CITIZEN

Service Manual

LINE THERMAL PRINTER

MODEL iDP3240

Rev. 1.0 First created Feb 10th, 2000

Japan CBM Corporation

REVISION

Rev.No.	Date	Content
Rev. 1.0	Feb 10th, 2000	First created

TABLE OF CONTENTS

1. MECHANISMS AND OPERATING PRINCIPLES

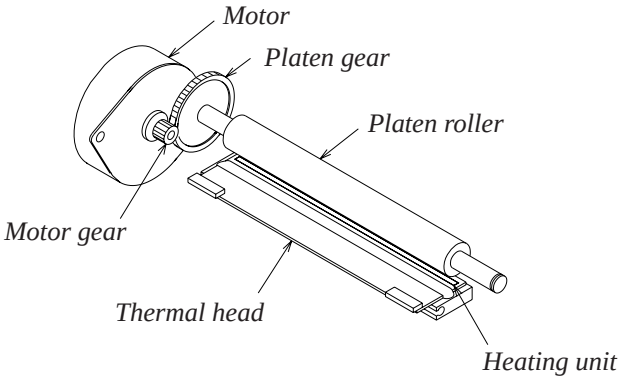
The basic mechanism of the printer and their operating principles are explained for each block as follows:

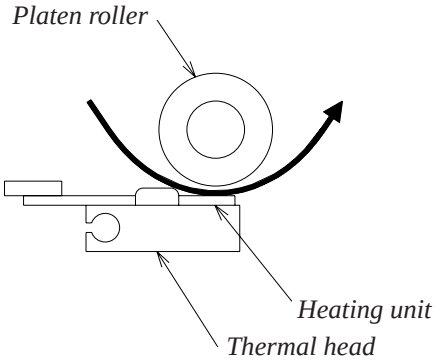
- Power transmission and mechanism for feeding recording paper
- Sensor mechanism
- Print head mechanism

1.1 Power transmission and mechanism for feeding recording paper

The driving force of the motor is transmitted from the motor gear attached to the motor shaft via the platen gear to the platen roller, and this driving force rotates the platen roller. The platen roller is pressed against the surface of the heating unit of the thermal head by wire springs located at both sides of the roller.

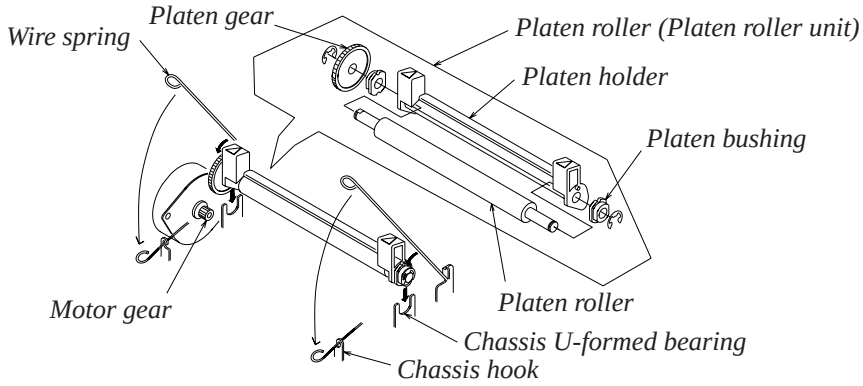
When the recording paper is inserted between the platen roller and the thermal head, the recording paper is pulled in between the platen roller and the thermal head by the rotation of the platen roller and transported to the output port in conjunction with the rotation of the platen roller.





1.2 Mechanism for attaching and detaching the platen roller

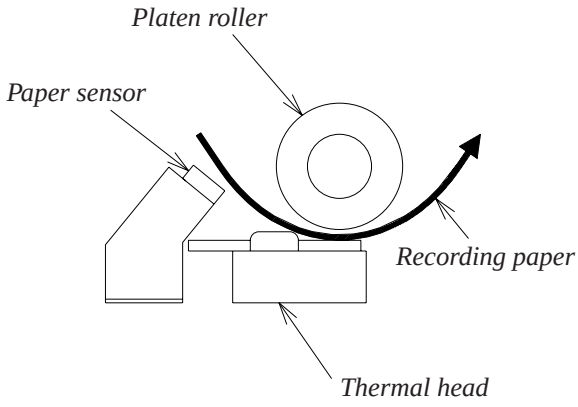
The platen roller, which is a part of the mechanism for feeding recording paper, is removable with this printer. The platen roller, which has the platen gear, platen bushings and platen holder attached, comprises a platen roller unit. When this unit is placed in the U-formed bearings of the chassis, the platen gear engages the motor gear. The wire springs, with one end anchored to the chassis, press against the platen bushings to keep the roller in contact with the thermal head. The platen roller unit can be attached or removed by hooking or unhooking the movable ends of the wire springs to or from the hooks on the chassis.



1.3 Sensor mechanism

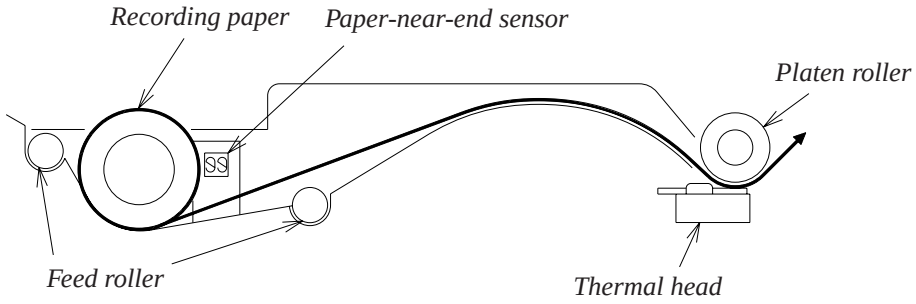
1.3.1 Paper sensor

The paper sensor is located immediately before the thermal head to detect whether recording paper is present or not. Applying electrical power to the thermal head while recording paper is not inserted could result in damage to the head or reduce the service life of it. The paper sensor is provided to help prevent this, as well as to detect whether recording paper is inserted or not in the case of auto loading.



1.3.2 Paper-near-end sensor

The paper-near-end sensor detects when the remaining amount of recording paper becomes small. When the remaining amount of recording paper decreases (about 50 cm to 2 m for specified recording paper), the outside diameter of the paper roll becomes small with its edge surface getting out of the range of the sensor. This permits the paper-near-end sensor to detect that the paper supply has become low. The amount of remaining paper differs with the thickness of the recording paper and the material of the roll core. Remaining amount cannot be adjusted.

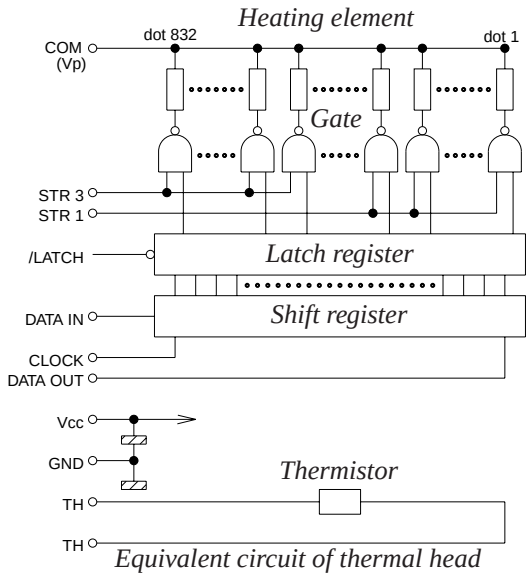


1.4 Print head mechanism

A thermal head is employed as the print head of this printer. The thermal head consists of a heat generating unit and a head driver to drive and control the thermal head.

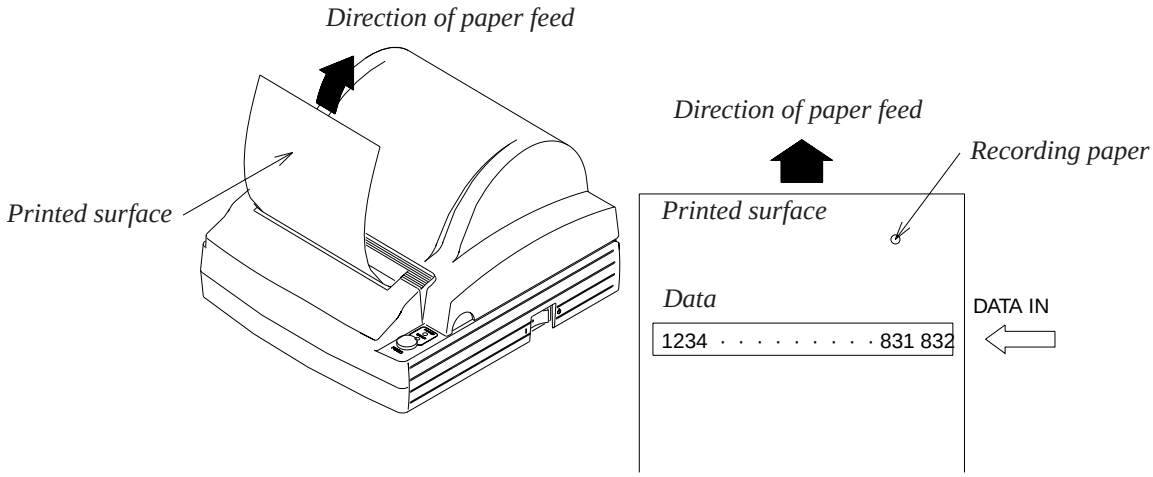
1.4.1 Outline of drive control

The serial print data which is input from DATA IN (DI) is transferred to the shift register in synchronism with CLOCK (CLK), and then stored in the latch register by LATCH (LAT) signal.
When the gates are turned ON by head electric signals (print command STR1 to 6), power is applied to the heating elements which correspond to the print data stored, enabling the data to be printed on thermal paper by the heat.



