

Service Manual

Supplement - 3

ELECTRONIC THERMAL TRANSFER TYPEWRITER

KX-W50TH
KX-W60TH

Please use this manual for model No. KX-W50TH/W60TH with the serial number prefix "MA".

Name Plate

Panasonic
ELECTRONIC THERMAL TRANSFER
TYPEWRITER

MODEL NO. KX-W50TH

SERIAL NO. MA008000

Panasonic
ELECTRONIC THERMAL TRANSFER
TYPEWRITER

MODEL NO. KX-W60TH

SERIAL NO. MA004190

KX-W50TH

KX-W60TH

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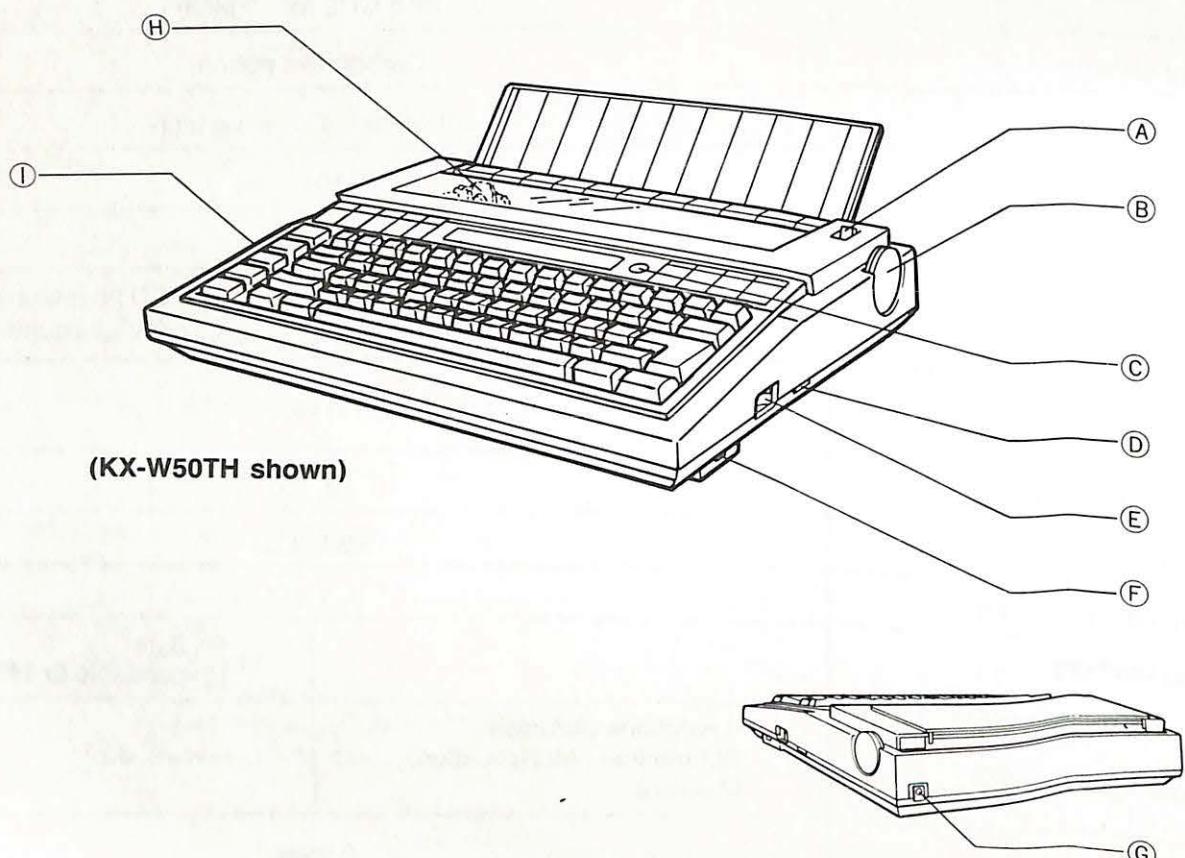
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1. Specifications

	KX-W50TH	KX-W60TH
Printing method	Thermal transfer (24 x 30 dot)	
Printing speed	15 CPS for 10 pitch 18 CPS for 12 pitch 22.5 CPS for 15 pitch	
Print ribbon	Carbon film ribbon	
Correction tape	Lift-off tape/Cover-up tape	
Paper capacity	10.0"	
Printing range	8.0"	
Display	LCD 15 characters	LCD 20 characters +3 digit counter
Printing characters and symbols	149	
Character pitch	10, 12, 15, PS	
Keyboard	KB I, II, III	
Line space	1, 1.5, 2	
Text memory		6K Byte (Expandable to 14K Byte)
Calculation function	4 functions (Addition, Subtraction , Multiplication, Division)	
Correction memory	2 lines	
Computer interface	Option (RP-K100 I/F Adaptor)	
Power supply	AC 120V 60Hz or Four D cell batteries	
Operating temperature	41°F-95°F (5°C-35°C)	
Dimensions	14 3/8" (W) x 11 7/16" (D) x 3 1/8" (H) (365 x 290 x 79 mm)	
Weight	Approx. 7.3 lbs (2.7 kg)	

Weights and dimensions shown are approximate. (Les poids et dimensions mentionnés sont approximatifs)
Specifications are subject to change without notice.

2. LOCATION OF CONTROLS



(A) ... Paper Release Lever

(B) ... Platen Knob

(C) ... Display Control

• Rotate to the right ... The displayed characters will be darker.

• Rotate to the left ... The displayed characters will be lighter.

(D) ... Print Density Control

• Turn the control to the front of the unit ... The characters printed will be darker.

• Turn the control to the rear of the unit ... The characters printed will be lighter.

(E) ... Power Switch

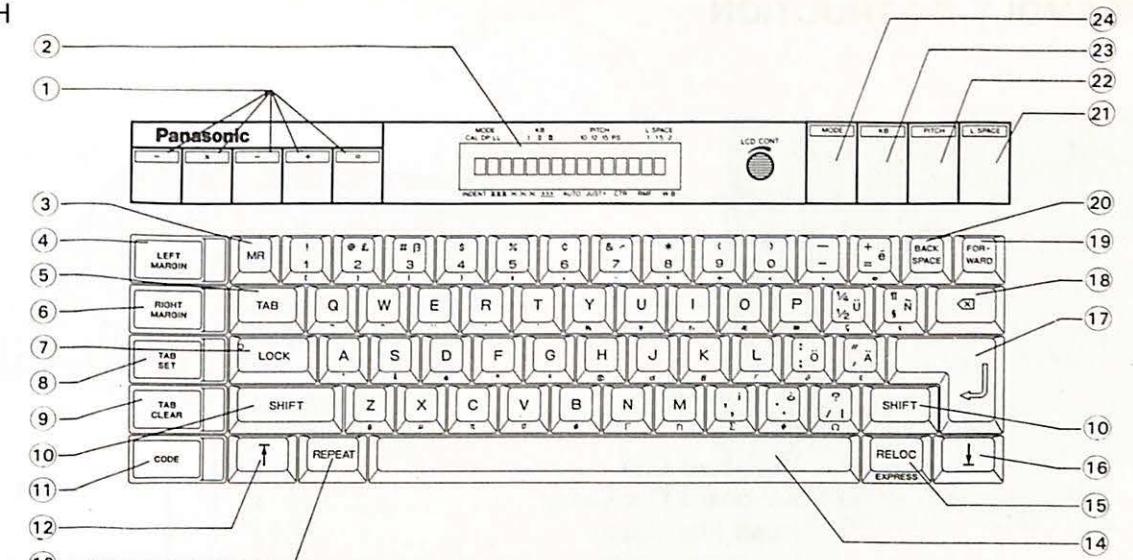
(F) ... Ribbon Select Switch

(G) ... AC Adaptor Connector

(H) ... Carriage

(I) ... Interface Connector (Left side)

KX-W50TH

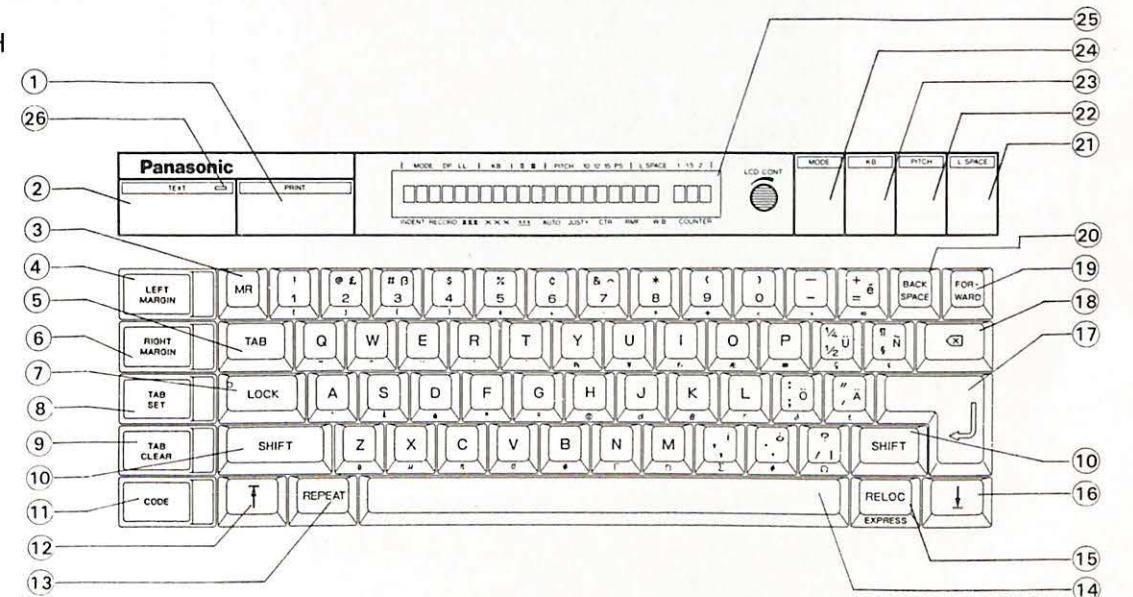


- ① ... Calculation Key
② ... LCD display
③ ... Margin Release Key
④ ... Left Margin Set Key
⑤ ... Tab Key
⑥ ... Right Margin Set Key
⑦ ... Shift Lock Key
⑧ ... Tab Set Key
⑨ ... Tab Clear Key
⑩ ... Code Key

- ⑪ ... Reverse Index Key
⑫ ... Repeat Key
⑬ ... Space Bar
⑭ ... Relocate Key
⑮ ... Index Key
⑯ ... Return Key
⑰ ... Cancel Key
⑱ ... Forward Key
⑲ ... Back Space Key

- ⑳ ... Line Spacing Select Key
㉑ ... Pitch Select Key
㉒ ... Keyboard Select Key
㉓ ... Mode Select Key

KX-W60TH



- ① ... Print Key
② ... TEXT Key
③ ... Margin Release Key
④ ... Left Margin Set Key
⑤ ... Tab Key
⑥ ... Right Margin Set Key
⑦ ... Shift Lock Key
⑧ ... Tab Set Key
⑨ ... Tab Clear Key
⑩ ... Code Key

- ⑪ ... Reverse Index Key
⑫ ... Repeat Key
⑬ ... Space Bar
⑭ ... Relocate Key
⑮ ... Index Key
⑯ ... Return Key
⑰ ... Cancel Key
⑱ ... Forward Key
⑲ ... Back Space Key

- ㉑ ... Line Spacing Select Key
㉒ ... Pitch Select Key
㉓ ... Keyboard Select Key
㉔ ... Mode Select Key
㉕ ... Text Indicator

- ㉕ ... LCD display

- 20 characters and three digits for the counter which show how many characters can be printed on the current line.

3. DISASSEMBLY INSTRUCTION

Procedure	To remove	Remove	Shown in Fig.
1 2 3	Cover	Platen Knob (A) x 1	Fig 3-1
		Screws (B) x 7	Fig 3-2
		Function Cable (C) x 1 (D) x 1	Fig 3-3
		LCD Cable (E) x 1	
4 5 6 7 8	Mechanism	Screws (F) x 4	Fig 3-3
		Keyboard Unit (G) x 1	
		Keyboard Flat Cable (H) x 1	
		Head Flat Cable (I) x 1	
		Correction Motor Cable (J) x 1	Fig 3-4
		Carriage Motor Cable (K) x 1	
		Paper Feed Motor Cable (L) x 1	
		Paper Out Sensor Cable (M) x 1	
		Solenoid Cable (N) x 1	
9		Home Sensor Cable (O) x 1	
		Screws (P) x 4	
10 11 12	P.C.B.	Screw (Q) x 1	Fig 3-4
		Print Density Control Cable (R) x 1	
		Power Supply Cable (S) x 1	
		Power Switch Cable (T) x 1	
		Ribbon Select SW Cable (U) x 1	
		Screws (V) x 6	
		Screws (W) x 2	
		Screws (KX-W60TH only) (X) x 4	

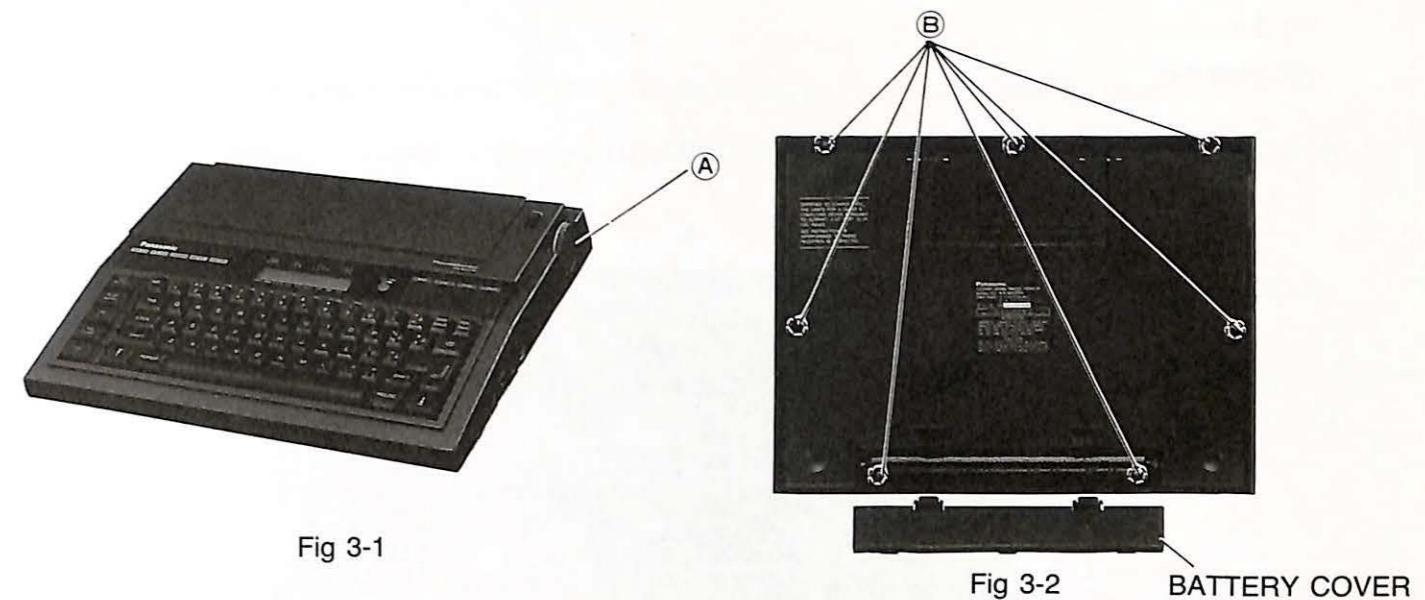
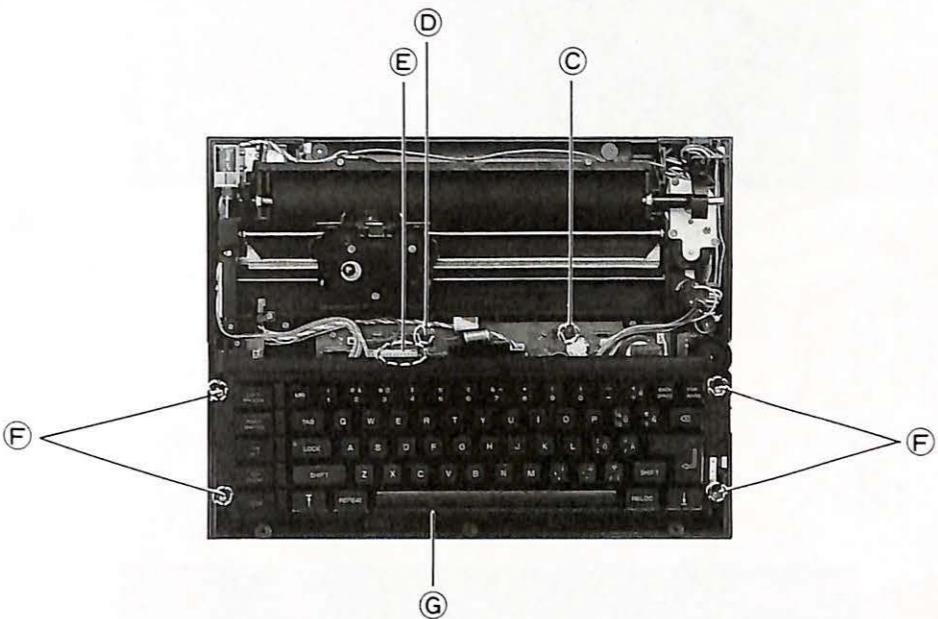


Fig 3-3
(KX-W50TH)



(KX-W60TH)

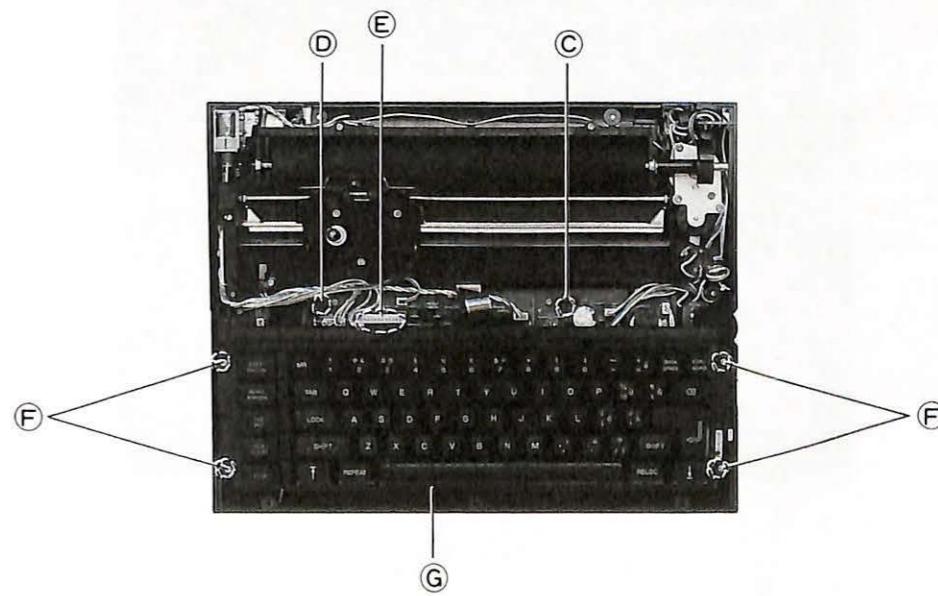
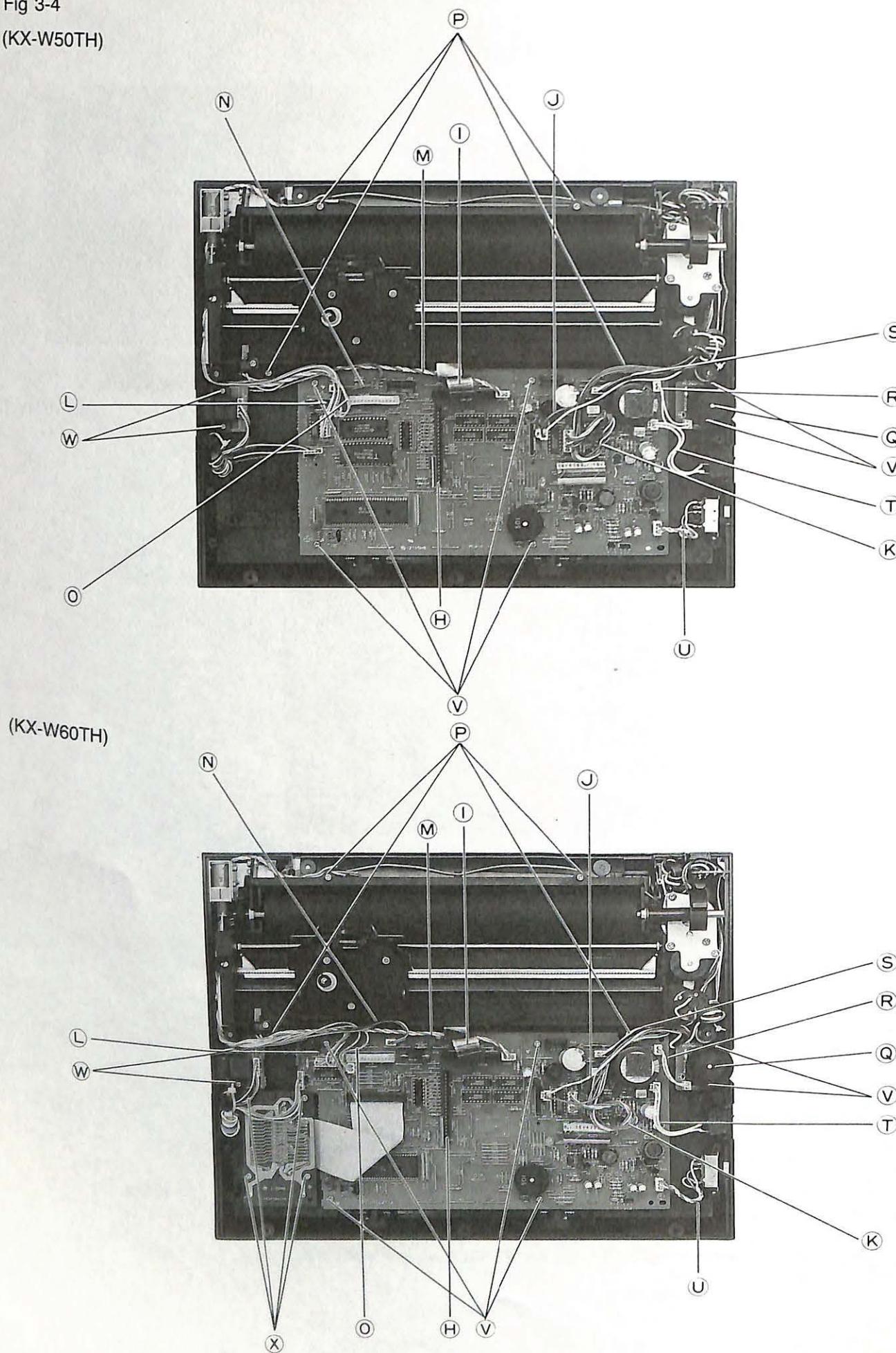


Fig 3-4
(KX-W50TH)



(KX-W60TH)

Carriage Removal

- (1) Remove the printing mechanism from the machine. (Refer to the disassembly instruction page 4).
- (2) Remove the screw, belt tension spring and tension frame **A** attached to the left side of the frame assembly.
- (3) Remove the timing pulley shaft(L_1) and timing pulley(L_2).
- (4) Remove the E-rings **B** and **C** from carriage shaft, and then remove the two screws from the solenoid block.
- (5) Slide the carriage shaft out to the left side. (Do not scratch the shaft).
- (6) Remove the E-ring **D** from correction shaft (Refer to Fig 3-6), and slide the correction shaft assembly out to the right side.
- (7) Remove the two screws and the carriage motor bracket assembly.
- (8) Remove the timing belt from the timing pulley(R).
- (9) Move the head flex holder B in the direction of the arrow and remove it (Fig 3-7).

(Note) Assemble in the reverse order.

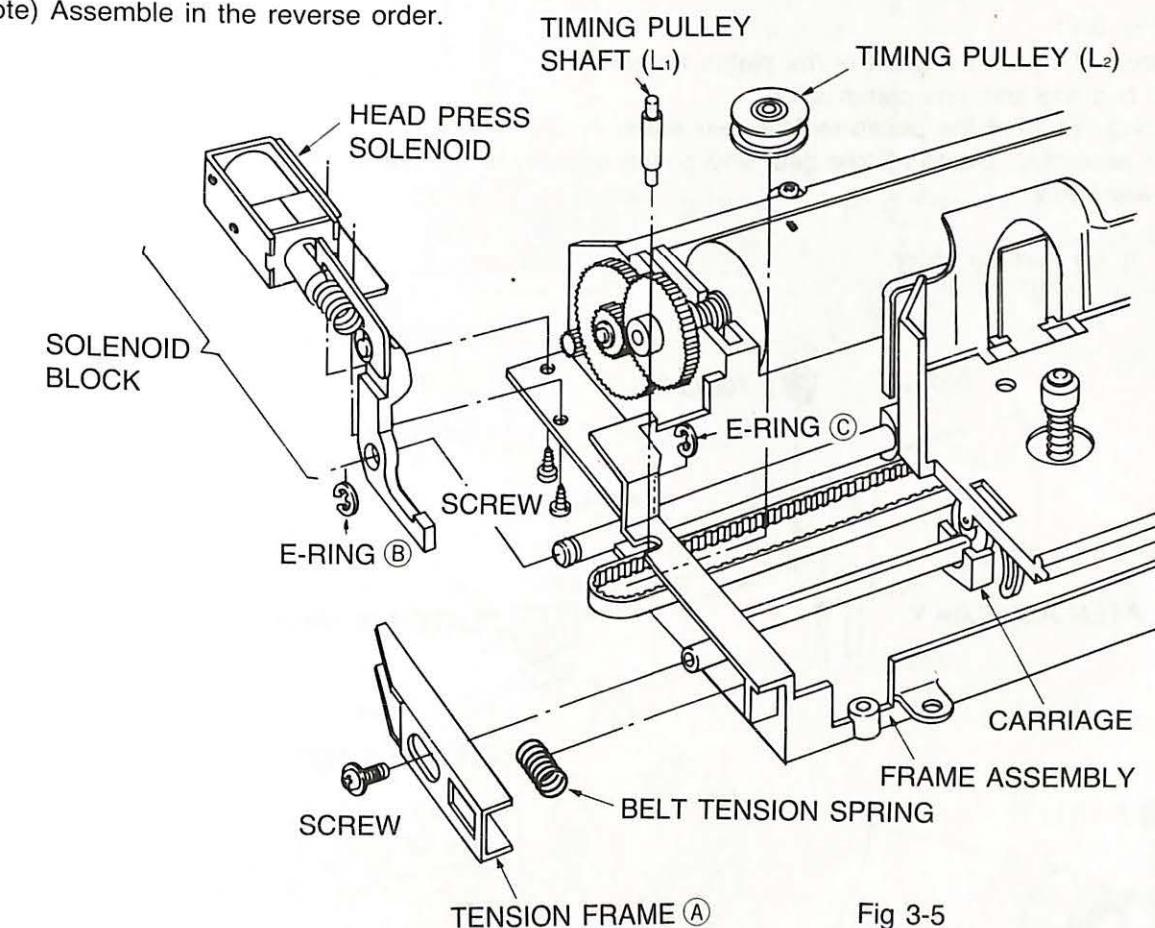


Fig 3-5

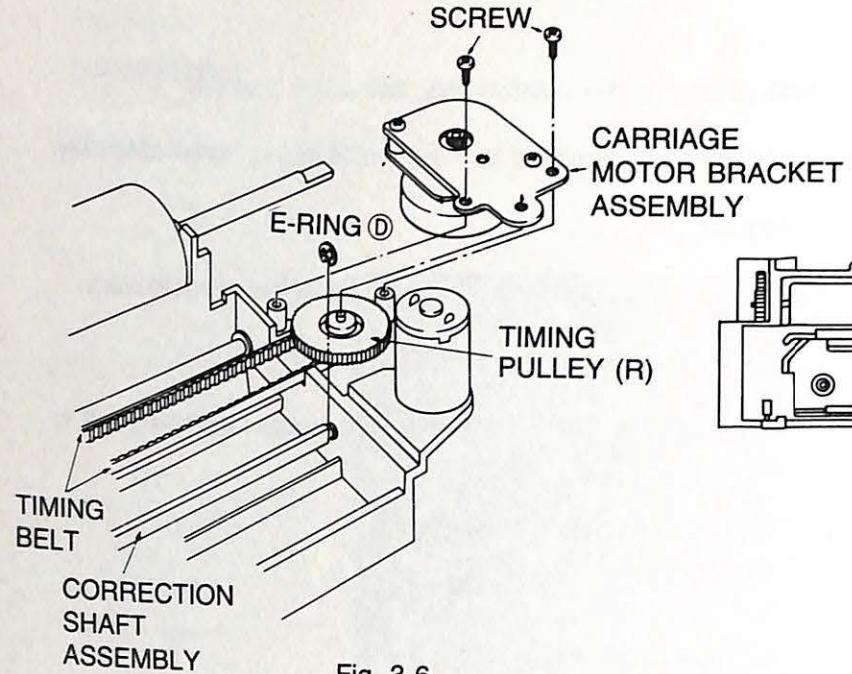


Fig. 3-6

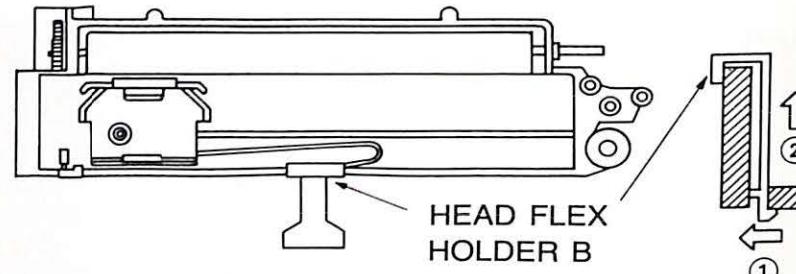


Fig. 3-7

Platen Removal (Fig. 3-8)

- 1) Remove the E-ring (E) from the shaft of the platen assembly.
- 2) Slide the platen bushing from the platen shaft.
- 3) Remove the E-ring (F) from the platen middle gear shaft.
- 4) Slide the platen assembly, platen middle gear and platen bushing to the left of the frame, then lift the platen assembly from the frame.

NOTE: Assemble in the reverse order.

