CITIZEN

Service Manual

TERMINAL SLIP PRINTER

MODEL CBM-820

Rev.1.00 First created July.21st, 2000

Japan CBM Corporation

REVISION

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INTRODUCTION

This manual describes the Terminal Slip Printer CBM-820.
It is designed for use as a reference for periodic inspections and maintenance procedures to be executed by service personnel. It is not intended for the general user. Users of this manual should have a basic knowledge and understanding of the English language.

- This manual is divided into the following sections:
  - Chapter 1 Adjustments
  - Chapter 2 Parts Replacement
  - Chapter 3 Maintenance and Lubrication
  - Chapter 4 Parts List

- First edition : Apr. 1998

CHAPTER 1
ADJUSTMENTS

1

Some of the features of this printer require minor adjustments in order to ensure optimal perfomance. This chapter explains how to make these adjustments. Please make sure to check that all of these adjustments are maintained whenever the printer is serviced or parts are changed.

ADJUSTMENTS

1. Tools and measures

1. The tools displayed in Table 1-1 are required when following the instructions in Chapter 1 (Adjustments) and Chapter 3 (Parts Replacement).
2. Be sure to lock the screws back into place after completing the processes described in Chapter 1 (Adjustments) and Chapter 3 (Parts Replacement). Refer to Fig. 4-1, 4-2.

Table 1-1 Tools

Tool name	Remarks
Phillips head	M2-M4
Screwdriver	For removing the stop ring
Wire cutter	
Tweezers	
Soldering iron (20W)	
Clearance gauge (0.25mm)	
Clearance gauge (0.30mm)	
Clearance gauge (0.50mm)	
Jig or hexagon wrench (2mm)	

2. Adjusting the gap between the print head and platen

This adjustment allows for optimal print quality.

2-1 Measuring the gap between the print head and platen

1. Remove printer mechanism according to the procedure described in section 2,2.
2. Using the clearance gauge, measure the gap (backlash) between the print head and the platen.
   Notice :
   When adjusting, install the four rubber sheets in the printer mechanism.

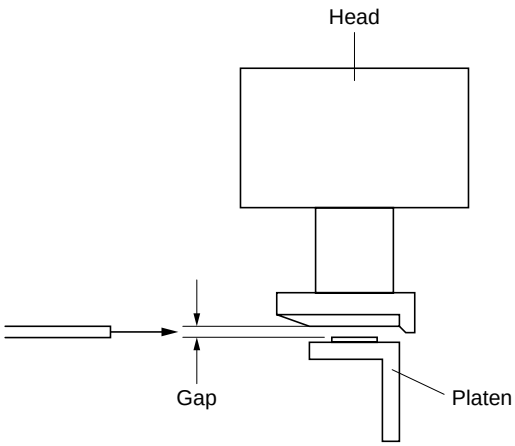


Fig. 1-1 Method for measuring the gap

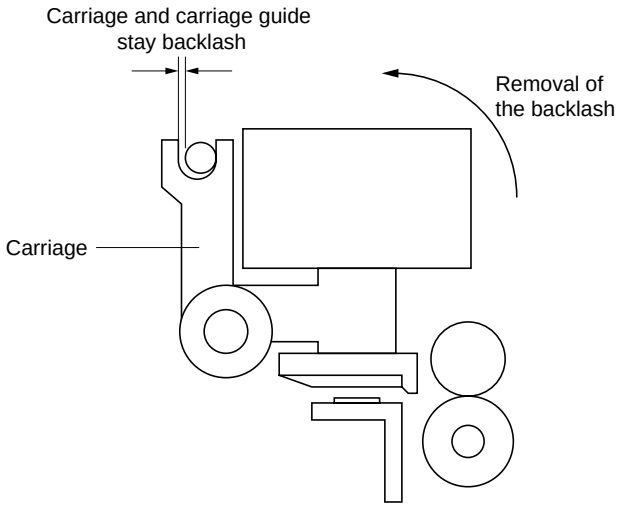


Fig. 1-2 Removal of the carriage and the carriage guide stay backlash

3. Measurements are taken within the left and right printing areas of the platen.
   Measure at 3 to 5 locations while rotating the PF roller. Be careful to prevent anything from altering the accuracy of the measurements taken and to avoid any warped areas of the gum roller.
4. The standard gap should measure between 0.25 and 0.3mm (a range from 0.2 to 35mm can be expected depending upon any variances).

2-2 Adjusting the gap between the print head and platen

Follow the instructions below if the size of the gap is not within the standard range.

1. Loosen the screws 1 (in 2 places).
2. Adjust the head gap by rotating the adjusting washer (D). If using a jig, make adjustments from above. If using a hexagon wrench, make adjustments from below.

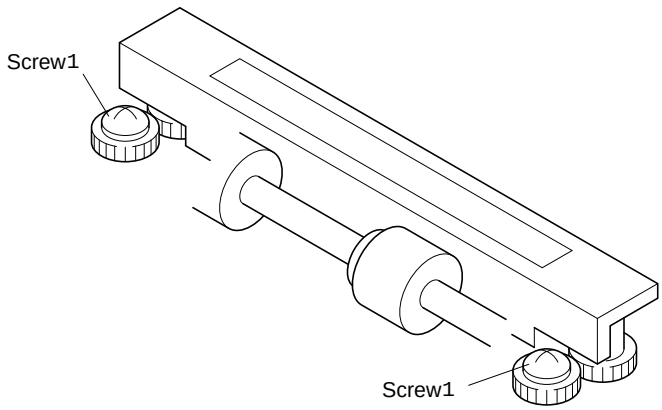


Fig. 1-3 Adjustments using a jig

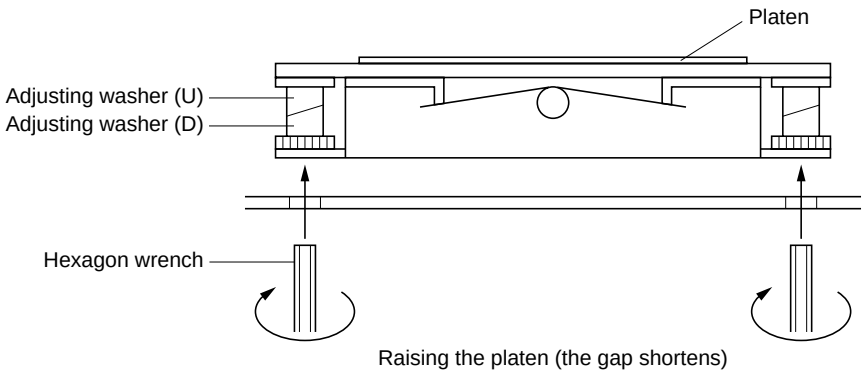


Fig. 1-4 Adjustments using a hexagon wrench

3. When the gap has been adjusted according to the instructions above, replace the screws 1.

3. Adjusting the Dot Alignment

This adjustment is made when the alignment of the print generated from left to right (outwards) does not correspond with the print generated from right to left (inwards).
The acceptable range of displacement is a pitch of 1.

3-1 Adjustment A

1. Generate a print sample to assess the range of displacement.
2. Loosen the screw of the TM sensor board
3. If the print generated from right to left is off to the right, move the TM sensor board in the direction indicated by the arrow 1. If the print is off to the left, move the TM sensor board in the direction indicated by the arrow 2.
4. Tighten the screw of the TM sensor board.
5. Generate another print sample. If the print is still out of alignment, go back to step 2 and repeat the above process.
6. If the print alignment does not improve, go to section 3-2 and go through the steps for Adjustment B.

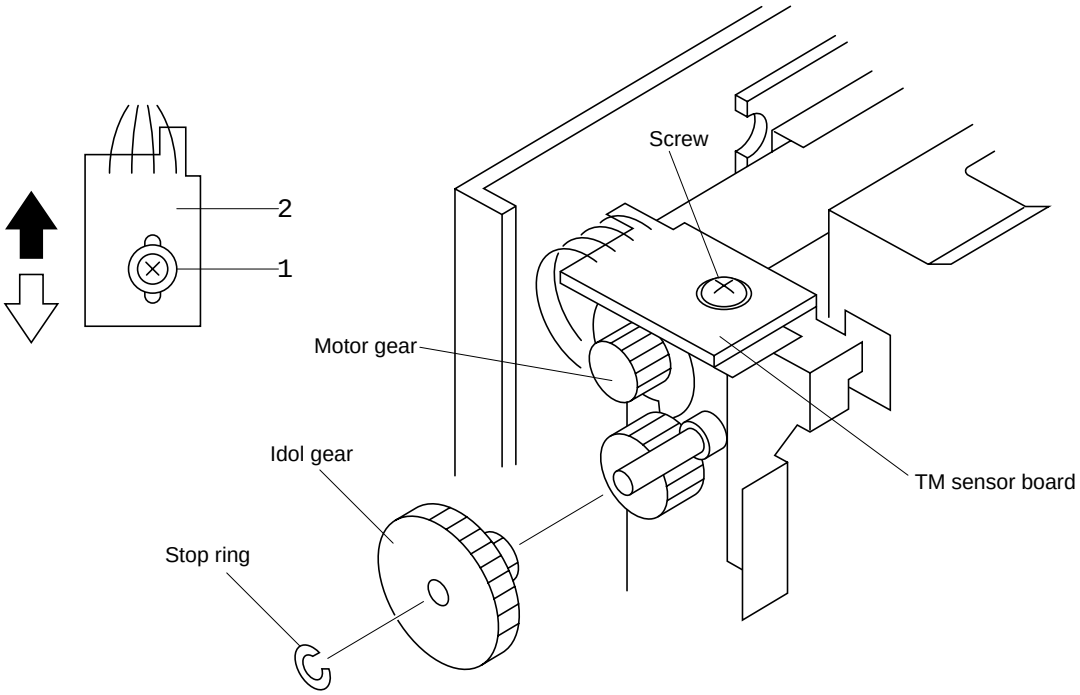
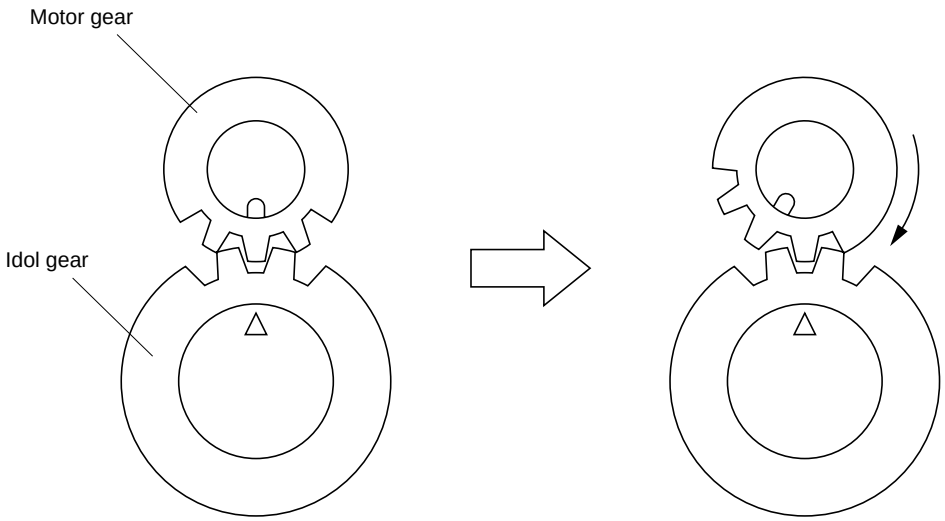


Fig. 1-5 Adjustments A and B for dot alignment

3-2 Adjustment B

1. Remove the stop ring and idol gear as shown in Fig. 1-5.
2. Move the motor gear the equivalent of one tooth. Reattach the idol gear and stop ring. The positioning of the motor gear in relation to the idol gear is illustrated in Fig. 1-6 (refer to the placement of the △ and ▽ symbols). (Make sure that the △ and ▽ symbols are not aligned.)
   *If the print generated from right to left is off to the right, rotate the motor gear in the direction indicated by the arrow.
3. Return to section 3-1 and repeat Adjustment A.



Print generated from left to right (outwards) H H H · · · H
Print generated from right to left (inwards) H H H · · · H

Fig. 1-6 Adjustment B for dot alignment

3-3 Adjusting the Solenoid Gap

1. Loosen the screw 1 and move the solenoid base in the direction indicated by the arrow to increase the gap to between 0.3 and 0.5 mm.