1.4.2 Print data and print position

The 832-bit print data numbered 1 to 832 and transferred by DATA IN (DI) are printed at the positions indicated in the following diagram.



2. DISASSEMBLING AND ASSEMBLING METHODS

The following precautions should be adhered to at the time of maintenance.

(1) Do not disassemble, assemble or adjust the printer if it is operating satisfactorily. In particular, do not carelessly loosen the screws holding various parts in place.
(2) Following inspection, perform a check to ensure that everything is in order before turning ON the power.
(3) Never allow the printer to print without paper placed in it.
(4) Check that recording paper and platen roller are placed correctly.
(5) When servicing, be sure not to leave used parts or screws, etc. inside the printer.
(6) When handling the thermal head, do not wear gloves, etc. likely to generate static electricity.
(7) When disassembling or assembling, inspect cords and boards for damage and be sure not to route cords in unreasonable fashion or fasten them in unreasonable positions.

2.1 Required tools

- Philips and flat-end screwdrivers #1, #2.
- A pair of tweezers
- A pair of suitable pliers

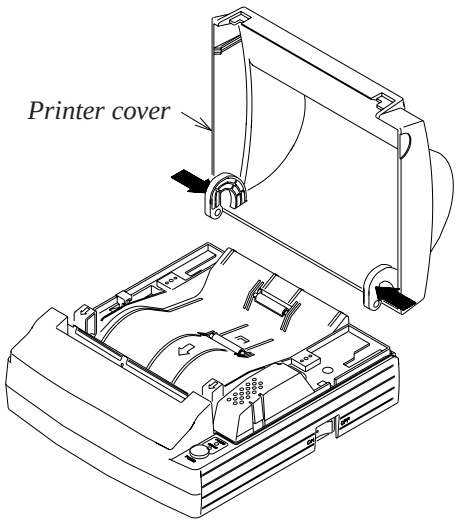
2.2 Disassembling procedure

2.2.1 Before starting disassembling:

(1) Remove the paper roll from the printer.
(2) Disconnect the AC adapter and the cable connected on the back of the printer from the respective connectors.

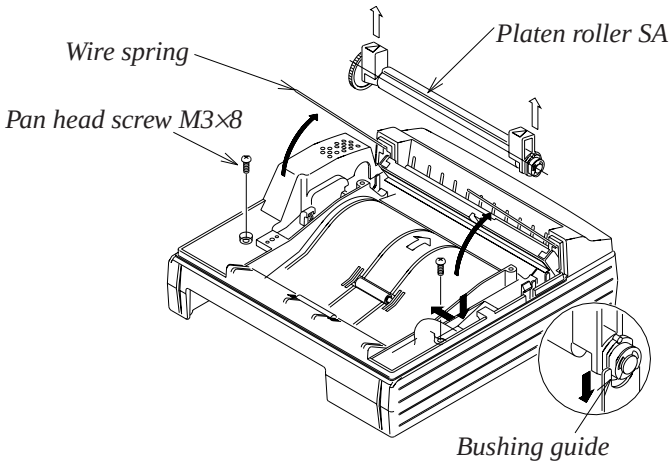
2.2.2 Remove the printer cover:

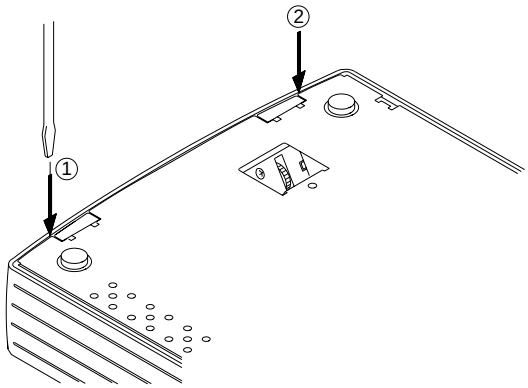
(1) Placing your finger in the small hollow on each side of the printer cover, open it upward.
(2) Pushing the cover hinges inwards, remove the printer cover from the upper cover.



2.2.3 Remove the top cover:

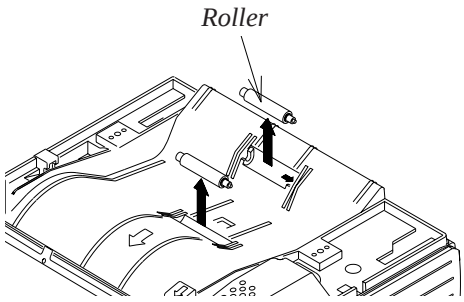
(1) Disengage the wire springs from the hooks on the top cover, and then remove the platen roller SA.
(2) Remove screws M3×8 (three locations).
(3) Placing the printer upside down, insert a flat-end screwdrive into the gap between the case and chassis near the locations indicated by the 2 arrows ① ②, to disengage the claws holding the chassis and the case.
(4) Return the printer to its normal position. While being careful not to damage the wire springs, slowly lift out the top cover.





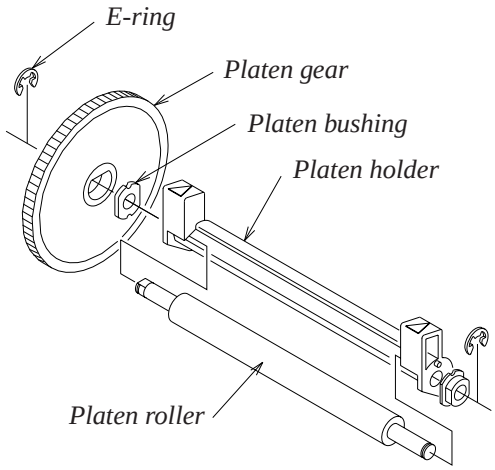
2.2.4 Remove rollers from the top cover:

(1) Remove the 2 rollers, each by bending the roller axis holding part outwards.



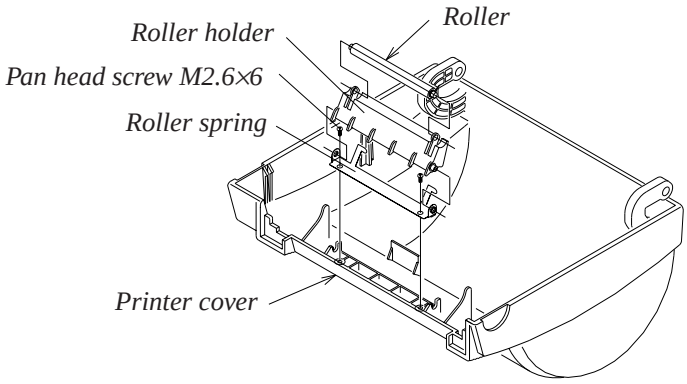
2.2.5 Disassemble the platen roller SA:

(1) Remove the E-rings, platen gear, and platen bushings.
(When assembling, the notches in the platen bushings should mesh with the protrusions of the platen holder sides.)
(2) Remove the platen roller by first disengaging its end with no D-cut and then D-cut end from the platen holder.



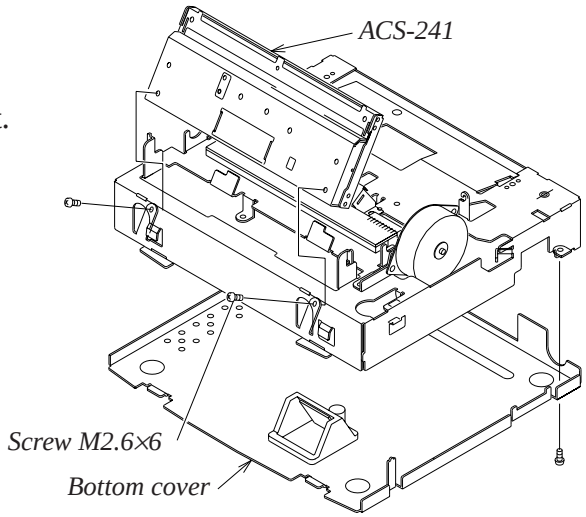
2.2.6 Remove the pressure roller:

(1) Remove the 2 M2.6×6 Screws from the printer cover.
(2) Bend the roller spring to remove it from the roller holder.
(3) Bend the roller holder's bearing section to remove the roller.



2.2.7 Remove the bottom cover:

(1) Remove the 2 M3×8 screws located in the lower part of the bottom cover.
(2) Lifting the back of the bottom cover, remove it.

