Key.

Then status on the display is specified and the unit enters the device check on/off mode.

- ON - : Enables the result of device check and displays an error if detected.
- OFF - : Disables the result of device check and ignores an error though detected.

#### 5-6-3 Buzzer ON/OFF mode

The buzzer doesn't sound in this mode at the end of the operation or on FAIL stop.

(The buzzer still sounds at the press of keys in this mode.)

-- Sequence of process --

- (1) After the device check ON/OFF mode is specified, the unit displays the current buzzer ON/OFF status.

PASS/FAIL BUZZER

- ON -

(2) Press the ↑ key.

Each time the key is pressed, the display switches between "ON" and "OFF".

PASS/FAIL BUZZER

- OFF -

(3) Press the ENT key.

The unit is specified for displayed state, and  
then enters VERIFY mode again.

(4) Press the RESET key.

The unit exits this mode.

#### 5-7. Test Mode

The unit can be adjusted and inspected in this mode.

The following seven items are provided in test mode:

- \* AC test
- \* Repeat test
- \* Power sequence test
- \* DC test
- \* Device orientation check
- \* Address driver check
- \* Data driver check

CAUTION: After specified for test mode, the unit may update some  
setup values such as available range. Be sure to specify  
the device code again after the unit is performed in test  
mode.

#### Key and function

<div>↑</div>	Used for switching test mode on/off ON: Enables the test mode on the display. OFF: Disables the test mode on the display.
<div>ENT</div>	Specifies the status on the display and moves to the next items.
<div>START</div>	Test start (Items indicated by "START ?")
<div>RESET</div>	Clears the test mode and this select mode.

#### -- Sequence of process --

(1) Press the 

S.COM

 and 

3

 keys.

The unit starts displaying the test mode items in sequence from "AC Test Setting Mode".

AC TEST MODE SET  
- OFF -

(2) Press the 

ENT

 key.

Press the key repeatedly to get the display of item you want to perform.

- (3) Press the  key and  key to set the displayed item.  
Or press the  key to start the test.
- (4) Press the  key to exit this mode.

#### 5-7-1 AC test

Current waveform for writing process can be verified in this mode.

Initialize the writing data (DATA = FF) and set the test flag to '-ON-' and the unit monitors the current waveform in PROGRAM mode. (The operation will not be repeated because a verify error occurs if it is. And the device check should be set off in this mode.)

#### 5-7-2. Repeat mode

Set this flag to "-ON-" to repeat the process until a FAIL occurs.

#### 5-7-3. Power sequence

The unit repeatedly turns on and off to confirm the normal power rise and trail.

#### 5-7-4. DC test

The unit outputs the DC voltage for Vcc and Vpp.

Press the  key to update the setting value.

Some device code may cause no voltage to be output for writing.

5-7-5. Device orientation check.

The unit repeatedly checks the orientation of installed device. Check device for the wrong orientation if an error is detected during device check.

5-7-6. Address driver check

The address drivers outputs 'H' level starting from A0.

5-7-7. Data driver check

The data driver outputs 'H' level starting from D0.

# 5-8. List of Process Procedures.

## (1) Device select



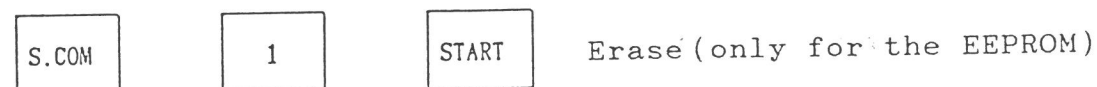
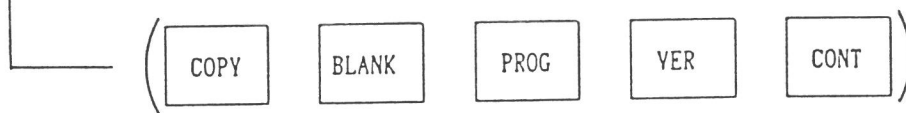
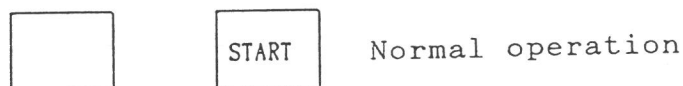
└────────── Device code ─────────┘



└── Any time ─┘



## (2) Read/write process





(3) Operation range specification

EDIT	PAE	Device	Starting address		ENT
		Device	Ending address		ENT
		Buffer memory	Starting address		ENT

Skips by pressing the upward arrow key.

Address mode

(4) Other settings

S.COM	2	↑	ENT
-------	---	---	-----

(5) Test mode

S.COM	3	( <input type="button" value="ENT"/> )	↑	ENT
-------	---	--	---	-----

or

S.COM	3	ENT	↑	START
-------	---	-----	---	-------

## 6. ERROR MESSAGE

The OU910 displays the following error messages:

### 6-1. Self-Check Error

```
SELF CHECK ERROR  
E-xx
```

The unit should be repaired.

### 6-2. Operation Error

```
*System Error:**
```

The unit should be repaired.

### 6-3. Device Check Error

```
*Check Error:10
```

This error message is displayed if the unit has a bad contact or a device improperly installed.

#### 6-4. Overcurrent Detection

```
*Over current:11
```

This error message is displayed if the unit detects overcurrent. Check the device for a failure or wrong orientation.

#### 6-5. Signature Check Error

```
*Illegal ID :12
```

This error occurs if you have specified device code with signature function, which doesn't represent the device in the IC socket.

#### 6-6. Socket Error

```
*Bad Socket :13
```

Check the socket adapter for its availability or bad contact.

#### 6-7. Memory Specification Error

```
Buffer over :14
```

Buffer memory size over. You attempted to specify the memory size over the capability of the Model 1890A.

This error also occurs if wrong address mode is specified or the PAE key is pressed in improper sequence.