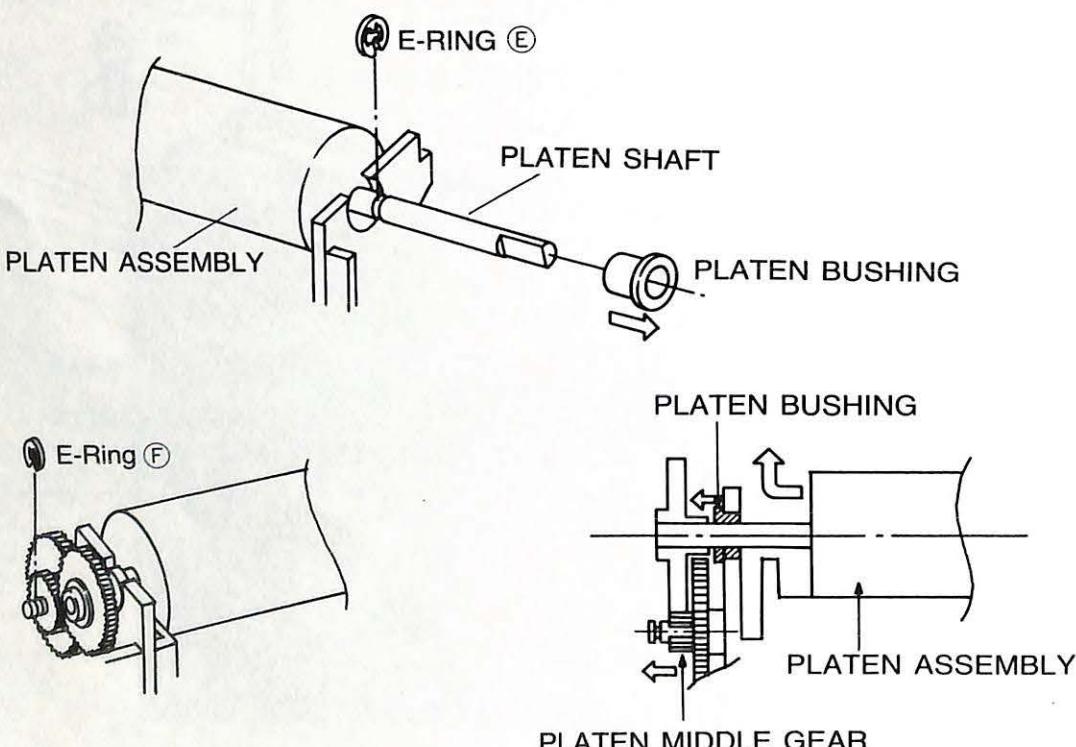


Fig 3-8

Carriage Disassembly

- (1) Remove the two screws and then the align scale. (Fig. 3-9)
- (2) Remove the two E-rings from the cassette holder shaft, and then lift the cassette holder up. (Fig. 3-9)
- (3) Remove the head flex holder A by pulling in the direction of the arrow. (Fig. 3-11)
- (4) Unhook the head spring, and remove the head holder and thermal head assembly. (Fig. 3-10)
- (5) Remove the three screws and then the carriage cover. (Fig. 3-10)

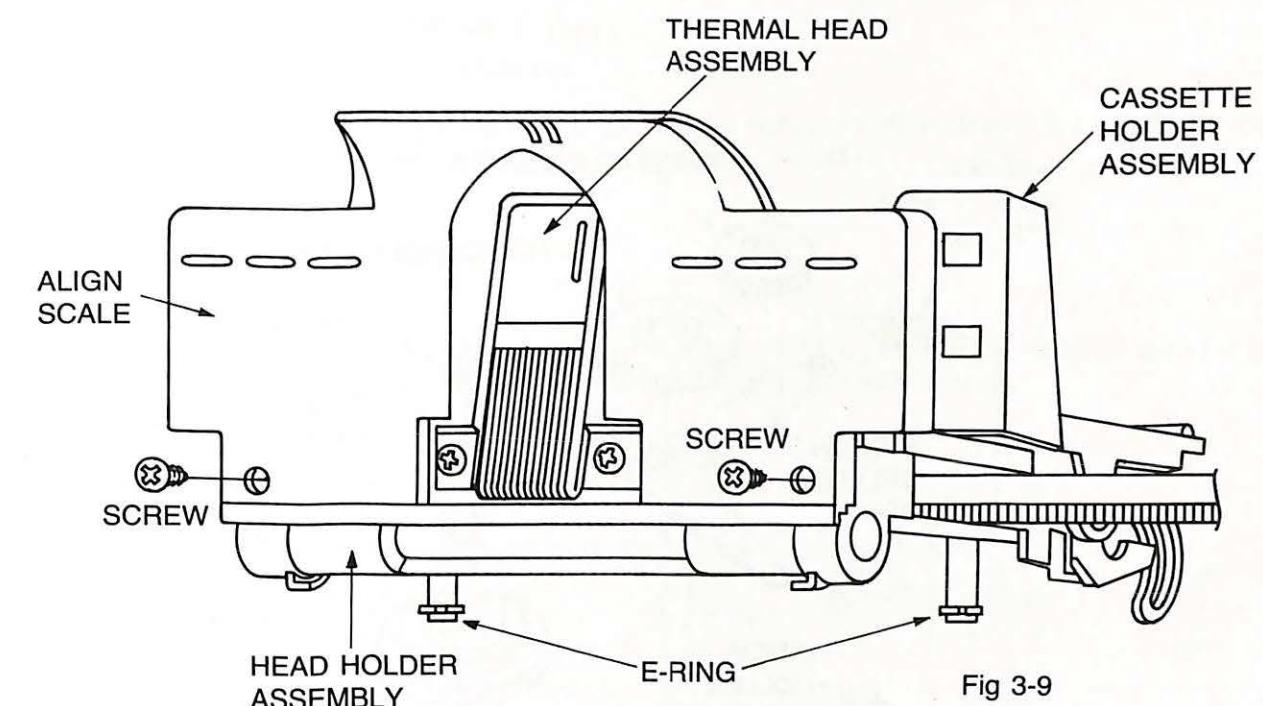


Fig 3-9

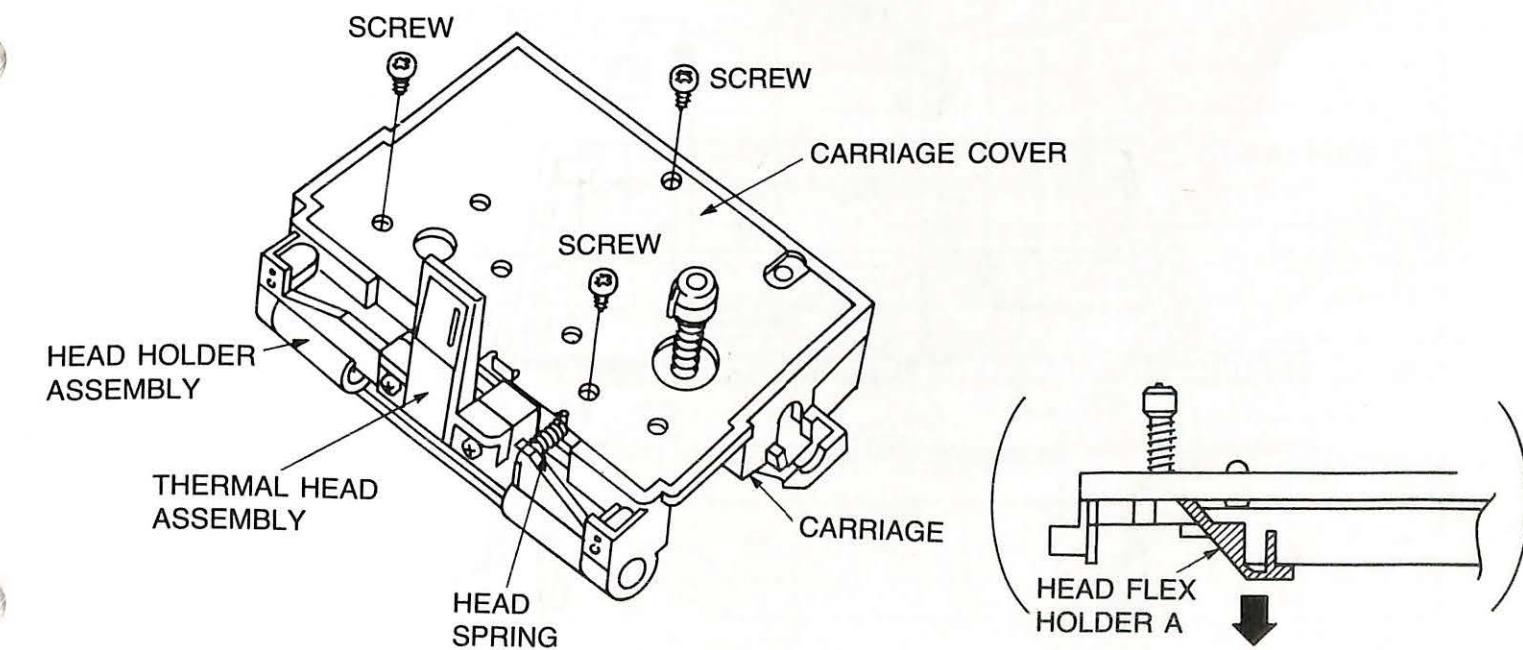


Fig 3-10

Fig 3-11 (REAR VIEW)

- (6) Remove the ribbon idle gears A and B. (Fig. 3-12)
- (7) Unhook the ribbon select arm spring and remove it.
Remove the ribbon select arm. (Fig. 3-12)
- (8) Remove the ribbon pulley. (Fig. 3-12)
- (9) Remove the intermittent winding lever and then the intermittent winding cam. (Fig 3-12)
- (10) Remove the E-ring from the shaft and slide the ribbon winding gear assembly out. (Fig. 3-12)
- (11) Remove the two pinch rollers. (Fig. 3-12)
- (12) Remove the timing belt. (Fig. 3-12)

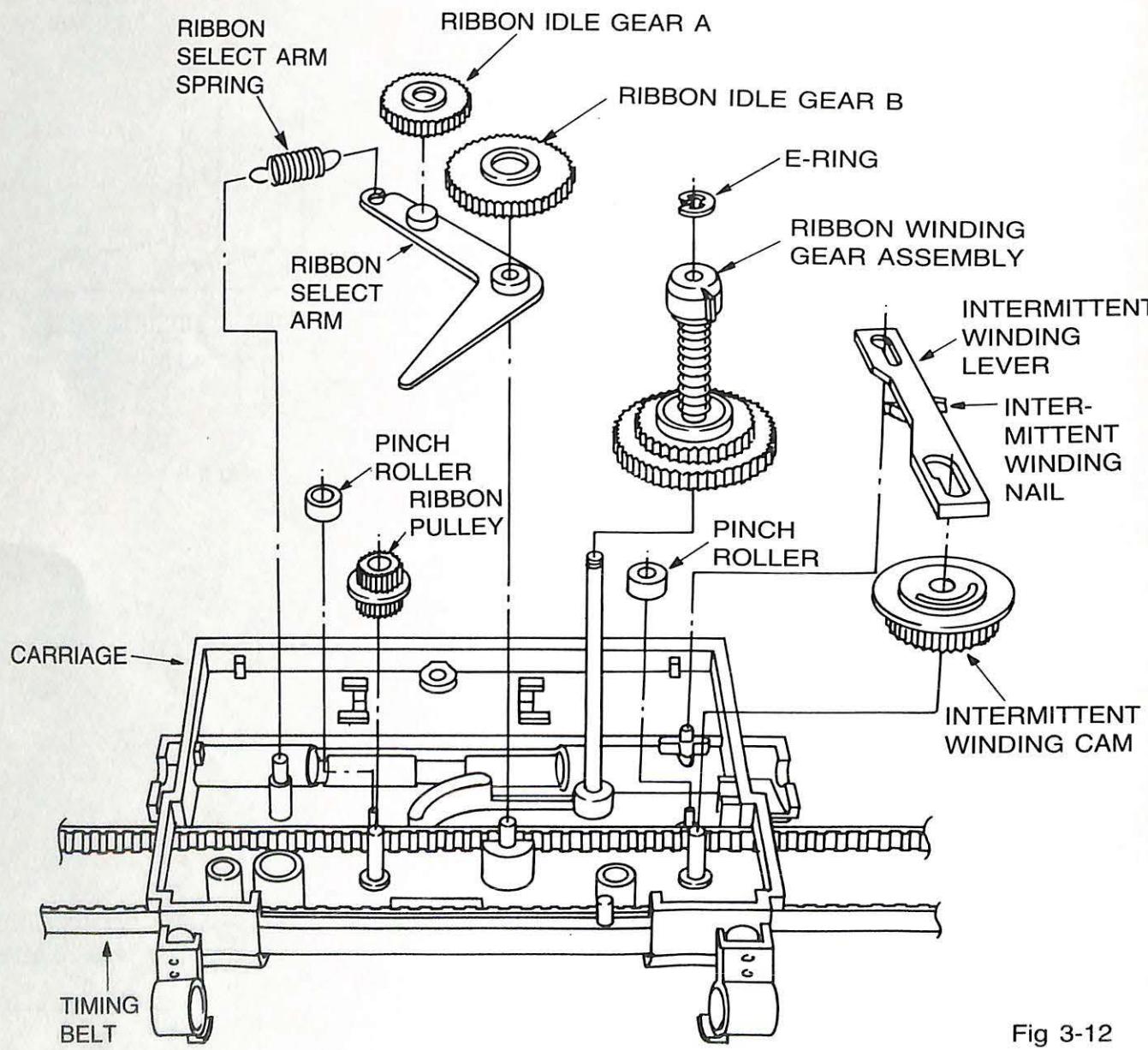


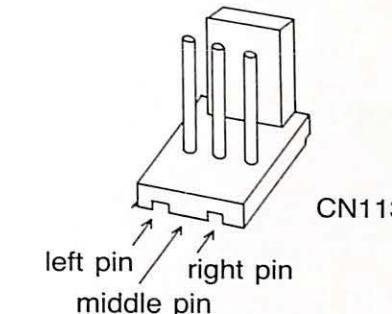
Fig 3-12

4. ADJUSTMENT OF THERMAL HEAD VOLTAGE

All thermal heads for this unit do not have the same resistance. When the thermal head is replaced, adjust the thermal head voltage by the following procedure. DC digital voltmeter and a small screw driver are required.

Step 1

Turn the Power off



Step 2

Create a short circuit between the middle pin and the right pin of CN113 on the Main P.C.B. Connect a DC digital voltmeter with the left pin and the shorted pins of CN113.

Step 3

Power on with using AC adaptor.

Step 4

Set thermal head voltage by rotating variable resistor VR101 on Main P.C.B according to the specified voltage which corresponds with the resistance of the individual thermal head. Refer to the following specified voltage table.

(Note) Specified voltage has $\pm 0.03V$ tolerance.

Specified voltage table for thermal head (Revised)

Resistance of thermal head	Specified voltage ($\pm 0.03 V$)
55Ω	6.81 V
56Ω	6.84 V
57Ω	6.88 V
58Ω	6.91 V
59Ω	6.96 V
60Ω	6.99 V
61Ω	7.03 V
62Ω	7.08 V
63Ω	7.12 V
64Ω	7.16 V
65Ω	7.18 V
66Ω	7.23 V
67Ω	7.28 V
68Ω	7.33 V
69Ω	7.38 V
70Ω	7.43 V
71Ω	7.48 V
72Ω	7.53 V
73Ω	7.58 V
74Ω	7.63 V

5. TEST PRINT

5.1 Operation

- While holding the  key down, turn the unit on. This starts the test print mode.

5.2 Display will read “** Printing”

- In test print mode, all characters will be printed in the following order;

Printing Order

No.	Enlarge	Bold	Super/Sub Script	Pitch
1				10
2				15
3			Super	10
4			Super	15
5			Sub	10
6			Sub	15
7		ON		10
8		ON		15
9		ON	Super	10
10		ON	Super	15
11		ON	Sub	10
12		ON	Sub	15
13	ON			10
14	ON			15
15	ON		Super	10
16	ON		Super	15
17	ON		Sub	10
18	ON		Sub	15
19	ON	ON		10
20	ON	ON		15
21	ON	ON	Super	10
22	ON	ON	Super	15
23	ON	ON	Sub	10
24	ON	ON	Sub	15

After the last characters of the each case, three "H" are printed and then erased.

Print Sample

5.3 Paper Out Sensor

When printing on one sheet of paper is finished, the "END OF PAPER" message is displayed. To continue, insert a new sheet of paper and press the  key.

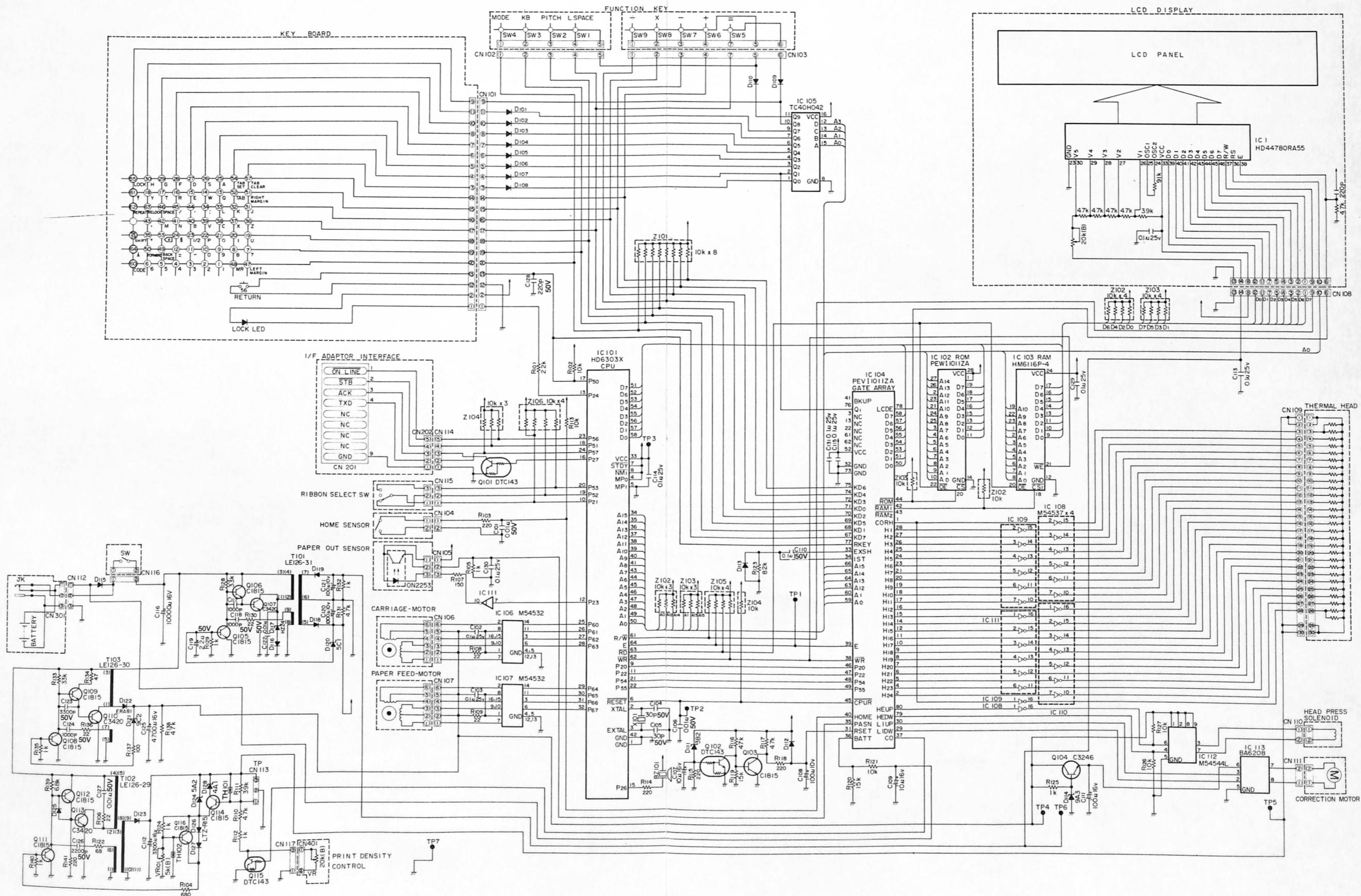
5.4 Termination

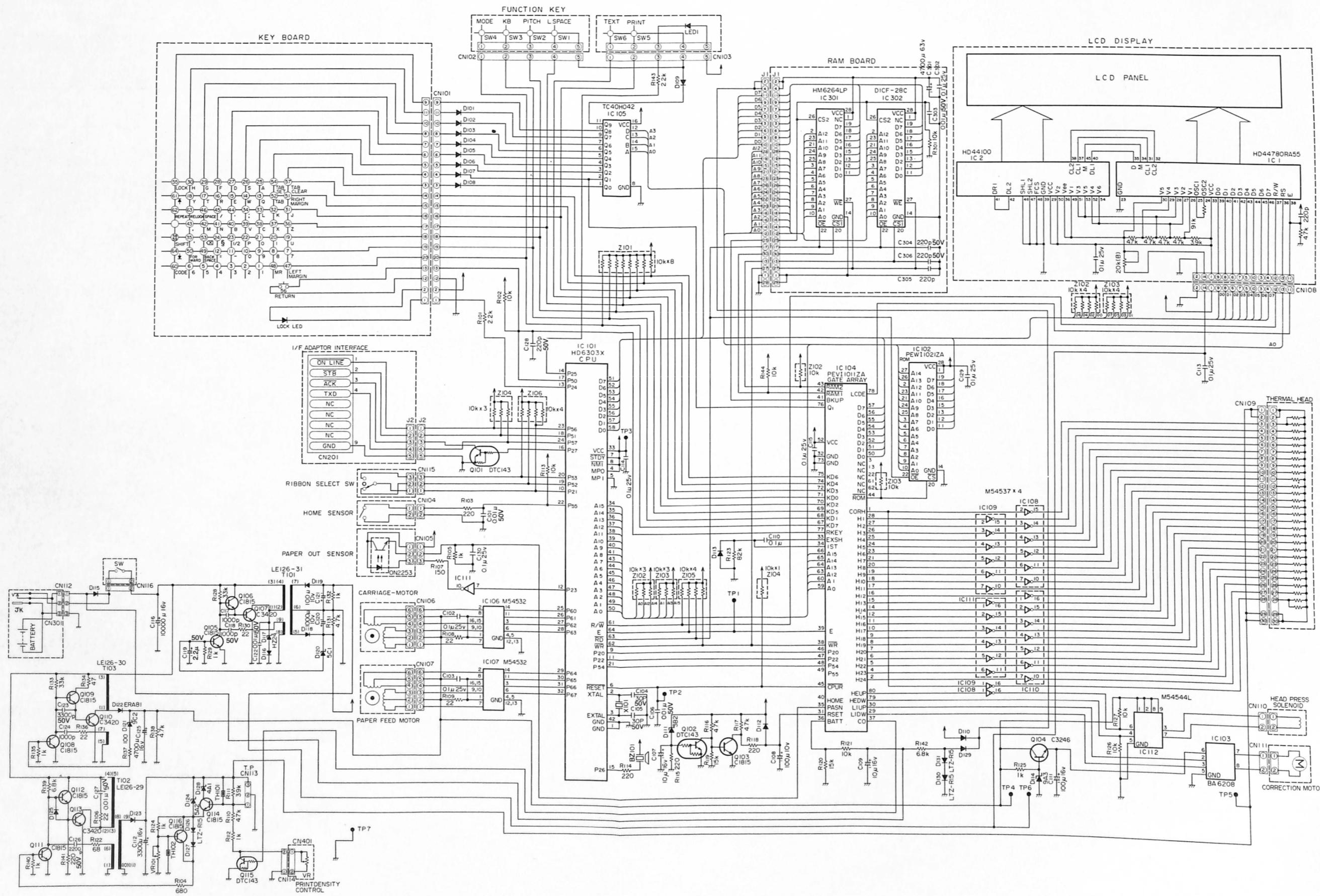
Test printing is continuously repeated in all the 24 type cases. Each case requires two or three lines. To terminate test printing, press the  key.

The unit is now ready for typing.

