SHARP

SERVICE MANUAL

CE-150

Printer and cassette interface

SHARP CORPORATION

CE-150

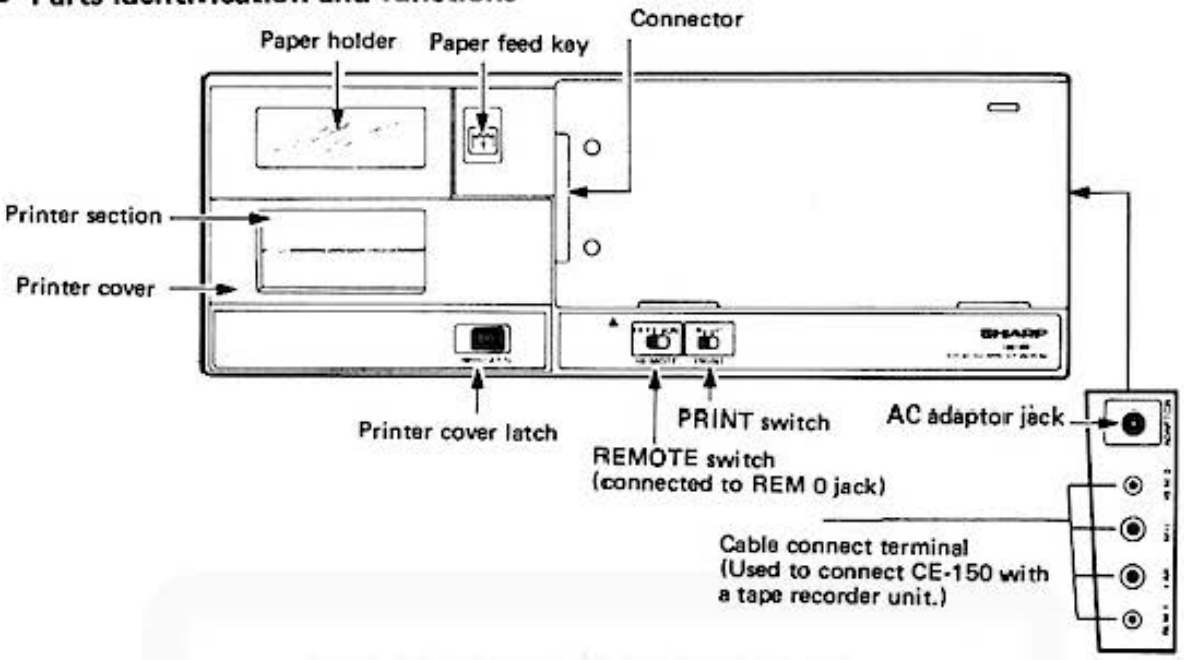
PC-1500 Option Printer & Cassette Interface

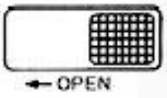
Service Manual

TABLE OF CONTENTS

1. SPECIFICATIONS

- **Parts identification and functions**





- **Printer cover latch**
  Moving the latch lever to the OPEN position enables you to remove the printer cover.

- **REMOTE switch**
  Moving the remote switch to the ON position allows the pocket computer to control start and stop operation of the REM 0 jack connected tape recorder. When in the OFF position, the remote control function is disabled through the REM 0 jack, and the tape recorder can then be operated manually.

- **PRINT switch**
  Placing the switch to the P side performs automatic printout of the computing formula and results of manual calculation.
  Turning the switch to the dot (·) side does not print the computing formula and results of manual calculation.
  However, printout takes place with such a PRINT command as LPRINT and LINE, regardless of switch position.

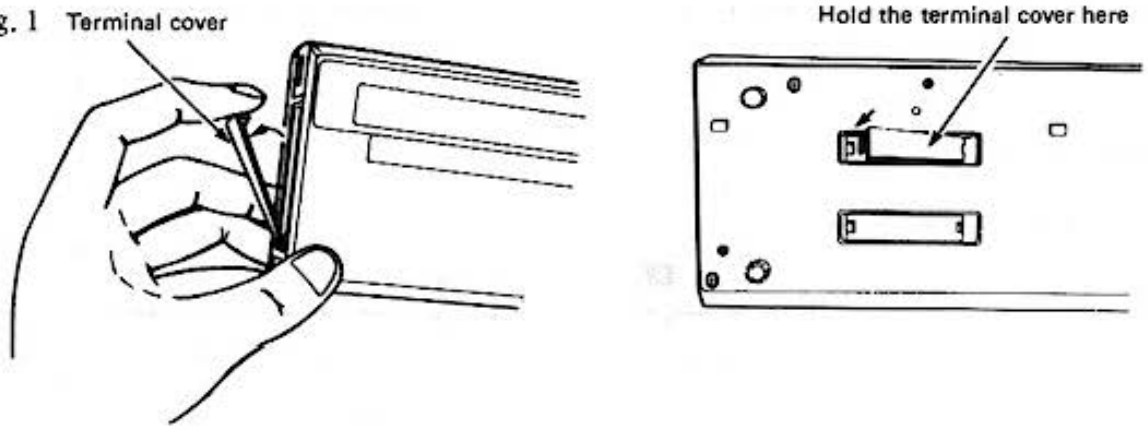
- **PAPER FEED key**
  Basically, this key is used to feed paper. But, depression of this key together with the [0] key permits the printing pen exchange mode.
  Also, simultaneous depression of this key with the [CL] key cancels the pen exchange mode and the machine returns to the normal operation mode.

• Connection of the CE-150 with the PC-1500

(1) Push the [OFF] key to turn power off.

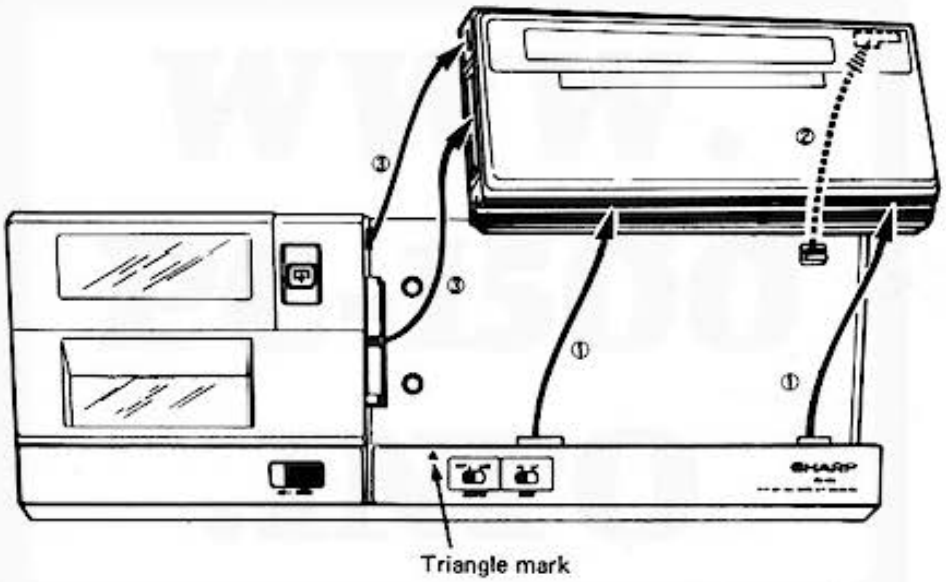
(2) Remove the terminal cover located on the left side panel of the pocket computer and place the cover in the terminal cover reserve slot located on the back panel of the CE-150 for future use.