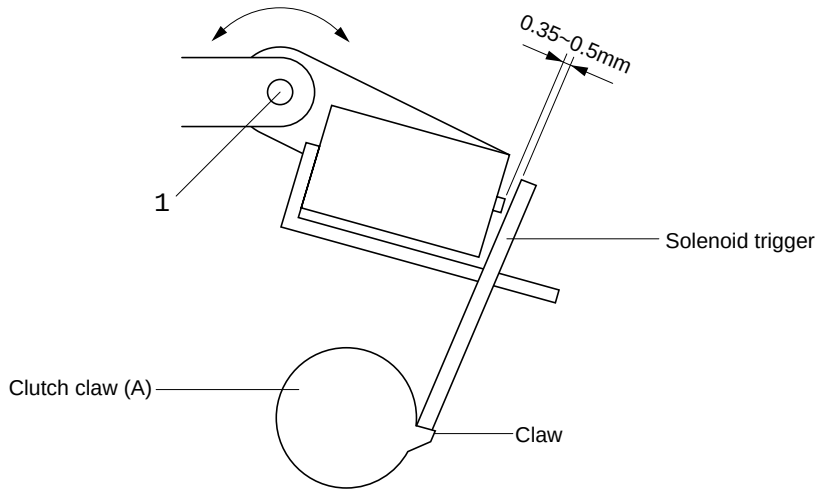
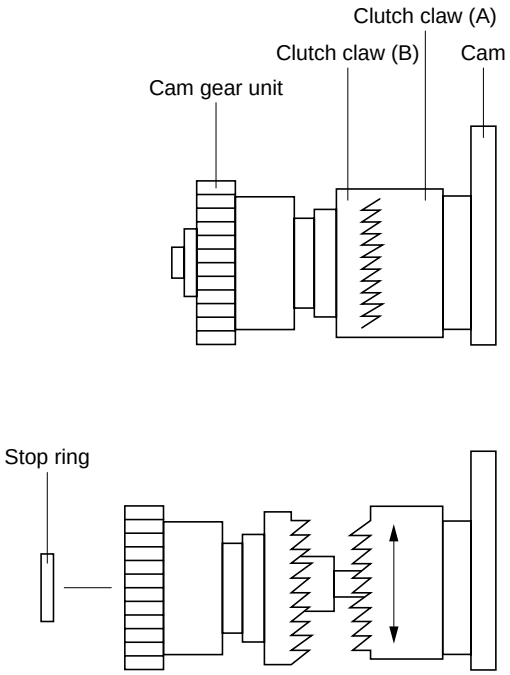
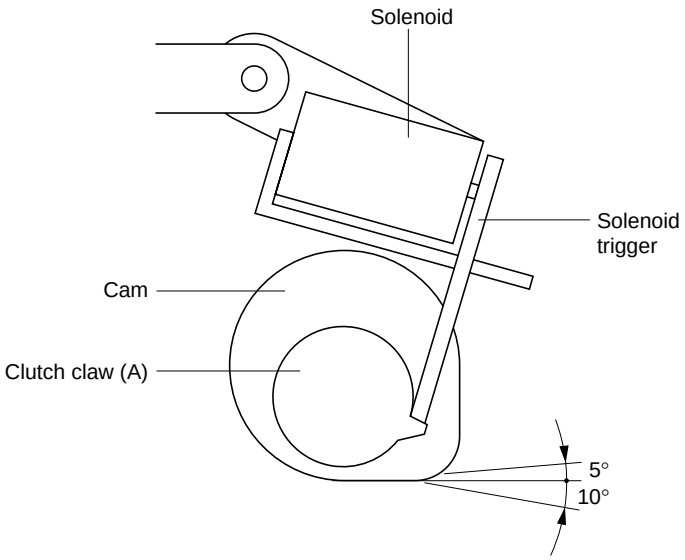


Fig. 1-7 Adjusting the solenoid gap

2. This adjustment will cause the end of the solenoid trigger to make contact with the clutch claw (A).

ADJUSTMENTS





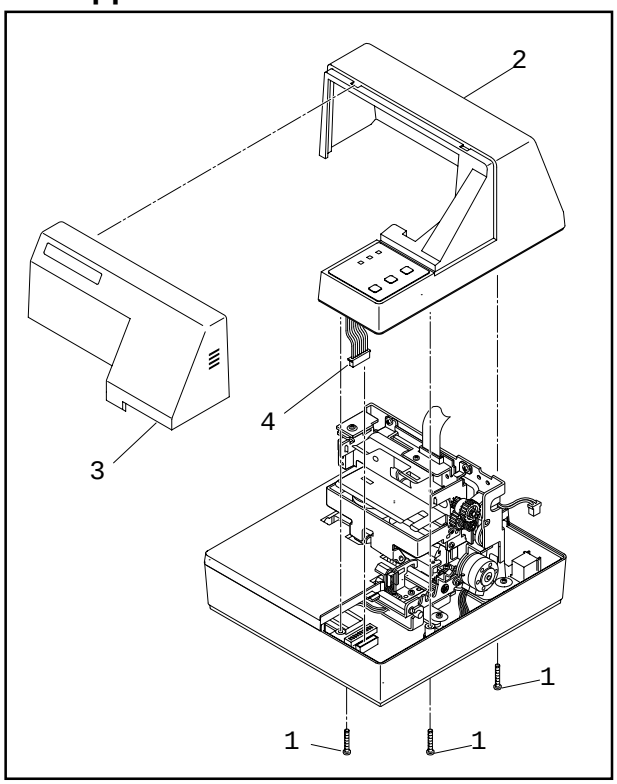
CHAPTER 2
PARTS REPLACEMENT

This chapter explains disassembly and reassembly of the printer. Note the following precautions during disassembly and reassembly.

1. Disconnect the printer power cord plug from the wall outlet before servicing it.
2. Assembly is the reverse of disassembly unless otherwise specified.
3. After reassembly, coat the screw heads with locking sealant.
4. Lubrication information is not provided in this chapter. Refer to Section 3.2.

PARTS REPLACEMENT

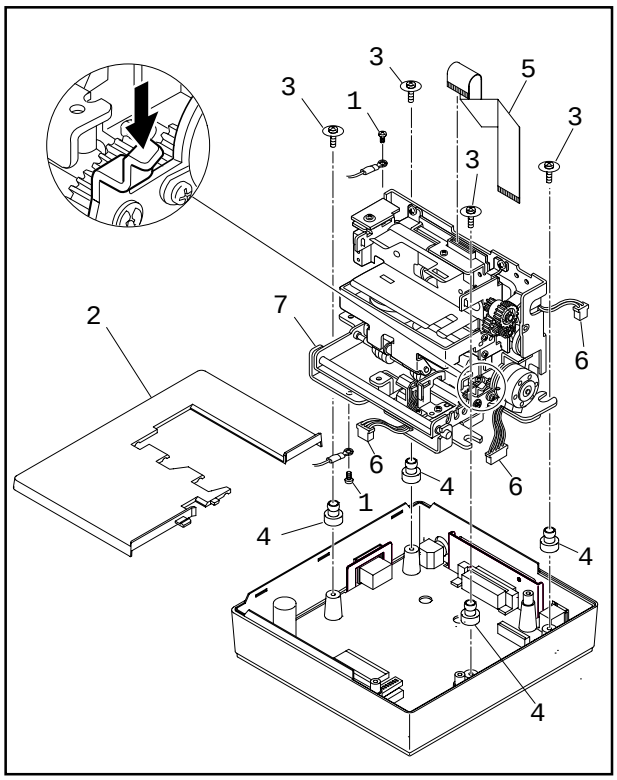
1. Upper Case Unit



(1) Turn off the powerswitch, disconnect the power cord from the wall outlet

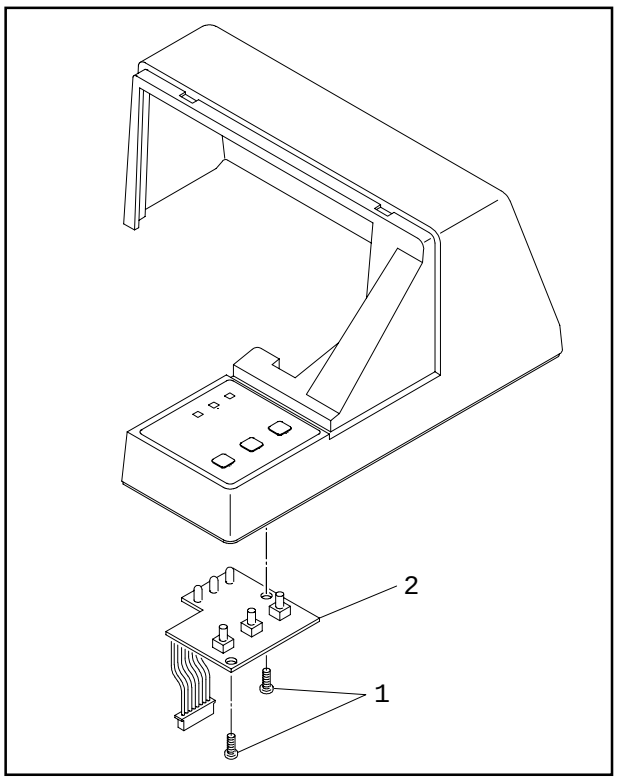
(2) Remove
- Three screws 1
- Upper case unit 2
- Front cover unit 3
- Connector 4

2. Printer Mechanism



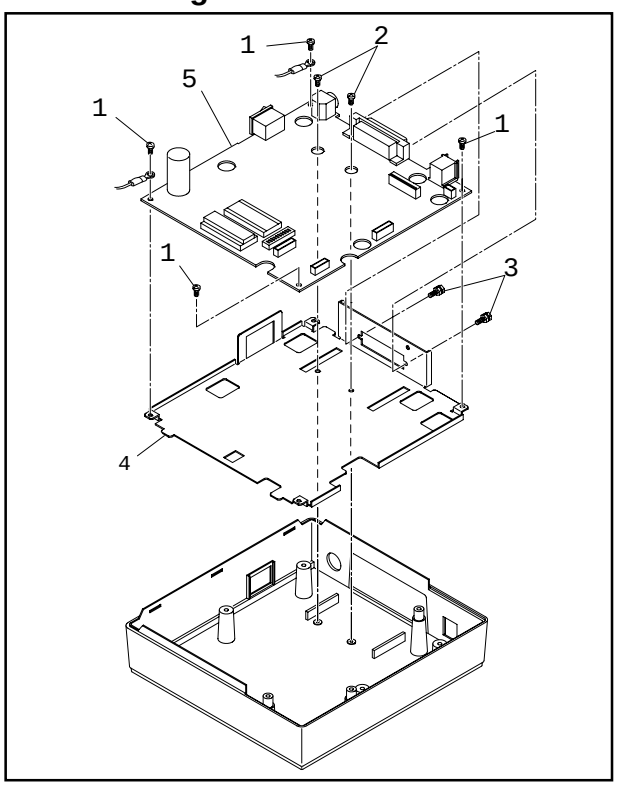
(1) Remove
- Upper case unit according to the procedure described in Section 2.1
- Two screws 1
- Document table 2
- Move the lever down as shown by the arrow in the illustration, then pull the document table out to the left.
- Four screws 3
- Four rubber sheets 4
- Flat cable 5
- Three connectors 6
- Printer mechanism 7

