

SAMSUNG

ELECTRONIC CASH REGISTER ER-290

***SERVICE* Manual**

ELECTRONIC CASH REGISTER



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About this Manual

This service manual describes how to perform hardware service maintenance for the Samsung ER-290 Electronic Cash Register.

Acronym	Definition
ECR	Electronic Cash Register
ESD	Electro-statically Sensitive Device
GND	Ground
IC	Integrated Circuit
N.C.	Not Connected
PBA	Printed Board Assembly
PCB	Printed Circuit Board
RAM	Random Access Memory
ROM	Read Only Memory
SRAM	Static Random Access Memory

Notes

Note: Notes may appear anywhere in the manual. They draw your attention to additional information about the item.

Precaution symbols

 indicates a Safety Precaution applies to this part component.

 indicates the part or component is an electro-statically sensitive device. Use caution when handling these parts.

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System Overview

This Electronic Cash Register ER-290 is the microprocessor based system, using an 8-bit single chip microprocessor.

This service manual provides the technical information for many individual component systems, and circuitry, and gives an analysis of the operations performed by the circuits. The keyboard, power supply, display and printer circuit, and the other circuitry are covered.

Also included is the technical information on the EPSON wheel printer (M-405R) used in this machine. If you need more technical service, please call our service branch.

Schematics and specifications provide needed information for the accurate trouble-shooting.

All information in this manual is subject to change without prior notice. Therefore you must check the correspondence of your manual with your machine.

Warning

This equipment generates, uses, and can radiates radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class B computing device, pursuant to subpart J of part 16 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference

1 Precaution Statements

Follow these safety, servicing and ESD precautions to prevent damage and to protect against potential hazards such as electrical shock.

1-1 Safety Precautions

1. Be sure that all built-in protective devices are replaced. Restore any missing protective shields.
2. When reinstalling the chassis and its assemblies, be sure to restore all protective devices, including nonmetallic control knobs and compartment covers.
3. Make sure there are no cabinet openings through which people - particularly children - might insert fingers and contact dangerous voltages. Such openings include excessively wide cabinet ventilation slots and improperly fitted covers and drawers.
4. Design Alteration Warning:
Never alter or add to the mechanical or electrical design of the ECR. Unauthorized alterations might create a safety hazard. Also, any design changes or additions will void the manufacturer's warranty.
5. Components, parts and wiring that appear to have overheated or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damage or overheating, and correct any potential hazards.
6. Observe the original lead dress, especially near the following areas: sharp edges, and especially the AC and high voltage supplies. Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board. Check the AC power cord for damage. Make sure that leads and components do not touch thermally hot parts.
7. Product Safety Notice:
Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection. These safety features and the protection they give might be lost if the replacement component differs from the original - even if the replacement is rated for higher voltage, wattage, etc.

Components that are critical for safety are indicated in the circuit diagram by shading, ($\triangle$) or ($\triangle$). Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications. A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards

1-2 Servicing Precautions

Warning 1: First read the "Safety Precautions" section of this manual. If some unforeseen circumstance creates a conflict between the servicing and safety precautions, always follow the safety precautions.

Warning 2: An electrolytic capacitor installed with the wrong polarity might explode.

1. Always unplug the unit's AC power cord from the AC power source before attempting to:
(a) Remove or reinstall any component or assembly, (b) Disconnect an electrical plug or connector, (c) Connect a test component in parallel with an electrolytic capacitor.
2. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
3. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the portion around the serviced part has not been damaged.
4. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels and input terminals).
5. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500V) to the blades of the AC plug.
The insulation resistance between each blade of the AC plug and accessible conductive parts should be greater than 1 megohm.
7. Never defeat any of the B+ voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
8. Always connect an instrument's ground lead to the instrument chassis ground *before* connecting the positive lead; always remove the instrument's ground lead last.

1-3 Precautions for Electrostatically Sensitive Devices (ESDs)

1. Some semiconductor ("solid state") devices are easily damaged by static electricity. Such components are called Electrostatically Sensitive Devices (ESDs); examples include integrated circuits and some field-effect transistors. The following techniques will reduce the occurrence of component damage caused by static electricity.
2. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. (Be sure to remove it prior to applying power - this is an electric shock precaution.)
3. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of electrostatic charge.
4. Do not use freon-propelled chemicals. These can generate electrical charges that damage ESDs.
5. Use only a grounded-tip soldering iron when soldering or unsoldering ESDs.
6. Use only an anti-static solder removal device. Many solder removal devices are not rated as "anti-static"; these can accumulate sufficient electrical charge to damage ESDs.
7. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
8. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
9. Minimize body motions when handling unpacked replacement ESDs. Motions such as brushing clothes together, or lifting a foot from a carpeted floor can generate enough static electricity to damage an ESD.

2 Product Specifications

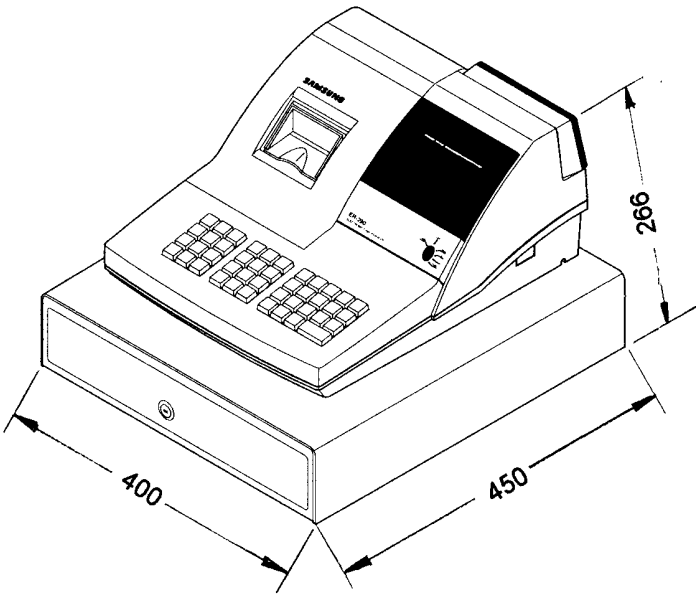
Specifications are correct at the time of printing. Product specifications are subject to change without notice. See below for product specifications.

2-1 Specifications

Item	Description	Remarks
AC Power Source	AC 120V, 60Hz AC 230V, 50 Hz	USA Europe
Power Consumption	35W	USA and Europe
Printer	Epson Model-405R Wheel Type Printer Printing speed: 3.2 lines per second	
Processor	80C32	
Memory	* Main PCB Default : SRAM (KM6264*1) : 8kbyte EPROM (27C512*1) : 64kbyte	
Data Storage	60 Days	When battery fully charged
Battery	Ni-cad, 60mA Charging time: 24 hours	
Display	Front: 9-digit display (Window Display) Rear: 9-digit display (Turret Display)	
Keyboard	43-Key	
Drawer	D5508, 5C5B 8C4B Weight: 8.13Kg Dimensions: 400 (W) x 450 (L) x 112 (H)	USA Europe When packed millimeters
Packing Carton	Weight: 17.6Kg Dimensions: 504 (W) x 555 (L) x 365 (H)	millimeters

Equipment specifications are subject to change without notice.

2-2 Dimensions



3 Installation and Operation

This chapter describes the method for installing the ECR system and shows the locations of the various feature items.

3-1 Key Board Installation

WARNING: When connecting the keyboard to the Main PCB, make sure the membrane chip is shaped as in Figure 3-1 (a), below. If the membrane is shaped as in Figure 3-1 (b), the keyboard may malfunction.

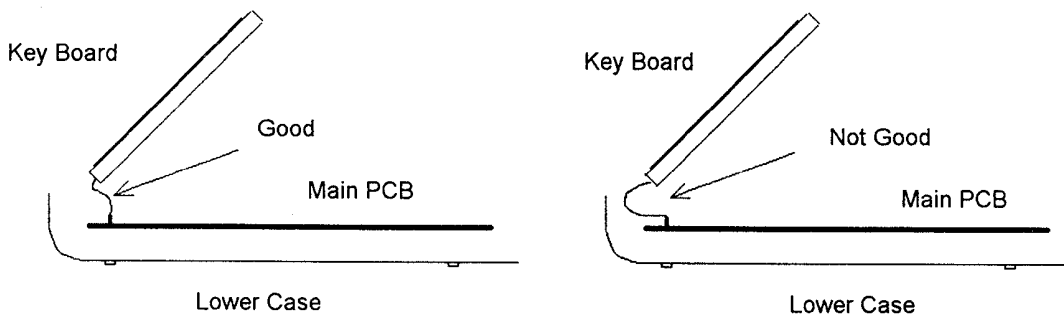


Figure 3-1. Membrane Shape

3-2 Handling The Printer

3-2-1 Precautions on Printer Handling

Precautions on Transport

(1) When transported as a single unit, the Printer should be carried as shown in Fig. 3-2.

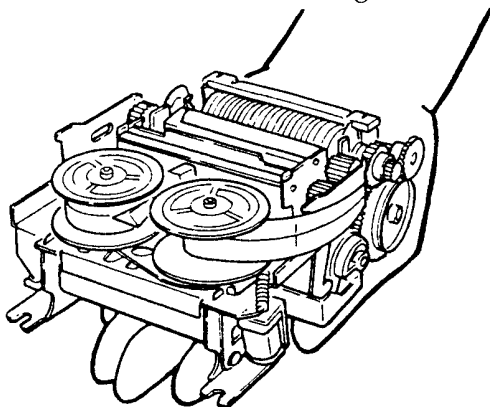


Fig. 3-2. Proper Carrying Method

(1) When transporting the Printer, the following actions must be strictly avoided:

- Do not grip the printer by its inner paper guide or outer paper guide assembly → They may become deformed or come loose of the printer.
- Do not grip the printer by the type wheel guide → It may come loose of the printer.
- Do not hook your fingers under the springs → They may come loose.
- Do not touch lubrication points → Optimum printer performance may be impaired.

3 Installation and Operation

Precautions on Storage

- (1) Avoid storage in locations exposed to excessive dirt or dust, direct sunlight, and / or excessive moisture.
- (2) In case of long-term storage, place the printer into a polyethylene bag after wrapping it in anti-rust (VCI) paper, then store it in a dry location.

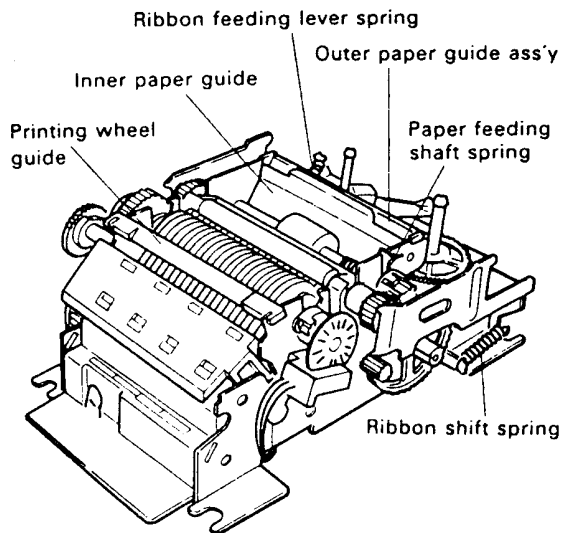


Fig. 3-3. Parts Not to Grip When Carrying the Printer

3-2-2 Paper Setting

Loading The Paper

When loading rolled paper in the printer, be sure to heed the following precautions :

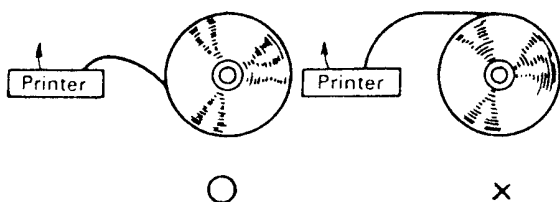


Fig. 3-4. Paper Setting Direction

Precautions on Use

- (1) Since this printer employs a permanent magnet (in the motor) and trigger magnets, avoid using it in location exposed to excessive iron filings, dirt, dust or other foreign particles.
- (2) Never perform printing without the paper and ribbon installed.
- (3) When installing this printer, be sure to use a buffering material such as rubber packing, etc., between the mounting legs of this unit and the host device.
- (4) Because the character selective magnet unit and motor employ permanent magnets, be careful to avoid contact between these parts and the printer mounting chassis and to avoid adhesion of foreign matter to these parts. (If conductive some particles adheres to the bottom of the character selective magnet unit, short-circuiting may occur.)
- (5) Be sure to use only the paper and ribbon that conform to our specifications.
- (6) Replace the ribbon cartridge according to the reference intervals listed below:
Red / Black ribbon : After use of 5 to 8 rolls of paper or once every six months.
Black ribbon : After use of 10 to 16 rolls of paper or once a year.
- (7) Never attempt to replenish the ribbon's ink supply.

- (1) Be sure to load the roll paper in the orientation shown in Fig. 3-4.
- (2) Prepare the paper's leading edge as shown in Fig. 3-5.

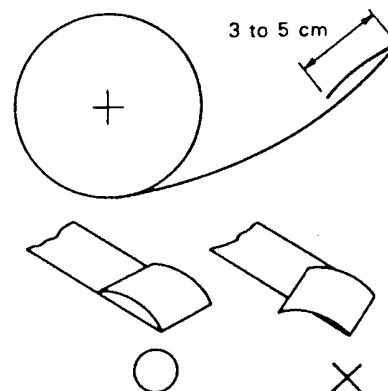


Fig. 3-5. Preparing the Paper's Leading Edge

(3) Paper insertion

- Insert the paper's leading edge straight into the printer's opening.
- Paper insertion can be simplified by pushing the paper in the direction of paper feeding.

Removal The Paper

When removing paper from the printer, be sure to use one of the two methods.

- (1) Perform paper feed using an electrical operation (switch the printer power ON, then press the Paper Feed button), then remove the paper.
- (2) In standby status, use the paper free mechanism permits the paper to be pulled out from the front of the printer. Be sure to pull the paper straight out.

Note: Never pull out the paper during printing or from the back of the printer; such action may cause faulty printing or paper jams.

3-2-3 Installation / Removal of the Ribbon

Be sure that only ribbon that conforms to our specifications is used. Use of other types of ribbon should be strictly avoided because it may adversely affect printer's print quality or durability, cause ink leakage, etc.

Installing / Removing the Ribbon Spools
Precautions

- When installing the ribbon spools, be careful not to mistake to take up the direction of the ribbon and the orientation of spools.
- After installing the ribbon, take up any excess slack in the ribbon by turning the ribbon-tightening knob.

