

CITIZEN

Service Manual

Model: CBM-290/291

Line Thermal Printer

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**Japan CBM Corporation
Information Systems Div.**

INTRODUCTION

This manual describes the disassembly, reassembly, and maintenance procedures of the dot matrix printer CBM-290/291. It is intended for field maintenance men.

FEATURES

The CBM-290/291 is a thermal line dot type small printer equipped with a line thermal head. This printer, developed for various data communication terminals, POS terminals, kitchen printers, is widely available for a variety of applications.

- (1) Rack built-in type small line thermal printer
- (2) High speed and low noise
- (3) High reliability due to long-life printing head and simple mechanism
- (4) Serial and parallel interfaces selectable by a DIP switch
- (5) Built-in input buffer
- (6) Capable of printing bar codes (By a special command)
- (7) Equipped with an auto cutter (CBM-291 only)
- (8) Capable of dealing with the JIS 1st- and 2nd-level Kanji
- (9) External character registration function (94 characters)

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1. HANDLING AND MAINTENANCE OF PRINTER

See the User's Manual coming with the printer body.

2. SPECIFICATIONS

2.1 Basic Specifications

Item	Description
Printing method	Line thermal dot printing system
Printing speed	50 mm/sec. at maximum
Dot density	8 dots/mm (Horizontal and vertical)
Printing digits	Font A: 34 digits, Font B: 46 digits
Character size	Font A: 1.25 mm x 3.00 mm (10 x 24 + 2 dot space), Font B: 0.88 mm x 2.13 mm (7 x 17 + 2 dot space), Kanji: 3.00 mm x 3.00 mm (24 x 24)
Character types	Alphanumeric, international characters, JIS 1st- and 2nd-level Kanji (Kanji for the domestic specifications)
Bar code types	UPC-A/E, JAN(EAN) 13 digits/8 digits, ITF, CODE 39, CODE 128, CODE BAR
Line spacing	4.23 mm(1/6 inch), settable by a command
Paper	Rolled thermal paper: 58 mm wide x ϕ 50 mm or less
Interface	Parallel(CENTRONICS) or serial(RS-232C) (Selectable by a DIP switch)
Input buffer	4 KB
Paper end detection	Stops printing when the paper runs out.
Auto loading	If new paper is set into the paper inlet, it will be fed automatically.
Auto cutter (CBM-291 only)	Cuts the paper automatically by a command. Either full cut or partial cut is selectable.
International character set	Capable of setting the following 10 countries for specific character codes by a command.(U.S., French, German, Danish 1 and 2, Swedish, Italian, Spanish, Japanese, Norwegian)
Supply voltage and power consumption	5 V +/- 5 %, approx. 0.2 A at standby and printout; 24 V +/- 5 %, approx. 10 mA at standby and approx. 1.8 A at print (Approx. 6 A at peak)
Operating temperature	5 to 40 °C, 35 to 85 % RH (No dew condensation)
Storage temperature	-20 to 60 °C, 10 to 90 % RH (No dew condensation)
Outer dimensions	106 (W) x 109 (H) x 99 (D) mm
Weight	CBM-290: Approx. 460 g (Main body only), CBM-291: Approx. 600 g (Main body only), Fitting: Approx. 50 g
Applicable standards	UL, CUL, TUV
EMI	VCCI: Class A applicable, FCC: Class A applicable
Reliability	Printing head life: Pulse resistance --- 50,000,000 pulses (Print ratio: 12.5 %), Wear resistance --- 30 km (With specified paper at normal temperature and humidity) Auto cutter life: 300,000 cuts (CBM-291)

2.2 Printing Paper Specifications (Specified Paper)

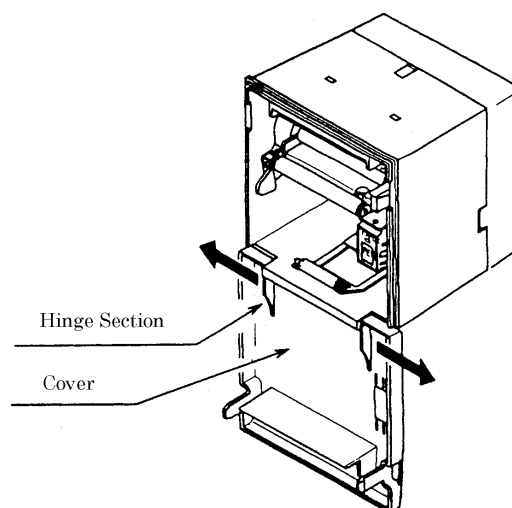
Type	: Thermal paper
Paper width	: 58 + 0/- 1 mm
Paper thickness	: 65 +/- 5 μ m
Roll diameter	: ϕ 50 mm or less
Printing face	: (Outside of the roll(surface))
Recommended paper	: NIPPON PAPER TF50KS-E2C or its equivalent
Core	: ϕ 12 mm(Inner diameter), ϕ 18 mm(Outer diameter)

3. DISASSEMBLY AND REASSEMBLY

3.1 Disassembly Procedure

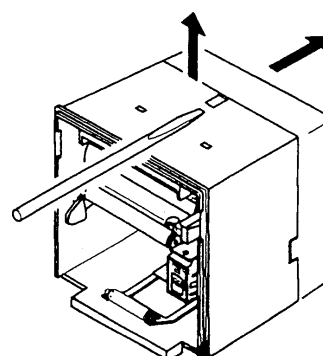
1. Remove a cover.

- (1) Open the cover.
- (2) Remove it, bending one hinge section outside.
- (3) Remove the other hinge section.



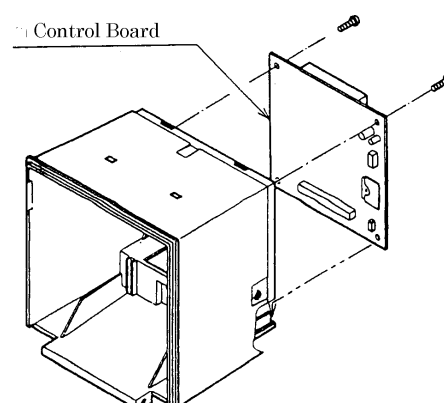
2. Remove a rear cover.