3. Control Panel Board Unit



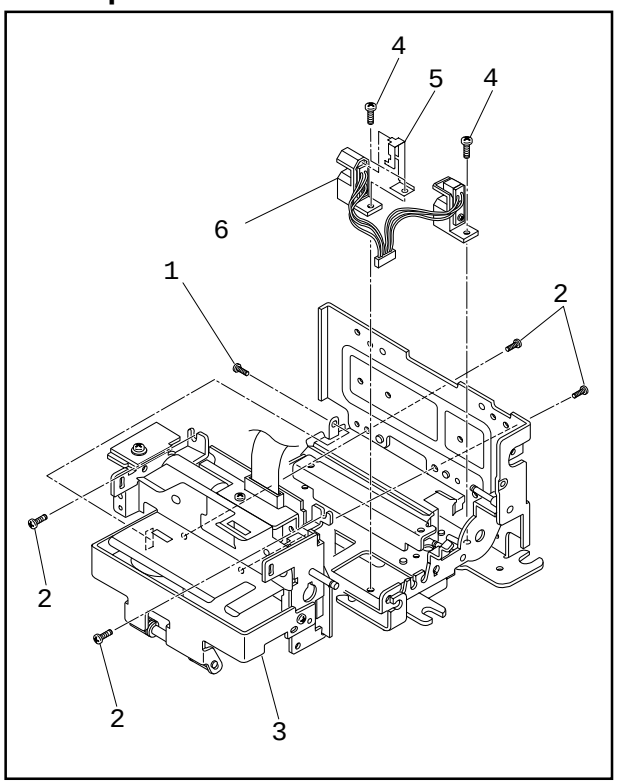
(1) Remove
- Upper case unit according to the procedure described in Section 2.1
- Two screws 1
- Control panel board unit 2

4. Main Logic Board



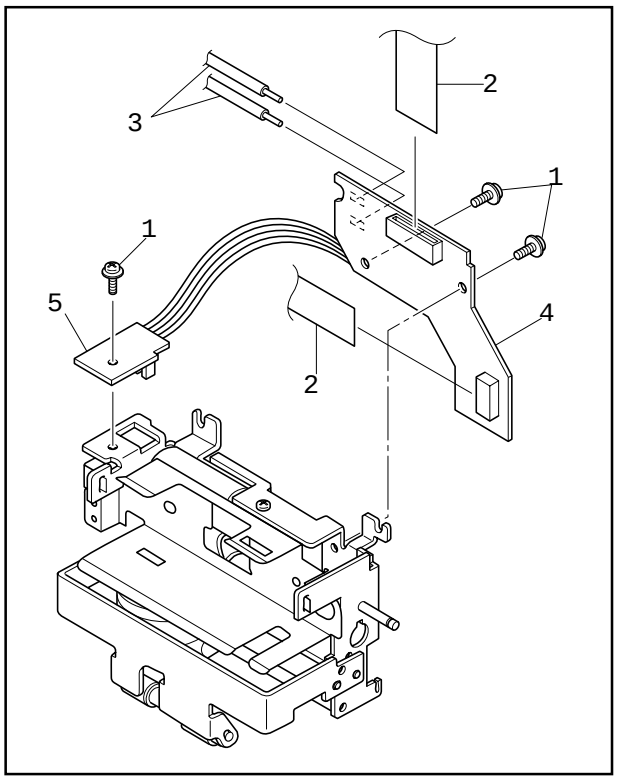
(1) Remove
- Printer mechanism unit according to the procedure described in Section 2.2
- Four screws 1
- Two tapping screws 2
- Two screws DBLC-J25SAF 3
- Chassis 4
- Main logic board 5

5. Paper Detector BD Unit



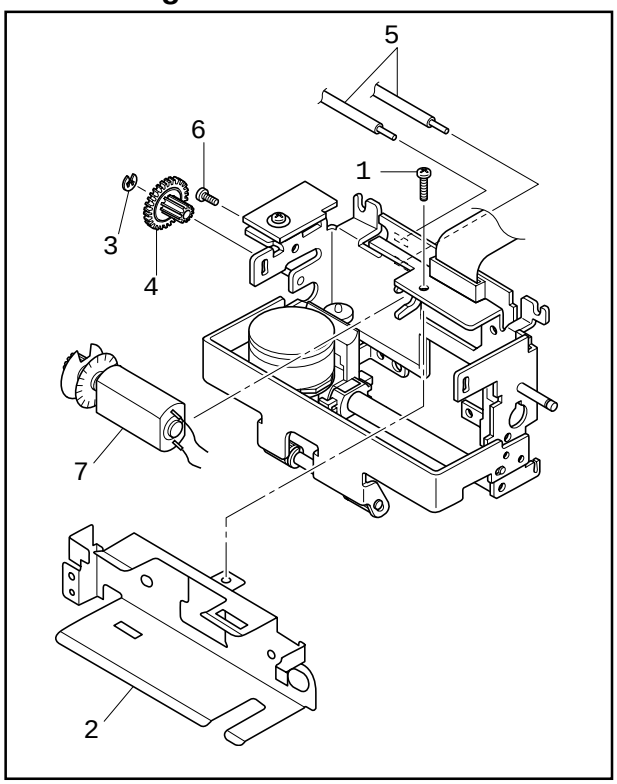
(1) Remove
- Printer mechanism unit according to the procedure described in Section 2.2
- Screw 1
- Four screws 2
- Print head drive unit 3
- Two screws 4
- Ground plate 5
- Paper detector BD unit 6

6. Terminal Board·Timing Detector BD Unit



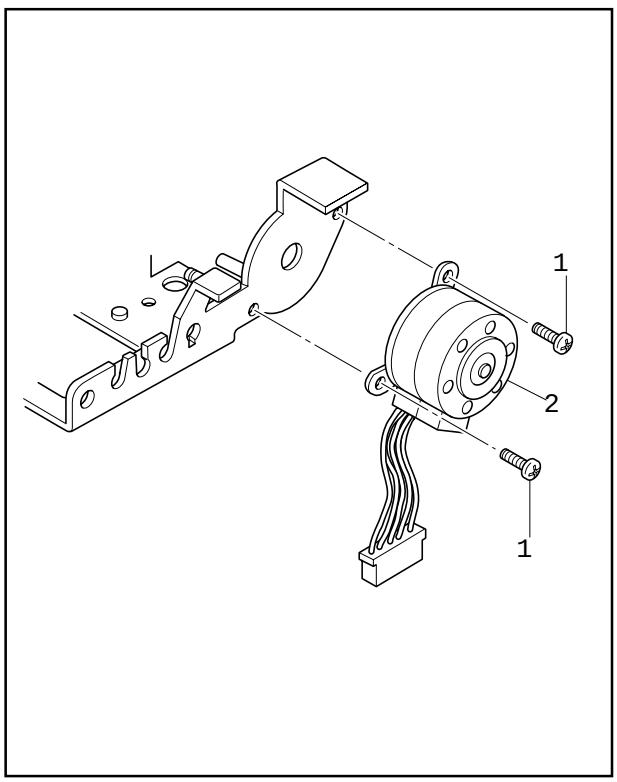
(1) Remove
- Paper detector BD unit according to the procedure described in Section 2.5
- Three screws 1
- Flat cable 2
- The two soldered lead wires 3 with the soldering iron. (black, red)
- Terminal board unit 4
- Timing detector BD unit 5

7. Carriage Motor Unit



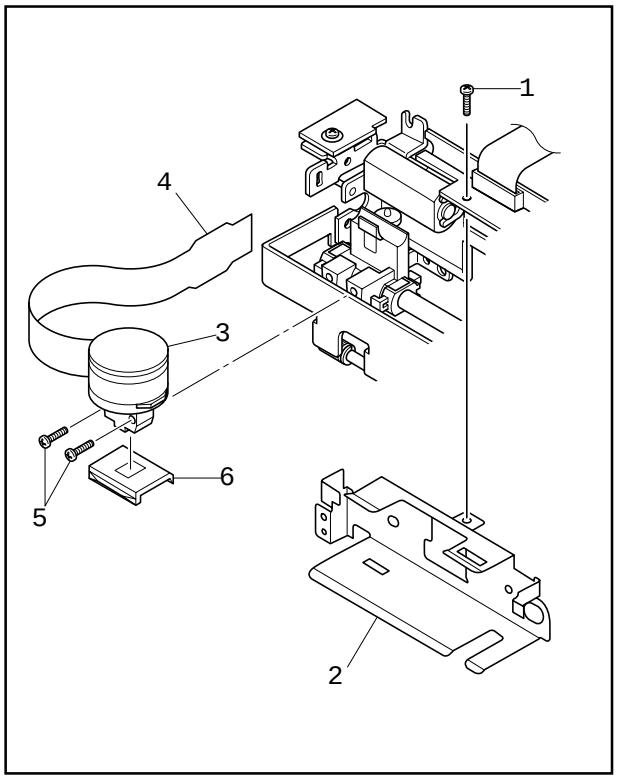
(1) Remove
- Paper detector BD unit according to the procedure described in Section 2.5
- Screw 1
- Ribbon base 2
- Stop ring 3
- Gear 4
- The two soldered lead wires 5 with the soldering iron (black, red)
- Screw 6
- Carriage motor unit 7

8. Paper Feed Motor Unit



(1) Remove
- Printer mechanism unit according to the procedure described in Section 2.2
- Two screws 1
- Paper feed motor unit 2

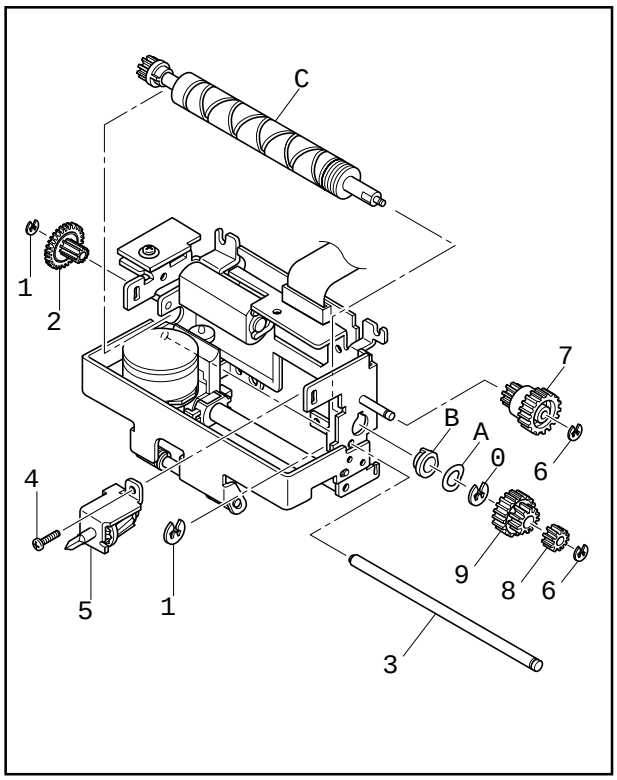
9. Print Head



(1) Remove
- Paper detector BD unit according to the procedure described in Section 2.5
- Screw 1
- Ribbon base 2
- Print head 3
- Remove the print head after it is moved to either the left or right end.
- Head cable 4
- Two tapping screws 5
- Ribbon guide 6

WARNING
The print head becomes hot after printing so wait for it to cool before removing it.

10. Drive Shaft Unit



(1) Remove
- Print head according to the procedure described in Section 2.9
- Two stop rings 1
- Gear 2
- Carriage guide stay 3
- Screw 4
- Ribbon shaft guide 5
- Two stop rings 6
- Idler gear 7
- Idler gear 8, 9
- Stop ring 0
- Wave washer A
- Drive shaft bearing B
- Drive shaft unit C

CHAPTER 3
MAINTENANCE AND LUBRICATION

MAINTENANCE AND LUBRICATION

1. Maintenance

Carry out maintenance control items listed below to maintain the original performance of this printer and prevent trouble from occurring.

1-1. Cleaning

(1) Removal of dirt.
Clean the dirt with tissure or soft cloth.
Note: Do not use thinners or trichlene/ketone base solvents for cleaning as they can damage plastic parts. Be careful not to damage electrical parts, wired areas or mechanisms and avoid getting them wet.

(2) Removal of dust, pile, etc.
Clean with a vacuum cleaner.
Note: Check the amount of oil after cleaning and lubricate if necessary.

1-2. Checks

Maintenance checks for this printer is divided into the two areas of “daily check” that the person using the printer carries out during normal use and “regular check” that can be done only by an experienced person with a knowledge of the equipment.

(1) Daily check:
Check that the printer is being properly used.
- Is the ribbon cassette set in the correct position?
- Is the peper set correctly?
- Is there any dirt or foreign object in the printer?

(2) Regular check:
Carry out regular check and lubrication after six months use or after printing 1 million lines.
- Check for bending of springs.
- Remove any dirt or dust in the area of the detectors.
- Remove dirt around the drive shaft and lubricate.
- Check the gap between the platen and the print head.

2. Lubrication

Lubrication is extremely important for preserving the original performance of the printer over a long period of time.

