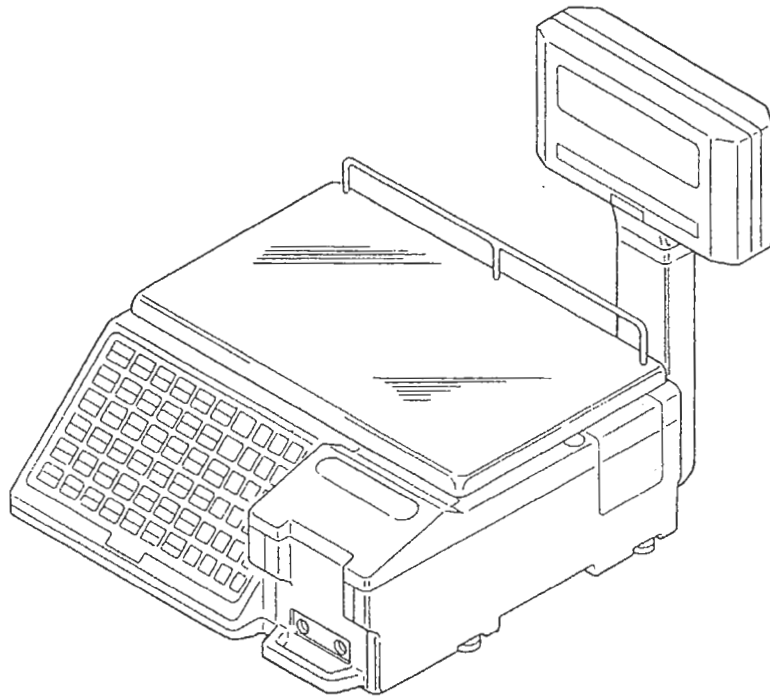


# AC-2000

## System Scale

# Service Manual (USA)



# ISHIDA

ISHIDA SCALES MFG.CO., LTD.

44 SANNO-CHO SHOGOIN SAKYO-KU KYOTO 606 JAPAN

REVISION 0



*You can help improve this manual by calling attention to errors and recommending improvements. Please convey your comments to the nearest Ishida Scales regional representative.*

***Thank You!***

# **ISHIDA**

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## TABLE OF CONTENTS

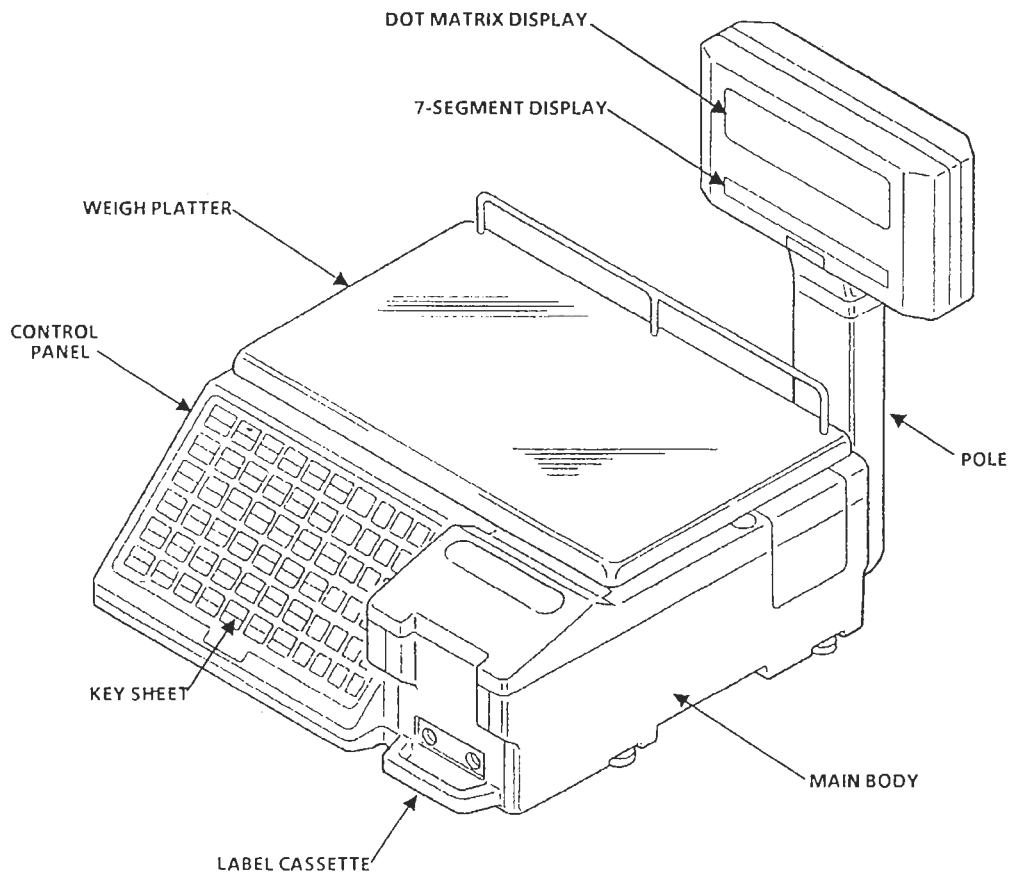
H1	INTRODUCTION	
	1.1 External Views	H1-1
	1.2 Dimensions	H1-3
	1.3 Features	H1-4
	1.5 Key Switch and Reset Key	H1-7
H2	MECHANICAL CONFIGURATION	
	2.1 Mechanical Components	H2-1
	2.2 Internal Components	H2-2
H3	REPLACEMENT PROCEDURE	
	3.1 Outer Case Removal	H3-1
	3.2 Load Cell Replacement	H3-3
	3.3 Electrical Component Replacement	H3-3
	3.4 Display Panel Replacement	H3-5
	3.5 Cassette	H3-6
H4	ELECTRICAL CONFIGURATION	
	4.1 Block Diagram	H4-1
	4.2 Connector Diagram	H4-2
	4.3 Power Unit	H4-3
	4.4 A/D Board (P704)	H4-8
	4.5 Main Board (P750)	H4-10
	4.6 Rom/Ram Board (P751)	H4-12
	4.7 Battery Switch Check	H4-16
	4.8 Sensor Signal Relay Board (P755)	H4-17
	4.9 Display Unit	H4-18
	4.10 Peeling Sensor	H4-19
	4.11 Label Sensor	H4-21
	4.12 Cassette Sensor	H4-23
H5	THERMAL HEAD	
	5.1 Outline	H5-1
	5.2 Specifications	H5-1
	5.3 Configuration	H5-2
	5.4 Adjustments	H5-3
H6	ADJUSTMENTS	
	6.1 Overview	
	6.2 Adjustment Items	
	6.3 Four-Corner Limit Adjustments	H6-1
	6.4 Initial A/D Value Adjustment	H6-2
	6.5 Span Adjustment	H6-4
	6.6 Adjustment Sequence	H6-5
	6.7 Peeling Sensor Adjustment	H6-6
H7	INSTALLATION	
	7.1 Procedure For Installation	H7-1

H8	MAINTENANCE	
	8.1	Outline
	8.2	When Replacing A Defective Unit
	8.3	Cleaning
	8.4	Daily Inspection
	8.5	Preventive Maintenance
	8.6	Troubleshooting
H9	PARTS	
	9.1	Overview
	9.2	Parts List
		H9-1
S1	OUTLINE OF SOFTWARE	
	1.1	Memory
	1.2	PLU File
	1.3	Label Formatting
	1.4	Non-Keyboard Characters
		S1-1
		S1-3
		S1-6
		S1-7
S2	LABEL FORMATTING:USA	
S3	TOTALS	
S4	SET UP MODE	
S5	TEST MODE	
A1	APPENDIX:CONNECTORS	
	SCHEMATIC	

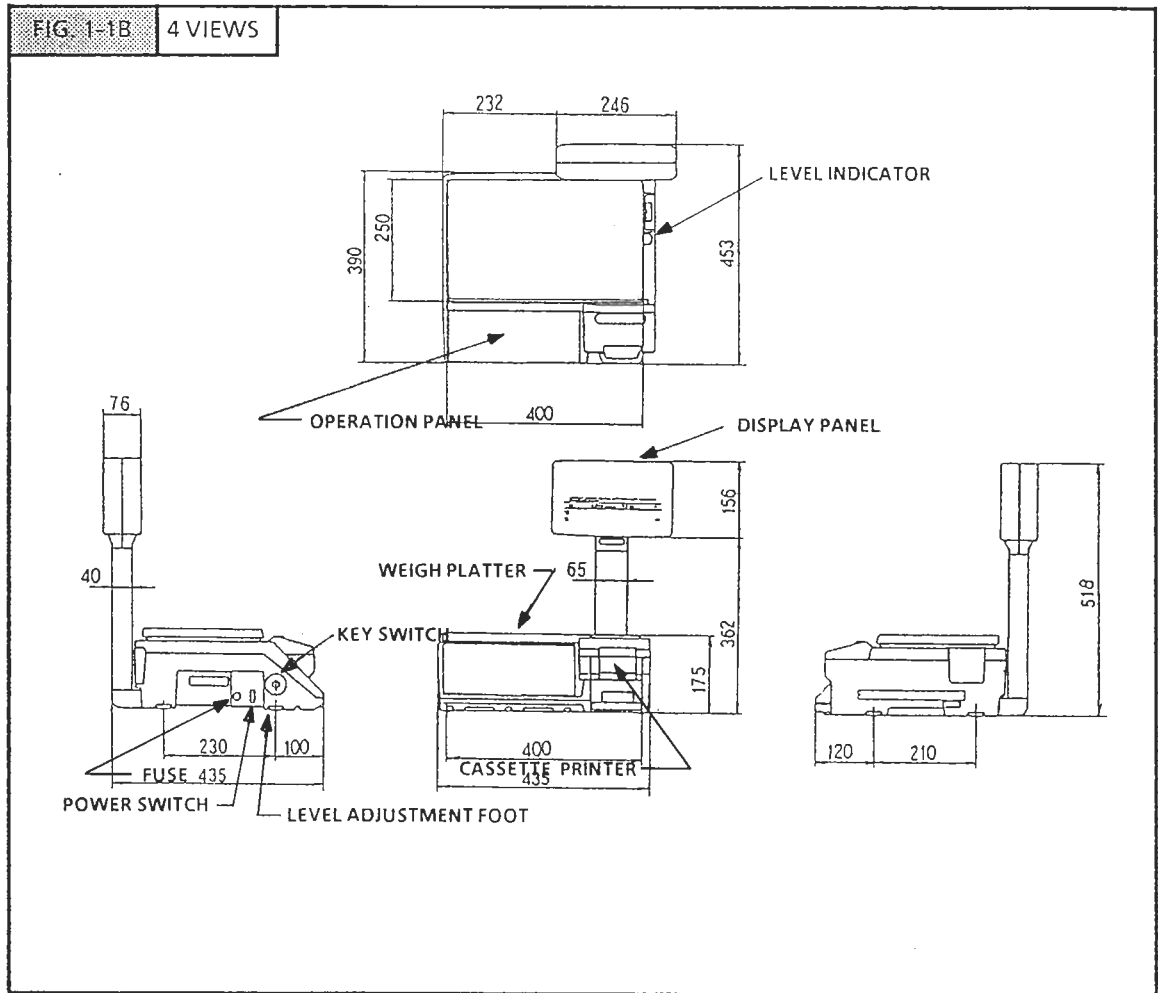
# H1 INTRODUCTION

## 1.1 EXTERNAL VIEWS

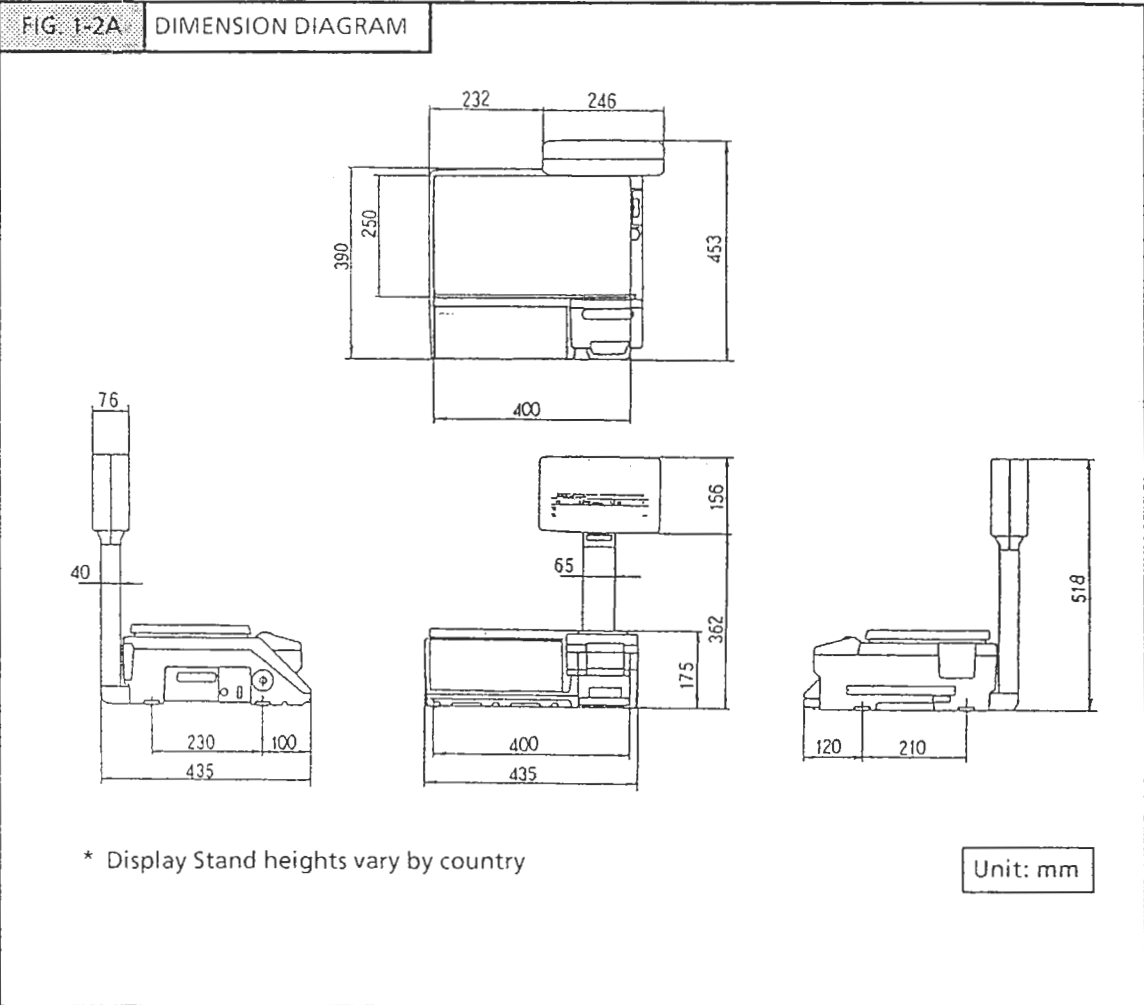
FIG. 1-1A EXTERNAL VIEW 1



# H1 INTRODUCTION



1.2 DIMENSIONS



## 1.3 FEATURES

The AC-2000 includes the following features:

- Two 16 bit microprocessors (V-40) to process weight data
- Dot matrix display
  - ▶ FIP256X64AB Fluorescent Display Panel, 256X64 dot
  - ▶ Commercial message display capability
- E2 Prom (EP-ROM)
  - ▶ Electronically read/write/erase ROM
  - ▶ Essential data initial setting
  - ▶ Data is maintained even when power is cut
- Lithium battery
  - ▶ Lithium battery for memory backup power. No need to recharge the battery upon installation (battery has sufficient reserve that the battery switch is set to ON at time of factory shipment).  
**CAUTION:** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.
- 12 NET (INC 003 used for data transmission. Ishida transmission specs)
- Label Cassette for easy changeover and reduced storage space
- Simplified adjustment of thermal head voltage via software parameters
  - ▶ Thermal head resistance value can be entered via key panel. Voltage can be set to desired value.
- Monitoring of peeling sensor
  - ▶ Standard peeling sensor detection voltage level is displayed
  - ▶ No need to measure voltage using a meter
- Selling mode can be set to user's specifications.
- System expansion

For further information on features please refer to the Operation Manual.



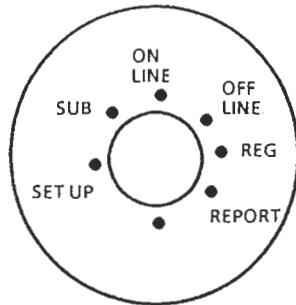
Item	Description	Remarks
Model	AC-2000	
Type	Twin beam load cell	CLC-25L
Accuracy	1/3000	
Capacity	30 Lb / 0.01 lb 15 Kg/2g, 5g	Single range (USA) Multi Range
Display	Fluorescent tube display front and rear Dot matrix display for product name	Pole type Inside main unit.
Total Weight	17 Kg	
Electrical Power	AC 115 V, 220 V, 240 V 50/60 Hz	± 10%
Power Consumption	Stand by 50W In operation 100W	
Setup space	435 mm (W) 390 mm (D) height to top of platter : 170 mm height to top of display stand : 468 mm	
Labels	2. Roll core inner dia, 40 mm 3. Paper roll outer dia. 100 mm 4. Paper width 62 or 67 mm	
Receipts	1. Role core inner dia. 12 mm 2. Paper outer dia. 62 or 67 mm 3. Paper width 100 mm	
Label output capacity	Fixed Price (Automatic) 80-85 per min. Random weighing ("") 60-65 per min.	
Label replacement method	Front loading cassette	
Registration	1000 items: standard Expandable up to 5,000 items	Varies according to number of char/product name
Time setting	Built in clock/calender	
Display panel	Flourescent dot matrix (2) Flourescent 7-segment (2)	256X64 dot When using labels
Printing method	Thermal serial dot total dot count: 448 dot dot dimensions 0.135 mm (W) 0.14 mm (H)	
Keys	Flat keys (Tact Sw) 29 function keys 36 preset keys	

## H1 INTRODUCTION

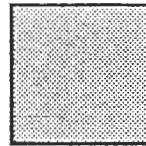
Item	Description	Remarks
Mode positions	Setup / Subtraction / Online / Offline / Registration / Report	
Input connector	I <sup>2</sup> Net 1 channel RS-232 C 2 channel	inside: 1 channel For full keyboard

1.5 Key switch and Reset Key

KEY SWITCH



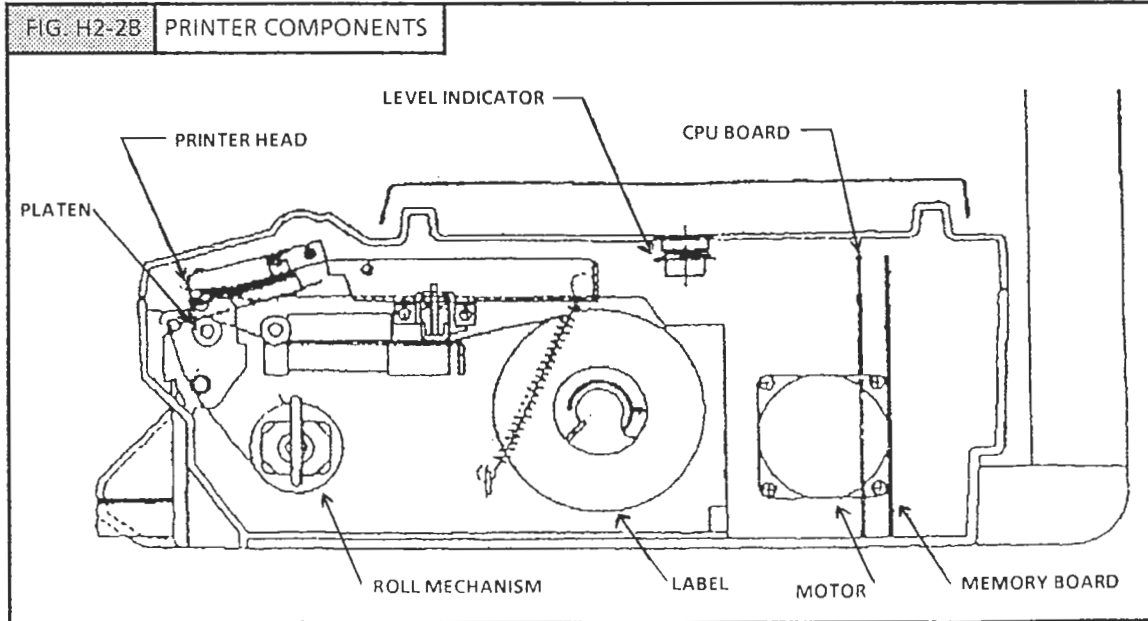
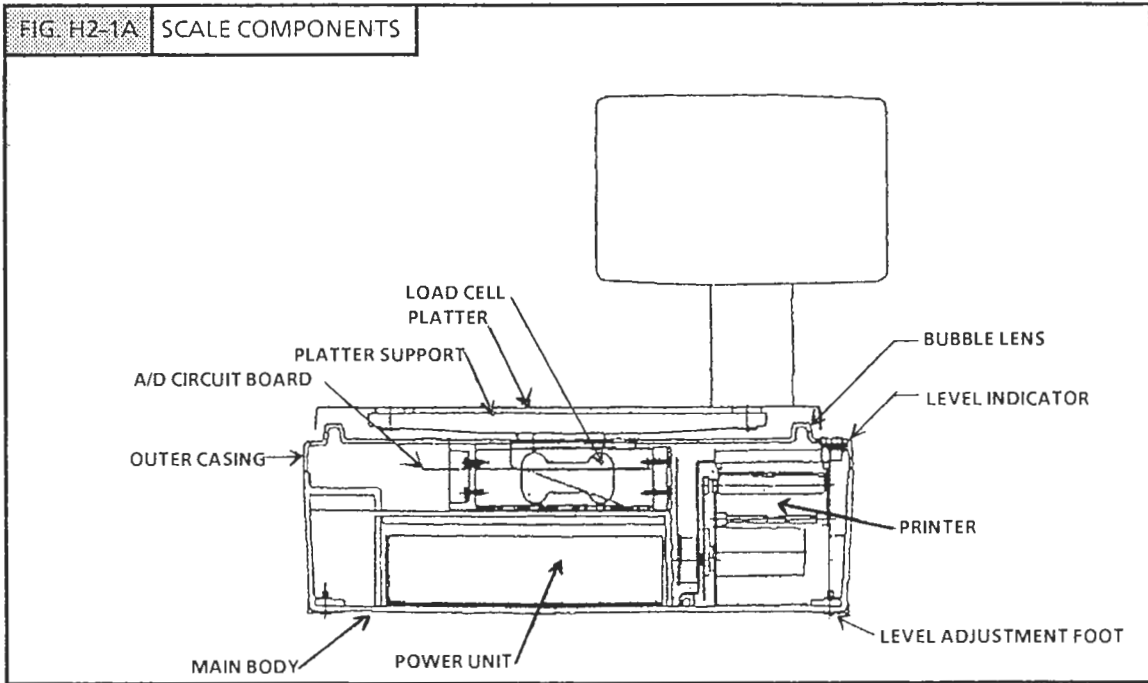
RESET KEY



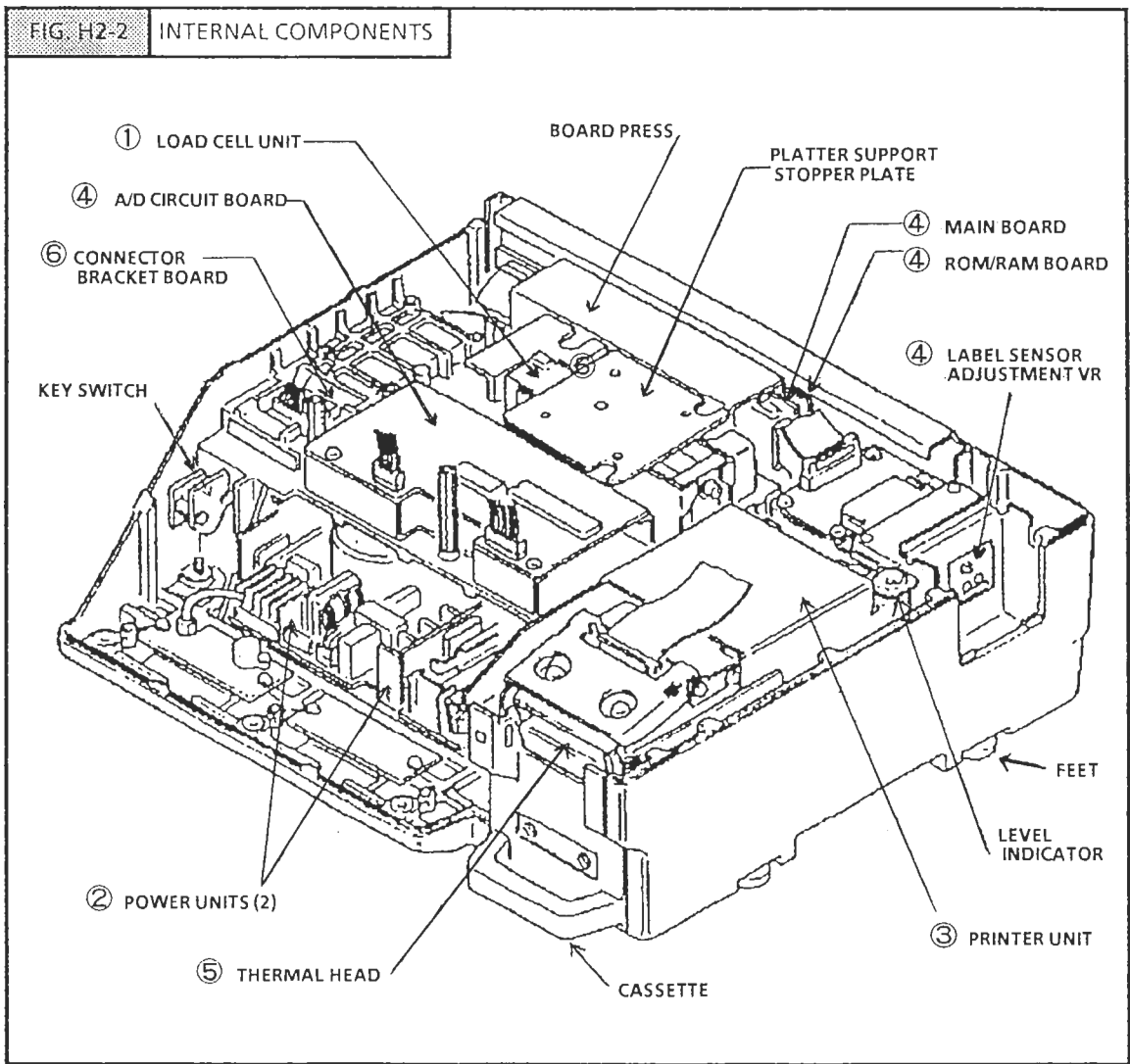
Online	Used when using System on line specifications
Offline	Used when using free standing unit specifications
Registraiton	Used when performing registration operations
Report	Used when generating totals
Sub	Used when correcting statistical data
Setting	Used during setup
Reset Key	Used when there is a malfunction (in test mode)

# H2 MECHANICAL CONFIGURATION

## 2.1 MECHANICAL COMPONENTS



2.2 INTERNAL COMPONENTS



DESCRIPTION

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>① Load cell (CLC-25L)</li> <li>② Power Unit (DL-481, DL-482)</li> <li>③ Printer Unit             <ul style="list-style-type: none"> <li>• Thermal Head (Mitsubishi)</li> <li>• Cassette (for labels or receipts)</li> </ul> </li> <li>④ Boards             <ul style="list-style-type: none"> <li>• Main Board (P-750)</li> <li>• Rom/Ram Board (P-751)</li> <li>• Scale A/D board (P-704)</li> <li>• Label sensor (P-545)</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>⑤ Thermal Head (E60-74C Mitsubishi)</li> <li>⑥ External Output/Input connector bracket board (P-753)</li> <li>⑦ Fuse Holder (5A)</li> <li>⑧ Power switch</li> </ul> <p>* For ⑦ and ⑧ see H2-1</p> |
|--|--|

# H3 REPLACEMENT PROCEDURE

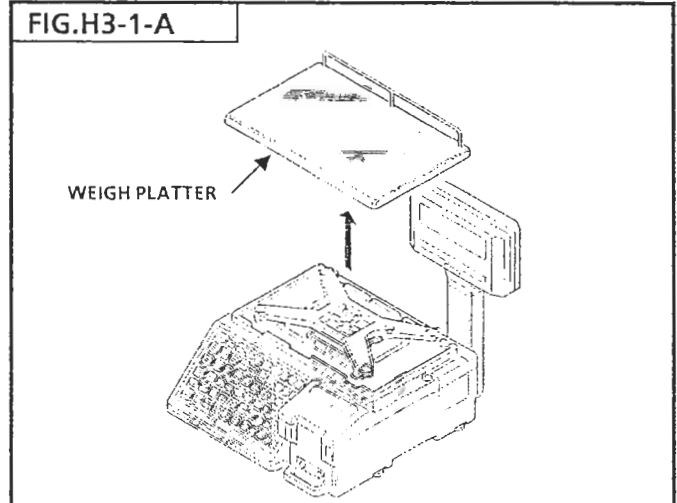
## 3.1 OUTER CASE REMOVAL

Remove components in the following order:

PLATTER → PLATTER SUPPORT → OPERATION PANEL → OUTER CASE

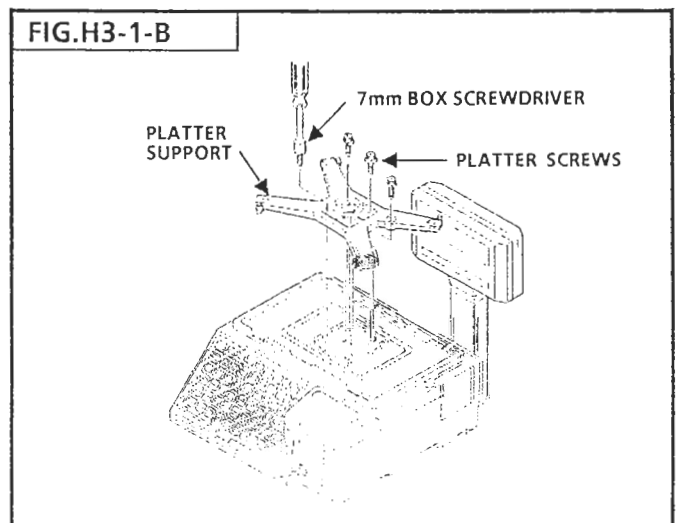
### 3.1.1 REMOVE PLATTER

1. Place the scale on a level surface.
2. Disconnect power plug from outlet.
3. Remove the platter by lifting straight up with both hands.



### 3.1.2 REMOVE PLATTER SUPPORT

1. Unscrew the four platter support screws with a Philips or 7mm box screwdriver.
2. Remove the platter support by lifting up.

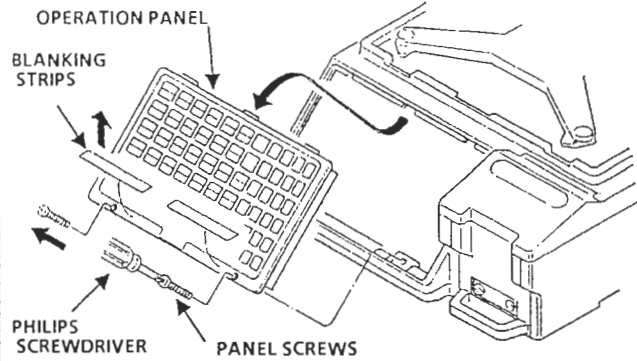


## H3 REPLACEMENT PROCEDURE

### 3.1.3 REMOVE OPERATION PANEL

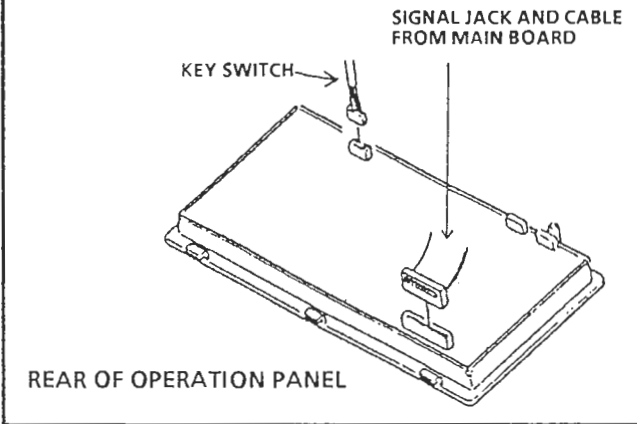
1. Remove the two blanking strips attached to the bottom of the operation panel.
2. Remove the two panel screws with a philips screwdriver.
3. Remove the panel by pulling it toward you in an upward diagonal angle.