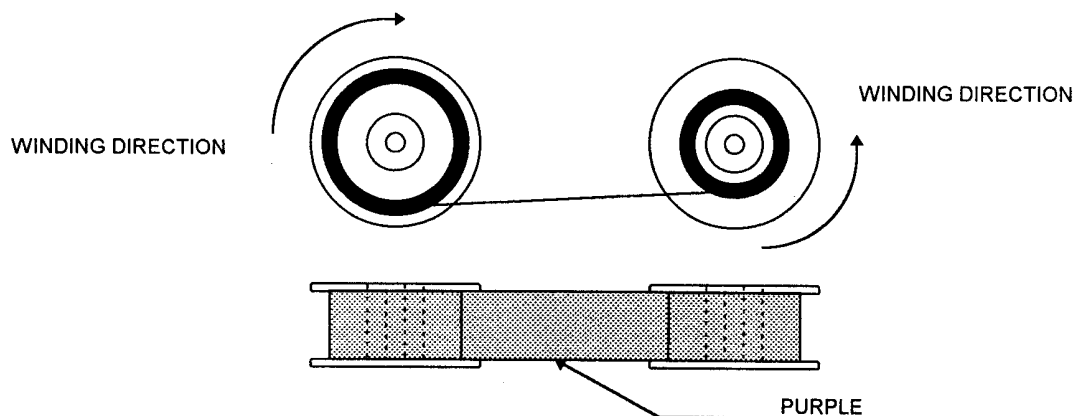
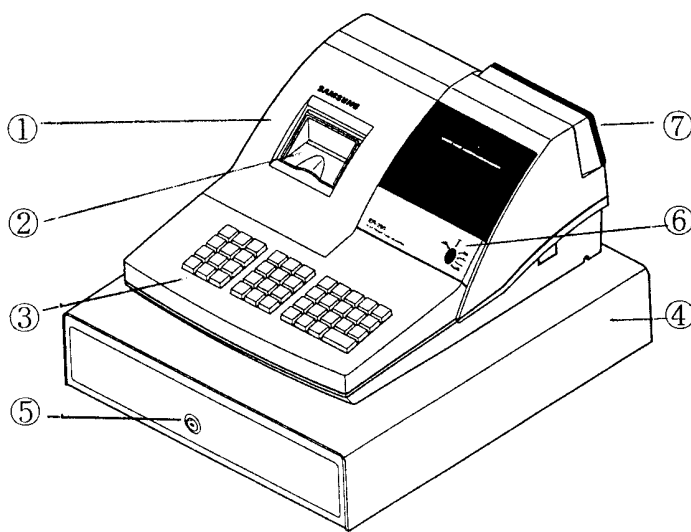


Figure 3-6. Ribbon Cassette

3-3 Operation

Note: Before using this Electronic Cash Register (ECR) for the first time, leave it powered ON in the REG mode for at least twenty-four hours. This allows the Ni-Cad battery, which maintains the ECR's memory while the power is OFF, to fully charge.

3-3-1 ECR Features



- ① Cover Printer
- ② Wheel Printer
- ③ Keyboard
- ④ Drawer

- ⑤ Drawer Lock Key
- ⑥ Mode Key Switch
- ⑦ Rear (Turret) Display

3-3-2 Mode Switch

The position of the Key in the Mode Switch determines the action of the SECR. Table 3-1 shows the various modes that are available.

Table 3-1. ECR Modes

Mode	Function
VOID	Cancel operation
OFF	Operation stop
REG	Sales Operation
X	X-level report generation
Z	Z-level report generation
PGM	Program mode

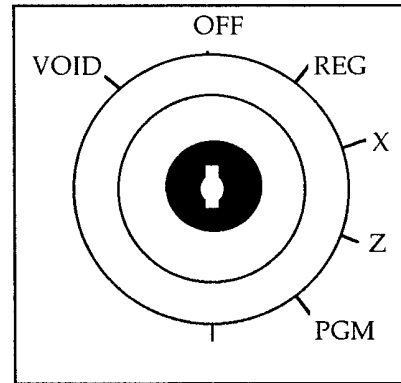


Figure 3-8. Mode Switch

3-3-3 Keyboard Matrix

The ER-290 ECR offers 43-key Board, as shown in Table 3-2 .

Table 3-2. Keyboard Types

Model	Keys	Type
ER-290	43	Membrane (Chip)

4 Disassembly and Reassembly

This chapter describes the disassembly and reassembly procedures for ER-290, electronic cash registers.

WARNING: This ECR contains electrostatically sensitive devices. Use caution when handling any components.

4-1 Disassembling

Caution: Disconnect the ECR from the external power source before disassembly.

Note: The following directions are given for the ER-290. Differences between the models are identified in the text.

See the Exploded View on Chapter 7.

4-1-1 Upper Case Disassembly

1. Lift off the Printer Cover.
2. Remove three screws (11 and 12) on the Upper Case and lift it up.
3. Remove the red and the white connectors on the Main PCB.
4. Remove the Upper Case.

4-1-2 Model-405R (Epson) Printer Disassembly

1. Unplug the Harness (22Pin) on the Printer Board.
2. Remove the Paper Roll.
3. Remove the screw 43 on the Ground Plate to be disassemble the ground wire between the Printer and the Ground Plate at the Transformer's up side.
4. Remove the two screws 33 on the Lower Case and pull the Printer Assembly front and up.
5. Remove the two screws 35 and 36 to be disassemble the Stamp 27 and the Bracket Stamp.
6. Remove the screw 30 to be disassemble the Paper Guide 29.

4-1-3 Main Board Disassembly

1. Unplug the Harness CN5/6 on the Printer Board.
2. Unplug the Harnesses on the Main Board.
3. Remove the screws 18 at the Transformer and 20 on the Main Board.
4. And pull the lock at the bottom side of the Main Board then pull up the Board.

4-1-4 Display Board Disassembly

1. Remove the four screws 17 on the Upper Case.
2. Unplug the Harness CN3 connected with the Turret (Rear) Display Board.
3. Remove the four screws 15 on the Display Board.

4-1-5 Mode Key Disassembly

1. Remove the two screws 4 on the Upper Case.

4-1-6 Lower Case Disassembly

1. Remove the screw 39 on the Lower Case

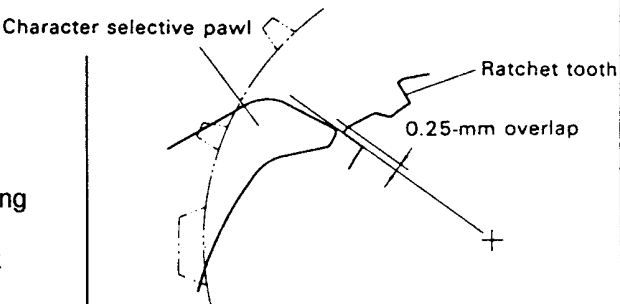
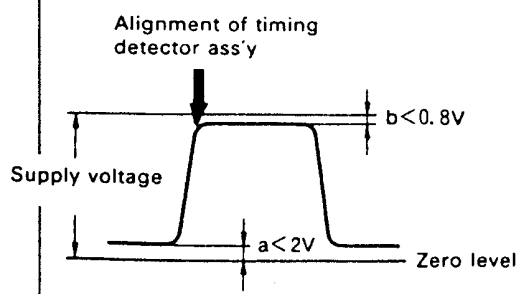
4-2 Reassembling

Reassembling procedure is the reverse procedure of the chapter 4-1 disassembling.
And confer the Exploded View Chapter 7.

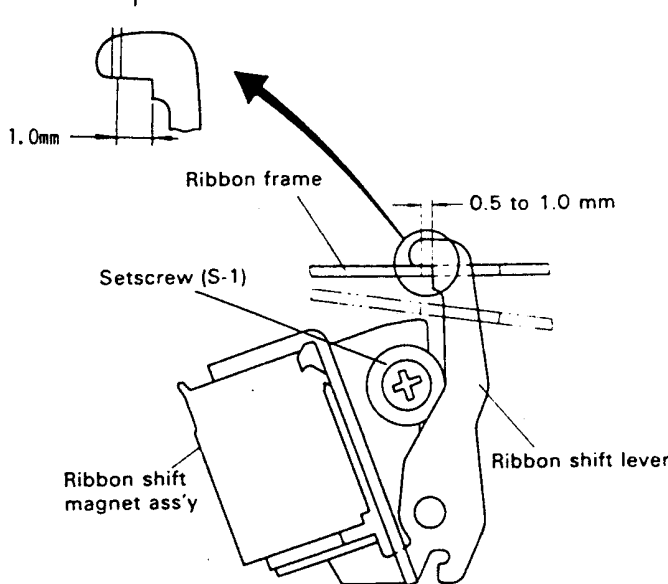
5 Alignment and Adjustments

This chapter describes the methods for aligning and adjusting components in this ECR.

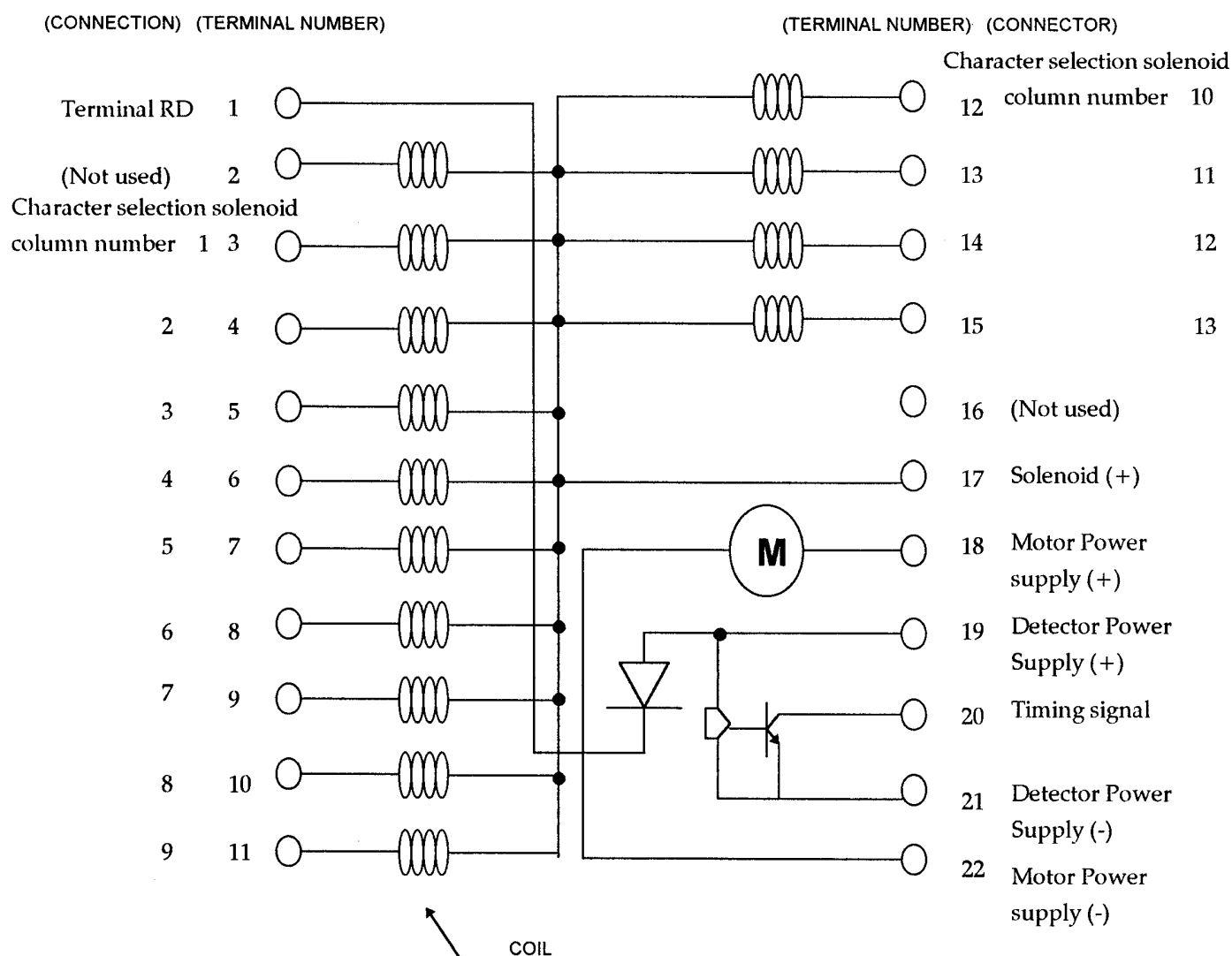
5-1 Position of the Timing Detector Assembly

Adjustment Step	Description	Points in Adjusting
1	Manually rotate the second reduction gear until the desired ratchet teeth of the printing wheel assembly are aligned with the tip of the character selective pawls.	
2	- Apply the rated voltage to the timing detector assembly, then use an oscilloscope to observe the output waveforms. - Loosen the screws S-4 (M3x8) of the timing detector assembly, then rotate the timing detector assembly in the → arrow direction. At this time, the output waveforms should change to LOW level. - When the timing detector assembly is rotated in the opposite direction, the output waveforms should change to HIGH level. - Slowly rotate the timing detector assembly again in the → arrow direction, then tighten its setscrew to mount it at the position just before the output waveforms change from HIGH to LOW level. (Screw-tightening torque : 6 kg/cm)	
3	Use the oscilloscope to check the output voltage of the Timing signals. Reference : Zero level a : Less than 2V b : Less than $0.8 V_b < 0.8 V_a < 2V$	

5-2 Position of the Ribbon Shift Magnet Assembly

Adjustment Step	Description	Points in Adjusting
1	- Loosen the setscrew S-1 (M3x4) of the ribbon shift magnet assembly. - After manually setting the ribbon shift lever into drawn status, slide the ribbon shift magnet assembly to adjust the gap between the ribbon shift lever and ribbon frame unit. Rated gap : 0.5 mm to 1.0mm	
2	Permanently tighten the setscrew of the ribbon shift magnet assembly. (Reference)	 The diagram illustrates the adjustment of the ribbon shift magnet assembly. It shows the ribbon frame, ribbon shift lever, ribbon shift magnet assembly, and setscrew (S-1). A gap of 0.5 to 1.0 mm is indicated between the ribbon shift lever and the ribbon frame. A 1.0mm dimension is also shown for the ribbon shift lever.

5-3 Printer Terminal Arrangement



Note:

1. The column numbers correspond to the arrangement of the columns.
2. The column (1 to 13) are numbered from the frame motor side.
3. The board terminals (1 to 22) are numbered from the frame motor side.
4. Connecting a current suppresser diode.

5-4 Detailed Specifications

5-5-1 Character Arrangement

Column No.	13	12	11	-	-	-	-	-	4	3	2	1
Character	numerals + comma + decimal point										space	symbol

5-5-2 Paper

Table 5-1. Roll Paper Characteristic

Characteristic	Measurement
Type	High Quality Paper
Paper Thickness	0.06 to 0.085mm
Paper Width	57.5 ± 0.5mm
Weight	47 to 64 g/m ²

Note:

1. When using roll paper other than Samsung recommend paper, the roll paper remnant length will differ.
2. When using roll paper with a red end mark, the Winding Core may pull out of its holder due to the paper sticking to Winding Core.