2-1. Type of oil

The type of oil used has a major influence on the performance and durability of the printer.You should pay particular attention to the cold temperature properties of the oil. We recommend use of the grease and lubrication oils listed below for this printer.

Type of oil	Product name	Manufacturer
Grease	Molykote EM-30L	Dow Corning Corp.

2-2. Lubrication method

When lubricating during disassembly or assembly operations, be sure to wash and clean the equipment well prior to lubrication to remove dirt and dust.

Lubricate the equipment at regular intervals of six months or after every one million lines. Be sure to lubricate equipment after disassembling or replacing parts when oil has been removed by cleaning.

2-3. Lubrication locations

No.	Lubrication locations	Type of oil
1	Holder frame and Support roller shaft	EM-30L
2	Shift frame and Pivot shaft	EM-30L
3	Solenoid base and Trigger assy	EM-30L
4	Clutch spring and Clutch claw	EM-30L
5	Locating lever and Shaft	EM-30L
6	Cam gear unit and Shaft	EM-30L
7	Base frame and Pivot shaft	EM-30L
8	Ribbon shaft and Ribbon shaft guide	EM-30L
9	Worm gear and Worm wheel	EM-30L
0	Worm wheel and Frame	EM-30L
A	Contact surfaces between carriage guide stay and carriage	EM-30L
B	Crisscross grooves and both ends of the drive shaft	EM-30L
C	Gear 12 × 45 × 0.4 and Gear shaft	EM-30L
D	Shift frame and cam	EM-30L

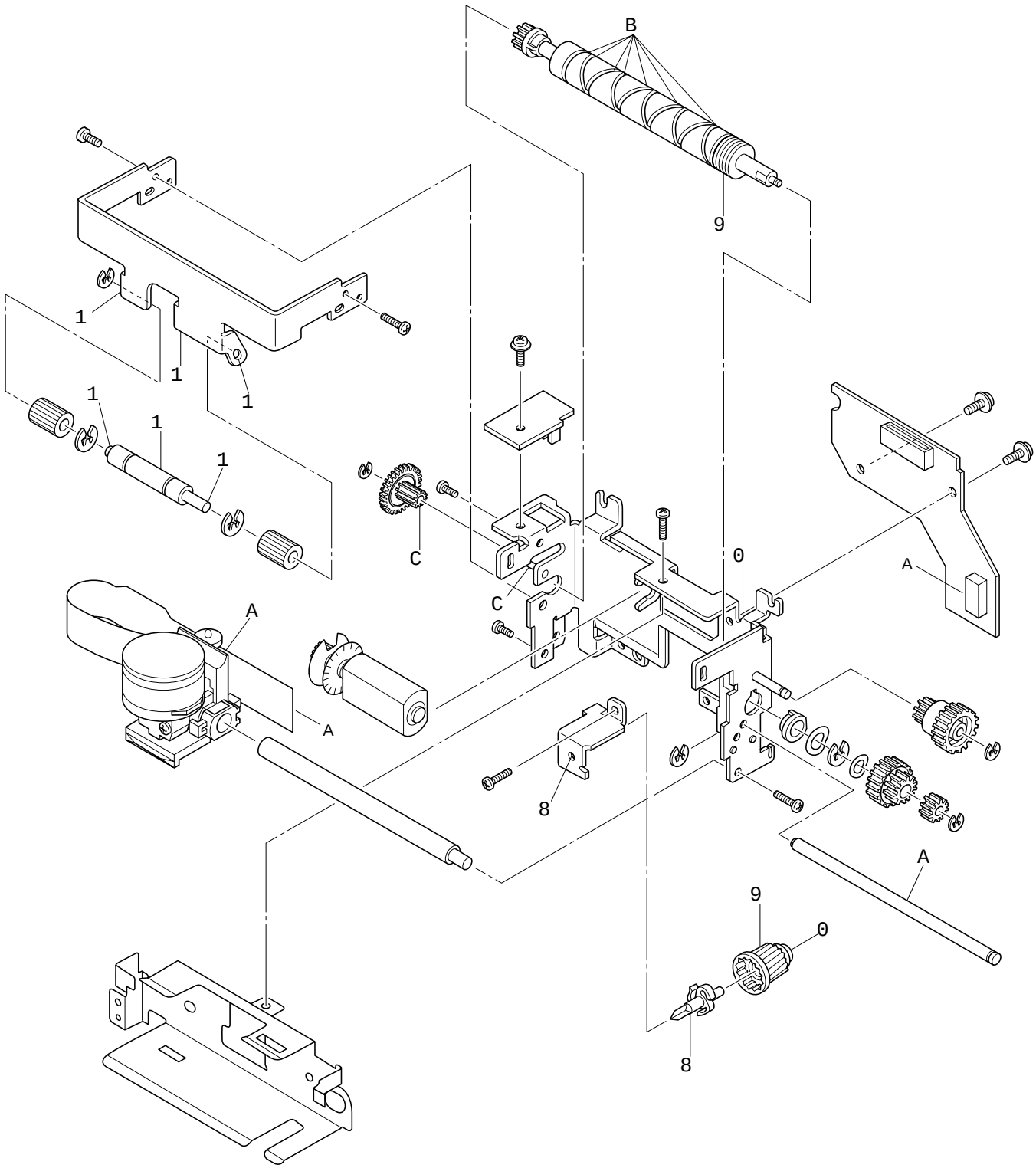


Fig. 3-1 Lubricated Areas 1

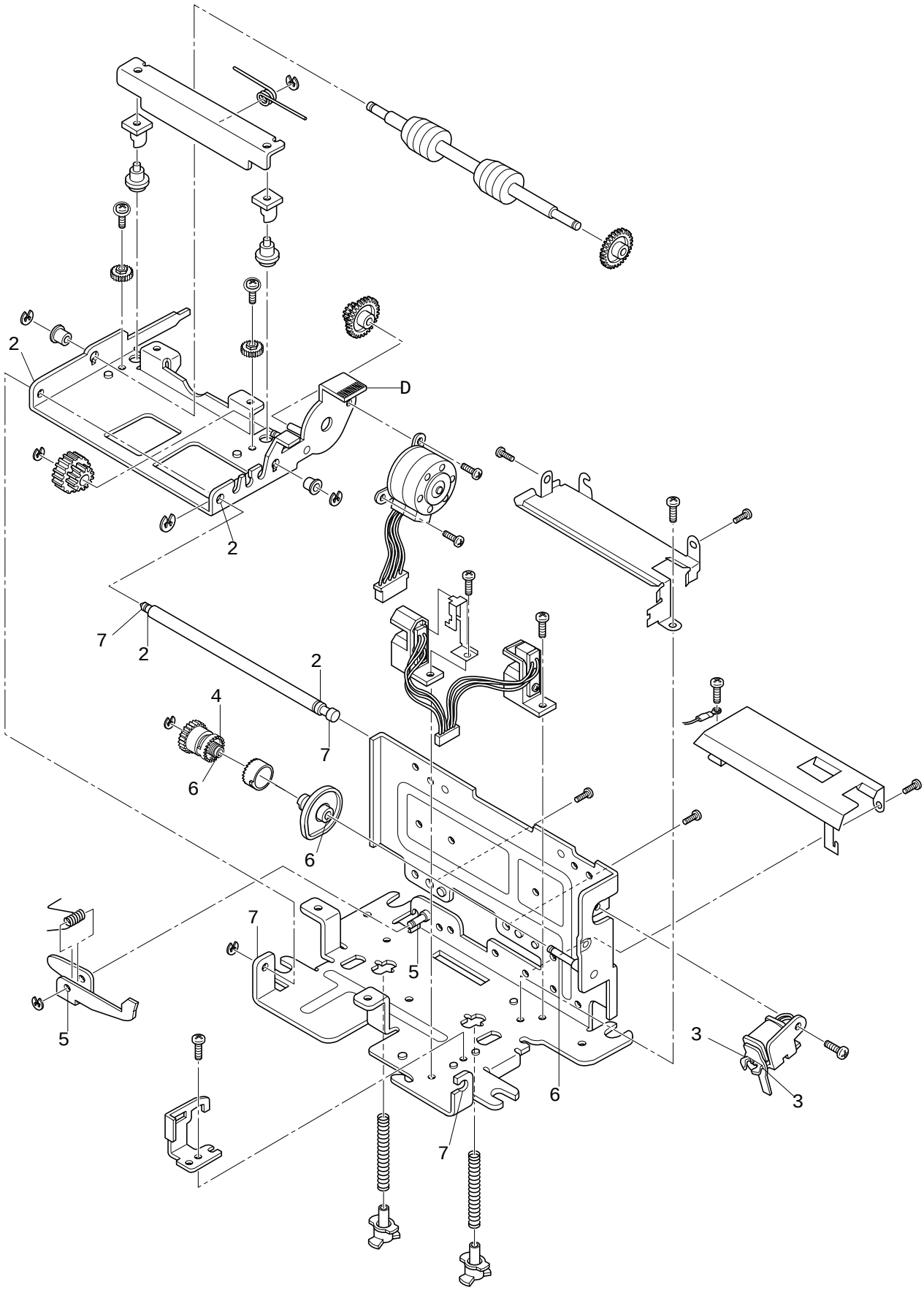


Fig.3-2 Lubricated Area 2

CHAPTER 4
PARTS LIST

HOW TO USE PARTS LIST

(1) DRWG. NO.
This column shows the drawing number of the illustration.

(2) REVISED EDITION MARK
This column shows a revision number.

(3) PART NO.
Parts numbers must be notified when ordering replacement parts. Parts described as “NPN” have no parts number and are not in stock, i.e., unavailable.

(4) PARTS NAME
Parts names must be notified when ordering replacement parts.

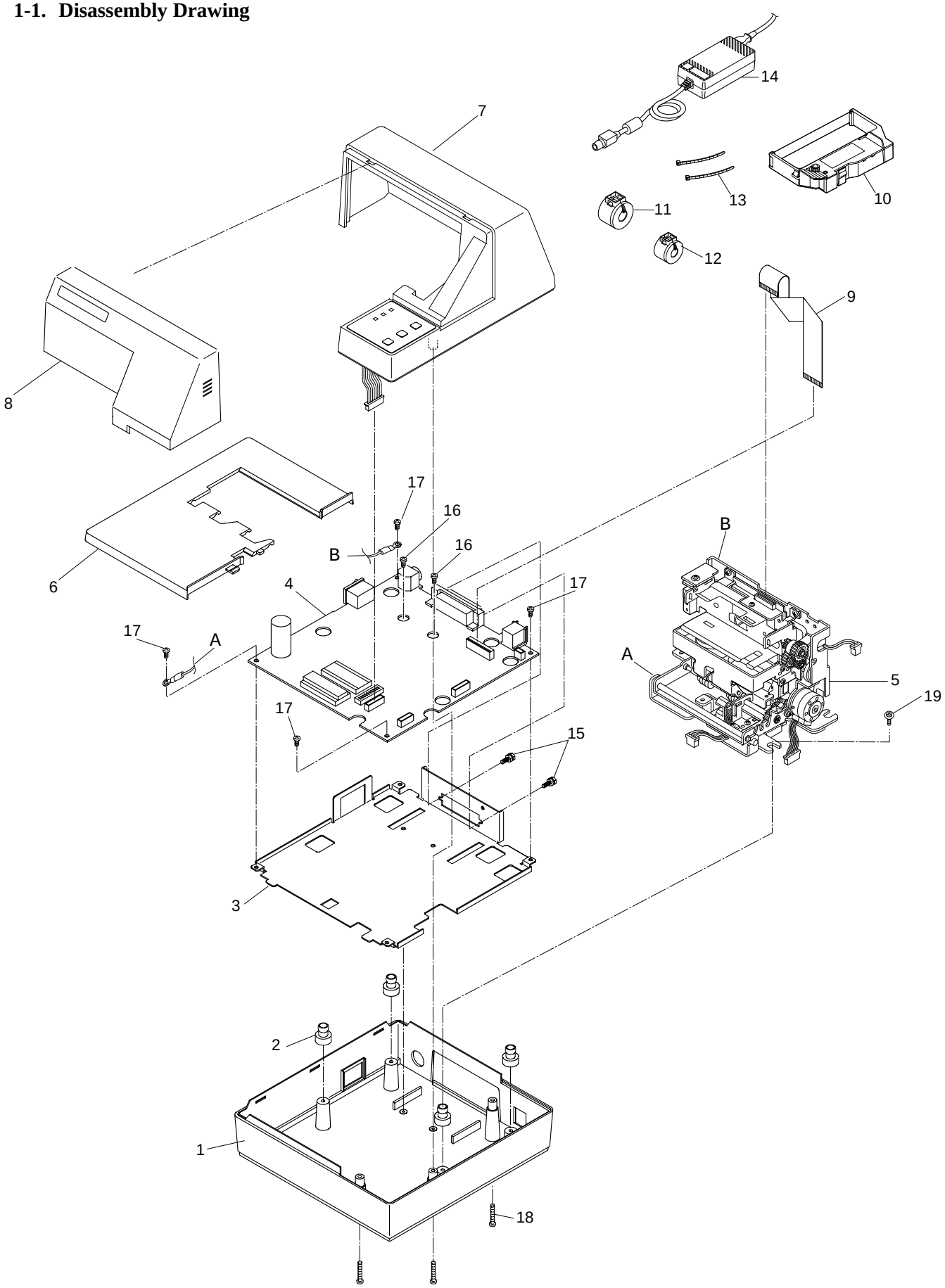
(5) Q’TY
This column shows the number of the part used as indicated in the figure.