6. SCHEMATIC DIAGRAM

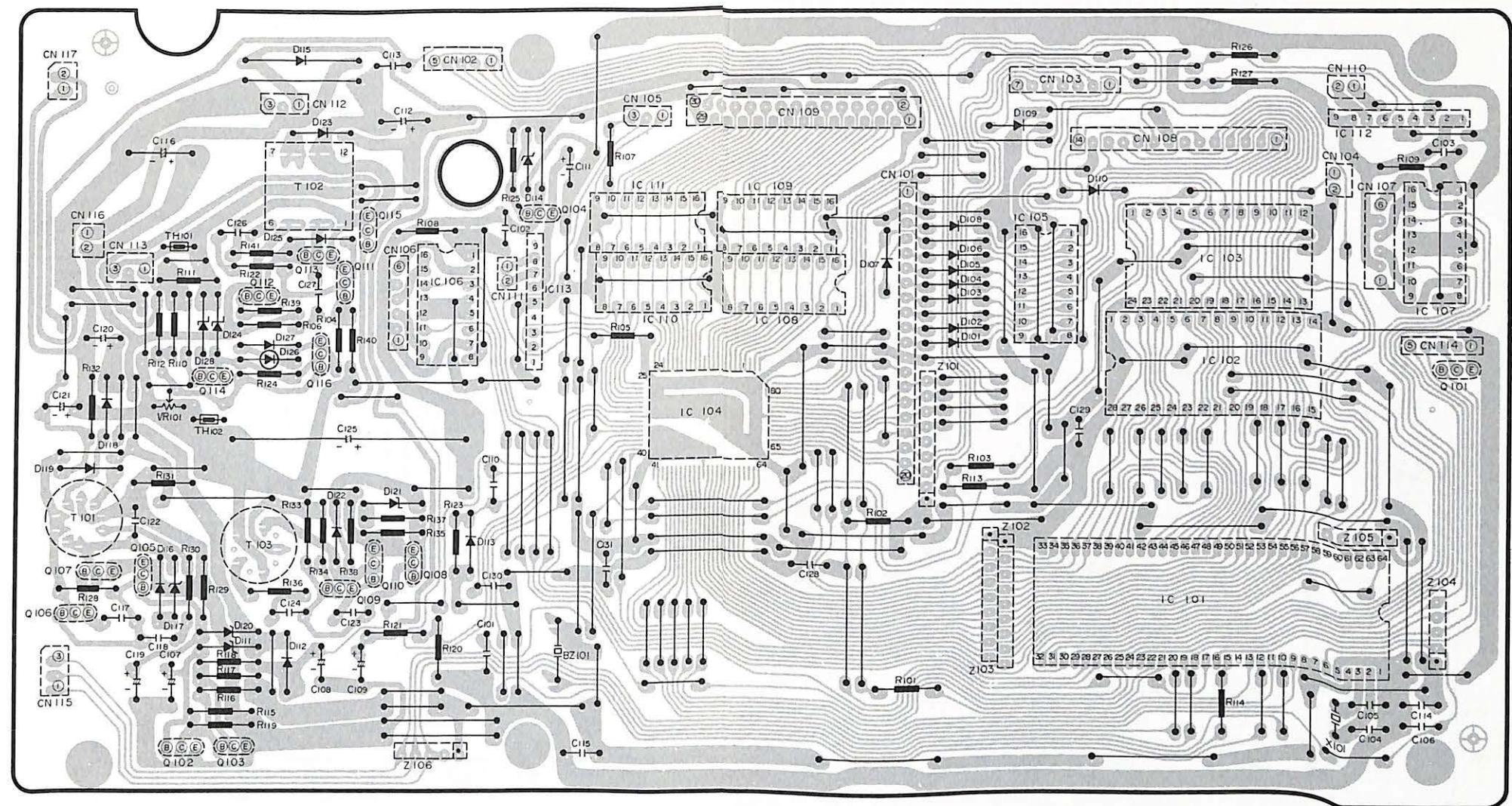
KX-W50TH



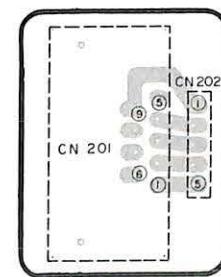


7. PRINT CIRCUIT BOARDS

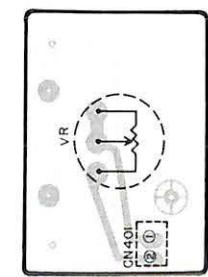
KX-W50TH



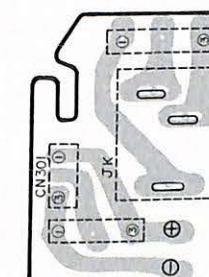
Main Board



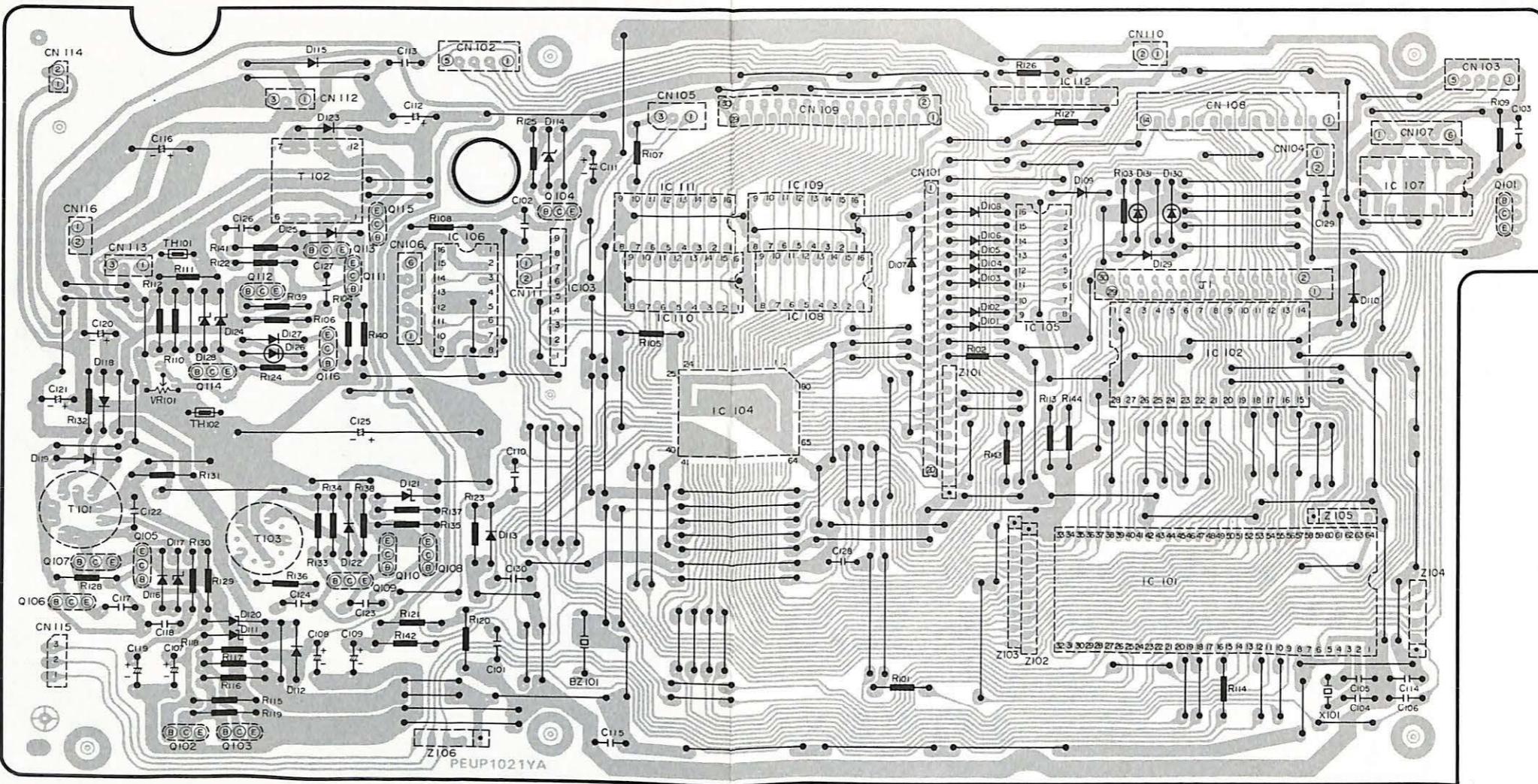
I/F Board



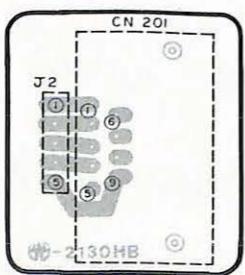
Density Control Board



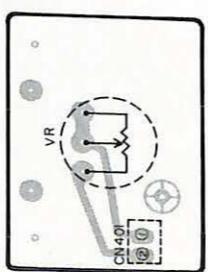
Power Input Board



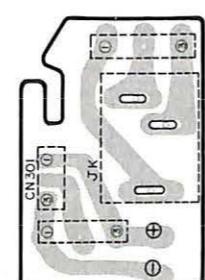
Main Board



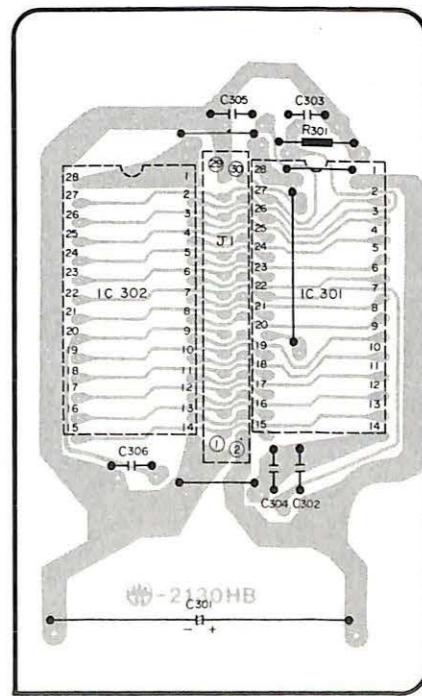
I/F Board



Density Control Board

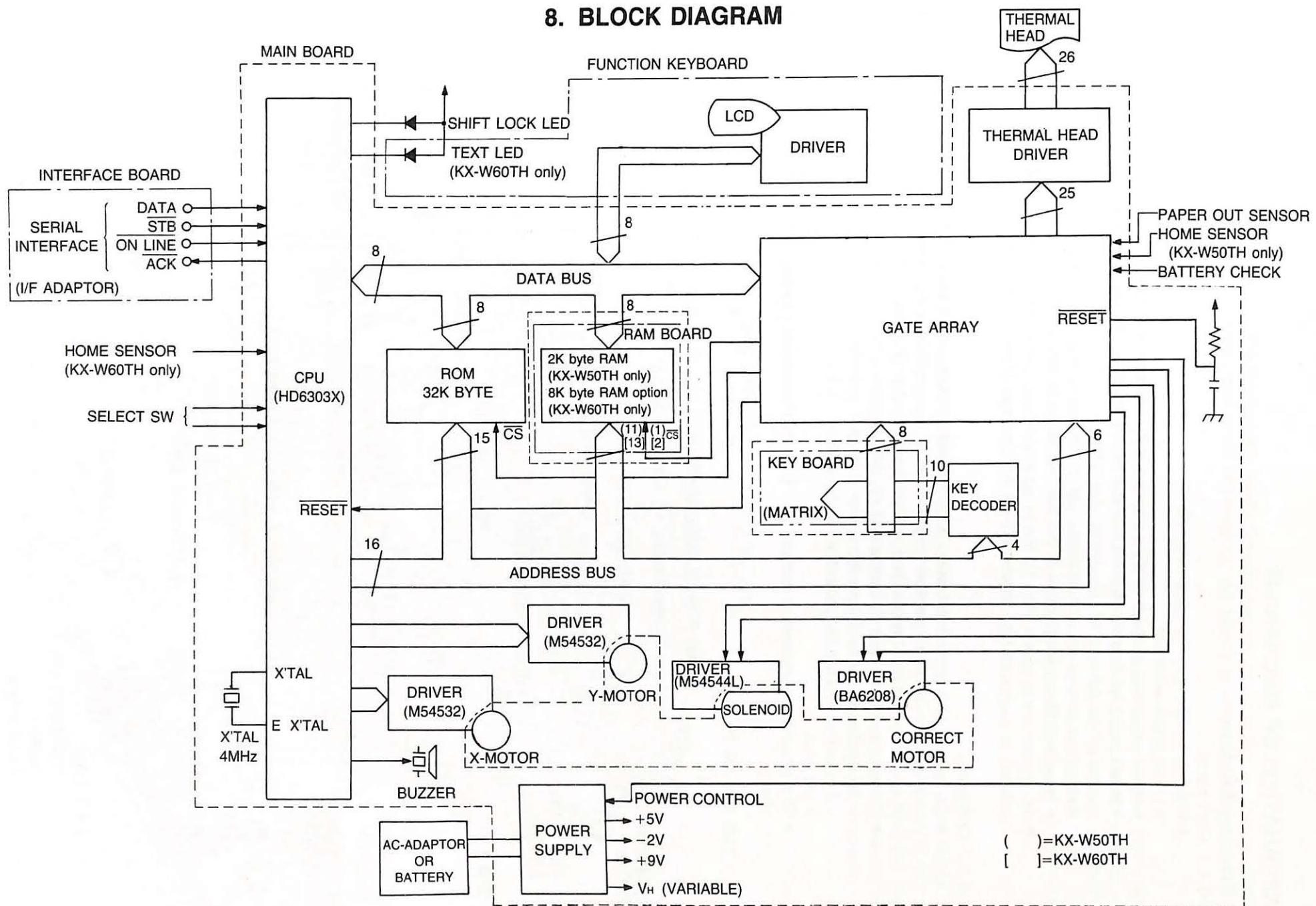


Power Input Board



RAM Board

8. BLOCK DIAGRAM



9 EXPLANATION OF MECHANISM

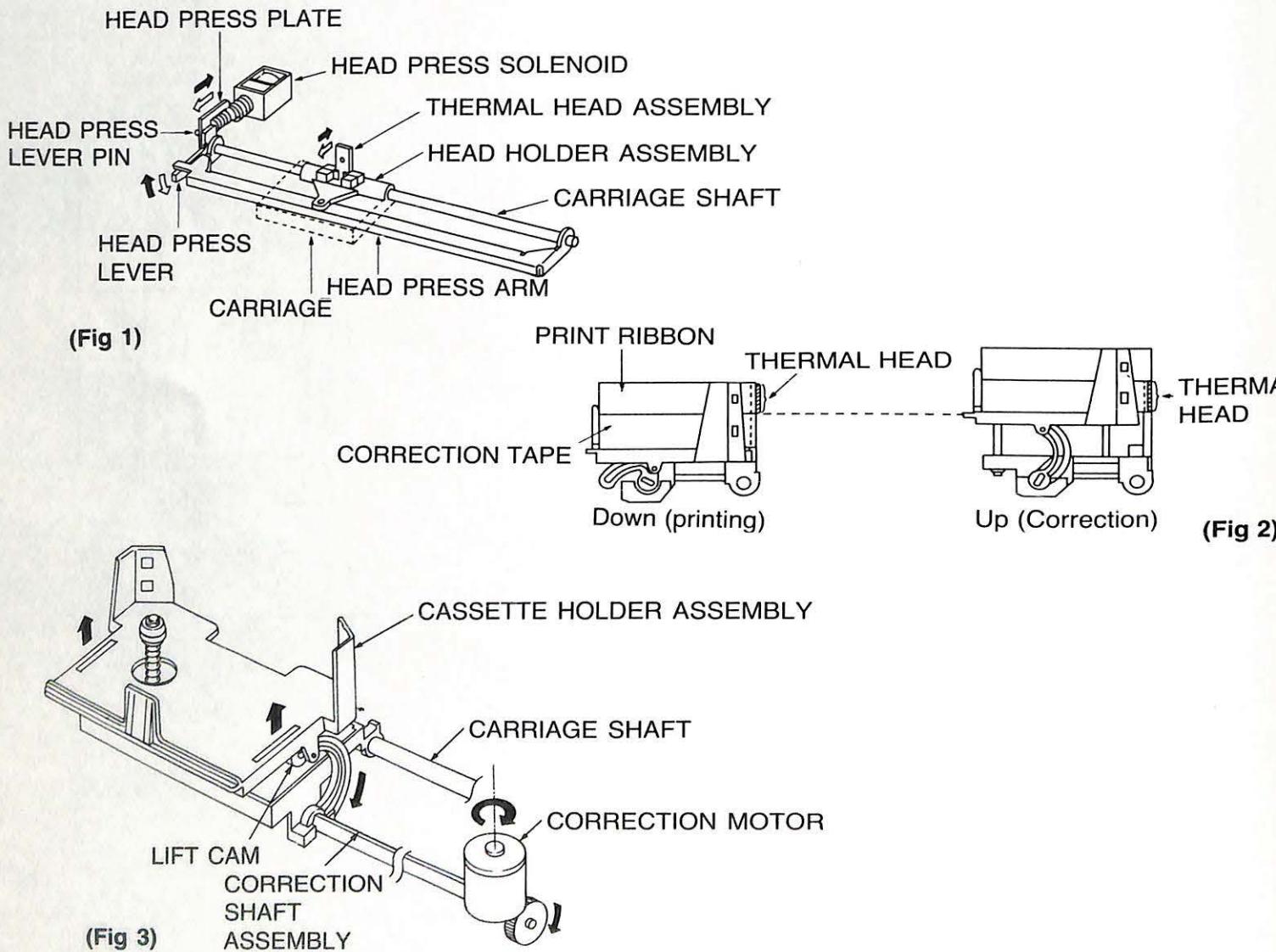
9.1. Printing Section

9.1.1 Print Head

- Printing mechanism is composed of;
 - Head press solenoid
 - Head press plate which is linked to the solenoid and the head press cover
 - Head press lever which transforms the slide movement of the head press plate to rotational movement at the fulcrum of the carriage shaft.
 - Head press arm which transmits rotating movement to the head holder
 - Head holder assembly which the thermal head is attached.
- As shown in the figure (Fig. 1), the head press solenoid engages the thermal head. In this condition, printing is performed by movement of the carriage (Thermal Head)

9.1.2 Correction

- Correction of a printed character is performed by the lower of the two cartridges (correction tape cartridge). That is, the correction tape is lifted to the position of thermal head. In the character which is to be corrected will be covered with white ink twice. (Fig. 2)
- Correction mechanism is composed of; (Fig. 3)
 - Correction motor with correction worm gear
 - Correction shaft with correction worm wheel
 - Lift cam
- The rotating movement is transformed to slide movement (up-down) by the worm gear and the Lift cam.



9.2 Ribbon Feed Section

- Winding of ribbon is controlled by the mechanism inside the carriage as shown in Fig. 4. That is, when printing, the ribbon is wound continuously and when not printing, the ribbon is wound intermittently.

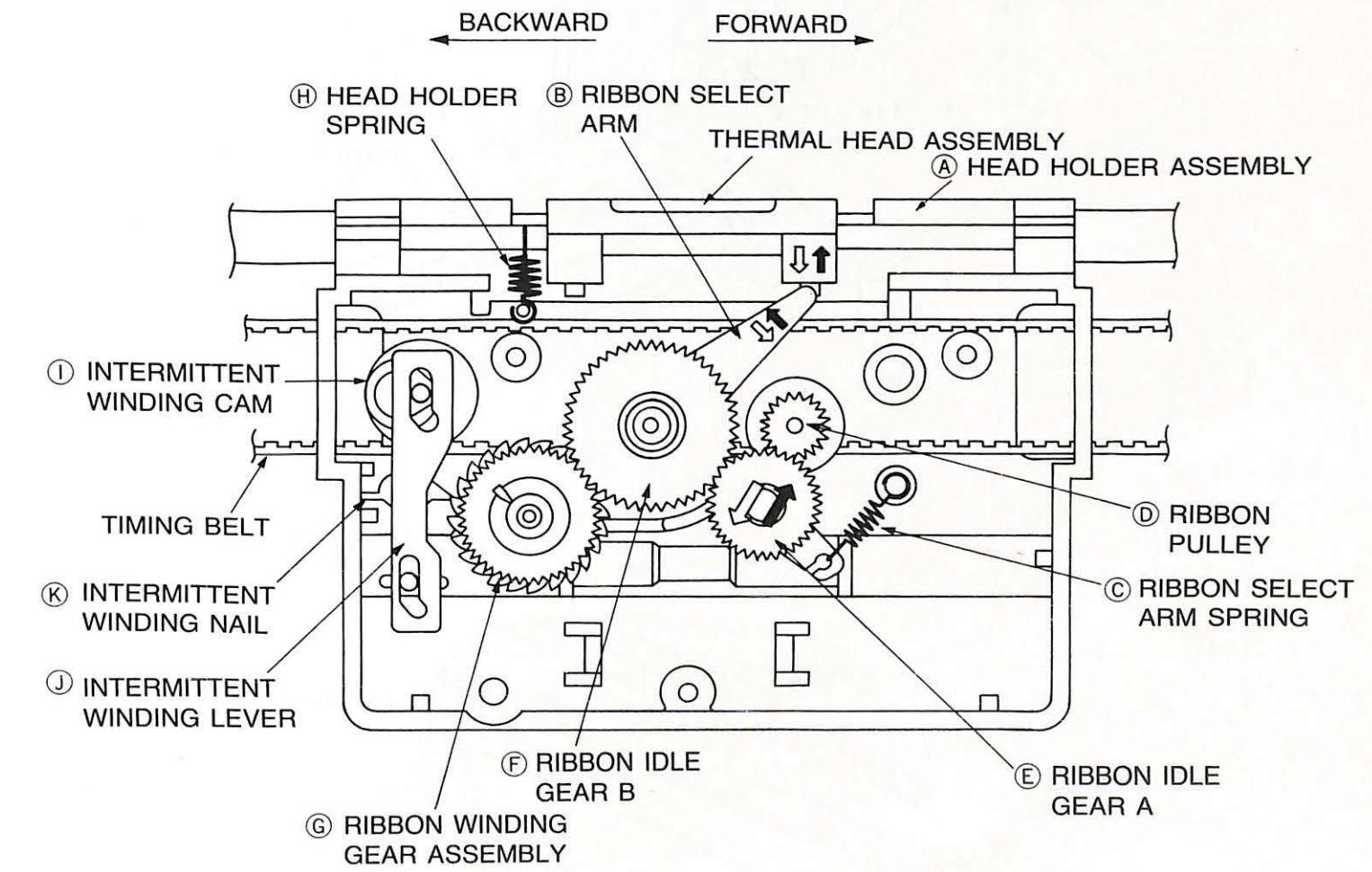
Winding Mechanism

1) When Printing

When printing, the head holder assembly ④ moves toward the platen because the head press solenoid is energized. The ribbon select arm ⑤ (which presses against the head holder assembly ④) also moves towards the platen because of the ribbon select arm spring ⑥. This causes the ribbon idle gear ⑦ to engage in the ribbon pulley ⑧. Since the ribbon pulley ⑧ is rotated by the timing belt during carriage movement, rotating power is transmitted from ⑧→⑨→⑩→⑪(ribbon winding assembly) and ribbon is wound continuously.

2) When Not Printing

When not printing, the head holder assembly ④ is held away from the platen by the head holder spring ⑫. Because of this, the ribbon idle gear ⑦ is not engaged in the ribbon pulley ⑧ so continuous rotating power is not transmitted by the timing belt to the ribbon winding assembly ⑪. At this time the ribbon is wound intermittently by the following means. The intermittent winding cam ⑨ is rotated by the timing belt. This cam drives the intermittent winding lever ⑩, which drives the ribbon winding gear assembly ⑪ by means of the intermittent winding nail ⑪.



(Fig 4)
TOP VIEW WITHOUT
CARRIAGE COVER

9.3. CARRIAGE SPACING SECTION

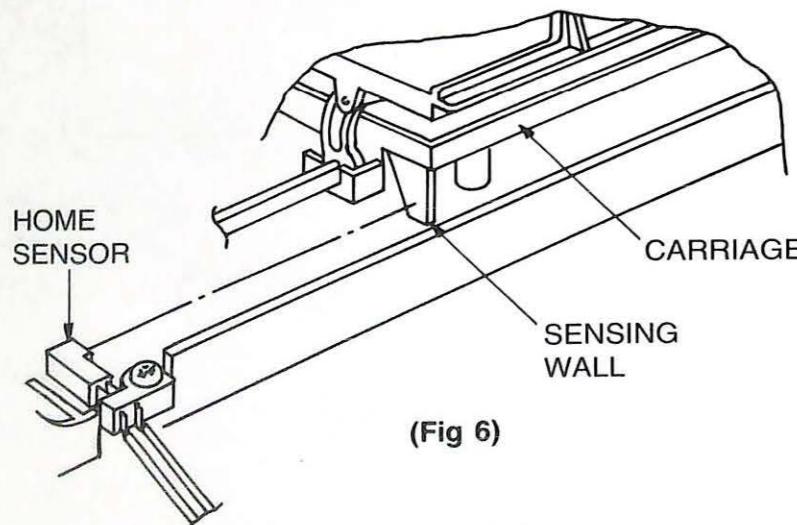
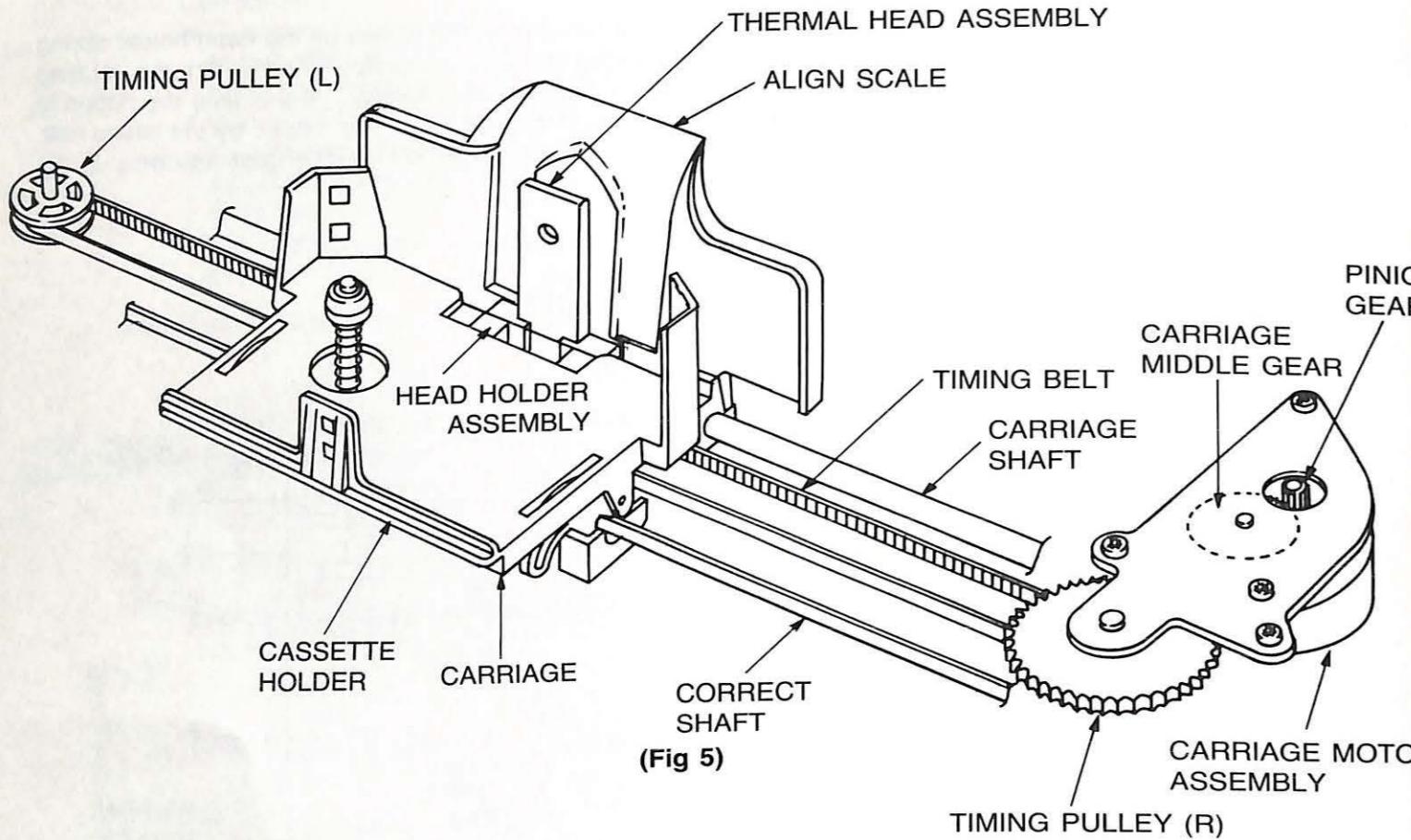
Carriage movement is provided by a stepping motor controlled by the logic board. The carriage motor is a stepping motor which operates in 7.5° increments for each pulse received, moving the carriage 1/180 inch to the left or right per pulse. The Ribbon cassette holder is mounted on the carriage and the align scale is attached with 2 screws.

9.3.1 Power Transmission Mechanism

Revolution of the carriage motor is transmitted to the carriage through the pinion gear on the motor shaft, carriage middle gear, timing pulley (R) (L) and the timing belt. (Fig. 5)

9.3.2 Home sensor

The home sensor is used for setting the home position for the carriage spacing operation. The home position is detected when the sensing wall of the carriage pushes the home sensor. (Fig. 6)



9.4. Paper Feed Section

9.4.1 Power Transmission Mechanism

Revolution of the platen feed motor is transmitted to the platen gear through the platen middle gear. (Fig. 7)

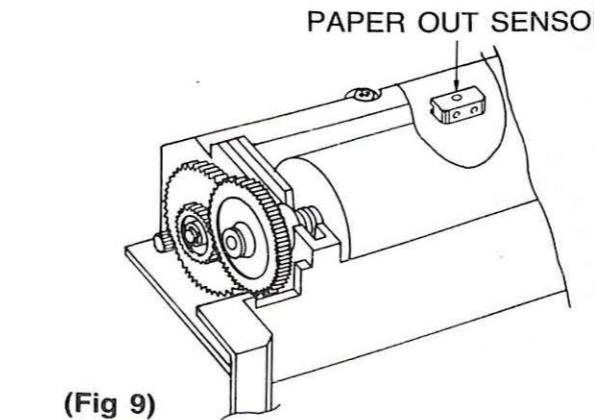
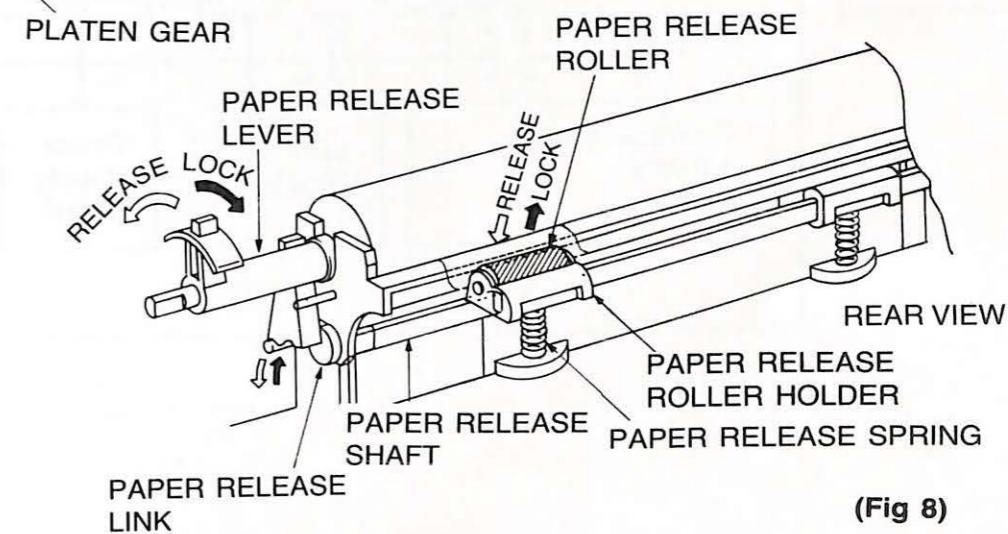
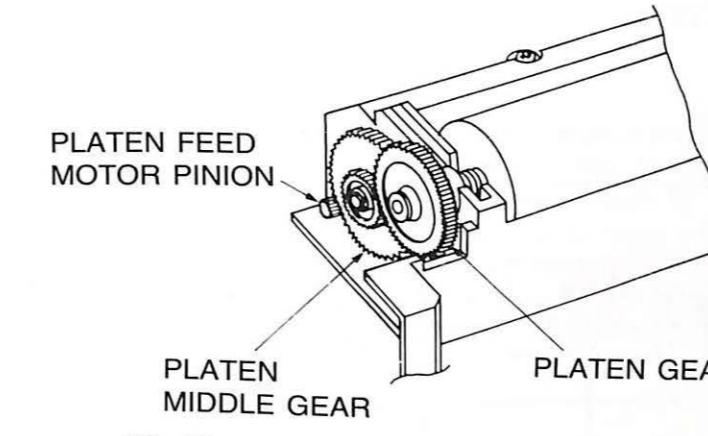
9.4.2 Friction Feed Mechanism (Fig. 8)

The friction feed mechanism consists of the paper release roller and the paper release roller holder which apply pressure to the platen, the paper release spring which gives pressure to the roller and roller holder, the paper release shaft, the paper release link which turns the shaft, and the paper release lever which guides the paper release link.

Pulling on the paper release lever in the direction of the arrow (↗) causes the paper release shaft to rotate, forcing the paper release springs downward and allowing the rollers to move away from the platen.

9.4.3 Paper Out Detector (Fig. 9)

During continuous printing, the paper out sensor detects the end of the paper and outputs an electric signal. An interrupting type photo sensor, located in opposition to the platen, detects the absence of paper and generates the "END OF PAPER" signal.



10 EXPLANATION OF ELECTRONIC OPERATION

10.1. Principle of Operation

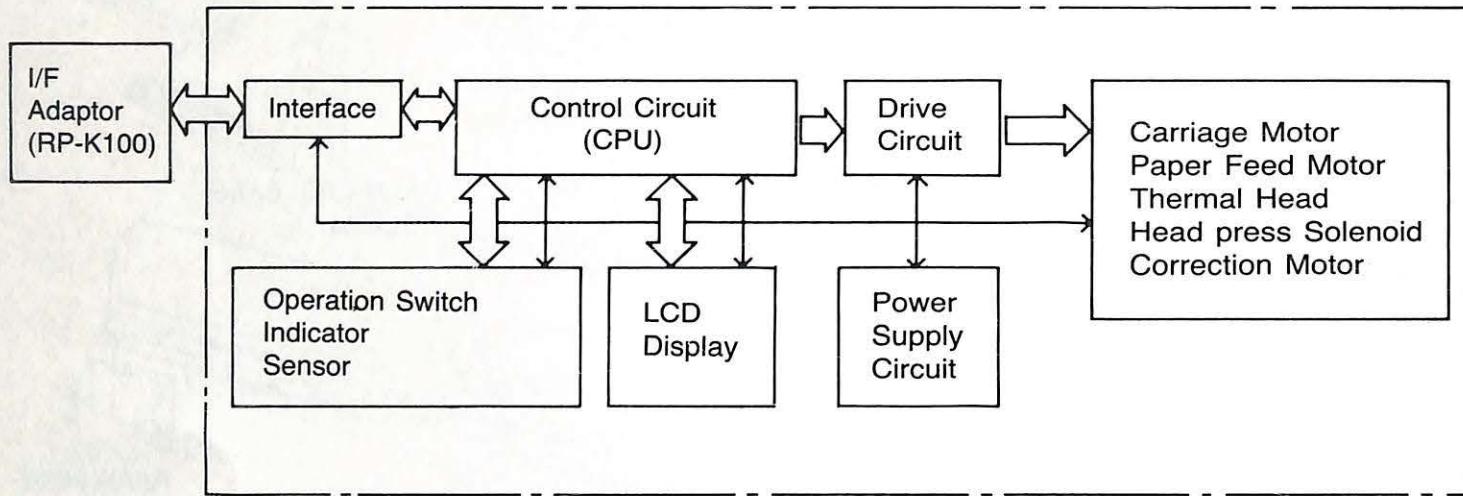
In this chapter, the basic operation of the electronic circuitry of the KX-W50TH/W60TH thermal transfer typewriters are explained.

The KX-W50TH/W60TH have two sensors. One sensor is a photo sensor, which senses a paper out condition. The other sensor is a mechanical switch, which is the home sensor for the carriage assembly. The typewriter has five drive circuits which drive: the carriage motor, the paper feed motor, thermal head, the head press solenoid and the correction motor. There is a three position mechanical switch which is used for ribbon selection.

The KX-W50TH/W60TH Keyboard functions are the: type mode selector, keyboard selector, type pitch selector, line space selector, text switch, print on/off switch, text key LED, which indicates the status of the text mode (KX-W60TH only), mathematical function switches (KX-W50TH only), the LCD display and the display contrast knob.

The mode status indicators of both machines display the setting of the: typing mode, keyboard, type pitch, line space, indent, bold print, enlarge print, auto underline print mode, auto return, justification mode, auto centering, the right margin flush mode, weak battery, and the text record status (KX-W60TH only).

LOGIC DIAGRAM



10.2. Circuitry

10.2.1. Power Supply Block

(1) Power and filter section

The power from the AC adaptor or the batteries is supplied to the power switch. The absorption capacitor (C116) together with the filter removes noise entering the circuit from the power source. The capacitors are also used for eliminating noise leaving the typewriter to the power line.

As a result, the typewriter's digital circuitry operates stable, and will be unaffected by noise entering the circuit from the outside and prevents noise from leaving the typewriter.

(2) Power Circuitry

In this circuit, the Primary DC power passes through a switching regulator circuit, thus providing the necessary voltages for the control circuitry and drive circuitry. The voltage for the thermal head is varied with the density controller (VR). Variable range is from 0-1.5 volts.

The following voltages are supplied:

DC +9V	: Stepping motor, Head press solenoid and DC motor
DC +6~7.5V	: Thermal head
DC +5V	: CMOS logic and Interface
DC -2V	: LCD Display

During correction operation the thermal head voltage rises to its maximum voltage, this will happen regardless of the density control knob setting.

Since all the thermal heads for this unit do not have the same resistance, adjustment of thermal head voltage is required.

Set thermal head voltage by rotating Variable resistor VR101 on Main P.C.B. according to the specified voltage which corresponds with the resistance of the individual thermal head (Refer to section 4. Adjustment of thermal head voltage).

10.2.2 Reset Circuit

The reset circuit is provided to initialize the CPU HD6303X (IC101). About 300m-sec after the +5V is supplied to IC101, the reset signal on pin ④5 of IC104 changes from L to H. In the standing state Q102 is turned on because of D111 and R115 voltage divider, and Q103 is not turned on.

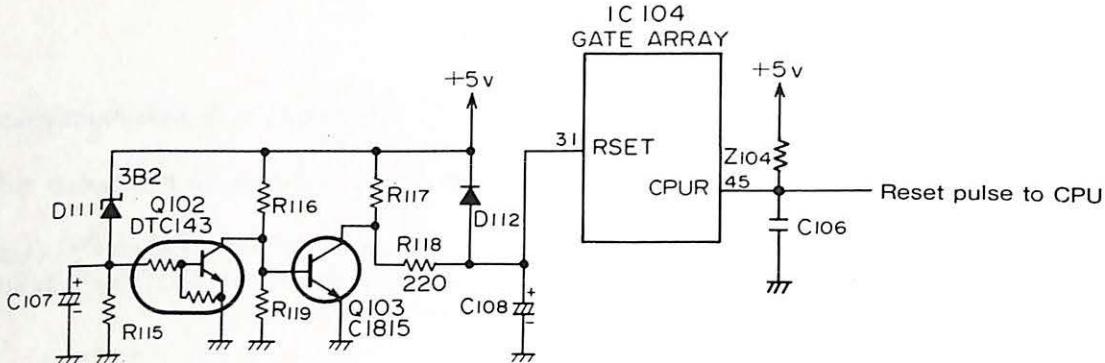
When power is supplied to the circuit, Q103 is turned on before Q102.

When Q102 is turned on, Q103's collector, changes slowly from L to H because capacitor C108 is not charged.

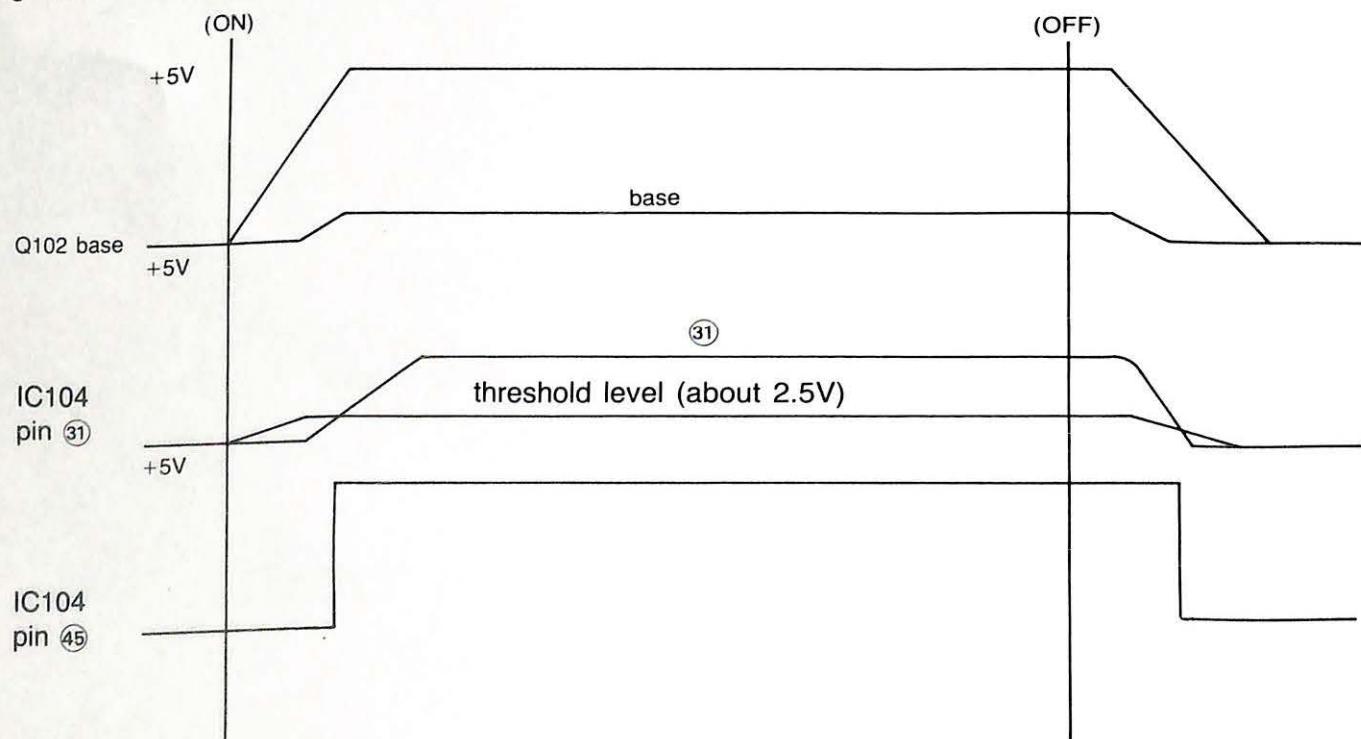
After stabilization of the +5V by the time constant R117, R118 and C108, the potential of pin ③1 of IC104 increases and when it is larger than threshold level of pin ③1, pin ④5 of IC104 changes from L to H. The output of this delay circuit is sent to IC101 and the reset operation is performed.

When the voltage drops, and current is Low, Q103 is turned on because Q102 is not turned on. Since Q103 is turned on, the charge accumulated on C108 is quickly released. Also the potential of pin ③1 is smaller than threshold level and pin ④5 changes from H to L.