- (1) Insert a regular screwdriver into a slot located at the top(or bottom) of the rear cover.
- (2) Raising the end of the regular screwdriver, remove the rear cover.



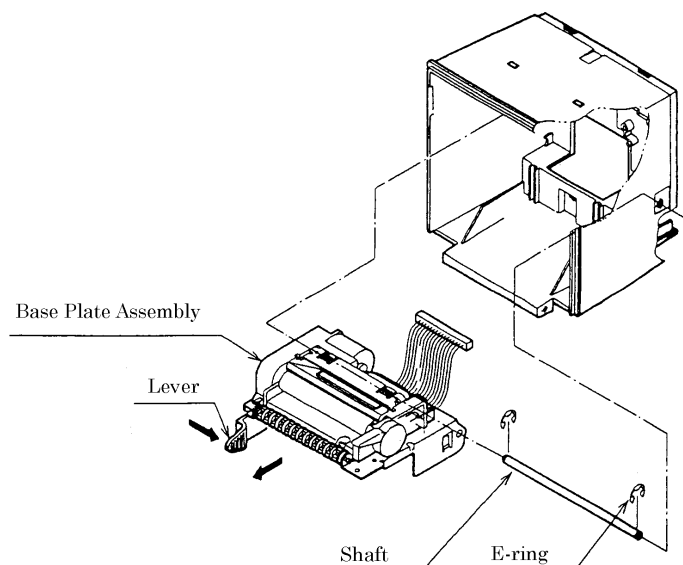
3. Remove a control board.

- (1) Using a Phillips screwdriver, remove two screws(PHT M2.6 x 8).
- (2) Disconnect a connector from the control board.



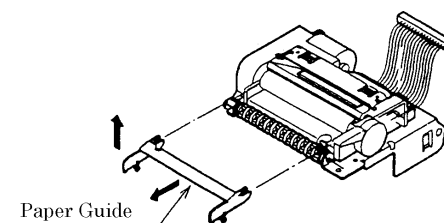
4. Remove a base plate assembly.

- (1) Remove an E-ring from a shaft.
- (2) Pull out the shaft.
- (3) Pushing a lever inside, pull out the base plate assembly to this side.



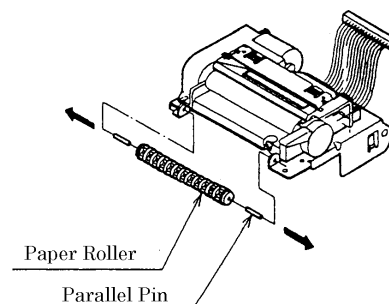
- Remove a paper guide from the base plate assembly.

- (1) Pull the paper guide to this side.
- (2) Directing this side of the paper guide upward, pull it out.



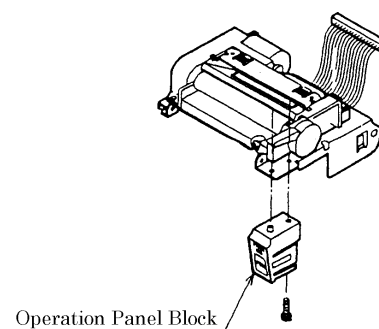
- Remove a paper roller from the base plate assembly.

- (1) Using radio pliers, etc., pull out parallel pins from the paper roller.
- (2) Remove the paper roller.

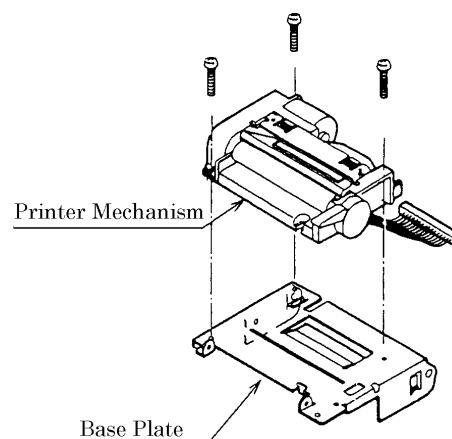


- Remove an operation panel block from a base plate.

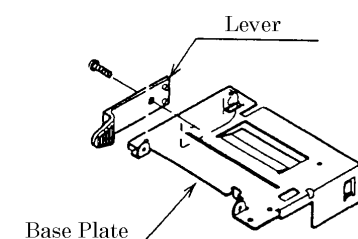
- (1) Using the Phillips screwdriver, remove screws(PHT, M2.6 x 6) used to secure the operation panel block.
- (2) Remove the operation panel block from the base plate.



- Remove the printer mechanism(LT-282) from the base plate assembly.
 - (1) Using the Phillips screwdriver, remove 3 screws(binder, M2.6 x 5) used to secure the printer mechanism.
 - (2) Remove the printer mechanism from the base plate.

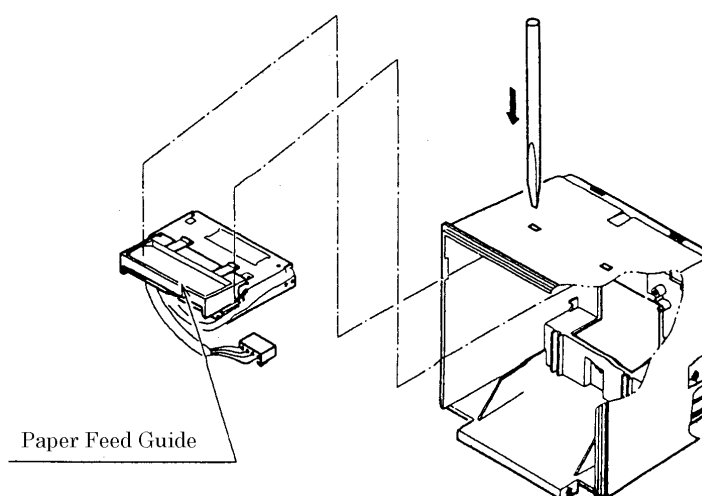


- Remove a lever from the base plate assembly.
 - (1) Using the Phillips screwdriver, remove 1 screw(PHT, M2.6 x 5) used to secure the lever.