(6) REMARKS
When differences in specifications exist depending on location/destination.

(7) RANK
Parts marked “S” a service parts. Service parts are recommended to be in stock for maintenance.

1. Printer Assembly

1-1. Disassembly Drawing



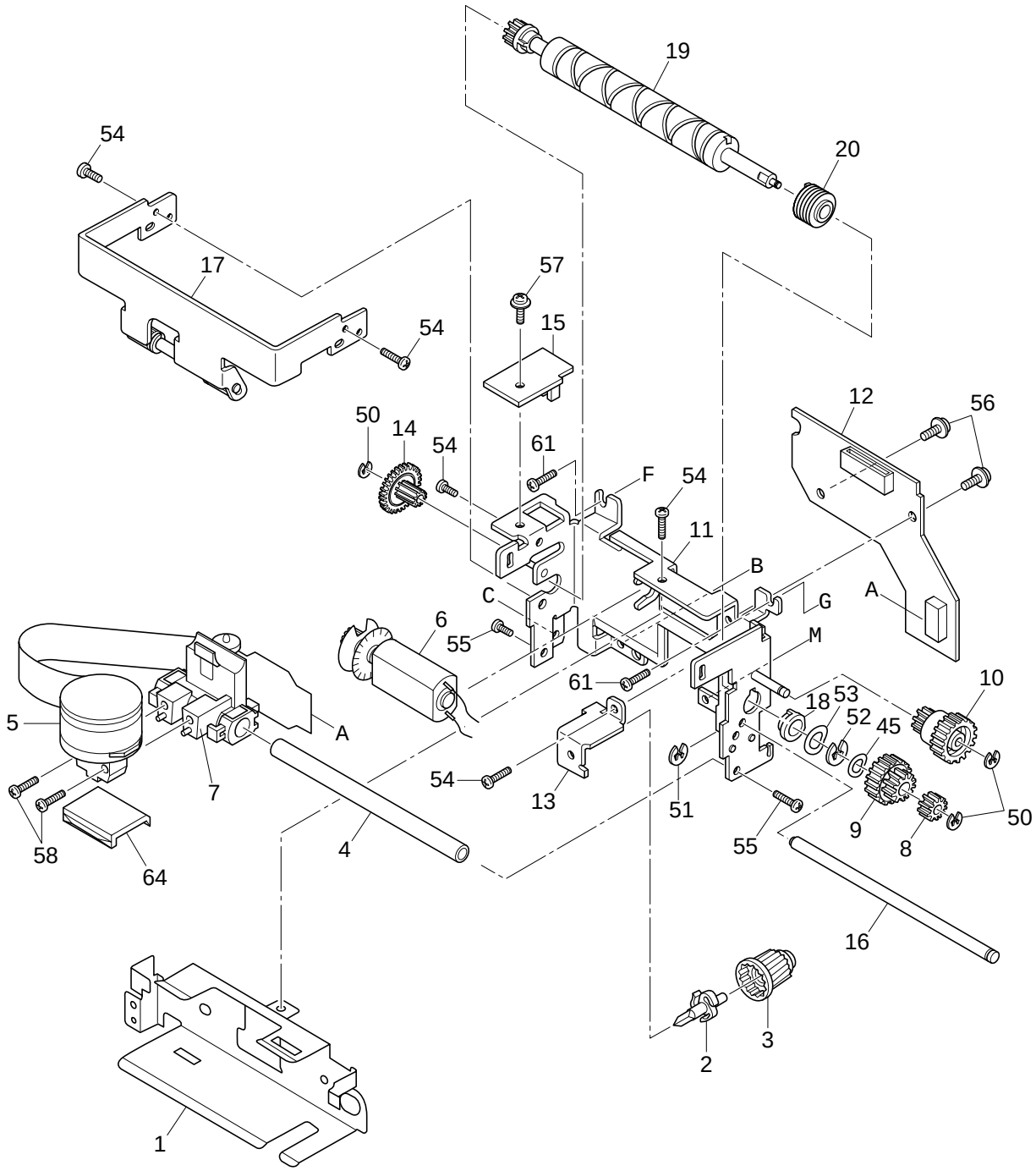
1-2. Parts List

Printer Assembly

DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
1		37300030	LOWER CASE UNIT SP290	1		S
2		30991110	RUBBER SHEET SCP7	4		
3		32010220	BOARD CHASSIS SP290	1		S
4		37307010	MAIN LOGIC BOARD UNIT SP290	1		S
5		38082010	MP292-24GS	1		S
6		33090010	DOCUMENT TABLE SP290	1		S
7		37301040	UPPER CASE UNIT SP290	1		S
8		37300330	FRONT COVER UNIT SP290	1		
9		30722010	FLAT CABLE 19X205	1		
10		30980022	INK RIBBON CARTRIDGE RC200P	1		
11		09990723	FERRITE CORE TFC-23-11-14	1		
12		09990713	FERRITE CORE TFC-16-8-16	1		
13		04991204	FASTENER T18S	2		S
14		39560020	PS48 AND US CORD SET	1	OPTION	
		39560030	PS48 AND EC CORD SET	1	OPTION	
		39560040	PS48 AND UK CORD SET	1	OPTION	
		39560050	PS48 AND AS CORD SET	1	OPTION	
15		04991401	SCREW DBLC-J25SAF	2		S
16		00930603	SCREW TAT 3-6 PT	2		S
17		00930609	SCREW TAT 3-6 CT	4		S
18		01903103	SCREW TAT 3-18 PT	3		S
19		01914038	SCREW TAT 4-20 PWF	4		S
-		30721330	CABLE UNIT PS48-24A	1	OPTION	

2. Printer Mechanism

2-1. Disassembly Drawing



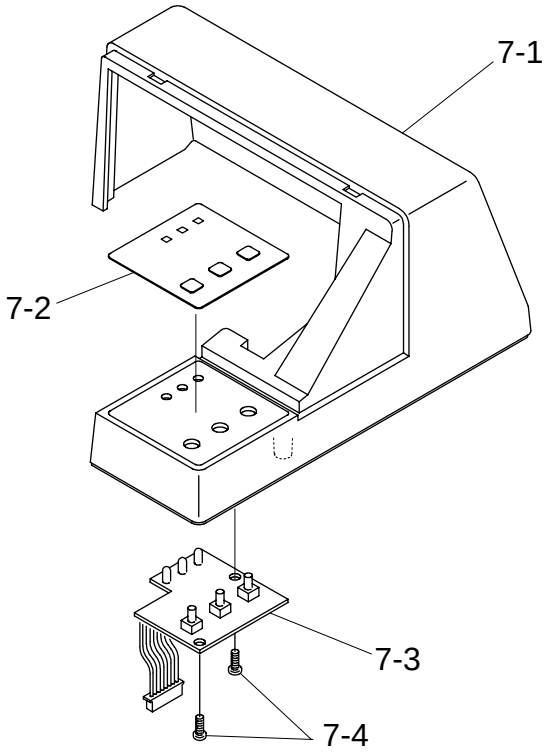
2-2. Parts List

Printer Mechanism

DRWG.NO.	REV.	PARTS NO.	PARTS NAME		Q'TY	REMARKS	RANK
1		32980030	RIBBON BASE	MP290	1		
2		33980030	RIBBON SHAFT	MP290	1		S
3		33140110	WORM WHEEL	MP2	1		S
4		31360130	CARRIAGE STAY	MP2S	1		
5		89130190	PRINT HEAD DP8901M	(D)	1		
6		37002050	MOTOR 12V UNIT	MP2	1		S
7		37001130	CARRIAGE UNIT	MP290	1		
8		33100020	DRIVE SHAFT GEAR L	MP2	1		
9		33101640	IDLER GEAR B	MP290	1		S
10		33101630	IDLER GEAR A	MP290	1		S
11		37000070	FRAME UNIT	MP290	1		
12		37007051	TERMINAL BOARD UNIT	MP290	1		
13		32981010	RIBBON SHAFT GUIDE	MP2	1		
14		33100110	GEAR 12X45X0.4	MP2	1		
15		37007620	TIMING DETECTOR BD UNIT	MP290	1		
16		31360121	CARRIAGE GUIDE STAY	MP2	1		
17		37000080	HOLDER FRAME UNIT	MP290	1		
18		80203041	DRIVE SHAFT BEARING	MP300	1		
19		37001030	DRIVE SHAFT UNIT	MP292	1		
20		33140010	WORM GEAR	MP2	1		
21		37000391	SHIFT FRAME B ASSY	MP290	1		
22		33102160	GEAR 31X0.3	MP290	2		
23		33500000	ADJUSTING WASHER U	MP290	2		
24		33500011	ADJUSTING WASHER D	MP290	2		
25		37000360	PLATEN UNIT	MP290	1		
26		30201000	PAPER FEED ROLLER	MP290	1		S
27		33102040	PAPER FEED GEAR	MP290	1		
28		33101620	IDLER GEAR 2	MP290	1		S
29		33101610	IDLER FEAR 1	MP290	1		
30		33215010	PF ROLLER BEARING	PR1	2		
31		37000351	PAPER FEED MOTOR UNIT	MP290	1		S
32		31303000	PIVOT SHAFT	MP290	1		
33		37000310	BASE FRAME ASSY	MP290	1		
34		33292000	CAM	MP290	1		
35		33491010	CLUTCH CLAW A	MP290	1		
36		37000341	CAM GEAR UNIT	MP290	1		S
37		37008130	SOLENOID 24V UNIT	MP290	1		S
38		32045530	PAPER GUIDE U	MP290	1		
39		32045540	PAPER GUIDE L	MP290	1		
40		32490110	LOCATING LEVER	MP290	1		
41		32045520	PAPER GUIDE R	MP290	1		
42		33040000	SPRING HOLDER	MP290	2		
43		37000330	PAPER DETECTOR BD UNIT	MP290	1		S
44		30531040	PLATEN HOLDER SPRING	MP290	1		S
45		02305013	POLY-SLIDER WP5X0.13		1		
46		30520060	SPRING C055-045-0415		2		S
47		30531030	LOCATING LEVER SPRING	MP290	1		S
48		32040220	REINFORCEMENT PLATE	MP290	1		S
49		32090010	GROUND PLATE	MP290	1		S
50		04020010	STOP RING SE2.0		10		S
51		04020015	STOP RING SE3.0		2		S
52		04020016	STOP RING SE4.0		1		S
53		82500040	WAVE WASHER 1	DT	1		S
54		00926503	SCREW TAT 2.6-5 CT		8		S
55		00626404	SCREW TR 2.6-4		2		S
56		01902617	SCREW TAT 2.6-5 CT-FL		2		S