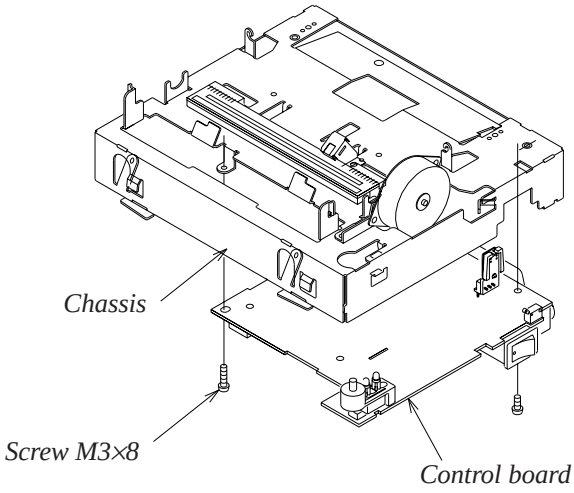


2.2.8 Remove the Auto Cutter ACS-241 from the chassis:

(1) Disconnect the connector for the cutter connected to the control board.
(2) Remove the 2 M2.6×6 screws and lift the ACS-241 upwards to remove.

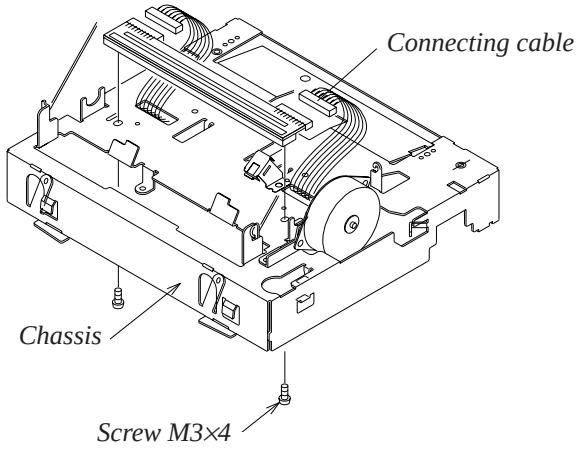
2.2.9 Remove the control board from the chassis:

(1) Remove all connecting cables on the board.
(2) Remove the 3 M3×8 screws.
(3) While taking special care not to deform or damage the paper-near-end sensor and power switch, etc, lift the chassis straight up.



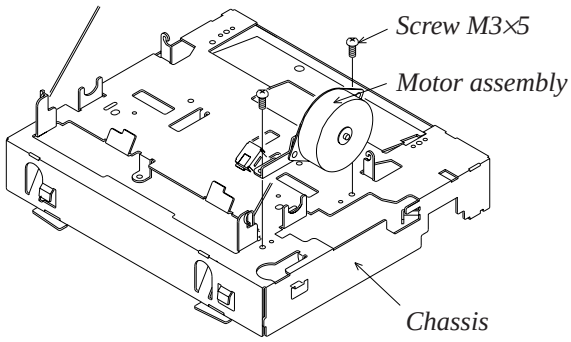
2.2.10 Remove the thermal head from the chassis:

(1) Remove the 2 M3×4 screws holding the head from the underside of the chassis.
(2) Detach the cable on the underside of the chassis from hooks.
(3) Remove the 2 connecting cables from the head.



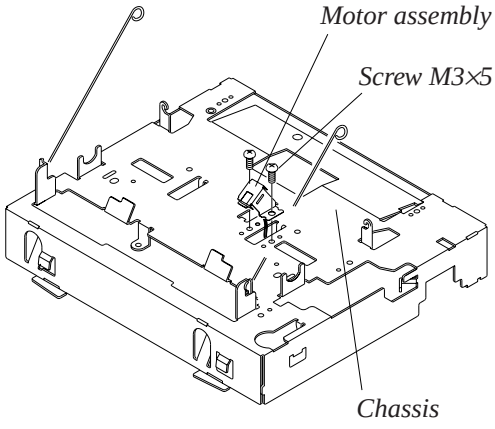
2.2.11 Remove the motor assembly from the chassis:

(1) Remove the 2 M3×5 screws from the chassis.
(2) While playing attention to its cable, remove the motor.



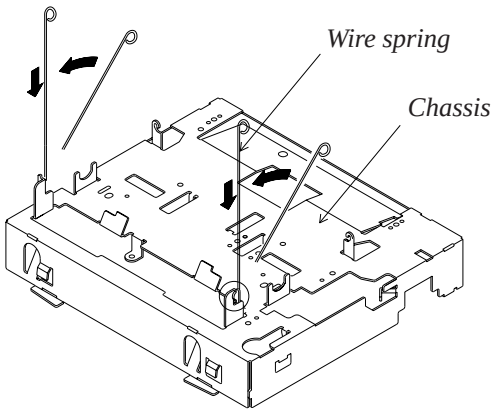
2.2.12 Remove the paper-end sensor SA:

(1) Remove the 2 M3×5 screws from the chassis.
(1) Remove the paper-end sensor SA.



2.2.13 Remove the wire springs from the chassis:

(1) Raise the wire springs until vertical, then push them down (with care not to deform them) to remove.



Note: Assemble all parts by following the disassembling procedure in reverse order.