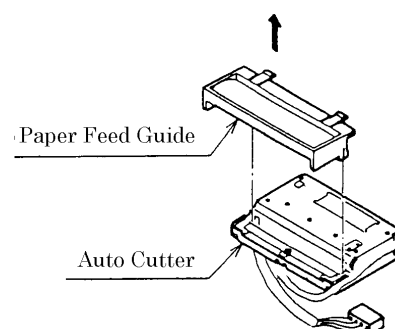
5. Remove an auto cutter assembly.

- (1) Put the regular screwdriver into two holes located at the top of the case and disengage paper feed guide jaws.
- (2) Pull out the auto cutter assembly to this side.



- Remove the paper feed guide from the auto cutter assembly.

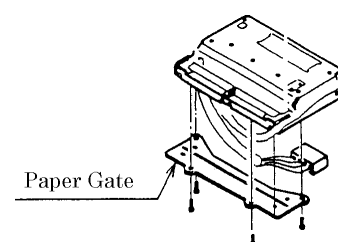
(1) Pull out the paper feed guide in an arrow-indicated direction.



- Remove a paper gate from the auto cutter assembly.

(1) Using the Phillips screwdriver, remove 4 screws(PHT, M2 x 3) used to secure the paper gate.

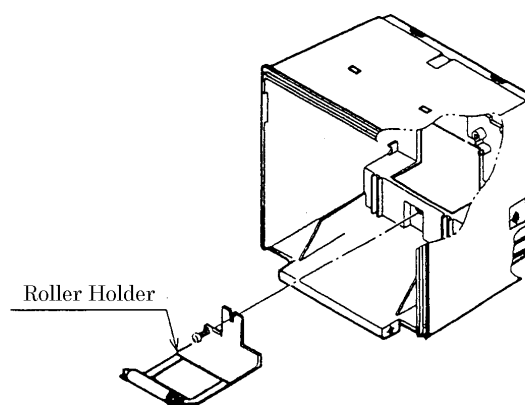
(Note) There are bosses(4 places) on the cutter side. Pay attention to them when tightening the screws at assembly.



6. Remove a roller holder.

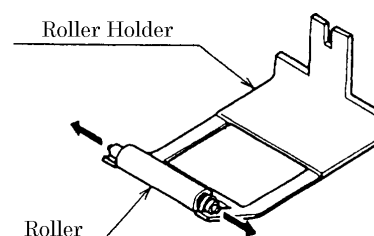
(1) Using the Phillips screwdriver, remove screws(binder, M2.6 x 6).

(2) Remove the roller holder from the case.



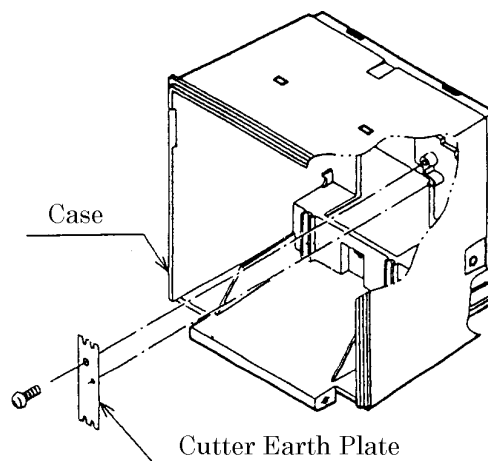
- Remove a roller from the roller holder.

(1) Expose the roller receiving section of the roller holder to the outside to remove a roller.



7. Remove a cutter earth plate.

- (1) Using the Phillips screwdriver, remove a screw(PHT, M2.6 x 6).
- (2) Remove the cutter earth plate from the case.



3.2 Reassembly Procedure

Reassemble each part in the reverse order of the disassembly procedure described in Section 3.1.

4. TROUBLESHOOTING

4.1 Troubleshooting Procedure

When a trouble occurs, confirm its phenomenon, locate a defective part in accordance with 4.2 Troubleshooting Guide, and troubleshoot as described below.

- **Phenomenon:** Find a trouble phenomenon in this column. If there are multiple phenomena, take all the corresponding items into consideration. This allows you to specify a hidden defective part.
- **Cause:** Lists as many possible causes as possible. Guess a trouble cause out of them and take its check method to specify the trouble cause.
- **Check Method:** Describes a check method to specify a trouble cause.
- **Remedy:** Troubleshoot by taking a remedy described in this column.

By troubleshooting in accordance with the above-mentioned procedure, you can troubleshoot efficiently with fewer misjudgments.

4.2 Troubleshooting Guide

Phenomenon	Cause	Check Method	Remedy
Printing failure	Faulty power supply	Check whether 5 V DC is available.	Supply 5 V/24 V DC.
No printing	Faulty mounting and connection of an interface cable	Check mounting and connection of the interface cable.	Connect the interface cable correctly.
	Faulty printer mechanism		Replace the printer mechanism unit.
Thin printing color	Faulty power supply	Check whether a 5 V/24 V DC power capacity is sufficient.	Use the power source with a sufficient capacity.
Missing dots	Foreign substance adhered to a printing head	Check the head for any adhered foreign substance.	Dip a cotton swab or soft cloth in ethyl alcohol and wipe away the foreign substance.
Badly blurred printout	Faulty power supply	Check whether a 5 V/24 V DC power capacity is sufficient.	Use the power source with a sufficient capacity.
	Contaminated thermal head	Check the thermal head for any contamination.	Dip a cotton swab or soft cloth in ethyl alcohol and wipe away the foreign substance.
Bad printing quality	Faulty printing paper	Check whether the paper meets the specifications.	Replace it with the specified paper.
Paper feed failure	Faulty connection of a motor connector	Check connection of the connector.	Connect the connector correctly.
A printing paper feed motor does not function or malfunctions.	Faulty power supply	Check whether a 5 V/24 V DC power capacity is sufficient.	Use the power source with a sufficient capacity.
	Faulty printer mechanism		Replace the printer mechanism.