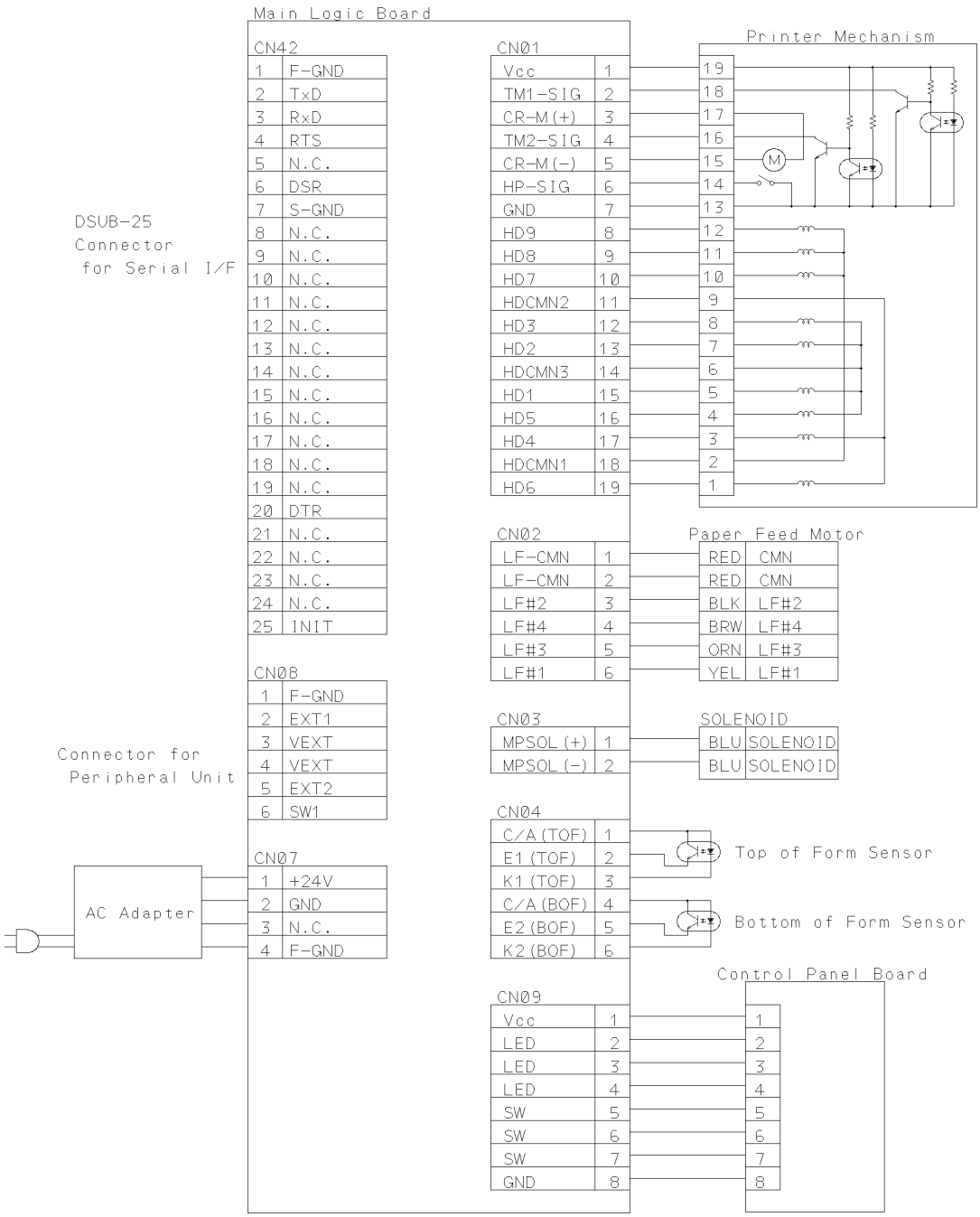
DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
57		01902622	SCREW TAT 2.6-5 WF	1		S
58		01902612	SCREW TAT 2.6-16 PT	2		S
59		80707060	WIRE 18UL1007BLK095TT	2		S
60		01902639	SCREW TAT 2.6-6 WF	2		S
61		00930609	SCREW TAT 3-6 CT	14		S
62		01903088	SCREW TAT 3-6 WS	1		S
63		00930403	SCREW TAT 3-4 CT	6		S
64		83904900	RIBBON GUIDE 8901M	1		

3. Upper Case Unit



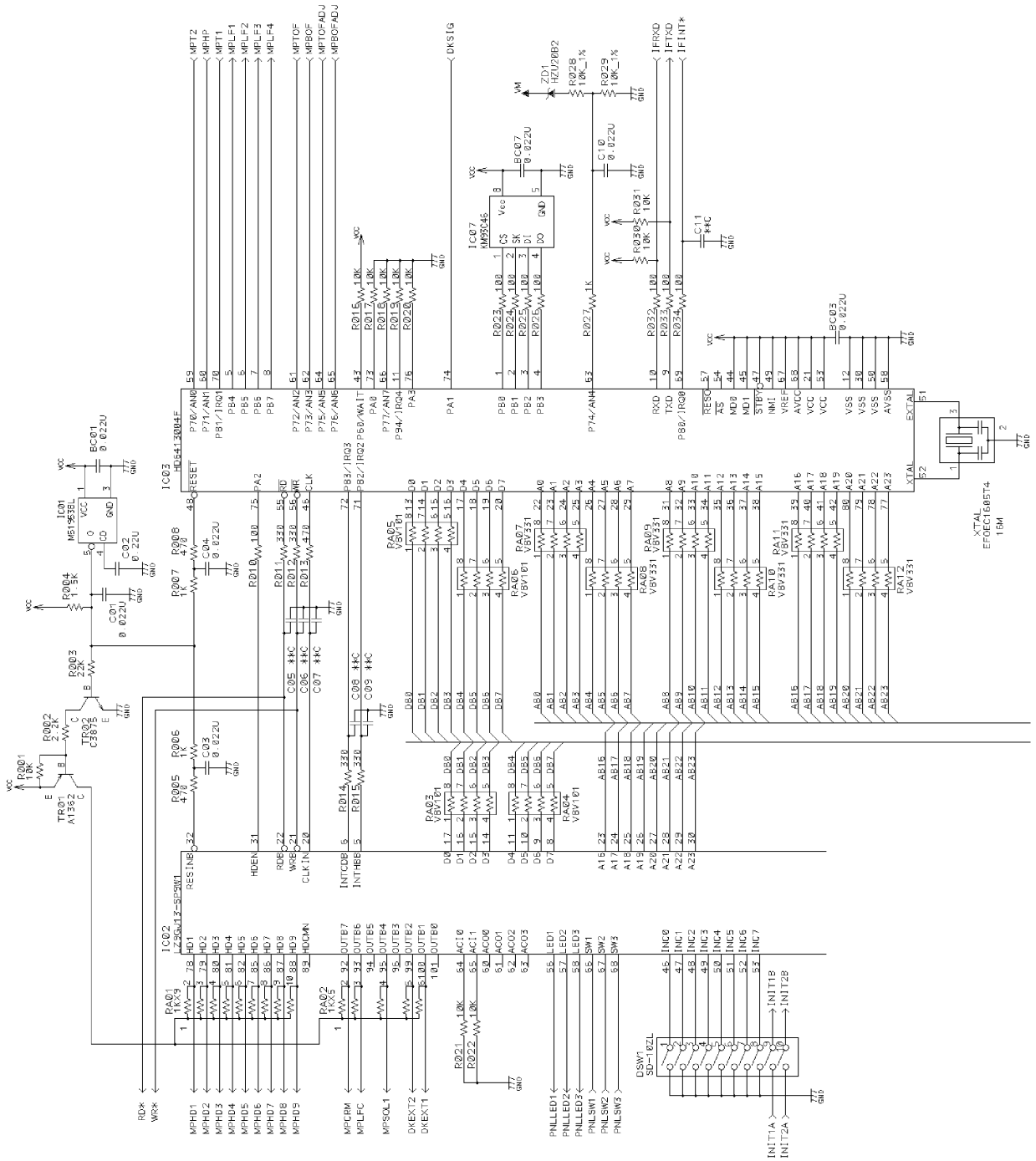
DRWG.NO.	REV.	PARTS NO.	PARTS NAME		Q'TY	REMARKS	RANK
7-1		33021090	UPPER CASE	SP290	1		
7-2		30060030	OPERATION SHEET	SP290	1		
7-3		37307210	CONTROL BOARD UNIT	SP290	1		
7-4		00930803	SCREW TAT 3-8 PT		2		