FIG.H3-1-C



4. CAUTION:  
Signal jack with cable is connected to the rear of the operation panel. To avoid damage, do not pull the panel forward.

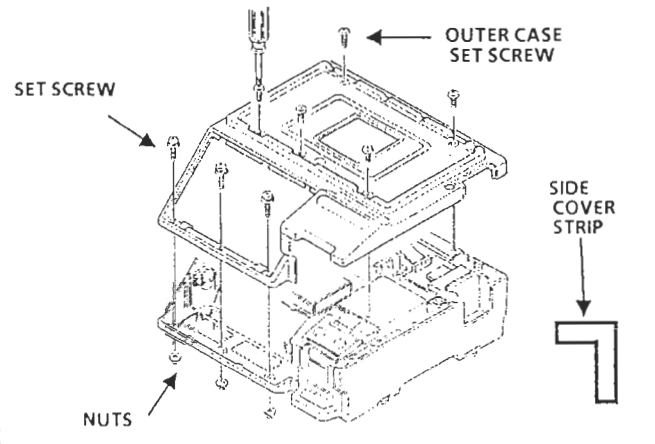
FIG.H3-1-D



### 3.1.4 REMOVE OUTER CASE

1. After removing operation panel remove the side cover strip.
2. Remove the 5 outer case screws with a phillips screwdriver.
3. Remove the 3 locking screws at the lower front of the operation panel.

FIG.H3-1-E



### 3.2 LOAD CELL REPLACEMENT

1. Remove the soldered ends of the five load cell output cables with a solder remover.
2. Remove the two load cell bolts with a 5 mm hexagonal wrench.
3. Lift the load cell unit straight up.
4. To replace, reverse the above procedure.

**NOTE:** Be sure to replace the wires in proper order.

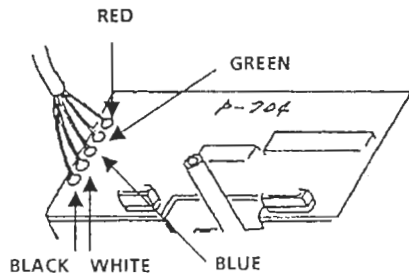
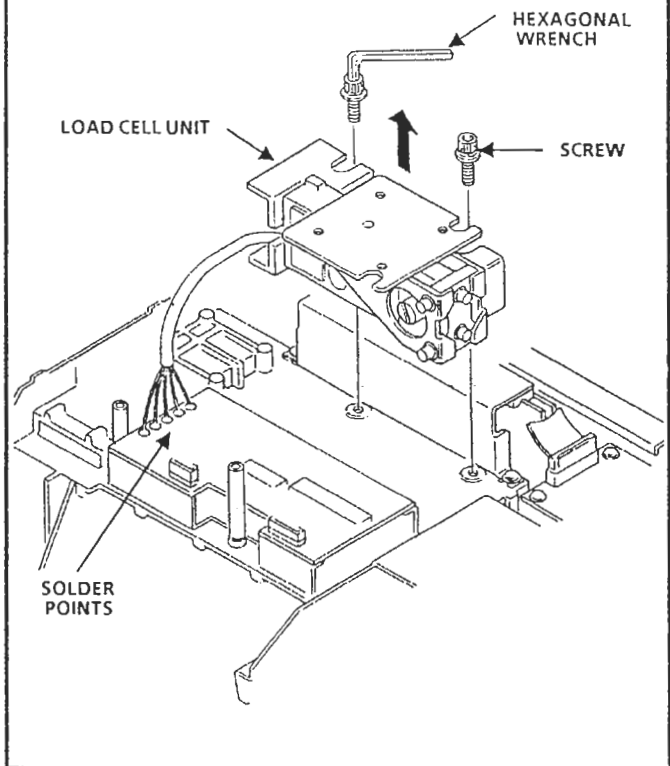


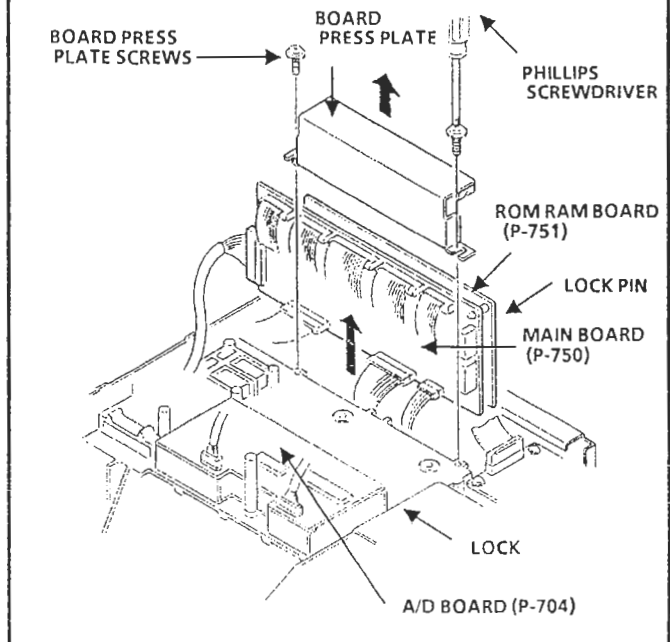
FIG.H3-2



### 3.3 ELECTRICAL COMPONENT REPLACEMENT

1. Remove the 2 board press plate screws with a Phillips screwdriver.
  2. Remove the board press plate.
  3. Remove the board connectors.
  4. Remove the 5 soldering points from the A/D board (P-704) input cables from the load cell. (see H3-3-A).
- Another method is to unfasten the lock pins at the four corners of the board.
5. To replace, reverse the above procedure.

FIG.H3-3-A



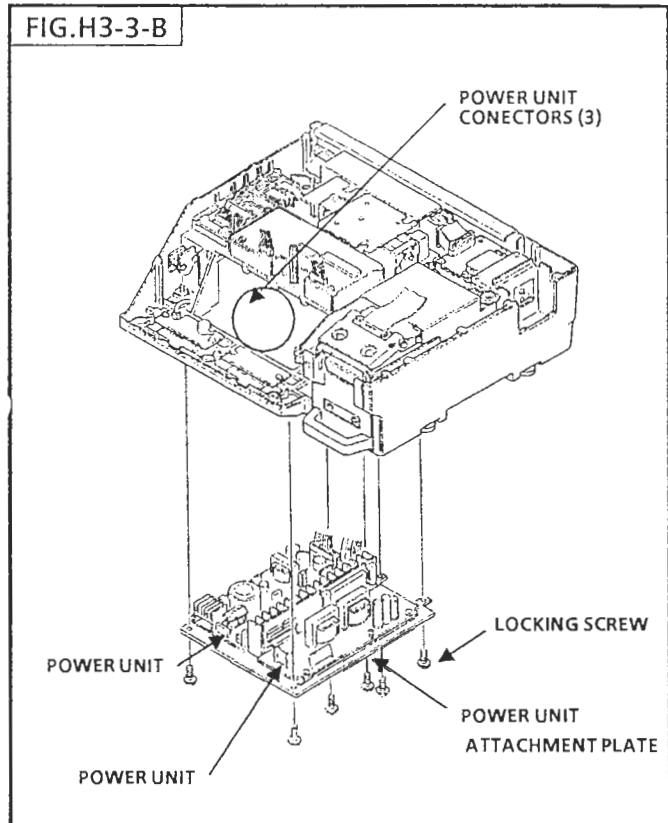


## H3 REPLACEMENT PROCEDURE

### 3.3.2 POWER UNIT REMOVAL (DL-483, DL-482, DL-481)

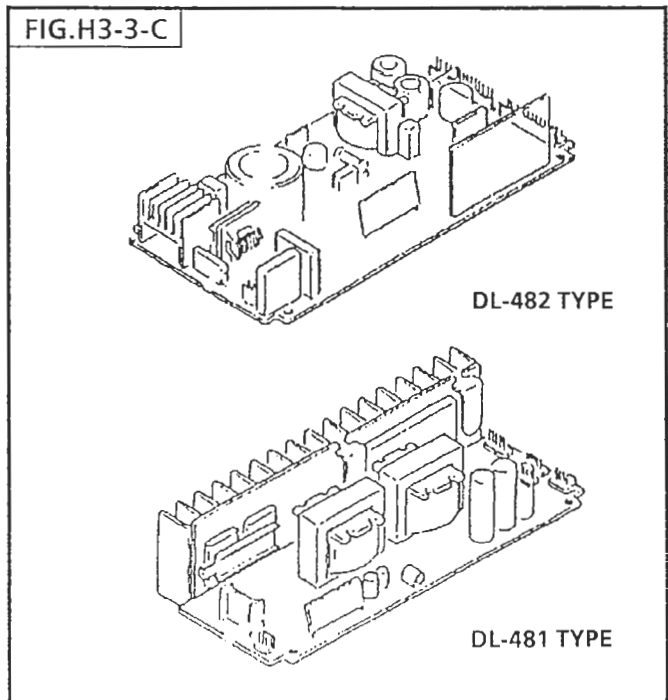
1. Remove the 3 power unit connectors from the power unit.
2. Remove the 6 screws from the power unit attachment plate with a Phillips screwdriver.
3. Remove the connectors.
4. Remove the power unit from the main body base.

FIG.H3-3-B



5. Remove the power units from the attachment plates.
6. To replace, reverse the above procedure.

FIG.H3-3-C

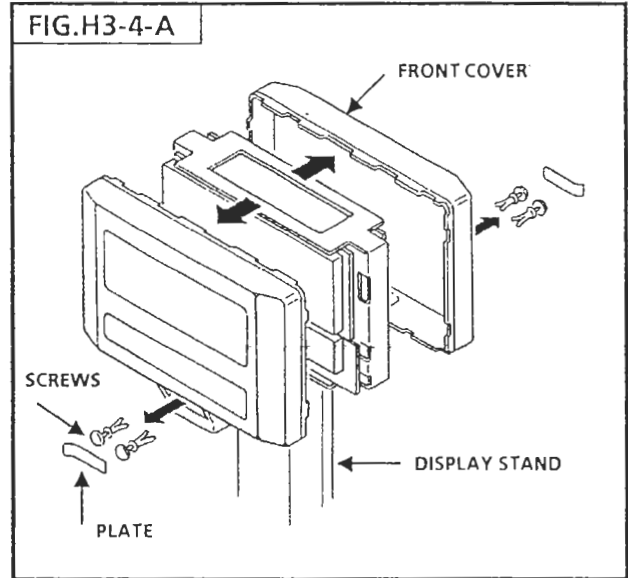


**3.4 DISPLAY PANEL REPLACEMENT**

**3.4.1 REMOVE THE FRONT COVER OF DISPLAY**

1. Remove the 2 Ishida trademark plates.
2. Remove the four screws.
3. Remove the covers from both sides.

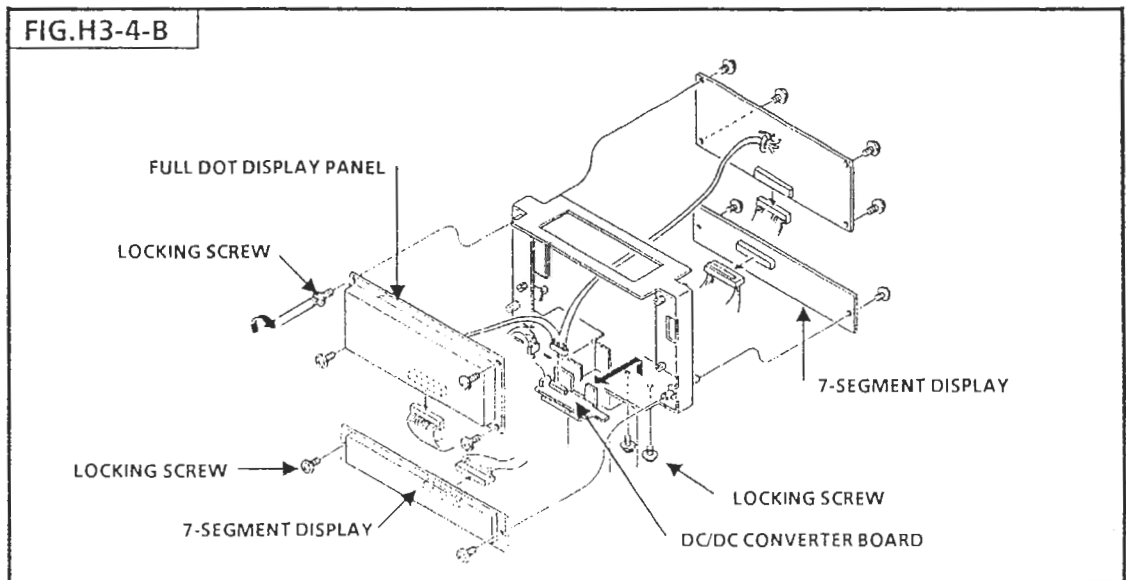
NOTE: Be careful not to scratch the front covers during removal.



**3.4.2 REMOVE THE DISPLAY AND THE LOWER 7-SEGMENT DISPLAY**

1. Remove the 8 locking screws from the upper display.
2. Remove the four locking screws from the lower display.
3. Remove the 2 screws from the DC/DC converter board.
4. Remove the DC/DC converter board.

NOTE: Be careful with the connector connections.



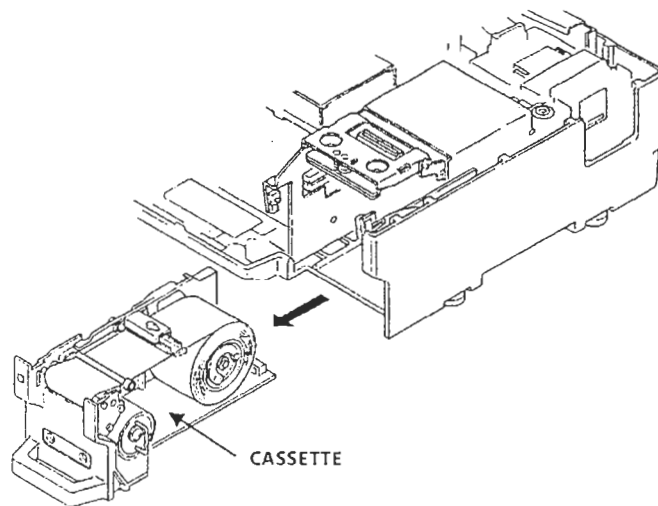
## H3 REPLACEMENT PROCEDURE

### 3.5 CASSETTE

The printer cassette in the AC-200 is capable of printing labels and receipts. By replacing the label cassette the specifications for label or receipt format are automatically altered.

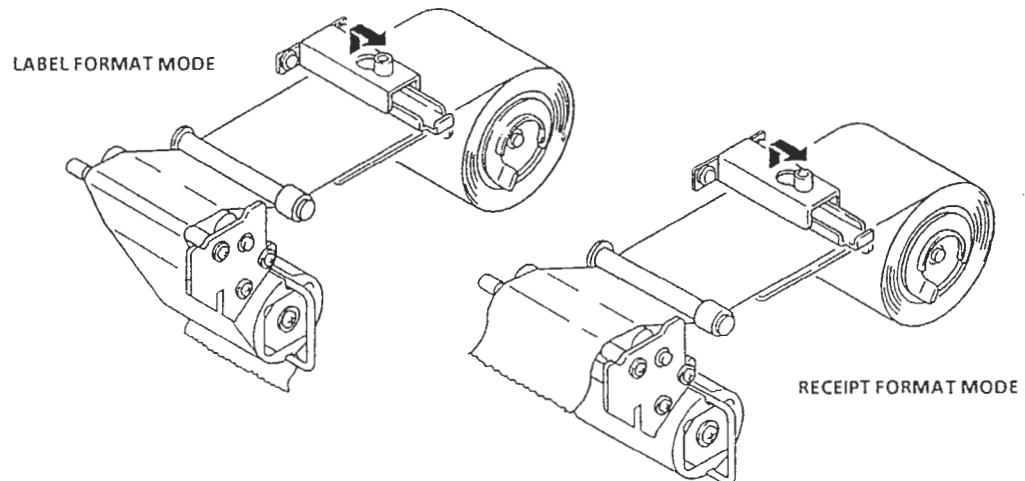
#### 3.5.2 CASSETTE REMOVAL

FIG.H3-5-A



#### 3.5.3 LABEL OR RECEIPT FORMAT MODES

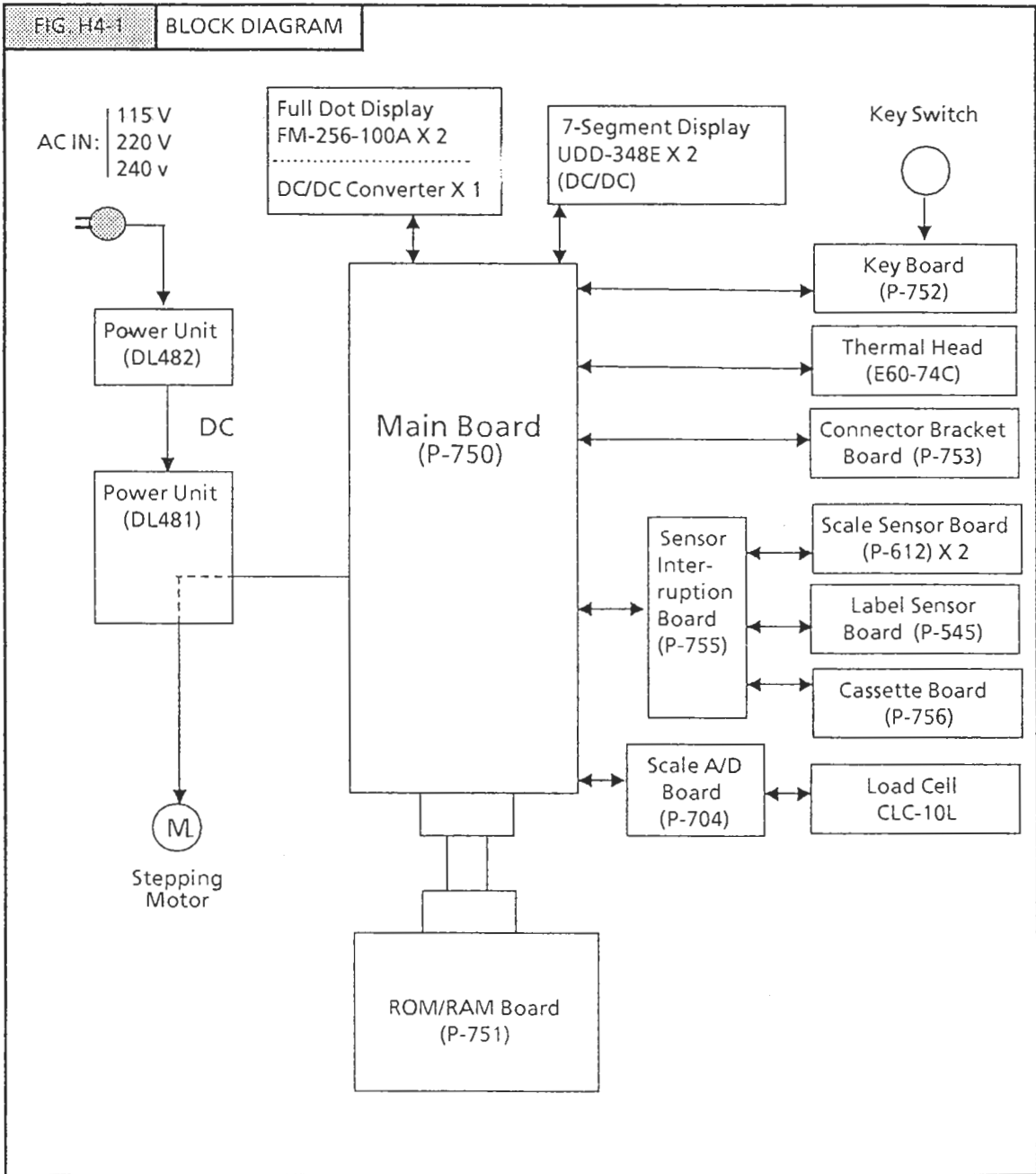
FIG.H3-5-B



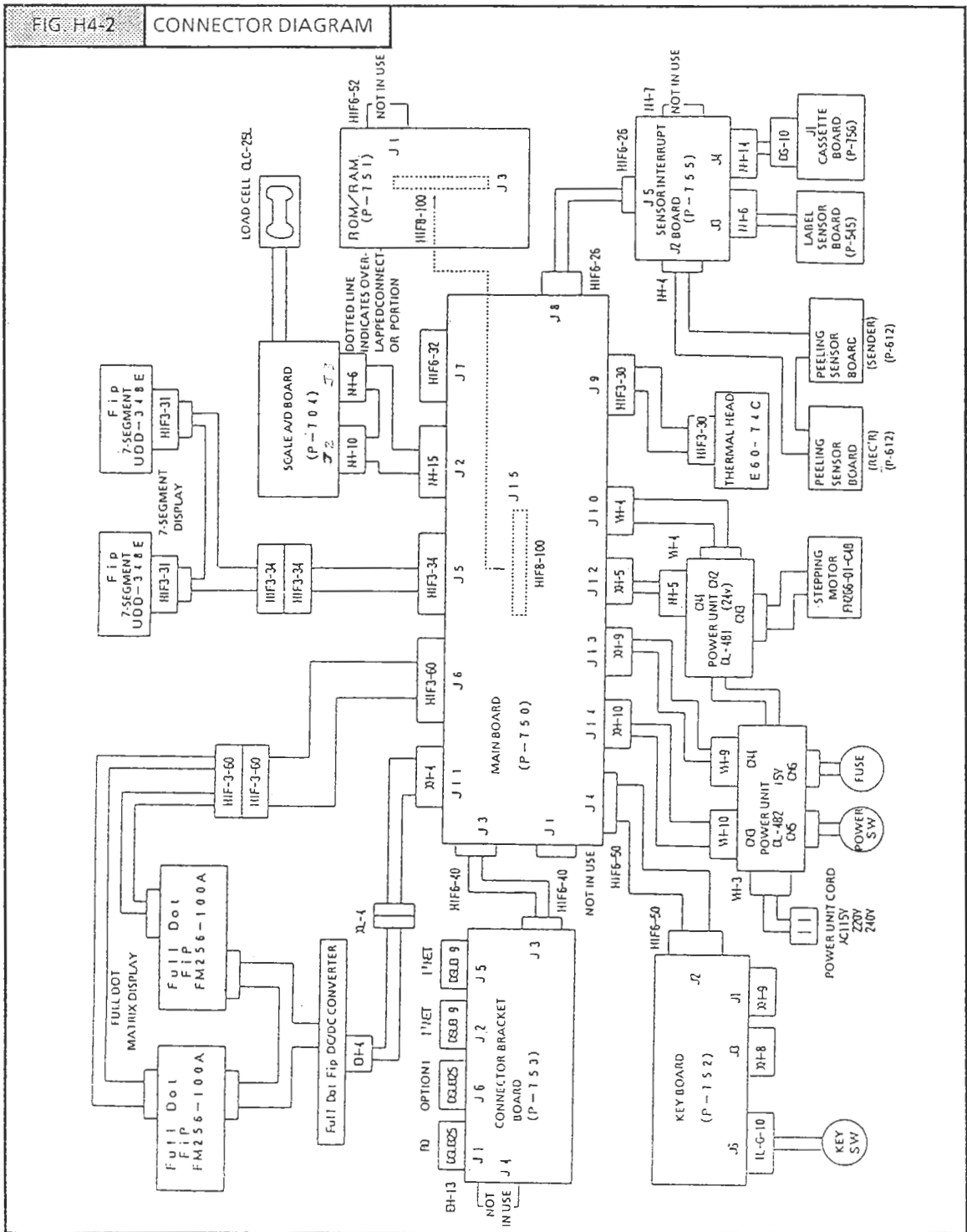
NOTE: Replacement and/or maintenance of cassette is done on a whole unit basis.

# H4 ELECTRICAL CONFIGURATION

## 4.1 BLOCK DIAGRAM



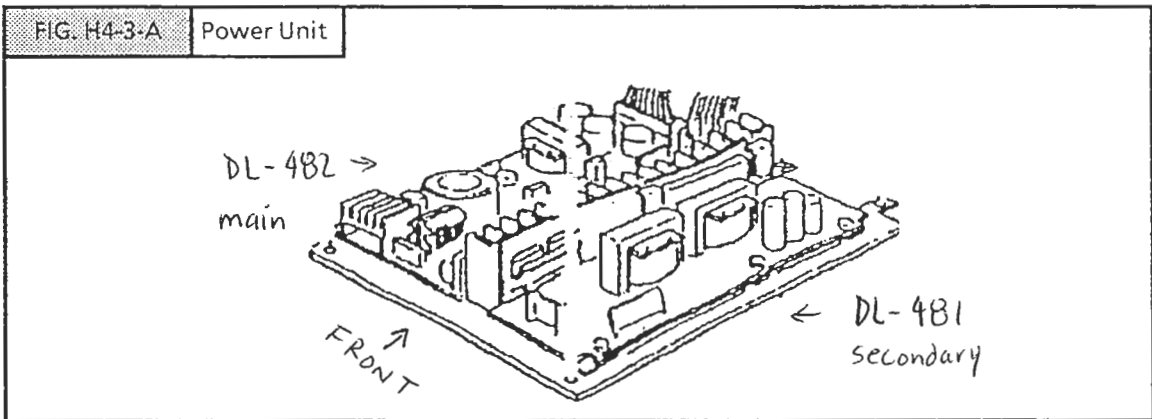
4.2 CONNECTOR DIAGRAM



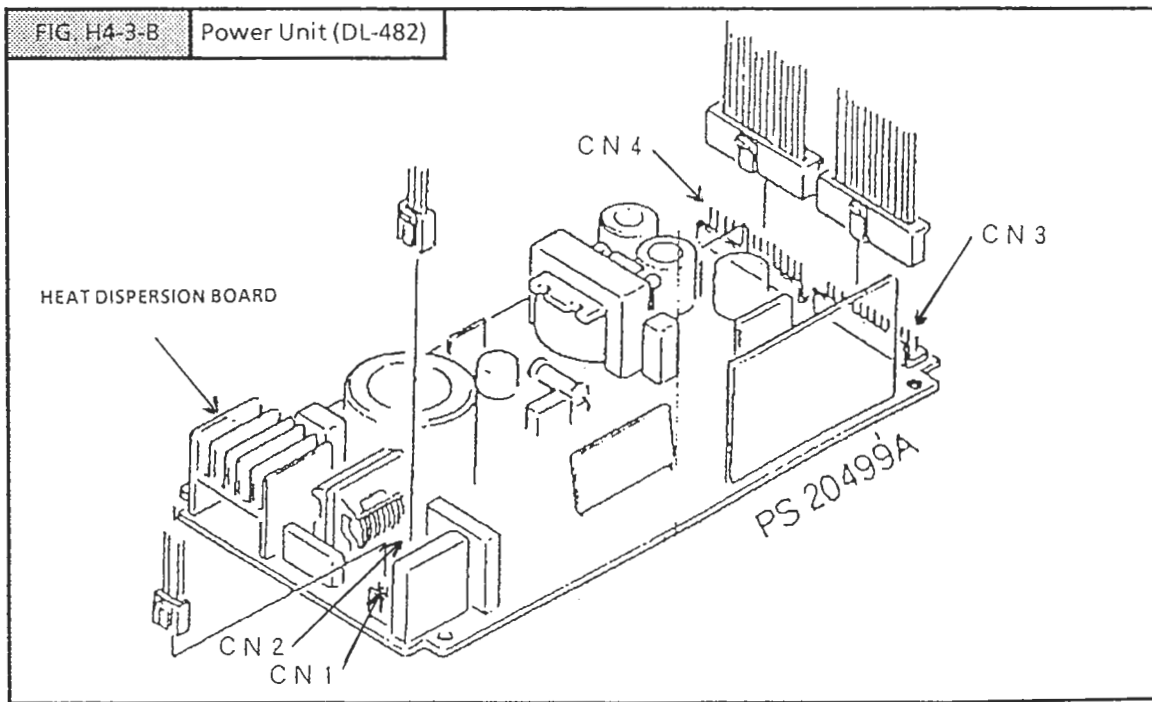
**POWER UNIT**

The AC-2000 uses a power unit which combines 2 components. This unit generates efficient voltage conversion and stable low voltage. s

NOTE: Current Overflow: Provides protection against short circuiting. Short circuit time should be 10 seconds or less.



**4.3.1 POWER UNIT (DL-482)**

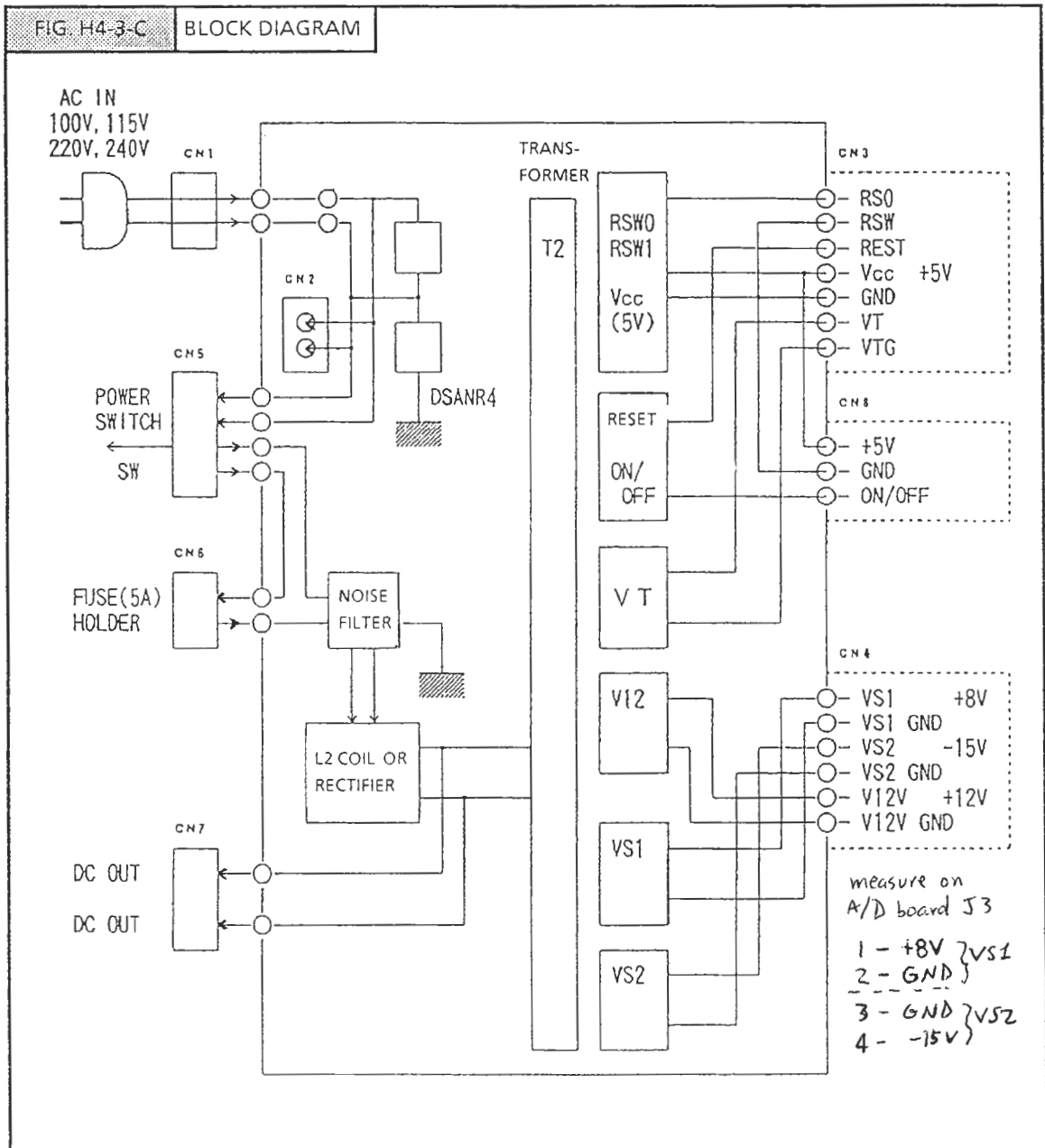


# H4 ELECTRICAL CONFIGURATION

## 4.3.2 FUNCTIONS

1. Inputs AC power.
2. Supplies power to the other Power unit (DL-481).
3. Supplies Scale A/D board (P-704) regulator power [(VS1) +8V; (VS2)-15V].
4. Supplies +12V power to the full dot display (V12).
5. Supplies +5V data signal transmission power.
6. Supplies +5V digital circuit (Vcc) power.
7. Input and output for reset signal (NMI, RES).