Fig. 1

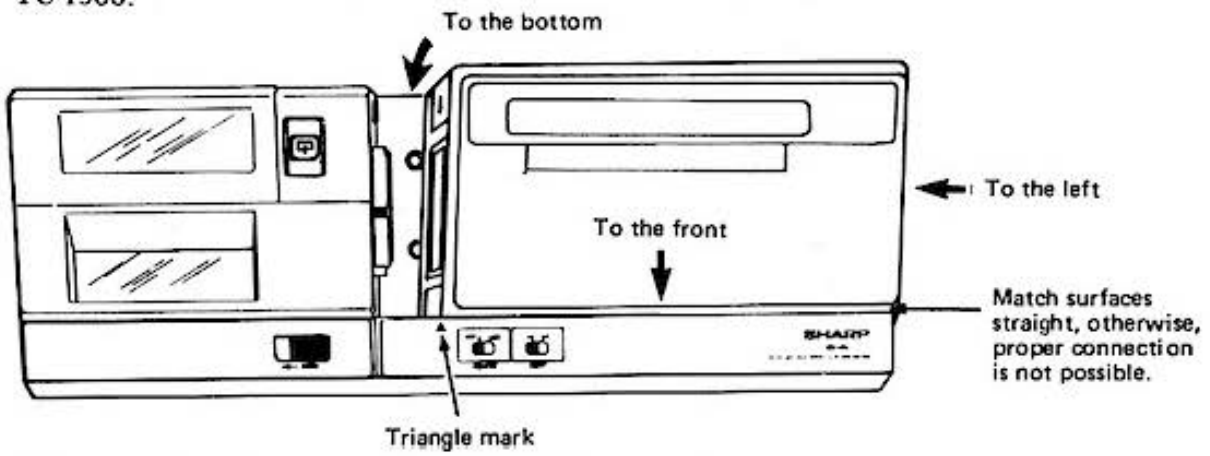


(3) Engage studs on the CE-150 into the stud holes in the pocket computer as shown by arrow-heads in order of number indicated and the procedure introduced next.

Fig. 2



1) Place the PC-1500 on the CE-150 so that the triangle mark should be at the left edge of the PC-1500.



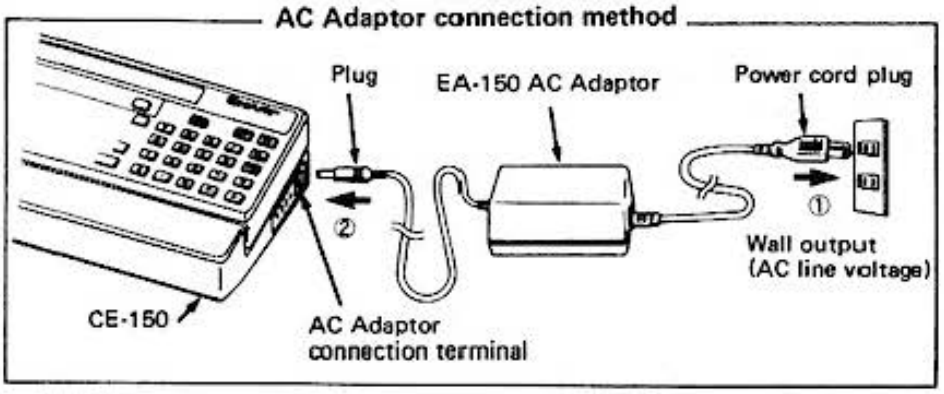
2) If the point 2) of Fig. 2 does not fit well, lightly move the pocket computer to left and right.

3) After the point 2) fits, insert the point 3) (connection terminal) next.

- Make sure connector pins are firmly engaged and avoid forceful insertion.

• How to charge power

Push the [CL] key of the pocket computer and push the [OFF] key to turn off power, then make connection of the EA-150 AC Adaptor in the order of 1) and 2).

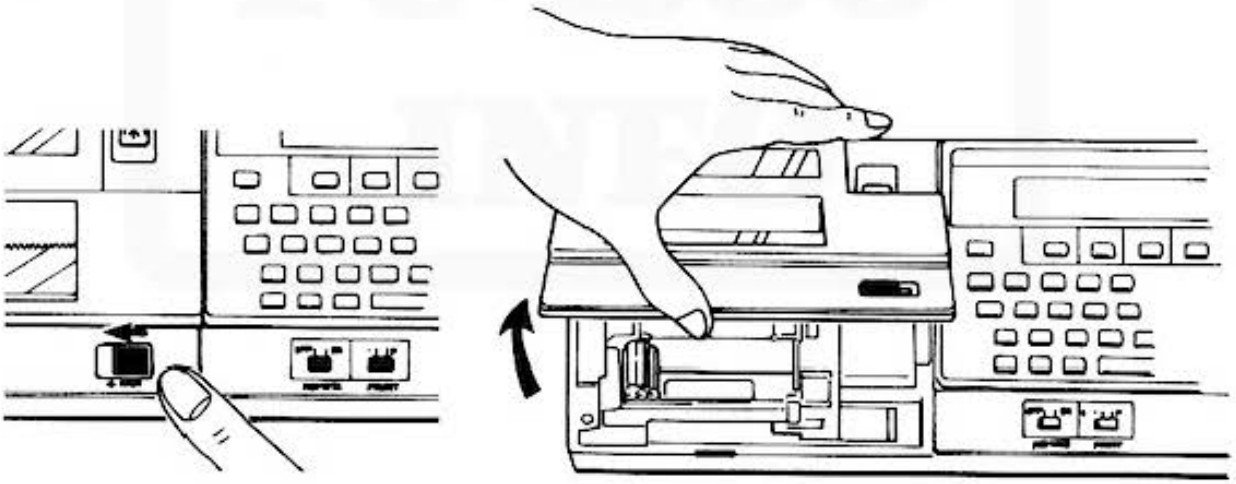


NOTE: Be sure to turn off power before the connection and disconnection of the AC Adaptor.

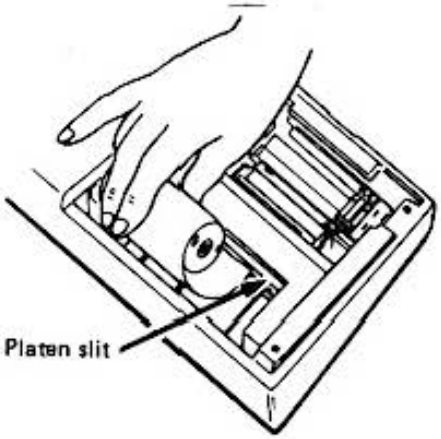
Battery recharge will be complete in about 15 hours when the AC Adaptor is connected and the power switch of the pocket computer is off.
Printing of about 1,100 characters for the size-2 print characters are permitted, when operated with the rechargeable battery supply.
Recharge will also be complete in about 15 hours even if the pocket computer is operated, providing that the printer is kept out of operation.

• How to change roll paper

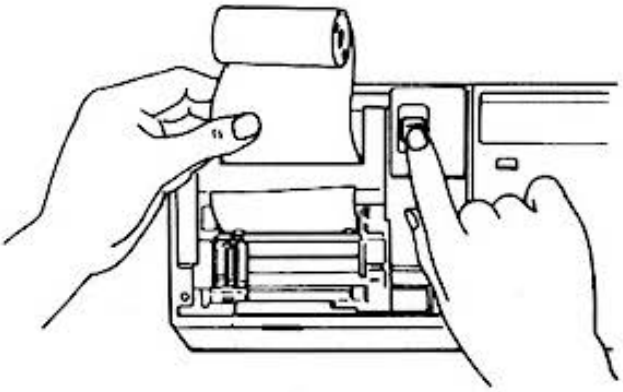
1) Move the printer cover latch lever towards the arrow direction to remove.



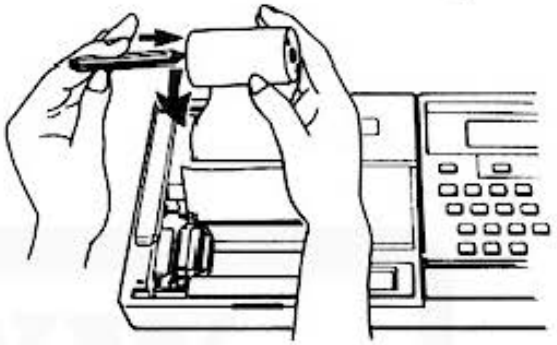
2) Cut the leading edge of the paper straight and insert the paper into the platen slit. Bent paper edge and wrinkles in the paper may sometimes impede proper paper insertion.