Phenomenon	Cause	Check Method	Remedy
The printing paper is not fed or fed irregularly.	Paper feed failure	Check whether or not the printing paper is jamming or torn and caught in a paper path.	Eliminate unnecessary printing paper and re-set it correctly.
	Foreign substance in the gear	Check the platen gear or motor gear of the printer mechanism for any foreign substance.	Eliminate the foreign substance.
	Broken gear	Check the platen gear or motor gear of the printer mechanism for breakage.	If broken, replace the printer mechanism.
Faulty sensor Does not detect the printing paper.	Faulty paper sensor	Check the window of the paper sensor for any foreign substance.	Eliminate the foreign substance or replace the printer mechanism.
Faulty auto cutter The cutter does not function	Motor connector connection failure	Check the connector for connection.	Connect the connector properly
	Paper jam	Check for the printing paper for jamming.	Eliminate the jammed paper.
	Faulty auto cutter		Replace the auto cutter.
When the trouble still persists		Replace the control board and check whether the printer functions properly.	Replace the control board.

* For the printer mechanism LT-282 and auto cutter AC-120, see the Service Manual separately provided.

5. SERVICE PARTS LIST

The following table lists the service parts required for maintenance, and so on. The parts mounted (Surface mount parts) onto the PCBs are excluded from the service parts because it is difficult to supply them in bulk.

5.1 Parts List for Mechanism

EXPLODED VIEW

1/2

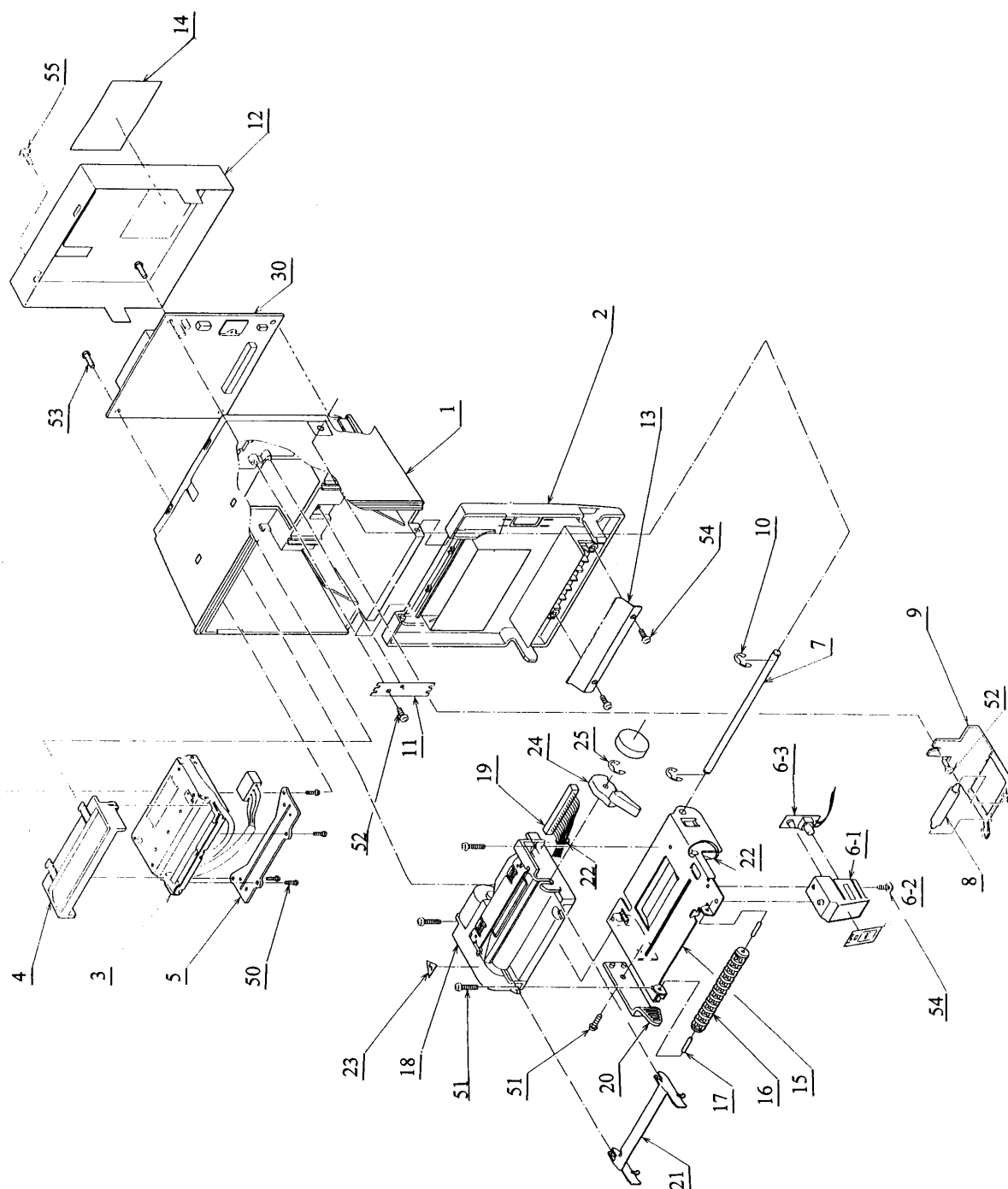
Ref. No.	Parts No.	Description	Q'ty	Remarks
1	E 6210-010	Case	1	291 only
2	E 6200-670	Front panel	1	
3	ACS-221	Auto cutter ACS-221	1	
4	E 8022-080	PF guide	1	
5	E 8022-070	Papet gate	1	
6-1	E 4019-220	OP case	1	
6-2	E 5200-310	OP sheet	1	
6-3	E 40000210	OP PCB assy	1	290 only
	E 5102-490	Switch SKHHBV	1	
	E 480-330	LED SEL2110S	1	
7	E 6233-070	Shaft	1	
8	E 6233-080	Roller	1	
9	E 6233-090	Roller holder	1	
10	E 3	E ring E3	2	
11	E 4035-810	Earth plate	1	
12	E 6310-030	Rear cover	1	
13	E 6220-590	Paper cutter	1	
14		Rating lable		
15	E 6601-350	Base plate	1	
16	E 6612-070	PF roller	1	
17	23G65662	Pin 2x10	2	291 only
18	LT282HA	Printer LT-282HA	1	
19	E 4900-420	Harness CA212-3S	1	
20	E 8029-030	Lever	1	
21	E 8022-090	Paper guide	1	
22	E 8035-010	Wire band	1	
23		Caution paper HOT		
24	E 8032-100	Head up lever	1	
25	E 2.5	E ring E 2.5	1	
30	E 70010900	PCB assy	1	
50	23G57459	Screw M2x3	4	
51	23G65751	Screw M2.6x5	4	
52	23G23179	Screw M2.6x6	2	
53	23G22839	Screw M2.6x8	2	
54	23G65930	Screw M2.6x6	1	
55	23G42966	Screw M3x6-WT	1	