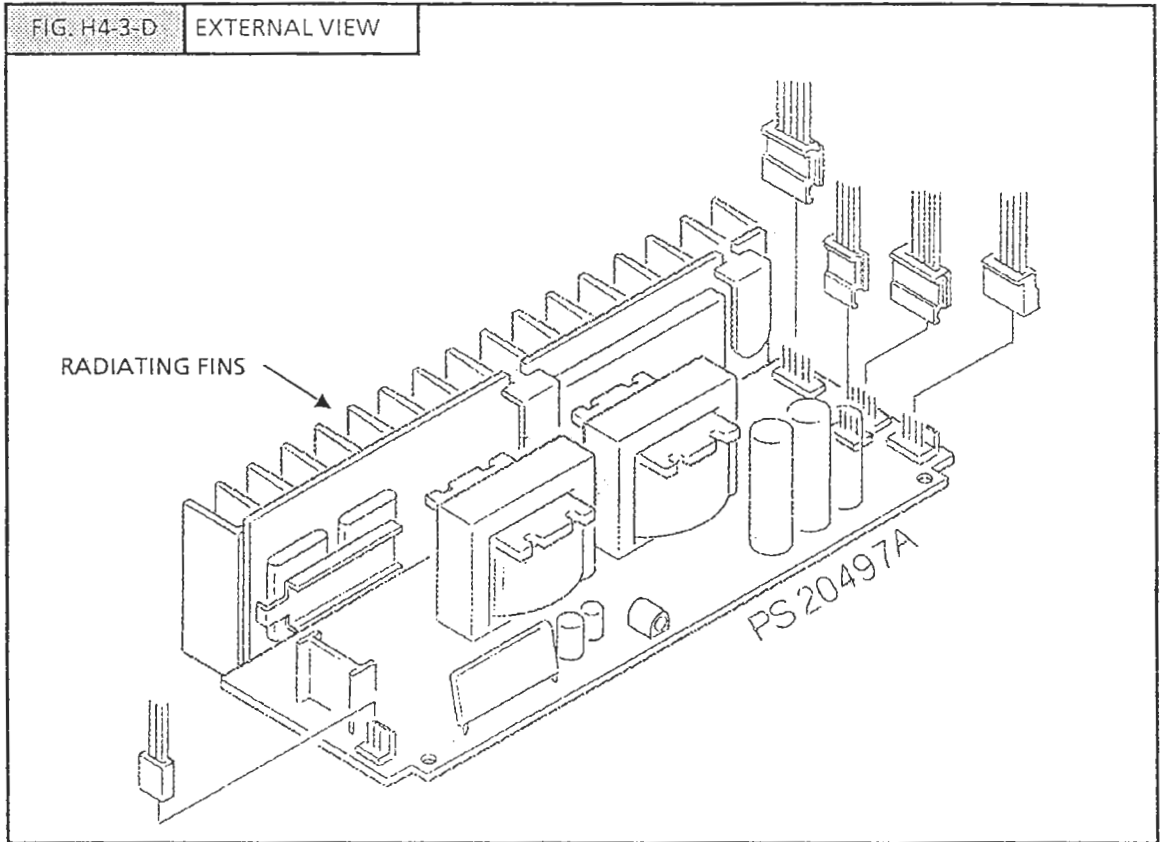
main  
(left side)  
DL-482



Secondary (right side)

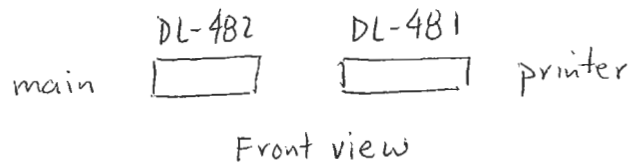
4.3.2 POWER UNIT (DL-481)

FIG. H4-3-D EXTERNAL VIEW



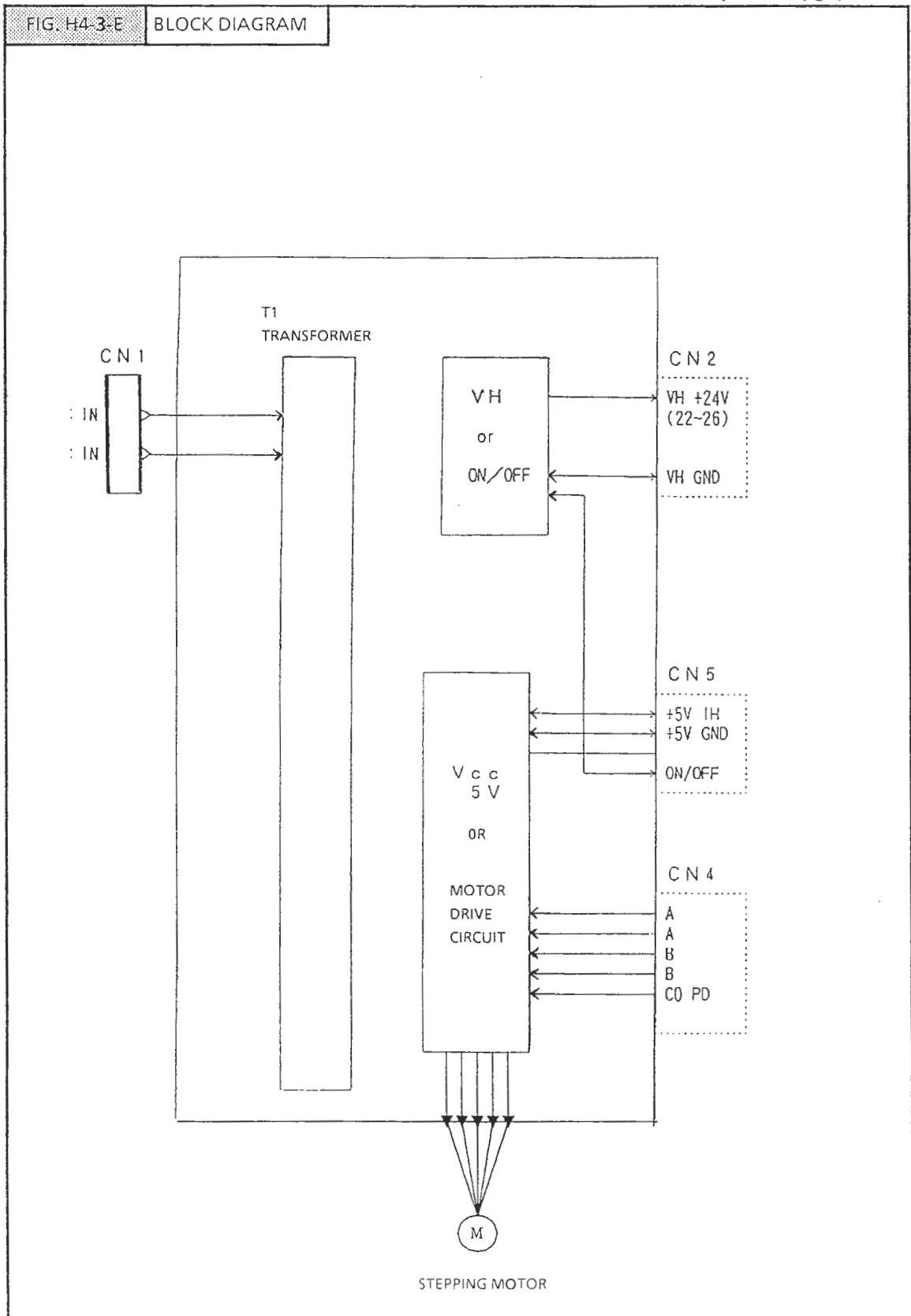
FUNCTIONS

1. Receives power from the other power unit (DL-482).
2. Supplies + 24 power to the thermal head and stepping motor (VH).
3. Stepping motor drive circuit.  
Converts and outputs the signal from the main board into a stepping motor drive signal.



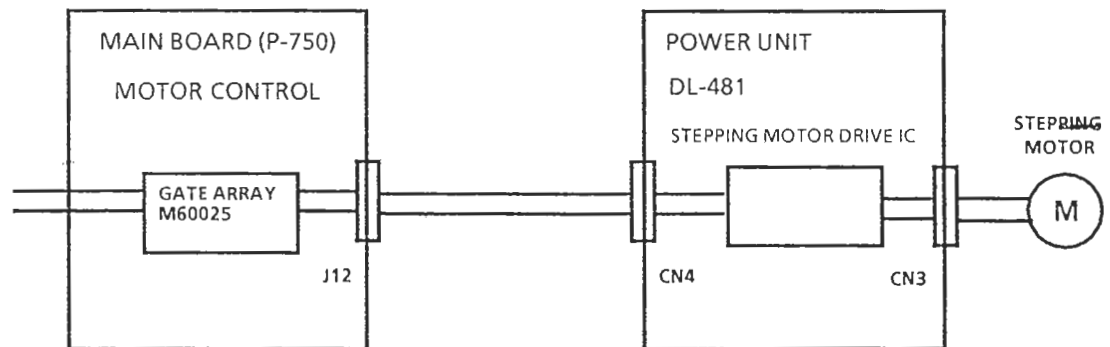


(right side)  
DL-481



### 4.3.3 POWER UNIT PERIPHERY

1. Power unit reset and control panel reset switch:
  - If the AC power goes below 83~87%, the internal reset circuit is activated and holds all scale and printer operations are terminated.
  - In the same way, the control panel reset switch resets the internal circuits. Therefore, this reset switch is used to recover after a malfunction.
2. Fuses
  - Glass fuse (5A:100V/115V, 3A:220V/240V). Note: there are no fuses inside the power unit.
3. Label advance motor
  - The AC-2000 uses a stepping motor to advance the labels. rotation and stability can be precisely controlled. Also since rotation speed is synchronized with the print signal to the thermal head, the print quality is stabilized.
  - Stepping motor drive circuit configuration



- Specifications
  1. Stepping motor drive Hybrid IC  
Sanken S1-73000A
  2. Stepping motor  
PH266-01  
1.8° step

## H4 ELECTRICAL CONFIGURATION

### 4.3.4 POWER UNIT TYPES

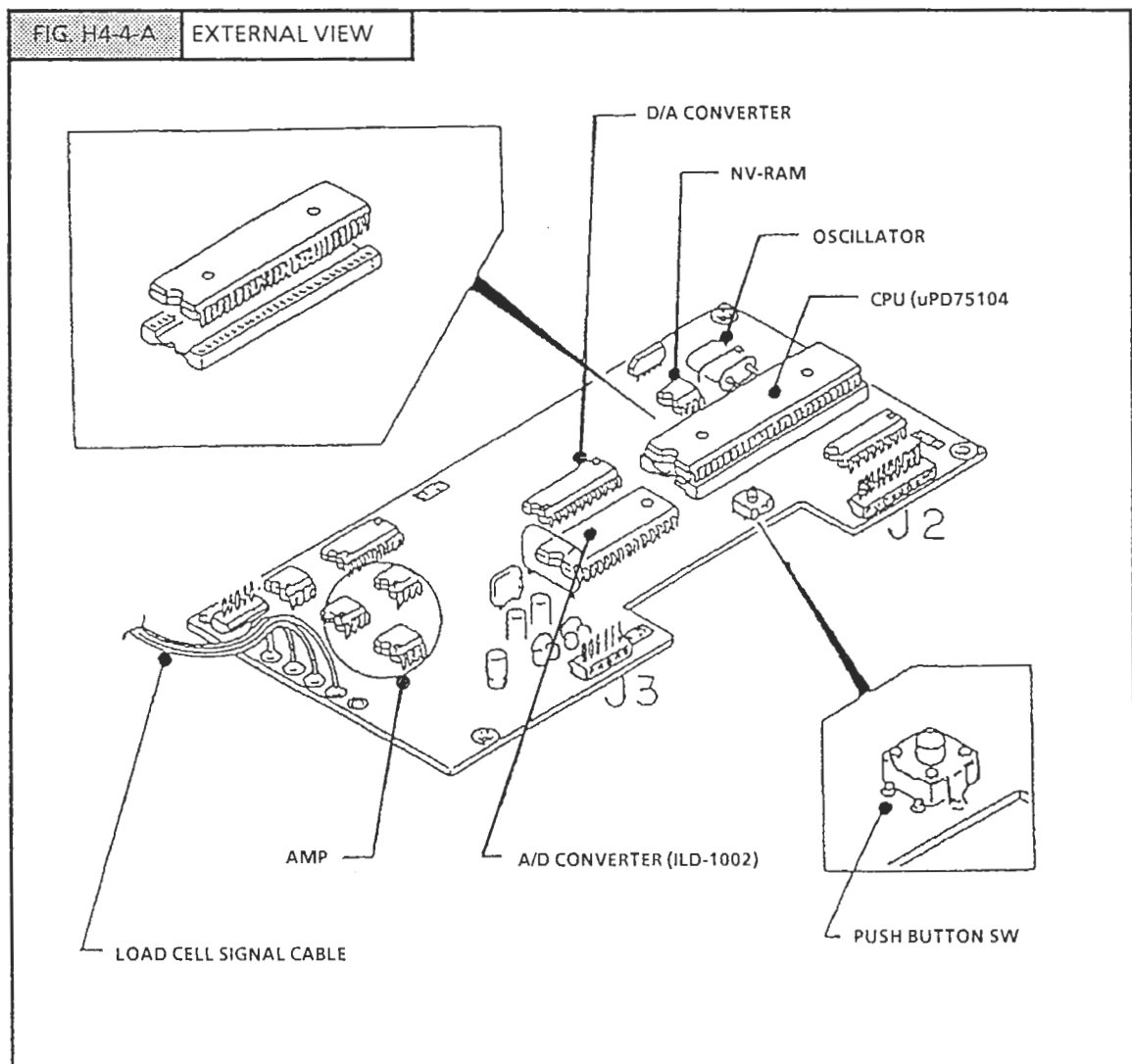
Depending on the power source, the power unit model varies as follows:

- 100V, 115V power      Type DL-481L, DL-482L
- 220V, 240V power      Type DL-481H, DL-482H

NOTE: A seal indicating model type is attached to the power units.

### 4.4 A/D BOARD (P-704)

FIG. H4-4-A EXTERNAL VIEW



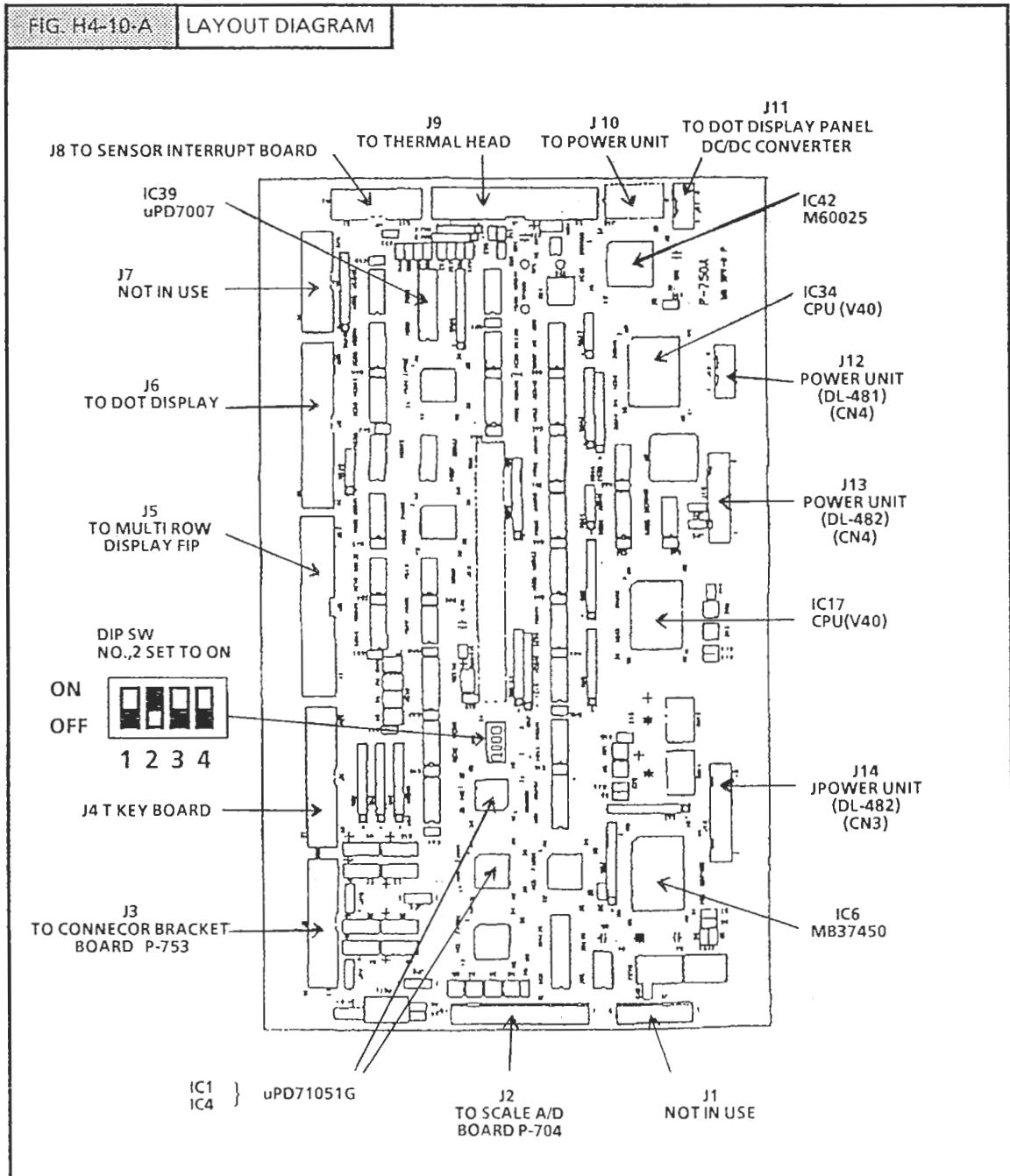
FUNCTIONS
-----------

1. Supply load cell excitation voltage (-12V)
2. Amplify load cell output signal (Amp type.... LC-8000)
3. Remove minute vibrations via filter circuit
4. A/D conversion
  - A/D converter                   ILD1001 (Ishida custom-made IC)
  - CPU                                uPD75104 (4-bit microcomputer, 2K ROM internal memory)
5. CPU circuit
  - Process A/D converter data and transfer data to main board (P-750)
  - Automatic monitoring and control of A/D converter initial and span value.  
Zero adjustment circuit control.  
D/A conversion circuit control
  - NV-RAM data control
6. Data write to NV-RAM
7. Reset circuit
  - Supply to CPU (uPD75104), A/D converter (ILD1001), NV-RAM (S 245R25R)
8. Oscillator circuit:           4. 1975 MHZ
  - Supply to CPU (uPD75401)
9. Generate + 5V, -12V

## H4 ELECTRICAL CONFIGURATION

### MAIN BOARD (P-750)

- 16-bit microprocessors (V40) (2), control all data processing for AC-2000.
- Multi-layered type, highly condensed component mounting, with lowered electrical impedance to improve endurance against electrical noise and static electricity.



#### 4.5.2 FUNCTIONS

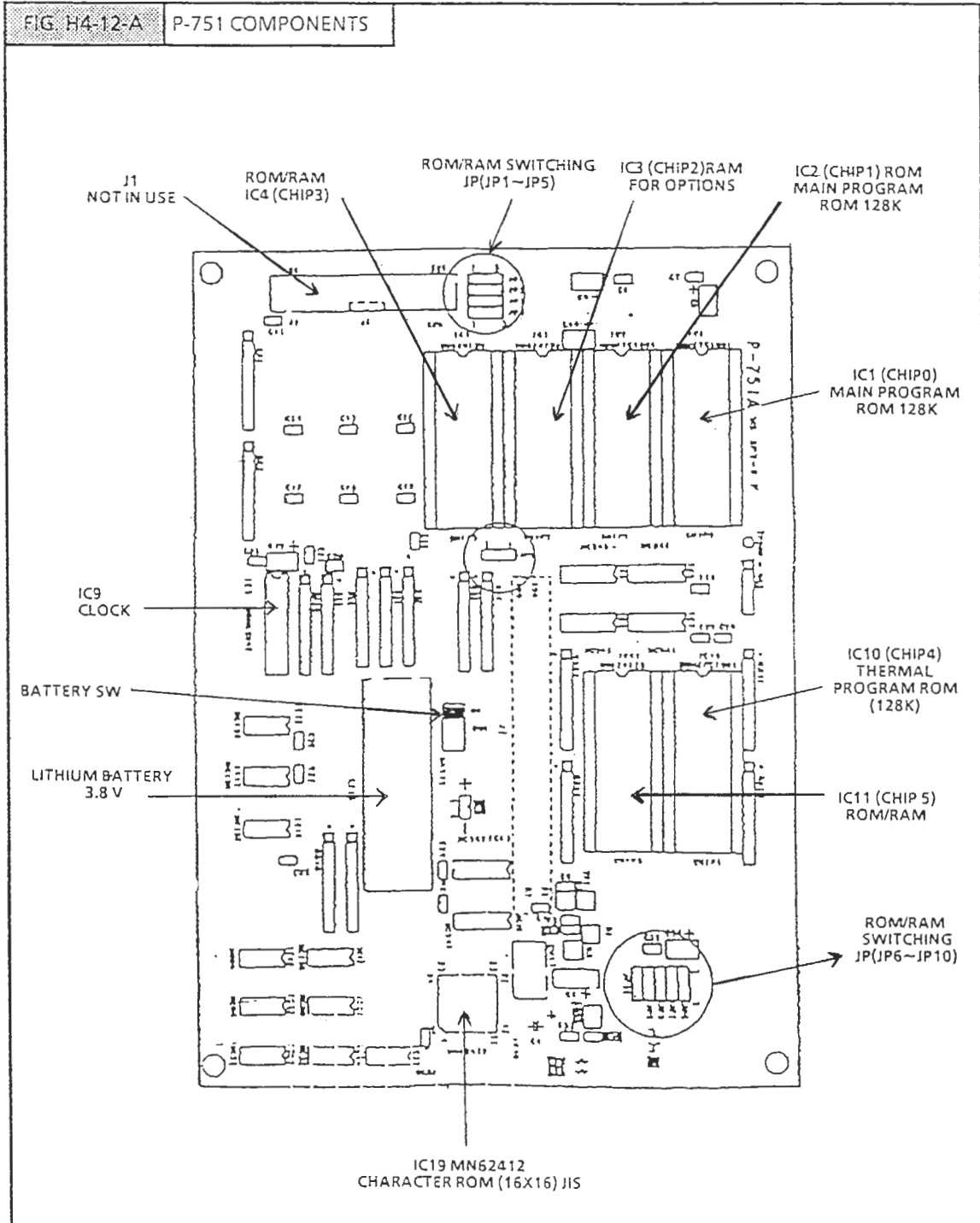
1. Power input (VS1, VS23, VH, Vcc)
2. Power reset (RESET, RSWO, RSW1)
3. Weigh data signal input/output control
4. All sensors (Label, scale, cassette) detection signal (A/D conversion type) control
5. Display signal output (Dot matrix and multi-row displays)
6. Stepping motor control signal output
7. RS-232C input/output signal control (2 lines)
  - One of the 2 lines is also used for IF/RQ and full keyboard
8. I<sup>2</sup> Net input/output signal control (1 line)
9. Thermal head print data control
10. Cash drawer input/output signal control
11. Input/output signal control to ROM/RAM board.
12. Clock IC (Internal calendar) control

#### 4.5.3 Main IC (CPU)

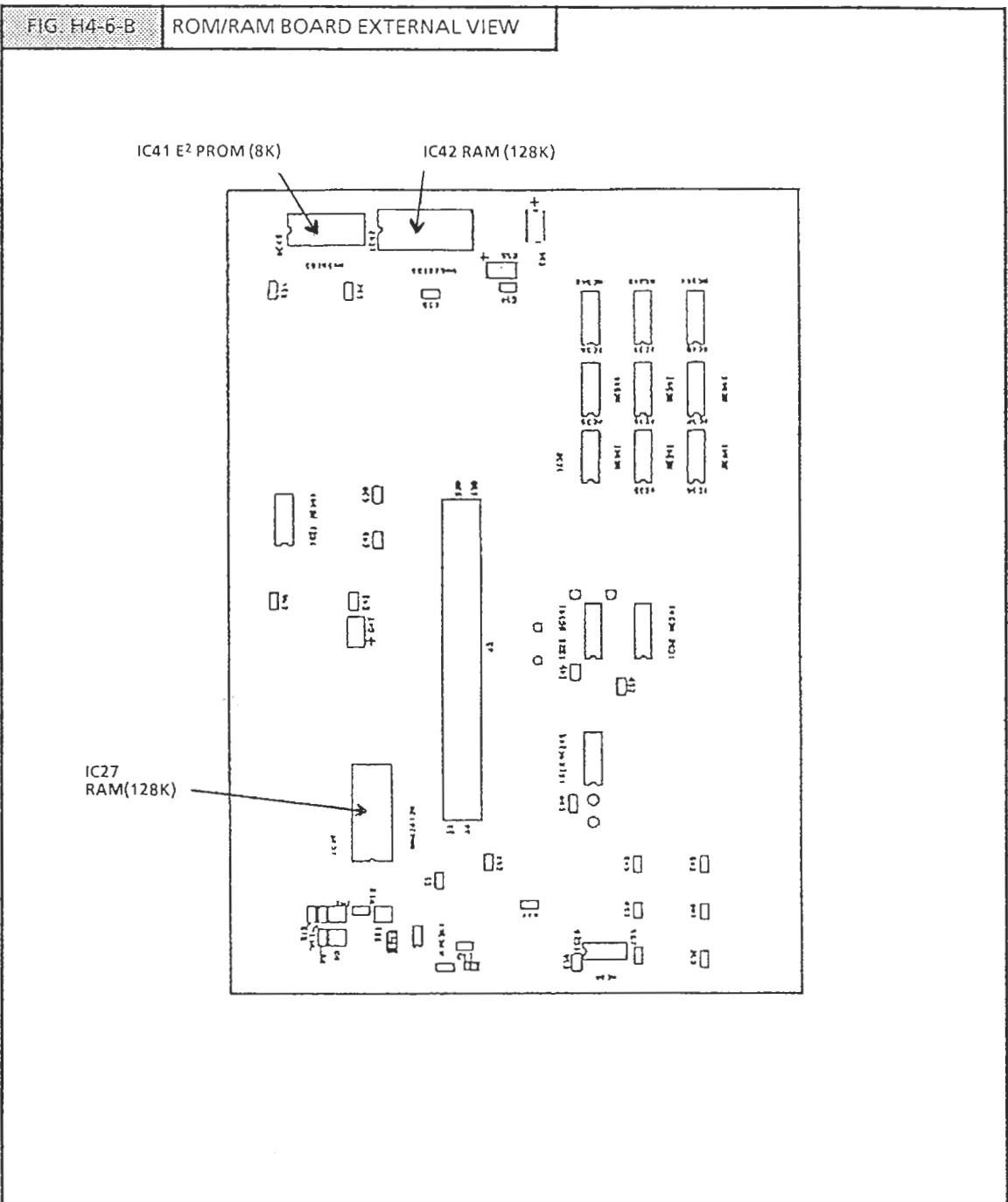
- |            |                |  |
|------------|----------------|--|
| • IC17, 34 |                | CPU (V40) UPD70208 .... 16 bit microprocessors (2)                                   |
| • IC42     | M60025.....    | For Thermal head, stepping motor gate array, New type elements                       |
| • IC8      | M60024....     | Image scanner gate array. New type element   |
| • IC1,4    | uPD71051G      | Serial I/O port  |
|            |                | Serial control IC  |
| • IC39     | uPD7001IC..... | Sensor signal A/D converter (scale, label sensor)                                    |
| • IC70, 74 | uPD4712GT....  | RS232C signal transmission, reception driver   |
| • IC6      | MB37450...     | INC 2003 (Ishida Custom IC)<br>for I <sup>2</sup> NET (For INC3003 or later version) |
| • IC73     | uPD43256....   | 32K RAM for INC2003 signal data memory   |

# H4 ELECTRICAL CONFIGURATION

## 4.6 ROM/RAM BOARD (P-751)



**CAUTION:** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.





## H4 ELECTRICAL CONFIGURATION

### 4.6.1 DESCRIPTION

1. This main board performst all contol functons for the AC-2000 software programs via ROM, character table ROM, Memory RAM (256 bite), E2 PROM (8K byte) etc. A/D converter data processing, totals data, thermal print data, sensor data, keyboard input and output control and data backup functions are performed here.

2. Program

#### Main Program

ROM	Chip 0 (IC1)	128K bite (1M bit)	D27C100A	1 pc.
	Chip 1 (IC2)	128K bite (1M bit)	D27C100A	1 pc.
RAM	Chip 2 (IC3)	128K bite (1M bit)	Available (option)	
	Chip 3 (IC4)	128K bite (1M bit)	Available (option)	

#### Thermal Program

ROM	Chip 4 (IC10)	128K bite (1M bit)	D27C1001A	1 pc.
	Chip 5 (IC11)	128K bite (1M bit)	ROM/RAM	Available (option) 1 pc.

3. Ram staNdard package (POS type) soldered

HN62818L (IC42)	128K bite (1M bit)	1 pc.
HN62818L (IC27)	128K bite (1M bit)	1 pc.

4. E2 PROM electonically programmable and erasable.

HN58C65 (IC41)	8K bite (1M bit)	1 pc.
----------------	------------------	-------

5. Character ROM (16X16) JIS standard

HN62412 (IC19) Hitachi

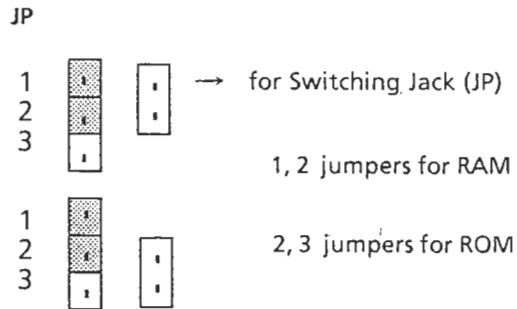
6. Clock circuit

Clock IC

MSM62X42 BRS (IC9) CalendAr included (with leap year) 1 pc.

7. ROM/RAM Switching (JP) setting  
 Location No. Chip 3 (IC4)  
 Location No. Chip 5 (IC11) [ROM/RAM switching available for socketted chip]

JP Switching Method



▶ JP Switching Range

- CHIP 3 (IC4) sockets: JP1~JP5
- CHIP 5 (IC11) sockets: JP6~JP10

NOTE: This switching operation applies when options are being used. At factory shipment, the JP switching position is on the RAM side.

8. Data Backup

*Battery Switch*

Make sure the battery switch for memory backup is set to ON at time of delivery.

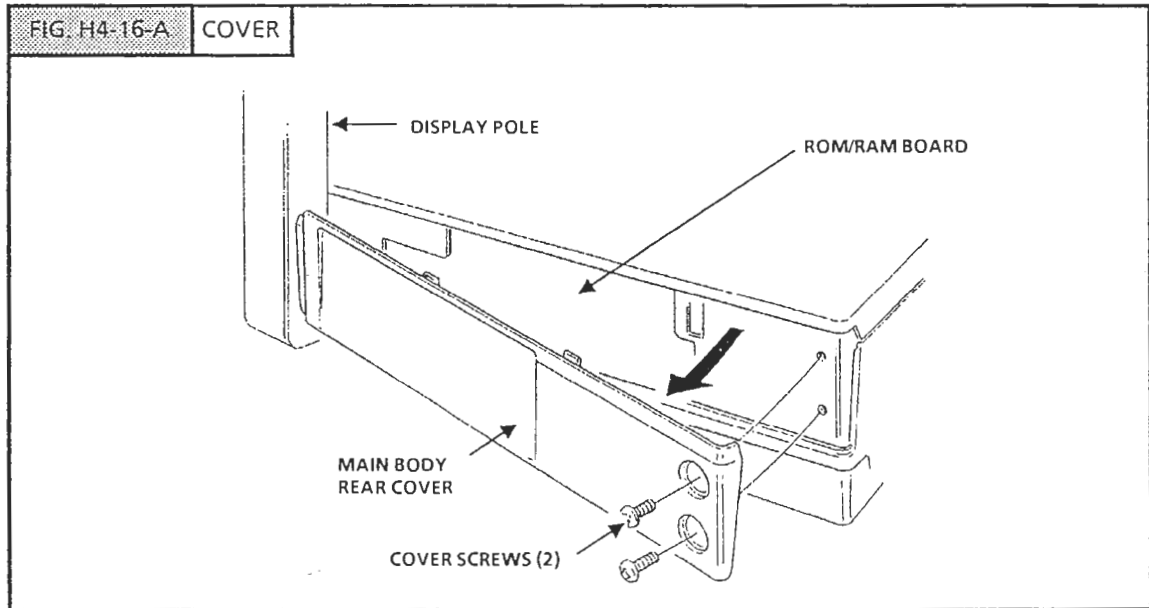
NOTE: This scale uses a rechargeable lithium battery; normal charge: 3.8 V. Average life: 10 years. Battery switch is set to ON at time of shipment from factory.