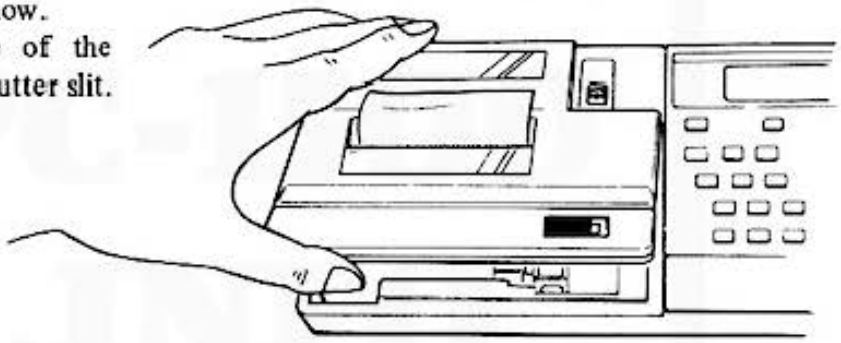
3) Now, turn on the power of the pocket computer by pushing the [ON] key and push the [↑] key on the printer until the paper is advanced about 3 to 5cm from the platen. If the platen does not feed the paper properly use your fingers to help the paper advance.



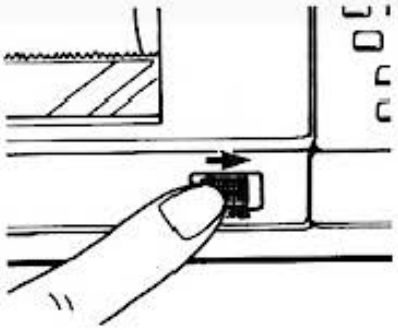
4) Insert the roll paper shaft into the paper roll core hole and place it into the paper holder casing.



5) Replace the printer cover now. Thread the leading edge of the paper through the paper cutter slit.



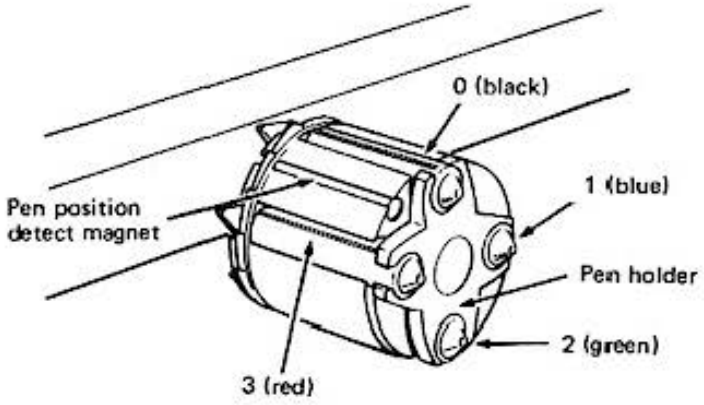
6) Lock the printer cover.



- To take out the paper from the printer, pull it straight out through the paper holder or paper feed side.

- **How to install and exchange writing pens**

Four different color ball point pens can be used on this printer. They must be arranged in position shown below.

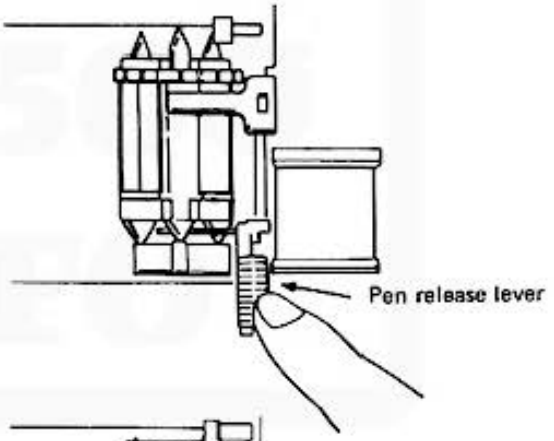


When pen position, 0~3, is chosen by the COLOR command, it will be selected by the action of the pen position detect magnet. Pen positions are arranged in order of 0, 1, 2, 3, clockwise from the magnet position. However, the pen holder rotates counterclockwise to bring the designated pen into the upper position.

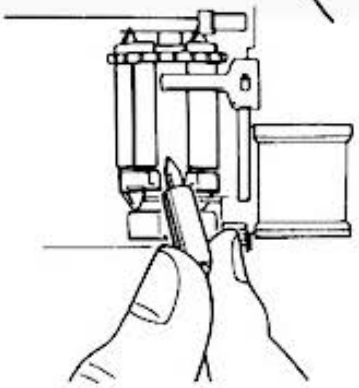
Use the following instructions to install or exchange pen(s).

1) Push the [↑] key on the printer while depressing the [0] key on the pocket computer. The printer now goes into the pen exchange mode and the pen holder moves to the left margin. It rotates to bring the first replaceable pen to the upper position, then it moves to the right margin and waits for the pen replacement there. Be sure to release your finger from the key as soon as the pen holder starts to move.

2) Push down the pen release lever to remove the pen on the upper position.
NOTE: Place your finger tip lightly in front of the pen before removing the pen, in order to prevent the pen from jumping into the printer mechanism.



3) Replace with the new pen.



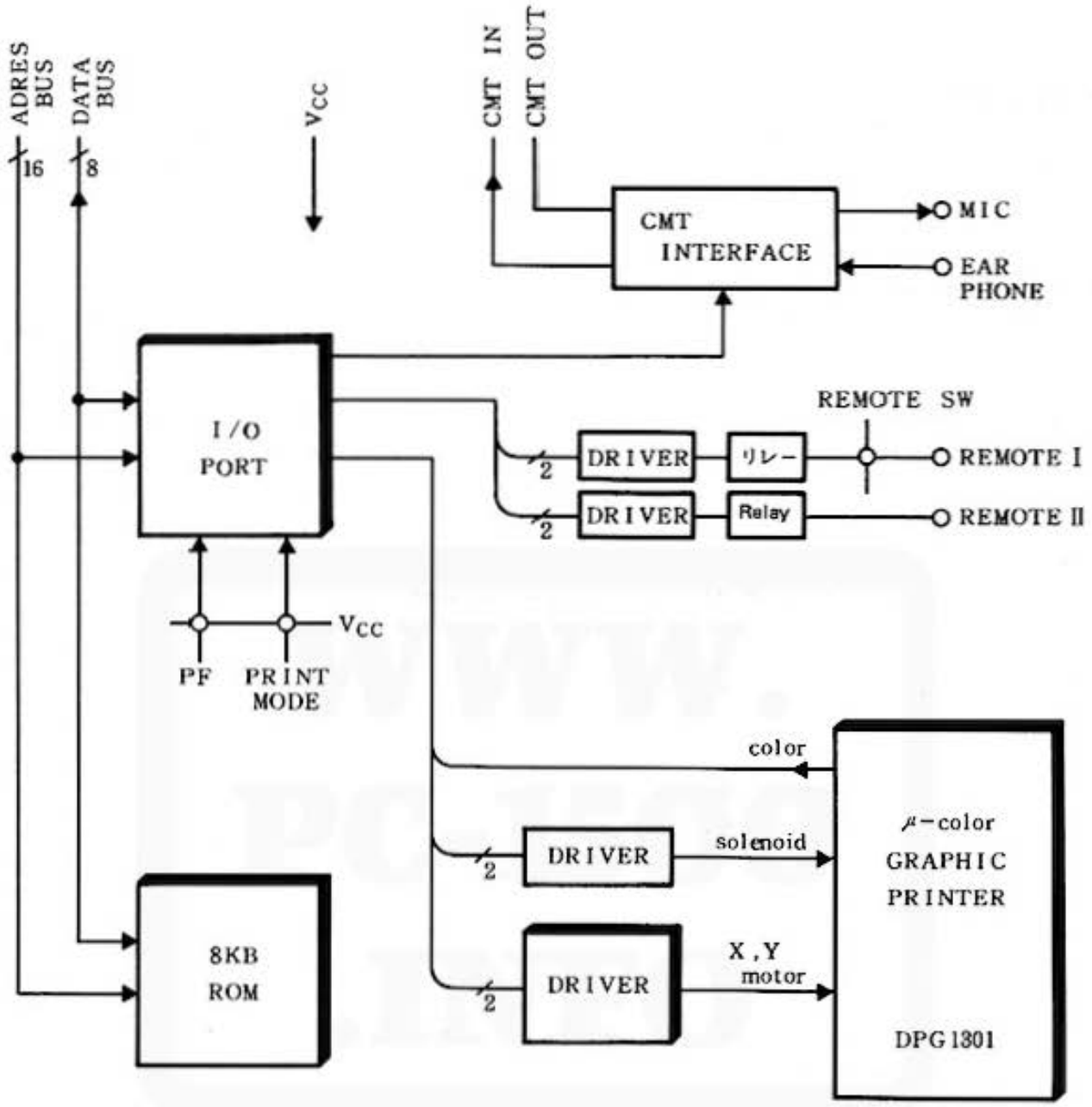
4) To remove or replace a succeeding pen, push the [↑] key again. This makes the pen holder move to the left margin and the pen holder rotates to the next exchanging pen position, and then starts to move to the right margin. As soon as the pen holder stops at the right margin, remove or replace the pen with the new one in accordance Steps, 2 and 3.