2/2

Ref. No.	Parts No.	Description	Q'ty	Remarks
60	E 4900-460	Harness CA215-5	1	
61		Thermal paper		
62	E 6233-110	Mounting BRT	1	
63	23G22294	Screw M3x12	2	
65	E 8035-020	Wire cramp	1	
66		Manual		
73	29*-GI	Gift box		
74	29*-MA	Master carton		
75	29*-CU	Cushion		

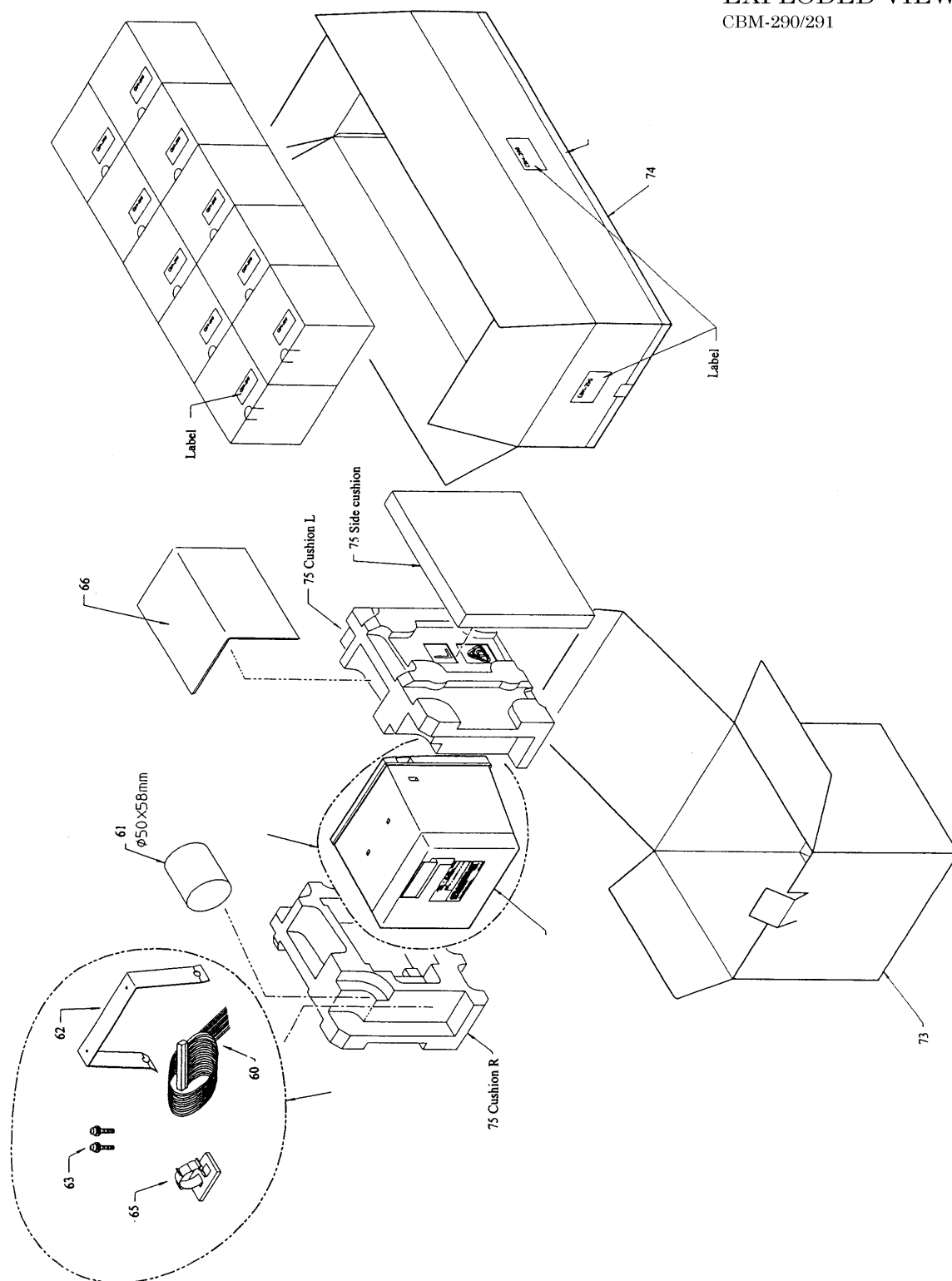
5.2 Disassembly Drawing

EXPLODED VIEW
CBM-290/291



5.3 Packing Drawing

EXPLODED VIEW CBM-290/291



5.4 Parts List for Control Board

1/2

Ref. No.	Parts No.	Description			CBM-290	CBM-291
IC 1	2020PC-03	CPU	202PC-03		1	1
IC 2	E 104-530	Gate array	CBM202LA-00		1	1
IC 3	E 107-330	RAM	TC55257DFL-55L		1	1
IC 4	E 210-070	HC-MOS	TC74HC04AF		1	1
IC 5	E 107-340	Reset IC	M51953BPF		1	1
IC 6	E 210-120	I/F IC	MAX232ACSE		1	1
TA 1	E 202-890	Tr.array	LB1650		1	1
TA 2	E 202-830	Tr. Array	TA8428K			1
Tr. 1,2	E 358-080	Transistor	RN1302		2	2
Tr. 3	E 358-090	Transistor	2SJ267-FD13		1	1
Tr. 4,5	E 359-190	Transistor	2SC2712-GR		2	2
D 1-9	E 400-600	Diode	FM4003		9	9
D 10,11	E 400-610	Diode	1SS193		2	2
R 3,31,33		Chip Re.	RK73K2A 100J		3	3
R 15		Chip Re.	RK73K2A 180J		1	1
R 16		Chip Re.	RK73K2A 220J		1	1
R 25,26		Chip Re.	RK73K2A 330J		2	2
R 5		Chip Re.	RK73K2A 620J		1	1
R 4,22,24,38		Chip Re.	RK73K2A 1KJ		4	4
R 1,2,23,32,34		Chip Re.	RK73K2A 3.3KJ		5	5
R 10		Chip Re.	RK73K2A 6.8KJ		1	1
R 6-9,12-14 17,19-21,27 28,30 35-37		Chip Re.	RK73K2A 10KJ		17	17
R 18		Chip Re.	RK73K2A 33KJ		1	1
R 11		Chip Re.	RK73K2A 30KJ		1	1
R 29		Chip Re.	RK73K2A 82K		1	1
C 1	E 2010-010	El. Cap.	16MR100MF		1	1
C 2	E 2230-210	El. Cap.	SRG35VB-100M		1	1
C 3	E 2600-160	C. Cap.	GRM40CH101J50		1	1
C 4,6,8,16	E 2600-130	C. Cap.	GRM40B102K50		4	4
C 5,7,10-15	E 2600-170	C. Cap.	GRM40F104Z50		8	8
C 17	E 2600-150	C. Cap.	GRM40B471K50		1	1