**CAUTION:** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

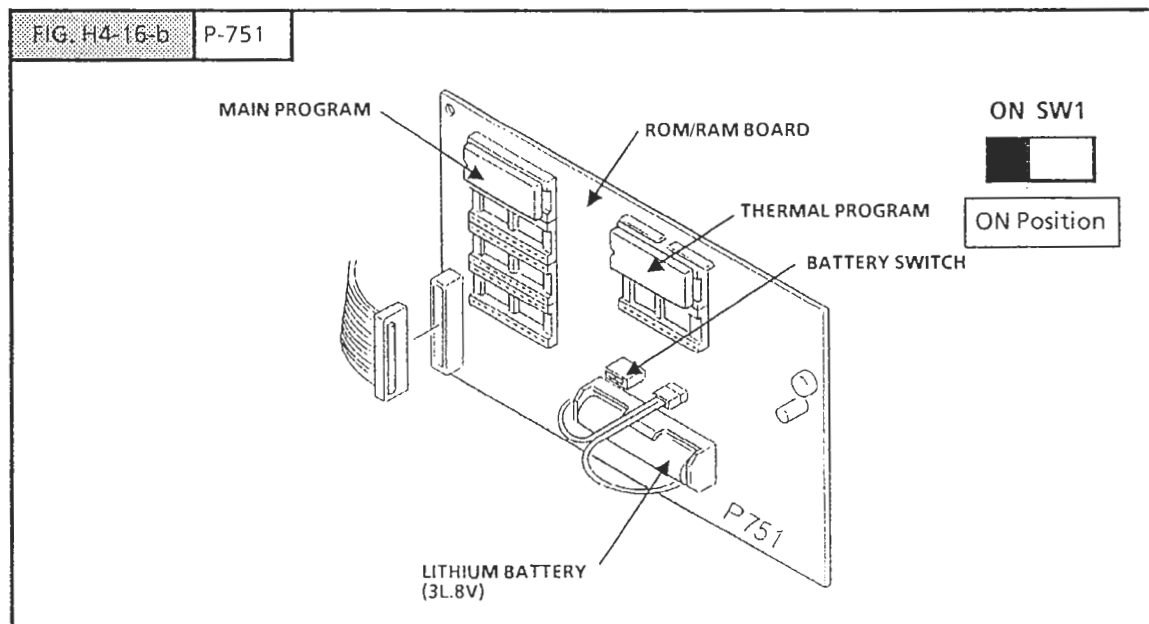
## H4 ELECTRICAL CONFIGURATION

### 4.7 BATTERY SWITCH CHECK

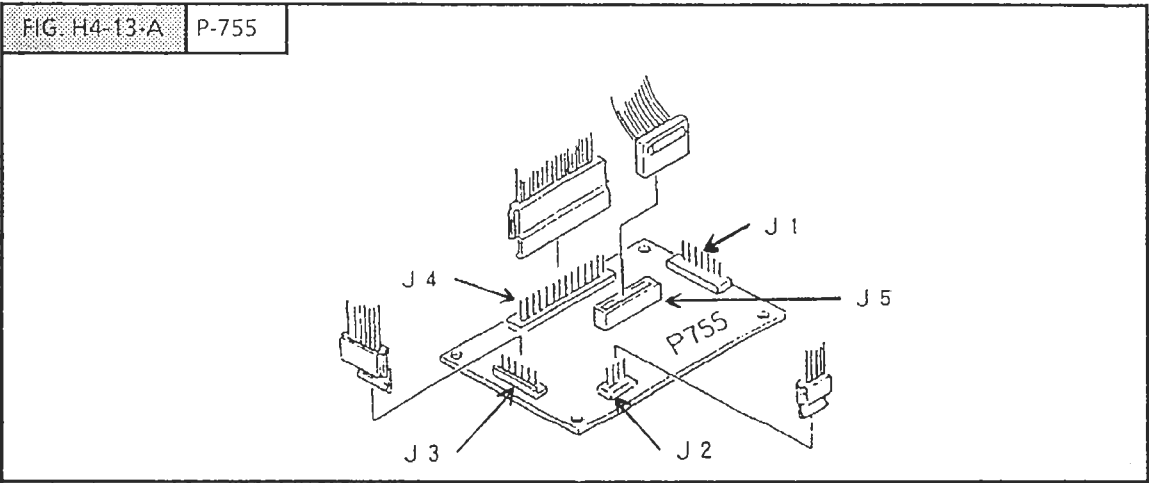
1. Remove the two main body casing screws at the rear of the scale.
2. ROM/RAM board (P-751) is mounted here. The lithium battery and switch 1 are located at the lower center area.



3. Remove the rear cover. Check that the battery switch is ON.

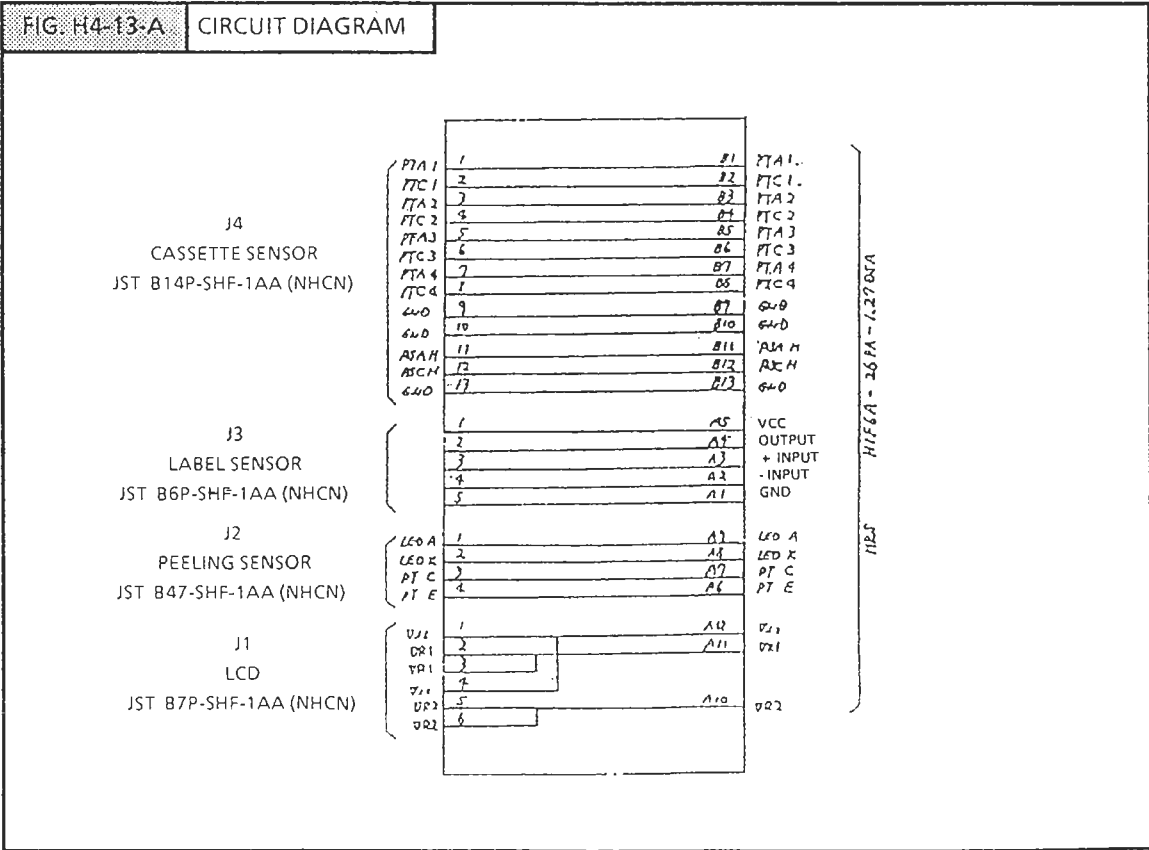


**4.8 SENSOR SIGNAL RELAY BOARD (P-755)**



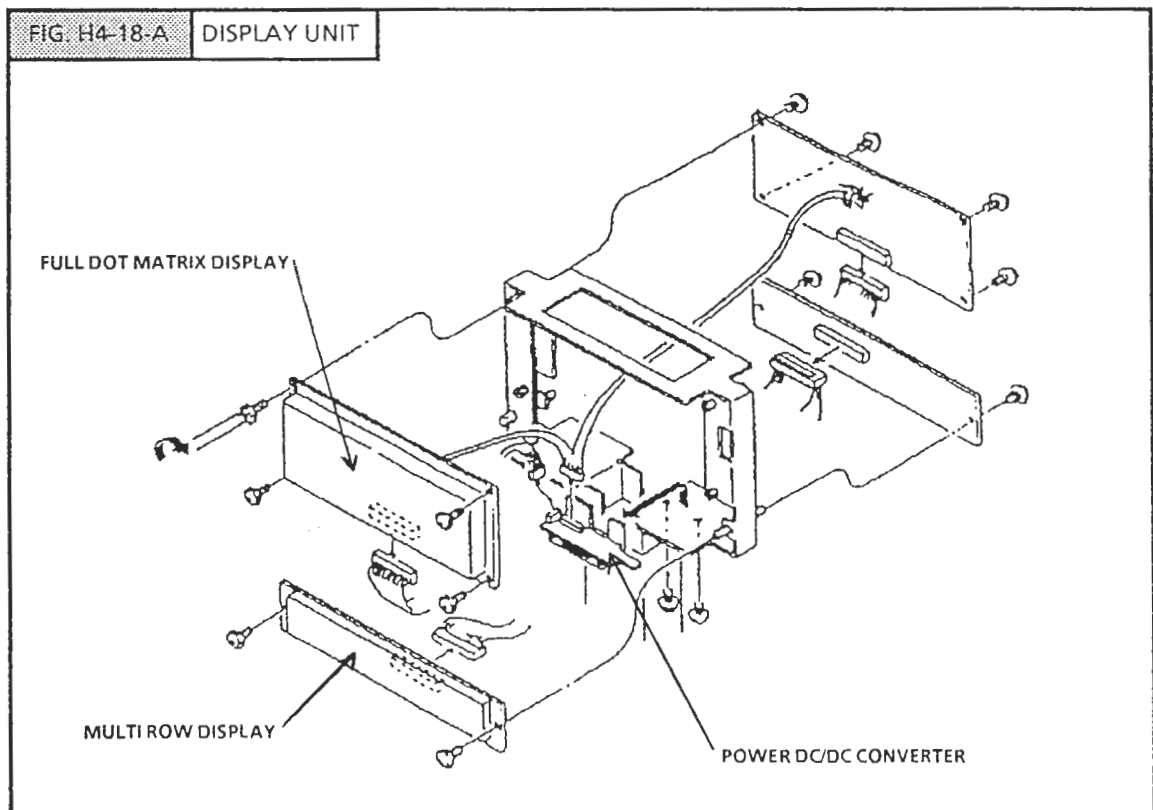
**4.8.1 FUNCTIONS**

Each sensor (peeling, label, cassette) signal is communicated to the main board (P-750) J8 via J5 jack, and flat cable.



**4.9 DISPLAY UNIT**

THE AC-2000 uses 2 types of fluorescent displays: full dot matrix and 7-segment. The full dot matrix display is used for displaying alphabetical messages. The 7-segment display is used to numerically display weight, price etc. For electrical conversion, a DC/DC converter is used. (5V, 12 V)

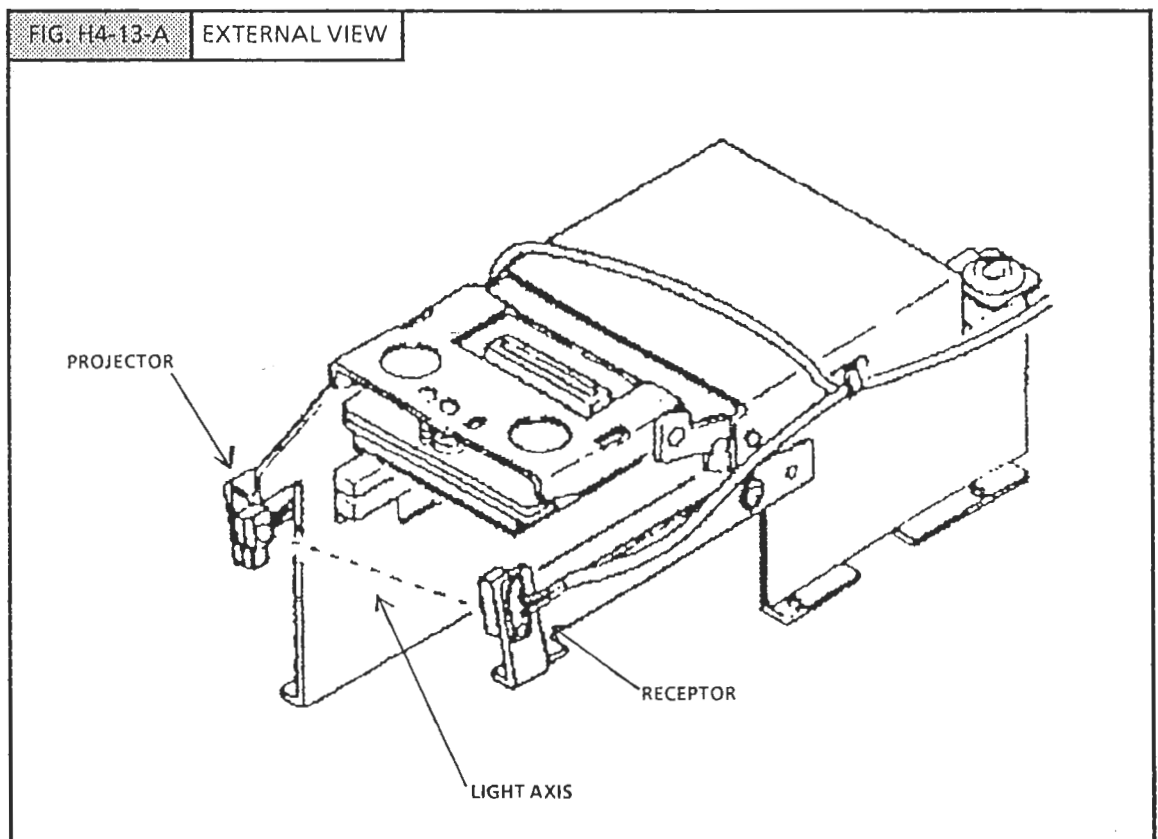
**CAUTION**

1. Do not plug the cable in or pull out with the power switch turned on.
2. Be careful to avoid applying shock or pressure to the display. When handling the display with bare hands, be careful to avoid injury.

## 4.10 PEELING SENSOR

The peeling sensor controls label issue. The set cassette no. and label size determines the amount of label advance.

**NOTE:** During label printing, if there is no label peeling operation, the next label will not be printed. Label peeling is only activated during label printing (according to cassette number). During receipt printing the signal is disregarded.



### 4.10.1 FUNCTION

When label advance starts and the label interrupts the light axis, the label is advanced the distance set. Therefore, if the label size are misset, the proper label advance cannot be executed.

## H4 ELECTRICAL CONFIGURATION

### 4.10.2 POLARITY

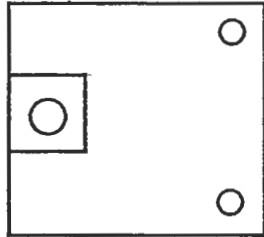
The sensor has polarity: take note when replacing.

#### P-612A face (Projectorside)

JP

#### P-612A face (receptor side)

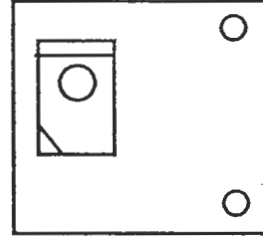
CATHODE



ANODE

Sensor Type: SE 307

EMITTER



COLLECTOR

Sensor Type: H110

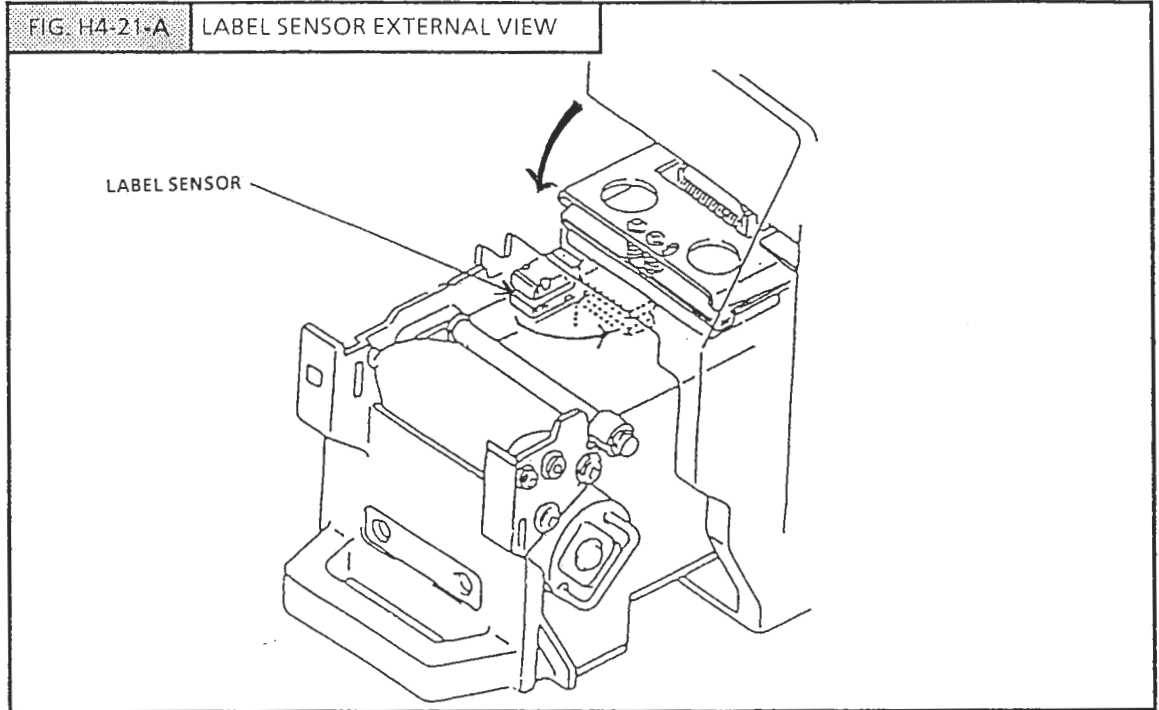
#### SENSOR RELAY BOARD (P-755)

SENDER SIDE: ANODE To J2 1 Pin  
CATHODE To J2 2 Pin

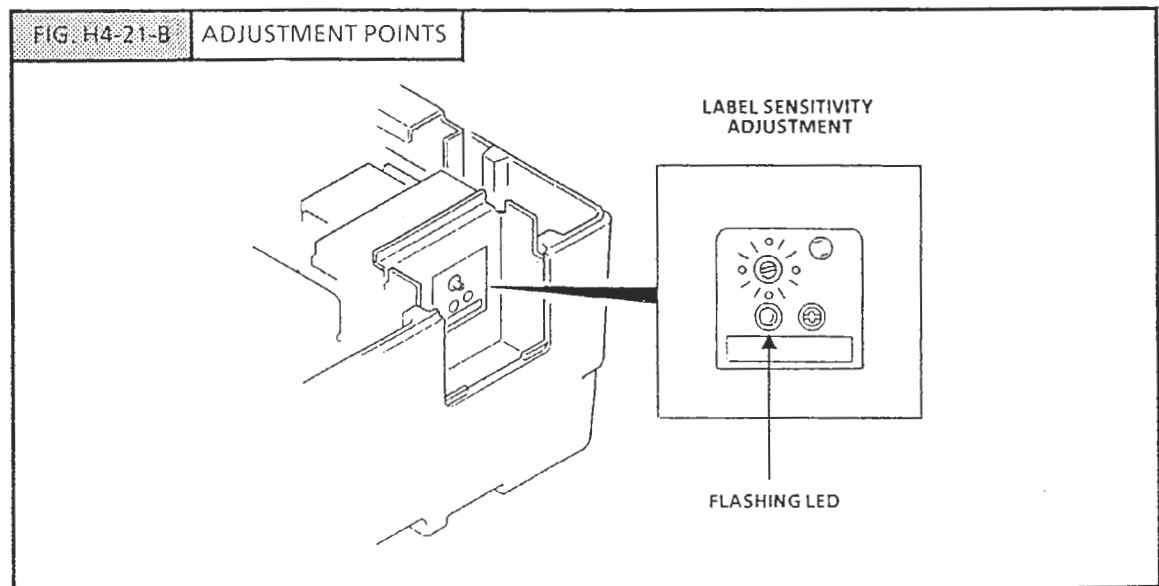
RECEIVER SIDE: COLLECTOR To J2 3 Pin  
EMITTER To J2 4 Pin

4.11 LABEL SENSOR

The label sensor controls a stepping motor, which regulates label advance.



The label sensitivity adjustment device with a flashing LED is located at the right rear side of the main body.





## H4 ELECTRICAL CONFIGURATION

### 4.11.1 LABEL SENSOR UNIT

#### FUNCTIONS

■ Sensor unit

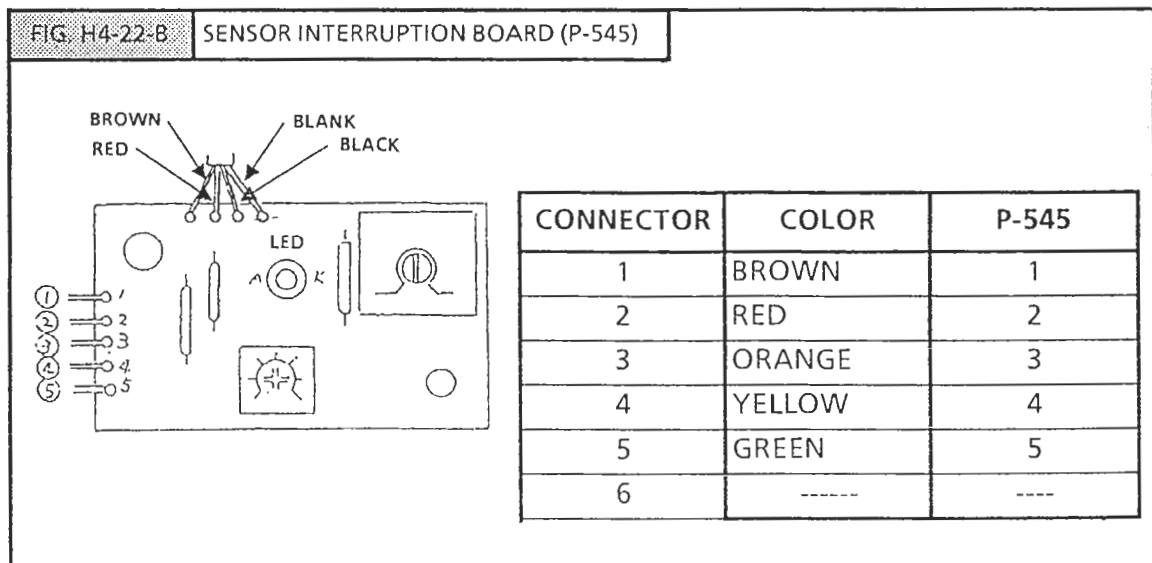
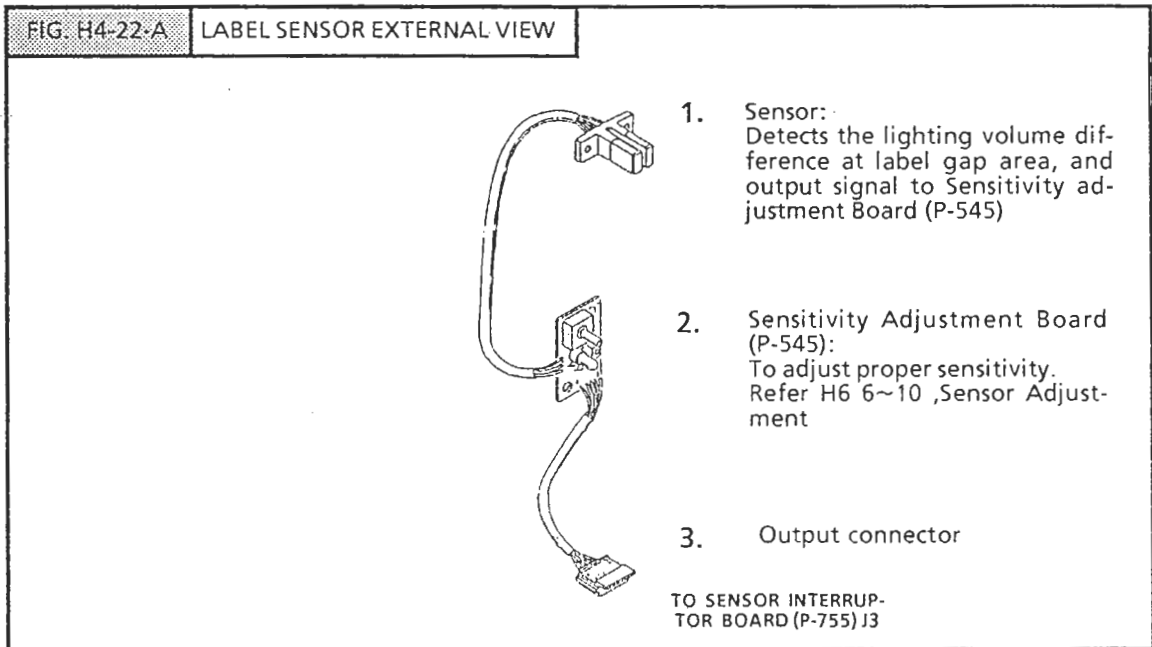
The registered light signal is output to the sensor sensitivity adjustment board (P-545).

■ Sensor sensitivity adjustment board (P-545)

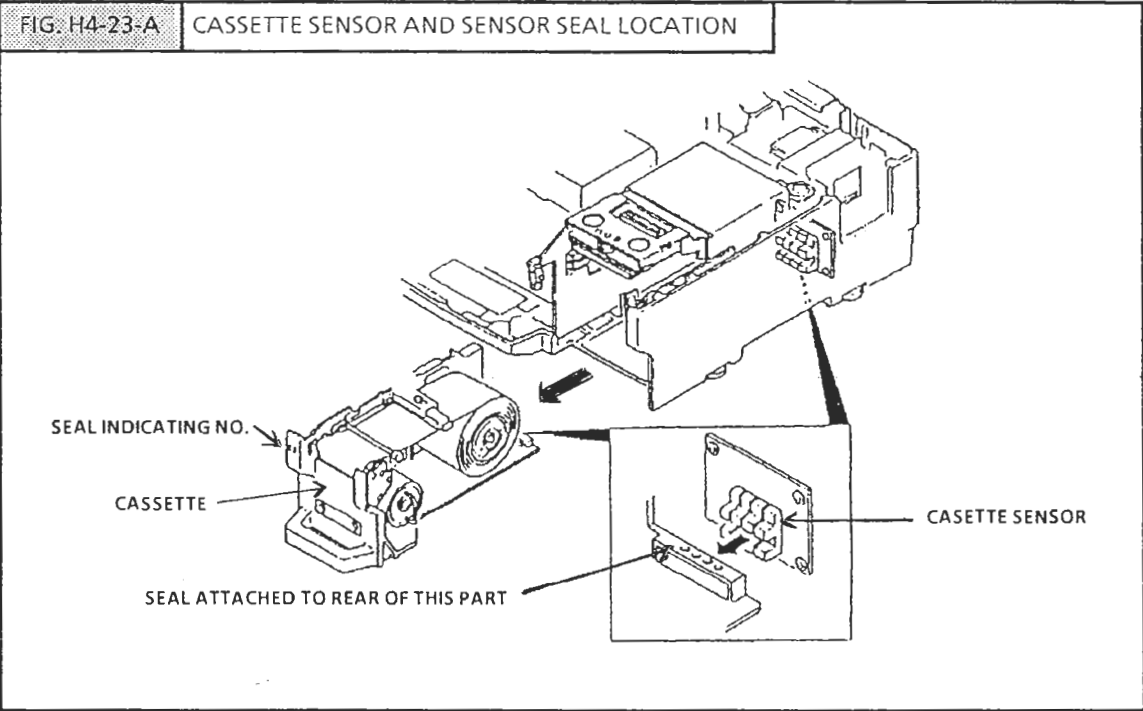
For adjustment instructions refer to H6.10

■ Output jack

Connected to the sensor interruption board (P-755) J3 jack

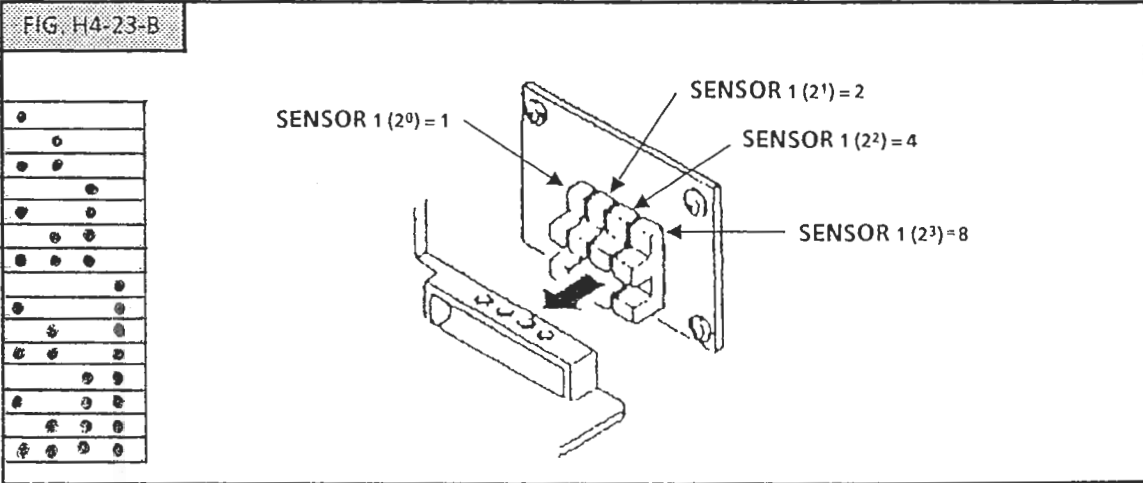


4.12 CASSETTE SENSOR



CASSETTE SENSOR AND CASSETTE NO.

The sensor is equipped with a photo interrupto. When the sensor seal interrupts the light beam the cassette sinal is detected. By combinations of the cassette signals, the cassette number is determined. Sensors 1~4 are combinations of 1,2,4, and 8 for a total of 15 possible combinations. NOTE: Cassete no. 0 is not available.