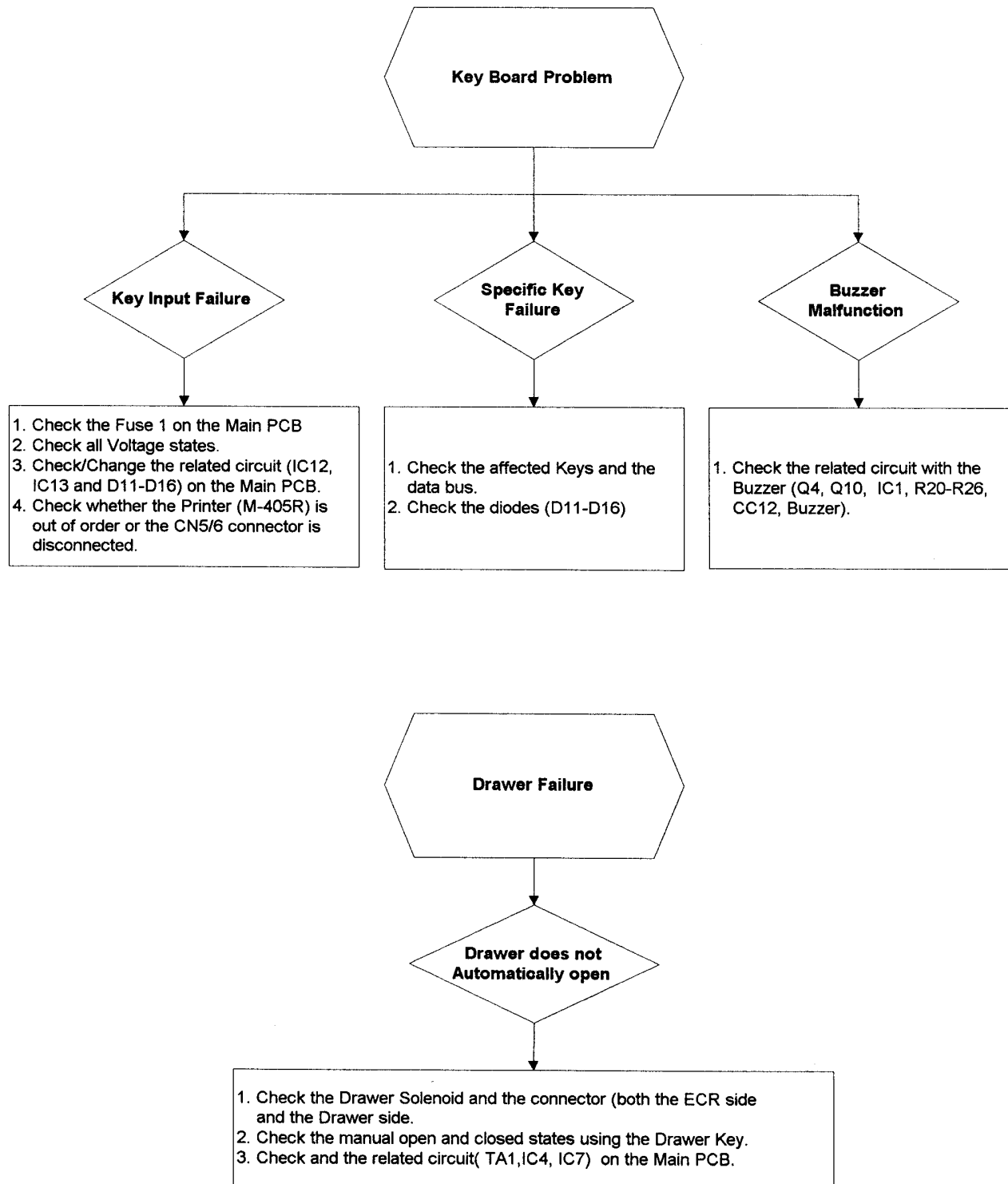
5-5-3 Ink Ribbon

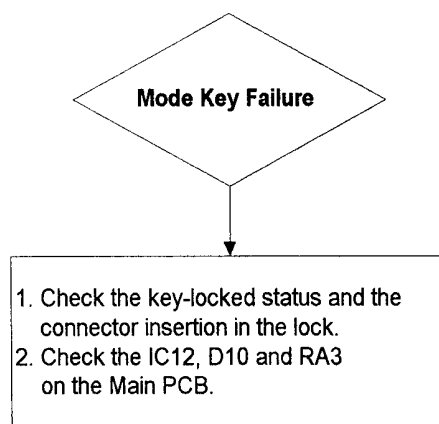
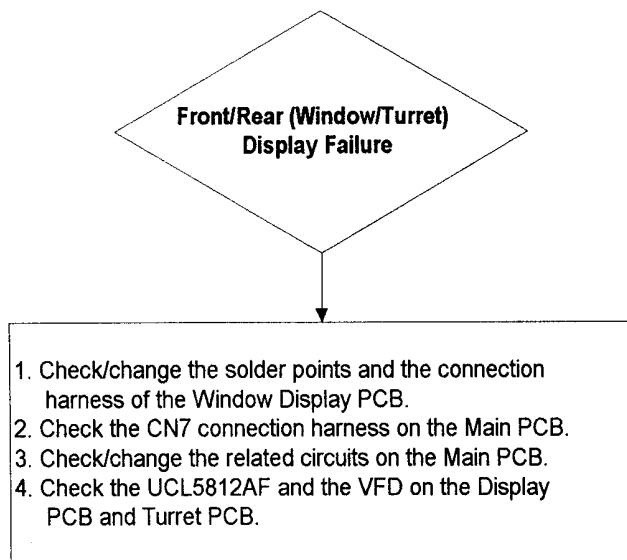
Item	Characteristic
Color	1-color ink ribbon (Purple)
Dimensions	width : 13mm length : 6000mm
Recommended ribbon	material : nylon quantity of Ink : Heavy
Spool Standard	EPSON standard ribbon spool
Cassette standard	EPSON standard ribbon cassette

6 Troubleshooting and Test Procedures

This chapter describes the methods for determining the source of malfunctions in this ECR.

6-1 Troubleshooting

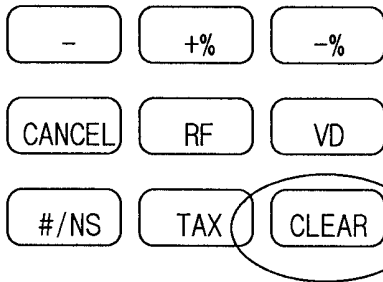




6-2 Test Procedure

6-2-1 All Clear

1. Turn the Mode Key to MC-Mode.
2. Turn off the Power.
3. Hold down the key **CLEAR** on the Key board, turn on the Power.
4. The Register issues an All Clear receipt.



USE THIS KEY FOR ALL CLEAR PROCEDURE
REGARDLESS OF WHAT KEY FUNCTION ID
PROGRAMMED AT THAT LOCATION

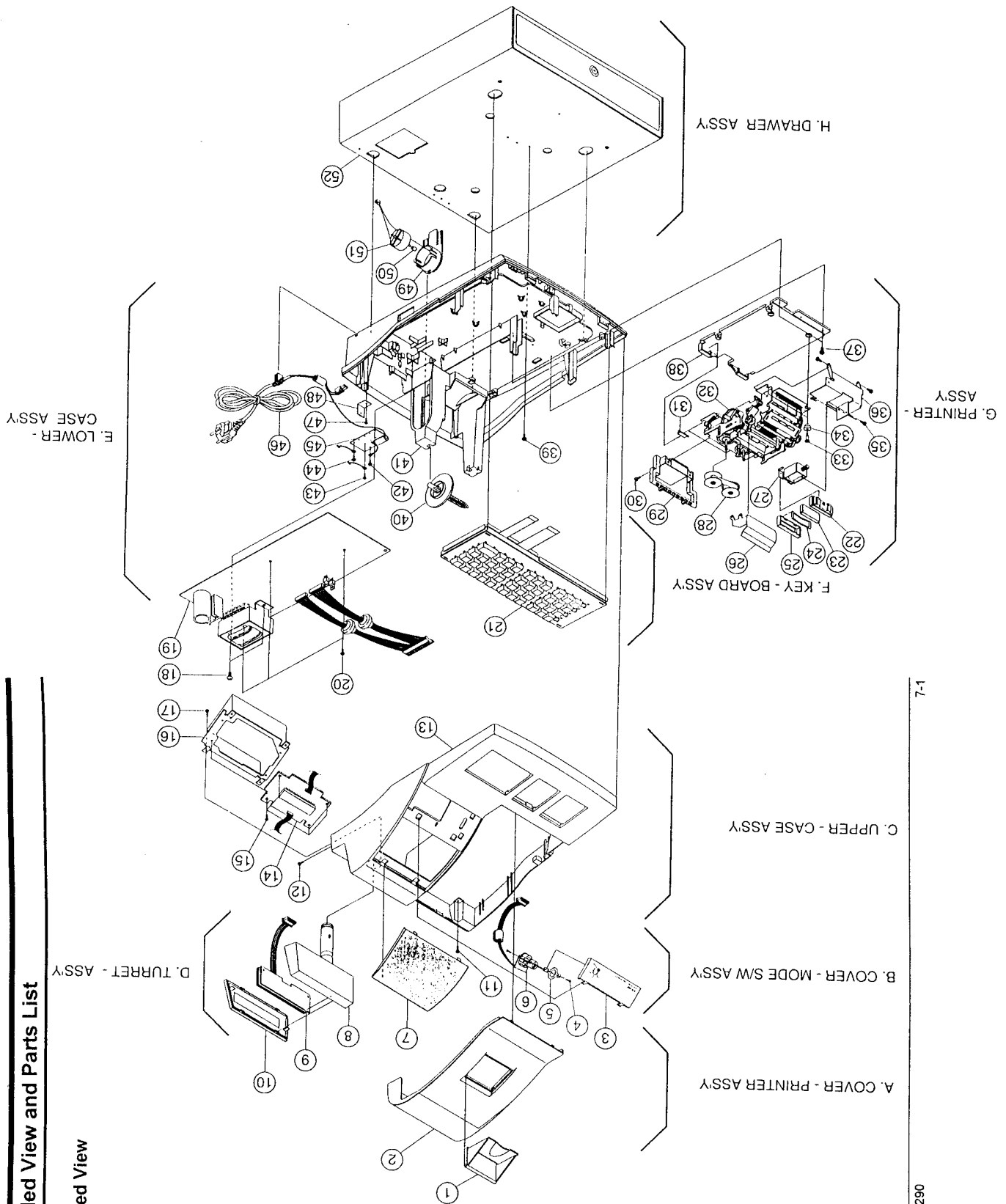
6-2-4 Test

1. Turn the Mode Key to PGM-Mode.

Test	Enter Key
Key Board	2222 + CHARGE
Mode Key	3333 + CHARGE
Self Test	#/NS

7 Exploded View and Parts List

7-1 Exploded View



7-2 Exploded Parts List

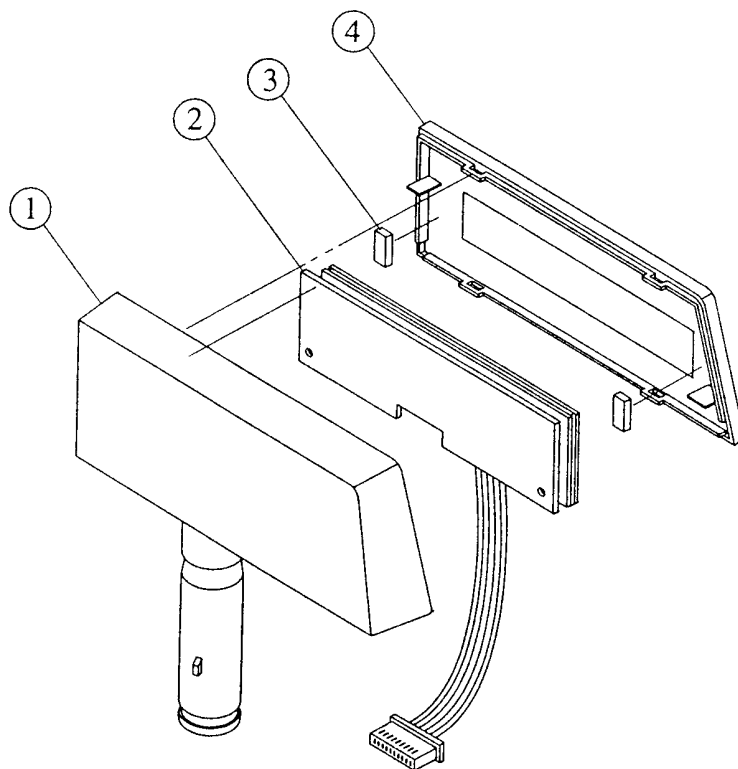
Loc. No.	Parts No.	Description	Specification	Remark
1	JK72-40918A	WINDOW-JOURNAL	ACRYL	
2	JK72-40917A	COVER-PRINTER	ABS(V0)	
3	JK72-40934A	COVER-MODE S/W	ABS(V0)	
4	6002-000319	SCREW-TAPPING	PH,M3,L8	
5	JK70-10004A	BRK'T-MODE SWITCH	SECC,T1.0	
6	JK96-00956A	MODEKEY ASS'Y	-	
7	JK72-40211A	WINDOW-DISPLAY	PC	
8	JK72-60007A	TURRET-BODY	ABS(V0)	
9	JK41-10002A	TURRET-PCB ASS'Y	9digit	
10	JK72-60006B	WINDOW-TURRET	PC	
11	6002-000174	SCREW-TAPPING	PWH,M3,L10	
12	6001-000367	SCREW-MACHINE	FH,M4,L10	
13	JK72-60010A	CASE-UPPER	ABS(V0)	
14	JK41-10504A	DISPLAY-PCB ASS'Y	9digit	
15	6002-000175	SCREW-TAPPING	PWH,M3,L8	
16	JK70-10407A	BRK'T-WINDOW PCB	SECC,T1.0	
17	6002-000175	SCREW-TAPPING	PWH,M3,L8	
18	6003-000014	SCREW-TAPPING	PWH,M5,L14	
19	JK41-10505A	MAIN-BOARD	-	
20	6002-000174	SCREW-TAPPING	PWH,M3,L10	
21	JK59-10525A	KEY BOARD ASS'Y	U.S.A STD	
	JK59-10528A	KEY BOARD ASS'Y	Europe STD	
22	JK72-40203A	COVER-HOLDER	ABS(V0)	
23	JK73-60306A	RUBBER-STAMP	ENGLISH STD	
	JK73-60306B	RUBBER-STAMP	SPANISH STD	
	JK73-60306D	RUBBER-STAMP	GERMANY STD	
24	JK70-10347A	PLATE-SPRING	STS 304	
25	JK72-40202A	COVER-STAMP	ABS(V0)	
26	JK70-10903A	PLATE-STAMP	SUS 304	
27	JK75-10906A	SOLENOID ASS'Y	-	
28	JK75-10382A	MEC-RIBBON	-	
29	JK72-40921A	GUIDE-PAPER	ABS(V0)	
30	6001-000618	SCREW-MACHINE	PH,M4,L8	
31	JK73-40901A	FOOT-REAR	NR,BLK	
32	JK59-10522A	UNIT-PRINTER ASS'Y	M-405R	
33	6002-000209	SCREW-TAPPING	RWH,M3,L17.5	
34	JK73-60304A	RUBBER-PRINTER	RUBBER	

7 Exploded View and Parts List

35	6001-000665	SCREW-MACHINE	PWH,M3,L4	
36	JK70-10902A	BRACKET-STAMP	SECC,T1.0	
37	6002-000174	SCREW-TAPPING	PWH,M3,L10	
38	JK72-40919A	HOLDER-PRINTER	ABS(V0)	
39	6003-000221	SCREW-TAP TITE	PWH,M4,L8	
40	JK72-60012A	PULLY-WINDING	ABS(V0)	
41	JK72-60011A	CASE-LOWER	ABS(V0)	
42	6006-000199	SCREW-ASS'Y TAPT	WT,BH,M4,L8	
43	6006-000196	SCREW-ASS'Y TAP	WT,RH,M3,L8	
44	6002-000174	SCREW-TAPPING	PWH,M3,L10	
45	JK70-10001A	GROUND-PLATE	SECC T1.2	
46	JK39-10003A	POWER-CORD ASS'Y	U.S.A STD	
	JK39-10001A	POWER-CORD ASS'Y	Europe STD	
	JK39-10008A	POWER-CORD ASS'Y	U.K. STD	
	JK39-10002A	POWER-CORD ASS'Y	AUSTRALIA	
47	6002-000171	SCREW-TAPPING	PH,M4,L10	
48	JK70-10002A	BRACKET-CASING	SECC T1.6	
49	JK72-60003A	HOLDER-MOTOR	ABS(V0)	
50	JK73-30200A	RCT-MOTOR	URETANE	
51	3101-001071	MOTOR-DC	-	
52	JK75-10397A	ASS'Y-DRAWER	B43NB	
	JK75-10398A	ASS'Y-DRAWER	B44LB	
	JK75-10907A	ASS'Y-DRAWER	A5B5C-N	
	JK75-10908A	ASS'Y-DRAWER	A5B5C-C	
	JK75-10909A	ASS'Y-DRAWER	A4B8C-N	
	JK75-10910A	ASS'Y-DRAWER	A4B8C-C	