PARTS LIST

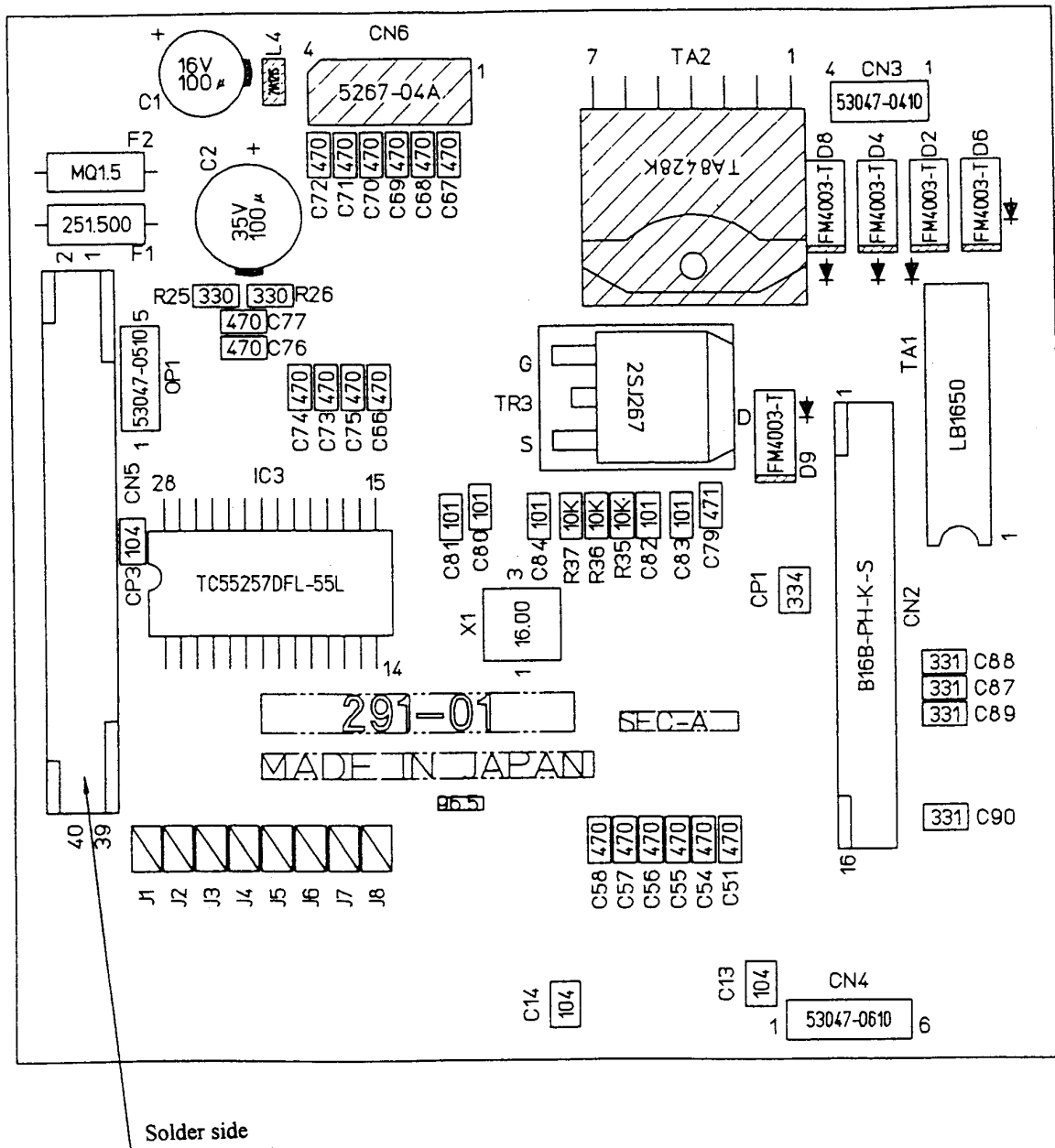
CONTROL BOARD ASSY

2/2

Ref. No.	Parts No.	Description	CBM-290	CBM-291
DS 1	E 5103-230	Dip SW. KSD08H	1	1
X 1	E 501-400	X'tal CSTCS16.00MXOC3	1	1
CN 2	E 48000780	Conn. B16BPH-K-S	1	1
CN 3	E 48000615	Conn. 53047-0410	1	1
CN 4	E 48000635	Conn. 53047-0610	1	1
CN 5	E 48000785	Conn. LY20-40P-DT1-P5	1	1
CN 6	E 48000350	Conn. 5267-04A		1
OP 1	E 48000775	Conn. 53047-0510	1	1
C 51-77	E 2600-180	C. Cap. GRM40CH470J50	27	27
C 78,80-85	E 2600-160	C. Cap. GRM40CH101J50	7	7
C 79	E 2600-150	C. Cap. GRM40B471K50	1	1
C 9,86	E 2600-170	C. Cap. GRM40F104Z50	2	2
C 87-90	E 2600-140	C. Cap. GRM40B331K50	4	4
CP 1	E 2600-190	C. Cap. GRM40F334Z25	1	1
CP 2-6	E 2600-170	C. Cap. GRM40F104Z50	5	5
L 1,4	E 4009-490	Fe. Beads BLM21A121A		2
L 2,3	E 4009-480	Fe. Beads BLM41P800S		2
F 1	E 4005-815	Fuse 251.500	1	1
F 2	E 4005-770	Fuse MQ1.5	1	1