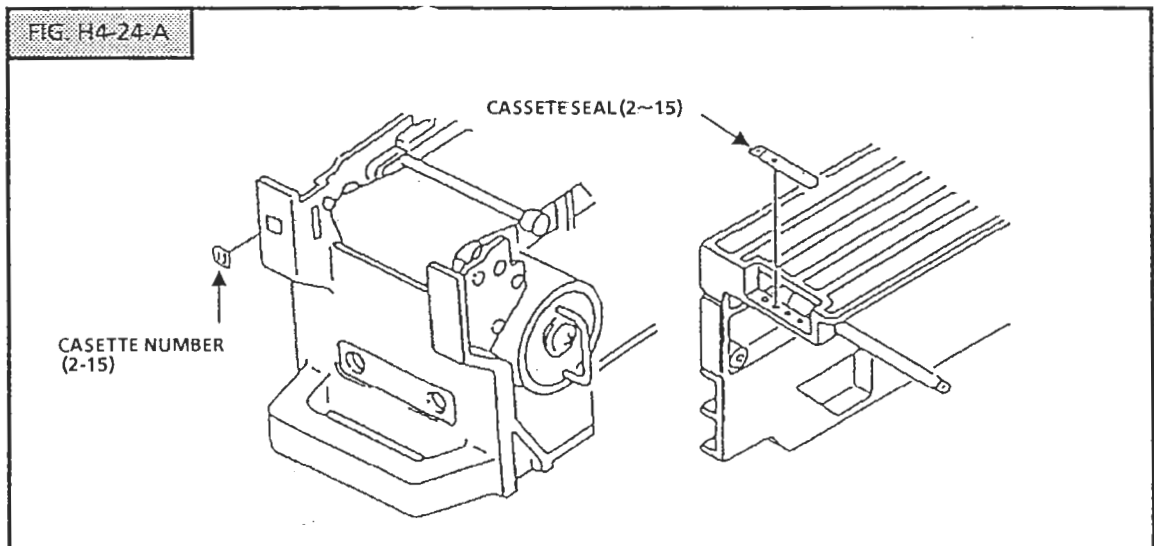
## H4 ELECTRICAL CONFIGURATION

### SENSOR SEAL

Note the following points:

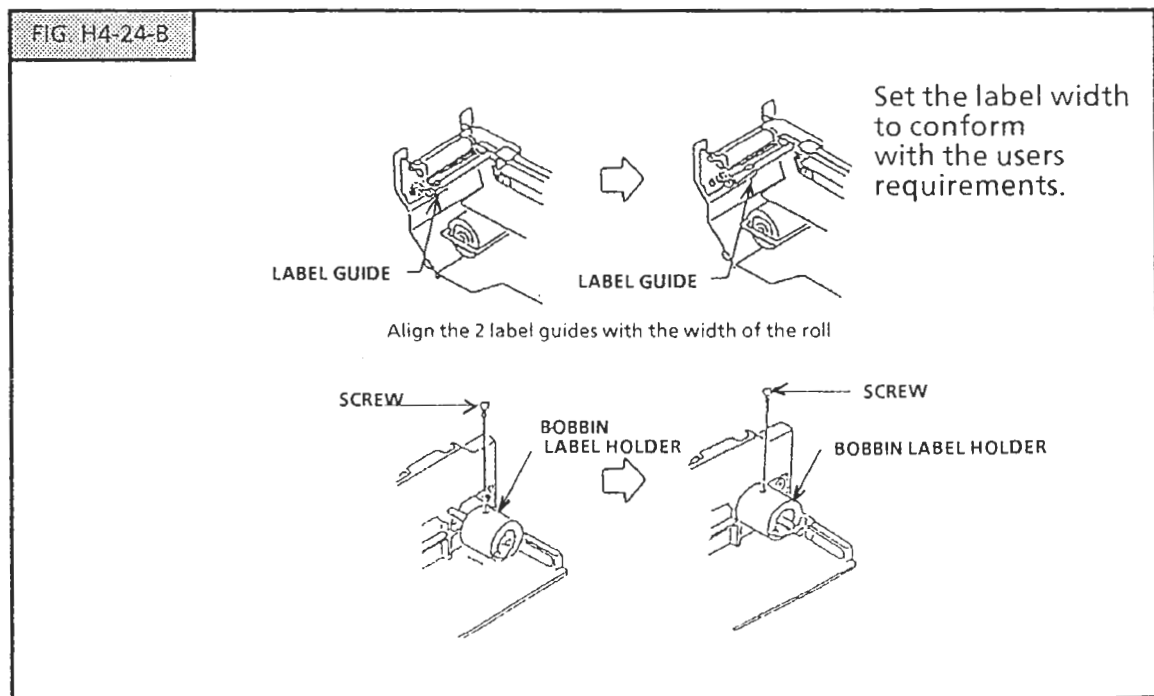
1. Cassette number and sensor number must be correct
2. Cassete seals at front and rear must match
3. Take care that the seal does not fall off

FIG. H4-24-A

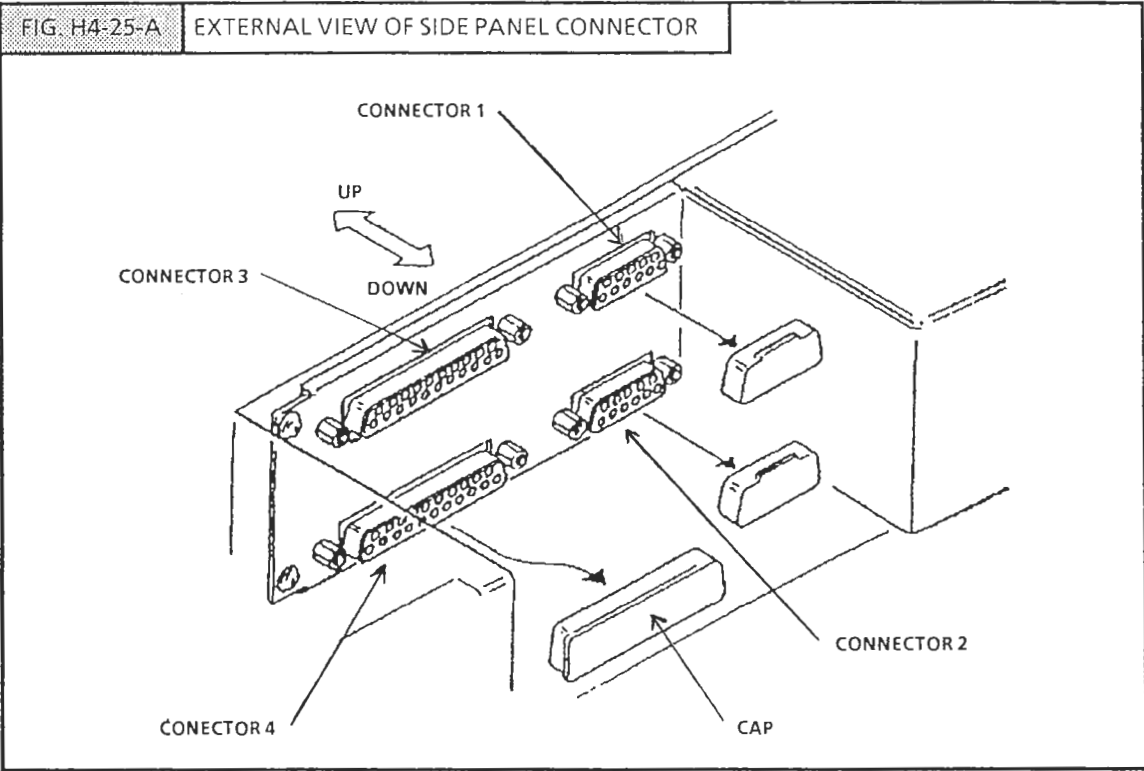


### LABEL WIDTH ADJUSTMENT

FIG. H4-24-B



4.13 SIDE PANEL CONNECTOR



- CONNECTOR 1 : Available at time of System start-up (i<sup>2</sup> NET)
- 2 : " " " " "
- 3 : Cassette Loading (RS-232C)
- 4 : Option (RS-232C)

NOTE: Please cover unused connectors with caps

# H5 THERMAL HEAD

## 5.1 OUTLINE

This chapter describes the mechanical configuration and electrical adjustment of the thermal head as well as information related to its function. The following items are covered:

- Specifications
- Thermal head configuration
- Function
- Adjustment
  - ▶ Mechanical adjustment
  - ▶ Head resistance and print density adjustment

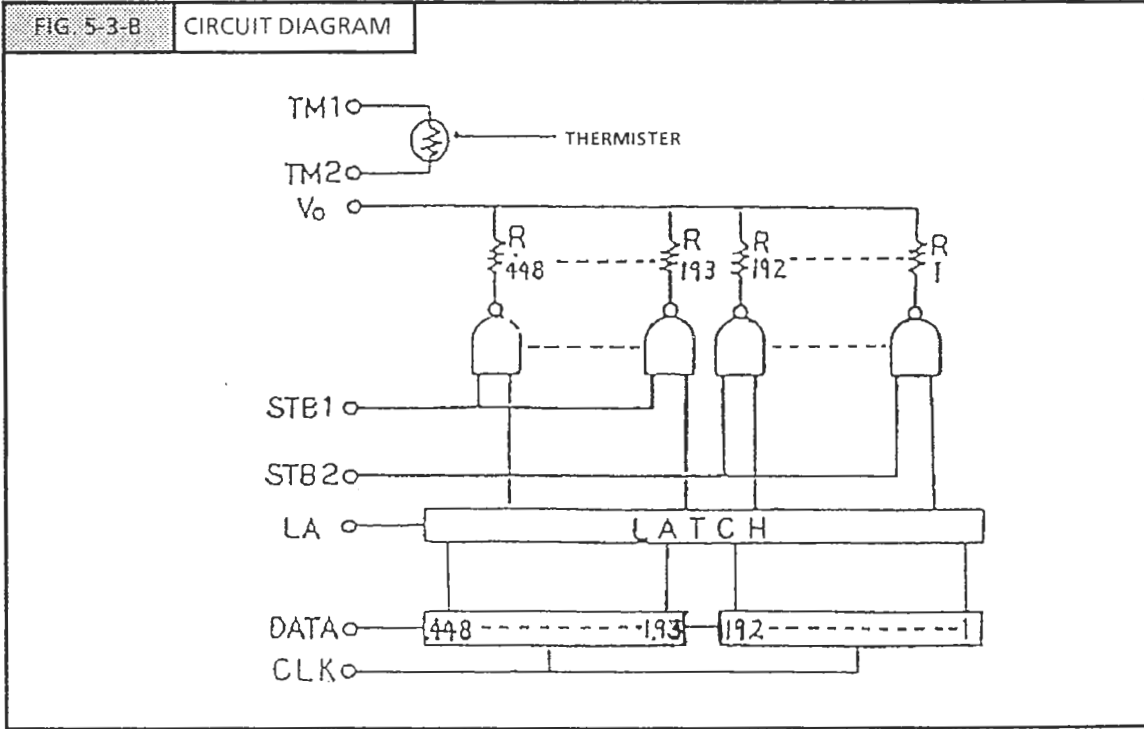
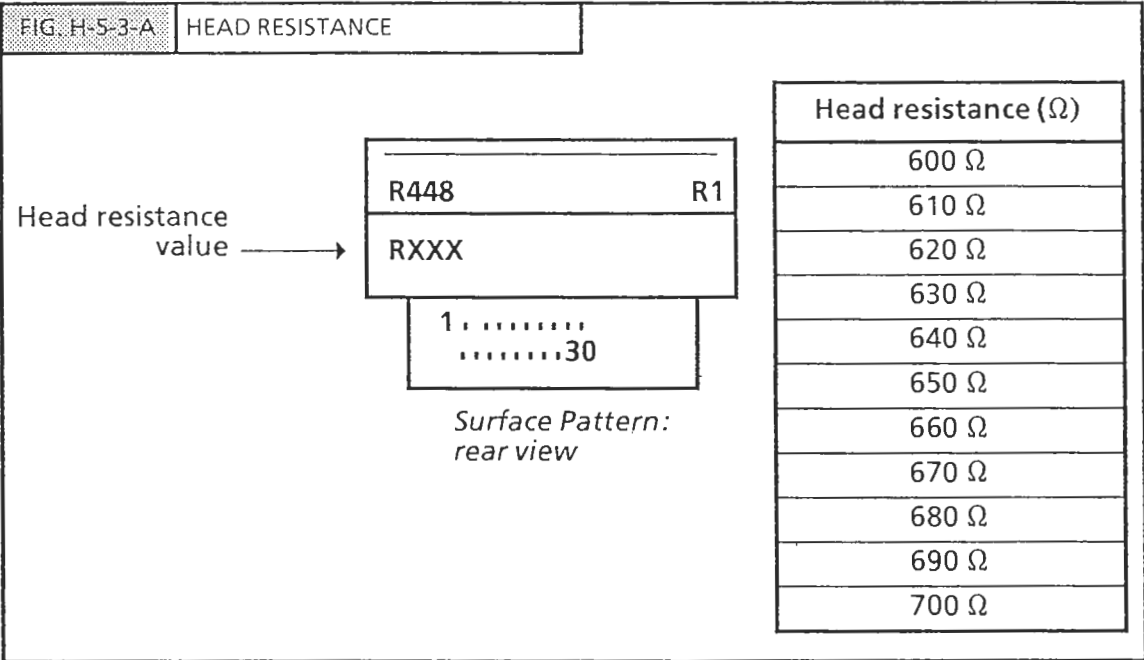
This thermal head (E60-74C Mitsubishi) used is a 448 dot high resolution type with 7.4 dot/mm. The printing is configured one row at a time.

NOTE: Do not use a different type of thermal head in the AC-2000.

## 5.2 SPECIFICATIONS

Total Dot count	448 dots
Dot dimensions	0.135 mm (W) X 0.155 mm (H)
Resistance	R = 600~700 ohms
	Voltage 0.84 W or less
	Voltage dropdown 1 V
	Head Print Volt. Max $VH + Rx0.84 + 1 V$

**5.3 CONFIGURATION**



## 5.4 ADJUSTMENTS

### 5.4.1 ADJUSTMENT ITEMS

1. Mechanical adjustment
2. Thermal head resistance value adjustment
3. Strobe pulse duty ratio adjustment

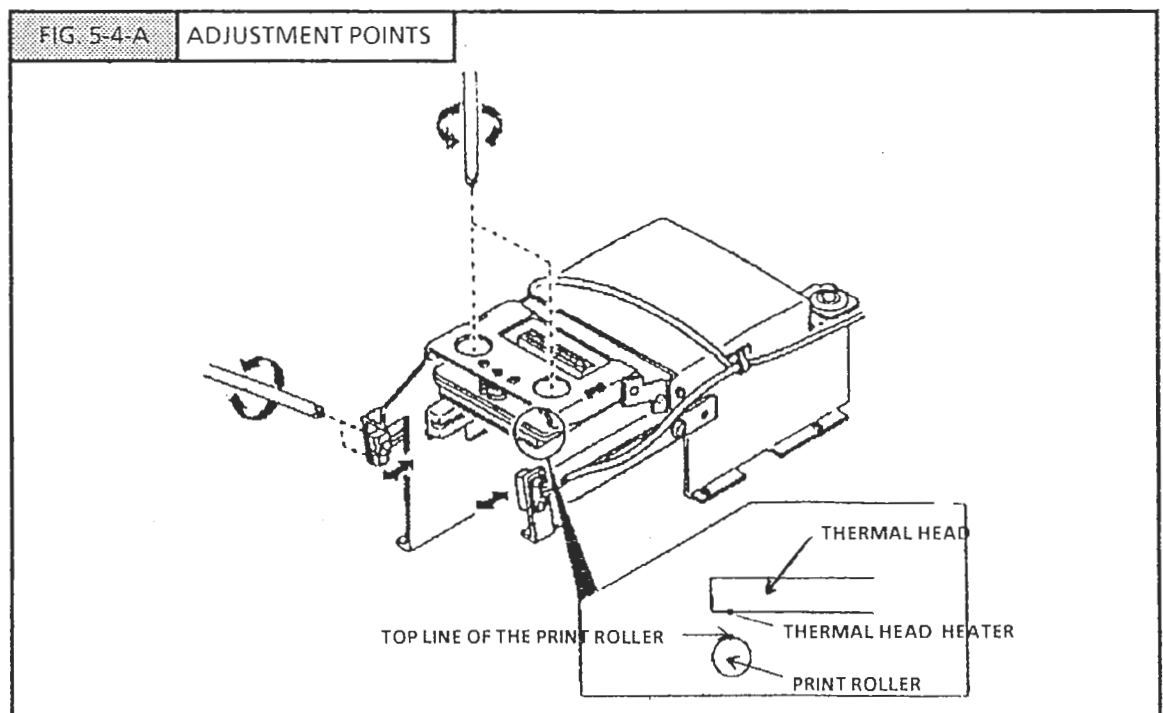
### 5.4.2 MECHANICAL ADJUSTMENT

#### 1. Purpose

In order for the thermal head to print out a line, the head's line and the top line of the print roller must be aligned to the same position. If misaligned, the entire width of the line will not be printed clearly. By adjusting the installation position of the thermal head, this adjustment can be made.

#### 2. Adjustment Method

Loosen the head screws, and align the thermal head and slightly retighten the screws. The head should be aligned so that the the printed characters are sufficiently and consistently dark throughout a line. Finally, tighten the head screw.



**NOTE:** The print roller is made slightly wider in diameter compared with previous models so that clear, consistent printing is still maintained even if roller and head is slightly misaligned. To ensure correct adjustment, change the Head resistance value higher, only for adjustment purposes.

### 5.4.3 THERMAL HEAD RESISTANCE ADJUSTMENT

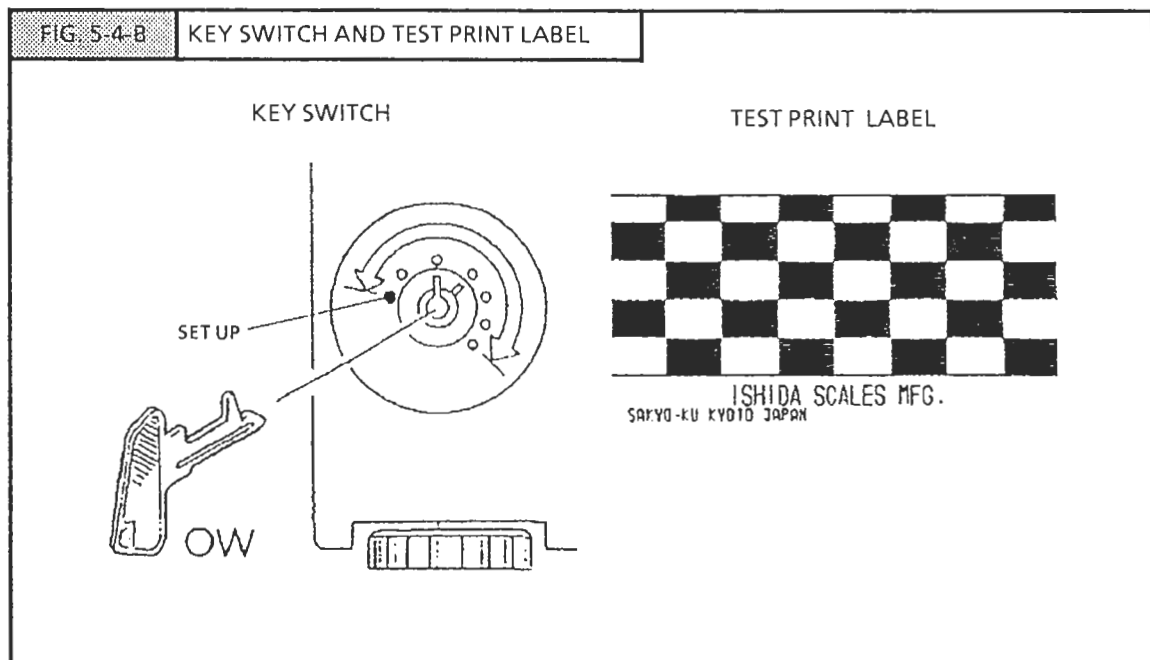
Purpose: To compensate for variations of head resistor value and ambient temperature variations. AC-2000 controls the apply voltage duration timing instead of varying head voltage.

Applied voltage is fixed at 24V.

The method of adjustment is as follows:

1. Press number 3 in the test mode
2. Press the DOWN/SET key.
3. The *Head Check* display appears.
4. Align cursor with the resistance value setting position
5. With the key switch in the SET UP position enter the resistance value (inscribed on the thermal head) via the ten-key pad and press the DOWN/SET Key.
6. Press the PRINT key to print the test.
7. In this condition density can be fine adjusted via the up and down cursor keys

NOTE: For details on the Test Mode, see Chapter S5.



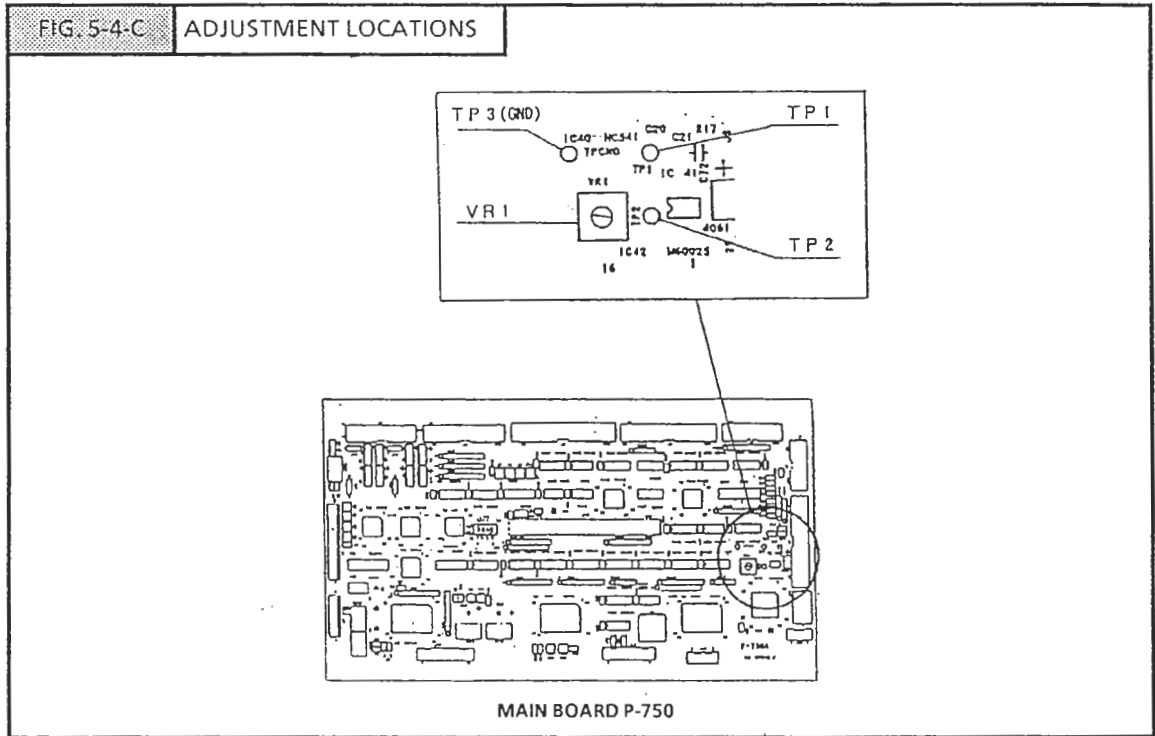
To clear the PRINT USAGE value:

Align cursor with the PRINT USAGE item  $\blacklozenge$  and press the ZERO Key 2 times. The cursor will shift simultaneously with clearing. Always perform this procedure when replacing the head.



**5.4.4 STROBE PULSE DUTY RATIO ADJUSTMENT**

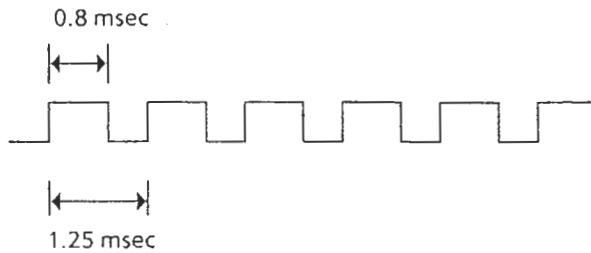
Depending on the printing frequency and the ambient temperature, the thermal head temperature will vary. This means that printing quality may vary when using high-sensitivity labels or receipts. For this reason the pulse duty ratio is adjusted.



TP1 is set to 3.3 V at time of factory shipment (VR1). Do not set to other than the prescribed level.

To adjust:

1. Measure the voltage between TP1 and TP3 (GND).
2. Adjust to 3.3 V.
3. The normal temperature can be diagramed as the following wave pattern.



NOTE: There is normally no need to set the strobe pulse ratio (64%). When needed set via (VR1) only.

# H6 ADJUSTMENTS

## 6.1 OVERVIEW

This chapter deals with mechanical and electrical adjustment points. For thermal head adjustments, refer to Chapter H5.

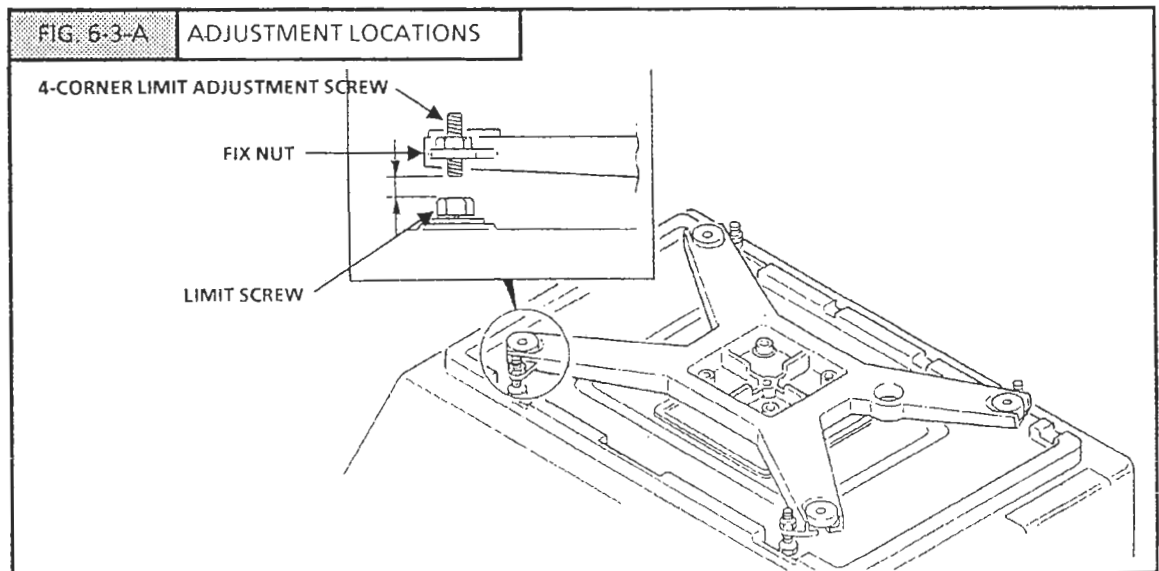
## 6.2 ADJUSTMENT ITEMS

1. Four-corner limit adjustment
2. A/D converter initialization value and span adjustment
3. Peeling sensor and label sensor adjustment.

## 6.3 FOUR-CORNER LIMIT ADJUSTMENT

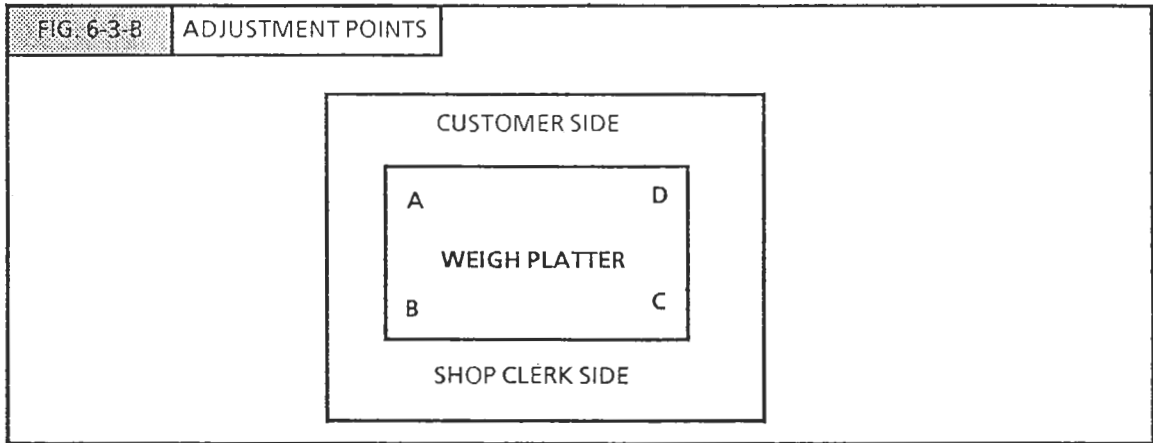
### PURPOSE

A limit is provided by the platter stand to protect the load cell from excessive external load. Adjustment is made at each corner of the platter supporter.



ADJUSTMENT METHOD

FIG. 6-3-B ADJUSTMENT POINTS



1. For each corner A~D consecutively, place a capacity weight + 1Kg on the corner.
2. Loosen the fixed nut and turn the limit adjustment screw so that it contacts the upper case set screw.
3. Tighten the fixed nut.

NOTE: This adjustment is necessary when replaing load cell or excessive load is applied to the load cell.

6.4 INITIAL A/D VALUE ADJUSTMENT

6.4.1 PURPOSE

If the A/D value falls outside a certain range, the scale cannot compute the weight. The initial value adjustment ensures that this range is maintained.

ADJUSTMENT PROCEDURE

1. Press the RESET Key then immediately press any key. The *TEST MENU* display will appear:

TEST MENU	[PAGE] 1/3
1: HARDWARE TEST	2. RAM CLEAR
3: THERMAL HEAD	4. SENSOR CHECK
	( 0)

2. Enter #1 and press the DOWN/SET Key. The *Hardware Test Menu* display will appear:

HARDWARE TEST MENU		[PAGE] 1/3
1: A/D CHECK	2. KEY CHECK	
3: DISPLAY CHECK	4. PROGRAM No.	
		( 0)

3. Enter #1 and press the DOWN/SET Key. The *A/D Check Display* will appear.

A/D CHECK	FIGURE (9)
	[PAGE] 1/3
*AREA→[SET]	ZERO POINT→[ZERO]
SPAN →[◆UP/T] ▲▼	
( 0)	

The A/D value will be displayed. In this mode the A/D check, A/D initial value adjustment, span adjustment etc. is performed.

NOTE: Refer to Chapter S5 for more detailed information on Test Mode.

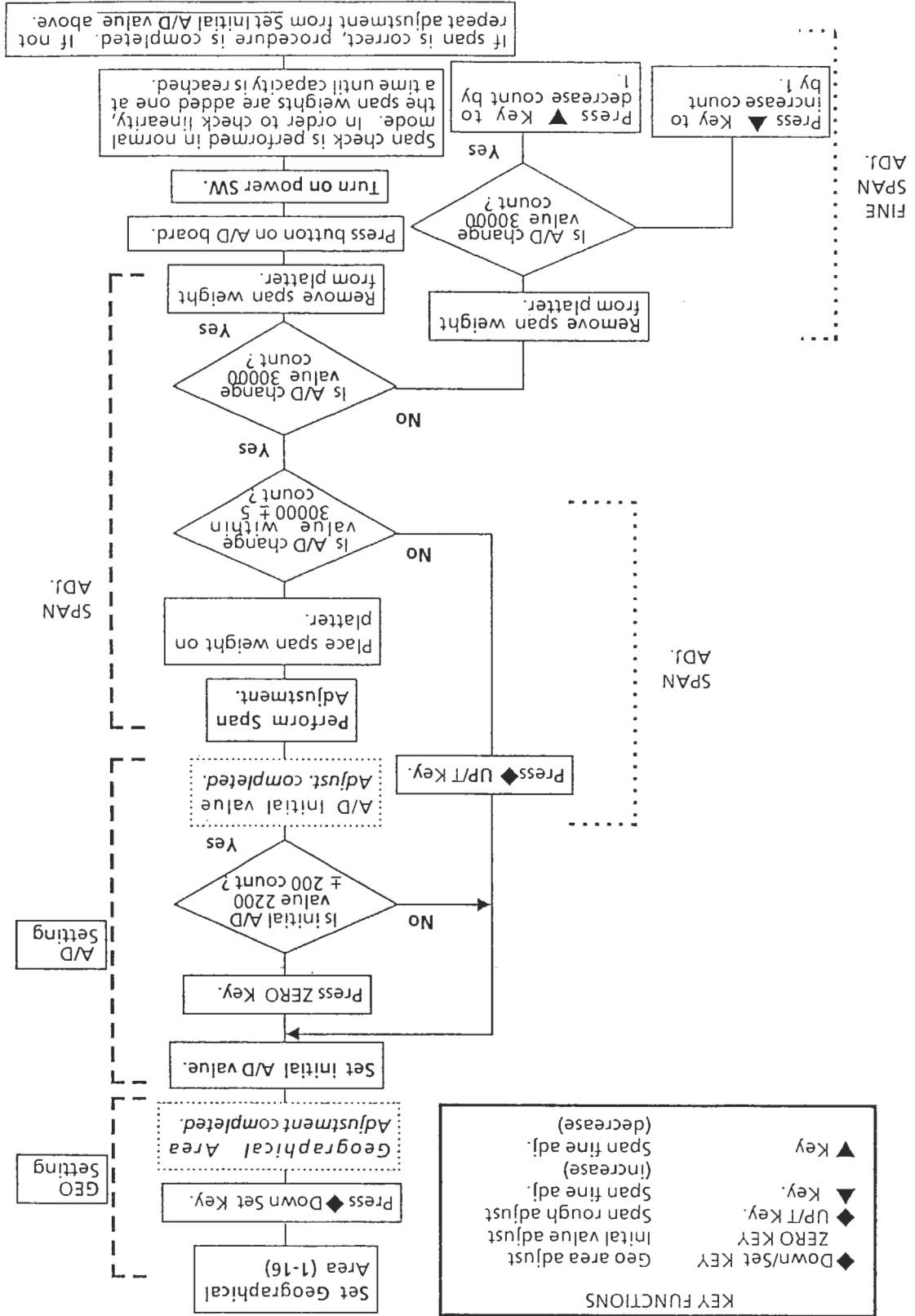
## 6.5 SPAN ADJUSTMENT

1. Press the ZERO Key. The A/D value display will show "0",
2. Place the span weight specified below on the weigh platter

CAPACITY/RANGE	SPAN ADJUST WEIGHT
15 Kg/ Single Range	15 Kg
30 Lb/Single Range	30 Lb
15 Kg/Multi-range	12 Kg

3. Press the ◆UP/T Key.
4. Verify that the A/D display shows 30,000 count during span adjustment.
5. Remove the span weight from the platter.
  - To perform fine span adjustment, place the span weight on the platter and press the up and down cursor keys ▲▼.
6. After span adjustment or initial A/D adjustment is completed, press the button on the A/D board.