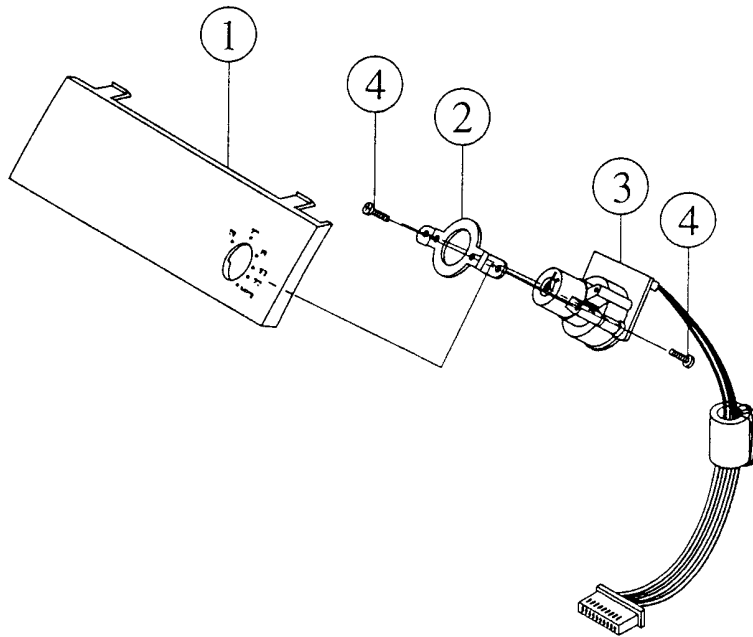
7-3 Window Display (c.f. 10-2 PCB diagram)

Loc. No.	Code No.	Description	Specifications	Remarks
	JK96-00943A	ASS'Y,DISPLAY	ER-290, 9 DIGIT	
J1~102	BH39-40305U	CBF-HARNESS	52MM,,,AWG22	
	JK07-10100A	VACCUM/TUBE-F.D	10G,4.2V,	9 DIGIT
CN2	JK39-40006A	CBF-HARNESS	2P,350MM,WHT/	2P
CN1	JK39-40007A	CBF-HARNESS	8P,400MM,RED/	8P
	JK41-10504A	PCB-DISPLAY	ER-290, 9DIGIT	9 DIGIT
PAD	JK73-10207A	RUBBER-PAD	ER-220N,SPONGE	PAD(T5.0)
UCN5812A F	1003-001101	IC-DISPLAY DRIVER	UCN5812AF,VFD DRIVER	
C1,C2	2202-000579	C-CERAMIC,MLC-AXIAL	100nF	
CN3	3711-000766	CONNECTOR-HEADER	BOX,22P,	

7-4 Turret PCB Assembly (c.f. 10-3 PCB diagram)

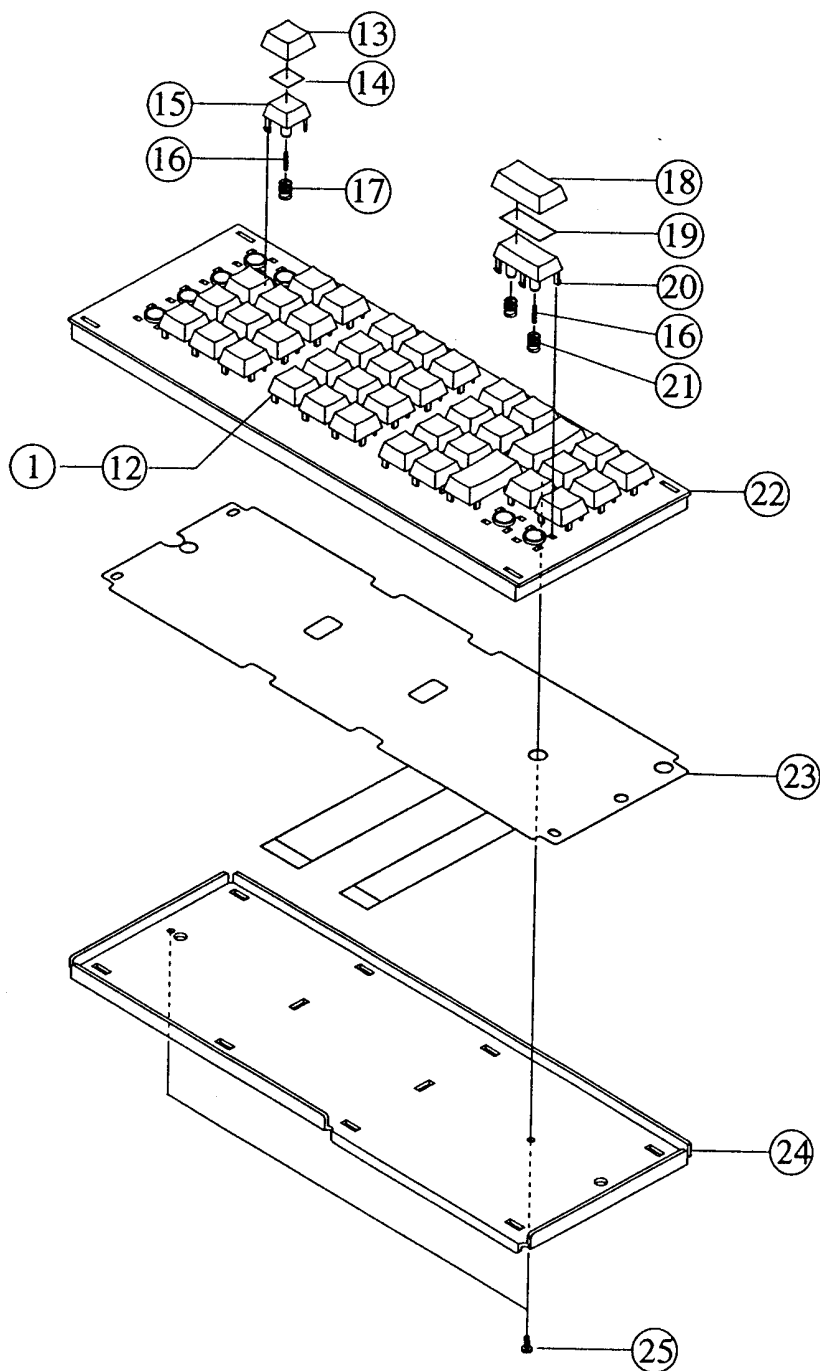
Loc. No.	Code No.	Description	Specifications	Remarks
	JK96-00205A	ASS'Y,TURRET-BODY	ER-350	nonservicable
	JK97-50016A	ASS'Y-TURRET/ DISPLAY	ER-350,9DIGIT	
	JK07-10100A	VACCUM/TUBE-F.D	9G,4.2V,	9 DIGIT
	JK39-40002A	CBF-HARNESS	22P,400MM,BLK	
	JK41-10002A	PCB-TURRET(9DIG)	ER-380,	9 DIGIT
	JK73-10208A	RUBBER-PAD	ECR,SPONGE,BLK	PAD

7-5 Mode Switch Assembly



Loc. No.	Code No.	Description	Specifications	Remarks
	JK92-10058F	ASS'Y,COVER-MODE S/W	ER-350	
	JK39-40517A	CBF-HARNESS	ER-290, FLAT,UL1007,300mm, 8color	No Core
	JK70-10004A	BRKT-MODE S/W	ER-380,SBHG	
	JK72-60408A	COVER-MODE S/W	ER-5100,AB	
	3406-000116	SWITCH-ROTARY	12V,30mA,SP	
	6002-000154	SCREW-TAPPING	PH,+,2,M3,L	BRKT MODE+ MODE S/W
	6002-000394	SCREW-TAPPING	PH,+,2,M3,L	BRKT MODE+ COVER MODE

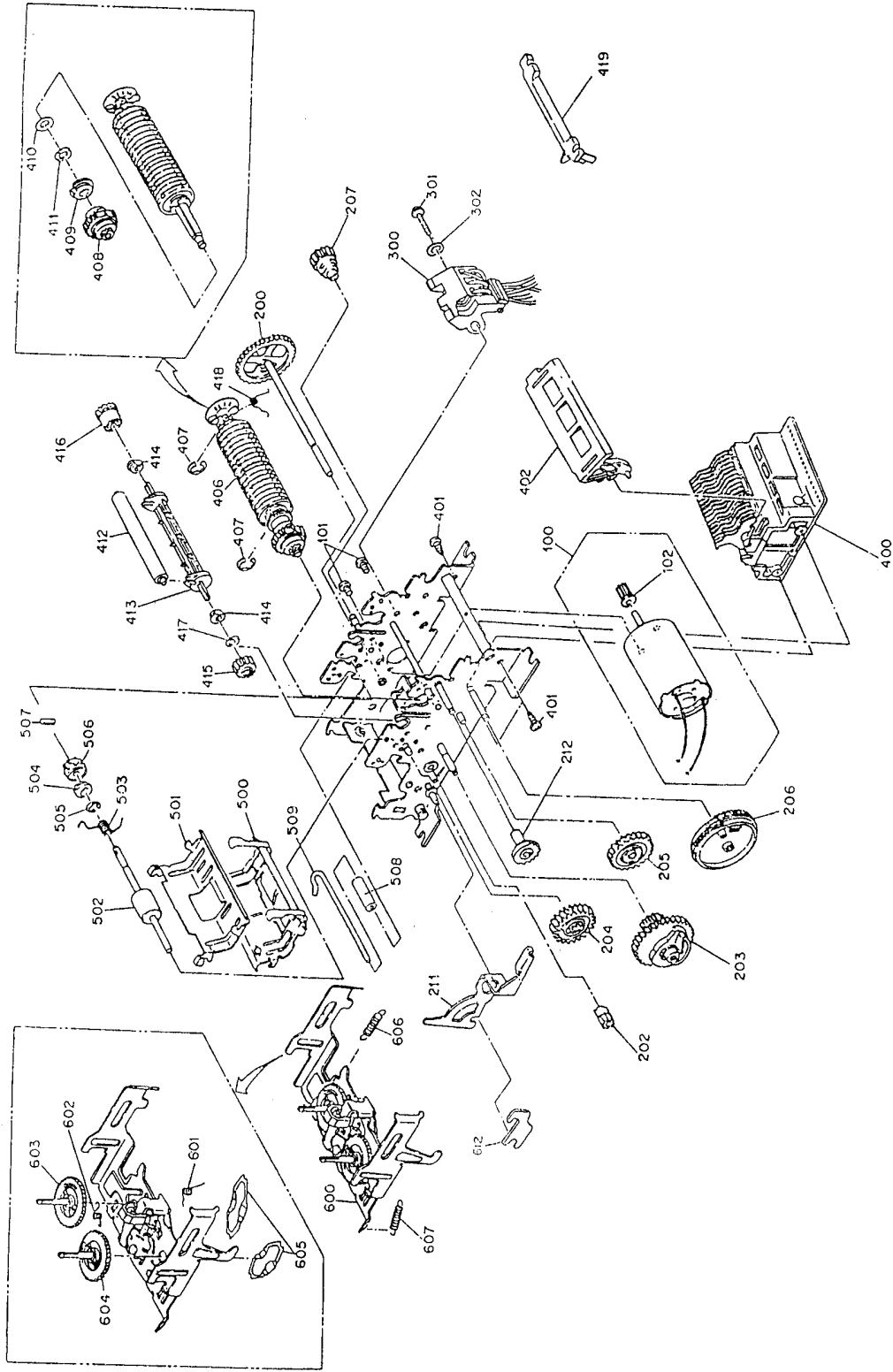
7-6 Keyboard Assembly Exploded View



7-7 Key Board Assembly

NO	PART NUMBER	DESCRIPTION / SPECIFICATION	Q'TY	REMARKS
1	JK81-10933A	COVER-KEY TOP, 1 : ABS	1	
2	JK81-10934A	COVER-KEY TOP, 2 : ABS	1	
3	JK81-10935A	COVER-KEY TOP, 3 : ABS	1	
4	JK81-10936A	COVER-KEY TOP, 4 : ABS	1	
5	JK81-10937A	COVER-KEY TOP, 5 : ABS	1	
6	JK81-10938A	COVER-KEY TOP, 6 : ABS	1	
7	JK81-10939A	COVER-KEY TOP, 7 : ABS	1	
8	JK81-10940A	COVER-KEY TOP, 8 : ABS	1	
9	JK81-10941A	COVER-KEY TOP, 9 : ABS	1	
10	JK81-10942A	COVER-KEY TOP, 0 : ABS	1	
11	JK81-10943A	COVER-KEY TOP, 00 : ABS	1	
12	JK81-10944A	COVER-KEY TOP, . : ABS	1	
13	JK81-10945A	KEY CAP, S : PC 1*1	1	QUANTITY IS CHANGEABLE DEPEND-ING UPON BUYER MODEL
14	-	LABEL KEY TOP SET	1	
15	JK81-10947A	KEY TOP, S : ABS 1*1	1	QUANTITY IS CHANGEABLE DEPEND-ING UPON BUYER MODEL
16	26674-710-810	COIL SPRING:SUS CONTACT	44	"
17	26674-710-610	COIL SPRING:SWPA RETURN 1*1U	43	"
18	JK81-10946A	KEY CAP, L : PC 1*2	26	"
20	JK81-10948A	KEY TOP, L : ABS 1*2	26	"
21	JK61-70301A	COIL SPRING RETURN,1*2	2	"
22	JK72-60448A	HOUSING : POM	1	
23	JK81-10949A	FPC ASS'Y	1	
24	JK70-10422A	FRAME : SECC T0.8	1	
25	6002-000114	SCREW TP : M3x8(TAPPING)	2	

7-8 Printer Assembly Exploded View



EXPLODED DIAGRAM FOR M-405R(C1)