5.5 Parts Layout Drawing

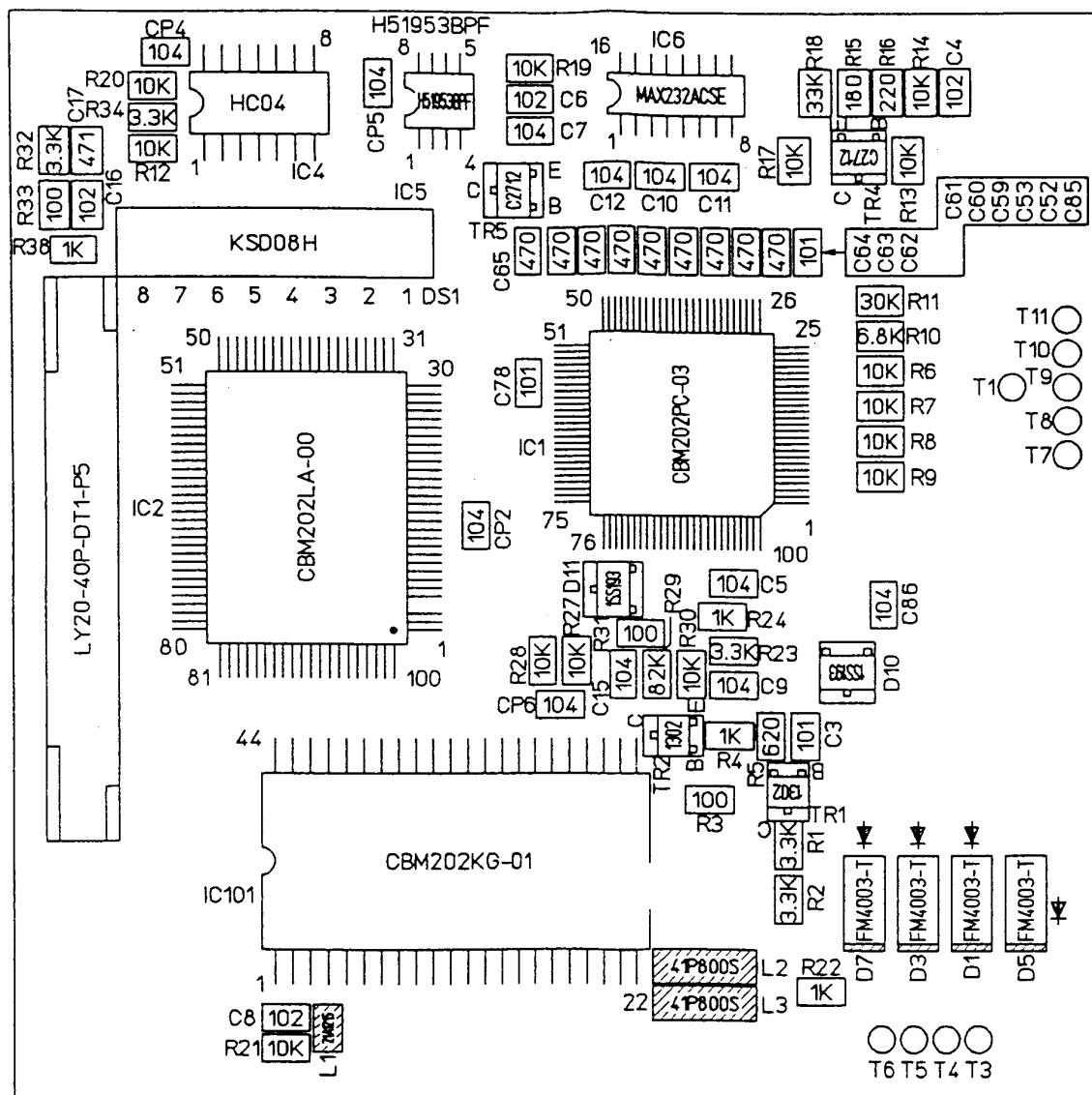
5.5.1 PCB Assy(Parts Side)



Not used:CBM290(L1-L4,TA2,CN6)