Circuit Diagram



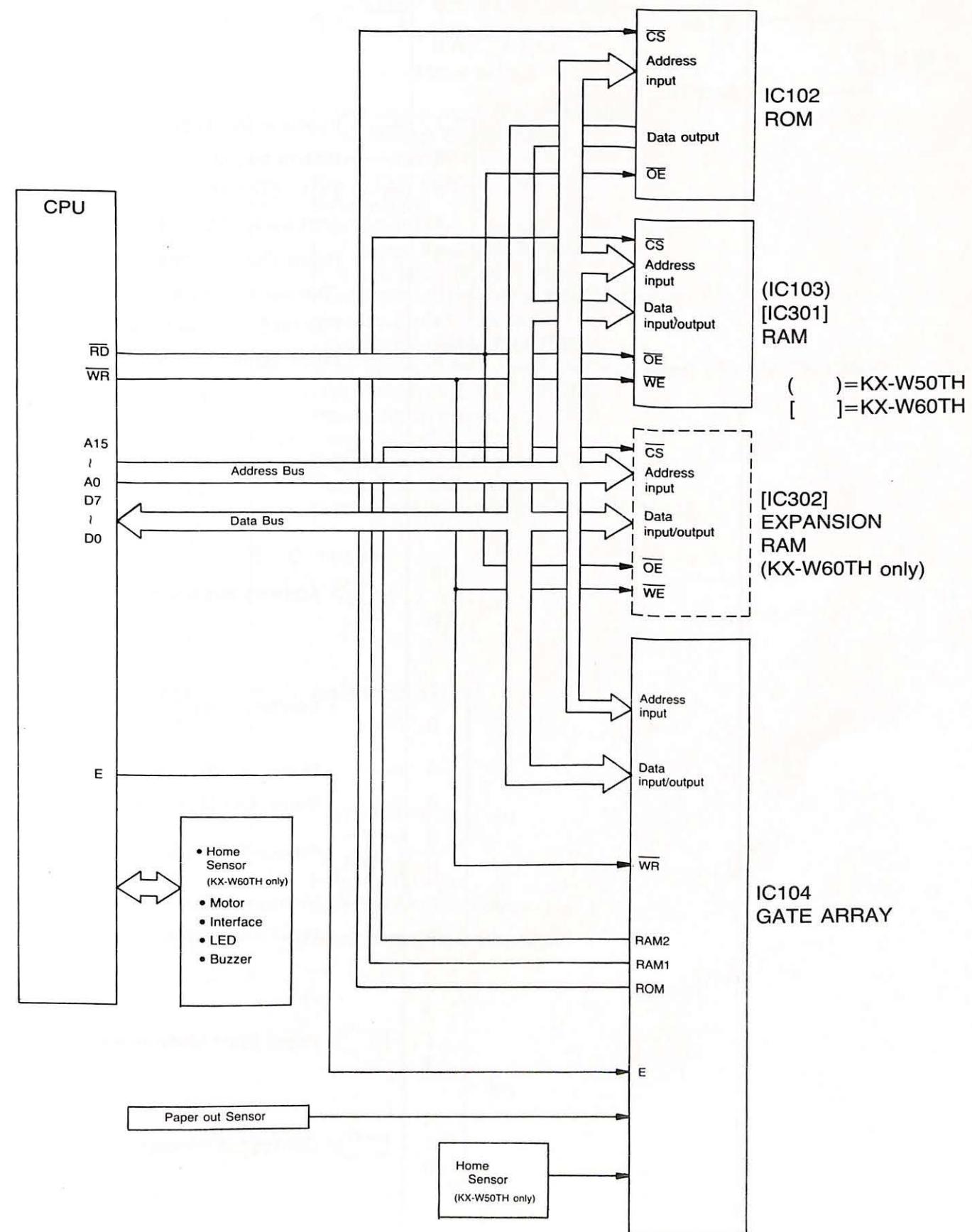
Timing Chart



10.2.3 CPU and Gate Array Circuit Block

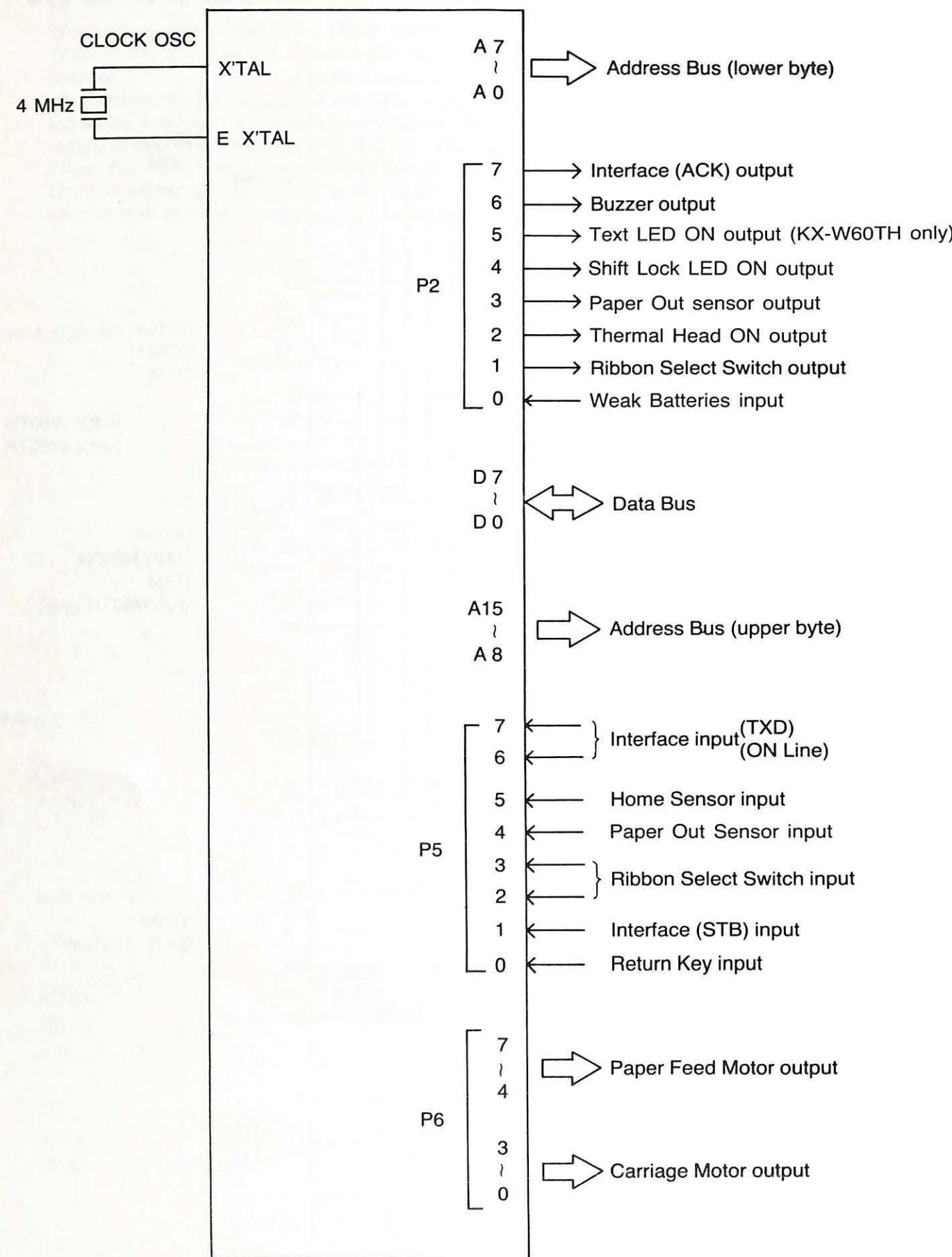
(1) This block consists mainly of CPU(IC101), ROM(IC102), RAM and the Gate Array (IC104).

This section receives data from the keyboard or the host computer and processes the input from the various sensors and operation switches, it also controls the paper feed, carriage, correct motors, the thermal head and the Head press solenoid.



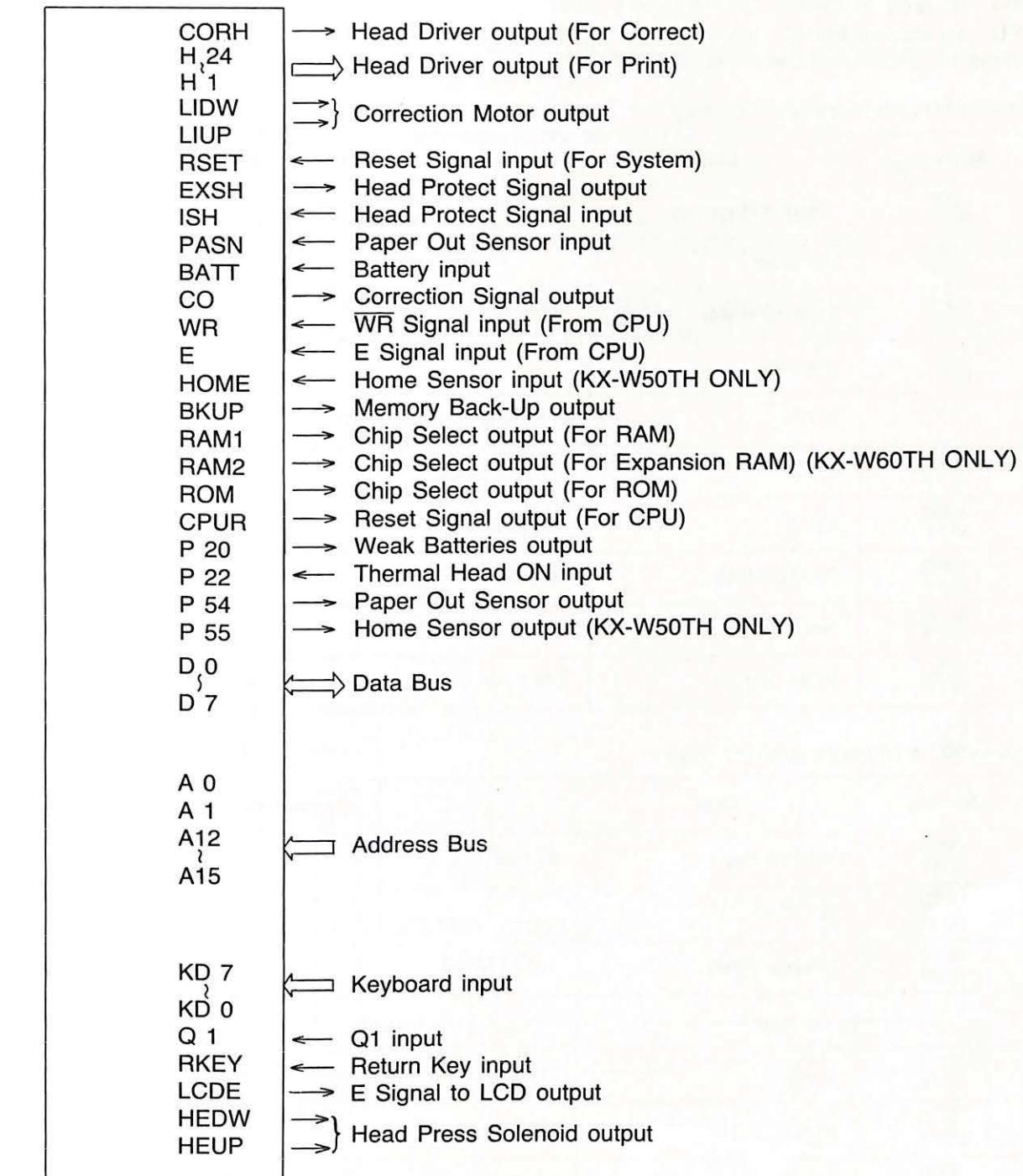
(2) CPU Pin Function

CPU (HD6303X) is CMOS 8-bit single chip micro computer with 192 bytes of internal RAM. The pin functions are as follows:



(3) Gate Array Pin Function

Gate Array (PEVI1011ZA) is composed of the Address Decoder, the Buffer, the Inverter and the Data Latch (30 bits). The pin functions are as follows:



(4) Address Decoder and Memory Map

The CPU can access a 64K byte memory area. The memory area is divided into one 32K byte, and two 16K byte blocks by IC104 using two address signals (A14, A15).
 Each of the three blocks are tied to the ROM, RAM and I/O areas.
 The RAM area is divided into 8K byte by IC104 using one address signal (A13).
 By IC104, I/O area is divided into 4K byte blocks.
 The CPU can access the I/O, when the two address signals (A14, A15) are both L levels.
 At this time the ROM and the RAM are disabled.

KX-W50TH Memory and I/O map

Address	Chip	Description
0000 001F	(Internal Register)	32 byte
0020 003F	Not used	
0040 00FF	(Internal RAM)	192 byte
0100 0FFF	Not used	
1000 1FFF	IC104	I/O (Data Latch (30 bits))
2000 2FFF	IC104	I/O (Key input)
3000 3FFF	IC104	I/O (LCD Display)
4000 5FFF	RAM (IC103)	2K byte
6000 7FFF	Not used	
8000 FFFF	ROM (IC102)	32K byte

KX-W60TH Memory and I/O map

Address	Chip	Description
0000 001F	(Internal Register)	32 byte
0020 003F	Not used	
0040 00FF	(Internal RAM)	192 byte
0100 0FFF	Not used	
1000 1FFF	IC104	I/O (Data Latch (30 bits))
2000 2FFF	IC104	I/O (Key input)
3000 3FFF	IC104	I/O (LCD Display)
4000 5FFF	RAM (IC 301)	8K byte
6000 7FFF	Expansion RAM (IC302)	8K byte (option)
8000 FFFF	ROM (IC102)	32K byte

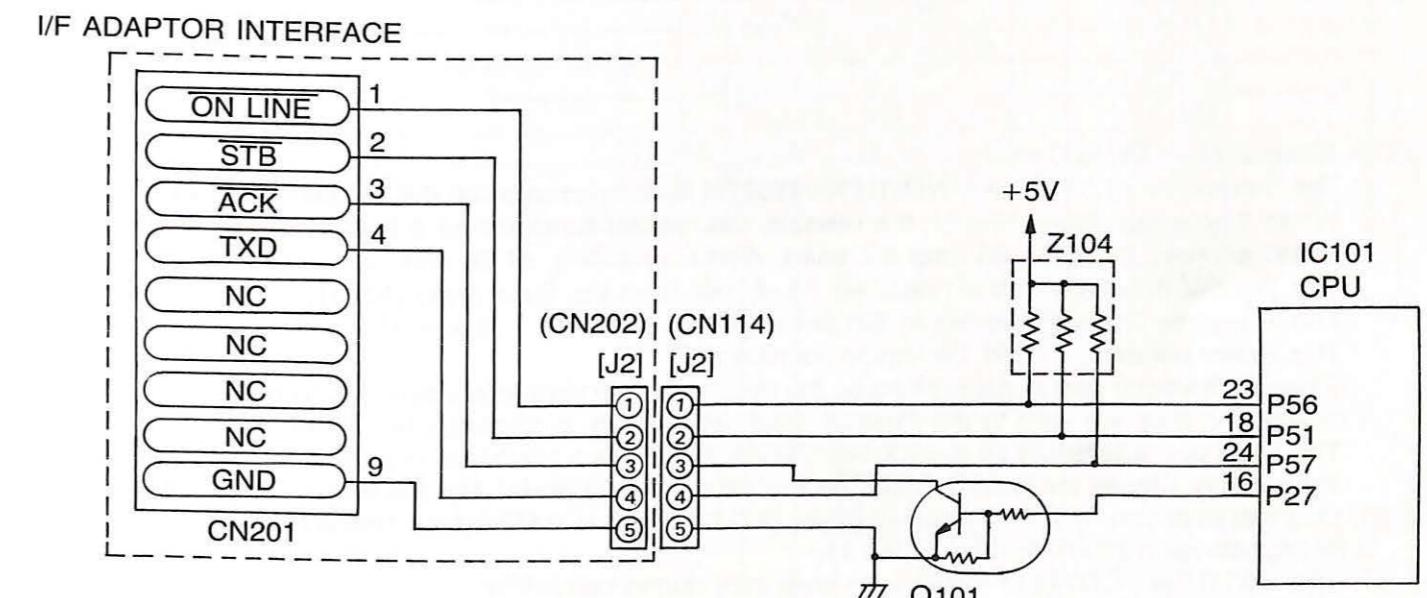
10.2.4 Interface Circuit

The interface circuit handles the handshaking needed for communication with a I/F Adaptor (RP-K100). The RP-K100 allows interfacing with a host computer.
 The handshake method is described in the following steps.

Process;

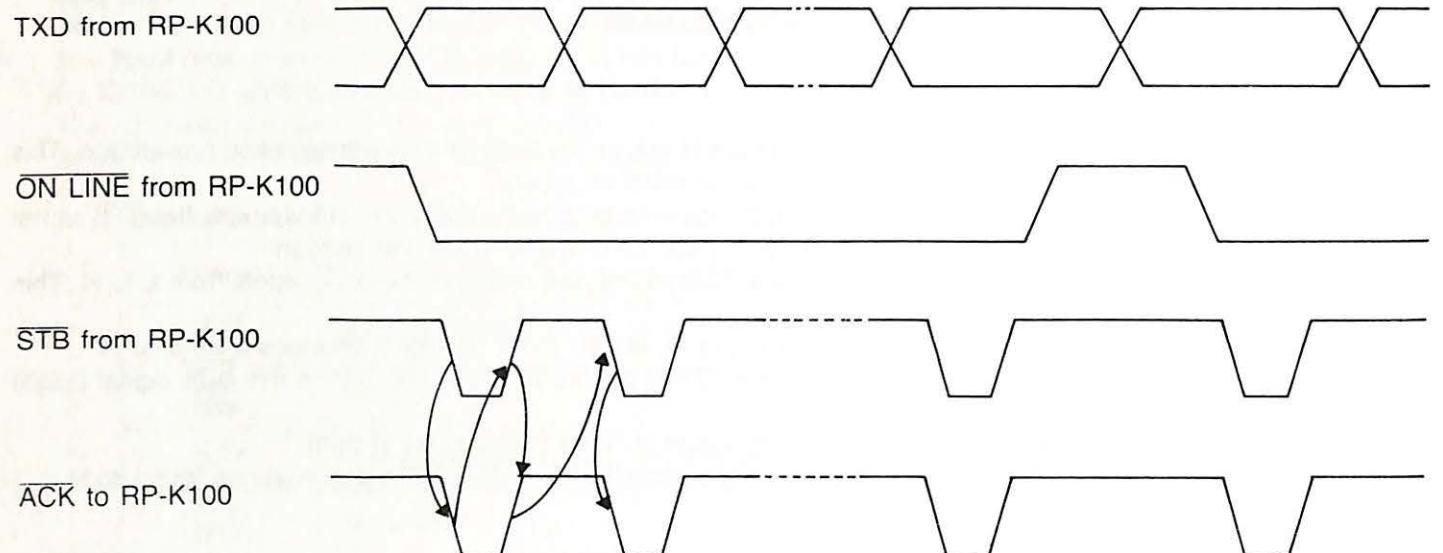
- (1) The RP-K100 changes the ON LINE signal from H to L indicating that data transmission has started. This ON LINE signal remains Low during the transmission of 1 byte.
- (2) The RP-K100 first sends the LSB (D0) of a transmitted byte to the TXD line and changes the STB signal from H to L. This STB signal is sent to P51 of the CPU which is the interruption.
- (3) In the interruption state, the CPU receives a TXD signal and changes the ACK signal from L to H. This ACK signal is sent to the RP-K100.
- (4) After the RP-K100 has received the ACK signal (L level), the STB signal changes from L to H.
- (5) When the STB signal (High) is sent from the RP-K100, the thermalwriter sends the ACK signal (High) to the RP-K100.
- (6) When the ACK signal is High, the RP-K100 starts to send the next bit of data.
- (7) Once the RP-K100 sends 1 byte of data (8 bits) to the CPU, the ON LINE signal changes from L to H.

Circuit Diagram



()=KX-W50TH
 []=KX-W60TH

Timing Chart



10.2.5 Thermal head Drive Circuit

The thermal head on the KX-W50TH/KX-W60TH is composed of 28 dot shaped resistors. When the current flows through the resistor, the resistor functions as a heating element. When printing, 24 of the 28 dots are used. When correcting, all 28 dots are used. The thermal head drive circuit receives its signals from the Gate Array (IC104). These signals (25 bits) are fed to the driver (IC108, IC109, IC110 and IC111) which is a M54537.

This driver contains 7 NPN Darlington transistors.

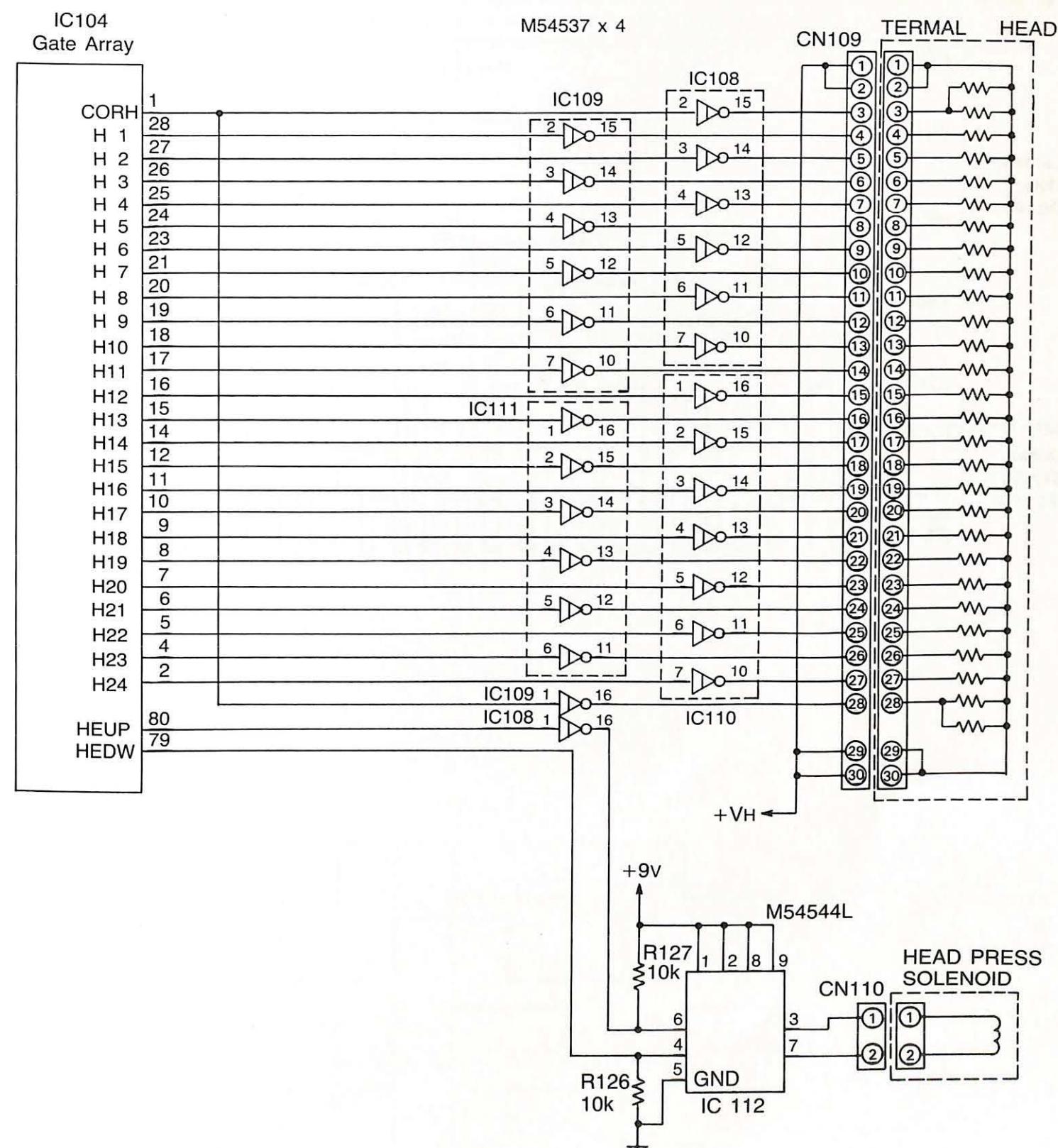
Since a character font is determined by the dot matrix, the signals are synchronized with the Carriage Motor timing and they are sent to the thermal head, as a result, a character is printed.

The head press solenoid on the KX-W50TH/KX-W60TH is a latch type plunger solenoid. This solenoid, during printing, places the thermal head on the paper, and at return, lifts the thermal head off the paper. This solenoid is driven by a bi-directional driver (IC112) which is a M54544L. This solenoid drive circuit receives its signals from HEUP-HEDW of IC104.

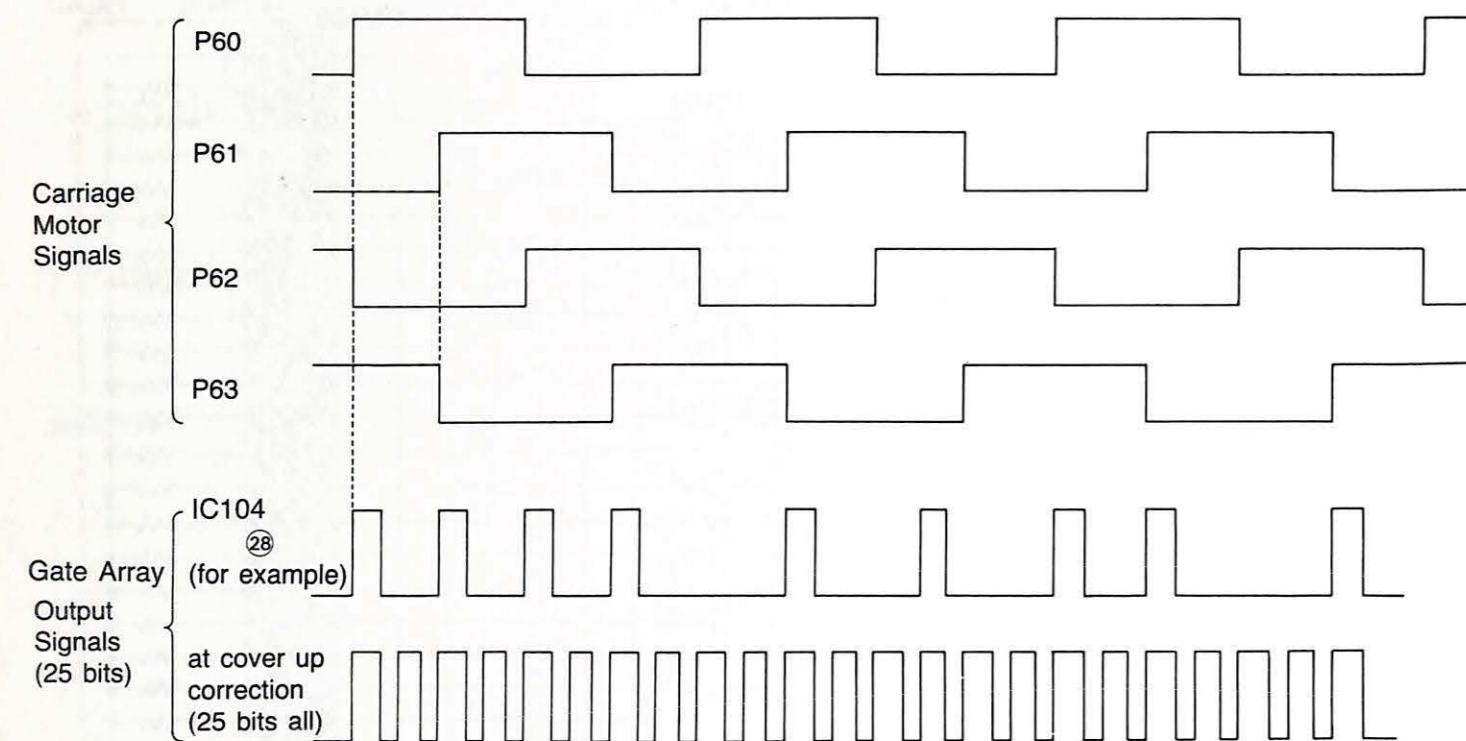
The signal from CORH of IC104 is H level only during correction.

In the sequential timing of the software, the head press solenoid first places the thermal head against the paper, then the Carriage Motor moves along the shaft, next the printing signals are sent to the thermal head.

Circuit Diagram



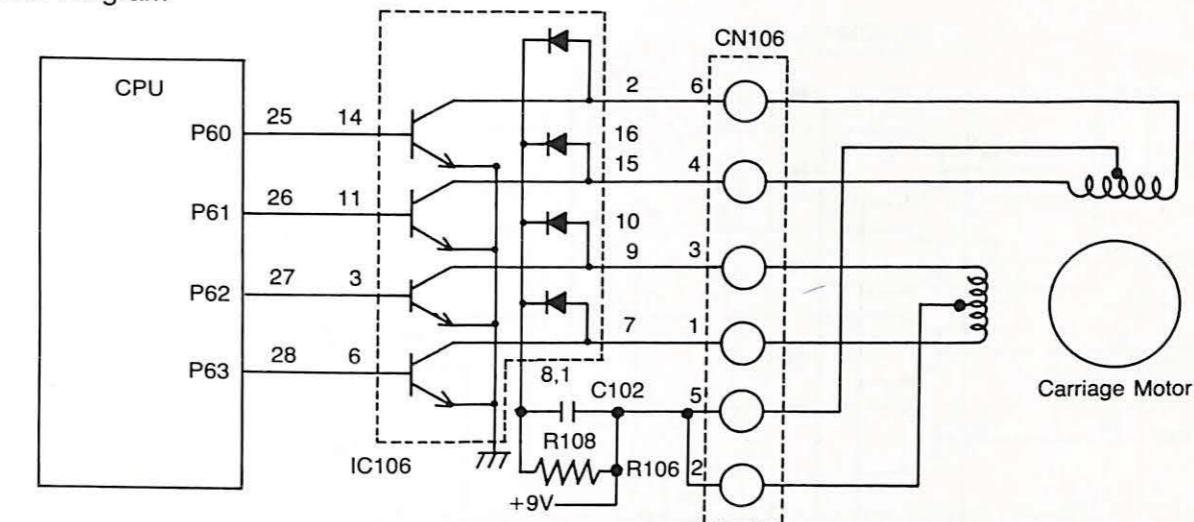
Timing Chart



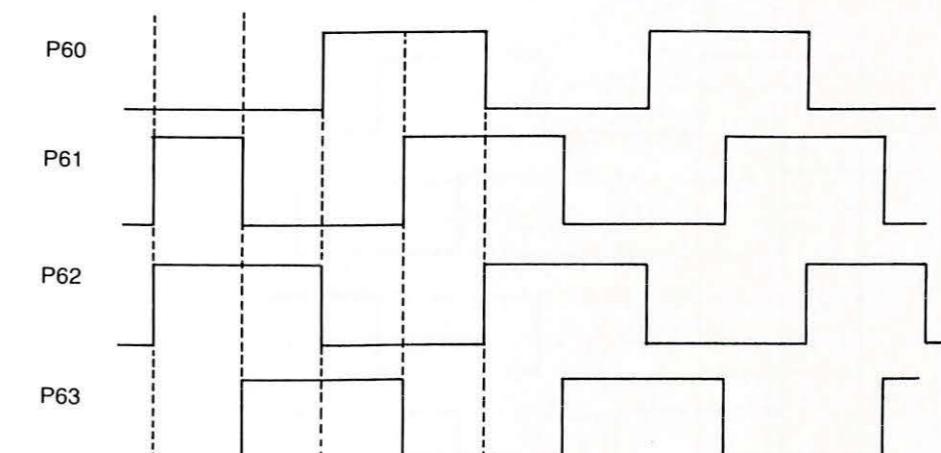
10.2.6 Carriage Motor Drive Circuit

The Carriage motor is a four-phase uni-polar PM type stepping motor. The motor drive circuit receives its signals from P60-63 of the CPU. These signals are L levels and are fed to the driver (IC106) which is a M54532. This driver contains 4 NPN Darlington transistors with clamp diodes. When the CPU sends the signals for the Motor to step, the transistors are turned on in a given sequence. Once the motor has finished stepping, all the transistors are turned off and no current flows to the motor, because P60-63 of the CPU become L levels.