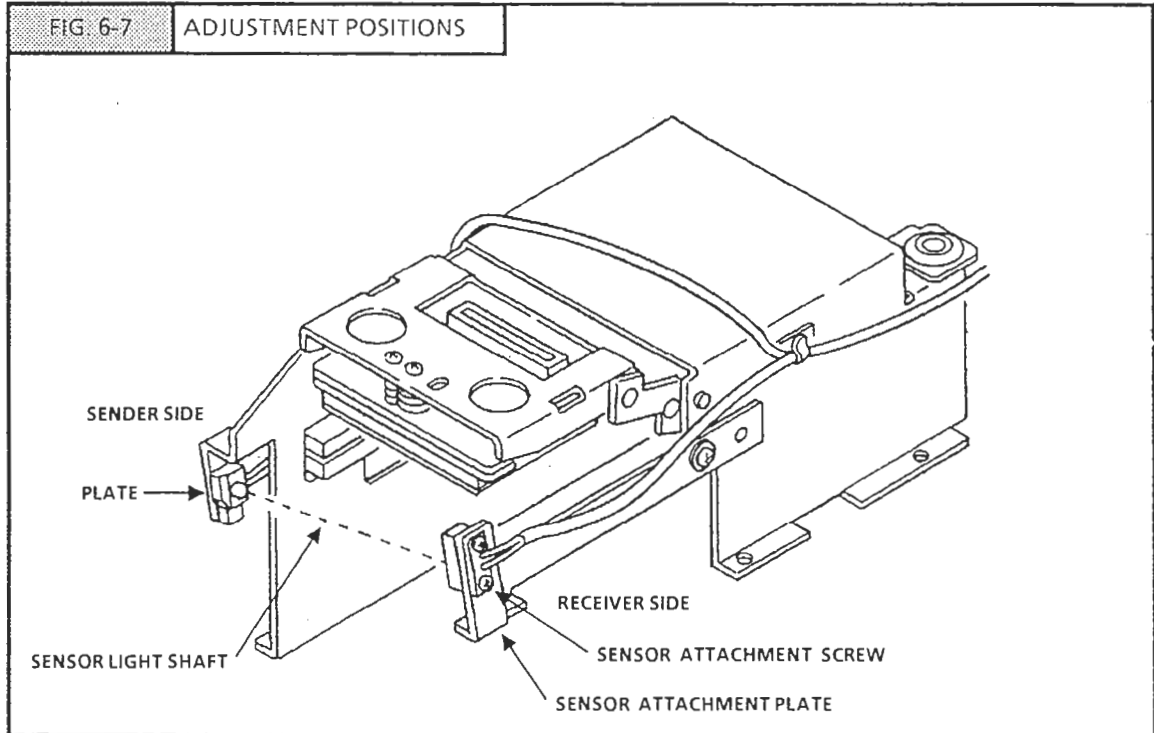
6.6 ADJUSTMENT SEQUENCE



## 6.7 PEELING SENSOR ADJUSTMENT

Purpose: The adjustment is made to prevent notch feeding of label in case the axis of sensor is misaligned by external interference

FIG. 6-7 ADJUSTMENT POSITIONS



### 6.7.1 ADJUSTMENT METHODS

1. Loosen the sensor attachment screw and align the light axis.
2. Move the sensor attachment plate and align the light axis.
3. Align the light axis by bending the plate on the label sensor receiver side.

### 6.7.2 ADJUSTMENT VERIFICATION

See Chapter S5: 5.6 Test Mode.

**6.7.3 PEELING SENSOR SENSITIVITY LEVEL VALUES**

The sensitivity count show. Therefore the peeling sensor value which is displayed in test mode 4 corresponds to the count as shown below.

Count standard value

(Count + 0.02 V.)

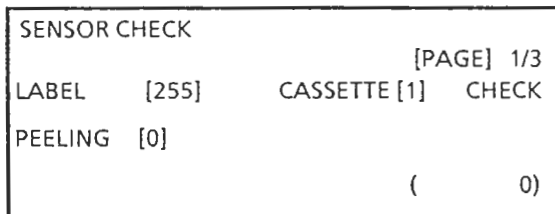
Peeling sensor voltage at time of light transmission ..... 1 volt or less  
 Peeling sensor at time of light interrupt ..... 4 volts or less

Therefore the Peeling sensor count is:

Peeling sensor voltage at time of light transmission ..... 50 count (1 volt) or less  
 Peeling sensor at time of light interrupt ..... 200 count (4 volts) or less

**6.7.4 CAUTION POINTS**

- Make sure there is no foreign matter on the sensor components
- Verify power activated condition (Test Mode)
  1. In the test mode menu enter '4' and press the **◆** Down Set Button
  2. The sensor check screen will appear:





**ADJUSTMENT METHODS**

Adjustment Method A

1. Turn the Fine Adjustment VR all the way counterclockwise.
2. Press the Feed Key lightly one time, and turn the fine adjustment VR clockwise until it corresponds with the position of one label advance. This is position A.
3. Turn the Feed VR all the way clockwise.
4. Press the Feed Key lightly one time, and turn the fine adjustment VR counterclockwise until it corresponds with the position of one label advance. This is position B.
5. Set the VR halfway between positions A and B.

NOTE: If B cannot be determined, rotate the rough adjustment VR clockwise a little and perform procedure again from 1.

Adjustment Method B (When range cannot be determined via fine adjustment VR)

1. Align the Fine Adjustment VR to the center position.
2. Turn the Rough Adjustment VR all the way counterclockwise.
3. Press the Feed Key lightly one time, and turn the rough VR counterclockwise until it corresponds with the position of one label advance. This is position C.
4. Turn the Rough Adjustment VR all the way clockwise.
5. Press the Feed Key lightly one time, and turn the Rough Adjustment VR counterclockwise until it corresponds with the position of one label advance. This is position D.
6. Set the VR halfway between positions C and D.
7. Perform Method A again.

NOTE: Upon delivery or during regular check of the scale, set B after setting A.

# H7 INSTALLATION

## 7.1 PROCEDURE FOR INSTALLATION

1. Open the carton and check the scale and its components for damage.
2. Attach the weight platter and the display unit (including the pole).
3. Insert power plug into a power outlet.
4. Perform the Initial Set Up procedure in Test Mode 2 (page 2/2).
5. Perform RAM clear in Test Mode 2 (page 1/2).
6. Set the scale to conform to the users requirements:
  - Label format, label advance distance etc.
7. Register the day and time.
8. Register PLU Master Files etc.
9. Insert the label or the receipt cassette, and determine if printing quality is normal.
10. Clear Totals.
11. Download all registered data to cassette or floppy disk as back-up.
12. Perform aging with the power SW still on.  
NOTE: The installed lithium battery requires no aging (10 year life-span).

# H8 MAINTENANCE

## 8.1 OUTLINE

This chapter contains cleaning, inspection, maintenance, and troubleshooting procedures for the dealer and user so that the scale is kept in its best operating condition.

## 8/2 WHEN REPLACING A DEFECTIVE UNIT

When there is a malfunctioning unit reported by the user, unit replacement is the usual countermeasure. The following table shows the necessary specifications for the components used in the AC-2000.

No.	PART NO.	PART NAME	SPECS	NOTES
1	16-3965-62	PWB, P-750' B	Main Board	
2	19-3808-08	PWB, P-751' A	RAM board	
3	16-6531-15	PWB, P-752' A	Keyboard	
4	16-6535-10	PWB, P-753' A	Connector BKT	
5				
6	16-6538-01	PWB, P-755'	Sensor interrupt board	
7	16-6540-00	PWB, P-756'	Cassette sensor board	
8				
9	21-5806-27	PWB, P-704' D	A/D board	
10	02-2756-04	LC Unit, CLC-25L		15 Kg/30 lb
11	01-7047-17		Mitsubishi	E60-74C
12	18-3091-08	Stepping motor AS	Orental	PH266-01-C48
13	16-6659-09	Fluorescent display	URA	UDD-348E
14	16-6526-07	Power supply switching	Sanken Main	DL-482L 100V/115V
"	16-6528-04	Power supply switching	Sanken Main	DL-482H 220V/240V
15	16-6525-03	Power supply switching	Sanken Thermal	DL-481H 100V/115V

## H8 MAINTENANCE

No.	PART NO.	PART NAME	SPECS	NOTES
"	16-6527-01	Power supply switching	Sanken Thermal	DL-481H 220V/240V
16	18-3003-00	Fluorescent display panel	NEC	FM256GX64 AB-100A
17	18-3004-03	Fluorescent display panel	NEC	FM-P/S-001
18	09-2755-11	Label sensor unit		P-545C, PN150 (C) Matsushita

## 8.3 CLEANING

### 8.3.1 CLEANING LOCATIONS

1. Thermal head printing surface  
If ink, glue or dust from the label gets stuck to the thermal head print surface, heat will not be properly transferred to the label causing poor print quality.
2. Print roller  
The print roller drives the label feed. If dust from the label gets stuck to the roller, it could cause improper label feed.

NOTE:

- Clean with the attached cleaning pen dipped in filter cleaner.
- When the cleaning pen and filter cleaner are not available, wipe with a clean cloth moistened with benzene.
- When cleaning the head be very careful not to scratch or damage it.
- Never use thinner for cleaning the head.

3. Label sensor
  - Do not clean the label sensor with hard or abrasive materials
  - If foreign matter attaches to the sensor sensitivity will be reduced and malfunction may result.

## H8 MAINTENANCE

### 8.4 DAILY INSPECTION

The inspection points listed below should be performed by the operator as a habit. Early detection of a problem not only ensures proper machine operation but extends machine life as well.

Be sure to turn power off when performing inspection. Turn power on only when required to check operation.

No.	Inspection Item	Location	Remarks
1	Remove scrap product from and clean scale surface	Weigh Platter Upper Case Main Unit Base Front Cover Side Cover Keyboard Sheet Display Level Window	Use dry cloth
2	Remove scrap product from and clean inside scale.	Underneath Platter Label sensor Cassette Thermal Head surface Print Roller	Use dry cloth/cleaning pen
3	Check installation and operation	Check level (visually). Touch scale; check that it is affixed securely. Check that label feed is smooth. Check each key function. Check display.	



### CAUTION

Be sure to turn power off when performing inspection. Turn power on only when it is required to check operation

<b>8.5 PREVENTIVE MAINTENANCE</b>
-----------------------------------

Pre-maintenance procedures should be performed every 3~4 months.

No.	Inspection Item	Location	Remarks
1	Remove scrap product from and clean scale surface	Weigh Platter Upper Case Main Unit Base Front Cover Side Cover Keyboard Sheet Display Level Window	Use dry cloth
2	Remove scrap product from and clean inside scale.	Underneath Platter Label set location  Thermal Head surface Print Roller	Use dry cloth  Use cleaning pen
3	Check installation and operation	Check level (visually). Touch scale check that it is affixed securely. Check that label feed is smooth. <ul style="list-style-type: none"> <li>• Feed should be quiet</li> <li>• Check label sensitivity adjustment</li> <li>• Check print position</li> </ul>	
4	Check parts functions	Check function keys for intermittence, chattering, etc. Check display on store and customer sides. Check A/D value output including initial and span values. Check label take up. Inspect friction plate for dirt. Check print quality.	Use span weight.
5	Check that screws are tight and connectors are plugged in securely	Thermal head cable. External output connector rust (for cassette loading). Printer.	Visual inspection
6	Other	Four corner load cell limit adjustment. Print roller damage.	

## H8 MAINTENANCE

### 8.5.1 MAINTENANCE CAUTIONARY INSTRUCTIONS

Be sure to follow the items below to ensure personnel safety when performing maintenance, disassembly, assembly, adjustment and pre-maintenance.

1. Turn power OFF and unplug power cable from socket and detach completely.
2. Clear surrounding work area. Remove label set on printer.  
Be sure that no parts, screws or papers fall into the internal mechanisms or electronics during maintenance.
3. When plugging in or unplugging connectors, be sure to grip the connector and not pull by the cable wire. In particular, malfunction of the thermal head cable can result in temperature detection failure resulting in overheating.
4. Take extra care when cleaning the thermal head and print roller to avoid scratching their surfaces.
5. Be sure to follow all instructions for assembly and adjustment procedures completely.



## 8.6 TROUBLESHOOTING

The following causes for malfunction are the most probable and common ones. Other factors may lead to abnormal functioning of the scale.

## H8 MAINTENANCE

No.	Condition	Probable Cause and Checkpoints
1	Blank display when power turned ON	<ol style="list-style-type: none"> <li>1. Power cable not plugged in.</li> <li>2. Main fuse is blown.</li> <li>3. Voltages absent on J10, J1, J14 on Main Board (P-750)               <ol style="list-style-type: none"> <li>a. Connector unplugged. ⇒ Check power unit side, too.</li> <li>b. Connector miscontact. ⇒ Check power unit side too.</li> <li>c. Faulty power supply unit ⇒ Check Vcc (+5V) 7-segment display. ⇒ Check Display drive V12 (Dot display) (+5V).. ⇒ Check RST is &lt;3V</li> </ol> </li> <li>4. Main board defect</li> <li>5. ROM, RAM board defect</li> <li>6. Power Switch defect</li> <li>7. Power switch connector defect</li> </ol>
2	Scale enters Test Mode after power switch is turned on	<ol style="list-style-type: none"> <li>1. Key board short circuit</li> <li>2. Main board defect</li> </ol>
3	"Just a moment! Scale is warming up!" Display does not extinguish	<p>This indicates that the initial A/D value is most likely unstable;</p> <ol style="list-style-type: none"> <li>1. Load cell defective</li> <li>2. External vibration influencing weigh components</li> <li>3. Defective main board amp circuit</li> <li>4. Defective power unit (unstable +8V, -15v)</li> </ol>
4	"Just a moment! Scale is warming up!" Display appears when power turned on. Weight, price. unit price displays read "0".	<ol style="list-style-type: none"> <li>1. Check Key switch cable and its connection</li> <li>2. Key SW defect</li> <li>3. J2 connector on Key board (P-752) contact defect</li> <li>4. J4 connector on Main board (P-750) contact defect</li> </ol>
5	Weigh reading in error or Weigh reading varies by itself	<ol style="list-style-type: none"> <li>1. Mechanical fault.               <ol style="list-style-type: none"> <li>a. Load cell or its mount is hitting limiter.</li> <li>b. Foreign object stuck under or contacting platter.</li> </ol> </li> <li>2. Electrical Fault.               <ol style="list-style-type: none"> <li>a. Defective Load Cell</li> <li>b. Main board amp circuit defect</li> </ol> </li> </ol>
6	A display column or segment doesn't light or does not extinguish	<ol style="list-style-type: none"> <li>1. Program not running</li> <li>2. J5 connector on Main board (P-750) contact defect.</li> <li>3. Main board (P-750) defect</li> <li>4. Display board defect</li> </ol>

No.	Condition	Probable Cause and Checkpoints
7	Key fault	<ol style="list-style-type: none"> <li>1. All keys fail to operate.               <ol style="list-style-type: none"> <li>a. J4 connector on Main board (P-750) pulled out</li> <li>b. Main board (P-750) defect</li> </ol> </li> <li>2. Specific key fails to operate.               <ol style="list-style-type: none"> <li>a. Key or key matrix problem.                   <ul style="list-style-type: none"> <li>⇒ Cable open or poor connection.</li> <li>⇒ Main board (P-750) defect</li> <li>⇒ Key board (P-752) defect</li> </ul> </li> </ol> </li> </ol>
8	Registered information altered	<ol style="list-style-type: none"> <li>1. Battery defect</li> <li>2. ROM/ Ram board defect</li> <li>3. Influence from external noise, static electricity</li> </ol>
9	Display goes out completely during operation	<ol style="list-style-type: none"> <li>1. Drop in AC input voltage.</li> <li>2. Power unit reset circuit defect.</li> </ol>
10	Label or receipts not printed	<ol style="list-style-type: none"> <li>1. Contact defect in thermal head cable</li> <li>2. Thermal head print voltage out               <ol style="list-style-type: none"> <li>a. Power unit defect</li> <li>b. Check thermal head resistance value (Head Check) via Test Mode 3</li> </ol> </li> <li>3. Main board (P-750) defect</li> <li>4. Thermal head defect</li> </ol>
11	Prints only on left or right half of paper	<ol style="list-style-type: none"> <li>1. Main board (P-750) defect</li> <li>2. Thermal head defect</li> <li>3. Strobe signal (either STB1 or STB2) not active</li> <li>4. Thermal head connector cable defect</li> </ol>
12	"Check Label Cassette" message appears	<ol style="list-style-type: none"> <li>1. Cassette mis-inserted</li> <li>2. Label or receipt specifications misset               <ol style="list-style-type: none"> <li>a. Check Set up mode, Label Format.</li> <li>b. Check cassette sticker</li> </ol> </li> <li>3. Cassette sensor defect               <ol style="list-style-type: none"> <li>a. Check Test Mode 4, Sensor Check</li> </ol> </li> <li>4. Main board (P-750) defect</li> </ol>
13	"Remove The Item on the Platter" message appears	<ol style="list-style-type: none"> <li>1. Check that platter is clear</li> </ol>
14	NV RAM Data Lost" message appears	<ol style="list-style-type: none"> <li>1. Reset initial value data</li> <li>2. NV RAM defect</li> <li>3. A/D board (P-704) defect</li> </ol>
15	"RAM Data Lost" message appears	<ol style="list-style-type: none"> <li>1. RAM data lost, Clear RAM data ( Test Mode 2)</li> <li>2. ROM, RAM board (P-751) defect</li> <li>3. Main board (P-750) defect</li> </ol>
16	"Mark Down Price Over" message appears	<ol style="list-style-type: none"> <li>1. Check mark down price</li> </ol>

## H8 MAINTENANCE

No.	Condition	Probable Cause and Checkpoints
17	"Memory Over" message appears	<ol style="list-style-type: none"> <li>1. During operation: Remove totals report and clear totals</li> <li>2. During registration: Remove totals report and clear totals. Or Delete unnecessary; PLU. If necessary take backup via IF/RQ, and Clear ram ( Test Mode 2)</li> </ol>
18	"Over Character" message appears	<ol style="list-style-type: none"> <li>1. Re-register (Too many characters in registration item.)</li> </ol>
19	"Over Character/POP" message appears	<ol style="list-style-type: none"> <li>1. Re-register (Time of ad message too long.)</li> </ol>
20	"Over Character/Reg." message appears	<ol style="list-style-type: none"> <li>1. Re-register (Excessive Reg. code)</li> </ol>
21	"Label End" message appears	<ol style="list-style-type: none"> <li>1. Label paper end.</li> <li>2. Cassette defect               <ol style="list-style-type: none"> <li>a. Label advance mechanism defective</li> </ol> </li> <li>3. Motor not rotating (stepping motor)               <ol style="list-style-type: none"> <li>a. Cable contact defect or connector contact defect</li> <li>b. Motor defect</li> <li>c. Main board (P-750) defect</li> <li>d. power unit (DL-481 side defect)</li> </ol> </li> <li>4. Peeling sensor defect ( Test Mode 4)               <ul style="list-style-type: none"> <li>• Only when label is not inserted after peeling sensor catches the label end</li> </ul> </li> </ol>
22	"Label Size Error" message appears	<ol style="list-style-type: none"> <li>1. Check label format setting</li> <li>2. Set to 1 via Key Switch</li> </ol>
23	"Label Size Set Error" message appears	<ol style="list-style-type: none"> <li>1. Check label format setting</li> <li>2. Set to 1 via Key Switch</li> </ol>

# H9 PARTS

## 9.1 OVERVIEW

This chapter contains the principle parts used in the AC-2000.

## 9.2 PARTS LIST

UNIT/PART	SPECIFICATION.
<i>OPERATION UNIT</i>	
Keyboard	P-752
Key Sheets (Normal, Totals, [Test Mode])	one of each
Switch Key (Operator's, Supervisor's)	one of each
<i>LOAD CELL UNIT</i>	
Load Cell	CLC-25L (15Kg/30lb)
• Rated Capacity	25 Kg
• Rated Output	1.95 mv/V
• Input Resistance	405 ± 10Ω
• Output resistance	350 ± 5Ω
<i>A I D BOARD (P-704)</i>	
CPU	uPD75104 (4 bit micro-processor; 2 KROM internal)
AD converter	ILD1001 (Ishida custom-made IC)
D/A converter	DAC0832
Analog SW (Multiplexor)	D4053
Power Regulator	70L05, 79L12
NV-RAM	S2444R (S24S45R)
<i>MAIN BOARD (P-750)</i>	
CPU (V40)	uPD75208
Gate array	M60025
I <sup>2</sup> NET transmission	M37450 (INC2003 Ishida custom-made IC)
I/O	71055G

## H9 PARTS

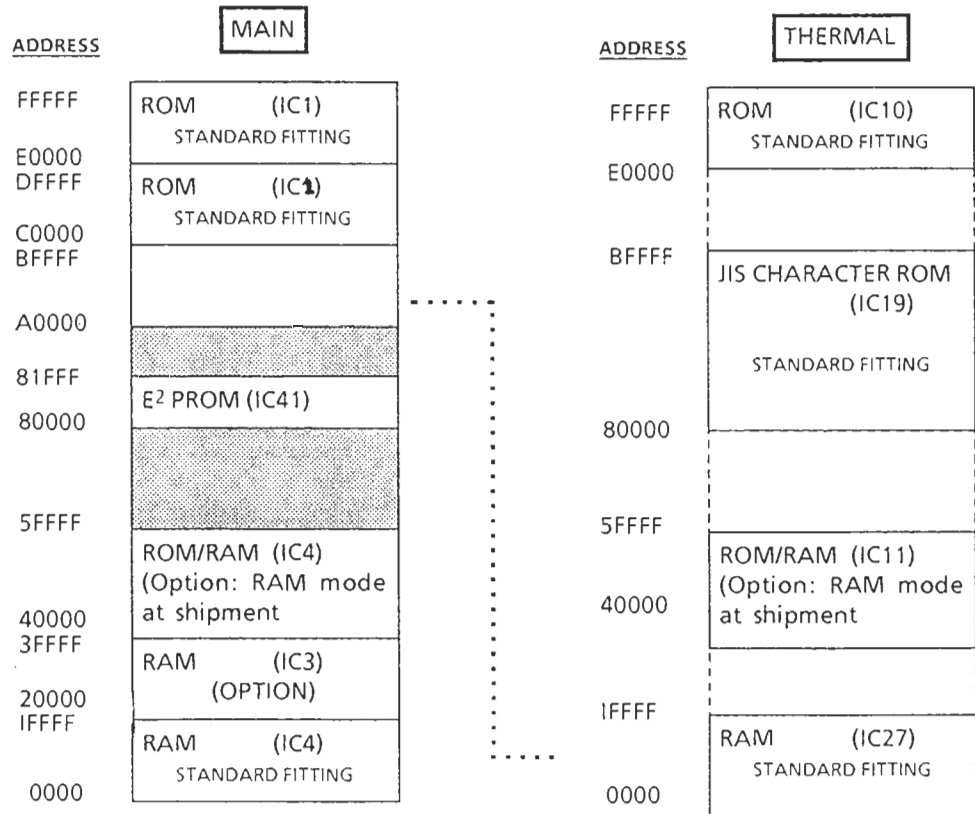
UNIT/PART	SPECIFICATION.
A/D Convert	uPD700IC
RS 232C Signal Transmission.	uPD71051G
RS 232C Buffer	uPD47129
<i>ROM / RAM BOARDS (P-751)</i>	
Character Table ROM (16X16)	HN62412FPW01 (Hitachi)
RAM (POS type) soldered installation	HN628128L (128K) (Hitachi)
Clock IC board	MSM62 X 42 BRS
ROM (program)	uPD27C100A (128K)
Data switchover board	HC541P (Tri-State)
<i>DISPLAY UNIT</i>	
7-Segment display	FM-P/S-001
X-Y Matrix fluorescent display module	FM256GX64AB-100A
Fluorescent display DC/DC converter	UDD-348E
<i>CASSETTE SENSOR</i>	
Photointerruptor	PS4005 (NEC)
<i>LABEL SENSOR UNIT</i>	
<i>PEELING SENSOR</i>	
Projector side (on P-612)	SE 307 (NEC)
Receiver side (on P-612)	PH 110 (NEC)
<i>MOTOR</i>	
Stepping motor	PH266-01 (Oleander)
<i>THERMAL HEAD</i>	
	E60-74C (Mitsubishi)

# S1 Outline of Software

## 1.1 MEMORY

### 1.1.1 MEMORY MAPS

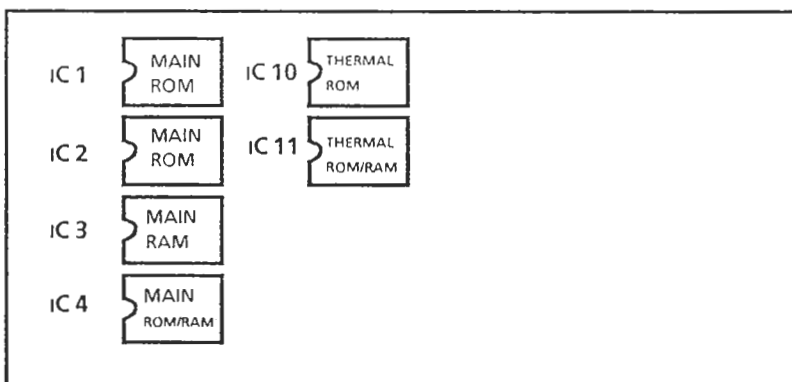
The memory map below refers to the main side memory data and Test Mode 6 described in Chapter 5.



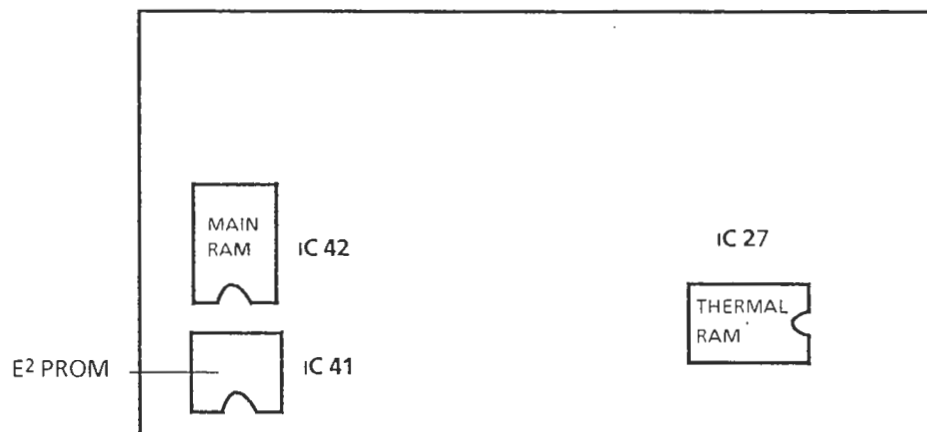
## S1 OUTLINE OF SOFTWARE

- RAM (IC 27) is used for printing (Initiated from the Main CPU side)

ROM/RAM board (P-750) Part Side



ROM/RAM board (P-750) Soldering Diagram



### 1.1.2 RAM EXPANSION

- To increase RAM to add PLU, add in this order: IC3, IC4.

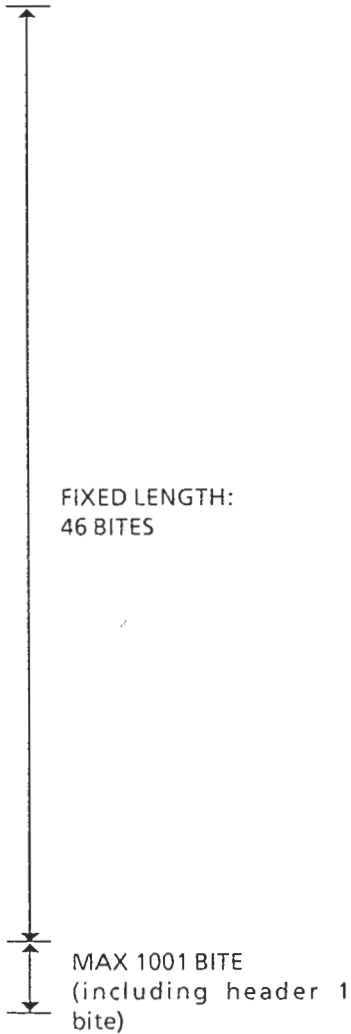
USE ONLY RAM PROVIDED BY ISHIDA'S SERVICE CENTER. IF OTHER RAM ARE UTILIZED, ISHIDA CANNOT BE RESPONSIBLE FOR MALFUNCTION.



1.2 PLU FILE

CONFIGURATION: BITE DISTRIBUTION

DESCRIPTION	BITE COUNT
ITEM LENGTH	2
PLU NO.	2
ITEM CODE	4
POS CODE FLAG	1
POS CODE	5
UNIT PRICE/FIXED PRICE	3
FIXED WEIGHT	3
COST	3
MARK DOWN FLAG	1
MARK DOWN DATA	3
TARE	2
SHELF LIFE	2
USE BY PERIOD	2
FIXED PRICE/WEIGHT FLAG	1
POS FLAG	1
DATE/TIME	2
MESSAGE 1~6	1
MESSAGES 7~ 99	1
TAX	1
TAX RATE	2
RESERVE	4
PLU	1 Character: 1 Bite



NOTE:

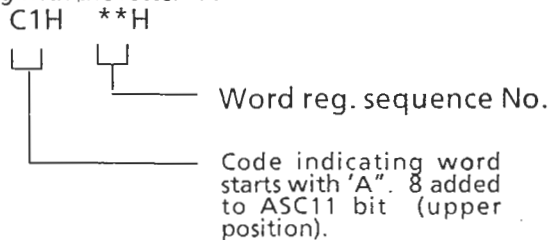
1. Start address for PLU Master is E000.
2. No totals data is contained in PLU master file. The totals data is contained in the area subsequent to the PLU master file (See S3).

## S1 OUTLINE OF SOFTWARE

- Fixed length is 42 bites (totals are in separate area).
- Product code is different from the POS code.
- When the POS code is the same as the product, POS code registration is unnecessary.
- Cost can only be registered as product information (not yet in use)
- Mark down flag:
  - 00 : SPCL
  - 01 : -\$
  - 02 : -%
  - 03 : U/Price
- Expiry date/
  - Use by date FF, FF : Refer to *Set Up Mode*
  - 0 : Prohibited PRINTING
  - 1~998 : Pack time, Shelf Life
  - 999 : Pack time only
  - 1001~1998 : Shelf Life only
- Fixed price/weight flag
  - 00 : Random weight
  - 01 : Fixed price
  - 02 : Random weight WITH fixed price
- POS flag
  - FF : Conform to Set Up Mode
  - 01 : 13 digit Non-PLU
  - 01 : 13 digit PLU
- Date/Time
  - 00: Non printing
  - 1~11 : Manual print AM \*\*
  - 12~23 : " PM\*\*
  - 24 : AM) NOTE:
  - 98 : Internal timer print

It is necessary to modify format to print out Date/Time.
- PLU file: Characters: One character bite (ASC 11code)  
 Dictionary Word : 2 bites per word

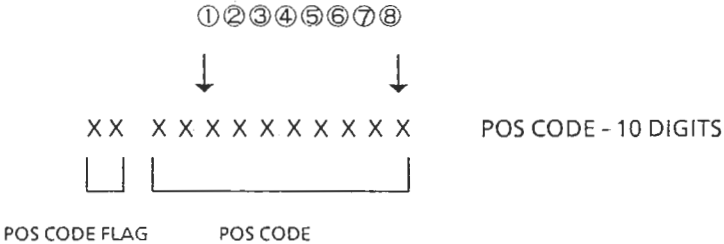
Example: A dictionary word starting with the letter "A"



NOTE: PLU file configuration and contents may vary by country

**ITEM CODE AND POS CODE**

1. If the POS code registered in PLU item is 0, the Item code is as shown here:



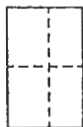






- When PLU file POS code flag is SET FF  
 Confirms to setting input in Set UP Mode. When not FF, The POS code for the PLU file takes precedence.
- When PLU file POS code is "0"  
 Print according to the ITEM code. When not "0", the POS code for the PLU file takes precedence. The POS code for PLU items all take precedence.

**1.3 LABEL FORMATTING**

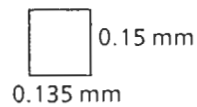
**1.3.1 CHARACTER TABLE**

Three types of font, two of which have X2 & X4 size are available. (Total character styles: 7)

	X1	X2	X4
Type 1	 15 X 30 dot	 30 X 60 dot	 650X120 dot
Type 2	 10 X 20 dot	 20 X 40 dot	 40X 80 dot
Type 3	 7X14 dot		

**NOTE:**

- The dimensions of one dot are:
- Character selection may be limited according to the registration item.



## 1.4 NON-KEYBOARD CHARACTERS

The characters shown in the following chart do not appear on the keyboard but are available.