4. Wiring Scheme of Printer

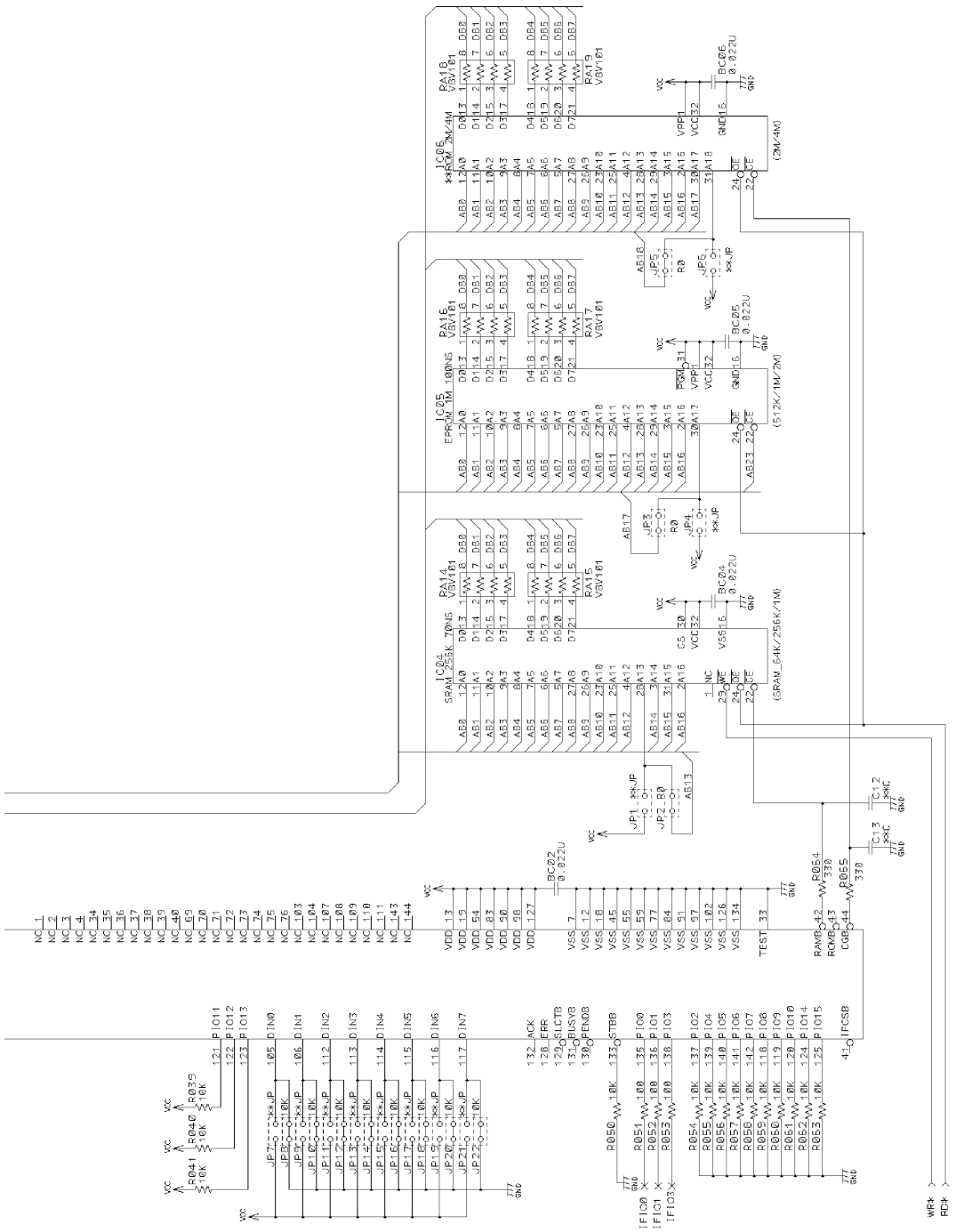


5. Main Logic Board

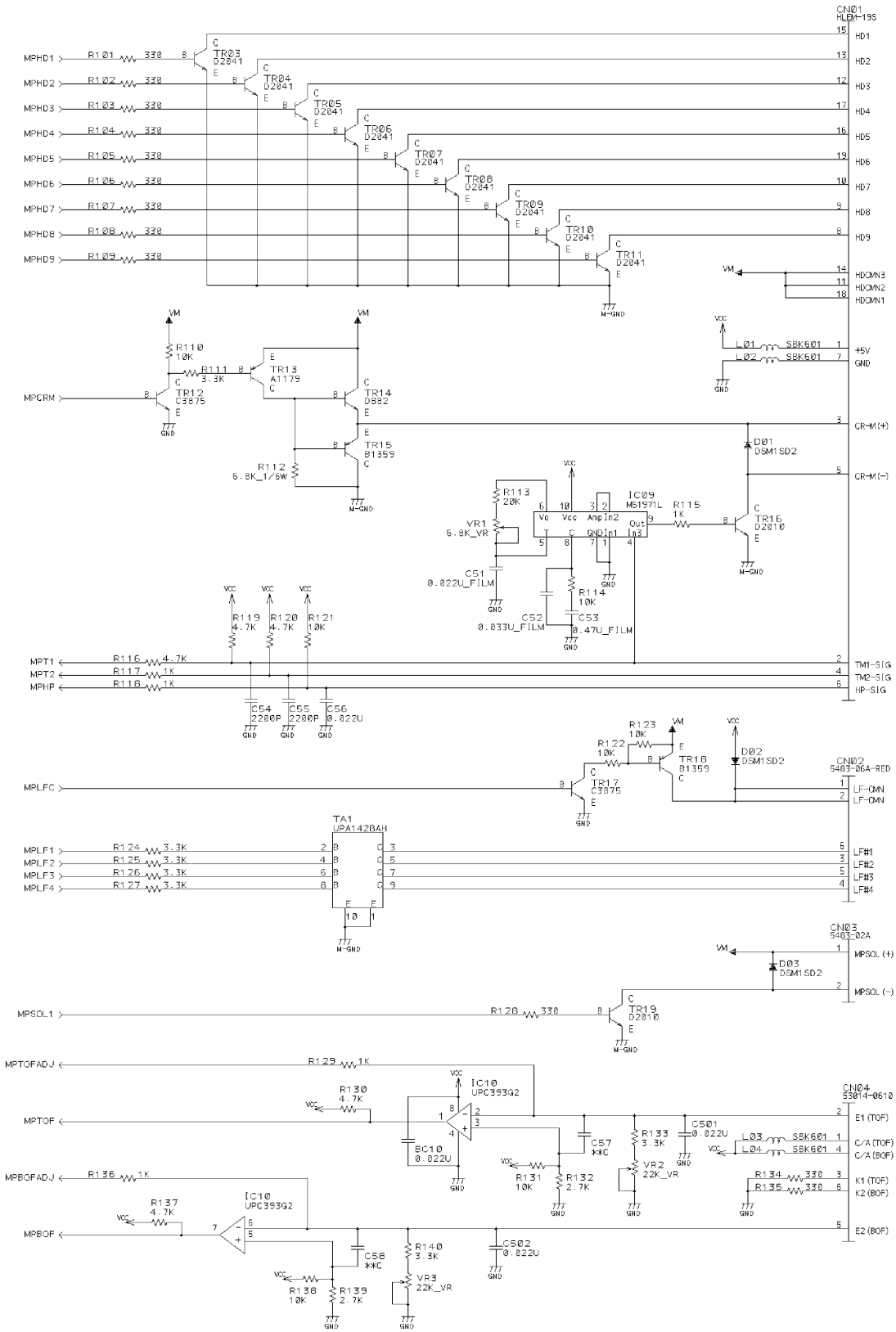
5-1. Circuit Diagram



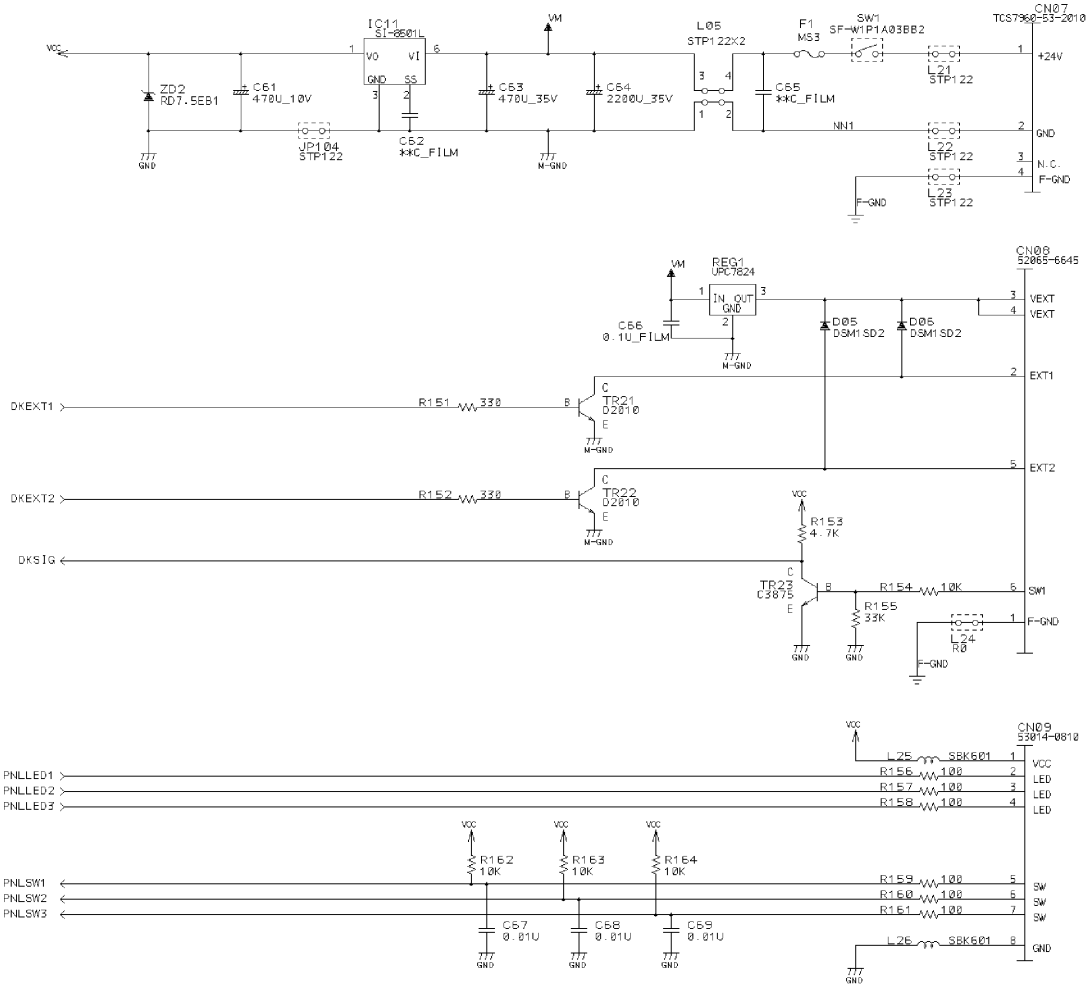
Main Logic Board (1/5)



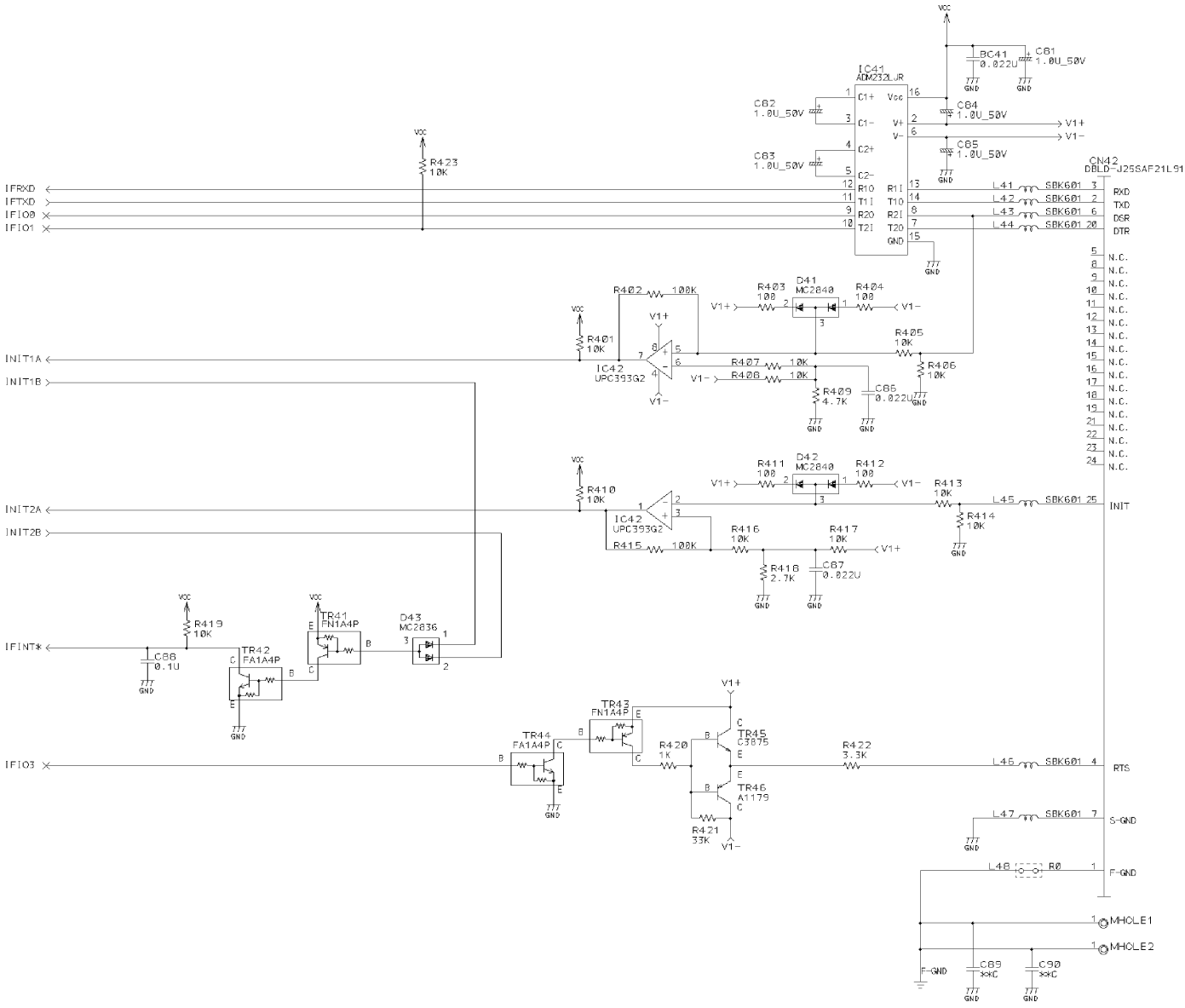
Main Logic Board (2/5)



Main Logic Board (3/5)



Main Logic Board (4/5)



Main Logic Board (5/5)