Circuit Diagram



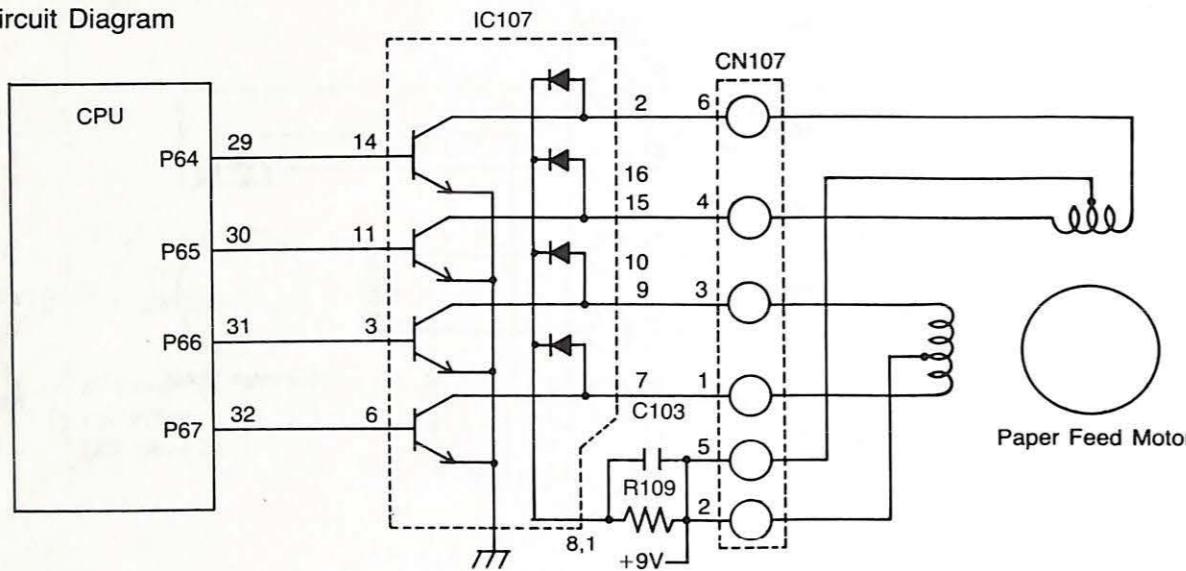
Timing Chart



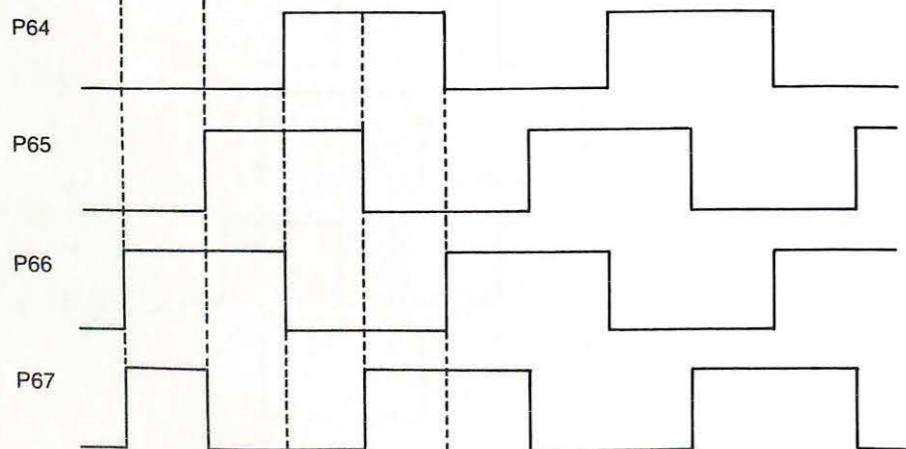
10.2.7 Paper Feed Motor Drive Circuit

The Paper Feed motor is a four-phase uni-polar PM type stepping motor. The motor drive circuit receives its signals from P64-67 of the CPU. These signals are L level and are sent to the driver (IC107) which is a M54532. This driver contains 4 NPN Darlington transistors with clamp diodes. When the CPU sends the signals for the Motor to step, the transistors are turned on in a given sequence. Once the motor has finished stepping all the transistors are turned off and no current flows to the motor, because P64-67 of the CPU become L levels.

Circuit Diagram



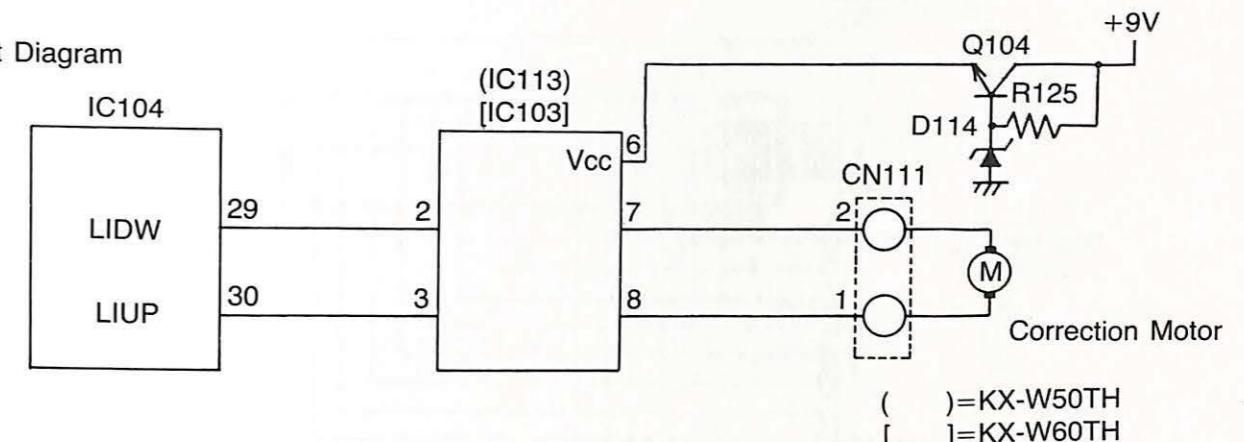
Timing Chart



10.2.8 Correction Motor Drive Circuit

The Correction motor is a Small Direct Current Motor. The motor drive circuit receives its signals from LIUP and LIDW of the Gate Array (IC104). These signals are sent to the driver (IC103) or [IC113] which is a BA6208. This driver is a bi-directional motor driver with brake function. When one of the two signals is H, the driver moves the motor. The direction in which the motor will move is controlled by an H level state on either LIUP or LIDW of IC104. At the beginning of a correction operation, pin ② and pin ③ of (IC103) or [IC113] are at L and H levels respectively, the driver rotates the motor, and the ribbon is lifted up. At the end of the correction operation, pin ② and pin ③ of (IC103) or [IC113] are at H and L levels respectively, the driver reverses the direction of the motor and the ribbon is lowered. The running time of the motor is controlled by software. Once the motor has finished running, no current flows to the motor, because LIUP-LIDW of IC104 become L level.

Circuit Diagram

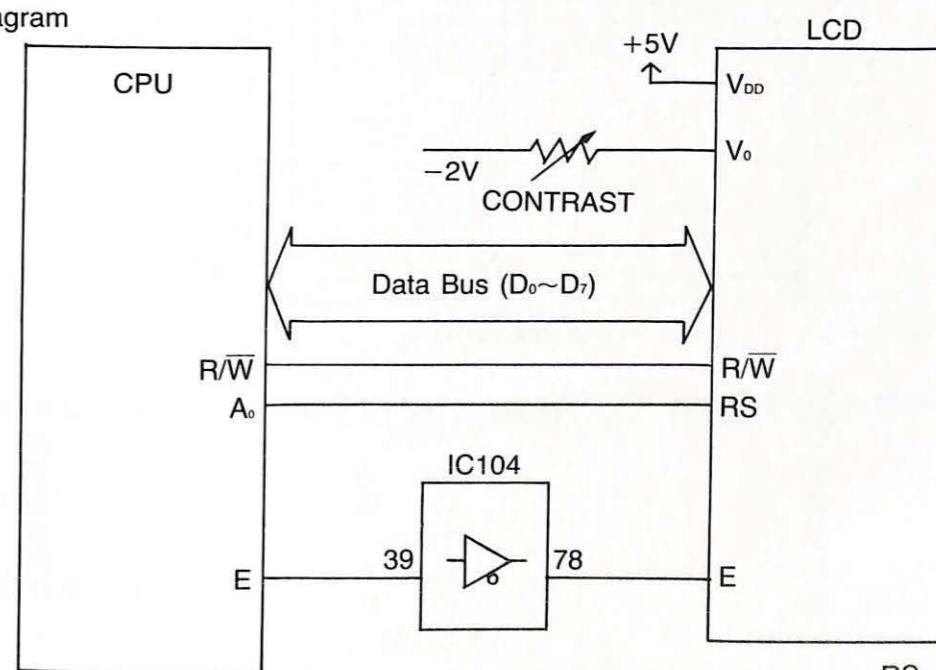


10.2.9 LCD Circuit Block

The LCD on the KX-W50TH is capable of displaying 15 (5x7 dot matrix) characters. The LCD on the KX-W60TH is capable of displaying 23 (5x7 dot matrix) characters. Three of the 23 characters act as a 3 digit decade counter which indicate the number of characters that can be input on the current typing line. Immediately after the power switch is turned on, the LCD is initialized by the CPU. Instructions and data are sent from the CPU to the LCD through the Data Bus. The state of RS determines whether the transmitted signal is data or instruction.

The state of the LCD (busy or ready) is monitored by the CPU through the Data Bus. It is monitored when R/W and E are both H levels.

Block Diagram



RS = "L": Instruction
RS = "H": Data

The KX-W50TH LCD is driven by one IC (IC1) and the KX-W60TH is driven by two IC's (IC1, IC2). These IC's, located on the back of the LCD panel, display characters by the following process. A character is displayed by seven common signals (C1-C7 or C9-C15) and five of the 40 (KX-W50TH) or 80 (KX-W60TH) segment signals as shown in Fig's.1 and 2. These common signals and segment signals form a matrix that is capable of displaying up to 15 (KX-W50TH) or 23 (KX-W60TH) characters as shown in Fig.1 or 2. Since IC1 contains the character generator ROM, it receives an 8 bit character code through the data bus and stores it in its buffer (80 character maximum). This information is sent to the common signal and segment signal driver circuits. Since the common signals are driven one at a time, the segment signals constantly change to correspond with the common signal that is being driven.

Fig. 3. illustrates the timing of the signals when the character "B" is displayed.

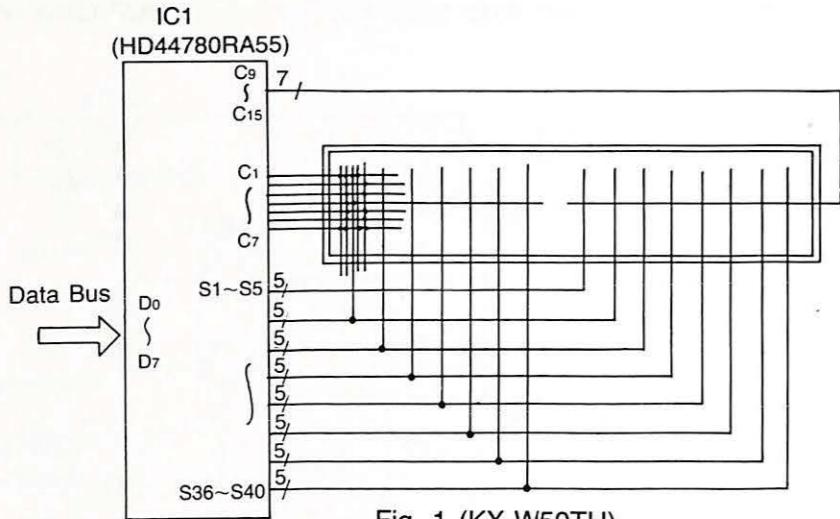


Fig. 1 (KX-W50TH)

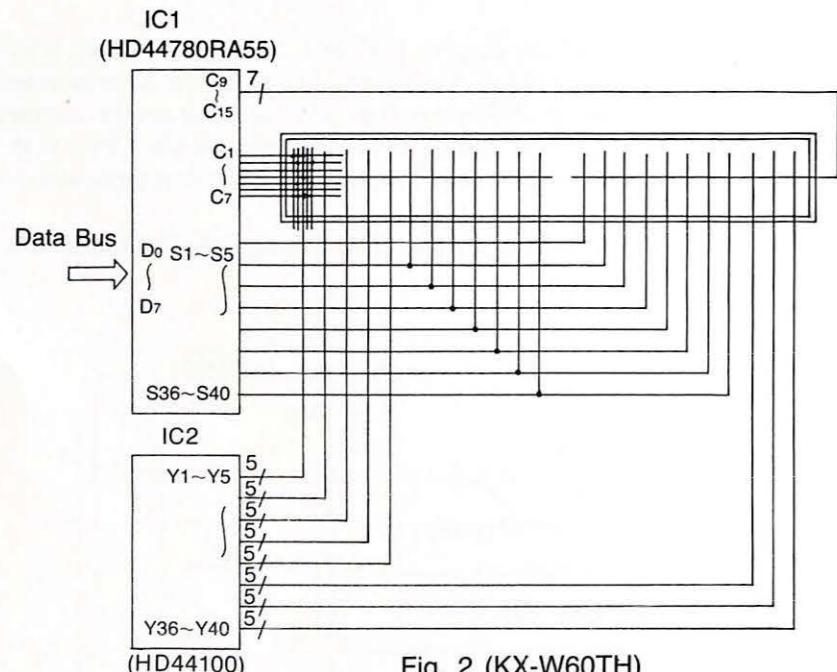


Fig. 2 (KX-W60TH)

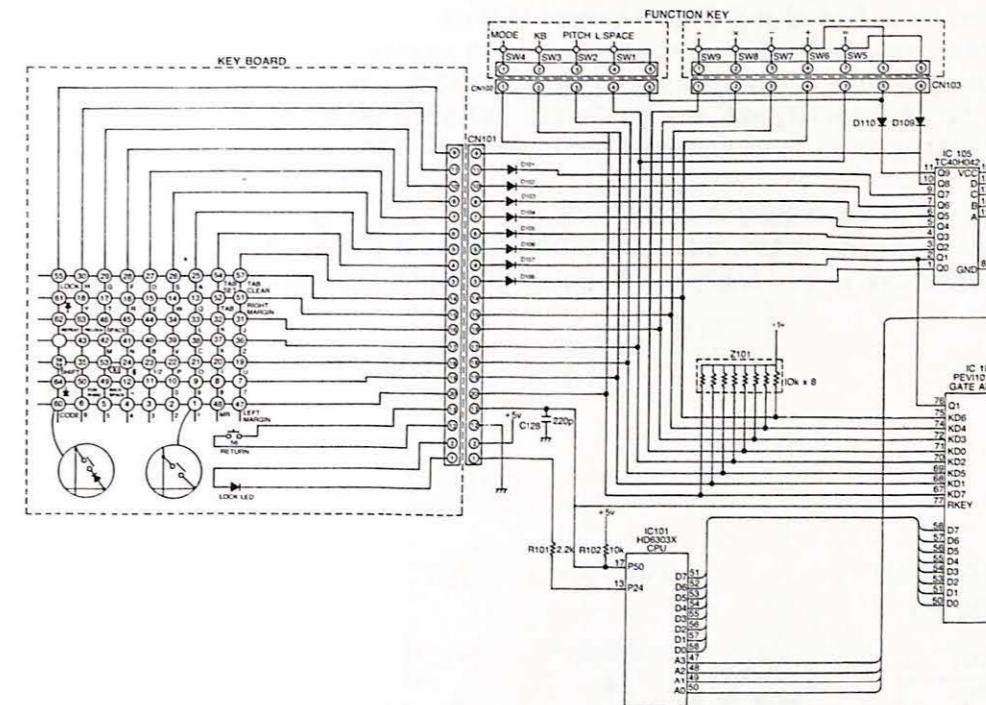
Sequence	Common Signal Driven	Segment Signals Driven
1 st	C ₁	Y ₁ Y ₂ Y ₃ Y ₄
2 nd	C ₂	Y ₂ Y ₅
3 rd	C ₃	Y ₂ Y ₅
4 th	C ₄	Y ₂ Y ₃ Y ₄
5 th	C ₅	Y ₂ Y ₅
6 th	C ₆	Y ₂ Y ₅
7 th	C ₇	Y ₁ Y ₂ Y ₃ Y ₄ Y ₅

Fig. 3

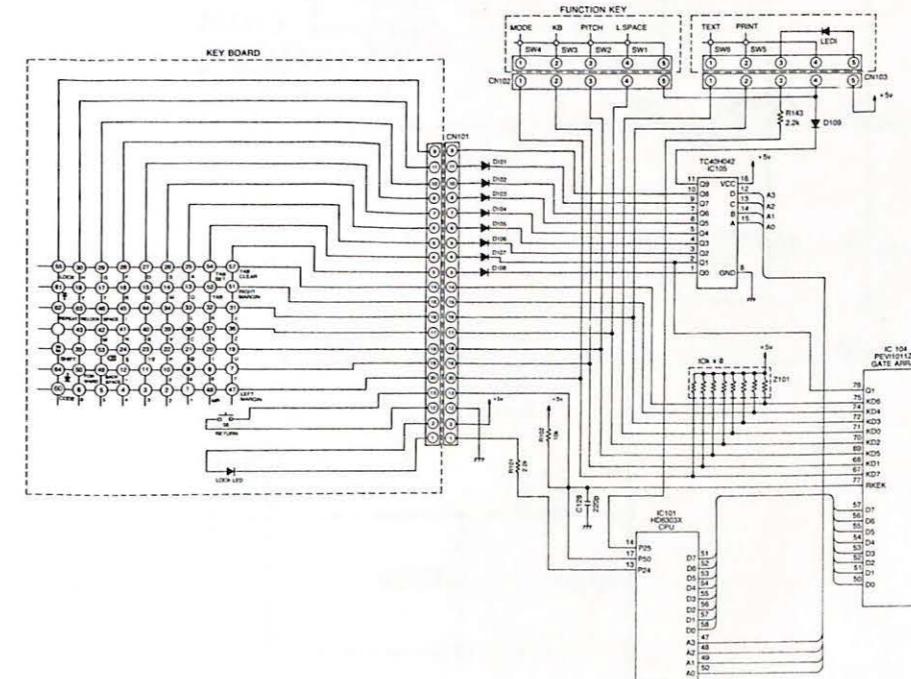
10.2.10 Keyboard+Function key Circuit

The KX-W50TH/W60TH have 64 keys and 9 mode switches (KX-W60TH 6 mode switches). These keys and switches form a matrix which is sent to the Data Bus of the CPU through IC104. The keys and switches are scanned by signals from the four address signals (A0-A3). The signals from A0 to A3 are decoded by IC105 which is a TC40H042, and applied to the key matrix.

(KX-W50TH)



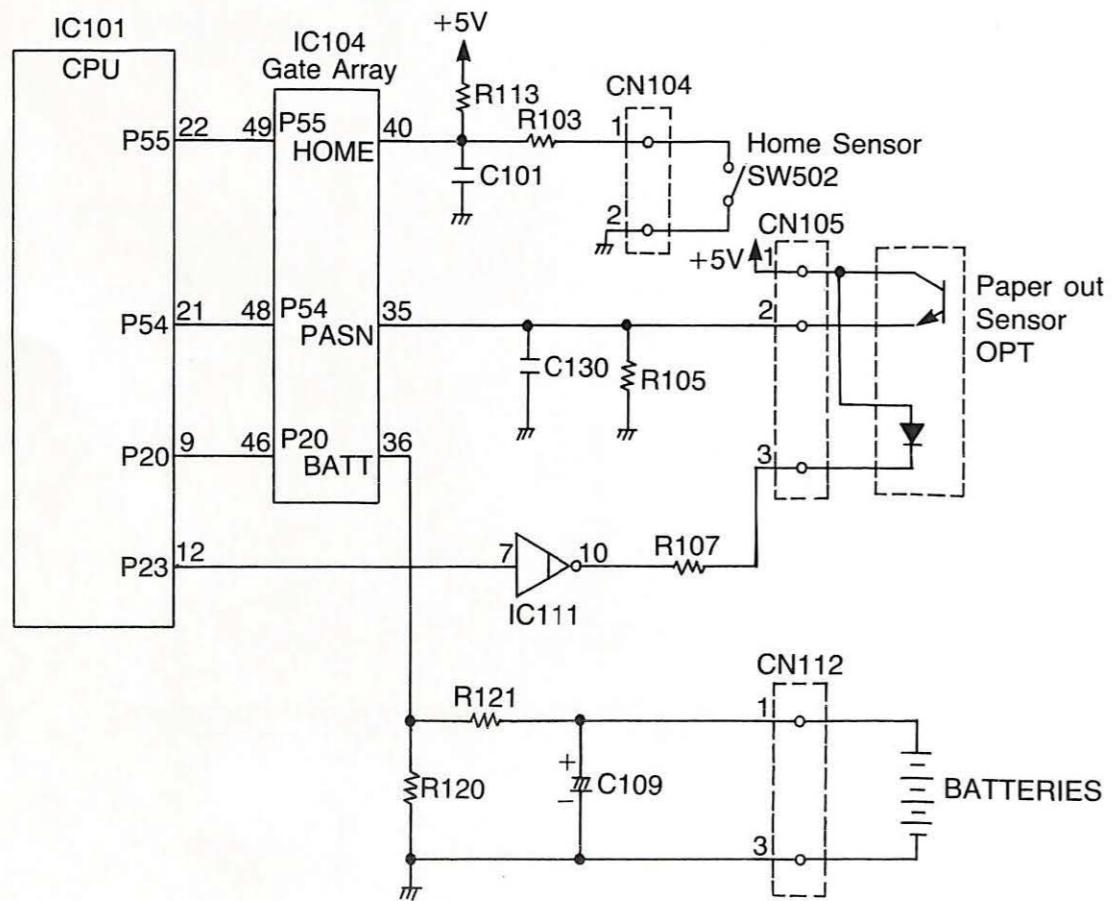
(KX-W60TH)



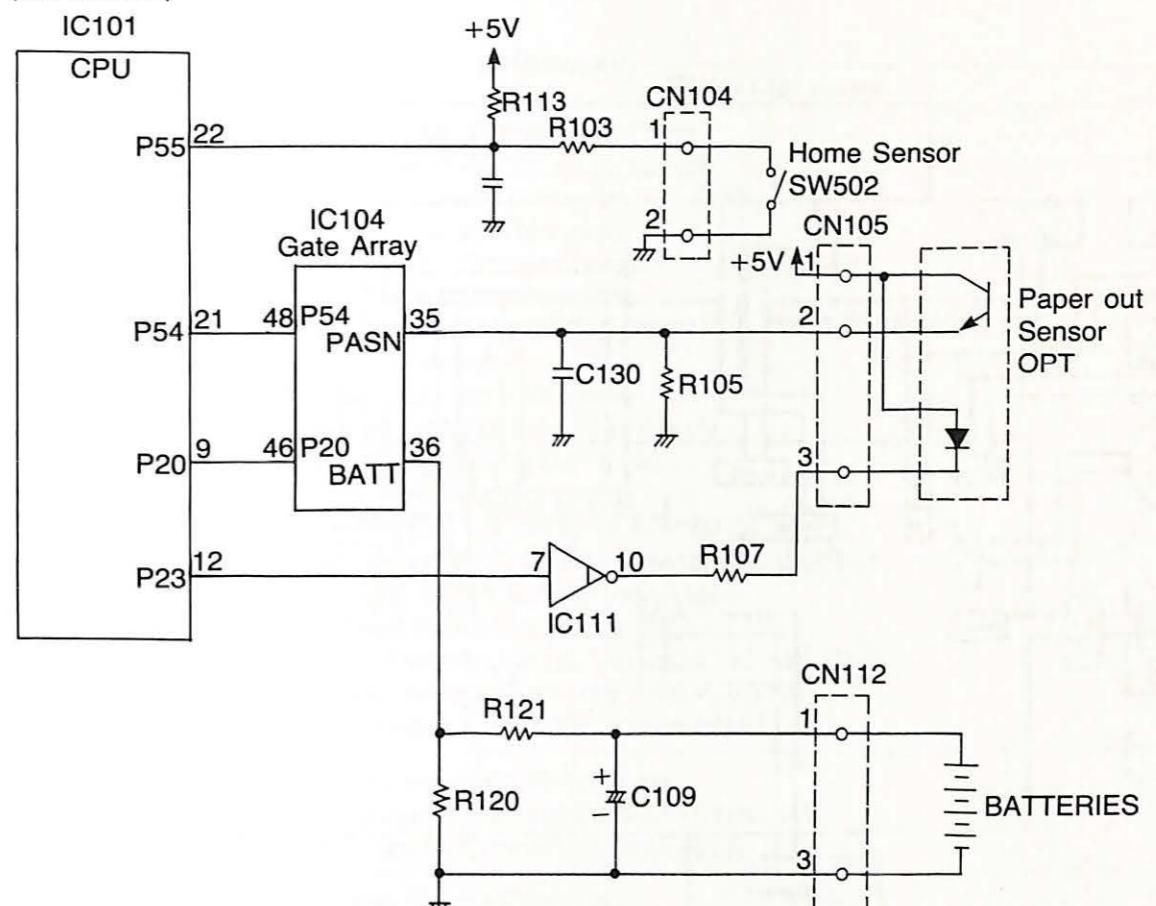
10.2.11 Sensor Circuit

- (1) The home sensor detects the carriage home position, when the power switch is turned ON. The number of steps from the home position determines the physical printing position. Home position detection is performed by a mechanical switch (SW502). When the carriage come to the home position, SW502 is closed; (KX-W50TH) pin 49 of IC104 changes from L to H. At this time, P55 of the CPU is at H level. (KX-W60TH) P55 of the CPU is directly L level.
- (2) The paper out sensor detects the paper out condition. The paper out sensor uses a photo-reflector (OPT). When the paper comes to the end, the reflected light of the LED is cut off and the photo-transistor is turned off. And pin 48 of IC104 changes from L to H. At the same time, P54 of the CPU becomes H level.
- (3) The weak battery detection informs when it is time to replace weak battery. When the battery voltage is high, voltage of pin 46 (IC104) is higher than threshold level, pin 46 (IC104) is at H level, the weak battery indicator on the LCD is turned off. When the battery voltage is low, voltage of pin 46 (IC104) is lower than threshold level, pin 46 (IC104) is at L level, the weak battery indicator is turned on. Turn over voltage of the battery is about 4.2V. When the battery voltage is low, the weak battery indicator will be ON at times of high voltage use and OFF when power use is low, finally it will remain ON when the batteries are dead.

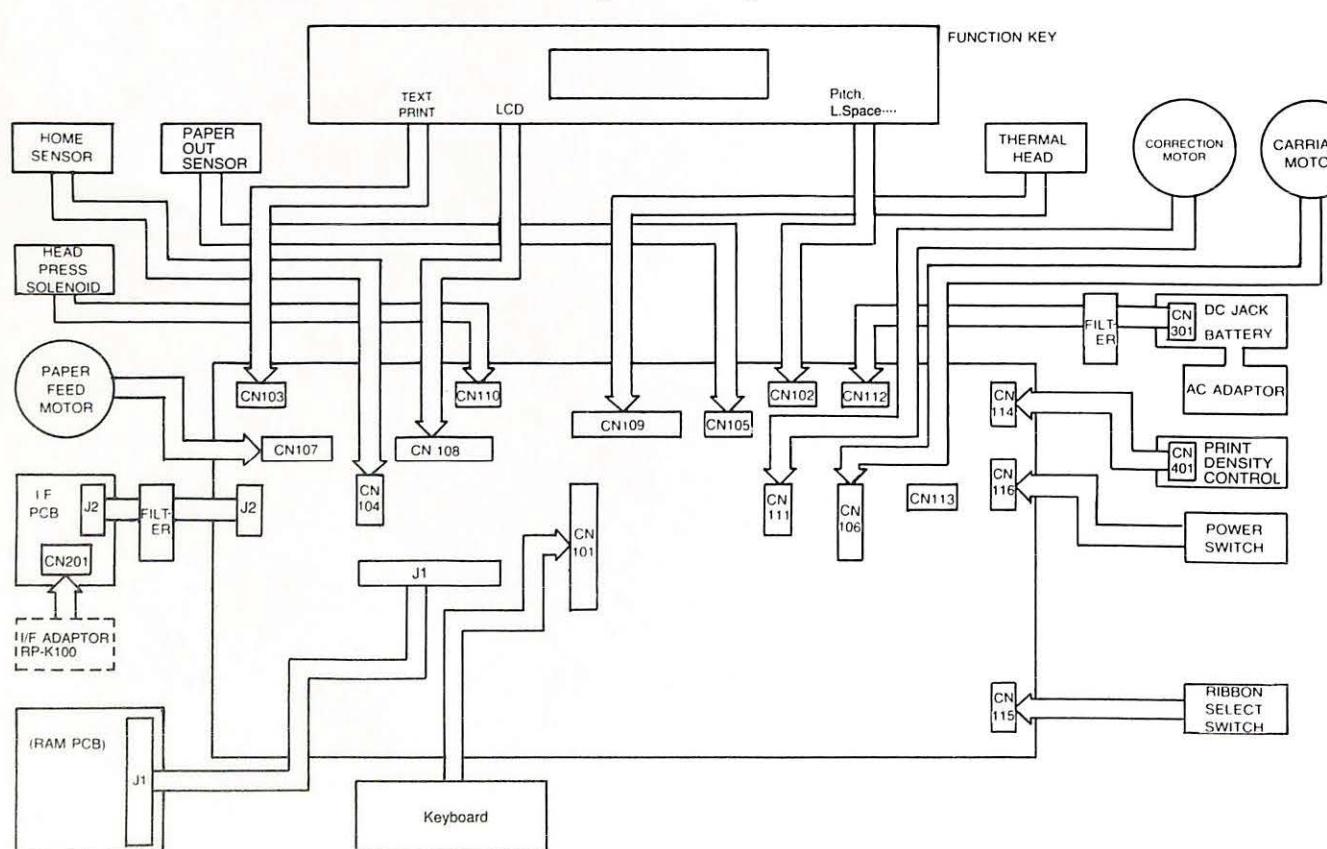
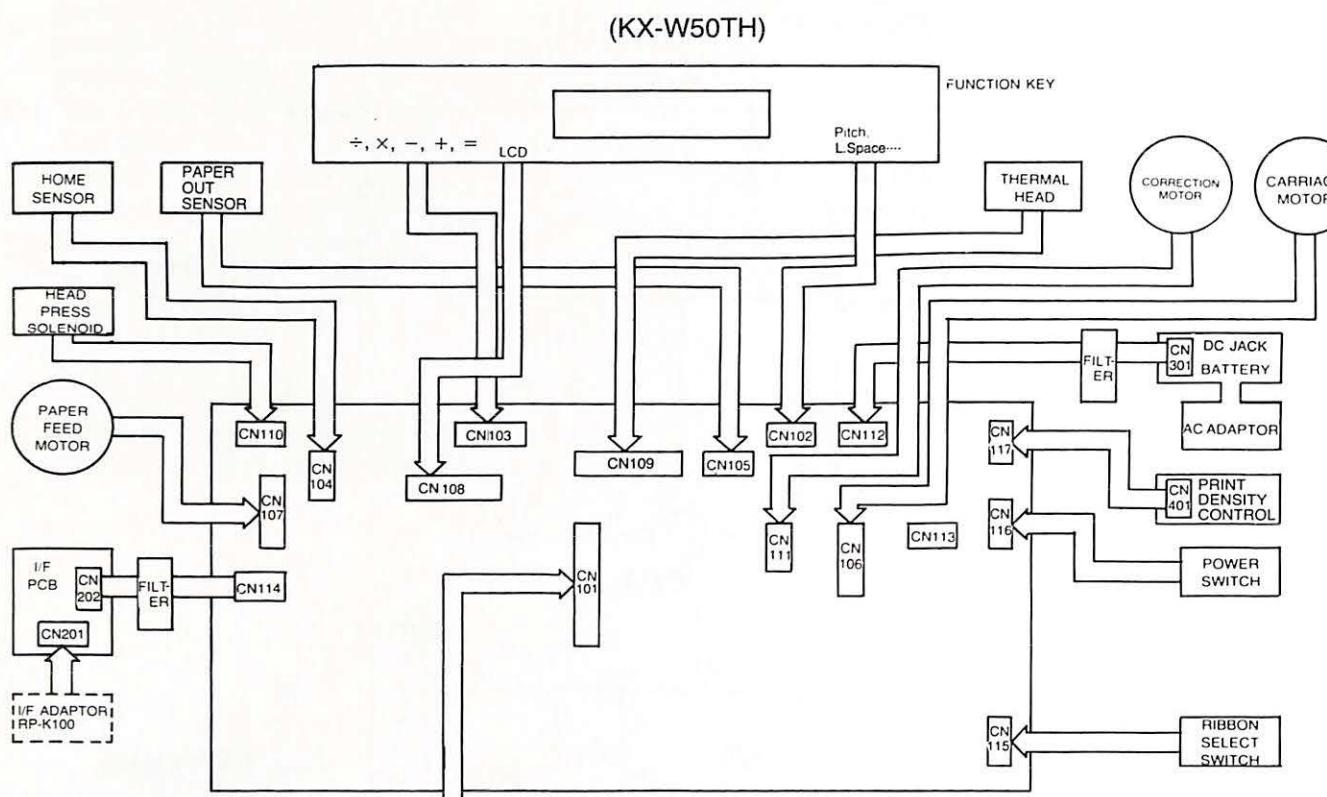
Circuit Diagram
(KX-W50TH)



Circuit Diagram
(KX-W60TH)



PCB Connection Diagram



10.3. Explanation of Connectors

10.3.1 Name of Connectors

Connector applications are shown below.