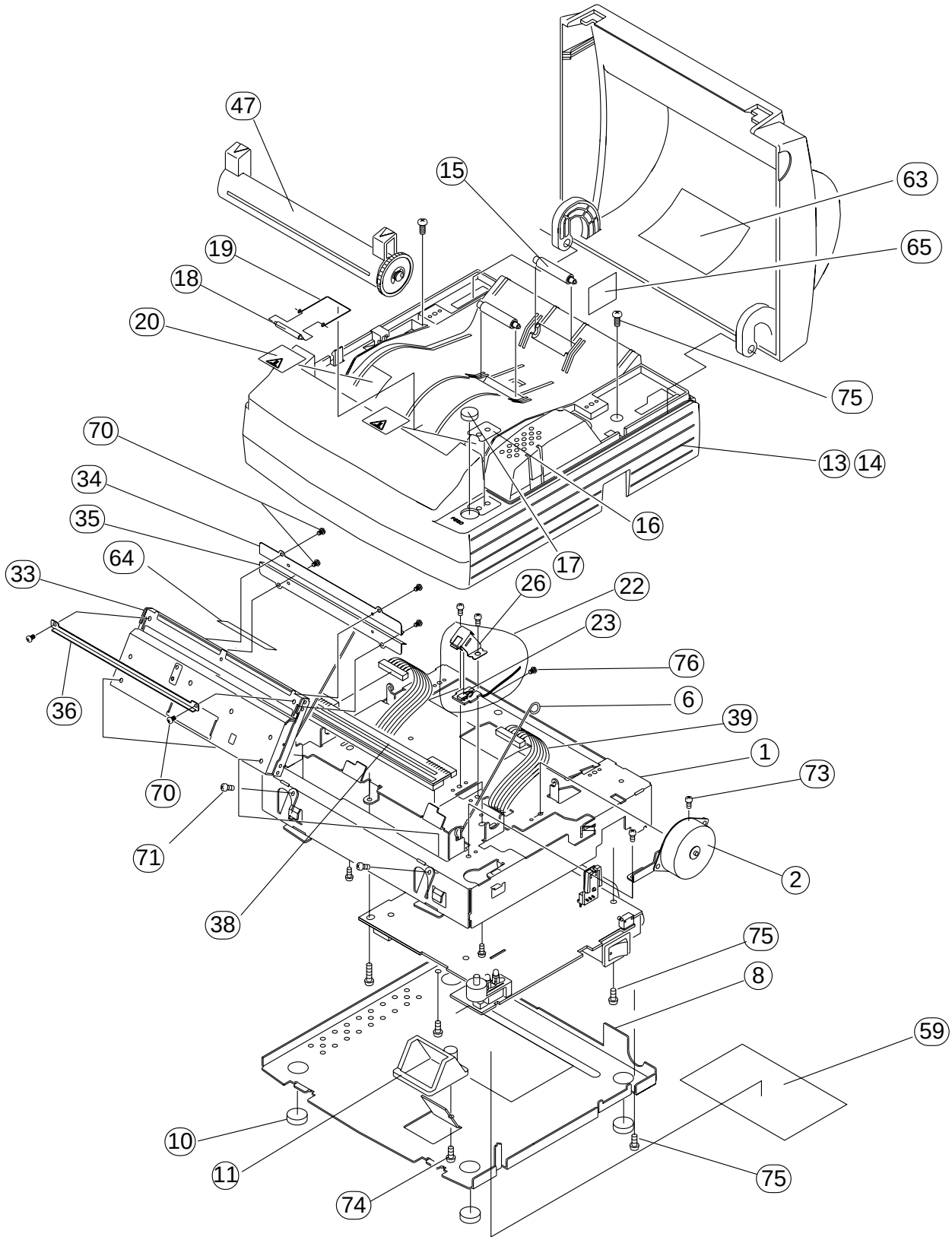
3. MECHANICAL SERVICE PARTS LIST

3.1 Parts List

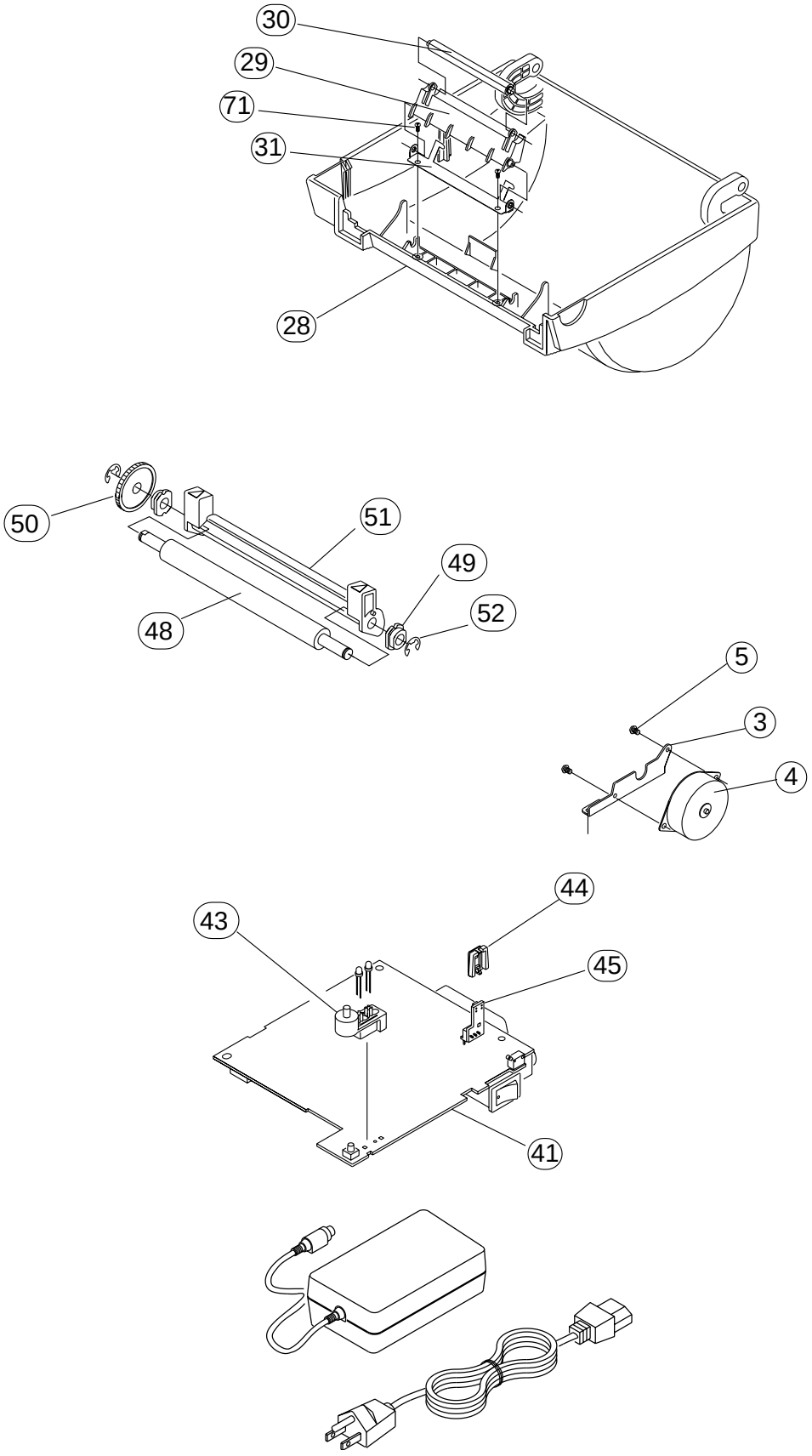
Ref. No.	Parts No.	Description	Q'ty	Remarks
			3240	
1	E4002-620	CHASSIS	1	
2	E8510-050	MOTOR Assy	1	
3	E8010-380	MOTOR BK	(1)	
4	E8017-110	MOTOR (SMB40-4850-D)	(1)	
5	23G 75069	SCREW,PH,M3 × 5	(2)	
6	E6601-430	WIRE SP	2	
8	E620 20430	BOTTOM COVER (R)	1	SERIAL
	E620 20440	BOTTOM COVER (P)		PARALLEL
10	E6302-370	RUBBER FOOT (ZUREN ZFK)	4	
11	E6601-330	FINGER GARD	1	
13	E66201-110	TOP COVER Assy	1	
14	E66201-100	TOP COVER	(1)	
15	E6612-050	ROLLER	(2)	
16	E5200-250	OP SHEET	(1)	
17	E5049-030	CAP	(1)	
18	E6101-150	INSERT ROLLER	(1)	
19	23G75514	INSERT ROLLER SP	(1)	
20	E6101-170	INSERTER	(2)	
22	E40000360	PE PCB Assy	1	
23	E40000370	PE PCB	(1)	
24	E4900-670	CODE Assy-CA3 (3240)	(1)	
25	E391-150	PHOTOINTERRUPTER (GP2S40)	(1)	
26	E4000390	PE PCB HOLDER	1	
27	E62040605	PRINTER COVER Assy	1	
28	E62040600	PRINTER COVER	1	
29	E8031-100	ROLLER HOLDER	1	
30	E8031-110	ROLLER	1	
31	E8031-120	ROLLER SPRING	1	
33	ACS-241-FM	ACS-241	1	
34	E8010-390	MOUTH PLATE R	1	
35	E8010-400	MOUTH PLATE F	1	
36	E6220-680	TEAR BAR	1	
38		THERMAL HEAD (KF2004-GC10C)	1	
39	E4900-660	HEAD CABLE Assy	1	
41	E77001-510	MAIN PCB Assy R-JPN	(1)	SERIAL
	E77001-511	MAIN PCB Assy R-USA	(1)	SERIAL
	E77001-520	MAIN PCB Assy R-EUR	(1)	SERIAL
	E77001-525	MAIN PCB Assy P-JPN	(1)	PARALLEL
	E77001-530	MAIN PCB Assy P-USA/EUR	(1)	PARALLEL
43	E5071-140	LED KEY TOP	(1)	
44	E5110-530	PE SENSOR COVER	(1)	
45	E40000380	PE Assy	(1)	
47	E8040-640	PLATEN ROLLER Assy	1	

Ref. No.	Parts No.	Description	Q'ty	Remarks
			3240	
48		PLATEN	(1)	
49		PLATEN BUSHING	(2)	
50		PLATEN GEAR	(1)	
51		PLATEN HOLDER	(1)	
52		E-RING No.4	(2)	
54		AC ADAPTER 31AD	1	
55	E6100-735	AC CORD SET-1 (JPN)	(1)	
	E6100-730	AC CORD SET-2 (USA)	(1)	
	E6100-765	AC CORD SET-3 (EUR)	(1)	
	E5103-560	Switching plug KPR-25-B		
59		Rating plate JPN	(1)	
		Rating plate USA	(1)	
		Rating plate EUR	(1)	
63		PAPER SET LABEL	1	
64		CAUTION DON'T TOUCH 3	(1)	
65		CAUTION DRAWER	(1)	
70		SCREW, No.0, PHT (ST) (#1), M2 × 6	6	
71		SCREW, PHT (ST), M2.6 × 6	2	
72		SCREW, PHT (BT), M2.6 × 6	2	
73		SCREW, PHT (ST), M3 × 5	2	
74		SCREW, PHT (BT), M3 × 6	1	
75		SCREW, PHT (ST), M3 × 8	7	
76		SCREW, PHT (ST, EXT, TW), M3 × 6	1	