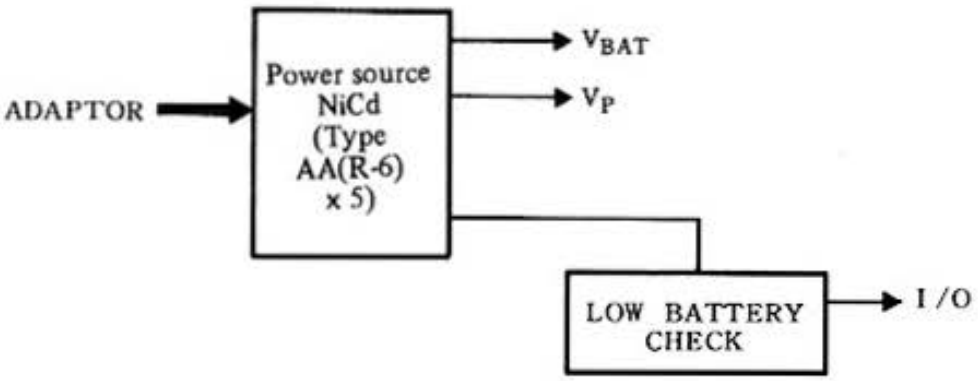
5) When pen replacement or installation is finished, push the [CL] key of the pocket computer together with the [↑] key on the printer. Then, the pen exchange mode is cancelled and the pen holder returns to the left margin.

• SPECIFICATIONS

Printer type:	DPG1301
Printing method:	X-Y plotter method
Print capacity:	18 digits, nominal. (Possible to select 36, 18, 12, 9, 7, 6, 5, and 4 digits operations)
Character size:	Nine variable sizes, 1.2mm x 0.8mm thru 10.8mm x 7.2mm.
Ball point pen:	EA850C (black, blue, green, red) EA850B (black only)
Printing directions:	Four directions (up, down, right, left)
Minimum pen moving distance:	0.2mm
Print speed:	11 characters/sec, max. (Print speed may vary according to character printed,)
Print paper:	Roll paper with maximum outer diameter 30mm and width of 58mm. Supplies as EA-1500P
Power source:	Rechargeable battery. EA-150 AC Adaptor
Line print power capacity:	About 1,100 lines (continuous printing of 555555555 of the character size 2 under 20°C, with a slight variation depending on operating condition).
Power consumption:	5.2W
Operating temperature:	5 to 40°C
Physical dimensions:	330(W) x 115(D) x 50(H)mm
Weight:	900g, except accessories
Accessories:	Carrying case, tape recorder connection cables (one each of three-line and one-line wires), EA-150 AC Adaptor, 3 rolls of paper, one each of black, blue, green, and red pen, name label, instruction manual.

2. SYSTEM BLOCK DIAGRAM





Refering to the block diagram, the CE-150 is the printer (DGP1301) and the CMT (cassette tape recorder interface) which consists of three blocks, the CMT interface, printer interface and power supply circuit.

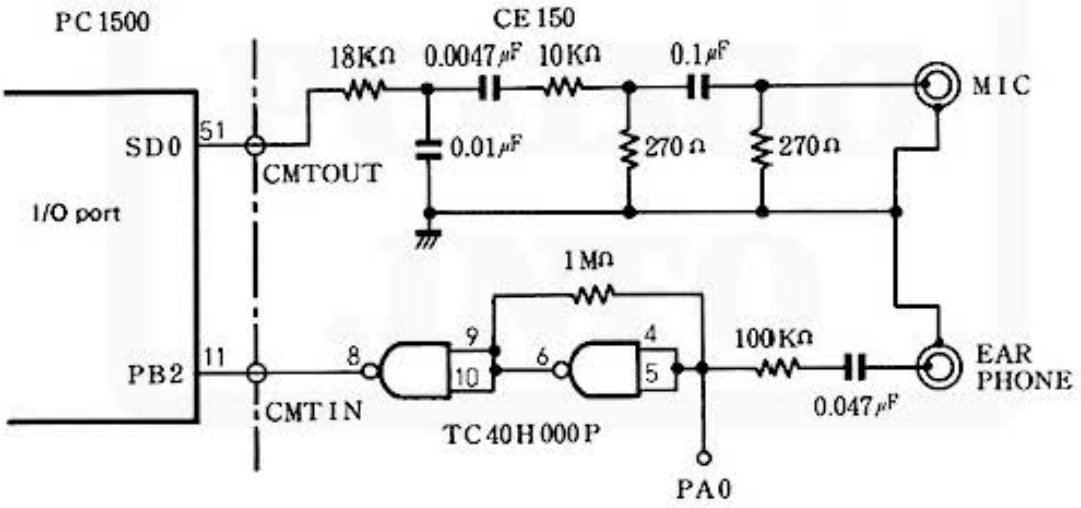
- **CMT interface**
  The CMT interface is the circuit that handles data transfer between the PC-1500 and the CMT and consists of a simple driver circuit (voltage level conversion circuit).
  In addition, there is the CMT on/off remote controlling circuit which is under the program control of the PC-1500 and performs switching operation via the I/O port using the relay circuit.

- **Printer interface**
  The printer inteface consists of character generator ROM (LH5367-01), I/O port (LH5801), motor drive circuit, print solenoid drive circuit, and the pen color detect input signal circuit.

- **Power supply block**
  A simple power stabilization circuit is provided to take care of recharge to the built-in NiCd batteries from the AC Adaptor.