PCB	Connector No.	Connector name
MAIN	CN101	Key Board Connector
	CN102	Function Key Connector (5 pin)
	CN103	Function Key Connector
	CN104	Home Sensor Connector
	CN105	Paper Out Sensor Connector
	CN106	Carriage Motor Connector
	CN107	Paper Feed Motor Connector
	CN108	LCD Connector
	CN109	Thermal Head Connector
	CN110	Head Press Solenoid Connector
	CN111	Correction Motor Connector
	CN112	Power Supply Connector
	CN114	I/F Jumper Connector (KX-W50TH)
	CN114	Print Density Control Connector (KX-W60TH)
	CN115	Ribbon Select Switch Connector
	CN116	Power Switch Connector
	CN117	Print Density Control Connector (KX-W50TH)
	J1	RAM Jumper Connector (KX-W60TH)
	J2	I/F Jumper Connector (KX-W60TH)
I/F	CN201	I/F Adaptor Connector (9 pin)
	CN202	I/F Jumper Connector (KX-W50TH)
	J2	I/F Jumper Connector (KX-W60TH)
POWER INPUT	CN301	Power Supply Connector
PRINT DENSITY	CN401	Print Density Control Connector
RAM	J1	RAM Jumper Connector (KX-W60TH)

10.3.2 Pin Assignment

Connector No.	Pin No.	Signal Name	Description of Signal	Direction
CN101	1	LED	Row Signal of LED	Out
	2	Vcc	+5V	Out
	3	ROW Q0	Row Signal of Matrix Circuit	Out
	4	ROW Q1	"	"
	5	ROW Q2	"	"
	6	ROW Q3	"	"
	7	ROW Q4	"	"
	8	ROW Q5	"	"
	9	ROW Q8	"	"
	10	ROW Q6	"	"
	11	ROW Q7	"	"
	12	GND	Signal Ground	-
	13	RET	Row Signal of Return	In
	14	COLUMN D6	Column Signal of Matrix Circuit	In
	15	COLUMN D4	"	"

Connector No.	Pin No.	Signal Name	Description of Signal	Direction
CN101	16	COLUMN D3	Colum Signal of Matrix Circuit	In
	17	COLUMN D2	"	"
	18	COLUMN D5	"	"
	19	COLUMN D1	"	"
	20	COLUMN D7	"	"
CN102	1	ROW S4	Row Signal of Matrix Circuit	In
	2	ROW S3	"	"
	3	ROW S2	"	"
	4	ROW S1	"	"
	5	COM	Column Signal of Matrix Circuit	Out
CN103 (KX-W50TH only)	1	ROW S9	Row Signal of Matrix Circuit	In
	2	ROW S8	"	"
	3	ROW S7	"	"
	4	ROW S6	"	"
	5	COM1	Column Signal of Matrix Circuit	Out
	6	COM2	"	"
	7	ROWS5	Row Signal of Matrix Circuit	In
CN103 (KX-W60TH only)	1	ROW S6	Row Signal of Matrix Circuit	In
	2	ROW S5	"	"
	3	LED	TEXT LED	Out
	4	COM1	Column Signal of Matrix Circuit	Out
	5	Vcc	+5V	Out
CN104	1	CHME	Carriage Home Position	In
	2	GND	Signal Ground	—
CN105	1	Vcc	+5V	Out
	2	Emitter	Signal From Paper Out Sensor	In
	3	Cathode	Row Signal to Paper Out Sensor	Out
CN106	1	CRA	Phase A for Carriage Motor Drive	Out
	2	CMP	Carriage Motor Power Supply	Out
	3	CRA	Phase A for Carriage Motor Drive	Out
	4	CRB	Phase B for Carriage Motor Drive	Out
	5	CMP	Carriage Motor Power Supply	Out
	6	CRB	Phase B for Carriage Motor Drive	Out
CN107	1	PRA	Phase A for Paper Feed Motor Drive	Out
	2	PMP	Paper Feed Motor Power Supply	Out
	3	PRA	Phase \bar{A} for Paper Feed Motor Drive	Out
	4	PRB	Phase B for Paper Feed Motor Drive	Out
	5	PMP	Paper Feed Motor Power Supply	Out
	6	PRB	Phase \bar{B} for Paper Feed Motor Drive	Out

Connector No.	Pin No.	Signal Name	Description of Signal	Direction
CN108 (KX-W50TH only)	1	D7	Data Bus	In/Out
	2	D6	"	"
	3	D5	"	"
	4	D4	"	"
	5	D3	"	"
	6	E	E Pulse	Out
	7	D2	Data Bus	In/Out
	8	Vcc	+5V	Out
	9	R/W	R/W Pulse	Out
	10	A0	Address Bus	Out
	11	D1	Data Bus	In/Out
	12	D0	"	"
	13	GND	Signal Ground	—
	14	V0	-2V	Out
CN108 (KX-W60TH only)	1	Vcc	+5V	Out
	2	GND	Signal Ground	—
	3	D6	Data Bus	In/Out
	4	D7	"	"
	5	D4	"	"
	6	D2	"	"
	7	D3	"	"
	8	D1	"	"
	9	D0	"	"
	10	D5	"	"
	11	E	E Pulse	Out
	12	R/W	R/W Pulse	Out
	13	A0	Address Bus	Out
	14	V0	-2V	Out
CN109	1	V _H	Thermal Head Power Supply	Out
	2	V _H	"	"
	3	CORT	Row Signal for Thermal Head	Out
	4	THQA7	"	"
	5	THQA6	"	"
	6	THQA5	"	"
	7	THQA4	"	"
	8	THQA3	"	"
	9	THQA2	"	"
	10	THQA1	"	"
	11	THQA0	"	"
	12	THQB7	"	"
	13	THQB6	"	"
	14	THQB5	"	"
	15	THQB4	"	"
	16	THQB3	"	"
	17	THQB2	"	"
	18	THQB1	"	"
	19	THQB0	"	"
	20	THQC7	"	"

Connector No.	Pin No.	Signal Name	Description of Signal	Direction
	21	THQC6	Row Signal for Thermal Head	Out
	22	THQC5	"	"
	23	THQC4	"	"
	24	THQC3	"	"
	25	THQC2	"	"
	26	THQC1	"	"
	27	THQC0	"	"
	28	CORT		
	29	V _H	Thermal Head Power Supply	Out
	30	V _H	"	"
CN110	1	HPSA	Signal for Head Press Solenoid	Out
	2	HPSB	"	"
CN111	1	CMA	Signal for Correct Motor	Out
	2	CMB	"	"
CN112	1	BAT IN	Power From Battery	In
	2	V _{IN}	Main Power Supply	In
	3	GND	Ground	-
CN114 (KX-W50TH only)	1	GND	Signal Ground	-
	2	ACK	Acknowledge	Out
	3	TXD	Serial DATA	In
	4	STB	Strobe	In
	5	ON LINE	On Line	In
CN114 (KX-W60TH only)	1	GND	Signal Ground	-
	2	V _{VR}	Density Control Signal	Out
CN115	1	P21	Signal to RIBBON SELECT SWITCH	Out
	2	P52	Signal from RIBBON SELECT SWITCH	In
	3	P53	"	"
CN116	1	Vout	Main Power Supply	Out
	2	VIN	Main Power Supply	In
CN117 (KX-W50TH only)	1	GND	Signal Ground	-
	2	V _{VR}	Density Control Signal	Out
CN201	1	ONLINE	On Line	In
	2	STB	Strobe	In
	3	ACK	Acknowledge	Out
	4	TXD	Serial Data	In
	5	NC	Non Connection	-
	6	NC	Non Connection	-
	7	NC	Non Connection	-
	8	NC	Non Connection	-
	9	GND	Signal Ground	-

Connector No.	Pin No.	Signal Name	Description of Signal	Direction
CN202 (KX-W50TH only)	1	GND	Signal Ground	-
	2	ACK	Acknowledge	In
	3	TXD	Serial Data	Out
	4	STB	Strobe	"
	5	ON LINE	On Line	"
CN301	1	BAT IN	Power from Battery	Out
	2	V _{IN}	Main Power Supply	Out
	3	GND	Ground	-
CN401	1	V _{VR}	Density Control Signal	In
	2	GND	Signal Ground	-
J1 (KX-W60TH only)	1	GND	Signal Ground	-
	2	V _{CC}	+5V	Out
	3	D3	Data Bus	In/Out
	4	V _{CC}	+5V	Out
	5	D4	Data Bus	In/Out
	6	D2	"	"
	7	D5	"	"
	8	D1	"	"
	9	D6	"	"
	10	D0	"	"
	11	D7	"	"
	12	A0	Address Bus	Out
	13	CS1	Chip Select of IC302	Out
	14	A1	Address Bus	Out
	15	A10	"	"
	16	A2	"	"
	17	OE	Output Enable	Out
	18	A3	Address Bus	Out
	19	A11	"	"
	20	A4	"	"
	21	A9	"	"
	22	A5	"	"
	23	A8	"	"
	24	A6	"	"
	25	CS2	Chip Select	Out
	26	A7	Address Bus	Out
	27	WE	Write Enable	Out
	28	A12	Address Bus	Out
	29	GND	Signal Ground	-
	30	CS1	Chip Select of IC301	Out
J2 (KX-W60TH only)	1	ON LINE	On Line	In
	2	STB	Strobe	In
	3	TXD	Serial Data	In
	4	ACK	Acknowledge	Out
	5	GND	Signal Ground	-

11. TROUBLESHOOTING

11.1 Symptoms

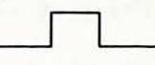
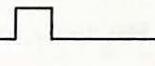
① When power switch is turned ON, the unit does not operate.

NO.	Cause of Trouble	Check Point	Repair Method
1	AC adaptor	Disconnect the connector (CN112) and check for voltage on pins 2-3 for approx. 9V DC using a voltmeter.	If voltage reading is incorrect, check the power switch. If the power switch is okay, AC adaptor may be faulty.

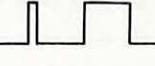
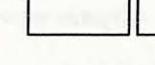
② If the voltage is okay and the unit does not operate.

NO.	Cause of Trouble	Check Point	Repair Method
1	MAIN PCB power lines	Check the Main PCB power lines voltage reading between the test points TP3 and TP7: approx. 5.3V DC. Voltage reading between the test points TP4 and TP7: approx. 9.5V DC. Voltage reading between the test points TP5 and TP7: approx. 6.0 - 7.7V DC. Voltage reading between the test points TP6 and TP7: approx. -2V DC.	If the Main PCB power lines are not correct, power lines are opened or short circuited.
2	Reset Circuit	Check PIN No. 6 of the CPU (IC101) at test point TP2. Normal state is H (high).	If reset pulse is not correct, check the Reset Circuit.
3	CPU periphery	Check E pulse of the CPU (PIN No. 64 of IC101) at the test point TP1. Frequency of E pulse is 1MHz.	If reset pulse is okay, check the oscillator (X101). If E pulse is okay, check the LCD. If the LCD is okay, CPU periphery is faulty.
4	Expansion RAM (KX-W60TH only)	When Expansion RAM is used, check the Expansion RAM.	If Expansion RAM is not inserted correctly, install the Expansion RAM correctly.

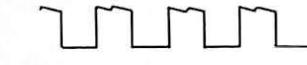
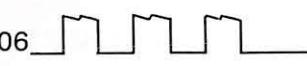
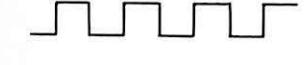
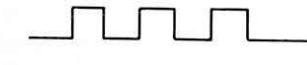
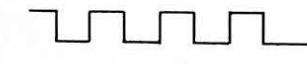
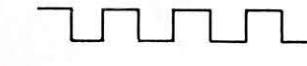
③ Head Press Solenoid does not move correctly.

NO.	Cause of Trouble	Check Point	Repair Method
1	Head Press Solenoid, Drive circuit or Logic circuit	Check waveform of IC112 Pin ⑦ of IC112  Pin ③ of IC112 	<ul style="list-style-type: none"> • If output waveform is okay, check the connector (CN110). • If output waveform and connector are okay, the Head Press Solenoid is faulty. • If output waveform is bad, IC112 is faulty. • If input waveform is bad, CPU periphery is faulty.

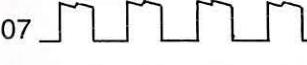
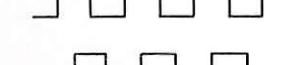
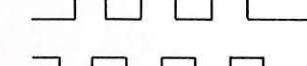
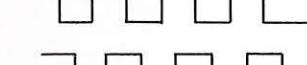
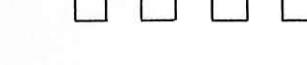
④ Correction Motor does not move correctly.

NO.	Cause of Trouble	Check Point	Repair Method
1	Correction Motor, Drive circuit or Logic circuit	Check waveform of IC113 Pin ⑦ of IC113  Pin ⑧ of IC113 	<ul style="list-style-type: none"> • If output waveform is okay, check connector (CN111). • If output waveform and the connector are okay, the Correction Motor is faulty. • If output waveform is bad, IC113 is faulty. • If input waveform is bad, the CPU periphery is faulty.

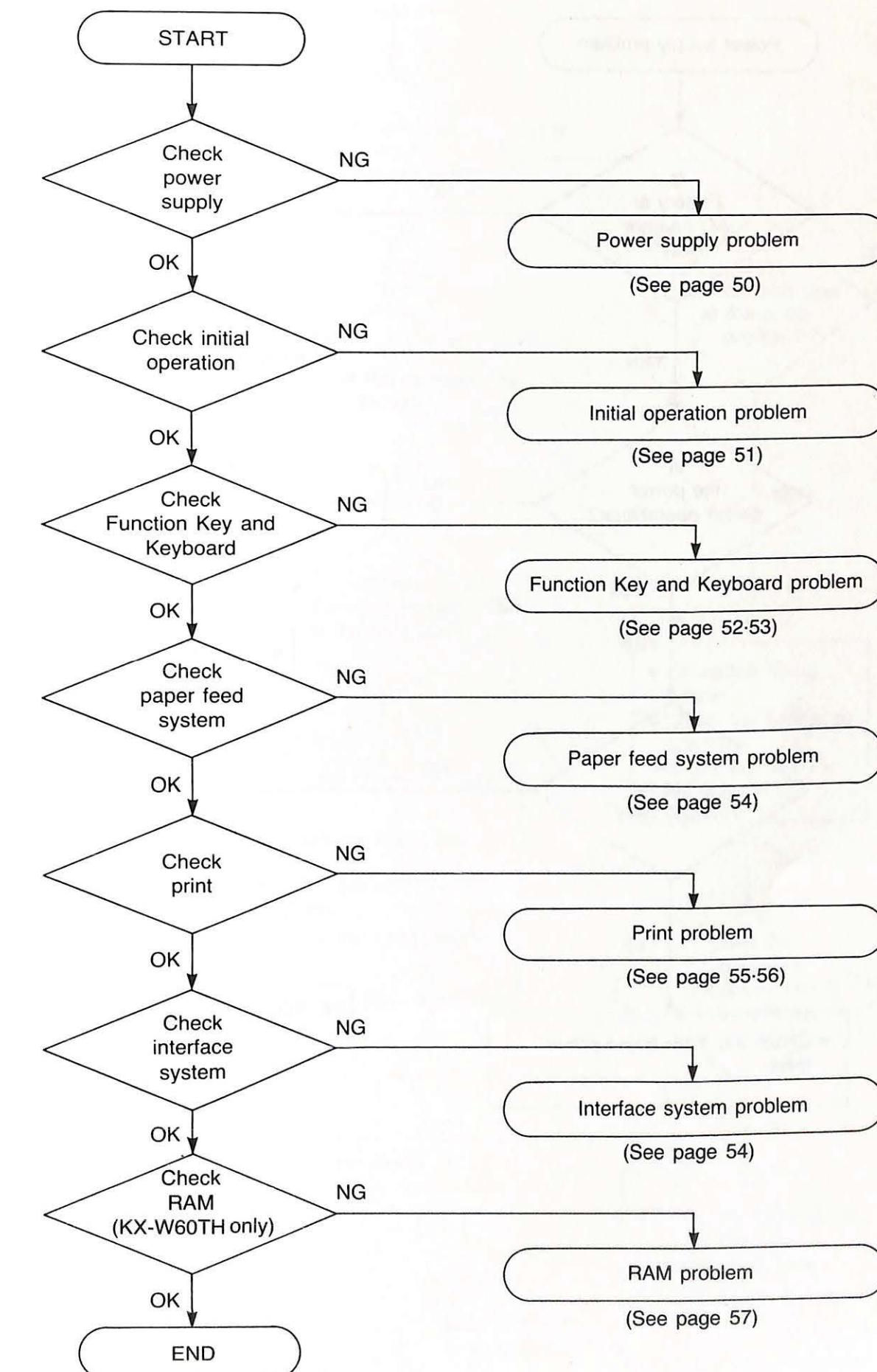
⑤ Carriage motor does not move, or the motor vibrates and it does not operate properly.

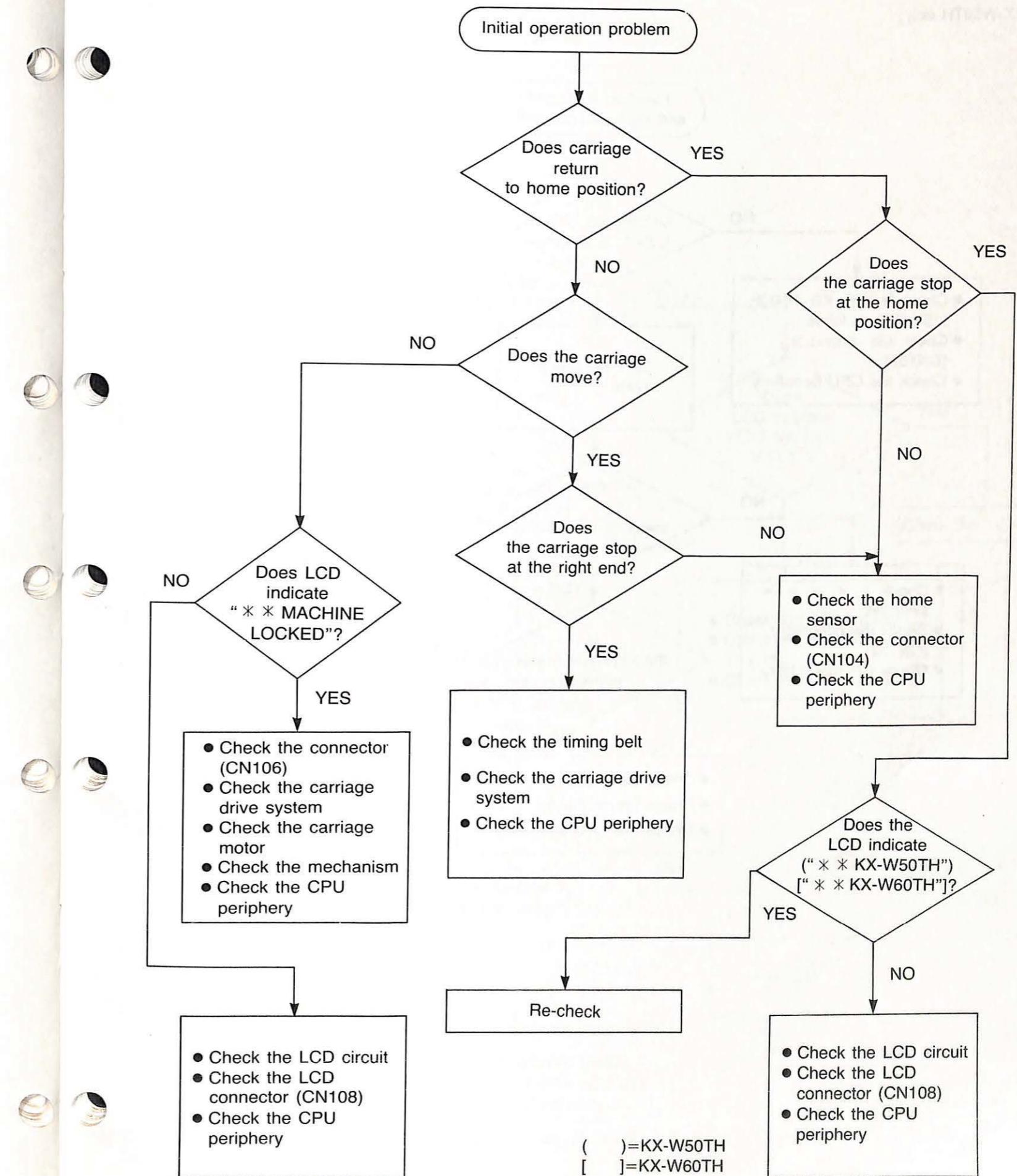
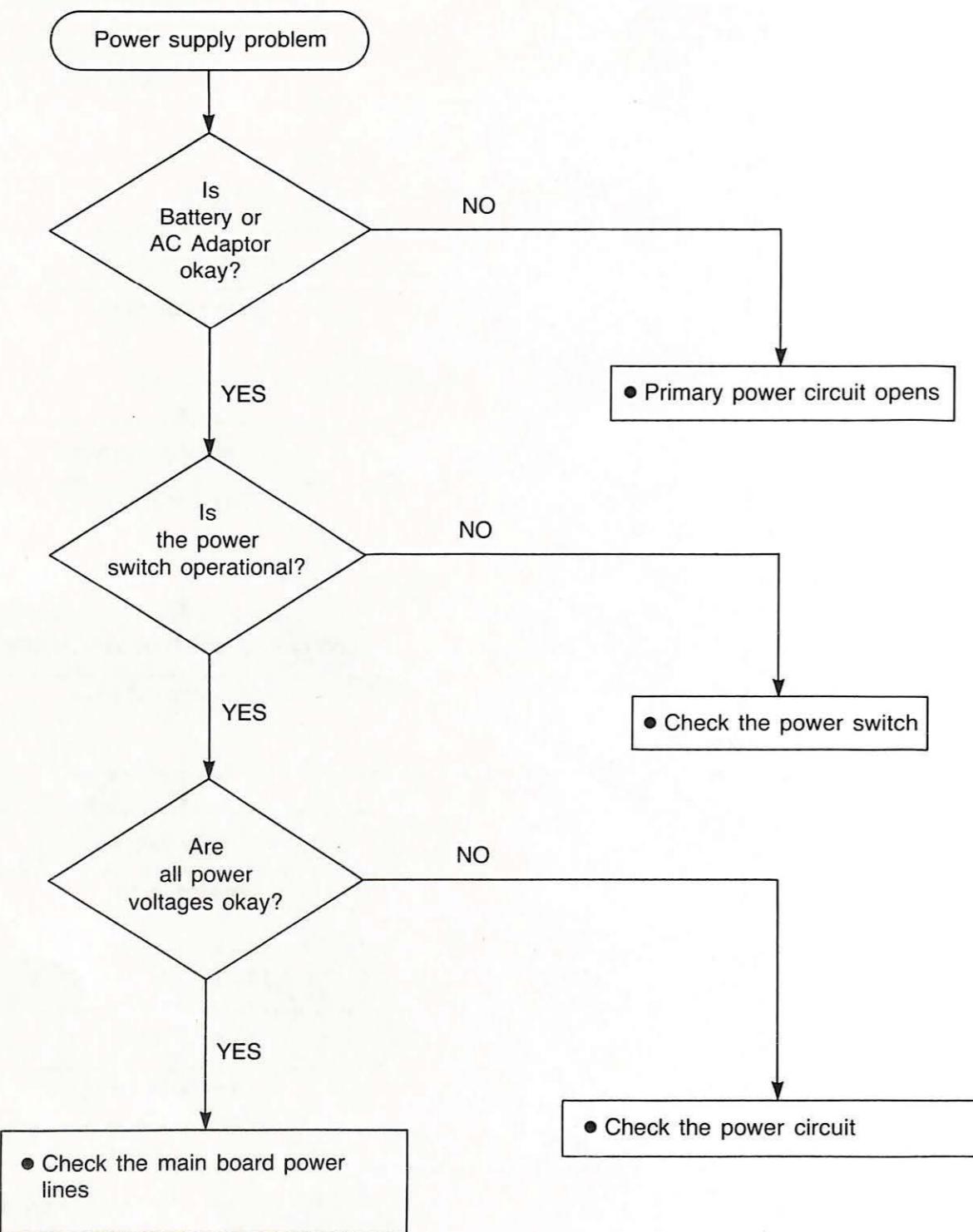
NO.	Cause of Trouble	Check Point	Repair Method
1	Carriage Motor, Drive circuit or Logic circuit	Check waveform of IC106 collector. Pin ② of IC106  Pin ⑯, ⑯ of IC106  Pin ⑩, ⑨ of IC106  Pin ⑦ of IC106  Check the waveform of IC106 base. Pin ⑭ of IC106  Pin ⑪ of IC106  Pin ③ of IC106  Pin ⑥ of IC106 	<ul style="list-style-type: none"> If collector waveform is okay, check the connector (CN106). If collector waveform and the connector are okay, the Carriage Motor is faulty. If collector waveform is bad, IC106 is faulty. If base waveform is bad, CPU periphery is faulty.

⑥ Paper Feed Motor does not move or the motor vibrates and it does not operate properly.

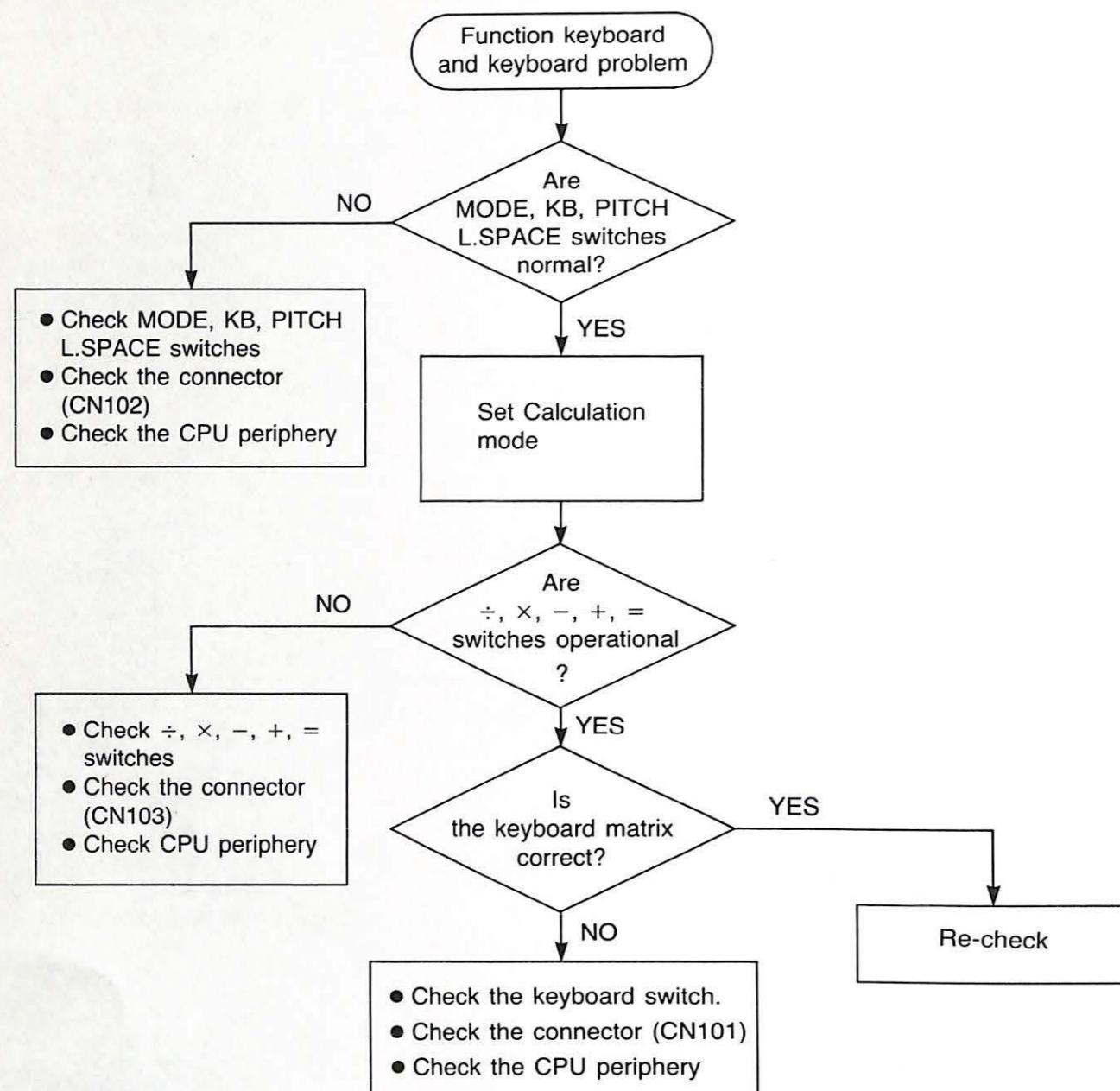
NO.	Cause of Trouble	Check Point	Repair Method
1	Paper Feed Motor, Drive circuit or Logic circuit	Check waveform of IC107 collector. Pin ② of IC107  Pin ⑯, ⑯ of IC107  Pin ⑩, ⑨ of IC107  Pin ⑦ of IC107  Check the waveform of IC107 base. Pin ⑭ of IC107  Pin ⑪ of IC107  Pin ③ of IC107  Pin ⑥ of IC107 	<ul style="list-style-type: none"> If collector waveform is okay, check the connector (CN107). If collector waveform and connector are okay, the Paper Feed Motor is faulty. If collector waveform is bad, IC107 is faulty. If base waveform is bad, CPU periphery is faulty.