3.2 Exploded View 1



3.2 Exploded View 2



4 iDP3240 CIRCUIT DIAGRAMS

4.1 Parts List for Control PCB Assy

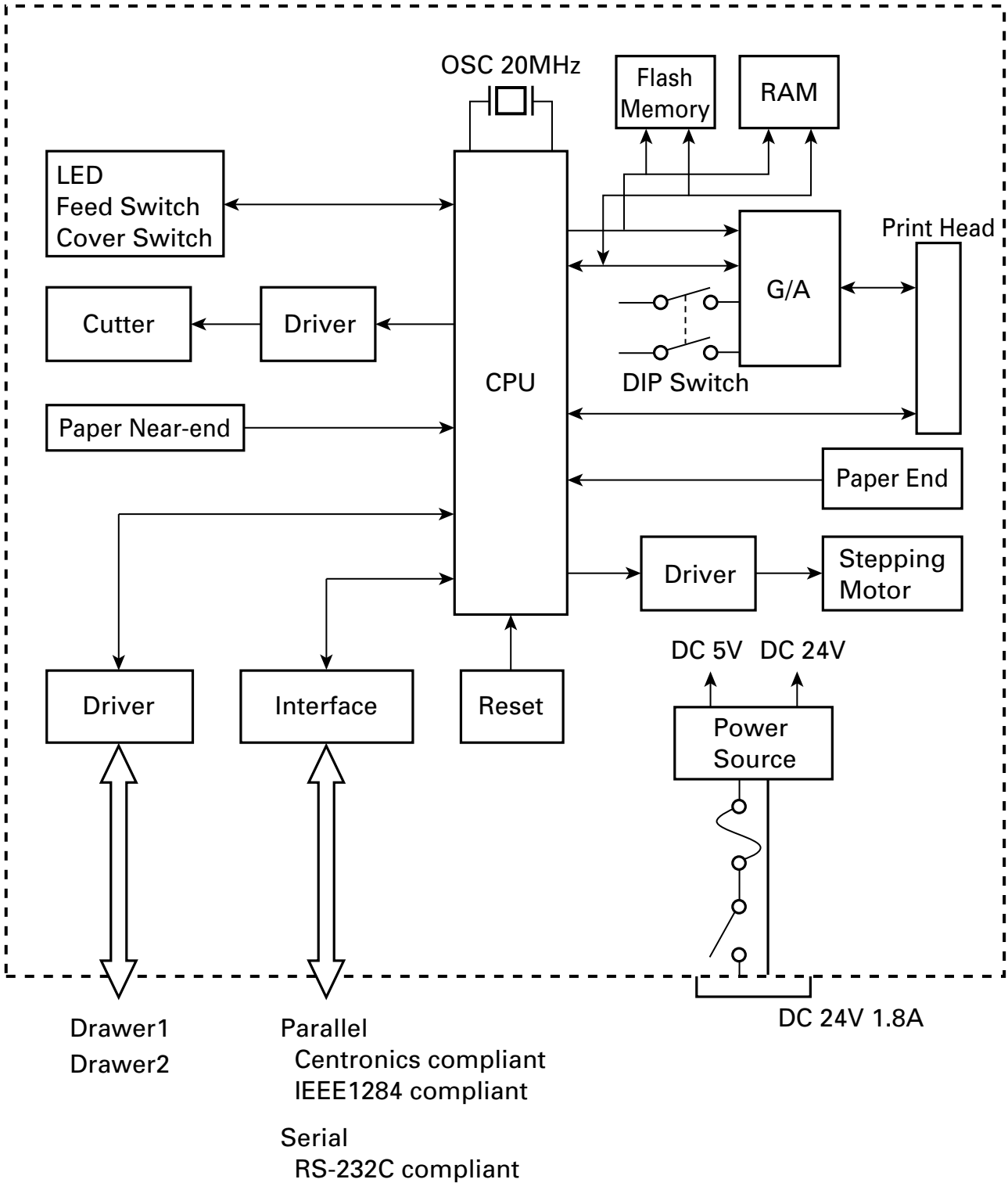
Ref. No.		Parts No.	Description	Q'ty		Remarks
R	P			R	P	
IC1	IC1		CPU	1	1	
IC2	IC2		GATE ARRAY	1	1	
IC3	IC3		FLASH-ROM	1	1	4M product
IC4	IC4		RAM	1	1	
IC5	IC5		DC/DC CONVERTER	1	1	
IC6	IC6		RESET IC	1	1	
IC7,8			INTERFACE	2		
	IC7,8		H-CMOS		2	
	IC9		H-CMOS		1	
IC101	IC101		KANJI ROM	1	1	Only mounted for JPN
TA1	TA1		TRANSISTOR ARRAY	1	1	L-angle product
TA2	TA2		TRANSISTOR ARRAY	1	1	
Tr1,9,10	Tr1,9,10		TRANSISTOR	3	3	
Tr2	Tr2		TRANSISTOR	1	1	
Tr3,4,8	Tr3,4,8		TRANSISTOR	3	3	
Tr5	Tr5		TRANSISTOR	1	1	
Tr6,7	Tr6,7		TRANSISTOR	2	2	
Tr11,12	Tr11,12		TRANSISTOR	2	2	
ZD1	ZD1		ZENER DIODE	1	1	
D1	D1		DIODE	1	1	
LED1	LED1		LIGHT EMITTING DIODE	1	1	
LED2	LED2		LIGHT EMITTING DIODE	1	1	

Ref. No.		Parts No.	Description	Q'ty		Remarks
R	P			R	P	
R34,39, 44,3			RESISTOR	4		
	R34,39, 44,53,3		RESISTOR		5	
R31,36,41	R31,36,41		RESISTOR	3	3	
R23			RESISTOR	1		
	R23,24		RESISTOR		2	
R24			RESISTOR	1		
R18~20, 26,30			RESISTOR	5		
	R18~20, 26,30		RESISTOR		5	
R11,12	R11,12		RESISTOR	2	2	
R1,2,16, 21,29			RESISTOR	5		
	R1,2,16, 21,29		RESISTOR		5	
R5~7,17, 22,25,27, 28,35,40, 45~50			RESISTOR	16		
	R5~7,17 22,25,27, 28,35,40, 45~50		RESISTOR		16	
R33,43	R33,43		RESISTOR	2	2	
R8,9	R8,9		RESISTOR	2	2	
R32,38,42			RESISTOR	3		
	R32,38,42		RESISTOR		3	
R15	R15		RESISTOR	1	1	
R14	R14		RESISTOR	1	1	
R52	R52		RESISTOR	1	1	
R51	R51		RESISTOR	1	1	
R4	R4		RESISTOR	1	1	
R10,13	R10,13		RESISTOR	2	2	
	RA1,2		RESISTOR ARRAY		2	

Ref. No.		Parts No.	Description	Q'ty		Remarks
R	P			R	P	
C1,2,37			CERAMIC CAPACITOR	3		
	C1,2,31		CERAMIC CAPACITOR		3	
C3	C3,30		CERAMIC CAPACITOR	1	2	
C4,5,8~11, 18,26~36, CP1,CP5~ 16			CERAMIC CAPACITOR	31		
	C4,5,8~11, 18,26, CP1~16		CERAMIC CAPACITOR		24	
C12,13, 16,106			CERAMIC CAPACITOR	4		
	C12,13, 16,28, 106		CERAMIC CAPACITOR		5	
C14,15	C14,15		CERAMIC CAPACITOR	2	2	
C17,19~25			CERAMIC CAPACITOR	8		
	C17,19~25, 27,29		CERAMIC CAPACITOR		10	
C101~105, 107,108			CERAMIC CAPACITOR	7		
	C101~105, 107,108		CERAMIC CAPACITOR		7	
C110,111 114			CERAMIC CAPACITOR	3		
	C110,111 114		CERAMIC CAPACITOR		3	
C6	C6		ELECTROLYTIC CAPACITOR	1	1	
C7	C7		ELECTROLYTIC CAPACITOR	1	1	
DS1,2	DS1,2		DIP SWITCH	2	2	
DS3,4			DIP SWITCH	2		
S1	S1		SWITCH	1	1	
S2	S2		SWITCH	1	1	
S3	S3		SWITCH	1	1	
F1	F1		FUSE	1	1	
F2	F2		FUSE	1	1	
F3	F3		FUSE	1	1	
X1	X1		OSCILLATOR	1	1	

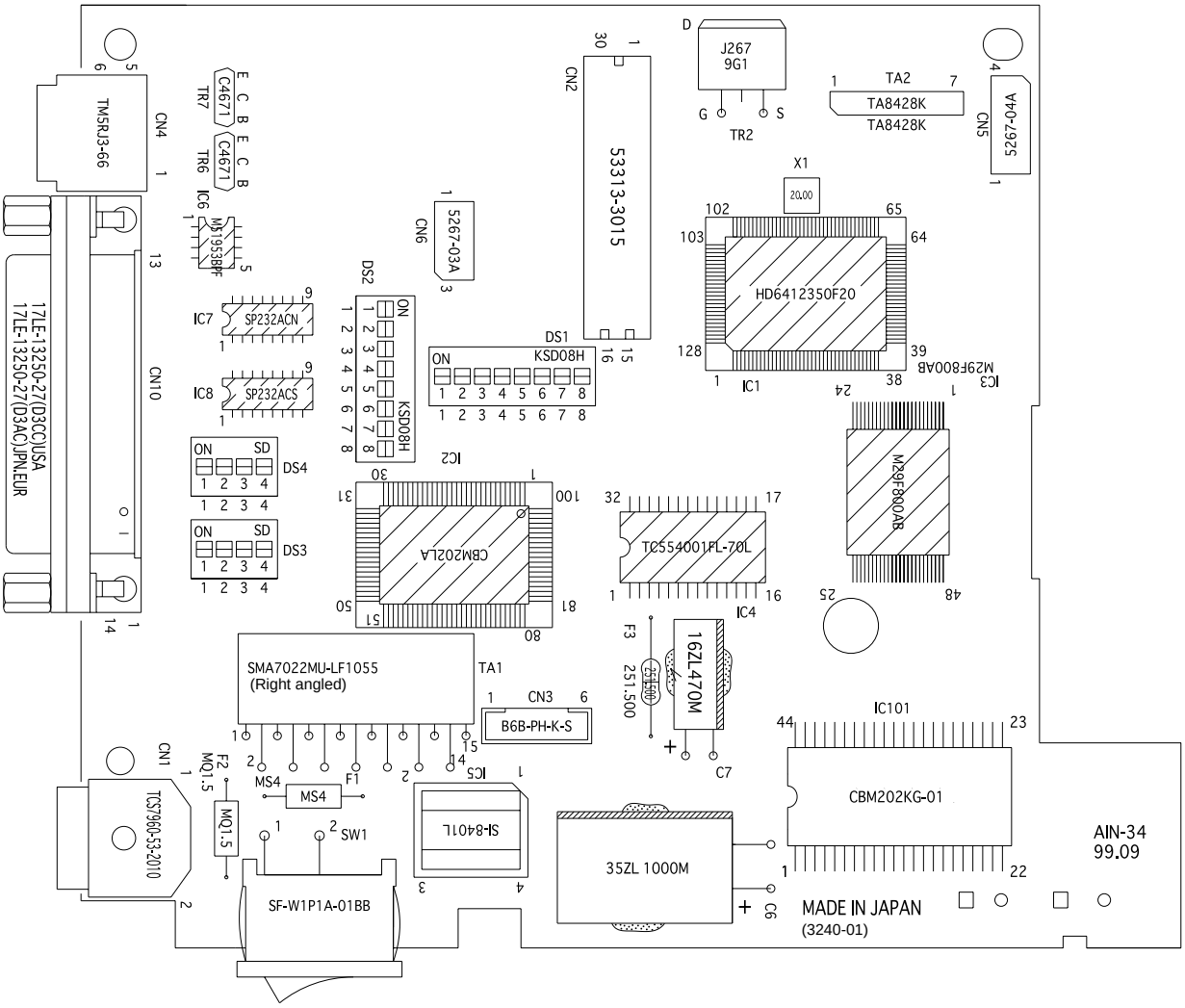
Ref. No.		Parts No.	Description	Q'ty		Remarks
R	P			R	P	
CN1	CN1		CONNECTOR	1	1	
CN2	CN2		CONNECTOR	1	1	
CN3	CN3		CONNECTOR	1	1	
CN4	CN4		CONNECTOR	1	1	
CN5	CN5		CONNECTOR	1	1	
CN6	CN6		CONNECTOR	1	1	
CN7	CN7		CONNECTOR	1	1	
CN8	CN8		CONNECTOR	1	1	
(CN9-2)	(CN9-2)		CONNECTOR	(1)	1	
CN10			CONNECTOR	1		JPN/EUR specifications only
CN10			CONNECTOR	1		USA specifications only
	CN10		CONNECTOR		1	
L1,2,4~7, 18~32,37 38,40			FERRITE BEADS	24		
	L1,2,4~7, 18~32,37 38,40		FERRITE BEADS		24	
L3,8~17, 33~36,39 41~60			FERRITE BEADS	36		
	L3,8~17, 33~36,39 41~73		FERRITE BEADS		49	
			LED KEY TOP	1	1	
			PCB	1		
			PCB		1	
(IC3)	(IC3)		ROM LABEL	1	1	