5-2. Parts List

Main Logic Board

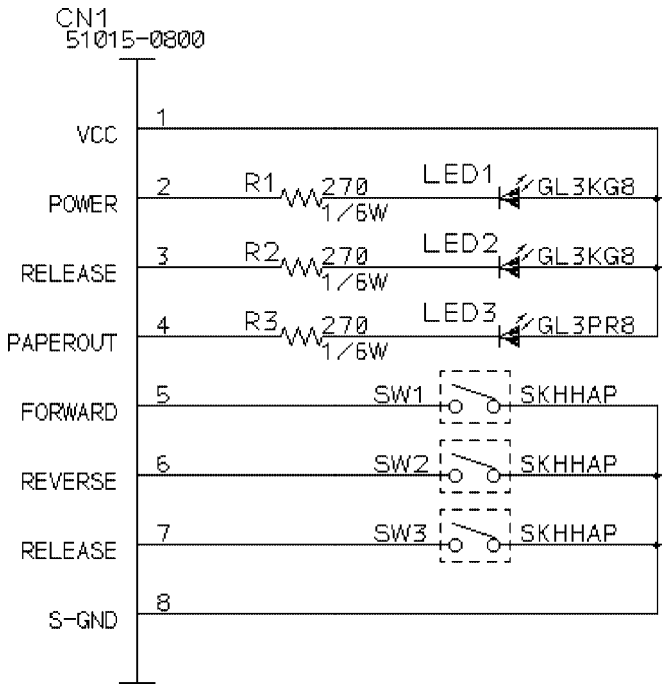
DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
BC01-07		05752236	CERA. CAPA. CHIP 0.022UF 50V	7		
BC08-09					NOT USED	
BC10		05752236	CERA. CAPA. CHIP 0.022UF 50V	1		
BC11-40					NOT USED	
BC41		05752236	CERA. CAPA. CHIP 0.022UF 50V	1		
C01		05752236	CERA. CAPA. CHIP 0.022UF 50V	1		
C02		05122241	CERA. CAPA. CHIP 0.22UF 16V	1		
C03-04		05752236	CERA. CAPA. CHIP 0.022UF 50V	2		
C05-09					NOT MOUNTED	
C10		05752236	CERA. CAPA. CHIP 0.022UF 50V	1		
C11-13					NOT MOUNTED	
C51		05252236	FILM CAPA. 0.022UF 50V	1		
C52		05253335	FILM CAPA. 0.033UF 50V	1		
C53		05254742	FILM CAPA. 0.47UF 50V	1		
C54-55		05752224	CERA. CAPA. CHIP 2200PF 50V	2		
C56		05752236	CERA. CAPA. CHIP 0.022UF 50V	1		
C57-58					NOT MOUNTED	
C61		05014776	CHEM. CAPA. 470UF 10V	1		
C62					NOT MOUNTED	
C63		05044771	CHEM. CAPA. 470UF 35V	1		
C64		05042281	CHEM. CAPA. 2200UF 35V	1		
C65					NOT MOUNTED	
C66		05251044	FILM CAPA. 0.1UF 50V	1		
C67-69		05751035	CERA. CAPA. CHIP 0.01UF 50V	3		
C81-85		05051057	CHEM. CAPA. 1UF 50V	5		
C86-87		05752236	CERA. CAPA. CHIP 0.022UF 50V	2		
C88		05751045	CERA. CAPA. CHIP 0.1UF 50V	1		
C89-90					NOT MOUNTED	
C501-502		05752236	CERA. CAPA. CHIP 0.022UF 50V	2		
CN01		09100419	CONNECTOR HLEM19S-1	1		
CN02		09100278	CONNECTOR 5483-06A-RED	1		
CN03		09100270	CONNECTOR 5483-02A	1		
CN04		09100341	CONNECTOR 53014-0610	1		
CN07		09100636	CONNECTOR TCS7960-53-2010	1		
CN08		09100421	CONNECTOR 52065-6645	1		
CN09		09100713	CONNECTOR 53014-0810	1		
CN42		09100483	CONNECTOR DBLD-J25SAF-21L9-1	1		
D01-03		08000091	DIODE DSM1SD2*A	3		
D05-06		08000091	DIODE DSM1SD2*A	2		
D41-42		08000059	DIODE CHIP MC2840	2		
D43		08000068	DIODE CHIP MC2836	1		
DSW1		09090054	DIP SWITCH SD-10ZL	1		
F1		09991018	FUSE MS3A-125V	1		
IC01		08200109	IC-RESET M51953BL	1		
IC02		08240089	GATE ARRAY LZ9GJ13-SP9W1	1		S
IC03		08251012	CPU HD6413004F16	1		S
IC04		08221055	SRAM LH52256CN-70LL	1		
IC05		08222103	EPROM M27C1001-10F1	1		
IC05-06		09110077	IC SOCKET ICS-32-2T	2		
IC07		08222047	EEPROM KM93C46	1		
IC09		08200128	IC-MOTOR M51971L	1		
IC10		08201013	IC-LIN UPC393G2*T1	1		
IC11		08202033	IC-REG SI-8501L	1		
IC41		08200157	IC-I/F ADM232LJR*SOL16	1		
IC42		08201013	IC-LIN UPC393G2*T1	1		
JP1					NOT MOUNTED	

DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
JP2		06750004	CHIP RESISTOR 0 OHM 1/10W	1		
JP3		06750004	CHIP RESISTOR 0 OHM 1/10W	1		
JP4					NOT MOUNTED	
JP5		06750004	CHIP RESISTOR 0 OHM 1/10W	1		
JP6-7					NOT MOUNTED	
JP8		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
JP9					NOT MOUNTED	
JP10		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
JP11					NOT MOUNTED	
JP12		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
JP13					NOT MOUNTED	
JP14		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
JP15					NOT MOUNTED	
JP16		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
JP17					NOT MOUNTED	
JP18		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
JP19					NOT MOUNTED	
JP20		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
JP21					NOT MOUNTED	
JP22		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
JP104		93930006	JUMPER WIRE STP122	1	L=5mm	
L01-04		09990738	BEADS INDUCTOR SBK2125-601Y	4		
L05		93930006	JUMPER WIRE STP122	1	L=8mmx2	
L21-23		93930006	JUMPER WIRE STP122	3	L=5mm	
L24		06750004	CHIP RESISTOR 0 OHM 1/10W	1		
L25-26		09990738	BEADS INDUCTOR SBK2125-601Y	2		
L41-47		09990738	BEADS INDUCTOR SBK2125-601Y	7		
L48		06750004	CHIP RESISTOR 0 OHM 1/10W	1		
R001		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R002		06752224	CHIP RESISTOR 2.2 K-OHM 1/10W	1		
R003		06752234	CHIP RESISTOR 22 K-OHM 1/10W	1		
R004		06751525	CHIP RESISTOR 1.5 K-OHM 1/10W	1		
R005		06754711	CHIP RESISTOR 470 OHM 1/10W	1		
R006-007		06751021	CHIP RESISTOR 1 K-OHM 1/10W	2		
R008		06754711	CHIP RESISTOR 470 OHM 1/10W	1		
R010		06751014	CHIP RESISTOR 100 OHM 1/10W	1		
R011-012		06753314	CHIP RESISTOR 330 OHM 1/10W	2		
R013		06754711	CHIP RESISTOR 470 OHM 1/10W	1		
R014-015		06753314	CHIP RESISTOR 330 OHM 1/10W	2		
R016-022		06751031	CHIP RESISTOR 10 K-OHM 1/10W	7		
R023-026		06751014	CHIP RESISTOR 100 OHM 1/10W	4		
R027		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		
R028-029		06751035	CHIP RESISTOR 10 K-OHM 1/10W	2		
R030-031		06751031	CHIP RESISTOR 10 K-OHM 1/10W	2		
R032-034		06751014	CHIP RESISTOR 100 OHM 1/10W	3		
R039-041		06751031	CHIP RESISTOR 10 K-OHM 1/10W	3		
R050		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R051-053		06751014	CHIP RESISTOR 100 OHM 1/10W	3		
R054-063		06751031	CHIP RESISTOR 10 K-OHM 1/10W	10		
R064-065		06753314	CHIP RESISTOR 330 OHM 1/10W	2		
R101-109		06753314	CHIP RESISTOR 330 OHM 1/10W	9		
R110		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R111		06753324	CHIP RESISTOR 3.3 K-OHM 1/10W	1		
R112		06056824	RD RESISTOR 6.8 K-OHM 1/6W	1		
R113		06752031	CHIP RESISTOR 20 K-OHM 1/10W	1		
R114		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		

DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
R115		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		
R116		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	1		
R117-118		06751021	CHIP RESISTOR 1 K-OHM 1/10W	2		
R119-120		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	2		
R121-123		06751031	CHIP RESISTOR 10 K-OHM 1/10W	3		
R124-127		06753324	CHIP RESISTOR 3.3 K-OHM 1/10W	4		
R128		06753314	CHIP RESISTOR 330 OHM 1/10W	1		
R129		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		
R130		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	1		
R131		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R132		06752725	CHIP RESISTOR 2.7 K-OHM 1/10W	1		
R133		06753324	CHIP RESISTOR 3.3 K-OHM 1/10W	1		
R134-135		06753314	CHIP RESISTOR 330 OHM 1/10W	2		
R136		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		
R137		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	1		
R138		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R139		06752725	CHIP RESISTOR 2.7 K-OHM 1/10W	1		
R140		06753324	CHIP RESISTOR 3.3 K-OHM 1/10W	1		
R151-152		06753314	CHIP RESISTOR 330 OHM 1/10W	2		
R153		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	1		
R154		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R155		06753334	CHIP RESISTOR 33 K-OHM 1/10W	1		
R156-161		06751014	CHIP RESISTOR 100 OHM 1/10W	6		
R162-164		06751031	CHIP RESISTOR 10 K-OHM 1/10W	3		
R401		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R402		06751041	CHIP RESISTOR 100 K-OHM 1/10W	1		
R403-404		06751014	CHIP RESISTOR 100 OHM 1/10W	2		
R405-408		06751031	CHIP RESISTOR 10 K-OHM 1/10W	4		
R409		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	1		
R410		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R411-412		06751014	CHIP RESISTOR 100 OHM 1/10W	2		
R413-414		06751031	CHIP RESISTOR 10 K-OHM 1/10W	2		
R415		06751041	CHIP RESISTOR 100 K-OHM 1/10W	1		
R416-417		06751031	CHIP RESISTOR 10 K-OHM 1/10W	2		
R418		06752725	CHIP RESISTOR 2.7 K-OHM 1/10W	1		
R419		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R420		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		
R421		06753334	CHIP RESISTOR 33 K-OHM 1/10W	1		
R422		06753324	CHIP RESISTOR 3.3 K-OHM 1/10W	1		
R423		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
RA01		06581022	RESIS. ARRAY 1 K-OHM 1/8W 9EL	1		
RA02		06581024	RESIS. ARRAY 1 K-OHM 1/8W 5EL	1		
RA03-06		06541011	RESIS. ARRAY CHIP V8V101J	4		
RA07-12		06543311	RESIS. ARRAY CHIP V8V331J	6		
RA14-19		06541011	RESIS. ARRAY CHIP V8V101J	6		
REG1		08202011	IC-REG UPC7824	1		
SW1		09030036	SEESAW SWITCH SF-W1P1A03BB2	1		
TA1		07650056	TRANSISTOR ARRAY UPA1428AH	1		
TR01		07013621	CHIP TRANSISTOR 2SA1362GR*85R	1		
TR02		07238754	CHIP TRANSISTOR 2SC3875S-G*AL	1		
TR03-11		07320411	TRANSISTOR 2SD2041	9		S
TR12		07238754	CHIP TRANSISTOR 2SC3875S-G*AL	1		
TR13		07011793	CHIP TRANSISTOR 2SA1179M6-STR	1		
TR14		07308821	TRANSISTOR 2SD882P	1		
TR15		07113591	TRANSISTOR 2SB1359	1		
TR16		07320101	TRANSISTOR 2SD2010	1		

DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
TR17		07238754	CHIP TRANSISTOR 2SC3875S-G*AL	1		
TR18		07113591	TRANSISTOR 2SB1359	1		S
TR19-22		07320101	TRANSISTOR 2SD2010	4		
TR23		07238754	CHIP TRANSISTOR 2SC3875S-G*AL	1		
TR41		07603017	DIGITAL TRANSISTOR FN1A4P	1		
TR42		07603016	DIGITAL TRANSISTOR FA1A4P	1		
TR43		07603017	DIGITAL TRANSISTOR FN1A4P	1		
TR44		07603016	DIGITAL TRANSISTOR FA1A4P	1		
TR45		07238754	CHIP TRANSISTOR 2SC3875S-G*AL	1		
TR46		07011793	CHIP TRANSISTOR 2SA1179M6-STR	1		
VR1		06496821	RP RESISTOR RH0615CS-6.8K	1		
VR2-3		06452234	RP RESISTOR RH0615CS-22K	2		
XTAL		09250064	CERA. OSCILLATOR EFO-EC1605T4	1		
ZD1		08020126	ZENER DIODE CHIP HZU20B2TRF	1		
ZD2		08020090	ZENER DIODE RD7.5EB1T	1		

6. Control Panel Board



DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
CN1		30721310	CABLE UNIT 8X75CC SCP7	1		
LED1-2		08300101	LED GL3KG8	2		
LED3		08300069	LED GL3PR8	1		
R1-3		06052714	RD RESISTOR 270 OHM 1/6W	3		
SW1-3		09010060	PUSH SWITCH SKHHAP	3		