3. CIRCUIT DESCRIPTION

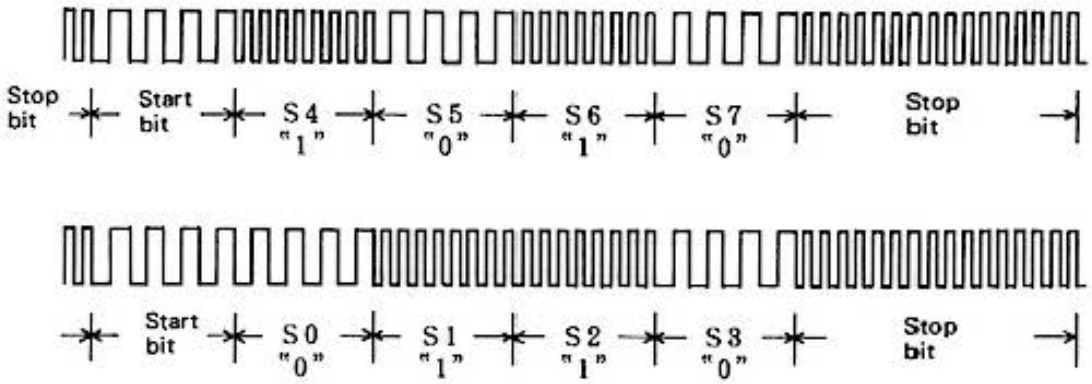
3-1. CMT Interface circuit diagram



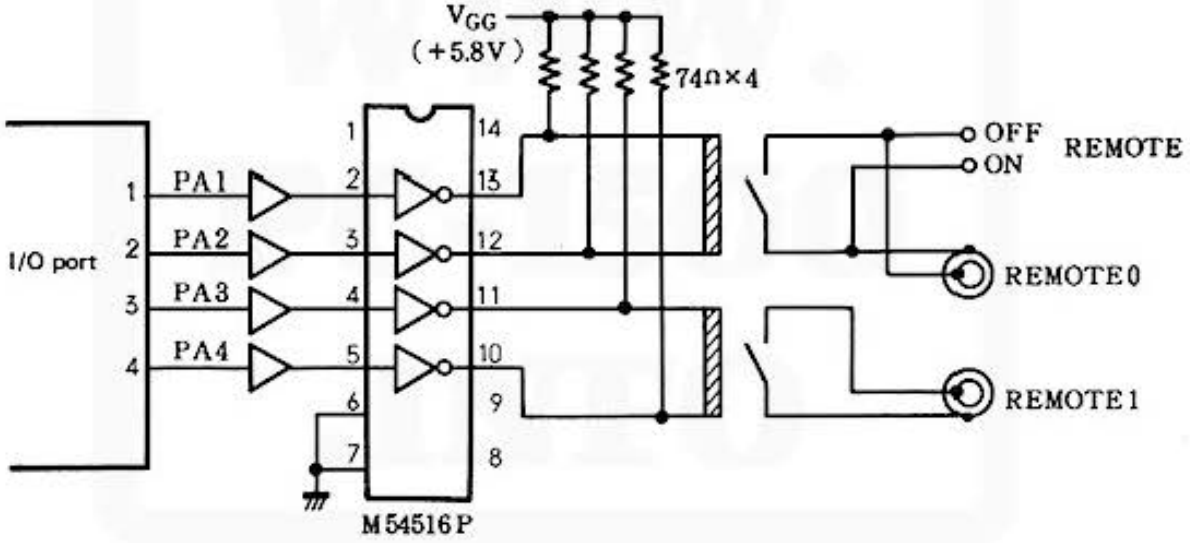
The signal CMT OUT is sent from the PC-1500 to write data on the cassette tape and the capacitor coupled interface circuit is provided to shift the voltage level before supplying the MIC jack. The read signal is the input from the EARPHONE jack and passed through the capacitor and two stages of gates to perform voltage level shift and waveform shaping and delivered to the PC-1500 as the CMT IN signal.
With respect to the CMT IN signal, the gate input to the first stage of the gate is forced to a low level by means of the PA0 signal as there is a possibility of supplying noise to the EARPHONE jack as input data to the PC-1500, except during the data read mode.

- **Recording signal**

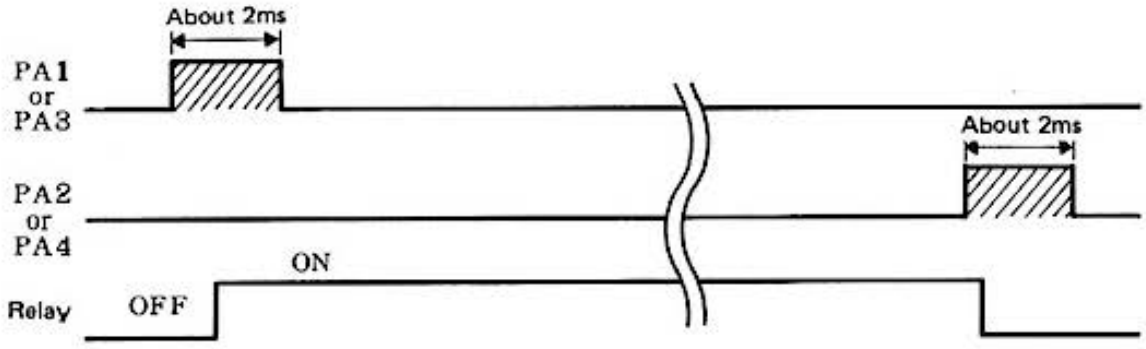
When the contents of the start bit or data bit is "0", four pulses of 1.27kHz are recorded in a time of 3.15ms. When the contents of the data bit is "1", eight pulses of 2.54kHz are recorded in the tape in a time of 3.15ms.
Shown below is an example of the conents of S (one byte) is "0 1 0 1 0 1 1 0".



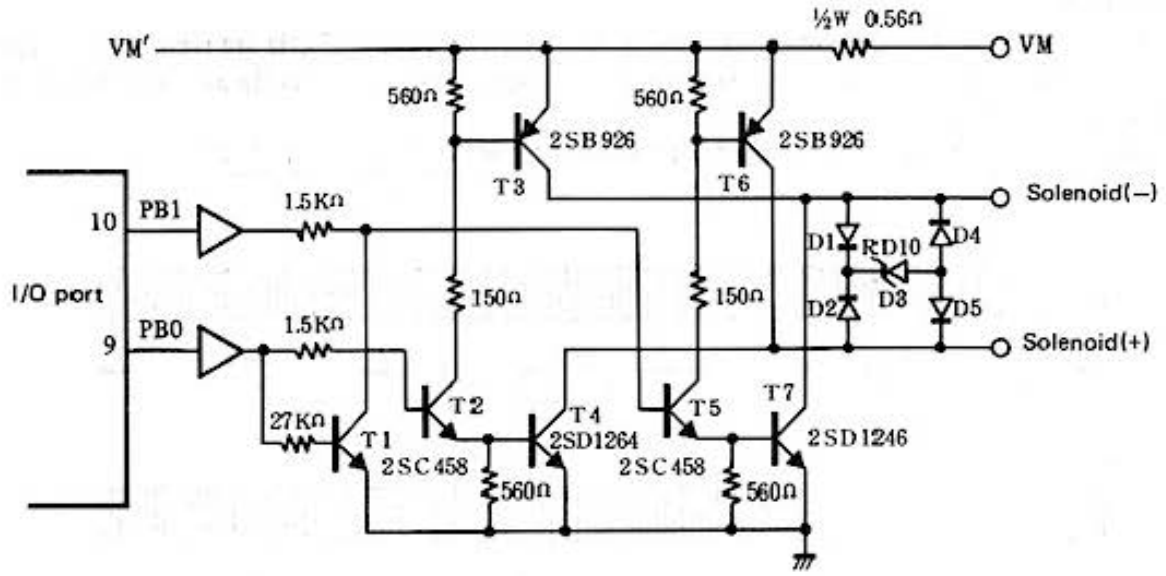
3-2. Remote circuit



This circuit is provided to perform automatic control of CMT on/off action. Signal from the PC-1500 is used to actuate the relay via the I/O port (LH5810 or LH5811).
When the REMOVE ON/OFF switch is in the OFF position, the REMOTE 0 circuit shuts off and disables control from the PC-1500. Normally, connection is made to the REMOTO 0 jack when one unit of CMT is used and both REMOTE 0 and REMOTE 1 jacks are connected to use two units of CMT.



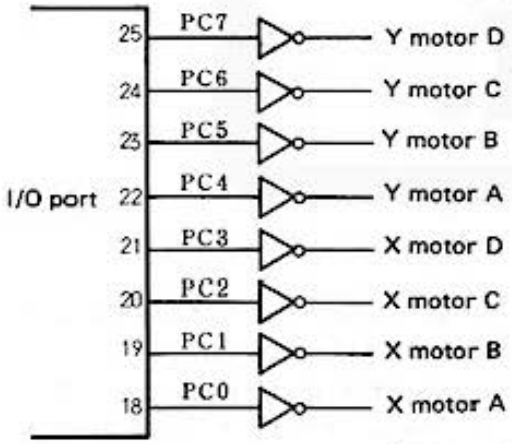
- **Solenoid drive circuit**



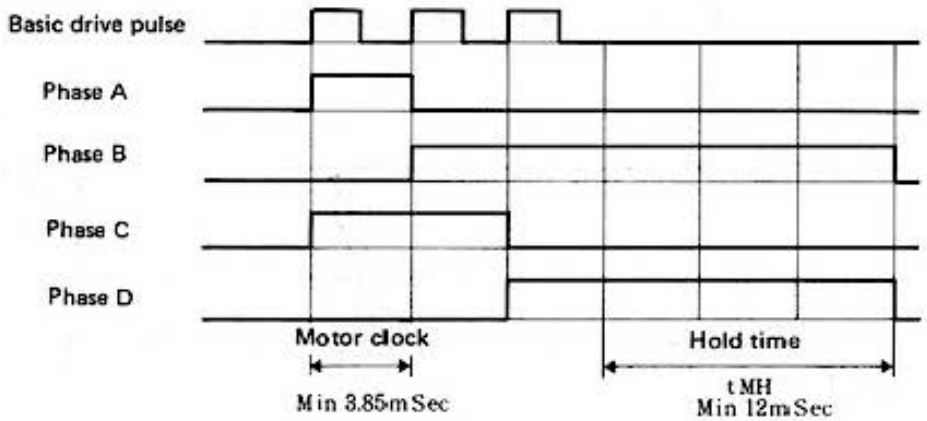
The solenoid is driven by the PEN UP signal PB0 and the PEN DOWN signal PB1 that is sent to the drive circuit via the I/O port.