4.2 Block diagram

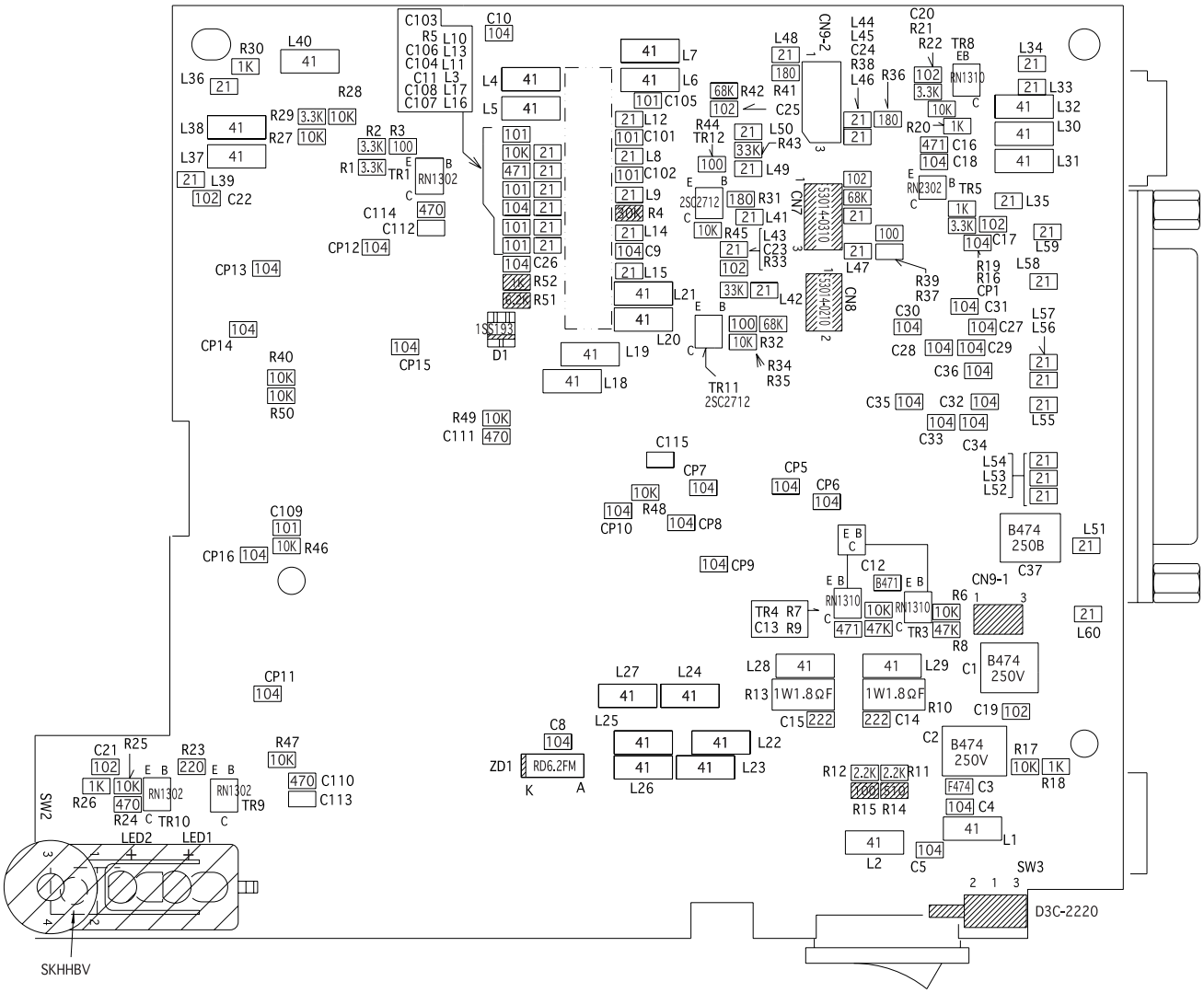


4.3 Parts Layout Drawing

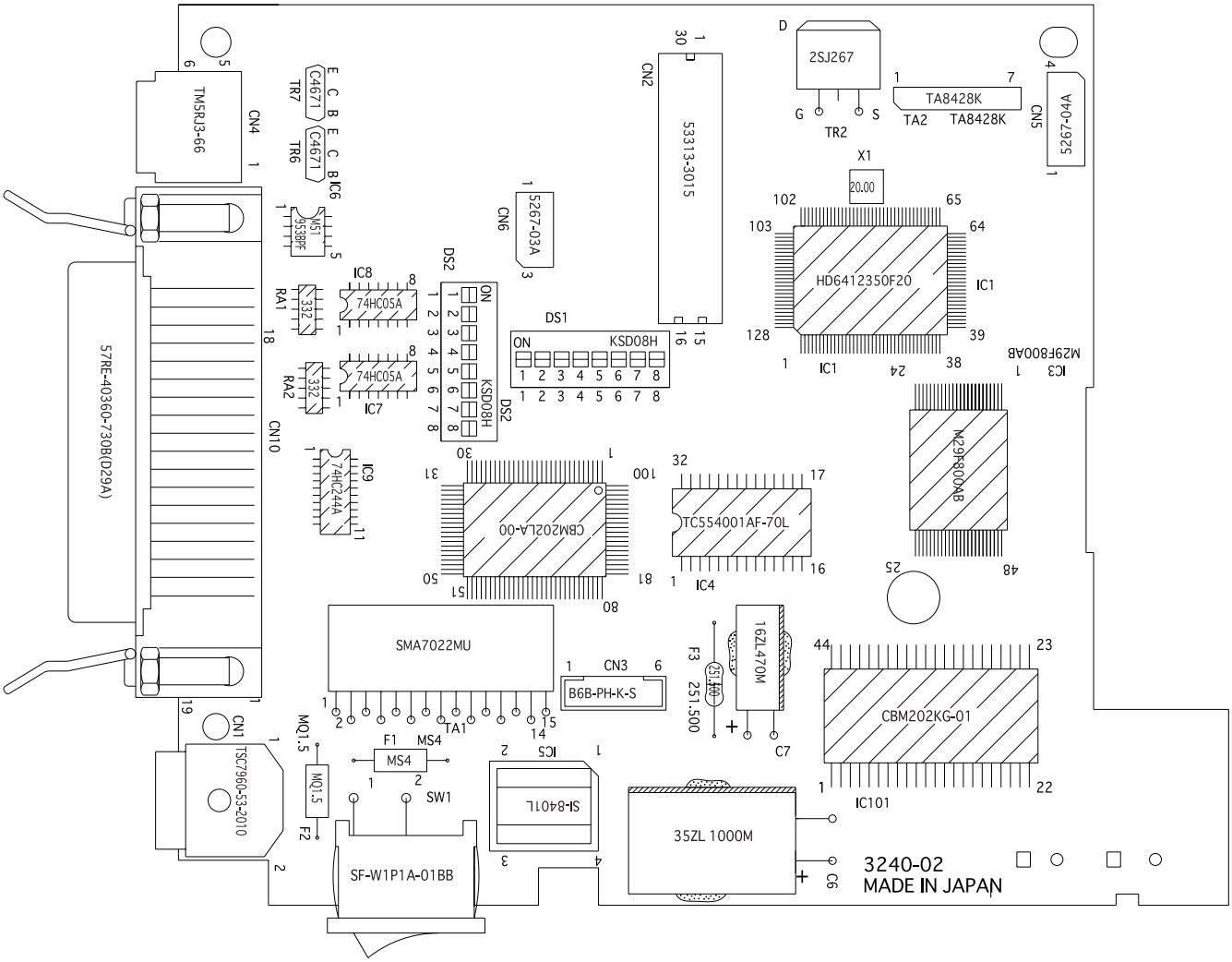
4.3.1 Control PCB Assy –Top side of the board (Serial Interface D-sub 25)