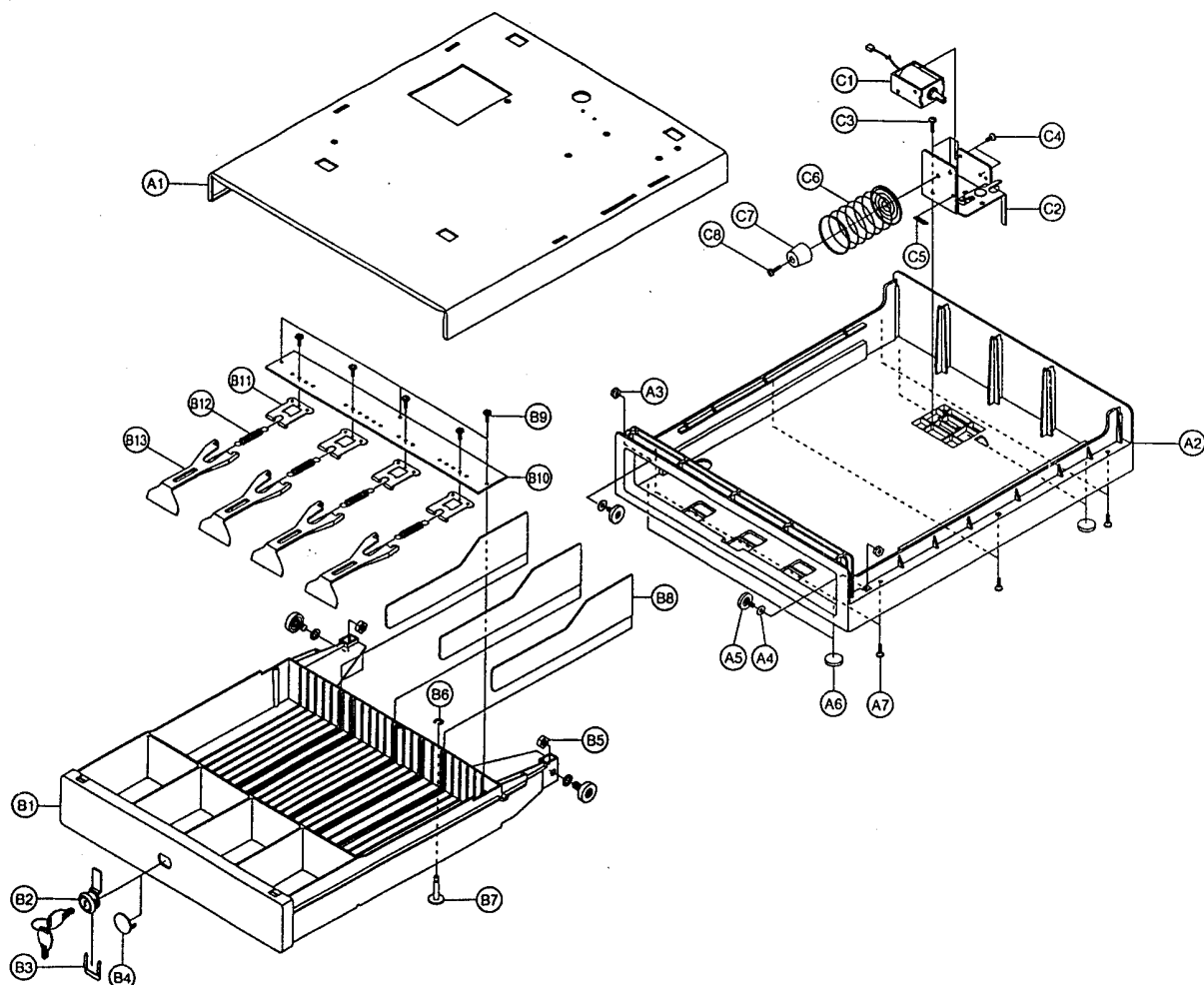
7-9 Printer Assembly

Lo. No.	PART CODE	DESCRIPTION/SPECIFICATION	Q'ty	REMARK
100	JK81-10957A	MOTOR ASS'Y / DC2.1W	1	
101	JK81-10958A	C.B.SCREW / M3X3	1	
102	JK81-10959A	FIRST REDUCTION GEAR	1	
200	JK81-10960A	SECOND REDUCTION GEAR ASS'Y M-400	1	
202	JK81-10961A	THIRD REDUCTION GEAR	1	
203	JK81-10962A	CAM GEAR	1	
204	JK81-10963A	PRINT TRANSMISSION GEAR	1	
205	JK81-10964A	INTERMITTENT TRANSMISSION GEAR	1	
206	JK81-10965A	INTERMITTENT GEAR	1	
207	JK81-10966A	PAPER FEEDING SECOND TRANSMISSION GEAR	1	
211	JK81-10967A	RIBBON FEED DRIVING LEVER	1	
212	JK81-10968A	SELECTIVE TRANSMISSION GEAR	1	
300	JK81-10969A	TIMING SIGNAL DETECTOR ASS'Y A	1	
301	JK81-10970A	C.P. SCREW / M3X8	1	
302	JK81-10971A	U-TYPE S.W / 3.2X0.3X7.3	1	
400	JK81-10972A	CHARACTER SELECTIVE MAGNET UNIT	1	
401	JK81-10973A	C.T.B. SCREW / M3X8	1	
402	JK81-10974A	RESET LEVER	1	
406	JK81-10975A	PRINT WHEEL ASS'Y	1	
407	JK81-10976A	RETAINING RING / TYPE-E(5X0.4)	1	
408	JK81-10977A	SELECTIVE GEAR	1	
409	JK81-10978A	PRINT WHEEL SHAFT HOLDER	1	
410	JK81-10979A	PLAIN WASHER / 6X0.7X12	1	
411	JK81-10980A	LEAF SPRING / 6X0.1X10	1	
412	JK81-10981A	PLATEN ASS'Y C M-440	1	
413	JK81-10982A	PLATEN HOLDER ASS'Y	1	
414	JK81-10983A	CRANK SHAFT HOLDER	1	
415	JK81-10984A	PRINTING GEAR	1	
416	JK81-10985A	PAPER FEEDING FIRST TRANSMISSION GEAR	1	
417	JK81-10986A	LEAF SPRING	1	
418	JK81-10987A	SLIT MASK SPRING B	1	
419	JK81-10988A	PRINT WHEEL GUIDE C	1	
500	JK81-10989A	OUTER PAPER GUIDE ASS'Y	1	
501	JK81-10990A	INNER PAPER GUIDE	1	
502	JK81-10991A	PAPER FEEDING ROLLER ASS'Y	1	
503	JK81-10992A	PAPER FEEDING ROLLER SHAFT SPRING	1	
504	JK81-10993A	PAPER FEEDING SHAFT HOLDER B	1	
505	JK81-11053A	RETAINING RING / TYPE-E(2.3)	1	

7 Exploded View and Parts List

506	JK81-11054A	PAPER FEEDING GEAR M-321	1	
507	JK81-11041A	SPRING PIN / 1.5X6	1	
508	JK81-11042A	PAPER HOLDER ROLLER	1	
509	JK81-11043A	PAPER HOLDING SPRING	1	
600	JK81-11044A	RIBBON UNIT	1	
601	JK81-11045A	RIBBON DETECTING LEVER SPRING	1	
602	JK81-11046A	RIBBON FEEDING PAWL SPRING	1	
603	JK81-11047A	SPOOL GEAR T	1	
604	JK81-11048A	SPOOL GEAR S	1	
605	JK81-11049A	SPOOL GEAR BRAKE SPRING	1	
606	JK81-11050A	RIBBON SHIFT SPRING	1	
607	JK81-11051A	RIBBON FEEDING LEVER SPRING	1	
612	JK81-11052A	RIBBON FRAME STOPPER	1	

7-10 Drawer Assembly Exploded View



7-11 Drawer Assembly

7-11-1 Assembly Cover

NO	PART NUMBER	DESCRIPTION / SPECIFICATION	UNIT	Q'TY	REMARKS
A1	JK70-10905A	HOUSING-DRAWER : STEEL	EA	1	
A2	JK72-60430A	COVER BOTTOM : HIPS HB	EA	1	
A3	6021-000167	NUT HEX M6	EA	2	
A4	6031-000243	WASHER PLAIN	EA	2	
A5	JK72-60415A	ROLLER	EA	2	
A6	JK73-60318A	RUBBER FOOT	EA	4	
A7	6002-000193	SCREW(M3*6)	EA	6	

7-11-2 Assembly Tray

NO	PART NUMBER	DESCRIPTION / SPECIFICATION	UNIT	Q'TY	REMARKS
B1	JK72-60039A	TRAY BILL COIN : HIPS HB	EA	1	
B2	JK75-10389A	LOCK KEY	EA	1	(WITH LOCK)
B3	JK70-10307A	PLATE CLIP	EA	1	(WITH LOCK)
B4	JK72-60322A	KEY BUSHING : HIPS HB	EA	1	(WITHOUT LOCK)
B5	JK72-10415A	ROLLER	EA	2	
B6	6031-000243	WASHER PLAIN	EA	4	
B7	6021-000167	NUT HEX M6	EA	2	
B8	6044-000124	E-RING	EA	1	
B9	JK70-40302A	SHAFT LOCK	EA	1	
B10	JK72-60037A	PARTITION BILL : HIPS HB	EA	2,3	
B11	6002-000193	SCREW (TAP3*6)	EA	6,7	
B12	JK70-10314A	PLATE-HOLDER	EA	1	
B14	JK70-10314A	HOLDER LEVER PRESS	EA	3,4	
B15	6107-000134	SPRING LEVER PRESS	EA	3,4	
B16	JK72-60318A	LEVER PRESS : POM(BLACK)	EA	3,4	

7-11-3 Assembly Lock

NO	PART NUMBER	DESCRIPTION / SPECIFICATION	UNIT	Q'TY	REMARKS
C1	24793-700-101	COIL-DC SOLENOID	EA	1	
C2	811 390003A	BRK'T-LOCK ASSY	EA	1	
	JK70-10328A	LEVER-LOCK	EA	1	
	JK70-40309A	SHAFT-RIVET	EA	1	
C3	6002-000201	SCREW (M4*12)	EA	3	
C4	6001-000677	SCREW, MACHINE, M3x6	EA	2	
C5	831 522004AB	SPRING LEVER LOCK	EA	1	
C6	6107-000126	SPRING PUSH	EA	1	
C7	JK73-60317A	RUBBER BUMPER	EA	1	
C8	6001-000702	SCREW (M4*15)	EA	1	

8 Electrical Parts List

8-1 Main PCB (c.f. 10-1 Main PCB diagram)

Location No.	Parts No.	Description	Specification	Remark
ASSY-MAIN AUTO	JK96-00928A	MAIN AUTO		
BD1	0402-000287	GBL02		
IC2	0902-000003	80C32		
IC10	1102-000209	EPROM,27C512		
IC10	3704-000235	28Pin Socket		
IC11	1106-000377	6264 RAM		
CE1	2401-001312	4700uF/50V		
CE2	2401-001430	470uF/50V		
CE5	2401-001430	470uF/50V		
CA1	2503-000106	C101, C-ARRAY		
CA2	2503-000106	C101, C-ARRAY		
RA1	2011-000539	472,R-NETWORK		
RA2	2011-000539	472,R-NETWORK		
RA3	2011-000766	153,R-NETWORK		
Q1	JK96-00940A	D73(Heat Sink)		
Q3	JK96-00953A	7805(Heat Sink)		
Q5	0501-000288	D288		
CN1	3711-000033	2Pin/Red		
CN2	3711-000034	2Pin/Black		
CN3	3711-000817	2Pin/White		
CN4	3711-000183	2Pin/Wall		
CN5	JK39-40510A	22Pin		
CN6	JK39-40510A	22Pin		
CN7	3711-000041	8Pin/Red		
CN8	3711-000817	2Pin/White		
CN9	3711-001133	8Pin/White		
CN10	3708-000327	8Pin		
CN11	3708-000306	6Pin		
CN12	3711-000817	2Pin/White		
TA1	0506-001019	STA471		
BZ1	3002-001027	Buzzer		
X1	2801-000140	12MHz		
X2	2801-003376	32.768kHz		
Fuse (USA)	3601-000136	125V / 3A		
Fuse (Europe)	3601-000261	250V / 3.15A		
Battery	4302-000126	Battery		
Transformer(USA)	JK26-30503A	120V/60Hz		
Transformer(Europe)	JK26-30504A	230V/50Hz		

8-2 Main Auto

Loc. No.	Code No.	Description	Specification	Remark
J1~102	BH39-40305U	Jumper Wire	Jumper Wire	
R1	2001-000065	R-CARBON	10k	
R2	2001-000055	R-CARBON	4.7k	
R3	2001-000116	R-CARBON	820	
R4	2003-000327	METAL-OXYDE	51(2W)	
R5	2003-000502	METAL-OXYDE	150(2W)	
R6	2001-000047	R-CARBON	2.2k	
R7	2001-000047	R-CARBON	2.2k	
R8	2001-000047	R-CARBON	2.2k	
R9	2001-000047	R-CARBON	2.2k	
R10	2001-000060	R-CARBON	6.8k	
R11	2001-000060	R-CARBON	6.8k	
R12	2001-000060	R-CARBON	6.8k	
R13	2001-000055	R-CARBON	4.7k	
R14	2001-000055	R-CARBON	4.7k	
R15	2001-000055	R-CARBON	4.7k	
R16	2001-000044	R-CARBON	1.2k	
R17	2001-000042	R-CARBON	1k	
R18	2001-000065	R-CARBON	10k	
R19	2001-000065	R-CARBON	10k	
R20	2001-000841	R-CARBON	51	
R21	2001-000055	R-CARBON	4.7k	
R22	2001-000042	R-CARBON	1k	
R23	2001-000081	R-CARBON	68k	
R24	2001-000915	R-CARBON	680k	
R25	2001-000081	R-CARBON	68k	
R26	2001-000081	R-CARBON	68k	
R27	2001-000027	R-CARBON	100	
R28	2001-000855	R-CARBON	560	
R29	2001-000855	R-CARBON	560	
R30	2001-000855	R-CARBON	560	
R31	2001-000855	R-CARBON	560	
R32	2001-000855	R-CARBON	560	
R33	2001-000855	R-CARBON	560	
R34	2001-000855	R-CARBON	560	
R35	2001-000855	R-CARBON	560	
R36	2001-000488	R-CARBON	200	

R37	2001-000855	R-CARBON	560	
R38	2001-000855	R-CARBON	560	
R39	2001-000855	R-CARBON	560	
R40	2001-000855	R-CARBON	560	
R41	2001-000855	R-CARBON	560	
R42	2001-000855	R-CARBON	560	
R43	2001-000855	R-CARBON	560	
R44	2001-000855	R-CARBON	560	
R45	2001-000855	R-CARBON	560	
R46	2001-000855	R-CARBON	560	
R47	2001-000855	R-CARBON	560	
R48	2001-000855	R-CARBON	560	
R49	2001-000855	R-CARBON	560	
R50	2001-000855	R-CARBON	560	
R51	2001-000855	R-CARBON	560	
R52	2001-000855	R-CARBON	560	
R53	2001-000855	R-CARBON	560	
R54	2001-000855	R-CARBON	560	
R55	2001-000855	R-CARBON	560	
R56	2001-000855	R-CARBON	560	
R57	2001-000855	R-CARBON	560	
R58	2001-000042	R-CARBON	1k	
R59	2001-000055	R-CARBON	4.7k	
R60	2001-000055	R-CARBON	4.7k	
R61	2001-000065	R-CARBON	10k	
R62	2001-000065	R-CARBON	10k	
R63	2001-000065	R-CARBON	10k	
R64	2001-000055	R-CARBON	4.7k	
R65	2001-000065	R-CARBON	10k	
R66	2001-000071	R-CARBON	22k	
R67	2001-000058	R-CARBON	5.6k	
R68	2001-000034	R-CARBON	220	
C1	2301-000010	C-CERAMIC,DISC	104M	
C2	2201-000021	C-CERAMIC,DISC	104	
C3	2201-000021	C-CERAMIC,DISC	104	
C4	2201-000021	C-CERAMIC,DISC	104	
C5	2201-000021	C-CERAMIC,DISC	104	
C6	2201-000021	C-CERAMIC,DISC	104	
C7	2201-000021	C-CERAMIC,DISC	104	
C8	2201-000021	C-CERAMIC,DISC	104	
C9	2201-000021	C-CERAMIC,DISC	104	