1) The high state of the PB1 signal, T5 and T7 actuates to turn the solenoid(−) terminal GND level. Actuation of the T5 causes T6 to actuate to turn the solenoid(+) terminal VM level (about +6V) and drive the solenoid of lower the pen to start printing.
2) The high state of the PB1 signal, T2 and T4 actuates to turn the solenoid(+) terminal GND level. Actuation of the T2 causes T3 to actuate to turn the solenoid(−) terminal VM level (about +6V) and drive the solenoid to lift up the pen to stop rinting.
3) D1 thru D5 are the arc suppressor diodes for the solenoid.

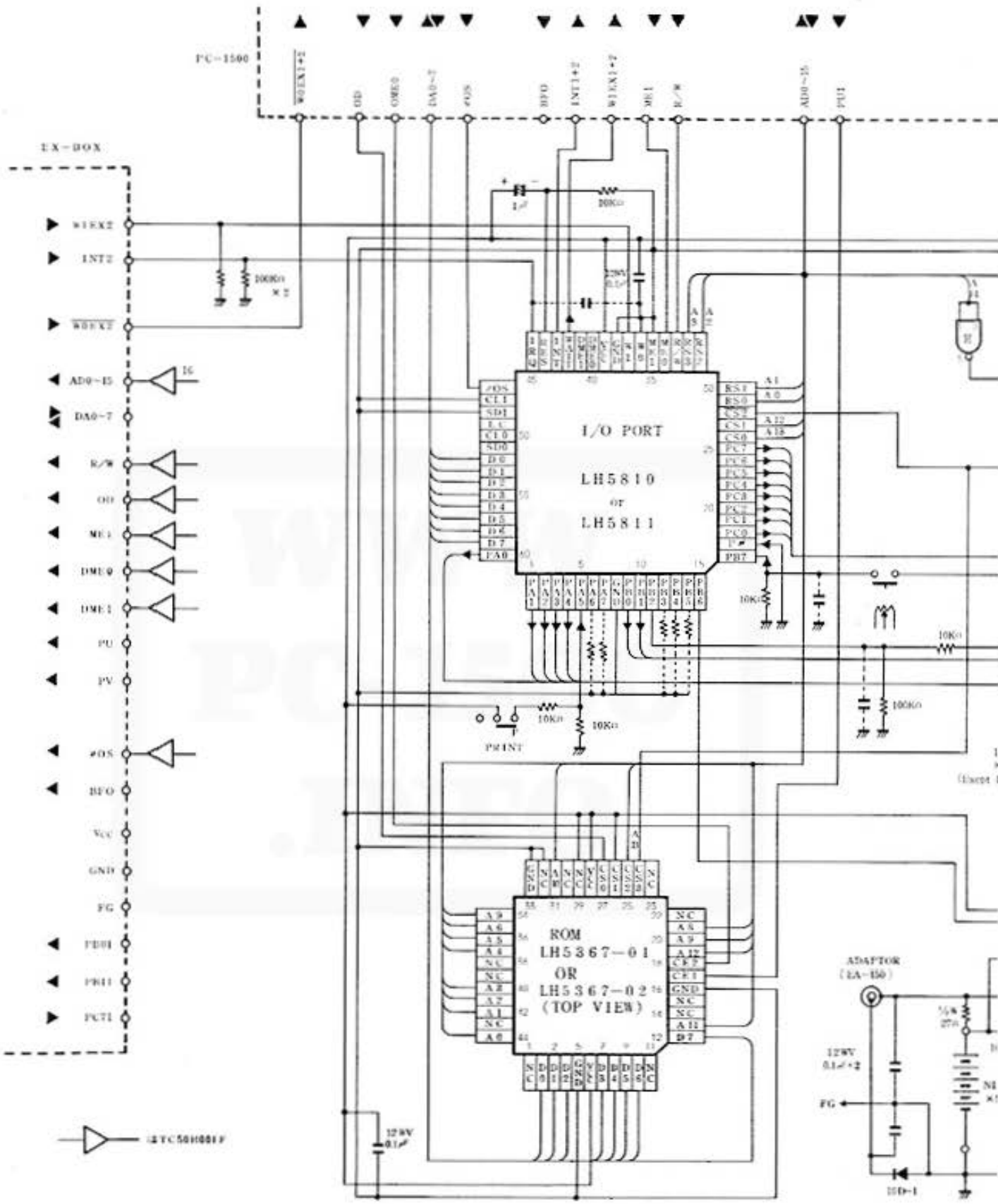
- **Motor drive circuit**

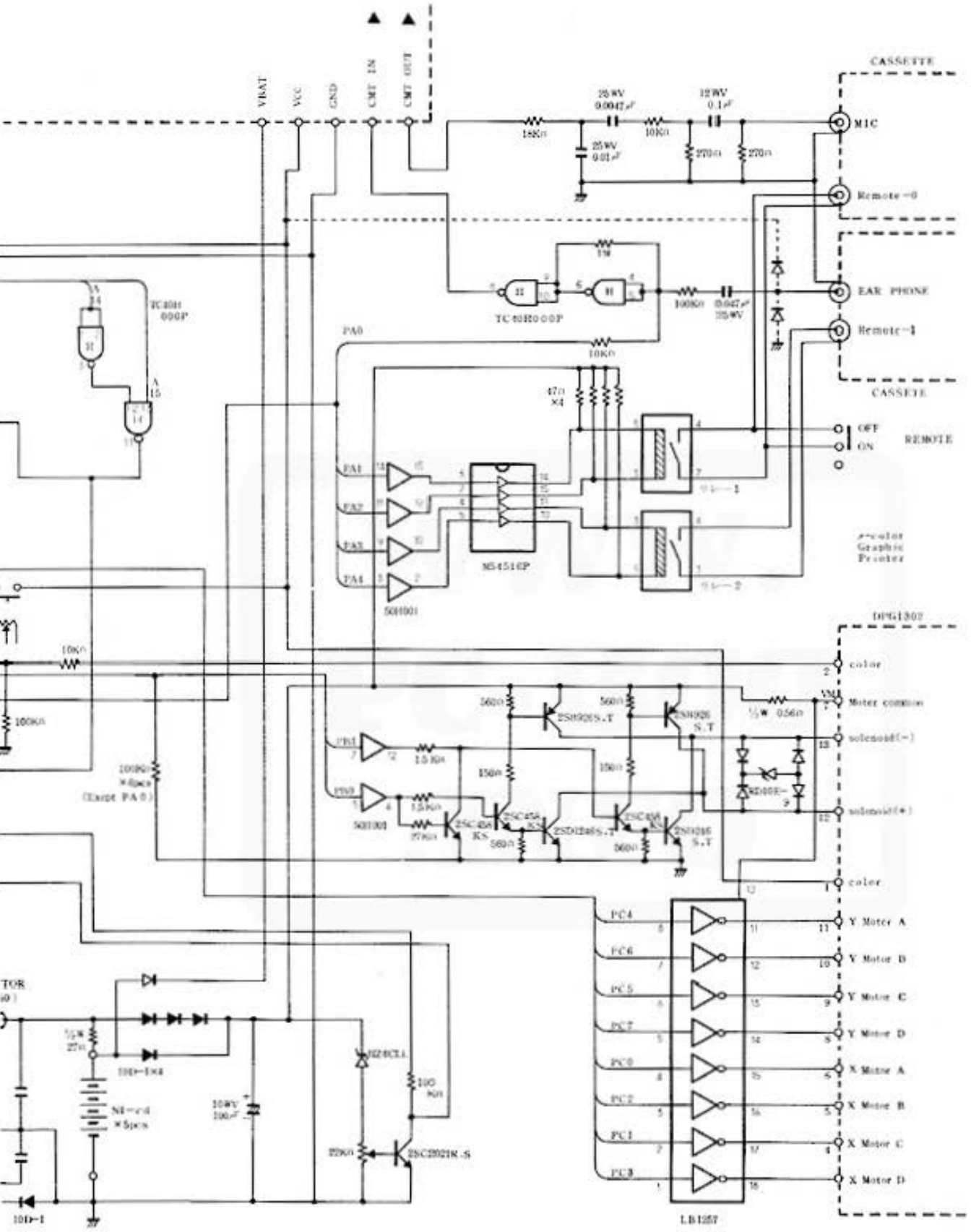


X motor A thru X motor D are the signals that drive the step motor the move the carriage on the carriage rail. And, Y motor A thru Y motor D are the paper feed step motor drive signals.
As the PC-1500 fetches character data from the ROM of the CE-150, the motor drive action is controlled via the I/O port of the CE-150.