11.2 Troubleshooting Flow Chart

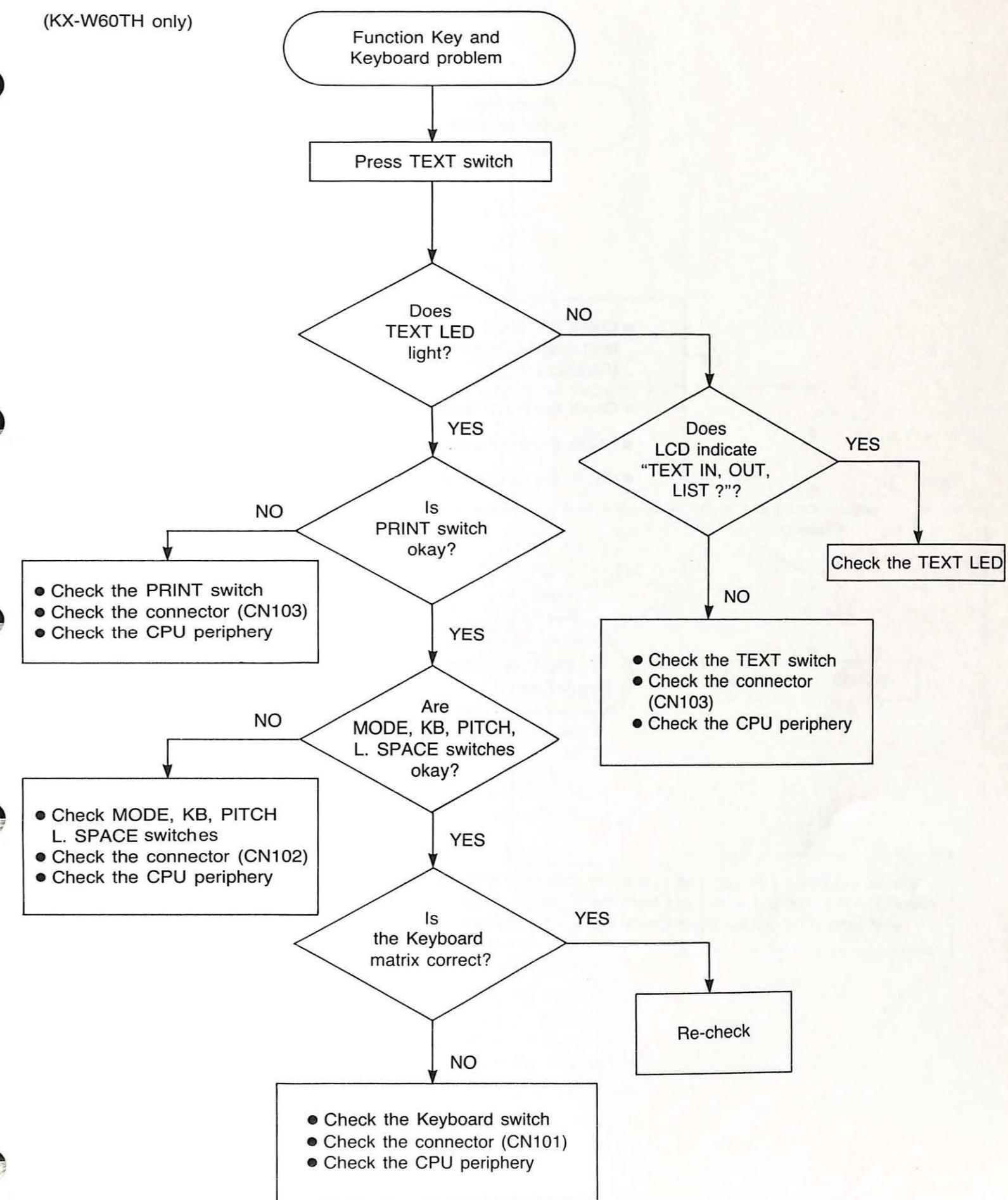


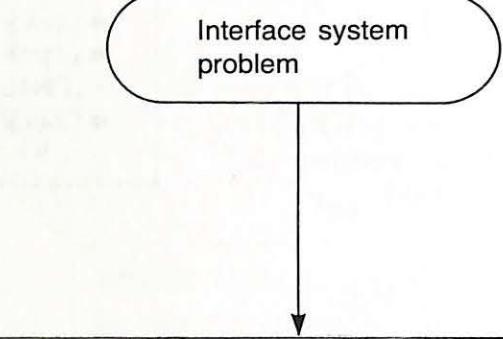
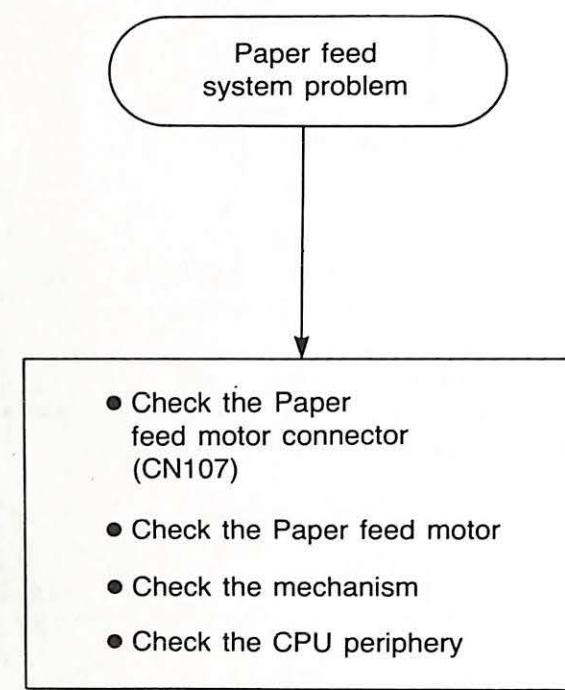


(KX-W50TH only)

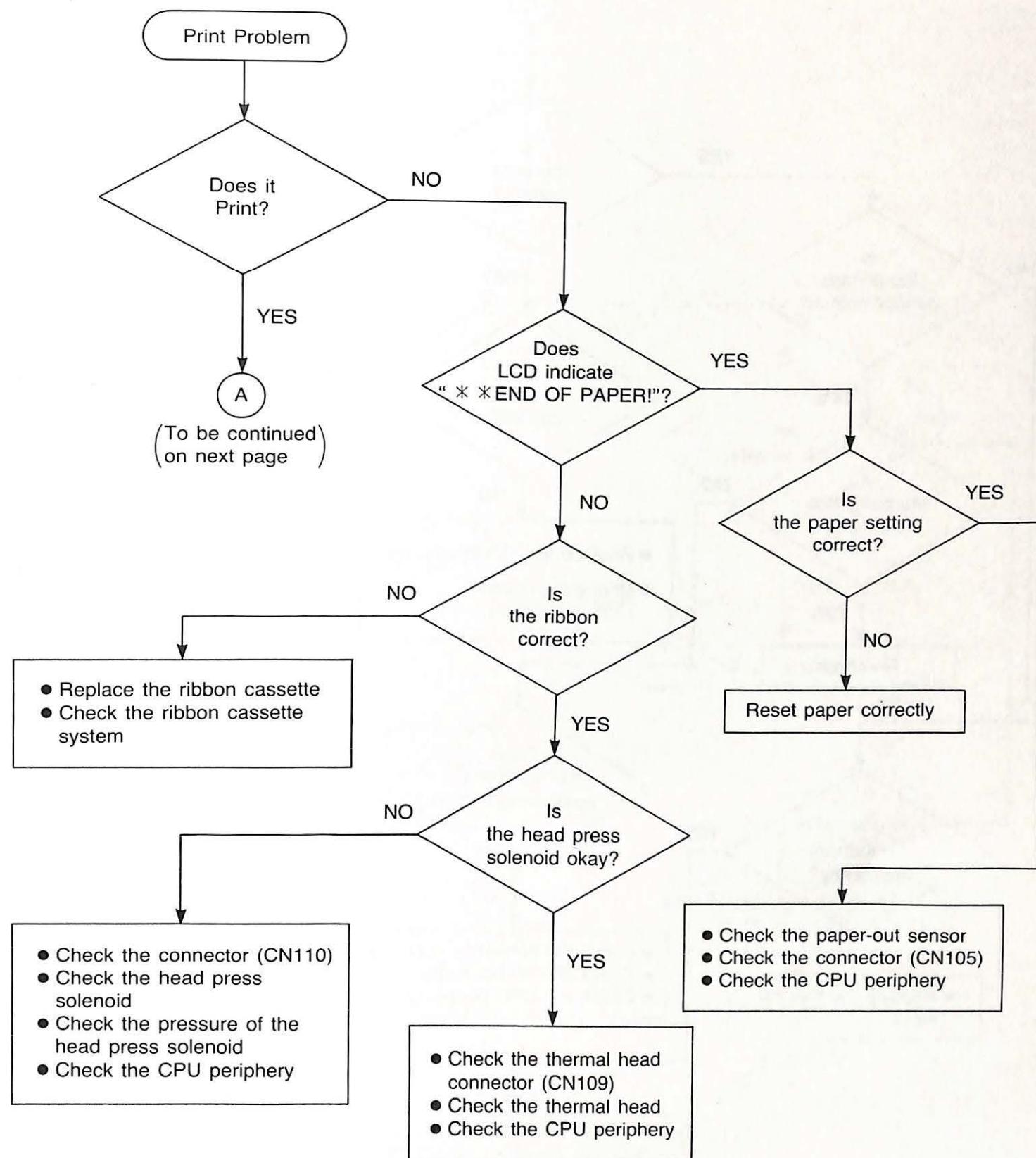


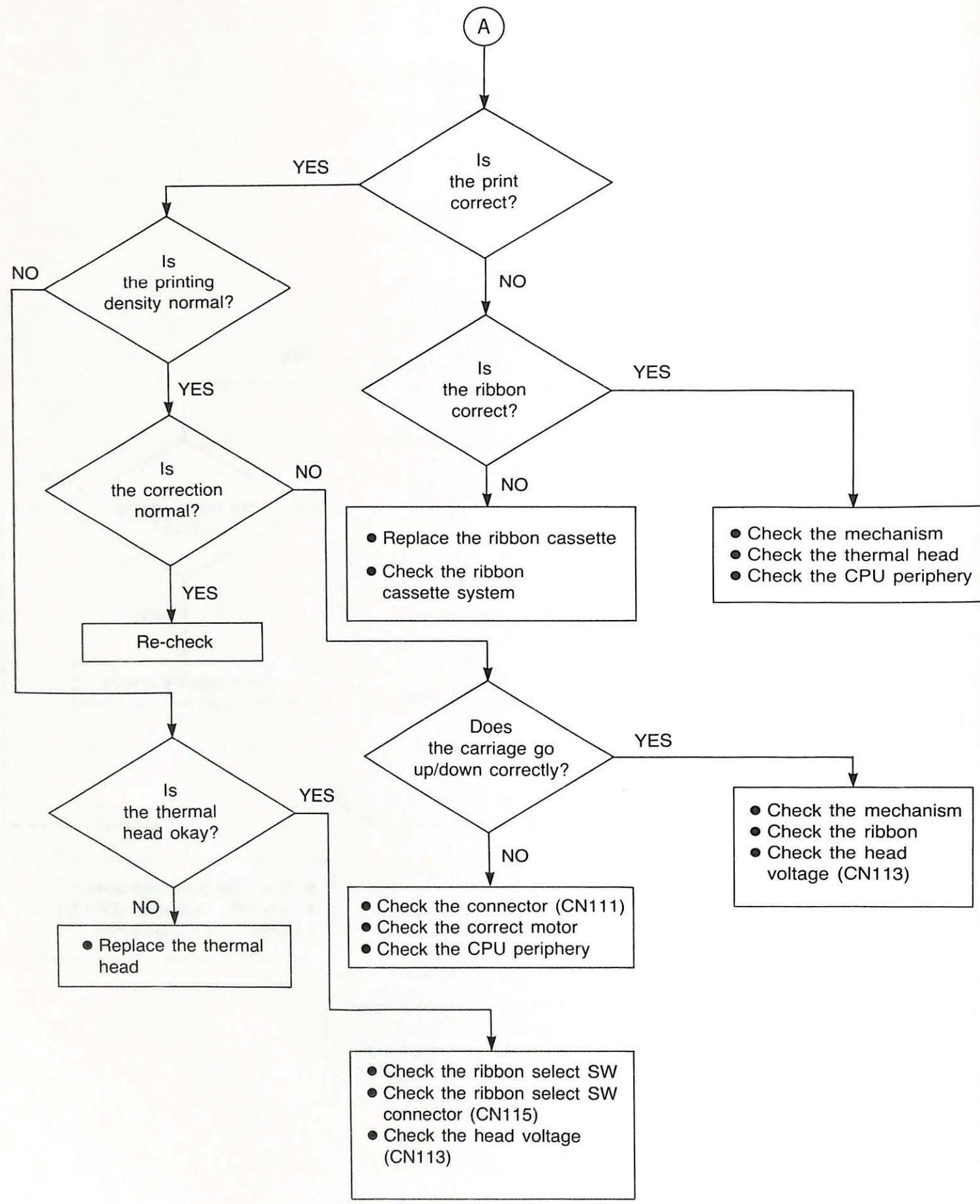
(KX-W60TH only)



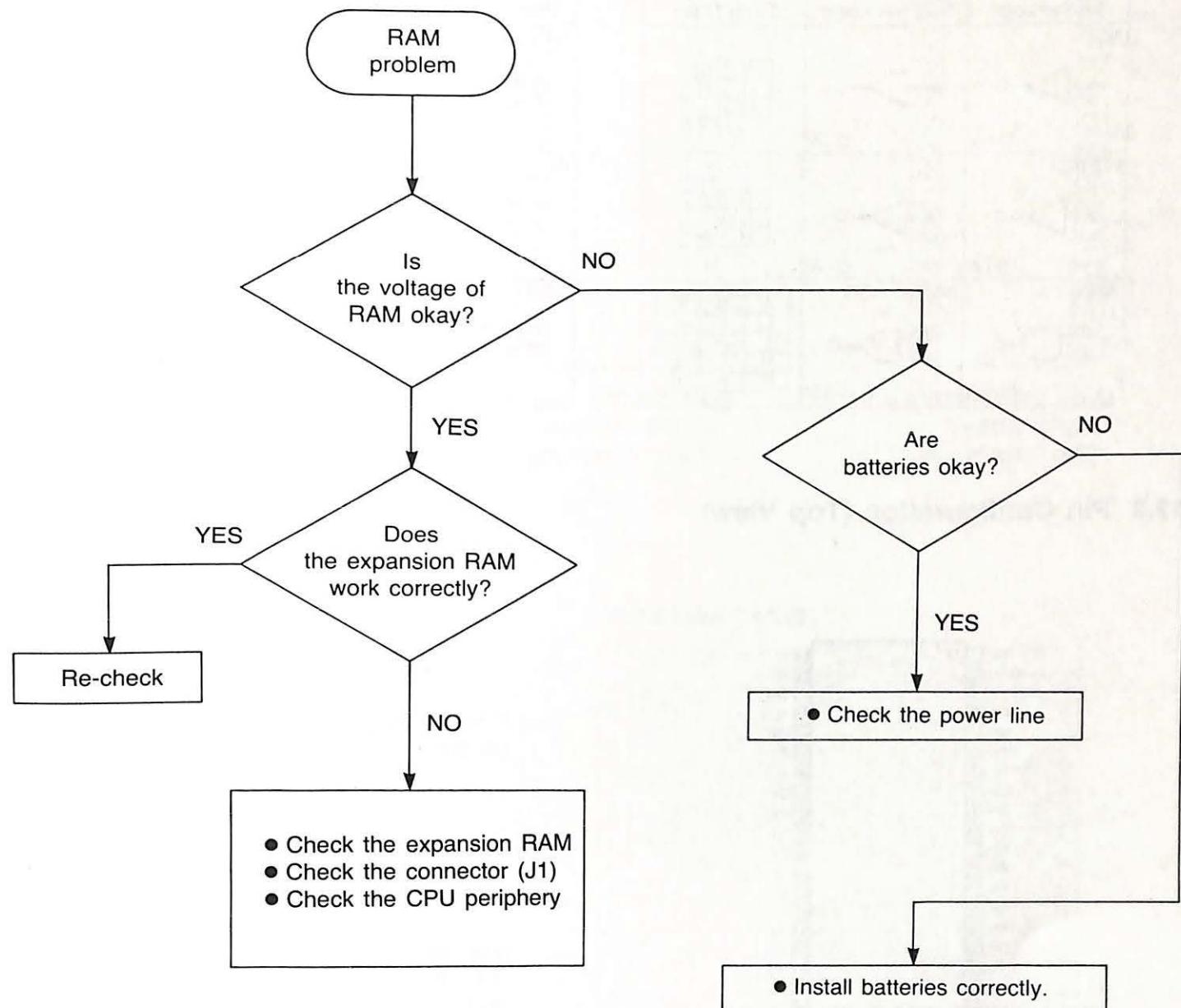


()=KX-W50TH
[]=KX-W60TH





(KX-W60TH only)



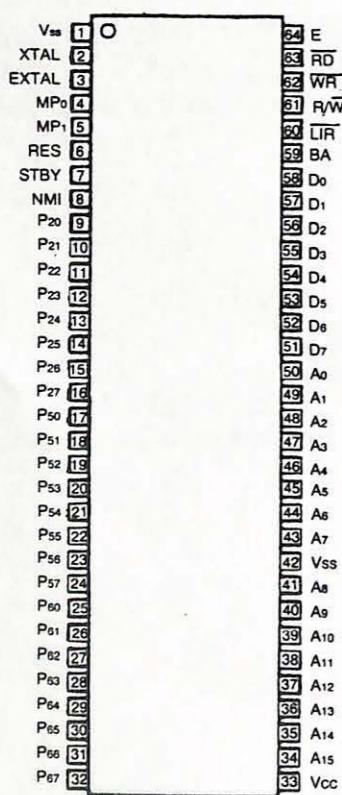
12. IC PIN CONFIGURATION

12.1 Logic Symbol Chart

Positive Logic	Negative Logic	Truth Table															
NOT																	
A C	A C	<table border="1"> <tr><th>A</th><th>C</th></tr> <tr><td>L</td><td>H</td></tr> <tr><td>H</td><td>L</td></tr> </table>	A	C	L	H	H	L									
A	C																
L	H																
H	L																
$C = \bar{A}$	$C = \bar{A}$																
BUFFER																	
A C	A C	<table border="1"> <tr><th>A</th><th>C</th></tr> <tr><td>L</td><td>L</td></tr> <tr><td>H</td><td>H</td></tr> </table>	A	C	L	L	H	H									
A	C																
L	L																
H	H																
$C = A$	$C = \bar{A}$																
AND	INVERT-NOR																
A B C	A B C	<table border="1"> <tr><th>A</th><th>B</th><th>C</th></tr> <tr><td>L</td><td>L</td><td>L</td></tr> <tr><td>L</td><td>H</td><td>L</td></tr> <tr><td>H</td><td>L</td><td>L</td></tr> <tr><td>H</td><td>H</td><td>H</td></tr> </table>	A	B	C	L	L	L	L	H	L	H	L	L	H	H	H
A	B	C															
L	L	L															
L	H	L															
H	L	L															
H	H	H															
$C = AB$	$C = \overline{A+B}$																

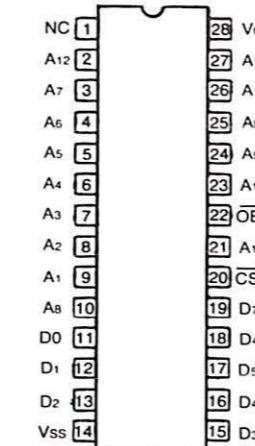
Positive Logic	Negative Logic	Truth Table															
NAND	INVERT-OR																
A B C	A B C	<table border="1"> <tr><th>A</th><th>B</th><th>C</th></tr> <tr><td>L</td><td>L</td><td>H</td></tr> <tr><td>L</td><td>H</td><td>H</td></tr> <tr><td>H</td><td>L</td><td>H</td></tr> <tr><td>H</td><td>H</td><td>L</td></tr> </table>	A	B	C	L	L	H	L	H	H	H	L	H	H	H	L
A	B	C															
L	L	H															
L	H	H															
H	L	H															
H	H	L															
$C = \bar{AB}$	$C = \bar{A} + \bar{B}$																
OR	INVERT-NAND																
A B C	A B C	<table border="1"> <tr><th>A</th><th>B</th><th>C</th></tr> <tr><td>L</td><td>L</td><td>L</td></tr> <tr><td>L</td><td>H</td><td>H</td></tr> <tr><td>H</td><td>L</td><td>H</td></tr> <tr><td>H</td><td>H</td><td>H</td></tr> </table>	A	B	C	L	L	L	L	H	H	H	L	H	H	H	H
A	B	C															
L	L	L															
L	H	H															
H	L	H															
H	H	H															
$C = A + B$	$C = \overline{AB}$																
NOR	INVERT-AND																
A B C	A B C	<table border="1"> <tr><th>A</th><th>B</th><th>C</th></tr> <tr><td>L</td><td>L</td><td>H</td></tr> <tr><td>L</td><td>H</td><td>L</td></tr> <tr><td>H</td><td>L</td><td>L</td></tr> <tr><td>H</td><td>H</td><td>L</td></tr> </table>	A	B	C	L	L	H	L	H	L	H	L	L	H	H	L
A	B	C															
L	L	H															
L	H	L															
H	L	L															
H	H	L															
$C = \overline{A+B}$	$C = \overline{AB}$																

12.2 Pin Configuration (Top View)

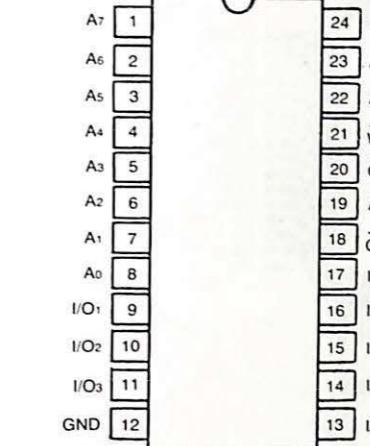


IC101 CPU
(HD6303XP)

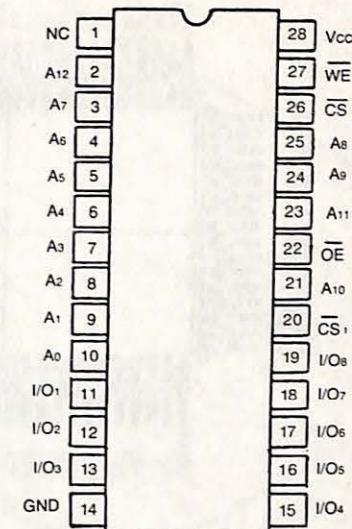
NMI: Non Maskable Interrupt
RD: Read Strobe
WR: Write Strobe
RES: Reset
MP₀, MP₁: Mode Program
LIR: Load Instruction Register
BA: Bus Available



IC102 ROM
(PEWI1011ZA) KX-W50TH
(PEWI1021ZA) KX-W60TH



IC103 STATIC RAM
(HM6116 P-4)
(KX-W50TH only)

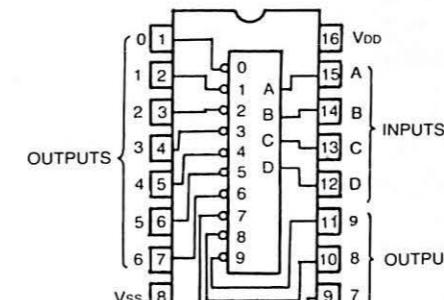


IC301 STATIC RAM
(HM6264LP)
(KX-W60TH only)

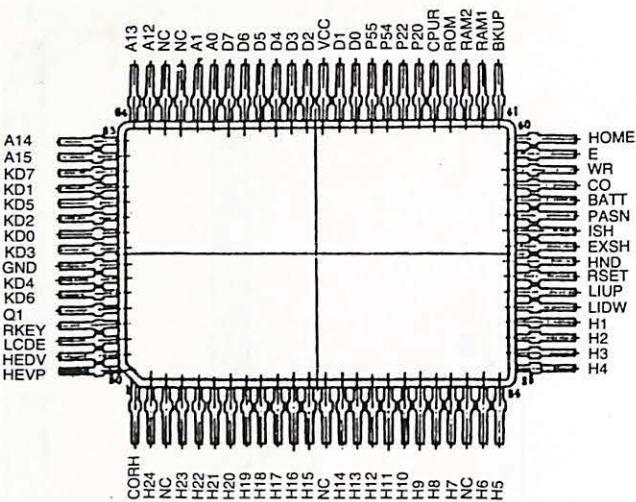
(FUNCTION TABLE)

No.	BCD INPUTS				DECIMAL OUTPUTS									
	A	B	C	D	0	1	2	3	4	5	6	7	8	9
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H
1	H	L	L	L	H	L	H	H	H	H	H	H	H	H
2	L	H	L	L	H	H	L	H	H	H	H	H	H	H
3	H	H	L	L	H	H	H	L	H	H	H	H	H	H
4	L	L	H	L	H	H	H	H	L	H	H	H	H	H
5	H	L	H	L	H	H	H	H	H	L	H	H	H	H
6	L	H	H	L	H	H	H	H	H	H	H	H	H	H
7	H	H	H	L	H	H	H	H	H	H	L	H	H	H
8	L	L	L	H	H	H	H	H	H	H	H	L	H	H
9	H	L	L	H	H	H	H	H	H	H	H	H	H	L
10	*	H	*	H	H	H	H	H	H	H	H	H	H	H
15	*	*	H	H	H	H	H	H	H	H	H	H	H	H

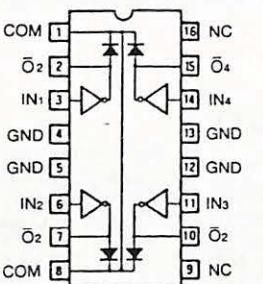
* = Don't care



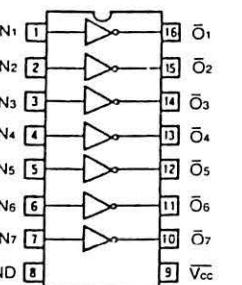
IC105
(TC40H042P)



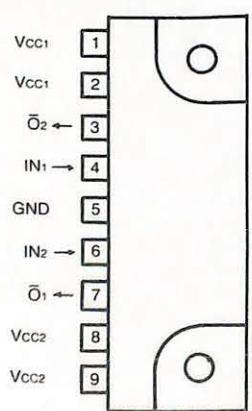
IC104
GATE ARRAY
(PEVI1011ZA)



IC106, 107
(M54532P)



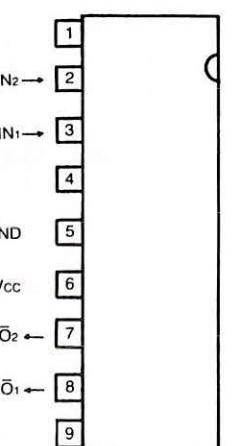
IC108, 109, 110, 111
(M54537P)



IC112
(M54544L)

(FUNCTION TABLE)

INPUT		OUTPUT		DESCRIPTION
IN1	IN2	OUT ₁	OUT ₂	
L	L	"OFF" state	"OFF" state	non-operate
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	L	L	Braking

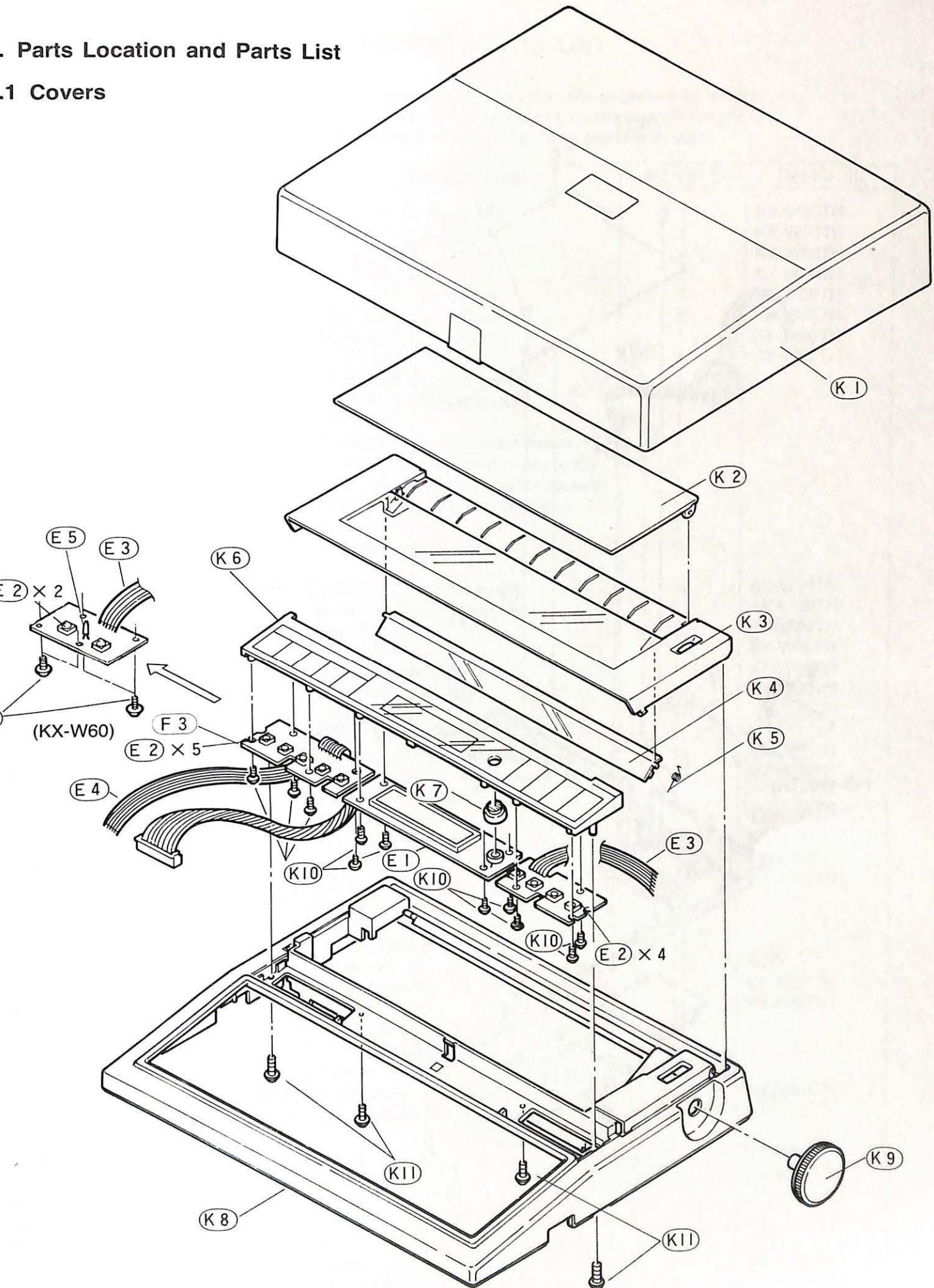


IC112=KX-W50TH
IC103=KX-W60TH
(BA6208)

INPUT		OUTPUT		DESCRIPTION
IN1	IN2	OUT ₁	OUT ₂	
L	L	"OFF" state	"OFF" state	non-operate
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	L	L	Braking

13. Parts Location and Parts List

13.1 Covers



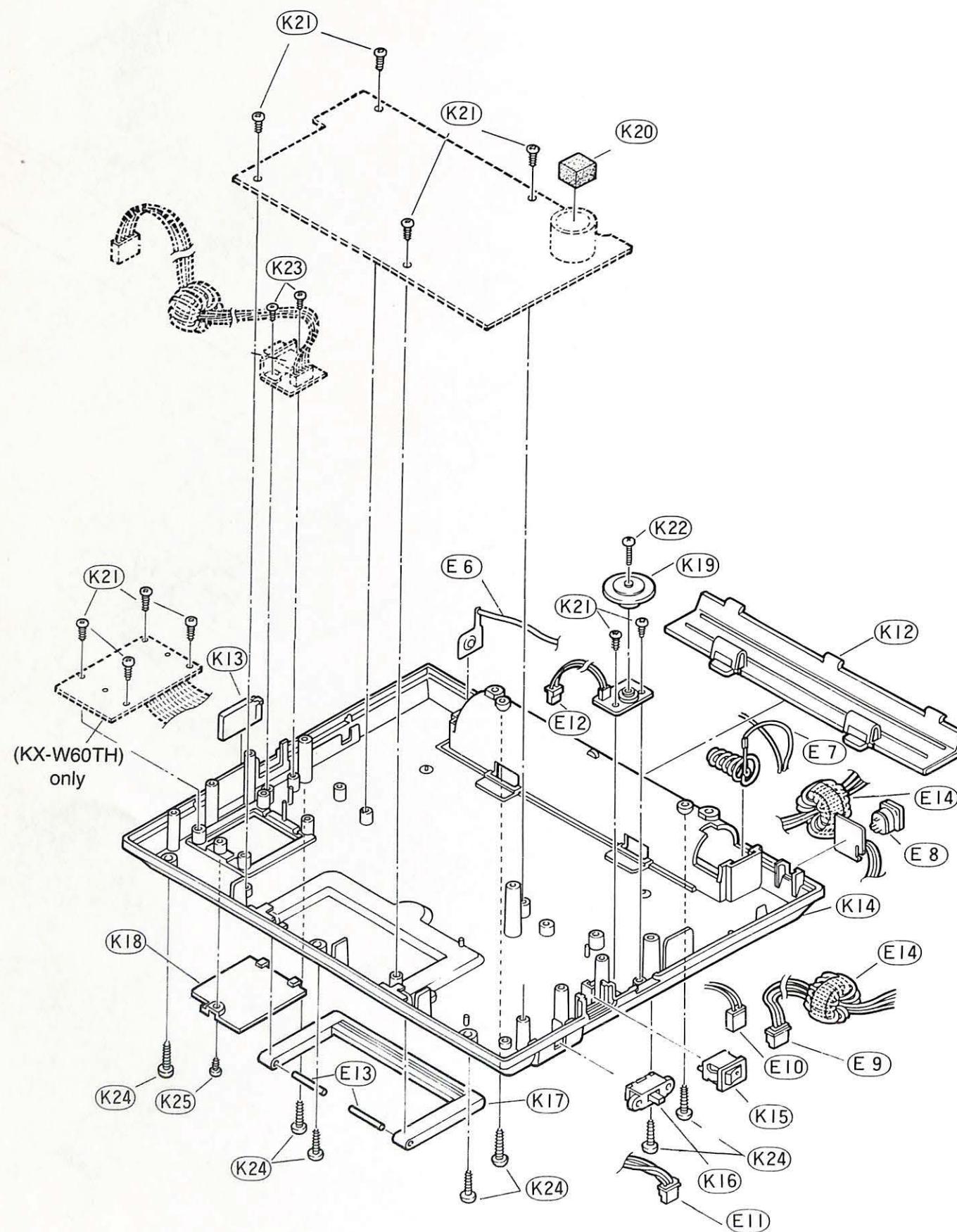
REPLACEMENT PARTS LIST

Notes: 1. Important safety notice.

Components identified by  mark have special characteristics important for safety.