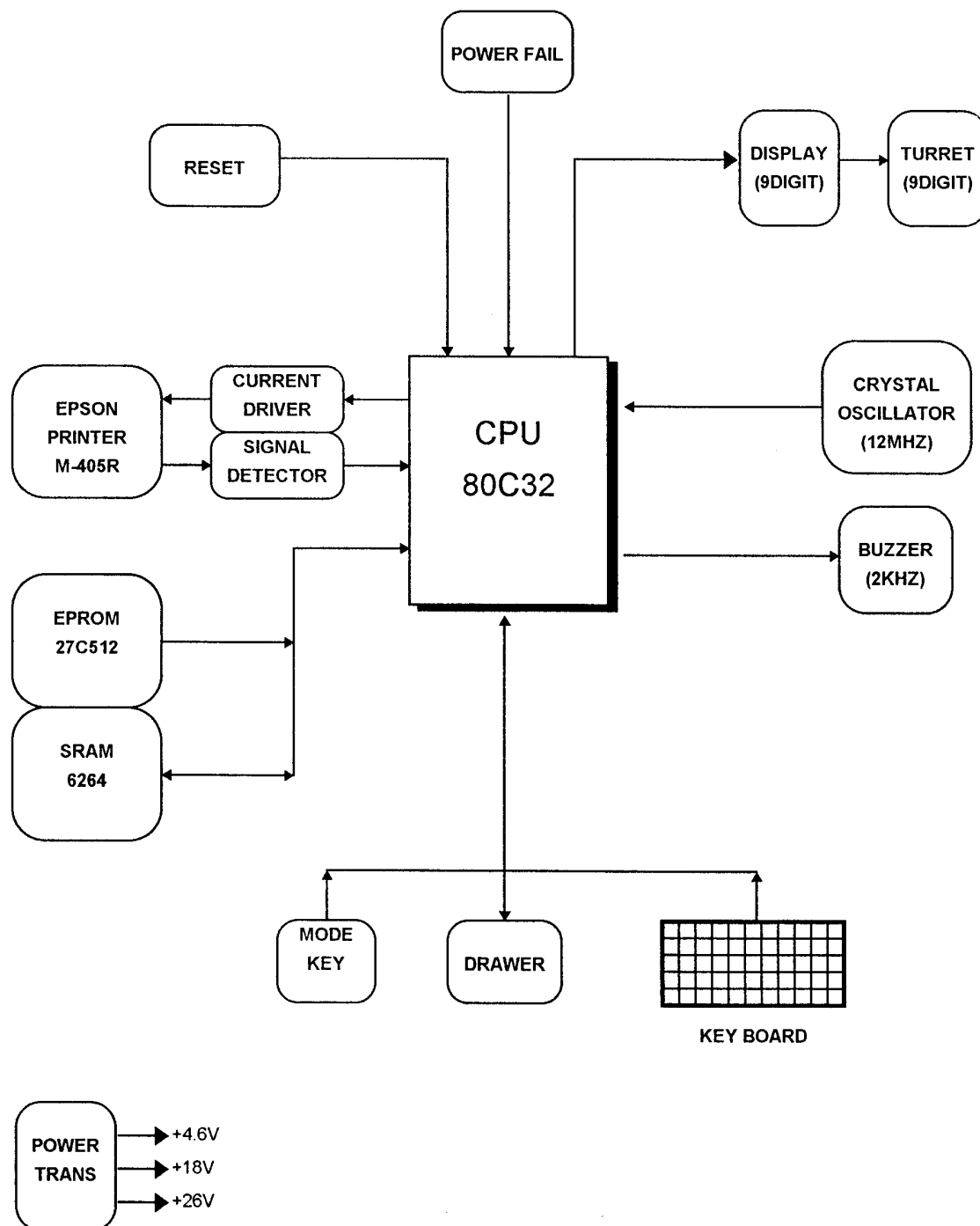
8 Electrical Parts List

C10	2201-000021	C-CERAMIC,DISC	104	
C11	2201-000021	C-CERAMIC,DISC	104	
C12	2201-000013	C-CERAMIC,DISC	471	
C13	2201-000021	C-CERAMIC,DISC	104	
C14	2201-000021	C-CERAMIC,DISC	104	
C15	2201-000021	C-CERAMIC,DISC	104	
C16	2201-000464	C-CERAMIC,DISC	30	
C17	2201-000021	C-CERAMIC,DISC	104	
C18	2201-000021	C-CERAMIC,DISC	104	
C19	2201-000021	C-CERAMIC,DISC	104	
C20	2201-000021	C-CERAMIC,DISC	104	
C21	2201-000021	C-CERAMIC,DISC	104	
C22	2201-000021	C-CERAMIC,DISC	104	
C23	2201-000021	C-CERAMIC,DISC	104	
C24	2201-000464	C-CERAMIC,DISC	30	
C25	2201-000464	C-CERAMIC,DISC	30	
C26	2201-000021	C-CERAMIC,DISC	104	
C27	2201-000021	C-CERAMIC,DISC	104	
C28	2201-000021	C-CERAMIC,DISC	104	
C29	2201-000021	C-CERAMIC,DISC	104	
C30	2201-000021	C-CERAMIC,DISC	104	
C31	2201-000021	C-CERAMIC,DISC	104	
C32	2201-000021	C-CERAMIC,DISC	104	
C33	2201-000021	C-CERAMIC,DISC	104	
Q2	0501-000399	TR-SMALL SIGNAL	C945,NPN	
Q4	0501-000399	TR-SMALL SIGNAL	C945,NPN	
Q6	0501-000399	TR-SMALL SIGNAL	C945,NPN	
Q7	0501-000399	TR-SMALL SIGNAL	C945,NPN	
Q8	0501-000399	TR-SMALL SIGNAL	C945,NPN	
Q9	0501-000399	TR-SMALL SIGNAL	C945,NPN	
Q10	0501-000399	TR-SMALL SIGNAL	C945,NPN	
Q11	0501-000399	TR-SMALL SIGNAL	C945,NPN	
Q12	0501-000399	TR-SMALL SIGNAL	C945,NPN	
Q13	0501-000399	TR-SMALL SIGNAL	C945,NPN	
D1	0402-000129	DIODE	1N4003(T)	
D2	0402-000129	DIODE	1N4003(T)	
D3	0401-000005	DIODE	1N4003(T)	
D4	0402-000129	DIODE	1N4003(T)	
D5	0402-000129	DIODE	1N4003(T)	
D6	0402-000129	DIODE	1N4003(T)	
D7	0402-000208	DIODE RECTIFIER	EK04	

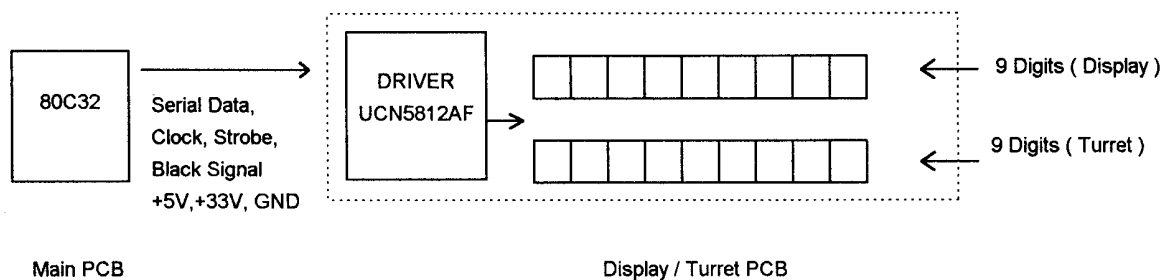
D8	0402-000208	DIODE RECTIFIER	EK04	
D9	0402-000208	DIODE RECTIFIER	EK04	
D10	0401-000005	DIODE SIGNAL	1N4148	
D11	0401-000005	DIODE SIGNAL	1N4148	
D12	0401-000005	DIODE SIGNAL	1N4148	
D13	0401-000005	DIODE SIGNAL	1N4148	
D14	0401-000005	DIODE SIGNAL	1N4148	
D15	0401-000005	DIODE SIGNAL	1N4148	
D16	0401-000005	DIODE SIGNAL	1N4148	
ZD1	0403-000264	DIODE-ZENER	Zener 18V	
ZD2	0403-000395	DIODE-ZENER	Zener 6.2V	
ZD3	0403-000343	DIODE-ZENER	Zener 3.9V	
CE3	2401-000025	C-AL,GP	100uF/16V	
CE4	2401-000025	C-AL,GP	100uF/16V	
CE6	2401-000027	C-AL,GP	4.7uF/50V	
CE7	2401-000025	C-AL,GP	100uF/16V	
CE8	2401-000025	C-AL,GP	100uF/16V	
CE9	2401-000025	C-AL,GP	100uF/16V	
CE10	2401-000023	C-AL,GP	1uF/50V	
IC1	1202-000103	VOLTAGE COMP	KA393	
IC3	0506-000109	IC-LIN ULN2003	ULN2003	
IC4	0801-000528	IC-CMOS LOGIC	74HCT574	
IC5	0506-000109	IC-LIN ULN2003	ULN2003	
IC6	0801-000528	IC-CMOS LOGIC	74HCT574	
IC7	0801-000495	IC-CMOS LOGIC	74HCT139	
IC8	0801-000511	IC-CMOS LOGIC	74HCT573	
IC9	0909-000111	IC-CMOS LOGIC	RP5C15	
IC12	0801-000522	IC-CMOS LOGIC	74HCT541	
IC13	0801-000471	IC-CMOS LOGIC	74HCT138	
Fuse Clip	3602-000001	Fuse-Clip,5.2x20,30M	Fuse Holder	
FB1	3301-000344	MAG-Core, Ferrite Bead	Bead	
FB2	3301-000344	MAG-Core, Ferrite Bead	Bead	
FB3	3301-000292	MAG-Core, Ferrite Bead	Axial Bead	
FB4	3301-000292	MAG-Core, Ferrite Bead	Axial Bead	
FB5	3301-000292	MAG-Core, Ferrite Bead	Axial Bead	
FB6	3301-000344	MAG-Core, Ferrite Bead	Bead	