PARTS LAYOUT
CBM-290/291
PARTS SIDE

5.5.2 PCB Assy(Solder Side)



PARTS LAYOUT
CBM-290/291
SOLDER SIDE

6. DRAWINGS

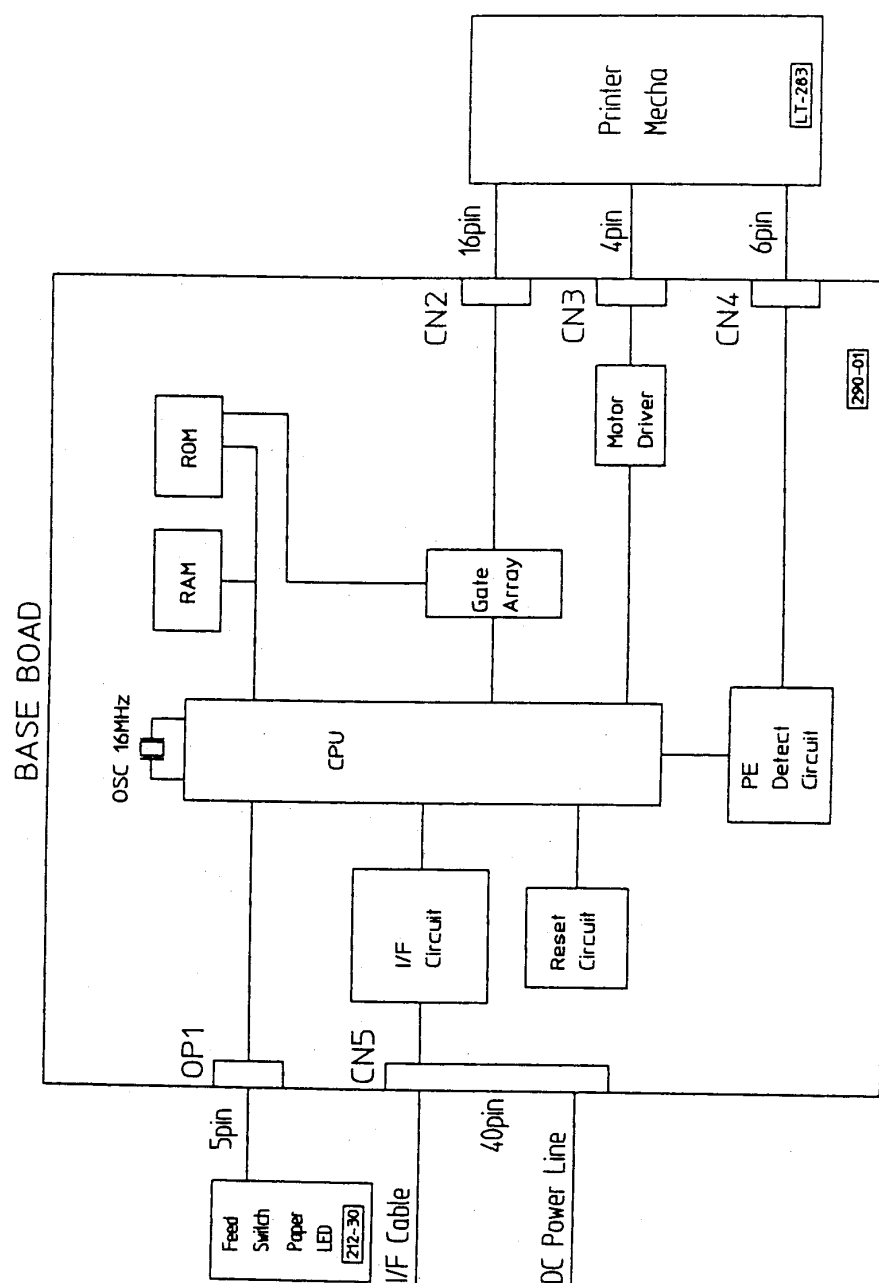
The following lists the reference drawings for maintenance, and so on.

- Block Diagram
- Circuit Diagram ----- For the serial interface, For the parallel interface

6.1 Block Diagram

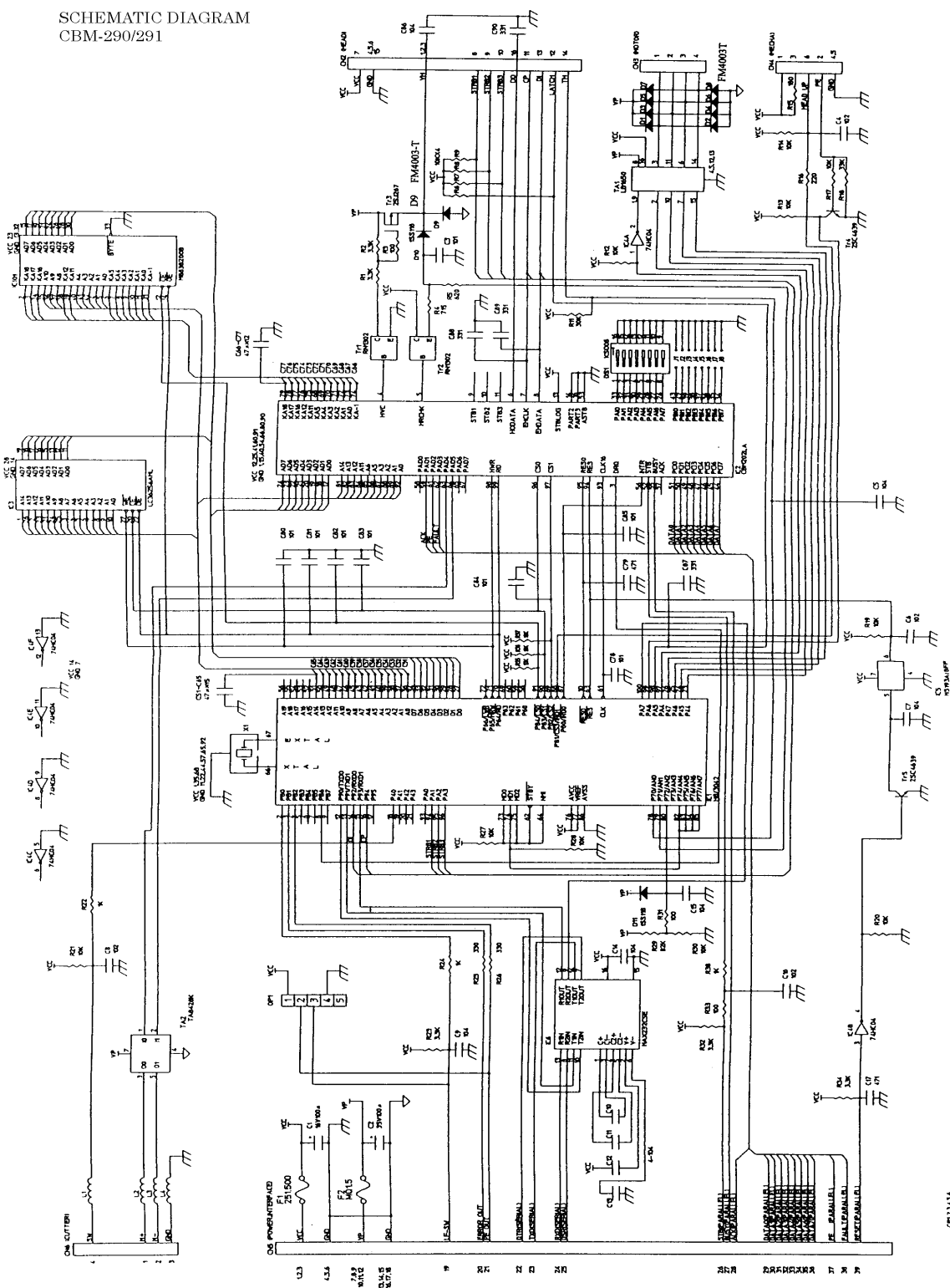
6.1.1 CBM-290(Without Auto Cutter)

CBM290 BLOCK DIAGRAM



6.2 Circuit Diagram

6.2.1 CBM-290/291

SCHEMATIC DIAGRAM
CBM-290/291

7. OUTER DIMENTION