ROW COLUMN	2	3	4	5	6	7
0	SP	0	@	P	,	p
1	!	1	A	Q	a	q
2	"	2	B	R	b	r
3	#	3	C	S	c	s
4	\$	4	D	T	d	t
5	%	5	E	U	e	u
6	&	6	F	V	f	v
7	'	7	G	W	g	w
8	(	8	H	X	h	x
9	)	9	I	Y	i	y
A	*	:	J	Z	j	z
B	+	:	K	[	k	{
C	,	<	L	\	l	
D	-	=	M	]	m	}
E	.	>	N	^	n	~
F	/	?	O	_	o	

### METHOD:

Example: To access the *exclamation mark*:

1. Press the FEED/SHIFT Key.
2. Press 21.
3. Press the PLU Key.

## S2 LABEL FORMATTING: USA

### Modifying Label Format

It is possible to modify label formats or move printed contents to comply with the customer's requirements. The location data is stored in E<sup>2</sup> PROM so there is no need to change it via PROM Writer.

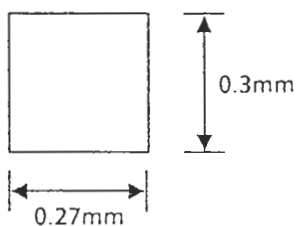
NOTE: Transaction labels or total label printing formats are subject to Weights and Measures approval. A change of format or deletion of printed information may result in non-compliance with Weights and Measures regulations. Please use the utmost caution when changing or modifying the printing format.

### Defining Coordinates

This section will describe the actual dot printing size and coordinate setting.

### DOT SIZE

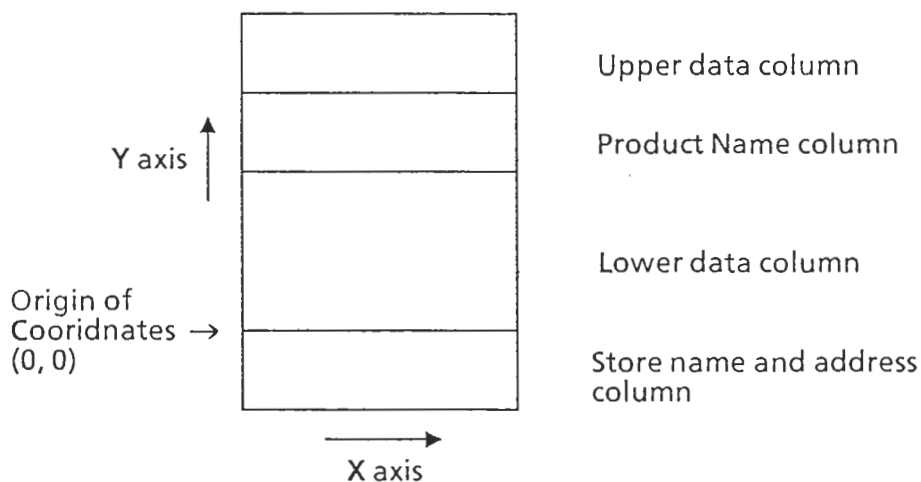
The AC-2000 is equipped with a double density type thermal head, but labels are printed at double density. Printing coordinates are set using double density specifications. Single density dot size is as shown below:



## S2 LABEL FORMATTING: USA

### COORDINATES AND PRINT FORMAT LAYOUT

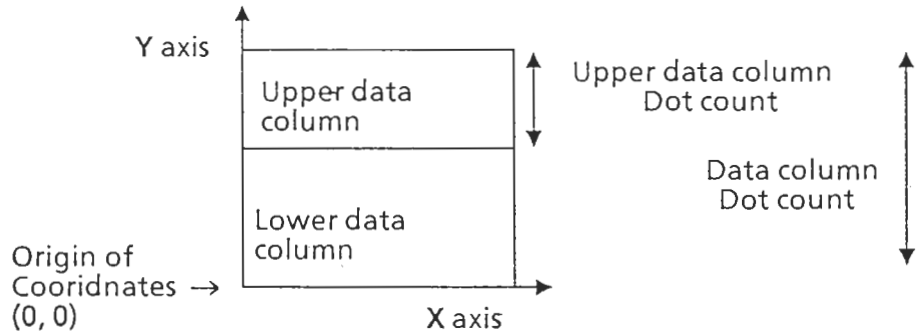
Labels are configured into four data columns as shown here. Only the upper and lower column data can be modified.



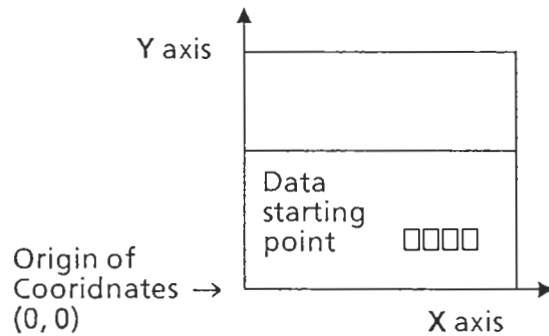
Table

Column name	Specifications
Upper data column	Data which appears above the product name (digits, bar code). This area is cleared each time a label is printed.
Product name column	Product name. Number of lines is entered via setup mode. 1 line = 8 dots = 2.5mm Data is cleared when a new PLU name is called up
Lower data column	Digits and bar code printed between the Store name and address and the product name columns. Data is cleared when a new PLU name is called up
Store name and address column	Pre-printed store name and address print area Fixed at 2.65 dots (7.5MM)

For entering actual coordinates, think of the data columns as adjacent.



**DATA COORDINATE STARTING POINTS**



**COORDINATE DATA TABLES**

The coordinates for label formats 1~4 are shown in the following tables. Label format items vary by country. Charts reflect U.S.A. specifications

Print locations can be changed using the E2 PROM WRITER (See Test Mode 6), for users using a large number of AC-2000 units of the same format, it is also possible to change the ROM initial values

For this purpose, the data in the 0 chip of the Main Program is changed:

For Print Prohibit enter [FF.FF] as the X coordinate.

For Markdown price (lines 1 and 2) refer to this pattern:

980 - Markdown Price





S2 LABEL FORMATTING: USA

FORMAT # 1

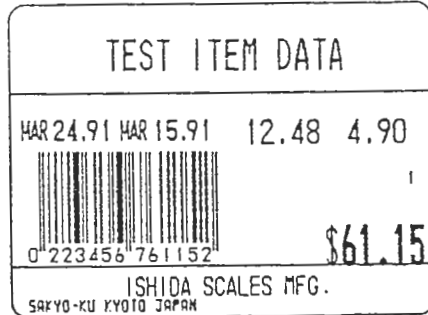


Chart S2-A 60mm J Label

DATA ITEM	E2 PROM ADDRESS	MAIN PROGRAM ADDRESS	X-AXIS DATA	Y-AXIS DATA
Label Width	80602H	0602H	02.24	-
Data line dot count (above & below line)	80604H	0604H	-	00.81
Upper data line dot count	80608H	0608H	-	00.00
Bar Code	80613H	0613H	00.15	00.55
Bar Code length	8061AH	061AH	-	00.43
PLU No. (7X14)	80620H	0620H	01.91	00.45
Weight value	8062DH	062DH	01.70	00.69
Unit price	8063AH	063AH	01.16	00.69
Price	80647H	0647H	01.47	00.20
Special Price	80654H	0654H	01.65	00.12
Line 1	80661H	0661H	01.65	00.09
Line 2	8066EH	066EH	01.65	00.06
Markdown	8067BH	067BH	01.65	00.24
Pack month	80688H	0688H	00.59	00.69
Pack day	80695H	0695H	00.76	00.69
Pack year	806A2H	06A2H	00.94	00.69
Shelf life month	806AFH	06AFH	00.06	00.69
Shelf life day	806BCH	06BCH	00.23	00.69
Shelf life year	806C9H	06C9H	00.41	00.69
PCS data	806D6H	06D6H	00.76	00.69
@PCS data	806E3H	06E3H	01.26	00.69

Chart S2-A 60mm J Label

DATA ITEM	E2 PROM ADDRESS	MAIN PROGRAM ADDRESS	X-AXIS DATA	Y-AXIS DATA
@Price data	806F0H	06F0H	01.50	00.69
[PCS @/] Print	806FDH	06FDH	00.94	00.67
Bakery weight	8070AH	070AH	01.16	00.69
[ ( ) ] Print	80717H	0717H	01.47	00.67
Bakery weight (lb.)	80724H	0724H	01.54	00.69
[lb.] Print	80731H	0731H	01.70	00.69
Bakery weight (oz.)	8073EH	073EH	01.84	00.69
[oz.] Print	8074BH	074BH	02.00	00.69

S2 LABEL FORMATTING: USA

FORMAT #2

TEST ITEM DATA		
HAR 24.91	HAR 15.91	1
12.48	4.90	\$61.15
ISHIDA SCALES MFG. SAKYO-KU KYOTO JAPAN		

Table S2-B 60mm Z Label

DATA ITEM	E2 PROM ADDRESS	MAIN PROGRAM ADDRESS	X-AXIS DATA	Y-AXIS DATA
Label Width	80802H	0802H	2.24	-
Data line dot count (above & below line)	80804H	0804H	-	00.60
Upper data line dot count	80808H	0808H	-	00.00
PLU No. (7X14)	80813H	0813H	01.91	00.45
Weight value	80820H	0820H	00.90	00.12
Unit price	8082DH	082DH	00.08	00.12
Price	8083AH	083AH	01.46	00.20
Special Price	80847H	0847H	01.65	00.12
Line 1	80854H	0854H	01.65	00.09
Line 2	80861H	0861H	01.65	00.06
Markdown	8086EH	086EH	01.65	00.24
Pack month	8087BH	087BH	00.90	00.45
Pack day	80888H	0888H	01.07	00.45
Pack year	80895H	0895H	01.25	00.45
Shelf life month	808A2H	08A2H	00.08	00.45
Shelf life day	808AFH	08AFH	00.25	00.45
Shelf life year	808BCH	08BCH	00.43	00.45
PCS data	808C9H	08C9H	00.16	00.12
@PCS data	808D6H	08D6H	00.66	00.12

Table S2-B 60mm Z Label

DATA ITEM	E2 PROM ADDRESS	MAIN PROGRAM ADDRESS	X-AXIS DATA	Y-AXIS DATA
@Price data	808E3H	08E3H	00.90	00.12
[PCS @ / ] Print	808F0H	08F0H	00.34	00.10
Bakery weight	808FDH	08FDH	00.16	00.12
[ ( ) ] Print	8090AH	090AH	00.47	00.12
Bakery weight (lb.)	80917H	0917H	00.55	00.12
[lb.] Print	80924H	0924H	00.71	00.12
Bakery weight (oz.)	80931H	0931H	00.84	00.12
[oz.] Print	8093EH	093EH	01.00	00.12

S2 LABEL FORMATTING: USA

FORMAT #3

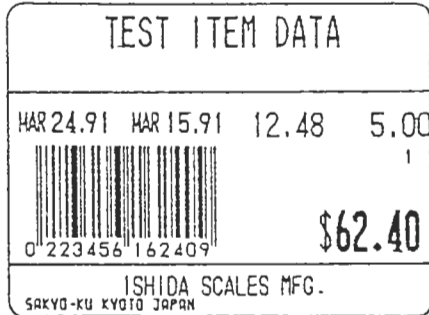


Table S2-C 64mm J Label

DATA ITEM	E2 PROM ADDRESS	MAIN PROGRAM ADDRESS	X-AXIS DATA	Y-AXIS DATA
Label Width	80A02H	0A02H	02.24	-
Data line dot count (above & below line)	80A04H	0A04H	-	00.91
Upper data line dot count	80A08H	0A08H	-	00.00
Bar Code	80A13H	0A13H	00.15	00.57
Bar Code length	80A1AH	0A1AH	-	00.43
PLU No. (7X14)	80A20H	0A20H	01.91	00.55
Weight value	80A2DH	0A2DH	01.84	00.72
Unit price	80A3AH	0A3AH	01.20	00.72
Price	80A47H	0A47H	01.46	00.27
Special Price	80A54H	0A54H	01.65	00.19
Line 1	80A61H	0A61H	01.65	00.16
Line 2	80A6EH	0A6EH	01.65	00.13
Markdown	80A7BH	0A7BH	01.65	00.31
Pack month	80A88H	0A88H	00.66	00.72
Pack day	80A95H	0A95H	00.83	00.72
Pack year	80AA2H	0AA2H	00.01	00.72
Shelf life month	80AAFH	0AAFH	00.06	00.72
Shelf life day	80ABCH	0ABCH	00.23	00.72
Shelf life year	80AC9H	0AC9H	00.41	00.72

Table S2-C 64mm J Label

DATA ITEM	E2 PROM ADDRESS	MAIN PROGRAM ADDRESS	X-AXIS DATA	Y-AXIS DATA
PCS data	80AD6H	0AD6H	00.86	00.72
@PCS data	80AE3H	0AE3H	01.36	00.72
@Price data	80AF0H	0AF0H	01.60	00.72
[PCS @ / ] Print	80AFDH	0AFDH	01.04	00.70
Bakery weight	80B0AH	0B0AH	01.20	00.72
[ ( ) ] Print	80B17H	0B17H	01.51	00.70
Bakery weight (lb.)	80B24H	0B24H	01.59	00.72
[lb.] Print	80B31H	0B31H	01.75	00.72
Bakery weight (oz.)	80B3EH	0B3EH	01.88	00.72
[oz.] Print	80B4BH	0B4BH	02.04	00.72

S2 LABEL FORMATTING: USA

FORMAT #4

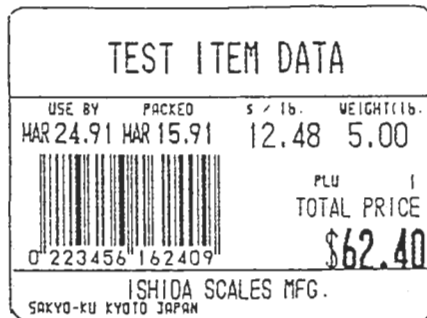


Chart S2-D 60mm J Label

DATA ITEM	E2 PROM ADDRESS	MAIN PROGRAM ADDRESS	X-AXIS DATA	Y-AXIS DATA
Label Width	80C02H	0C02H	02.24	-
Data line dot count (above & below line)	80C04H	0C04H	-	00.81
Upper data line dot count	80C08H	0C08H	-	00.00
Bar Code	80C13H	0C13H	00.15	00.55
Bar Code length	80C1AH	0C1AH	-	00.43
PLU No. (7X14)	80C20H	0C20H	01.91	00.45
Weight value	80C2DH	0C2DH	01.70	00.69
Unit price	80C3AH	0C3AH	01.16	00.69
Price	80C47H	0C47H	01.47	00.20
Special Price	80C54H	0C54H	01.65	00.12
Line 1	80C61H	0C61H	01.65	00.09
Line 2	80C6EH	0C6EH	01.65	00.06
Markdown	80C7BH	0C7BH	01.65	00.24
Pack month	80C88H	0C88H	00.59	00.69
Pack day	80C95H	0C95H	00.76	00.69
Pack year	80CA2H	0CA2H	00.94	00.69
Shelf life month	80CAFH	0CAFH	00.06	00.69
Shelf life day	80CBCH	0CBCH	00.23	00.69
Shelf life year	80CC9H	0CC9H	00.41	00.69

Chart S2-D 60mm JLabel

DATA ITEM	E2 PROM ADDRESS	MAIN PROGRAM ADDRESS	X-AXIS DATA	Y-AXIS DATA
PCS data	80CD6H	0CD6H	00.76	00.69
@PCS data	80CE3H	0CE3H	01.26	00.69
@Price data	80CF0H	0CF0H	01.50	00.69
[PCS @/] Print	80CFDH	0CFDH	00.94	00.67
[PLU] Print	80D0AH	0D0AH	01.60	00.45
[SELL BY] Print	80D17H	0D17H	00.20	00.78
[PACKED \$ / lb. WEIGHT (lb.)] Print	80D24H	0D24H	00.70	00.78
[TOTAL PRICE] Print	80D31H	0D31H	01.50	00.35



<b>S3</b>	<b>TOTALS</b>	
-----------	---------------	--

<b>SELECTING TOTALS</b>	
-------------------------	--

Totals configuration can be selected by modifying E2 PROM to conform to user requirements.

Data prohibit = FF  
Data write = 00

By eliminating totals which the user does not need, memory can be conserved.

ITEM	E2 PROM ADDRESS
Daily department totals	8024FH
Daily group totals	80250H
Daily item totals	80251H
Daily designated item totals	80252H
Accumulated department totals	80253H
Accumulated group totals	80254H
Accumulated item totals	80255H
Accumulated designated item totals	80256H
Hourly totals	80257H
Operator totals	80258H

- Addresses at time of factory shipment: 00
- In the case of PRINT MODE 1 the data will be prohibited
- The above total data will be accumulated when label is issued without error.

<b>TOTALS TIMING AND CLEAR TOTALS</b>	
---------------------------------------	--

Items which have timing preset:

1. Ram Clear
2. All Totals Clear
3. RQ reception completion (except for ERROR)
4. Change sales mode

S3 TOTALS

CLEARING MENU	CONTENTS OF CLEARING
ALL CLEAR	All totals clear (Production totals, sales totals.)
DAILY TOTALS CLEAR	Daily totals Daily Department Totals Daily Group Totals Daily Item Totals
ACCUMULATED TOTALS CLEAR	Daily department totals Daily group totals Daily item totals Daily designated item totals Accumulated department totals Accumulated group totals Accumulated Item totals Accumulated designated item totals
HOURLY CLEAR	Hourly grand totals Hourly totals
OPERATOR CLEAR	Operator totals

# S4 SET UP MODE

Refer to the AC-2000 Installation Manual for more information.

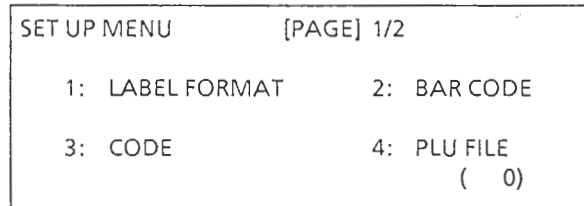
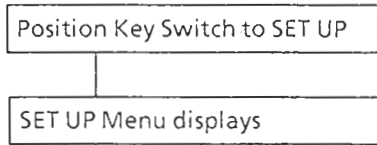
## 4.1 SET UP MODE

The set up mode of the AC-2000 is designed to meet the user's individual requirements.

NOTE: RAM Clear will delete contents of set up mode.

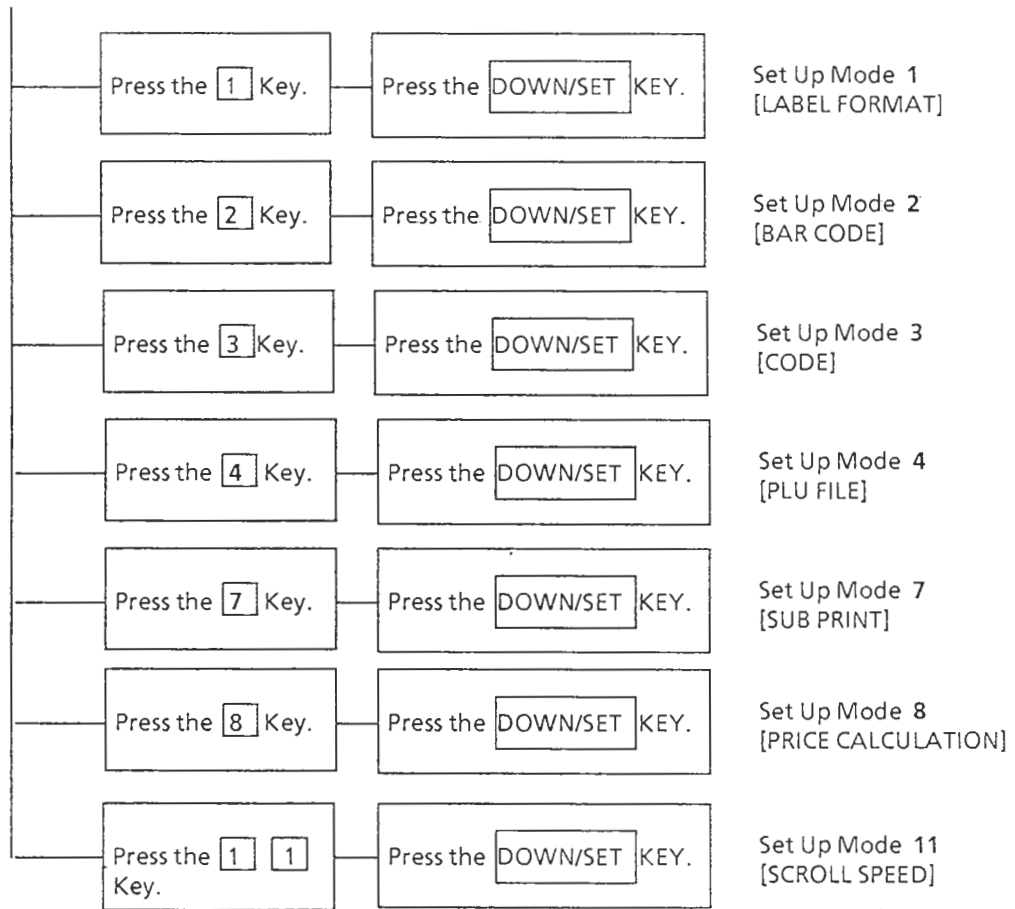
For detailed explanation of the set up mode refer to the Operation Manual. Only information about memory and maintenance is included here.

## SET UP MENU



Next Page

## S4 SET UP MODE



NOTE: Press the MENU Key to return to the Menu.

# S5 Test Mode

Refer to the AC-2000 Installation Manual for more information.

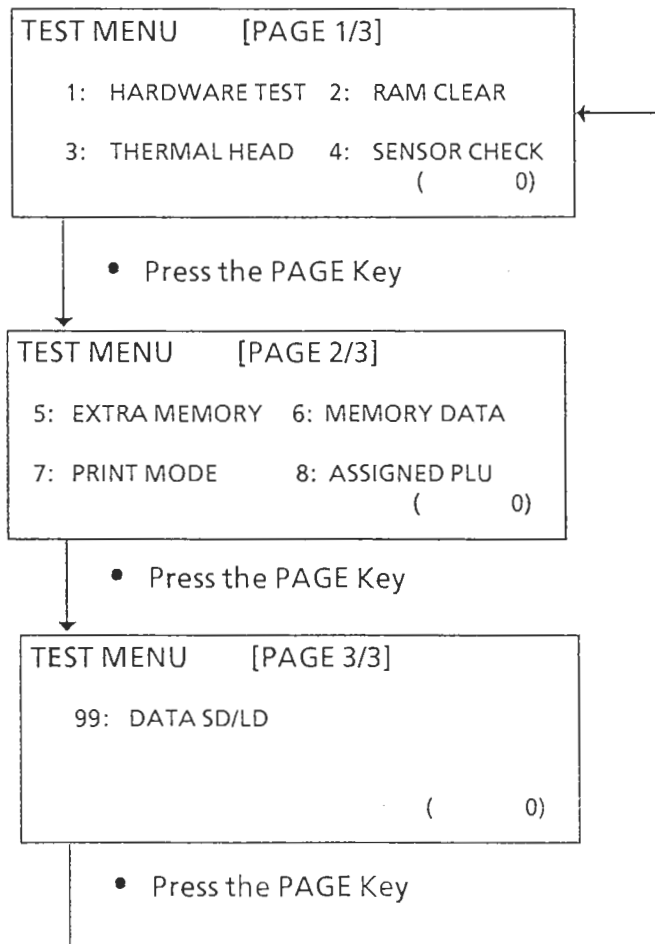
## 5.1 OVERVIEW

The Test Mode of the AC-2000 is used to ascertain whether the scale is functioning properly.

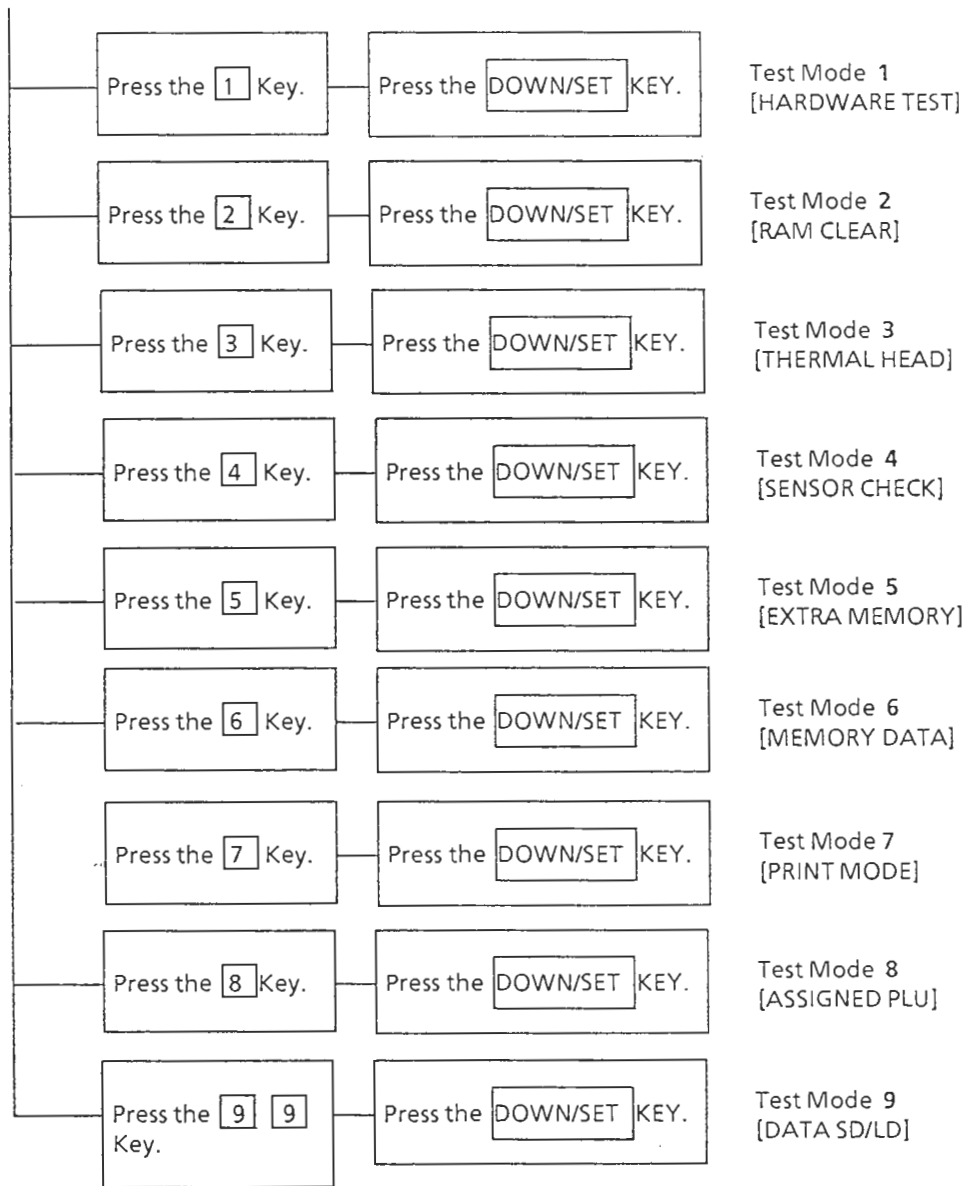
## 5.2 TEST MODE START UP

Press the RESET Key then immediately press any other key.

Test Mode is displayed

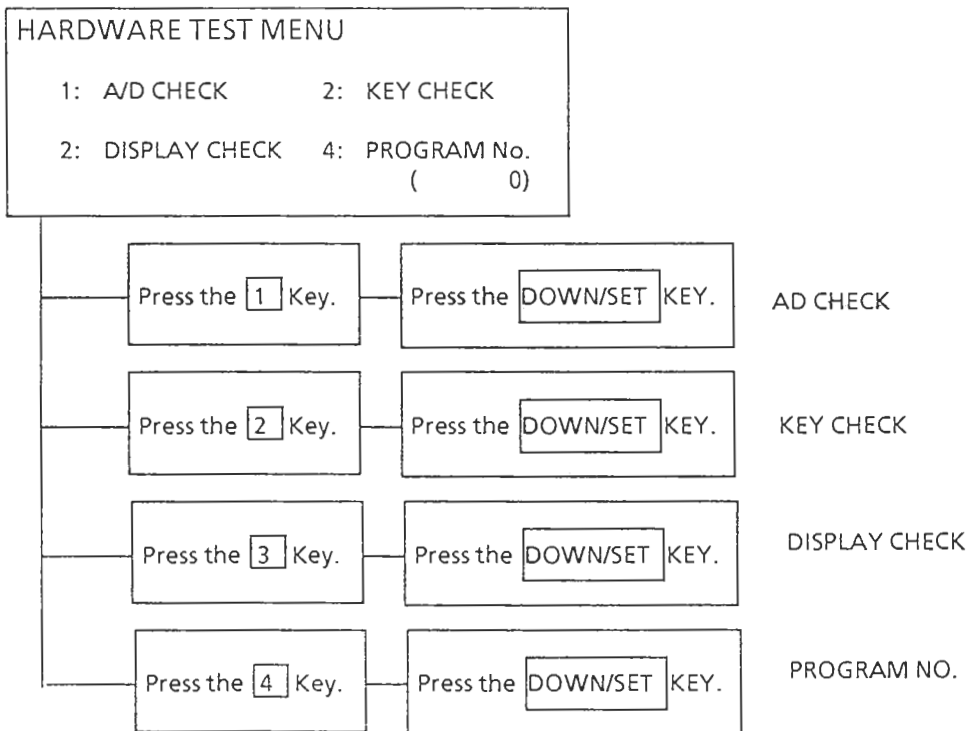


## S5 TEST MODE



NOTE: Press the MENU Key to return to the Menu, except for 2: KEY CHECK at Test Mode 1.

5.3 TEST MODE 1 (HARDWARE TEST)



A/D CHECK

A/D CHECK      FIGURE ( 9)  
 \* AREA → [SET]    ZERO POINT → [ZERO]  
 SPAN → [◆UP/T]    ▲▼  
 (      0)

0      2056

↑      ↑  
 (1)    (2)

1. 7-Segment Display (WEIGHT COLUMN)  
 Displays amount of A/D conversion. Press ZERO Key to display '0'.

S5 TEST MODE

2. 7-Segment Display: Unit price column  
Displays A/D converter initialization value
3. Enter value. After entry, press the PRINT Key to print out A/D con. value.

**KEY CHECK**

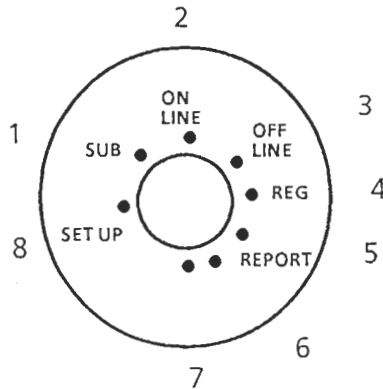
KEY CHECK	
KEY DATA	( 0 )
KEY SWITCH DATA	( 8 )

Key Data and Key switch data appear in the positions in parentheses. The Key data is as listed below:

KEYBOARD

1	7	D	13	19	1F	25	2B	31	37	
2	8	E	14	1A	20	26	2C	32	38	3D
3	9	F	15	1B	21	27	2D	33	39	3E
4	A	10	16	1C	22	28	2E	34	3A	3F
5	B	11	17	1D	23	29	2F	35	3B	3B
6	C	12	18	1E	24	2A	30	36	3C	3C

KEY SWITCH





## DISPLAY CHECK

## DISPLAY CHECK

After [SCREEN 1]~[SCREEN 4]  
Displays, all lamps will light in  
four stages of intensity.. Then the  
stay lit at the highest level.