9 Block Diagram

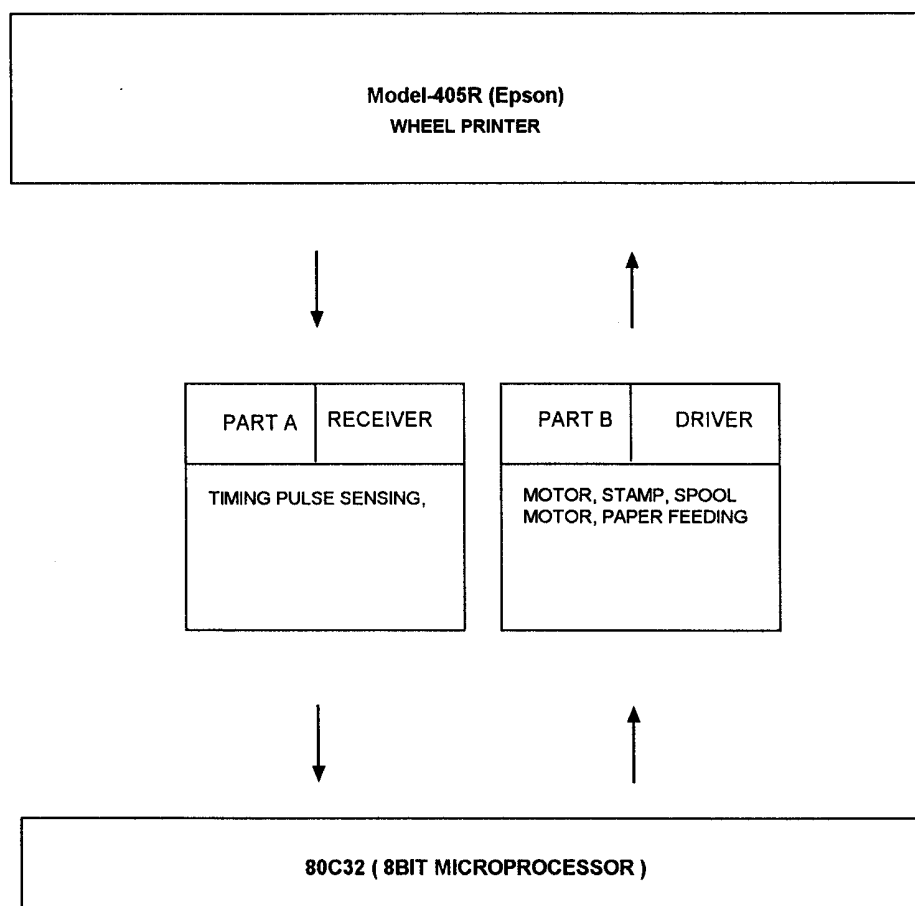
9-1 Main



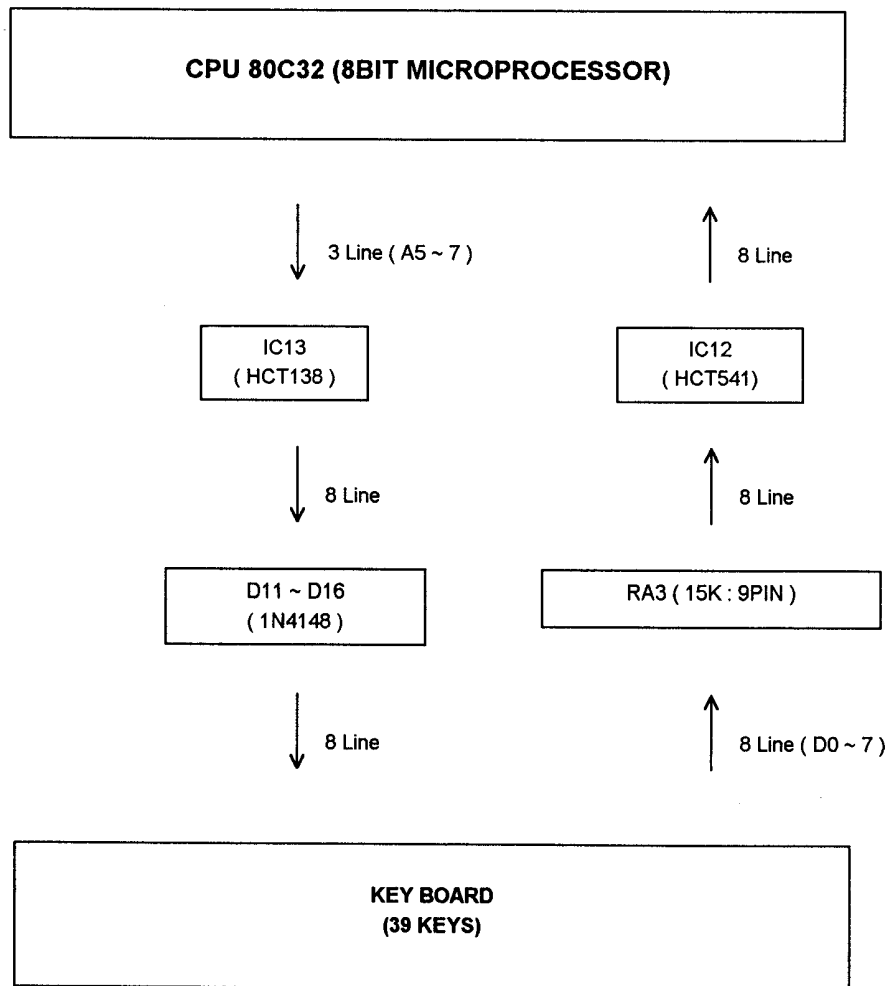
9-2 Front/Rear Display Driver



9-3 Printer Driver



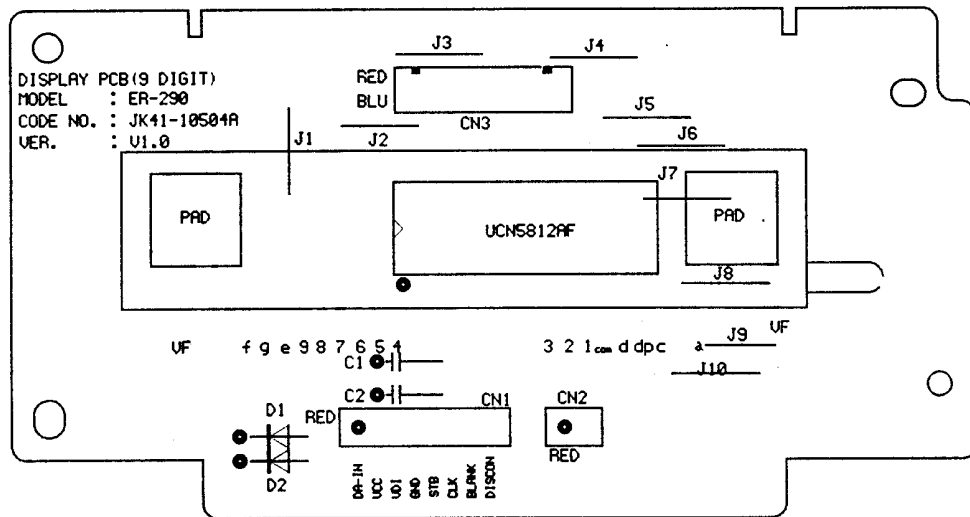
9-4 Keyboard



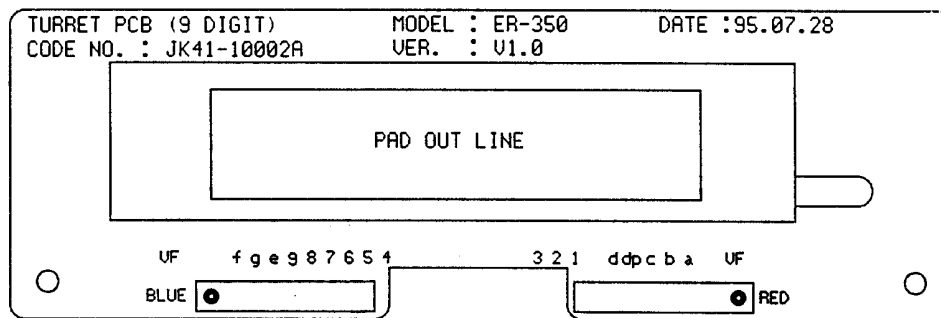
9-5 CPU Port Description

Function	Name	Pin #	Pin #	Name	Function
Mode Key	P1.0	1	40	Vcc	Vcc
Buzzer	P1.1	2	39	P0.0	Address/Data Bus
Display Data In	P1.2	3	38	P0.1	Address/Data Bus
Drawer Compulsory	P1.3	4	37	P0.2	Address/Data Bus
Display Strobe	P1.4	5	36	P0.3	Address/Data Bus
Display Clock	P1.5	6	35	P0.4	Address/Data Bus
Motor	P1.6	7	34	P0.5	Address/Data Bus
Spool Motor	P1.7	8	33	P0.6	Address/Data Bus
Reset	RESET	9	32	P0.7	Address/Data Bus
Not Connected	P3.0	10	31	/EA	GND
Not Connected	P3.1	11	30	ALE	Address Latch
Power Fail (INT0)	P3.2	12	29	/PSEN	EPROM /OE
Timing Pulse (INT1)	P3.3	13	28	P2.7	Address Bus
Not Connected	P3.4	14	27	P2.6	Address Bus
RAM /CE	P3.5	15	26	P2.5	Address Bus
/WR	P3.6	16	25	P2.4	Address Bus
/RD	P3.7	17	24	P2.3	Address Bus
Crystal (12MHz)	XTAL2	18	23	P2.2	Address Bus
Crystal (12MHz)	XTAL1	19	22	P2.1	Address Bus
Ground	GND	20	21	P2.0	Address Bus