4. CIRCUIT DIAGRAM



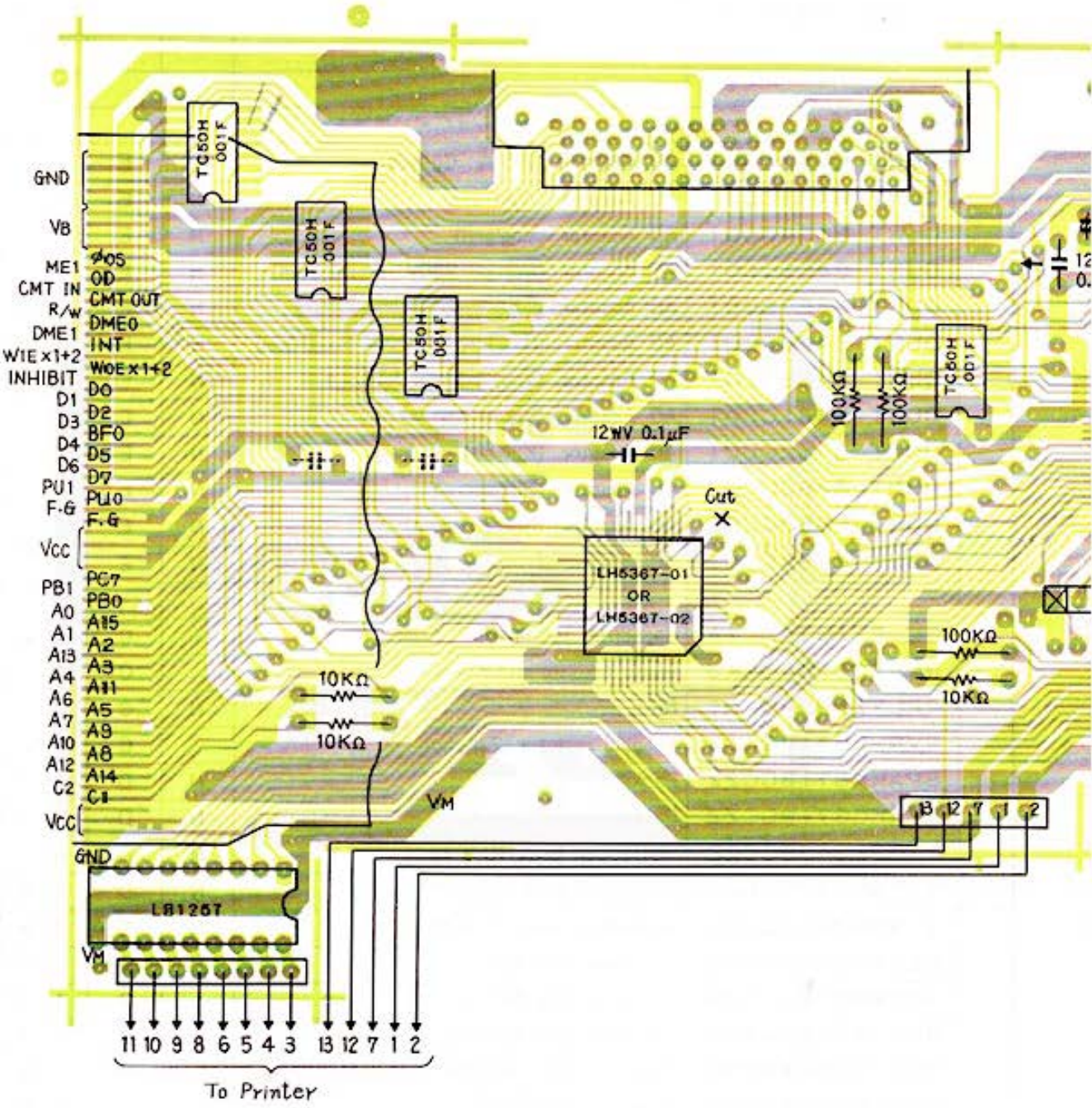


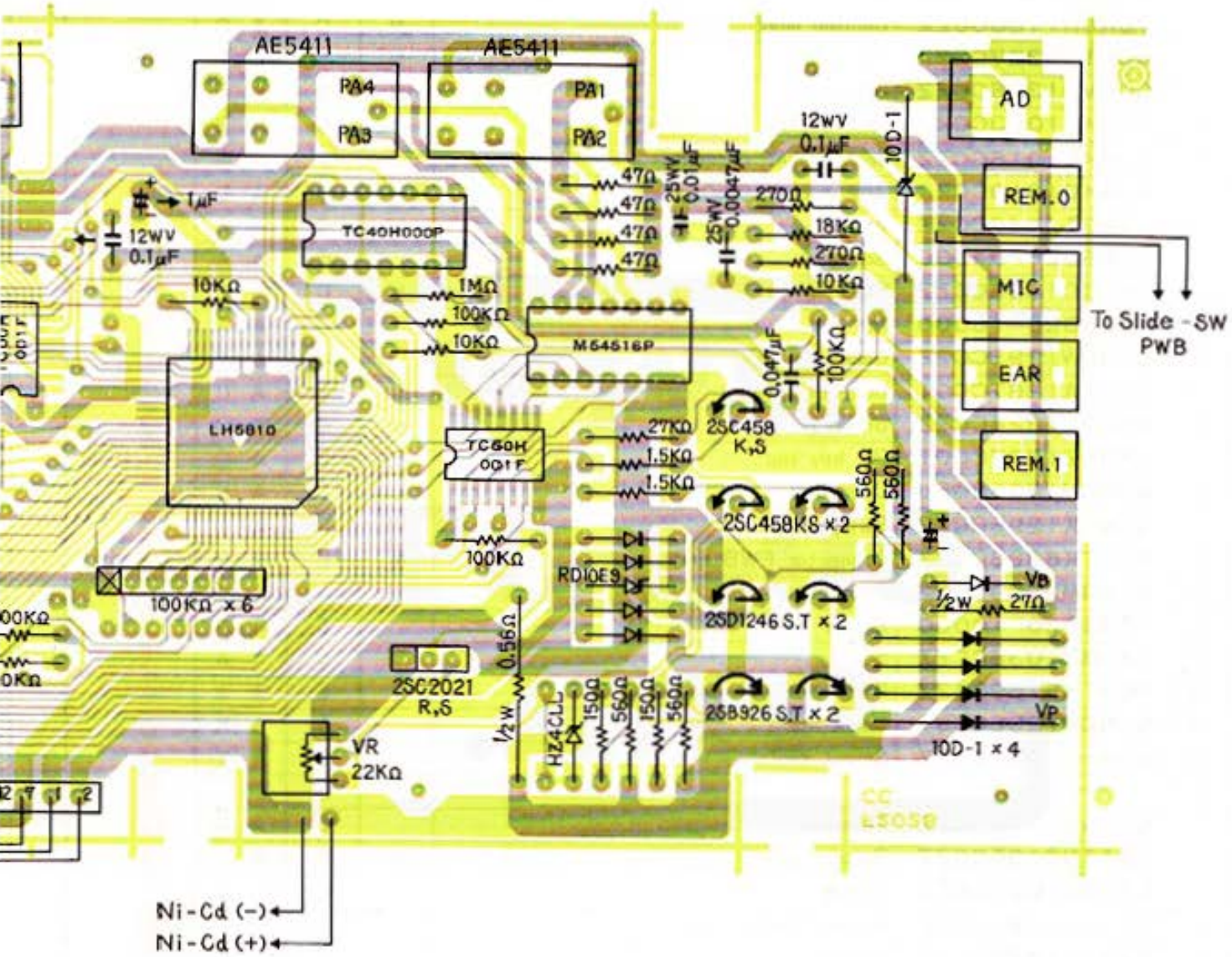
6. PARTS LIST & GUIDE

NO.	PARTS CODE	DESCRIPTION	NEW MARK	PARTS RANK	PRICE RANK
1	TLABH1628CCZZ	Pen label	N	D	A A
2	HDECA2018CCZZ	Dec. panel	N	D	A E
3	PTPEH1133CCZZ	Adhesive tape	N	D	A B
4	JBTN-1009CCZZ	Lock knob	N	C	A B
5	CCÖVA1335CC01	Printer cover	N	D	A E
6	MSPRP1189CCZZ	Lock spring	N	C	A B
7	XUPSD26P04000	Screw		C	A A
8	TCAUH1180CCZZ	Caution label	N	D	A C
9	DUNTG6387CCZZ	Top cabinet	N	D	A T
10	GCÖVH1336CCZZ	Jack cover	N	D	A E
11	QJAKC1003CCZZ	Jack socket (AC adaptor)		C	A D
12	QJAKC1016CCZZ	Jack socket (Remote)		C	A C
13	QJAKC1013CCZZ	Jack socket (MIC, EAR)		C	A C
14	LANGT1448CCZZ	Angle	N	C	A B
15	XBBSD20P04000	Screw		C	A A
16	PSLDC1335CCZZ	Shield plate	N	C	A C
17	XNESD20-16000	Nut		C	A A
18	QCNCW1293CCZZ	Connector 60pin		C	A Y
19	GFTAA1267CC01	Connector cover	N	D	A C
20	PSLDC1324CCZZ	Shield plate	N	C	A C
21	JKNBZ1737CC01	PF key top		C	A G
22	QCNCM1295CC6J	Connector		C	A V
23	QSW-K1295CCZZ	Switch		B	A D
24	DUNTK6388CCZZ	Connector PWB unit	N	E	A Z
25	QPWBM2029CCZZ	FPC		C	A V
26	XBBSD20P10000	Screw		C	A A
27	LX-BZ1038CCZZ	Screw		C	A A
28	DUNTK5169CSZZ	PWB unit with connector PWB	N	E	※ ※
29	QCNCW1296CC01	Connector		C	A K
30	QSW-S1074CCZZ	Select switch		B	A E
31	———				
32	QTANS1372CCZZ	Terminal		C	A B
33	UBATN2135CCZZ	Battery unit	N	B	A Z
34	LX-BZ1038CCZZ	Screw		C	A A
35	LFiX-1127CCZZ	Battery fixing plate		C	A E
36	PZETL1429CCZZ	Insulator		C	A D
37	QTANS1365CCZZ	Angle	N	C	A E
38	Ki-ÖB0066CCZZ	Printer unit (DPG-1301)	N	E	B T
39	XUPSD30P06000	Screw		C	A A
40	XUPSF26P08000	Screw		C	A A
41	GLEGP1009CCZZ	Lubber foot		C	A A
42	XBBSF20P06000	Screw		C	A A
43	GCABA2605CCZZ	Cabinet bottom	N	D	A L
44	LX-BZ1116CCZZ	Screw		C	A A

NO.	PARTS CODE	DESCRIPTION	NEW MARK	PARTS RANK	PRICE RANK
	DSFTZ0480CSZZ	Paper shaft unit	N	C	A F
	QPLGJ1013CCZZ	Cassett plug B	N	C	A K
	QPLGJ1014CCZZ	Cassett plug A	N	C	A R
	TLABZ1295CCZZ	Name label			A A
	UBAGZ1292CCZZ	Hard case			A Y
	DUNT-6452CC01	AC Adaptor (U.S.A, Canada)	N	E	
	DUNT-6453CC01	AC Adaptor (Australia)	N	E	
	DUNT-6454CC01	AC Adaptor (England)	N	E	
	DUNT-6455CC01	AC Adaptor (Europe 220V Round-2pin)	N	E	