- 0~ F repeatedly display in order

## PROGRAM NO.

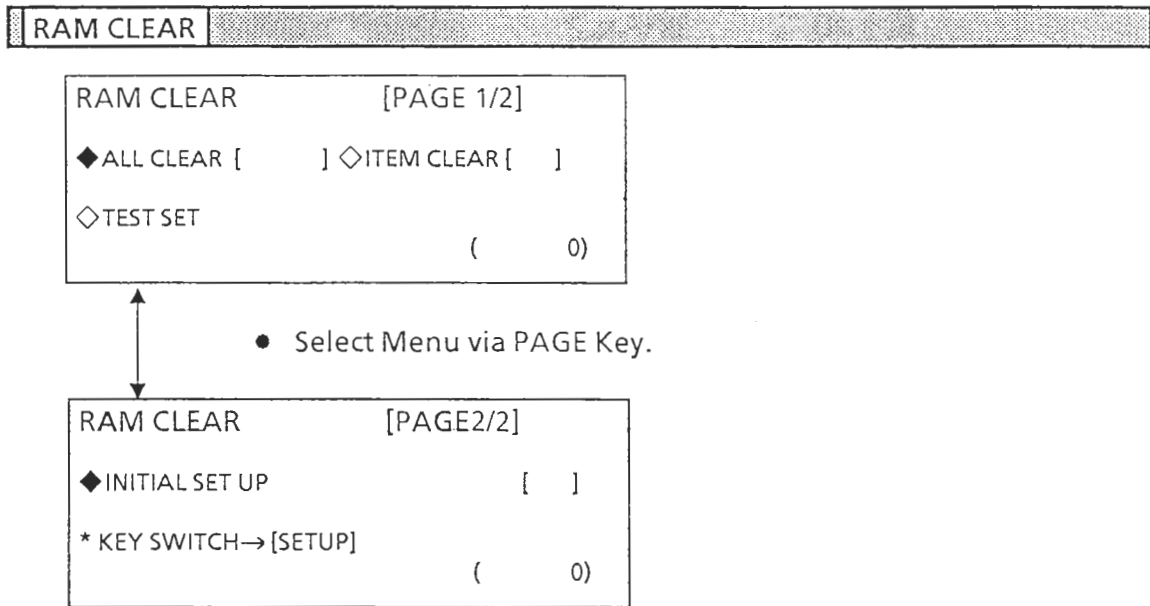
## PROGRAM No.

MAIN PROGRAM (B-108)

THERMAL PROGRAM (B-109)

- Main and thermal program numbers appear in parentheses.

## S5 TEST MODE



### METHOD

Align the cursor with the desired item then press the ZERO Key twice. A beeping noise and the message OK will occur, and the cursor will move to the next position.

- ◆ ALL CLEAR  
Clears all contents of RAM
  
- ◆ ITEM CLEAR  
Clears one PLU
  
- ◆ TEST SET  
Automatically sets test data for No. 1 after All Clear

- ◆ INITIAL SET UP  
Clears E2 PROM and sets initial data.

Initial Setup Mode Data

1. LABEL FORMAT	LABEL TYPE TEXT AREA LINE LENGTH + GAP SENSOR 1 DISTANCE SENSOR 2 DISTANCE	1 10.0 46.5 10.0 70.0	60-UPC mm mm mm mm
2. BAR CODE	NON PLU FLAG PLU FLAG BAR CODE TYPE NON-PLU	02 49 1 1	NON-PLU UPC, CODE:5
3. CODE	DEPT CODE GROUP CODE CODE/NON-PLU SHELF LIFE USE BY	31 42 36 999 0	
4. PLU ITEM SELECT	MARK DOWN SALES MODE FIXED WEIGHT (UNIT)PRICE COST PRICE TARE SHELF LIFE USE BY DATE ITEM CODE MESSAGE 1-6 MESSAGE 7-99 PACK TIME CODE SELECT FLAG CODE POS CODE TAX SELECT TAX TABLE SET	1 1 1 1 0 1 1 0 1 1 1 1 1 1 1 1 0 0	YES YES YES YES N O YES YES N O YES YES YES YES YES YES YES N O N O
5. MACHINE No.	TOTAL NBR OF MACHINE THIS MACHINE NUMBER SEARCH NUMBER	1 1 1	
6. TAX MODE	TAX SELECT TAX 1 TAX 2 TAX 1 TABLE 1 ST REPEAT TAX 1 TABLE LAST REPEAT TAX 1 TABLE TAX 2 TABLE 1 ST REPEAT TAX 2 TABLE LAST REPEAT TAX 2 TABLE	1 3.0 3.0 8 10 STEP 1(11) 8 10 STEP 1(11)	NON TAX % %

S5 TEST MODE

7. SUB PRINT CONTENTS		2	PLU No.
8. CALCULATION		1	4/5
9. ECR KEY SET	CASH CARD CHECK CERTIFICATE PAID OUT NO SALE	00 00 00 00 00 00	
10. RECEIPT		000001	
11. SCROLLSPEED		4	

Initial Setup TEST Data

3. THERMAL HEAD	REGISTER VALUE	630	Ω
7. PRINT MODE		1	IND LABEL, W/O TL
8. OPEN PLU		0	

**NOTE:**

1. When performing INITIAL SET UP always position the key switch to [SET UP]. INITIAL SET UP cannot be performed in other modes.
2. INITIAL SET UP takes approximately 10 seconds to write on the E<sup>2</sup> PROM. During this time the keys are not functional.
3. When performing RAM CLEAR and INITIAL SET up at the same time, perform INITIAL SET UP first.

## 5.5 TEST MODE 3 (THERMAL HEAD)

THERMAL HEAD KEY SW→ [SET UP]	
◆ REGISTER VALUE * ADJ [△▽]	[ 630 ]
◇ PRINT USAGE IN Km	[ 0.0 ] (        0 )

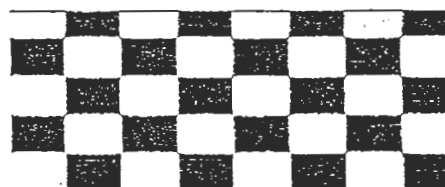
1. Resistance value setting:  
The print density of the AC-2000 is adjusted by changing the resistance value of the thermal head.

Method:

1. Set Key Switch to SET UP.
2. Align cursor with REGISTER VALUE.
3. Enter thermal head resistance value via numeric keys.
4. Test by pressing the PRINT Key. Fine adjust by pressing the [△▽] Keys.

Print Sample

TEST PRINT LABEL



ISHIDA SCALES MFG.  
SAYO-KU KYOTO JAPAN

2. Print Usage  
Displays the printing distance the thermal head has performed. To clear the Print Usage vale, align the cursor with [PRINT USAGE] and press the ZERO Key twice. Clear the Print Usage value when replacing the thermal head.

## S5 TEST MODE

### 5.6 TEST MODE 6 (SENSOR CHECK)

The AC 2000 checks and displays the converted A/D conversion data via Test Mode 4.

SENSOR CHECK		
LABEL	[ 255]	CASSETTE [1]
PEELING	[ 0]	( 0)

1. Label Sensor  
Approximately 0.02 v per 1 count in brackets
2. Peeling sensor  
Approximately 0.02 v per 1 count in brackets
3. Cassette sensor  
Cassette number appears in brackets ("0" appears when no cassette).

5.7 TEST MODE 5 (EXTRA MEMORY)

```

EXTRA MEMORY
* RAM ● POSITION [IC3→○ IC4→○]
RAM AREA:      75.3 KB FREE
                (          0)
    
```

1. The upper line shows IC3 and IC4 RAM condition.
  - : Open or ROM
  - : RAM
2. The lower line shows remaining memory capacity in the Main board RAM which can be used for PLU or totals data.

5.8 TEST MODE 6 (MEMORY DATA)

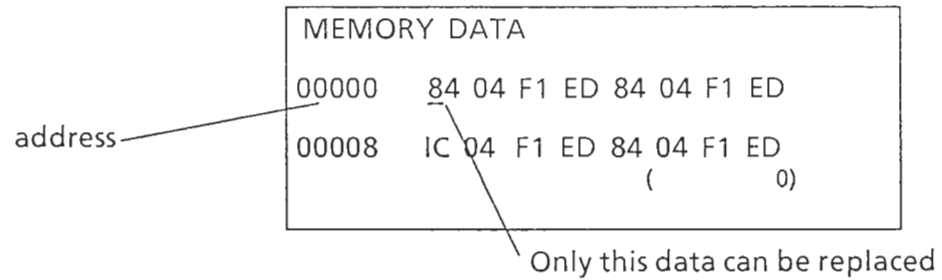
```

MEMORY DATA
00000 84 04 F1 ED 84 04 F1 ED
00008 IC 04 F1 ED 84 04 F1 ED
                (          0)
    
```

Used to confirm memory data. The data displayed is the ROM (Main Program) of ROM/RAM Board (P-751), Ram and E2 PROM Data. See S1 for addresses and memory map.

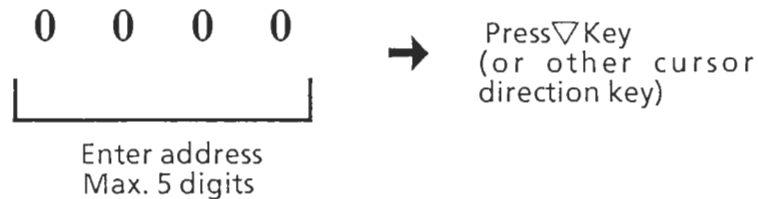
## S5 TEST MODE

### *Explanation of Memory*



### METHOD

#### *To Call up designated address*



After call up move cursors via cursor keys.

#### *To write over data*

##### **Ram data write over**

After entering address enter new data via numeric keys and press the DOWN/SET Key.

##### **E2 PROM**

After entering address enter new data via numeric keys and press the PRINT Key twice..

##### **NOTE:**

1. Write over is only possible on RAM and E2 PROM contents only. Also, when writing over E2 PROM, set the Key Switch to SET UP.
2. The data required for basic operation is also read onto the E2 PROM. Be careful not to affect this data.



## 5.9 TEST MODE 7 (PRINT MODE)

```

      <<PRINT MODE>>
◆MODE ▼1 : IND. LABEL, W/O TL (1)
CHOOSE MODE AND PRESS [SET] KEY.
              (      0)
  
```

### OPERATION

1. Position Key Switch to SET UP.
2. Indicate mode via cursor keys
  - 1 : IND. LABEL, W.O TL
  - 2 : OPE, W TOTAL
  - (3 : OPE, W TL, RECEIPT --*Next version*)
  - (4 : OPE, W TL, RECEIPT-- *Next version*)
3. Select print mode number via numeric keys and press the DOWN/SET Key.

### NOTE

The print mode function takes time to complete. Only perform the subsequent change after verifying altered value in brackets.

## S5 TEST MODE

### 5.10 TEST MODE 8 (OPEN PLU)

<<OPEN PLU>>

\* SET PLU NUMBER, THEN PRESS

CHOOSE MODE AND PRESS [SET ◆ DOWN] KEY.

No. 0 ( 0)

#### OPERATION

1. Enter the item to be entered as Open PLU via numeric keys (Max. 4 digits)
2. Press the DOWN/SET Key

## 5.11 TEST MODE 9 (DATA SD/LD)

```

DATA SEND/READ START→[COPY]
◆ SEND [ ]           ◇ READ [ ]
◇ VERIFY [ ]
  ▼ CMT(1200BPS) ( 0)

```

### OPERATION

The AC-2000 can be connected to the IF-21 and the IDF-RQ. There are two RS232 connectors on the AC-2000 but be sure to use the **External Connectors** only. Communication rate is selectable as follows: CMT (IF-RQ): 12000BPS, F/D(IF-21:9600BPS. Sect via cursor key. When using 9600BPS for the IF-21, set Dip SW \$#5 on the back of the device to ON. (For details please refer to the IF-21 service manual.

#### DATA TRANSMISSION

1. Set the IF-RQ or the IF-21 to reception mode
2. Press the DOWN SET Key to move cursor to the SEND position and press the COPY Key.
3. Display changes: EXEC→OK.

#### VERIFY

1. Press the DOWN SET Key to move cursor to the VERIFY position and press the COPY Key
2. Set the IF-RQ or the IF-21 to TRANSMISSION mode
3. Display changes: EXEC→OK.

#### DATA RECEPTION

1. Press the DOWN SET Key to move cursor to the READ position and press the COPY Key.
2. Set the IF-RQ or the IF-21 to TRANSMISSION mode
3. Display changes: EXEC→OK.

# A1 APPENDIX: CONNECTORS

## A/D BOARD (P-704 ) CONNECTOR SCHEMATICS

**J2**

Pin No.	Signal	Specification	Input	Output
1	BUSY			○
2	BUSY			○
3	OUTPUT DATA	SCALE DATA		○
4	OUTPUT DATA	" "		○
5	CLOCK		○	
6	CLOCK		○	
7	INPUT DATA	CONTROL DATA	○	
8	INPUT DATA	" "	○	
9	VT	+ 5 V PS SIGNAL	○	
10	GND VT			

**J3**

Pin No.	Signal	Specification	Input	Output
1	VS 1	+ 8V (To generate + 5V)	○	
2	GND VS 1			
3	GND VS 2			
4	VS 2	-15V (To generate -12V)	○	
5	GND VT			
6	NC	NOT IN USE		

MAIN BOARD (P-750)

J1

Pin No.	Signal	Specification	Input	Output
1		Drawer drive	○	○
2		Drawer drive	○	○
3,4	Vcc	5V		○
5,6	GND			○
7,8	VH	12V		○

J2

Pin No.	Signal	Specification	Input	Output
1	BUSY	A	○	
2	BUSY	B	○	
3	DATA IN	A	○	
4	DATA IN	B	○	
5	CLOCK	A		○
6	CLOCK	B		○
7	DATA OUT	B		○
8	DATA OUT	A		○
9	VT	5V		○
10	VT	GND		○
11	VS1	+8V		○
12	VSG	GND		○
13	VS2	-15V		○
14	VSG	GND		○

## J3

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A1	Tx CLK			○	B1	I <sup>2</sup> NET	DATA	○	○
A2	"			○	B2	"	"	○	○
A3	Rx CLK		○		B3	CLOCK	CLOCK	○	
A4	CTS		○		B4	DAT	SERIAL	○	
A5	"		○		B5	RESET	_____	○	
A6	RTS			○	B6	Vcc	+5V	○	
A7	DSR		○		B7	"	"	○	
A8	DTR			○	B8	"	GND	○	○
A9	Rx D		○		B9	"	"	○	○
A10	Tx D			○	B10	"	+12V		○
A11	Tx CLK			○	B11	"	"		○
A12	"			○	B12	V12	GND	○	○
A13	Rx CLK		○		B13	"	"	○	○
A14	CTS		○		B14	AR		○	
A15	"		○		B15	AU		○	
A16	RTS			○	B16	WG		○	
A17	DSR		○		B17	VD		○	
A18	DTR			○	B18	ST		○	
A19	Rx D		○		B19	VT		○	
A20	Tx D			○	B20	SG (GND)		○	○

A1 APPENDIX:CONNECTORS

J4

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A1	KD 0	KEY DATA	○		B1	KD 1	KEY DATA	○	
A2	" 2	"	○		B2	" 3	"	○	
A3	" 4	"	○		B3	" 5	"	○	
A4	" 6	"	○		B4	" 7	"	○	
A5	KS 0	KEY SELECTOR	○		B5	KS 1	KEY SELECTOR	○	
A6	" 2	"	○		B6	" 3	"	○	
A7	" 4	"	○		B7	" 5	"	○	
A8	" 6	"	○		B8	" 7	"	○	
A9	" 8	"	○		B9	" 9	"	○	
A10	" 10	"	○		B10	" 11	"	○	
A11	" 12	"	○		B11	" 13	"	○	
A12	" 14	"	○		B12	" 15	"	○	
A13	RSW 1		○		B13	RSW 0	GND	○	
A14	LD 0	KEY SWITCH DATA	○		B14	LD 1	KEY SWITCH DATA	○	
A15	" 2	"	○		B15	" 3	"	○	
A16	" 4	"	○		B16	" 5	"	○	
A17	" 6	"	○		B17	" 7	"	○	
A18	KIN		○		B18	BZ	BUZZER		○
A19	COMMON	Vcc 5V	○		B19	COMMON	Vcc 5V		○
A20					B20				
A21					B21				
A22					B22				
A23					B23				
A24					B24				
A25					B25				

## J5

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A1	15G	DIGIT SIGNAL		○	B1	14G	DIGIT SIGNAL		○
A2	16G	"		○	B2	13G	"		○
A3	17G	"		○	B3	12G	"		○
A4	18G	"		○	B4	11G	"		○
A5	19G	"		○	B5	10G	"		○
A6	20G	"		○	B6	9G	"		○
A7	SEG DP	SEGMENT		○	B7	8G	"		○
A8	SEG G	"		○	B8	7G	"		○
A9	SEG F	"		○	B9	6G	"		○
A10	SEG E	"		○	B10	5G	"		○
A11	SEG D	"		○	B11	4G	"		○
A12	SEG C	"		○	B12	3G	"		○
A13	SEG B	"		○	B13	2G	"		○
A14	SEG A	"		○	B14	1G	"		○
A15	GND	Vcc GND		○	B15	Vcc	+ 5V		○
A16	"	"		○	B16	"	"		○
A17	"	"		○	B17	"	"		○



A1 APPENDIX:CONNECTORS

J6

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A1	BRAD	BRIGHTNESS SIGNAL		○	B1	BRAD 1	BRIGHTNESS SIGNAL		○
A2	GND		○	○	B2	GND			○
A3	$\overline{\text{WRITE}}$			○	B3	$\overline{\text{WRITE 1}}$			○
A4	GND		○	○	B4	GND			○
A5	$\overline{\text{READY}}$			○	B5	$\overline{\text{READY 1}}$			○
A6	$\overline{\text{CLEAR}}$			○	B6	$\overline{\text{CLEAR 1}}$			○
A7	DSPE			○	B7	DSPE 1			○
A8	A 10	ADDRESS	○	○	B8	A 10	ADDRESS	○	○
A9	A 9	"		○	B9	A 9	"	○	○
A10	A 8	"		○	B10	A 8	"	○	○
A11	A 7	"		○	B11	A 7	"	○	○
A12	A 6	"		○	B12	A 6	"	○	○
A13	A 5	"		○	B13	A 5	"	○	○
A14	A 4	"		○	B14	A 4	"	○	○
A15	A 3	"		○	B15	A 3	"	○	○
A16	A 2	"		○	B16	A 2	"	○	○
A17	A 1	"		○	B17	A 1	"		○
A18	A 0	"		○	B18	A 0	"		○
A19	D 0	DATA		○	B19	D 0	DATA		○
A20	D 1	"		○	B20	D 1	"		○
A21	D 2	"		○	B21	D 2	"		○
A22	D 3	"		○	B22	D 3	"		○
A23	D 4	"		○	B23	D 4	"		○
A24	D 5	"		○	B24	D 5	"		○
A25	D 6	"		○	B25	D 6	"		○
A26	D 7	"		○	B26	D 7	"		○
A27	WP 0			○	B27	WP 0-1			○
A28	DP 0			○	B28	DP 0-1			○
A29	WP 1			○	B29	WP 1-1			○

J6

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A30	DP 1			○	B30	DP 1-1			○

J7: NOT IN USE

J8

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A1	PTA 1	CASSETTE SENSOR		○	B1	GND			
A2	PTC 1	"	○		B2	- IN	LABEL SENSOR	○	
A3	PTA 2	"		○	B3	+ IN	"	○	
A4	PTC 2	"	○		B4	OUT	"		○
A5	PTA 3	"		○	B5	Vcc	"		○
A6	PTC 3	"	○		B6	PT (E)	PEELING SENSOR	○	
A7	PTA 4	"		○	B7	PT (C)	"		○
A8	PTC 4	"	○		B8	LED (K)	"	○	○
A9	GND		○	○	B9	LED (A)	"		○
A10	"		○	○	B10	VLCD			
A11	PSAH	CASSETTE SENSOR		○	B11	VLCD			
A12	"	"	○		B12	VS 2	12V		
A13	GND		○	○	B13				

J9

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
1	TH	TH 1		○	16	VH	GND		○
2	TH	TH 2		○	17	STB1	STROBE CLOCK		○
3	DATA	SERIAL DATA		○	18	VH	GND		○
4	Vcc	+ 5V		○	19	"	"		○
5	"	"		○	20	"	"		○
6	VH	+ 24V		○	21	STB2	STROBE		
7	STB1	STROBE CLOCK		○	22	VH	GND	○	○
8	VH	+ 24V		○	23	STB2	STROBE		
9	STB1	STROBE CLOCK		○	24	VH	GND	○	○
10	VH	+ 24V		○	25	Vcc	GND	○	○
11	"	"		○	26	"	"	○	○
12	"	"		○	27	STB2	STROBE		○
13	"	GND		○	28	Vcc	GND	○	○
14	"	"		○	29	LATC	LATCH		○
15	STB1	STROBE CLOCK		○	30	CLOCK	CLOCK		○

A1 APPENDIX:CONNECTORS

J10

Pin No.	Signal	Specification	Input	Output
1	VH	+ 24V	○	
2	VH	+ 24V	○	
3	VH	GND	○	○
4	VH	GND	○	○

J11

Pin No.	Signal	Specification	Input	Output
1	Vcc	+ 5V	○	○
2	"	GND	○	
3	V12	+ 12V	○	
4	"	GND	○	

J12

Pin No.	Signal	Specification	Input	Output
1	A	PULSE MOTOR SIGNAL		○
2	B	"		○
3	A	"		○
4	B	"		○
5	P. D	POWER DOWN		○

## J13

Pin No.	Signal	Specification	Input	Output
1	VS 1	+ 8V	○	
2	VS 1	GND	○	○
3	VS 2	-15V	○	
4	VS 2	GND	○	○
5				
6	V12	+ 12V	○	
7	V12	+ 12V	○	
8	V12	GND	○	○
9	V12	GND	○	○

## J14

Pin No.	Signal	Specification	Input	Output
1	RSW	+ 8V	○	
2	RSW	GND	○	
3	RESET	-15V	○	
4	Vcc	+ 5V	○	
5	"	"	○	
6	Vcc	GND	○	○
7	"	GND	○	○
8	VT	+ 5V	○	
9	$\bar{V}T$	GND	○	○
10	NMI	TOP POSITION SIGNAL	○	

A1 APPENDIX:CONNECTORS

J15

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A1-A8	Vcc	GND		○	B1-B8	Vcc	+ 5v		○
A9	D 1	DATA		○	B9	D 0	DATA		○
A10	D 3	"	○	○	B10	D 2	"	○	○
A11	D 5	"	○	○	B11	D 4	"	○	○
A12	D 7	"	○	○	B12	D 6	"	○	○
A13	A 1	ADDRESS	○	○	B13	A 0	ADDRESS	○	○
A14	A 3	"		○	B14	A 2	"		○
A15	A 5	"		○	B15	A 4	"		○
A16	A 7	"		○	B16	A 6	"		○
A17	A 9	"		○	B17	A 8	"		○
A18	A 11	"		○	B18	A 10	"		○
A19	A 13	"		○	B19	A 12	"		○
A20	A 15	"		○	B20	A 14	"		○
A21					B21				
A22					B22				
A23	MWR	-----		○	B23	MRD	-----		○
A24	IOW			○	B24	IOR			○
A25	A 17	ADDRESS		○	B25	A 16	ADDRESS		○
A26	A 19	"		○	B26	A 18	"		○
A27	NMI			○	B27				
A28	RESET			○	B28				
A29					B29				
A30	CLOCK OUT			○	B30				
A31	E <sup>2</sup> OK	-----			B31	HDAK	-----		
A32	I OK	-----		○	B32	MOK	-----		
A33	I OK	-----		○	B33	MOK	-----		
A34					B34				
A35	D 1	DATA	○	○	B35	D 0	DATA	○	○

## J15

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A36	D 3	"	○	○	B36	D 2	"	○	○
A37	D 5	"	○	○	B37	D 4	"	○	○
A38	D 7	"	○	○	B38	D 6	"	○	○
A39	A 1	ADDRESS	○	○	B39	A 0	ADDRESS		○
A40	A 3	"		○	B40	A 2	"		○
A41	A 5	"		○	B41	A 4	"		○
A42	A 7	"		○	B42	A 6	"		○
A43	A 9	"		○	B43	A 8	"		○
A44	A 11	"		○	B44	A 10	"		○
A45	A 13	"		○	B45	A 12	"		○
A46	A 15	"		○	B46	A 14	"		○
A47	A 17	"		○	B47	A 16	"		○
A48	A 19	"		○	B48	A 18	"		○
A49	MRO	-----		○	B49	IOW	-----		○
A50	IOR	-----		○	B50	MWR	-----		○



A1 APPENDIX: CONNECTORS

ROM, RAM BOARD (P-751)

J1

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A1	Vcc	+5V		○	B1	Vcc	GND	○	○
A2	Vcc	+5V		○	B2	Vcc	GND	○	○
A3	DAT 0		○	○	B3	DAT 1		○	○
A4	" 2		○	○	B4	" 3		○	○
A5	" 4		○	○	B5	" 5		○	○
A6	" 6		○	○	B6	" 7			○
A7	ADR 0			○	B7	ADR 1			○
A8	" 2			○	B8	" 3			○
A9	" 4			○	B9	" 5			○
A10	" 6			○	B10	" 7			○
A11	" 8			○	B11	" 9			○
A12	" 10			○	B12	" 11			○
A13	" 12			○	B13	" 13			○
A14	" 14			○	B14	" 15			○
A15	" 16			○	B15	" 17			○
A16	" 18			○	B16	" 19			○
A17	Y3	-----		○	B17	RESET	-----		○
A18	MDR	-----		○	B18	MWR	-----		○
A19	CD1			○	B19	CD2			○
A20	ALM1	-----		○	B20	ALM2	-----		○
A21	WP			○	B21	IOR	-----		
A22	IOW	-----		○	B22	NMI			○
A23					B23	CLOCK OUT	OUT		○
A24					B24				
A25	Vcc				B25	Vcc	GND		
A26	Vcc				B26	Vcc	GND		

1	+
2	-

J3

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A1~A8	Vcc	GND		○	B1~B8	Vcc	+5		○
A9	D1	DATA	○	○	B9	D0	DATA	○	○
A10	D3	"	○	○	B10	D2	"	○	○
A11	D5	"	○	○	B11	D4	"	○	○
A12	D7	"	○	○	B12	D6	"	○	○
A13	A1	ADDRESS	○		B13	A0	ADDRESS	○	
A14	A3	"	○		B14	A2	"	○	
A15	A5	"	○		B15	A4	"	○	
A16	A7	"	○		B16	A6	"	○	
A17	A9	"	○		B17	A8	"	○	
A18	A11	"	○		B18	A10	"	○	
A19	A13	"	○		B19	A12	"	○	
A20	A15	"	○		B20	A14	"	○	
A21					B21				
A22					B22				
A23	MRW	-----	○		B23	MRD	-----	○	
A24	IOW		○		B24	IOR		○	
A25	A17	ADDRESS	○		B25	A16	ADDRESS	○	
A26	A19	"	○		B26	A18	"	○	
A27	NMI		○		B27				
A28	RESET		○		B28				
A29					B29				
A30	CLOCK OUT		○		B30				
A31	E <sup>2</sup> OK	-----			B31	HDAK	-----		
A32	IOK	-----	○		B32	MOK	-----		

## POWER UNIT JACKS (DL-481)

secondary, right-side

### CN1

Pin No.	Signal	Specification	Input	Output
1	DC	+100V (160~170)	○	
2	DC	-----	○	

- Rectified direct current supplied from PS Unit (DL-482).

### CN2

Pin No.	Signal	Specification	Input	Output
1	VH	+24V (22-26)		○
2	VH	+24V (22-26)		○
3	VH	GND		○
4	VH	GND		○

- Supplied to J10 on Main Board.
- Power supply for thermal head and stepping motor.

### CN3

Pin No.	Signal	Specification	Input	Output	Wire Color
1	$\bar{B}$	B PHASE		○	BLUE
2	B	B PHASE		○	RED
3	$\bar{A}$	A PHASE		○	GREEN
4	A	A PHASE		○	BLACK
5	B, COM	B COMMON		○	WHITE
6	A, COM	A COMMON		○	YELLOW

- Drive pulse signal to stepping motor (Oriental PH266-01-C48).

Motor OFF (DISCONNECTED)

5, 6     1, 2, 3, 4

(-)     (+)

~22.8VDC

DL-481

CN4

Pin No.	Signal	Specification	Input	Output
1	A	A PHASE	○	
2	$\overline{A}$	$\overline{A}$ PHASE	○	
3	B	B PHASE	○	
4	$\overline{B}$	$\overline{B}$ PHASE	○	
5	P. D	POWER DOWN	○	

- Pulse motor control pulse signal and power down from main power board is input. (P-750).

J14

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A1-A8	Vcc	GND		○	B1-B8	Vcc	+ 5v		○
A9	D 1	DATA	○	○	B9	D 0	DATA	○	○
A10	D 3	"	○	○	B10	D 2	"	○	○
A11	D 5	"	○	○	B11	D 4	"	○	○
A12	D 7	"	○	○	B12	D 6	"	○	○
A13	A 1	ADDRESS	○		B13	A 0	ADDRESS	○	
A14	A 3	"	○		B14	A 2	"	○	
A15	A 5	"	○		B15	A 4	"	○	
A16	A 7	"	○		B16	A 6	"	○	
A17	A 9	"	○		B17	A 8	"	○	
A18	A 11	"	○		B18	A 10	"	○	
A19	A 13	"	○		B19	A 12	"	○	
A20	A 15	"	○		B20	A 14	"	○	
A21					B21				
A22					B22				
A23	MWR	-----	○		B23	MRD	-----	○	
A24	IOW		○		B24	IOR		○	
A25	A 17	ADDRESS	○		B25	A 16	ADDRESS	○	
A26	A 19	"	○		B26	A 18	"	○	

A1 APPENDIX: CONNECTORS

J14

Pin No.	Signal	Spec	In-put	Out-put	Pin No.	Signal	Spec	In-put	Out-put
A27	NMI		○		B27				
A28	RESET		○		B28				
A29					B29				
A30	CLOCK OUT		○		B30				
A31	E <sup>2</sup> OK	-----			B31	HDAK	-----		
A32	I OK	-----	○		B32	MOK	-----		
A33	I OK	-----	○		B33	MOK	-----		
A34					B34				
A35	D 1	DATA	○	○	B35	D 0	DATA	○	○
A36	D 3	"	○	○	B36	D 2	"	○	○
A37	D 5	"	○	○	B37	D 4	"	○	○
A38	D 7	"	○	○	B38	D 6	"	○	○
A39	A 1	ADDRESS	○		B39	A 0	ADDRESS	○	
A40	A 3	"	○		B40	A 2	"	○	
A41	A 5	"	○		B41	A 4	"	○	
A42	A 7	"	○		B42	A 6	"	○	
A43	A 9	"	○		B43	A 8	"	○	
A44	A 11	"	○		B44	A 10	"	○	
A45	A 13	"	○		B45	A 12	"	○	
A46	A 15	"	○		B46	A 14	"	○	
A47	A 17	"	○		B47	A 16	"	○	
A48	A 19	"	○		B48	A 18	"	○	
A49	MRO	-----	○		B49	IOW	-----	○	
A50	IOR	-----	○		B50	MWR	-----	○	

DL-401

CN5

Pin No.	Signal	Specification	Input	Output
1	+5VIH (+5)			○
2	+5VG (-)			○
3				
4	ON/OFF			○

## POWER UNIT (DL-482)

*main, left-side*

### CN1, 2

Pin No.	Signal	Specification	Input	Output
1	AC	From power outlet	○	
3	AC	"	○	

- DL-482L: 100V/115V
- DL-482H: 220V/240V

### CN3

Pin No.	Signal	Specification	Input	Output
1	RSW			○
2	RSW			○
3	RESET			○
4	Vcc	+ 5V		○
5	Vcc	+ 5V		○
6	Vcc	GND		○
7	Vcc	GND		○
8	VT	+ 5V		○
9	VT	GND		○
10	NM1			

- Supplied to J14 on Main Board (P-750).

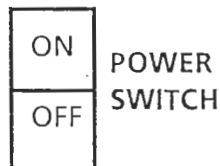
**CN4**

Pin No.	Signal	Specification	Input	Output
1	VS 1	+ 8V (SCALE)		○
2	VS 1	GND		○
3	VS 2	-15V (SCALE)		○
4	VS 2	GND		○
5				
6	V 12	Dot Matrix Display 12V		○
7	V 12	Dot Matrix Display 12V		○
8	V 12	GND		○
9	V 12	GND		○

- Pins 1-4 • Supplied to J3 on A/D Board (P-704).  
 • Converted to +8V ▶ +5V ▶ -12V at weigh board.
- Pins 6-9 • Supplied to J11 on Main /board (P-750).

**CN5**

Pin No.	Signal	Specification	Input	Output
1	AC	From Power Switch	○	
2	AC	From Power Switch	○	
3	AC	From Power Outlet	○	
4	AC	From Power Outlet	○	



**CN6**

Pin No.	Signal	Specification	Input	Output
1	AC	TO FUSE		○
2	AC	TO FUSE	○	



A1 APPENDIX: CONNECTORS

CN7

Pin No.	Signal	Specification	Input	Output
1	DC	<del>+24V</del> (-) 160 ~ 170 V		○
✗		↕		
✗ 2	DC	<del>-24V</del> (+) 160 ~ 170 V		○

- Supplied to CN1 on PS (DL-481).

CN8

Pin No.	Signal	Specification	Input	Output
1	Vcc	+ 5V		○
2	GND	GND		○
3				
4	ON/OFF		○	

- Supplies CN5 on PS (DL-481)