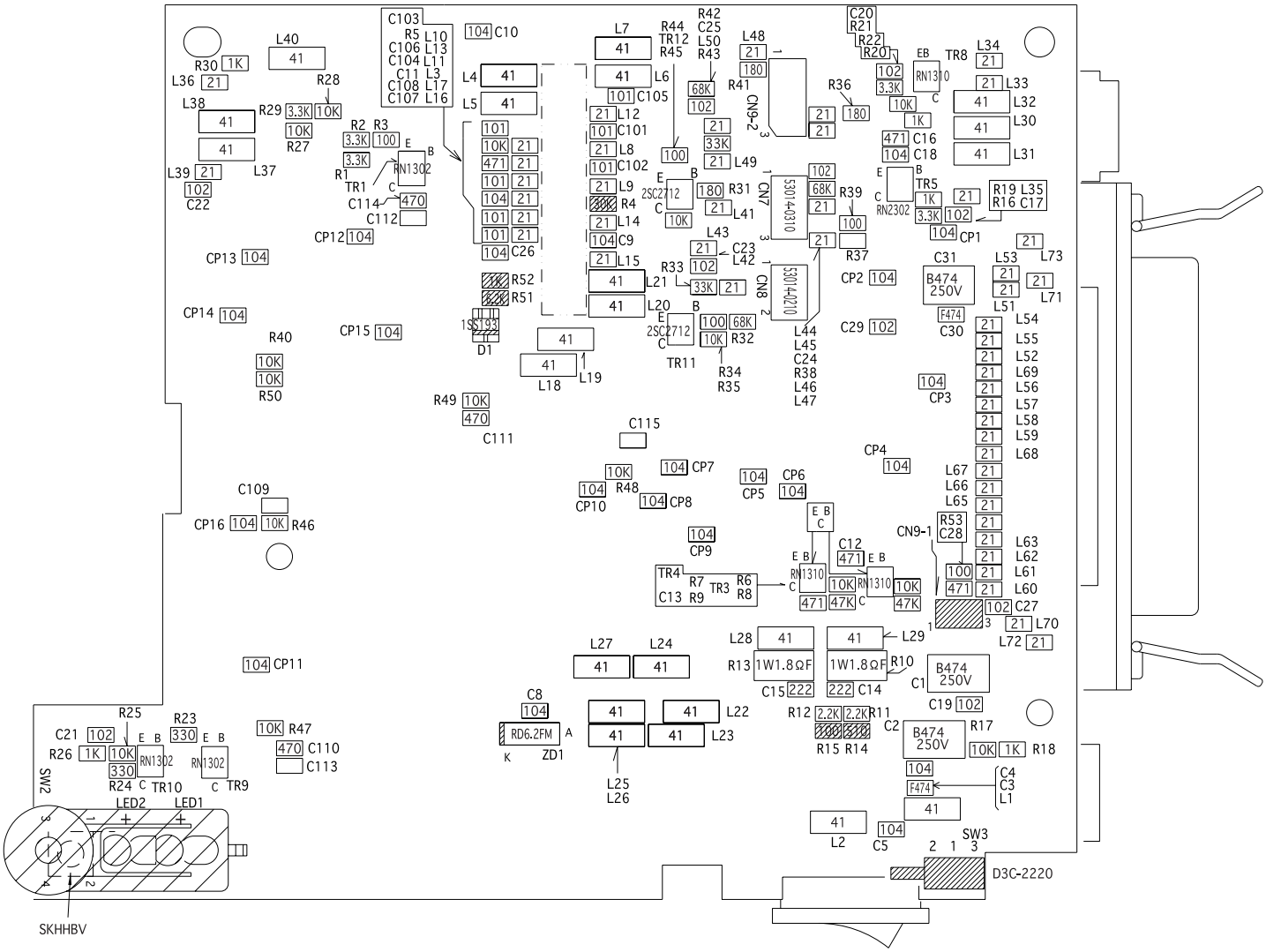
4.3.2 Control PCB Assy–Reverse side of the board