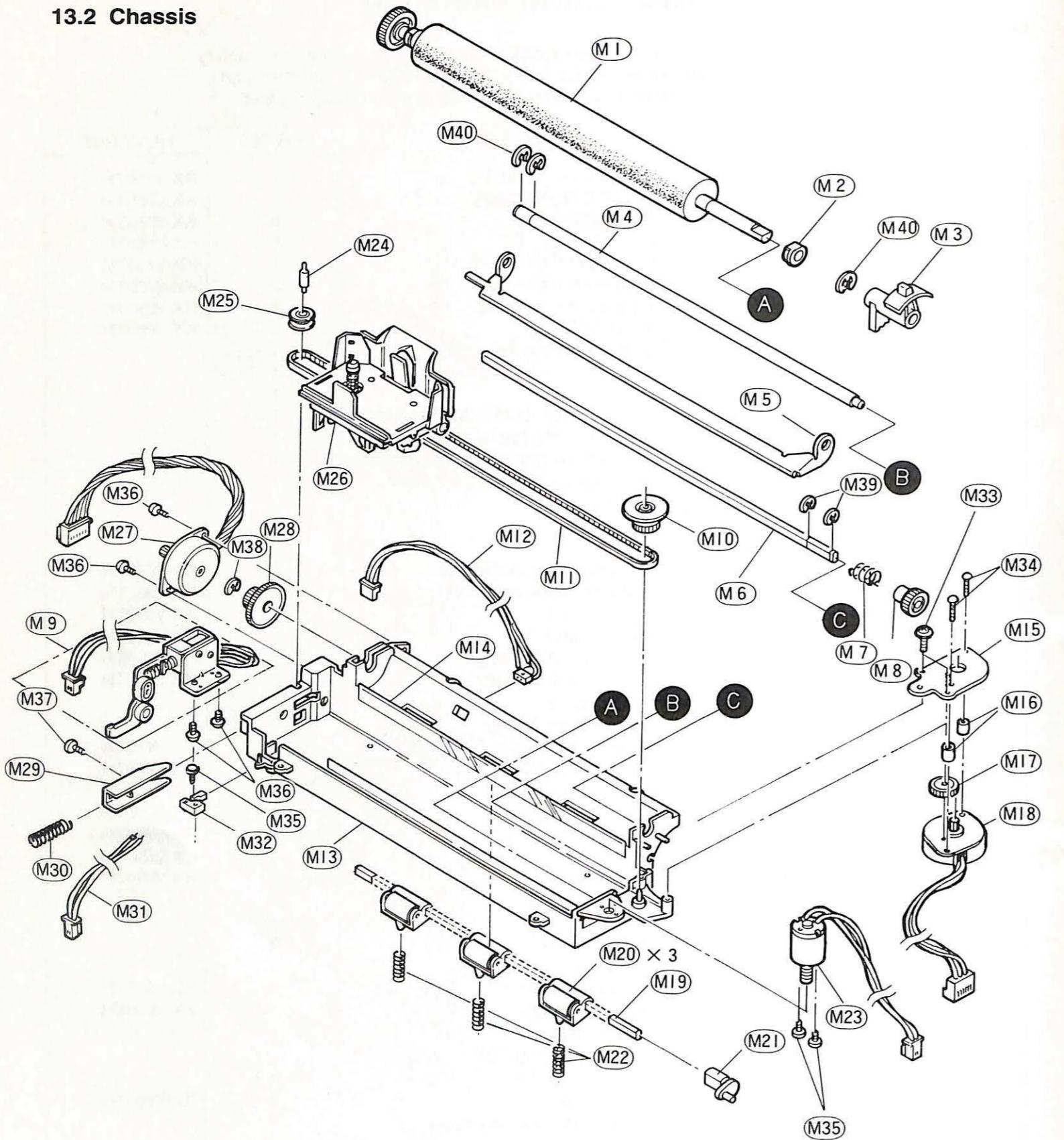
When replacing any of these components, use only manufacturer's specified parts.

2. The S mark is for service standard parts and may differ from production parts.



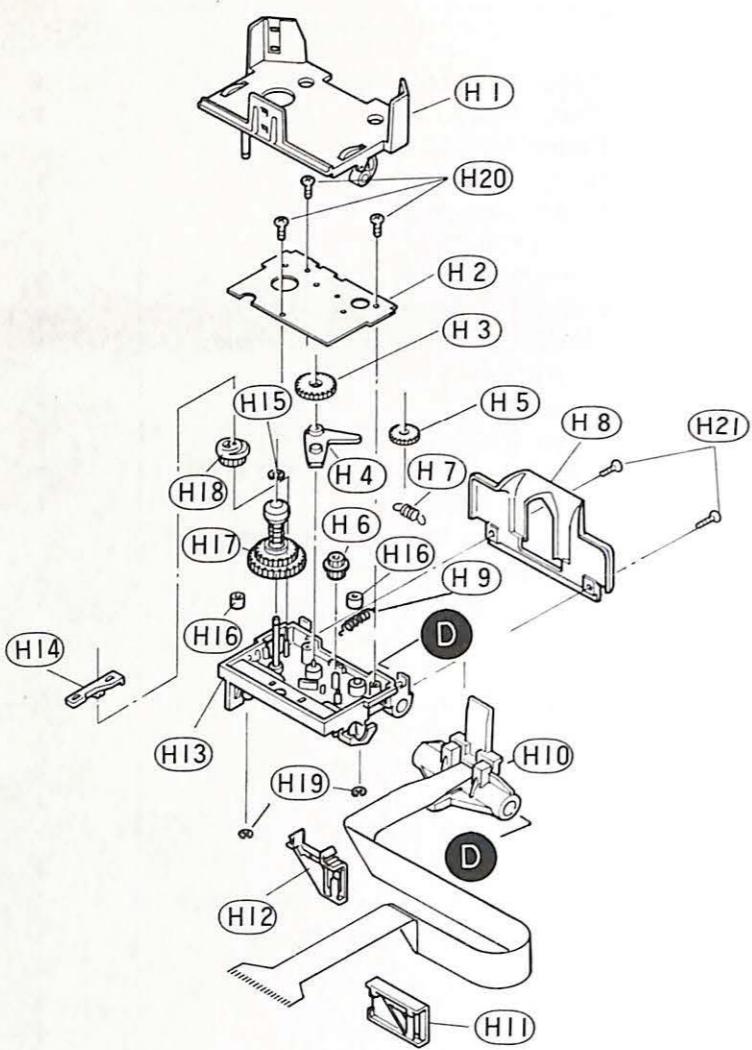
REF NO.	PARTS NO.	PARTS NAME	PER SET	REMARKS
E1	PEWP501Z	LCD P.C.B. Assembly	1	KX-W50TH
E1	PEWP502Z	LCD P.C.B. Assembly	1	KX-W60TH
E2	PEWS150TH	MT Switch	9	KX-W50TH
E2	PEWS150TH	MT Switch	6	KX-W60TH
E3	PEWW2501Z	Connector Cable 5pin	1	KX-W50TH
E3	PEWW2501Z	Connector Cable 5pin	2	KX-W60TH
E4	PEWW2511Z	Connector Cable 7pin	1	KX-W50TH
E5	PEVDTLS123	TEXT LED	1	KX-W60TH
E6	PEWW2711Y	⊕ Battery Lead Assembly	1	
E7	PEWW2721Y	⊖ Battery Lead Assembly	1	
E8	HEC0749	DC Jack	1	
E9	PEWW2401Z	Power Supply Connector Assembly	1	
E10	PEWW2001Z	Power Switch Connector Assembly	1	
E11	PEWW1161Y	Ribbon Select Switch Connector Assembly	1	
E12	PEWW2201Z	Print Density Control Connector	1	
E13	PEKT1011Z	Handle Shaft	2	
E14	PJJN9ZA-C	Ferrite Core	2	
K1	PEZX1011Z	Carrying Cover Assembly	1	KX-W50TH
K1	PEZX1021Z	Carrying Cover Assembly	1	KX-W60TH
K2	PEKE2011Z	Paper Stand	1	KX-W50TH
K2	PEKE1021Z	Paper Stand	1	KX-W60TH
K3	PEGA1011Z	Top Cover Assembly	1	KX-W50TH
K3	PEGA1021Z	Top Cover Assembly	1	KX-W60TH
K4	PEKE1011Z	Paper Guide	1	
K5	PEKE3011Z	Paper Guide Spring	1	
K6	PEGE2011Y	Function Key Case Assembly	1	KX-W50TH
K6	PEGE1021Y	Function Key Case Assembly	1	KX-W60TH
K7	PEBC4011Z	LCD Control Knob	1	
K8	PEYA1011Y	Case Assembly	1	KXW-50TH
K8	PEYA1021Y	Case Assembly	1	KX-W60TH
K9	PEYT1011Z	Platen Knob	1	KX-W50TH
K9	PEYT1021Z	Platen Knob	1	KX-W60TH
K10	XTB2+5G	Screw	11	
K11	XTW2+8S	Screw	4	
K12	PEKK1011Y	Battery Cover	1	
K13	PEKU1011Z	I/F Cover	1	
K14	PEYC2011Z	Base Assembly	1	KX-W50TH
K14	PEYC2021Z	Base Assembly	1	KX-W60TH
K15	EST2011B	Power Switch	1	
K16	PEFA2011Z	Ribbon Select Switch	1	
K17	PEKH1011Z	Handle	1	
K18	PEKU2011Z	RAM Cover	1	
K19	PEDZ1011Z	Print Density Control Knob	1	
K20	PEHZ1011Z	Cushion	1	
K21	XTN3+8G	Screw	6	KX-W50TH
K21	XTN3+8G	Screw	10	KX-W60TH
K22	XSN17+5	Screw	1	
K23	XTN26+12J	Screw	2	
K24	XTN3+12G	Screw	7	
K25	XTN3+8JFZK	Screw	1	KX-W60TH

13.2 Chassis



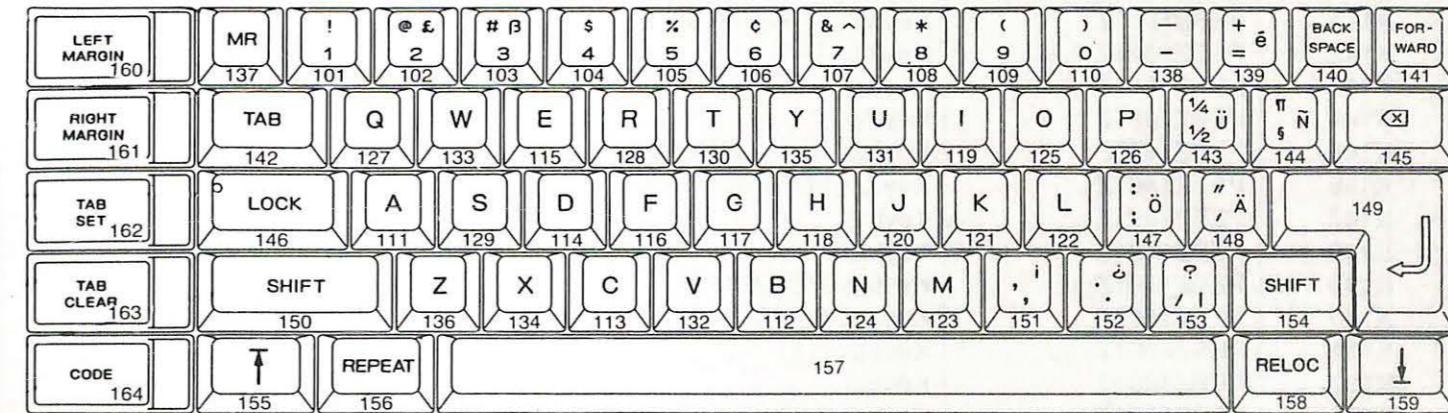
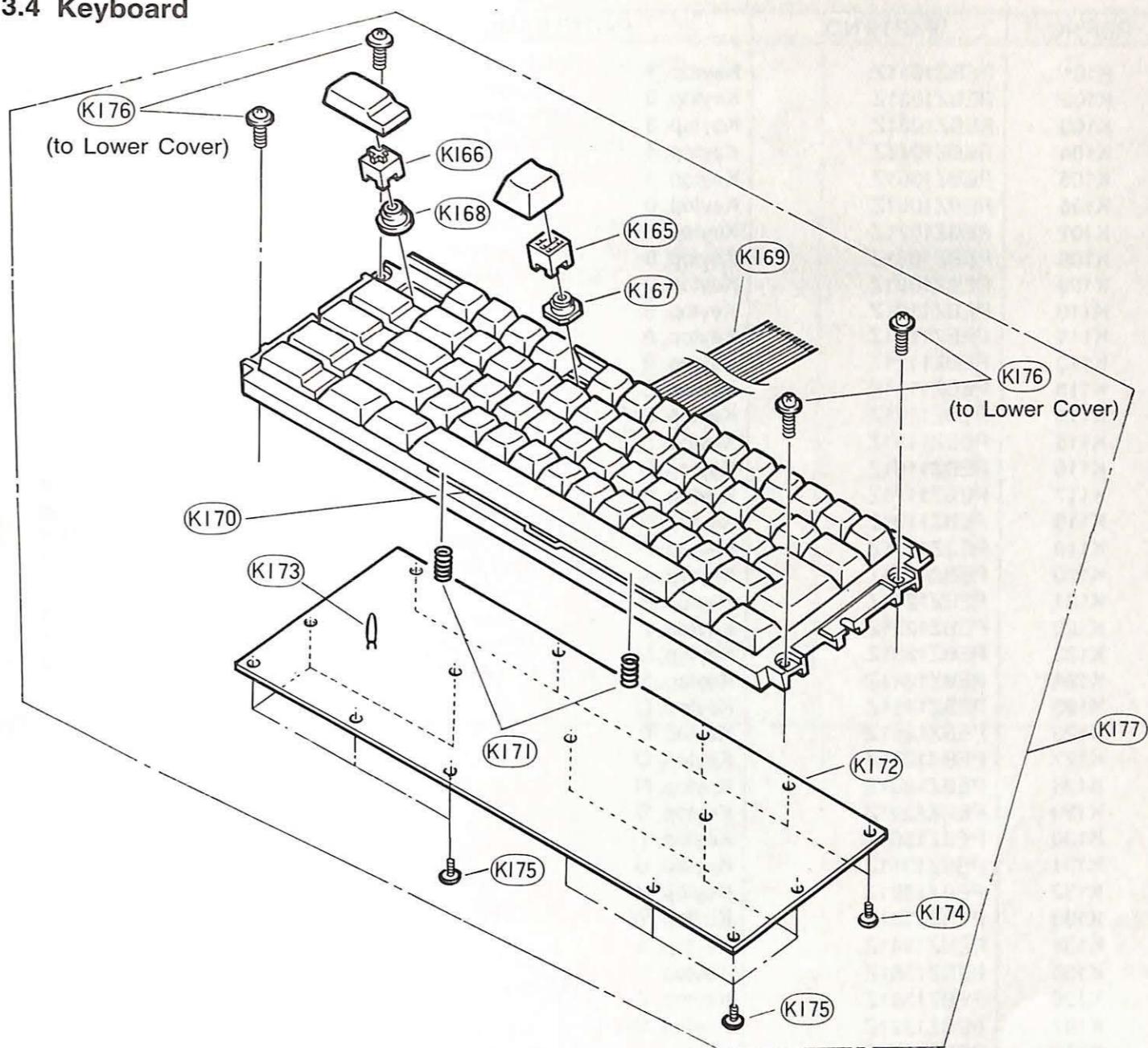
REF NO.	PARTS NO.	PARTS NAME	PER SET	REMARKS
M 1	PEDN 2011Y	Platen Assembly	1	
M 2	PEFU 1011Z	Platen Bushing	1	
M 3	PEUB 1011Z	Paper Release Lever	1	
M 4	PEU I 4011Z	Carriage Shaft	1	
M 5	PEEK 3011Z	Head Press Arm	1	
M 6	PEU I 1011Z	Correction Shaft	1	
M 7	PEUS 3011X	Correction Worm Gear Spring	1	
M 8	PEUD 2011Z	Correction Worm Gear	1	
M 9	PEWD1011Z	Head Press Solenoid Assembly	1	
M 10	PEUD 4011Z	Timing Pulley (R)	1	
M 11	PEDV 1011Z	Timing Belt	1	
M 12	PEVS 1011Z	Paper Out Sensor Assembly	1	
M 13	PEZH 1011Z	Frame Assembly (contained M14)	1	
M 14	PEUE 1011Y	Paper Press Sheet	1	
M 15	PEZU 1011Z	Carriage Motor Holder Assembly	1	
M 16	PEUL 1011Z	Carriage Motor Holder Sleeve	2	
M 17	PEUD 6011Z	Carriage Middle Gear	1	
M 18	PEFM 2011Z	Carriage Motor Assembly	1	
M 19	PEU I 1021Z	Paper Release Shaft	1	
M 20	PEDR 2011Z	Paper Release Roller Assembly	3	
M 21	PEUB 2011Z	Paper Release Link	1	
M 22	PEUS 2011Z	Paper Release Spring	3	
M 23	PEWF 1011Z	Correction Motor Assembly	1	
M 24	PEU I 3011Z	Timing Pulley Shaft (L)	1	
M 25	PEUD 5011Z	Timing Pulley (L)	1	
M 26	PEZA 1011Z	Carriage Assembly (with Head and Belt)	1	
M 27	PEFM 4011Z	Paper Feed Motor Assembly	1	
M 28	PEUD 8011Z	Platen Middle Gear	1	
M 29	PEUL 4011Z	Tension Frame	1	
M 30	PEUS 1011Z	Belt Tension Spring	1	
M 31	PEWW1231Z	Home Sensor Switch Connector Assembly	1	
M 32	MSW-1376CN	Home Sensor Switch	1	
M 33	XTN3+10G	Screw	2	
M 34	XYN3+C14	Screw	2	
M 35	XYN2+F5	Screw	1	
M 36	XYN3+F6	Screw	4	
M 37	XTW3+8P	Screw	1	
M 38	XUC25VW	E-ring	1	
M 39	XUC3Z	E-ring	2	
M 40	XUC5VW	E-ring	3	

13.3 Carrier



REF NO.	PARTS NO.	PARTS NAME	PER SET	REMARKS
H 1	PEZB 2011Z	Cassette Holder Assembly	1	
H 2	PECQ 1011Z	Carriage Cover	1	
H 3	PECB 2011Z	Ribbon Idle Gear B	1	
H 4	PECC 1011Z	Ribbon Select Arm	1	
H 5	PECB 1011Z	Ribbon Idle Gear A	1	
H 6	PECK 1011Z	Ribbon Pulley	1	
H 7	PECF 2011Z	Ribbon Select Arm Spring	1	
H 8	PEUG 1011Z	Align Scale	1	
H 9	PECF 3011Z	Head Spring	1	
H 10	PEEZ 2011X	Thermal Head Assembly	1	
H 11	PEEJ 2011Z	Head Flex Holder B	1	
H 12	PEEJ 1011Z	Head Flex Holder A	1	
H 13	PECA 1011Z	Carriage Base Assembly	1	
H 14	PECG 2011Z	Intermittent Winding Lever	1	
H 15	XUC1 5VW	E-ring	1	
H 16	PECN 1011Z	Pinch Roller	2	
H 17	PEZD 1011Z	Ribbon Winding Gear Assembly	1	
H 18	PECD 1011Z	Intermittent Winding Cam	1	
H 19	XUC2 VW	E-ring	2	
H 20	XTN2+6C	Screw	3	
H 21	XTQH 2+A8J	Screw	2	

13.4 Keyboard



REF NO.	PARTS NO.	PARTS NAME	PER SET	REMARKS
K101	PEBZ1011Z	Keytop, 1	1	
K102	PEBZ1021Z	Keytop, 2	1	
K103	PEBZ1031Z	Keytop, 3	1	
K104	PEBZ1041Z	Keytop, 4	1	
K105	PEBZ1051Z	Keytop, 5	1	
K106	PEBZ1061Z	Keytop, 6	1	
K107	PEBZ1071Z	Keytop, 7	1	
K108	PEBZ1081Z	Keytop, 8	1	
K109	PEBZ1091Z	Keytop, 9	1	
K110	PEBZ1101Z	Keytop, 0	1	
K111	PEBZ1111Z	Keytop, A	1	
K112	PEBZ1121Z	Keytop, B	1	
K113	PEBZ1131Z	Keytop, C	1	
K114	PEBZ1141Z	Keytop, D	1	
K115	PEBZ1151Z	Keytop, E	1	
K116	PEBZ1161Z	Keytop, F	1	
K117	PEBZ1171Z	Keytop, G	1	
K118	PEBZ1181Z	Keytop, H	1	
K119	PEBZ1191Z	Keytop, I	1	
K120	PEBZ1201Z	Keytop, J	1	
K121	PEBZ1211Z	Keytop, K	1	
K122	PEBZ1221Z	Keytop, L	1	
K123	PEBZ1231Z	Keytop, M	1	
K124	PEBZ1241Z	Keytop, N	1	
K125	PEBZ1251Z	Keytop, O	1	
K126	PEBZ1261Z	Keytop, P	1	
K127	PEBZ1271Z	Keytop, Q	1	
K128	PEBZ1281Z	Keytop, R	1	
K129	PEBZ1291Z	Keytop, S	1	
K130	PEBZ1301Z	Keytop, T	1	
K131	PEBZ1311Z	Keytop, U	1	
K132	PEBZ1321Z	Keytop, V	1	
K133	PEBZ1331Z	Keytop, W	1	
K134	PEBZ1341Z	Keytop, X	1	
K135	PEBZ1351Z	Keytop, Y	1	
K136	PEBZ1361Z	Keytop, Z	1	
K137	PEBZ1371Z	Keytop, MR	1	
K138	PEBZ1381Z	Keytop, —	1	
K139	PEBZ1391Z	Keytop, = + é	1	
K140	PEBZ1411Z	Keytop, BACK SPACE	1	
K141	PEBZ1401Z	Keytop, FORWARD	1	
K142	PEBZ1421Z	Keytop, TAB	1	
K143	PEBZ1441Z	Keytop, 1/2 1/4 Ü	1	
K144	PEBZ1451Z	Keytop, π § Ñ	1	
K145	PEBZ1431Z	Keytop, (X) (CANCEL)	1	
K146	PEBZ1461Z	Keytop, LOCK	1	
K147	PEBZ1471Z	Keytop, ; : ö	1	
K148	PEBZ1481Z	Keytop, " ' Ä	1	
K149	PEBZ1491Z	Keytop, RETURN	1	
K150	PEBZ1501Z	Keytop, SHIFT (LEFT)	1	
K151	PEBZ1801Z	Keytop, , ' ;	1	
K152	PEBZ1901Z	Keytop, . . ?	1	
K153	PEBZ2001Z	Keytop, / ! ?	1	

REF NO.	PARTS NO.	PARTS NAME	PER SET	REMARKS
K154	PEBZ1511Z	Keytop, SHIFT (RIGHT)	1	
K155	PEBZ1521Z	Keytop, ↑	1	
K156	PEBZ1531Z	Keytop, REPEAT	1	
K157	PEBZ1541Z	Keytop, (SPACE)	1	
K158	PEBZ1551Z	Keytop, RELOC	1	
K159	PEBZ1701Z	Keytop, ↓	1	
K160	PEBZ1491Z	Keytop, LEFT MARGIN	1	
K161	PEBZ1571Z	Keytop, RIGHT MARGIN	1	
K162	PEBZ1591Z	Keytop, TAB SET	1	
K163	PEBZ1581Z	Keytop, TAB CLEAR	1	
K164	PEBZ1601Z	Keytop, CODE	1	
K165	PEHR1001Z	Guide Tip (A)	59	
K166	PEHR1011Z	Guide Tip (B)	5	
K167	PESE150TH	Rubber Contact (A)	59	
K168	PESE250TH	Rubber Contact (B)	5	
K169	PEWW1421Y	Keyboard Cable	1	
K170	PEDE1001Z	Support Bar	1	
K171	PEDS1001Z	Coil Spring (Space Bar)	2	
K172	PEUP8011Y	Keyboard Plate P.C.B	1	
K173	PESE450TH	Shift Lock (L.E.D.)	1	
K174	XTN26+4C	Screw	5	
K175	XTN26+6C	Screw	10	
K176	XTN3+10C	Screw	4	
K177	PESH2011Z	Keyboard Assembly	1	

13.5 CIRCUIT BOARDS
INTEGRATED CIRCUITS, TRANSISTORS AND DIODES

REF NO.	PARTS NO.	PARTS NAME	PER SET	REMARKS
IC101	HD6303XP	CPU	1	
IC102	PEWI1011Z	IC MASK ROM	1	KX-W50TH
IC102	PEWI1021Z	IC MASK ROM	1	KX-W60TH
IC103	HM6116P-4	IC RAM	1	KX-W50TH
IC103	PEVIBA6208	Correction Motor Driver	1	KX-W60TH
IC104	PEVI1011Z	IC Gate Array	1	
IC105	TC40H042P	IC	1	
IC106, 107	M54532P	IC Transistor Array	2	
IC108-111	M54537P	IC Transistor Array	4	
IC112	M54544L	IC Solenoid Driver	1	
IC113	PEVIBA6208	IC Correction Motor Driver	1	KX-W50TH
IC301	HM6264LP	IC RAM	1	KX-W60TH
IC302	PEJSDICF-28C	IC Socket	1	KX-W60TH
Q101, 102	DTC143EF	Transistor	2	
Q103	2SC1815Y	Transistor	1	
Q104	2SC3246HJ	Transistor	1	
Q105, 106	2SC1815Y	Transistor	2	
Q107	2SC3420GR	Transistor	1	
Q108, 109	2SC1815Y	Transistor	2	
Q110	2SC3420GR	Transistor	1	
Q111, 112	2SC1815Y	Transistor	2	
Q113	2SC3420GR	Transistor	1	
Q114	2SC1815Y	Transistor	1	
Q115	DTC143EF	Transistor	1	
Q116	2SC1815Y	Transistor	1	
D101-110	1S1588	Diode	10	
D111	HZ3B2	Diode (Zener)	1	
D112, 113	1S1588	Diode	2	
D114	HZ9A3	Diode (Zener)	1	
D115	ERC04-02F	Diode	1	
D116	1S1588	Diode	1	
D117	HZ24-2	Diode (Zener)	1	
D118	MA170	Diode	1	
D119	1S1588	Diode	1	
D120	HZ5C1	Diode (Zener)	1	
D121	HZ9C2	Diode (Zener)	1	
D122, 123	ERA81-004	Diode	2	
D124	HZ5A2	Diode (Zener)	1	
D125	1S1588	Diode	1	
D126	PEVDLTZ-R15	Diode (LED)	1	
D127	1S1588	Diode	1	
D128	HZ4A1	Diode (Zener)	1	
D129	1S1588	Diode	1	
D130, 131	PEVDLTZ-R15	Diode (LED)	2	KX-W60TH
				KX-W60TH

RESISTORS

REF NO.	PARTS NO.	PARTS NAME	PER SET	REMARKS
R101	ERD25FJ222	22K 1/4W Carbon	1	S
R102	ERD25FJ103	10K 1/4W Carbon	1	S
R103	ERD25FJ221	220 1/4W Carbon	1	S
R104	ERD25FJ681	680 1/4W Carbon	1	S
R105	ERD25FJ102	1K 1/4W Carbon	1	S
R106	ERD25FJ220	22 1/4W Carbon	1	S
R107	ERD25FJ151	150 1/4W Carbon	1	S
R108, 109	ERD25FJ220	22 1/4W Carbon	2	S
R110	ERD25FJ472	4.7K 1/4W Carbon	1	S
R111	ERD25FJ393	39K 1/4W Carbon	1	S
R112	ERD25FJ102	1K 1/4W Carbon	1	S
R113	ERD25FJ103	10K 1/4W Carbon	1	S
R114, 115	ERD25FJ221	220 1/4W Carbon	2	S
R116, 117	ERD25FJ472	4.7K 1/4W Carbon	2	S
R118	ERD25FJ221	220 1/4W Carbon	1	S
R119, 120	ERD25FJ153	15K 1/4W Carbon	2	S
R121	ERD25FJ103	10K 1/4W Carbon	1	S
R122	ERD25FJ680	68 1/4W Carbon	1	S
R123	ERD25FJ823	82K 1/4W Carbon	1	S
R124, 125	ERD25FJ102	1K 1/4W Carbon	2	S
R126, 127	ERD25FJ103	10K 1/4W Carbon	2	S
R128	ERD25FJ333	33K 1/4W Carbon	1	S
R129	ERD25FJ102	1K 1/4W Carbon	1	S
R130	ERD25FJ220	22 1/4W Carbon	1	S
R131	ERD25FJ472	4.7K 1/4W Carbon	1	S
R132	ERD25FJ102	1K 1/4W Carbon	1	S
R133	ERD25FJ333	33K 1/4W Carbon	1	S
R134	ERD25FJ470	47 1/4W Carbon	1	S
R135	ERD25FJ102	1K 1/4W Carbon	1	S
R136	ERD25FJ220	22 1/4W Carbon	1	S
R137	ERQ14AJ101	100 1/4W Carbon	1	
R138	ERD25FJ472	4.7K 1/4W Carbon	1	S
R139	ERD25FJ682	6.8K 1/4W Carbon	1	S
R140	ERD25FJ102	1K 1/4W Carbon	1	S
R141	ERD25FJ221	220 1/4W Carbon	1	S
R142	ERD25FJ682	6.8K 1/4W Carbon	1	S KX-W60TH
R143	ERD25FJ222	2.2K 1/4W Carbon	1	S KX-W60TH
R144	ERD25FJ103	10K 1/4W Carbon	1	S KX-W60TH
R301	ERD25FJ103	10K 1/4W Carbon	1	S KX-W60TH
VR101	EVN39C00YB53	5K (B) Variable Resistor	1	
VR	EVLE8AT43B24	20K (B) Variable Resistor	1	
Z101-103	RGSN8X103J	Resistor Array 10K x 8	3	
Z104-106	PERGSN4X103J	Resistor Array 10K x 4	3	

CAPACITORS

REF NO.	PARTS NO.	PARTS NAME			PER SET	REMARKS
C101	ECKR1H103ZF	0.01	50V	Ceramic	1	
C102, 103	ECFR1E104ZF	0.1	25V	Ceramic	2	
C104, 105	ECCR1H300KC	30PF	50V	Ceramic	2	
C106	ECKR1H103ZF	0.01	50V	Ceramic	1	
C107	ECEA1CU100B	10	16V	Electrolytic	1	
C108	ECEA1AU101B	100	10V	Electrolytic	1	
C109	ECEA1CU100B	10	16V	Electrolytic	1	
C110	ECQB1H104KH	0.1 50V Polyester Film Capacitor			1	
C111	ECEA1CU101B	100	16V	Electrolytic	1	
C112	ECEA1CU332	3300	16V	Electrolytic	1	
C113-115	ECFR1E104ZF	0.1	25V	Ceramic	3	
C116	ECET1CU103	10000	16V	Electrolytic	1	
C117, 118	ECKR1H102KB	1000PF	50V	Ceramic	2	
C119	ECEA1HU2R2B	2.2	50V	Electrolytic	1	
C120	ECEA1AU102	1000	10V	Electrolytic	1	
C121	ECEA1AU101B	100	10V	Electrolytic	1	
C122	ECKR1H103ZF	0.01	50V	Ceramic	1	
C123	ECKR1H332KB	3300PF	50V	Ceramic	1	
C124	ECKR1H102KB	1000PF	50V	Ceramic	1	
C125	ECEB1CU472	4700	16V	Electrolytic	1	
C126	ECKR1H222KB	2200PF	50V	Ceramic	1	
C127	ECKR1H103ZF	0.01	50V	Ceramic	1	
C128	ECKR1H221KB	220PF	50V	Ceramic	1	
C129, 130	ECFR1E104ZF	0.1	25V	Ceramic	2	
C131	ECFR1E104ZF	0.1	25V	Ceramic	1	
C301	ECEB0JU472	4700	6.3V	Electrolytic	1	KX-W50TH
C302	ECFR1E104ZF	0.1	25V	Ceramic	1	KX-W60TH
C303	ECKR1H103ZF	0.01	50V	Ceramic	1	KX-W60TH
C304-306	ECKR1H221KB	220PF	50V	Ceramic	3	KX-W60TH

OTHER ELECTRICAL PARTS

REF NO.	PARTS NO.	PARTS NAME	PER SET	REMARKS
1	PEWP1011Y	Main P.C.B. Assembly	1	KX-W50TH
1	PEWP1021Y	Main P.C.B. Assembly	1	KX-W60TH
BZ101	EFBRD24C41	Buzzer	1	
J1	PEWW2101Z	RAM Cable Assembly (to J1)	1	KX-W60TH
T101	PELE126-31	Transformer	1	
T102	PELE126-29	Transformer	1	
T103	PELE126-30	Transformer	1	
TH101, 102	ERTD2ZHJ802	Thermistor 8K at 25°C	2	
X101	EFOA4ROM03A2	X'Tal	1	
CN101	PEJS23020303	FPC Connector B	1	
CN102	PEFJ-05-001	Connector A	1	
CN103	PEFJ-07-001	Connector H	1	KX-W50TH
CN103	PEFJ-05-001	Connector A	1	KX-W60TH
CN104	PE5045-02F	Connector C	1	
CN105	PE5267-03A	Connector B	1	
CN106, 107	PE5045-06A	Connector D	2	
CN108	PEW-P9014	Connector G	1	
CN109	PEJSHLEM30S	FPC Connector A	1	
CN110	5267-02A	Connector F	1	
CN111	PE5045-02F	Connector C	1	
CN112	PE5267-03A	Connector B	1	
CN113	PE5045-03A	Connector E	1	
CN114 (J2)	PEWW1301Y	I/F Cable Assembly	1 (1)	() = KX-W60TH
CN114	5267-02A	Connector F	1	KX-W60TH
CN115	PE5267-03A	Connector B	1	
CN116	PE5045-02F	Connector C	1	
CN117	5267-02A	Connector F	1	
CN201	DEL-J9PA-410	I/F Connector	1	
CN301	PEWW2401Z	Power Cable Assembly	1	
CN401	PEWW2201Z	Density Control Cable Assembly	1	

PACKING METALIALS

REF NO.	PARTS NO.	PARTS NAME	PER SET	REMARKS
	PEPK011Z	Carton Box	1	KX-W50TH
	PEPK021Z	Carton Box	1	KX-W60TH
	PEPE911Z	Carton Box Handle	1	
	PEPN111Z	Cushion (R)	1	
	PEPN211Z	Cushion (L)	1	
	PEPN011Z	Cushion (Bottom)	1	
	PEQX5111Z	Instruction Book	1	KX-W50TH
	PEQX5121Z	Instruction Book	1	KX-W60TH
	PEPP011Z	Plastic Bag	1	
	PEQA1011Z	Keyboard III Sticker	1	
	KX-WA50	AC Adaptor (120V)	1	⚠

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