	DUNT-6457CC01	AC Adaptor (Taiwan, Philippines, Brazil 110V/220V Flat-2pin)	N	E	
	DUNT-6458CC01	AC Adaptor (Hong kong 110/220V Round-3pin)	N	E	
	DUNT-6459CC01	AC Adaptor (Europe, Middle East 110V/220V Round-2pin)	N	E	
	DUNT-6461CC01	AC Adaptor (South Africa)	N	E	
	DUNT-6462CC01	AC Adaptor (Kuwait)	N	E	
	DUNT-6463CC01	AC Adaptor (Singapore)	N	E	
	DUNT-6553CC01	AC Adaptor (Soudi-Arabia)	N	E	
	DUNT-6452CC01	AC Adaptor (120V Latin-America)	N	E	
	RC-EZ107ACC1A	Capacitor 10V 100μF		C	A B
	RMPTC6104QCKJ	Block resistor 100Kohm×6		C	A C
	RRLYZ9999QCN1	Relay	N	C	A U
	RVR-MB410QCZZ	Voliable resistor 22Kohm		C	A D
	SPAKA6718CCZZ	Packing cushion	N	D	A K
	SPAKC6719CCZZ	Packing case (U.S.A)	N	D	A K
	TINSE3439CCZZ	Instruction book (U.S.A)	N	D	A N
	TINSE3485CCZZ	Instruction book (English)	N	D	A Q
	TINSM3484CCZZ	Instruction book (E, F, G, S)	N	D	A H
	VCEAAU1HW105Q	Capacitor 50V/1μF		C	A B
	VCTYPU1EX103M	Capacitor 25V 0.01μF		C	A B
	VCTYPU1EX472M	Capacitor 25V 4700PF		C	A A
	VCTYPU1EX473M	Capacitor 25V 0.047PF		C	A B
	VCTYPU1NX104M	Capacitor 12V 0.1μF		C	A B
	VHDDS1588L1-1	Diode 1S1588L1		B	A D
	VHD10D1////-1	Diode 1001		B	A D
	VHEHZ4CLL//-1	Zener diode 4~4.4V		B	A E
	VHERD10E9//-1	Zener diode 9.3~9.9V		B	A C
	VHiLB1257//-1	I. C. (LB1257)	N	B	A M
	VHiLH536702-1	L.S.I. (LH536702)	N	B	B B

5. PARTS AND SIGNALS POSITION





NO.	PARTS CODE	DESCRIPTION	NEW MARK	PARTS RANK	PRICE RANK
	VHiLH5811//−1	L.S.I. (LH5811 or LH5810)	N	B	A Z
	VHiM54516P/−1	I. C. (M54516P)		B	A F
	VHiTC40H000P1	I. C. (TC40H000P)		B	A F
	VHiTC50H001FN	I. C. (TC50H001F)		B	A H
	VRD−ST2EY103J	Resistor 1/4W 10Kohm		C	A A
	VRD−ST2EY104J	Resistor 1/4W 100Kohm		C	A A
	VRD−ST2EY105J	Resistor 1/4W 1Mohm		C	A A
	VRD−ST2EY151J	Resistor 1/4W 150ohm		C	A A
	VRD−ST2EY152J	Resistor 1/4W 1.5Kohm		C	A A
	VRD−ST2EY183J	Resistor 1/4W 18Kohm		C	A A
	VRD−ST2EY271J	Resistor 1/4W 270ohm		C	A A
	VRD−ST2EY273J	Resistor 1/4W 27Kohm		C	A A
	VRD−ST2EY470J	Resistor 1/4W 47ohm		C	A A
	VRD−ST2EY561J	Resistor 1/4W 560ohm		C	A A
	VRD−ST2HYR56J	Resistor 1/2W 0.56ohm		C	A B
	VRD−ST2HY270J	Resistor 1/2W 27ohm		C	A B
	VS2SB926−S/TC	Transistor (2SB926)	N	B	A D
	VS2SC2021−RSC	Transistor (2SC2021)		B	A F
	VS2SC458KS/−1	Transistor (2SC458K)		B	A C
	VS2SD1246−STC	Transistor (2SD1246)	N	B	A C