4.3.3 Control PCB Assy –Top side of the board (Parallel Interface)

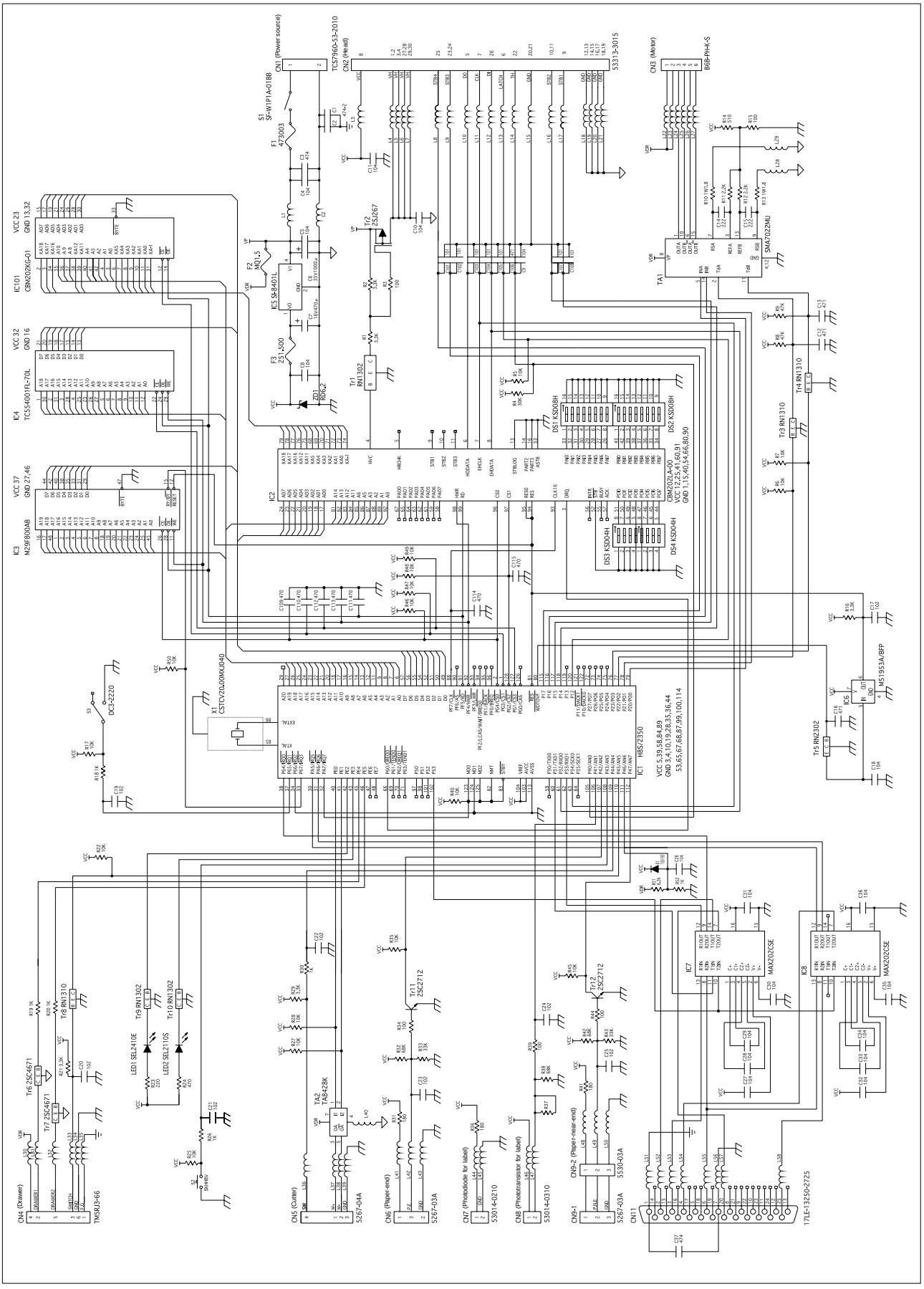


4.3.4 Control PCB Assy–Reverse side of the board

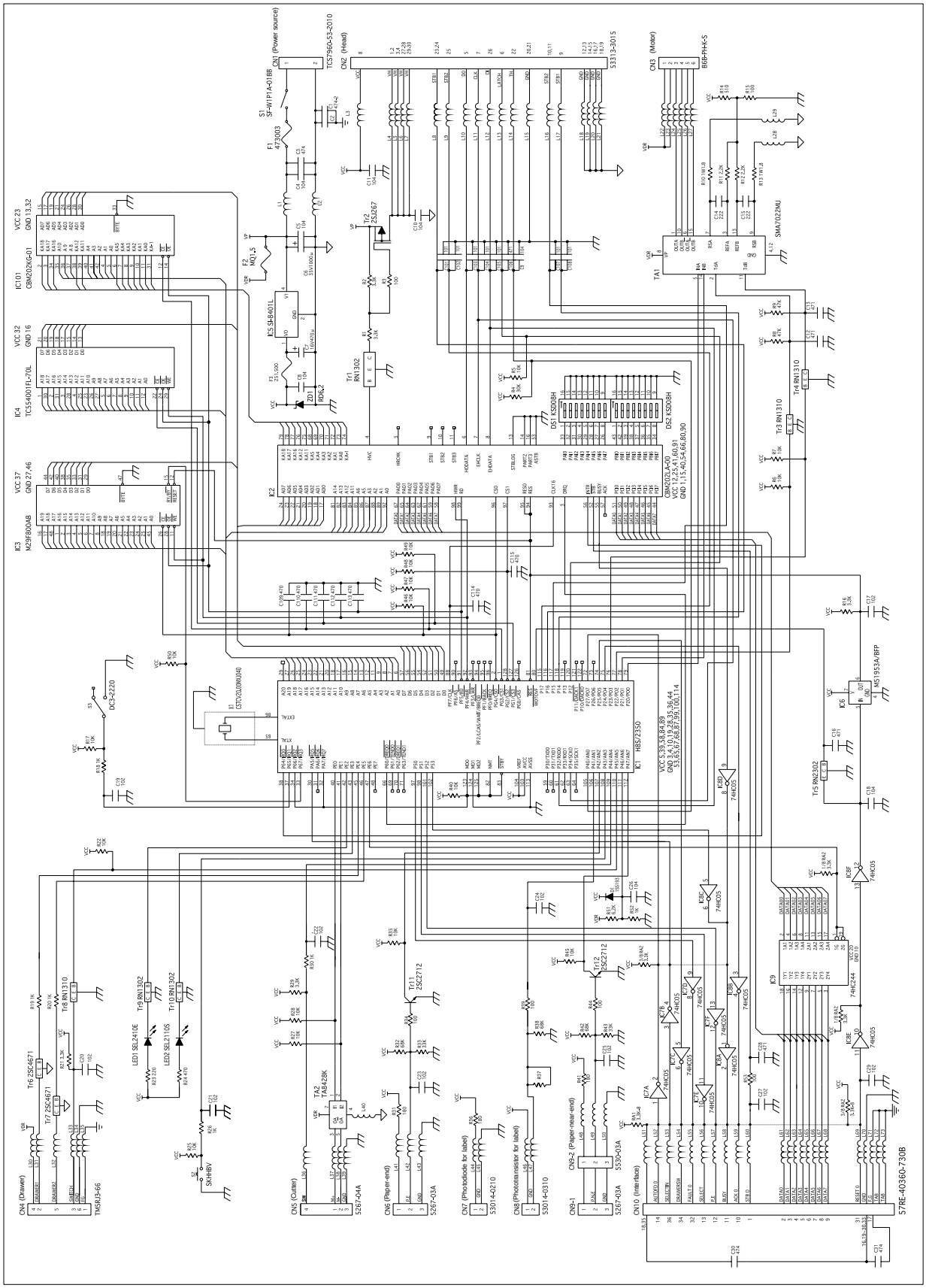


4.4 Circuit Diagram

4.4.1 Control PCB Assy (Serial Interface D-sub 25)



4.4.2 Control PCB Assy (Parallel Interface)



5. TROUBLESHOOTING

5.1 Troubleshooting Procedure

When a trouble occurs, be sure to ascertain the phenomenon and then determine where the problem is located in accordance with "(2) Repair guide". Then remedy in accordance with the specified repair method.

- Phenomenon: Use this column to determine the phenomenon of the trouble. If multiple phenomena seem to have cased the same problem, check all the relevant items. This allows you to pin down concealed defective points.
- Cause: Likely causes are listed as far as possible. Try to determine the cause of the trouble from the items in this column. Pin down the problem using the check method specified for the various items.
- Check Method: Lists the check methods for pinning down the cause of the problem.
- Repair Method: Repair the faulty location using the method(s) listed in this column.

Using the above troubleshooting procedures, you can identify, isolated and repair problems efficiently with minimum risk of misjudgement.

5.2 Repair guide

5.2.1 Faulty power supply

Phenomenon	Cause	Check Method	Repair Method
Power does not come ON. (POWER lamp does not light up.)	The AC adapter is not connected.	———	Connect the designated AC adapter.
	Fuse is blown.	Check if an out-of-spec power supply is used.	Use designated AC adapter.
		Check whether designated fuse is used.	Use designated fuse.
If a new fuse is replaced, it immediately blows.	Control board is defective.	———	Replace the control board.
	Circuit drive power supply is not normal.	Use a voltmeter to measure the circuit drive voltage.	Replace the control board.

* If the fuse blows even when the designated AC adapter is used, it is likely that the thermal head unit or control board is defective. Replace as required. Also, check the drawer and I/F cable wiring.

5.2.2 Faulty printing

Phenomenon	Cause	Check Method	Repair Method
Printer doesn't print.	Improper power supply.	Check if designated AC adapter is used.	Use designated AC adapter.
	Improper mounting of the control board.	Check the mounting of the control board and the condition of its connections.	Mount the control board correctly.
	Improper attachment of platen roller.	Check the attachment of the platen roller. Check wire springs for deformation or warp.	Attach the platen roller correctly. Replace deformed wire springs.
	Thermal head unit is defective.	———	Replace the thermal head unit.
Print is weak.	Improper power supply.	Check if designated AC adapter is used.	Use designated AC adapter.
	Paper other than recommended is used.	———	Replace with recording paper within specifications.
	Thermal head unit is defective.	———	Replace the thermal head unit.
	Supplied voltage is low.	Check the supplied voltage using a tester.	Operate using a voltage within the prescribed range.
	Foreign matter is adhering to the thermal head.	Check if foreign matter is adhering to the thermal head.	Remove foreign matter using a cotton swab or soft, lint-free cloth moistened with ethyl alcohol.
Printing smear is severe.	Improper power supply.	Check if designated AC adapter is used.	Use designated AC adapter.
	Foreign matter is adhering to the thermal head.	Check if foreign matter is adhering to the thermal head.	Remove foreign matter using a cotton swab or soft, lint-free cloth moistened with ethyl alcohol.
Printing quality is low.	Improper recording paper.	Check if recording paper matching specifications is used.	Replace with recording paper matching specifications.
	Supplied voltage is low.	Check the supplied voltage using a tester.	Operate using a voltage within the prescribed range.

5.2.3 Faulty feeding of recording paper

Phenomenon	Cause	Check Method	Repair Method
Recording paper is not fed. Or feeding is disturbed.	Improper connection of motor connector.	Check the state of the connection of the connector.	Connect the connector correctly.
	Improper power supply.	Check if designated AC adapter is used.	Use designated AC adapter.
	Improper mounting of control board.	Check the mounting of the control board and the condition of its connections.	Mount the control board correctly.
	Improper attachment of platen roller.	Check the attachment of the platen roller.	Attach the platen roller correctly.
	Improper attachment and connection of thermal head.	Check the mounting and connection of the thermal head and the control board. Check the wire springs for deformation or warp.	Connect the thermal head to the control board correctly. Replace a deformed wire springs.
	Improper feeding of recording paper.	Check if the recording paper is jammed, torn or trapped in the paper supply path.	Remove unnecessary recording paper and place paper correctly in the printer.
	Foreign matter has penetrated into the gear section.	Detach the platen roller, and check if foreign matter is trapped in the platen gear or motor gear.	Remove foreign matter.
	Gear is broken.	Detach the platen roller, or check if the platen gear or motor gear is broken.	Replace broken platen gear. If the motor gear is broken, replace the motor.
	Supplied voltage is low.	Check the supplied voltage using a tester.	Operate using a voltage within the prescribed range.
	Motor is defective.	Use a tester or an oscilloscope to measure voltage.	If the voltage is correct, replace the motor.

5.2.4 Faulty sensor

Phenomenon	Cause	Check Method	Repair Method
No detection of whether or not recording paper is present.	Defective paper sensor.	Replace the thermal head assembly and check if operation is normal. Confirm that the ERROR lamp lights when there is no recording paper.	Replace the PE sensor assembly.
	Foreign matter is caught in the sensor.	Check if foreign matter is caught in sensor.	Remove foreign matter.
No detection of paper-near-end for recording paper.	Defective paper-near-end sensor.	———	Replace the paper-near-end sensor.
	Improper connection of connector.	Check the connected condition of the connector.	Connect the connector correctly.
	Foreign matter is adhering to the sensor.	Check if foreign matter is adhering to sensor.	Remove foreign matter.

5.2.5 Faulty auto cutter

Phenomenon	Cause	Check Method	Repair Method
The cutter does not operate.	Improper connection of motor connector.	Check the connected condition of the connector.	Connect the connector correctly.
	Improper power supply.	Check if designated power supply is used.	Use designated power supply.
	Motor is defective.	Use a tester or an oscilloscope to measure supplied voltage.	If the voltage is correct, replace the motor (auto cutter).
	Improper feeding of recording paper (paper jam).	Check if the recording paper is jammed, torn and trapped in the paper supply path.	Remove unnecessary recording paper and place paper correctly in the printer.

6. OUTLINE DRAWING