10-2 Window PCB

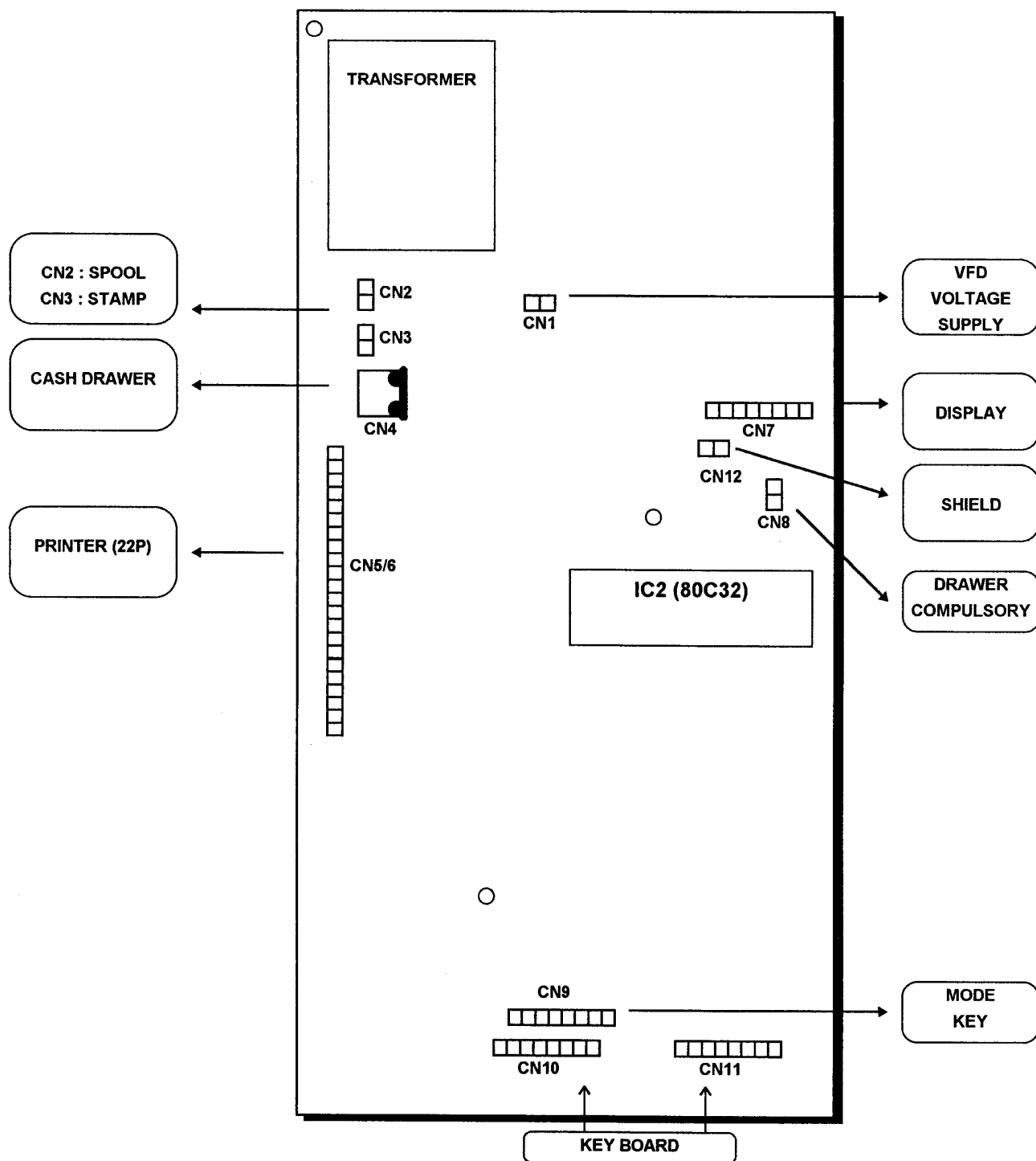


10-3 Turret PCB

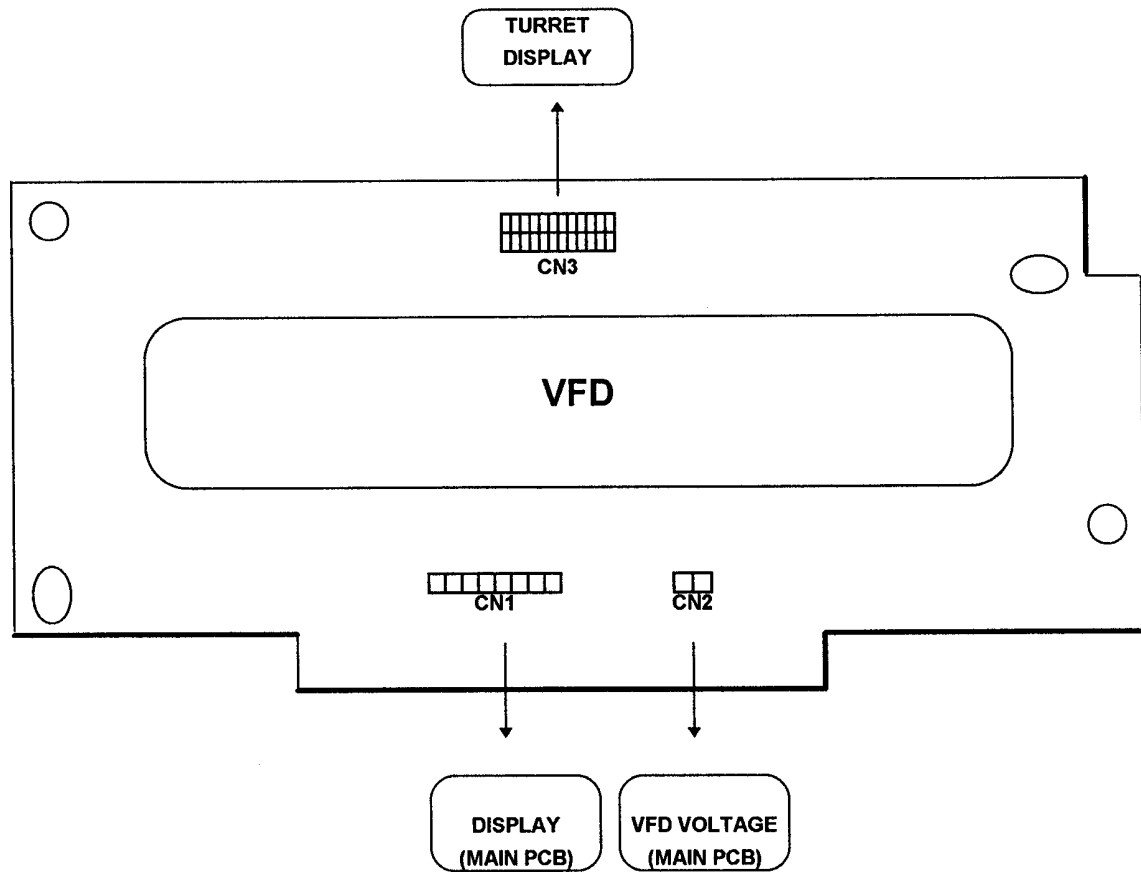


11 Wiring Diagrams

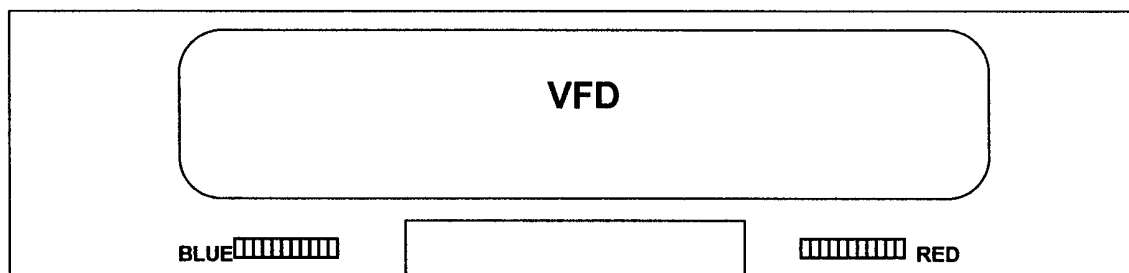
11-1 Main PCB



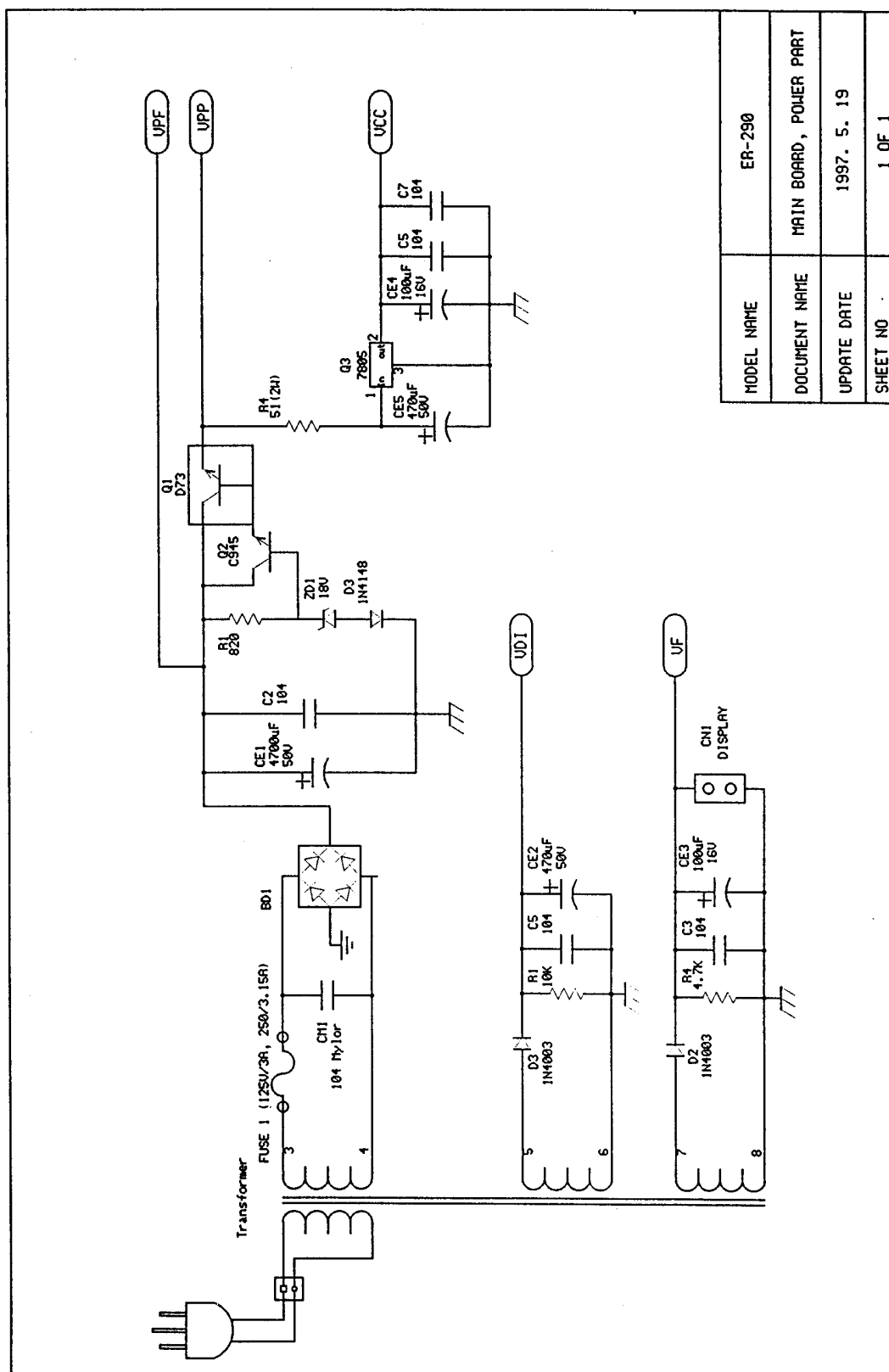
11-2 Window Display PCB



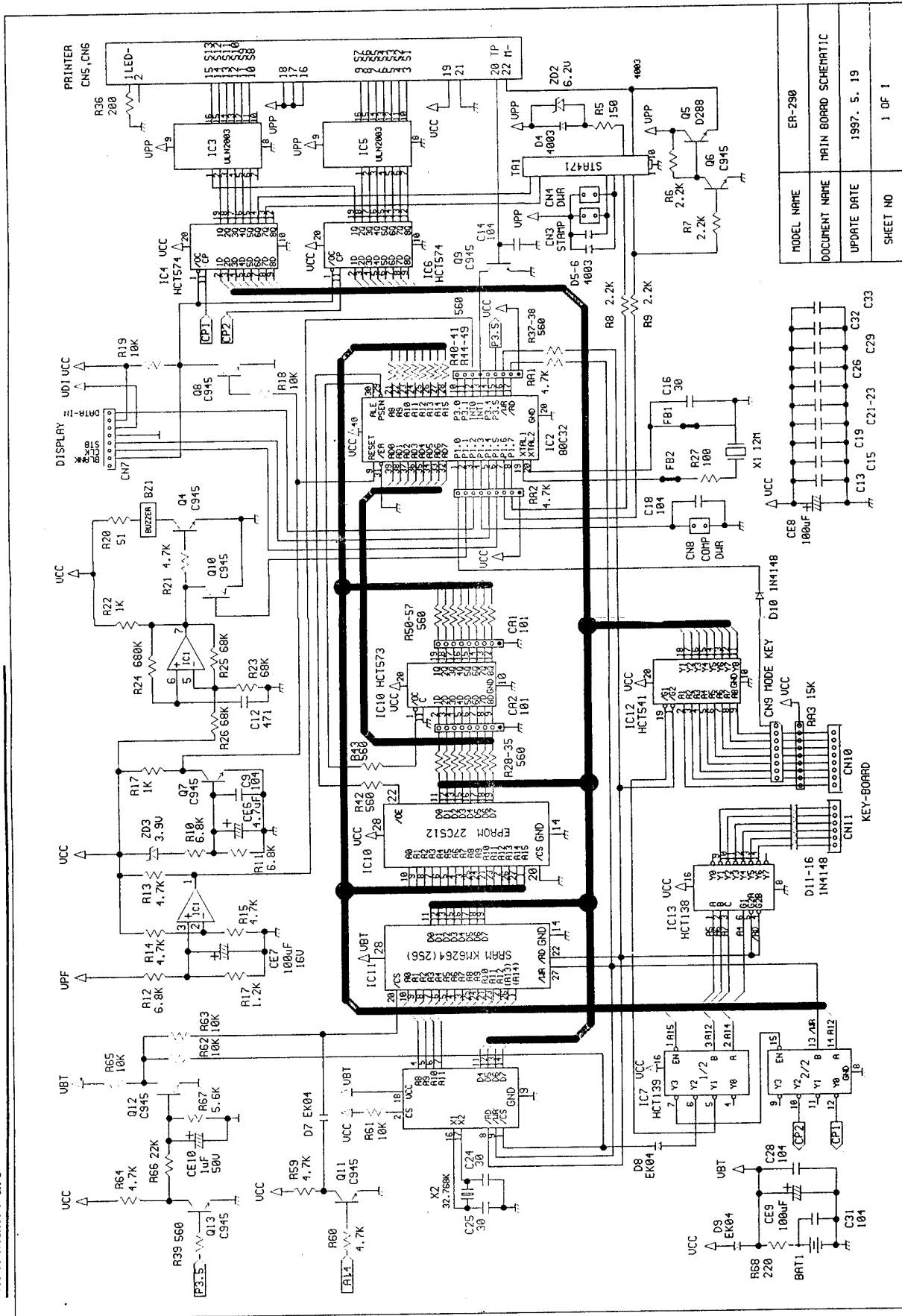
11-3 Turret Display PCB



12-1 Power Part

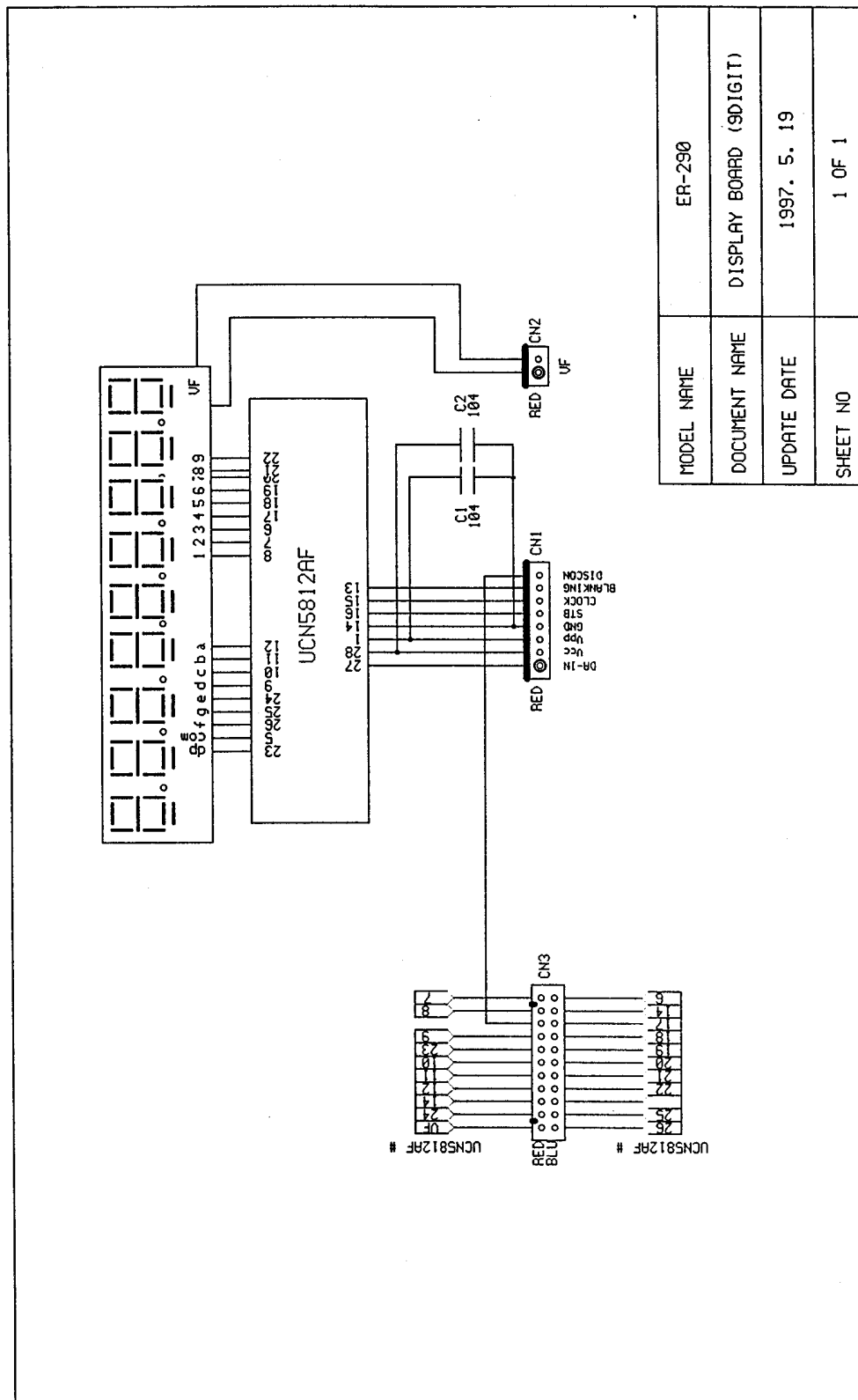


12-2 Main Part



MODEL NAME	ER-290
DOCUMENT NAME	MAIN BOARD SCHEMATIC
UPDATE DATE	1987. 5. 19
SHEET NO	1 OF 1

12-2-1 Window Display (Display Board)



12-3 Printer Terminal Pin Assignments**12-3-1 CN5**

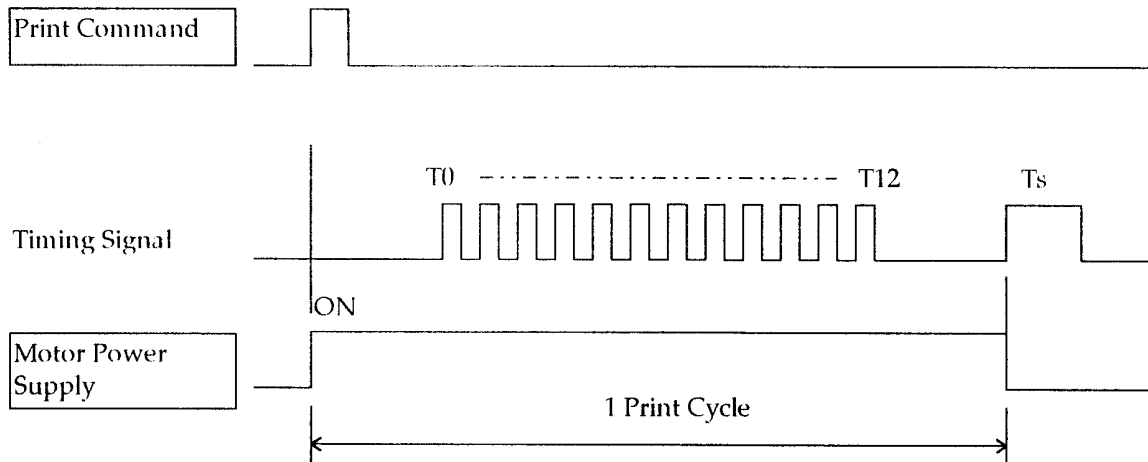
Pin #	Description
1	Motor Power Supply (-)
2	Detector Power Supply (-)
3	Timing Signal
4	Detector Power Supply (+)
5	Motor Power Supply (+)
6	Solenoid (+)
7	Not Used
8	Column number 13
9	Column number 12
10(RED)	Column number 11

12-3-2 CN6

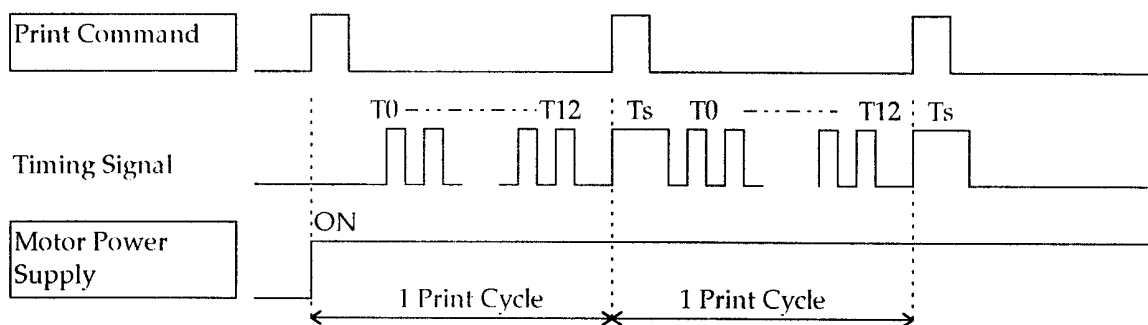
Pin #	Description
1	Column number 10
2	Column number 9
3	Column number 8
4	Column number 7
5	Column number 6
6	Column number 5
7	Column number 4
8	Column number 3
9	Column number 2
10	Column number 1
11	Not Used
12(RED)	Terminal RD

12-4 Printer Timing Chart

12-4-1 1 Line Printing



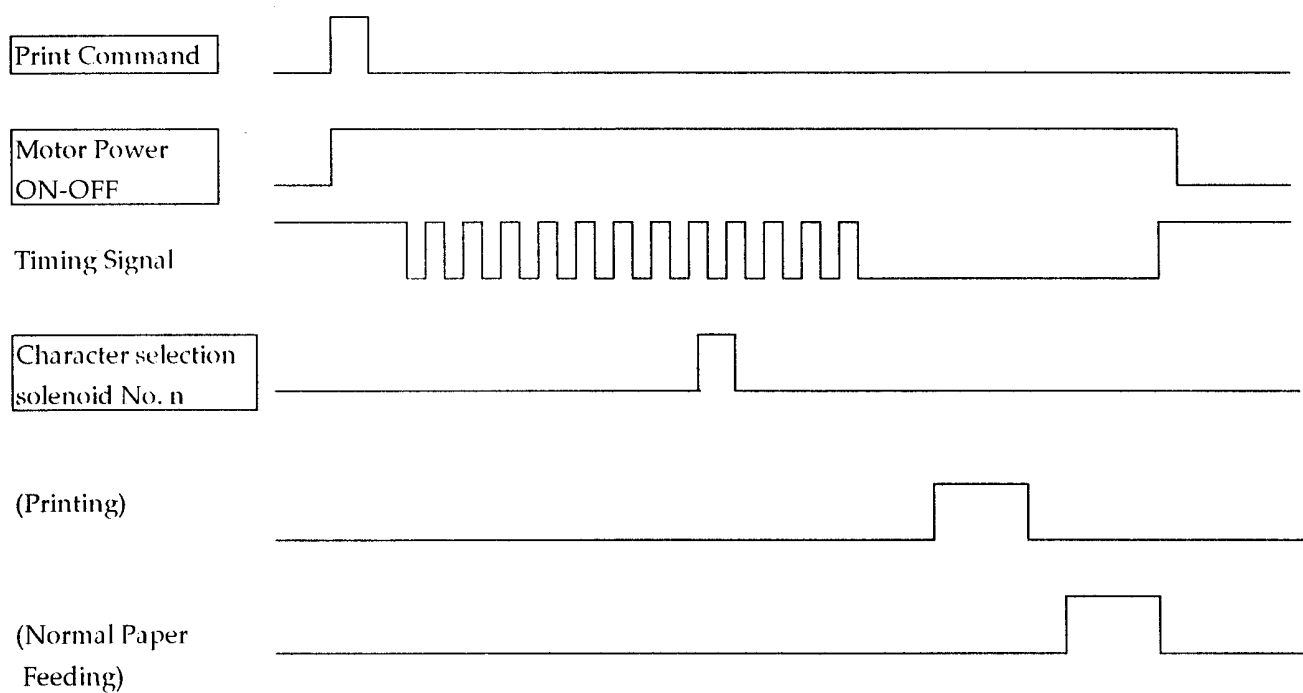
12-4-2 Continuous Printing



During continuous printing, when the leading edge of timing signal T_s occurs, it is possible to enter the next print cycle. Motor Power should be supplied continuously.

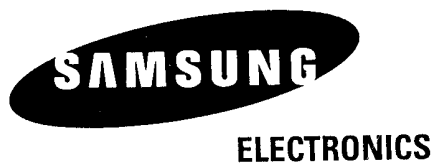
Note: denotes a signal to be supplied by the Main PCB assembly.

12-4-3 Timing Chart



Note:

1.  denotes a signal to be supplied by the Main PCB assembly.
2. The dashed line of x1 denotes the continuous printing mode. In this case, the printer can the next print cycle right after the timing signal Ts has been generated.
3. When a print command is input the timing signal may be "LOW" as shown by the broken line of x2.



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