

SERVICE MANUAL



Color Inkjet Printer
EPSON Stylus C 60



EPSON®

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- Typeface
 - Bit map LQ font : EPSON Courier 10 CPI
- Input data buffer
 - 32 KB

1.2.3 Paper Feeding

- Feeding method
 - Friction feed with ASF
- Paper path
 - Cut-sheet ASF (Top entry Front out)
- Feed speed

Table 1-3. Feed speed

Feed condition	Time	Speed
10.16 mm (0.4 inch) feed	110 msec	92.36 mm (3.64 inch)/sec
Continuous feed	140 msec	139.7 mm (5.5 inch)/sec

1.2.4 Paper Specification

1.2.4.1 Plain paper

Table 1-4. Plain paper

Item	Width (mm)	Length (mm)	Thickness (mm)	Weight (g/m ²)	Quality
A4	210	297	0.08-0.11	64-90 (17-24(lb))	Plain paper Reclaimed paper
Letter	215.9	279.4			
Legal	215.9	355.6			
Executive	184.2	266.7			
Half Letter	139.7	215.9			
B5	182	257			
A5	148	210			
A6	105	148			
User defined	89-241.3	89-1117.6			



- Poor quality paper may reduce print quality and cause paper jams or other problems. If you encounter problems, switch to a higher grade of paper.
- Do not load curled or folded paper.
- Use paper under normal conditions ;
 - Temperature 15 to 25°C (59 to 77°F)
 - Humidity 40 to 60% RH

1.3.2 Parallel Interface (Reserve Channel)

- Transmission mode : IEEE-1284 nibble mode
- Adaptable connector : See forward channel
- Synchronization : Refer to the IEEE-1284 specification
- Handshaking : Refer to the IEEE-1284 specification
- Data trans. timing : Refer to the IEEE-1284 specification
- Signal level : IEEE-1284 level 1 device
See forward channel.

Table 1-13. Connector pin assignment and signals

Pin No.	Signal name	Return GND pin	In/Out	Functional description
1	HostClk	19	In	Host clock signal.
2	DATA0	20	In	The DATA0 through DATA7 signals represent data bits 0 to 7, respectively. Each signal is at high level when data is logical 1 and low level when data is logical 0. These signals are used to transfer the 1284 extensibility request values to the printer.
3	DATA1	21	In	
4	DATA2	22	In	
5	DATA3	23	In	
6	DATA4	24	In	
7	DATA5	25	In	
8	DATA6	26	In	
9	DATA7	27	In	
10	PtrClk	28	Out	Printer clock signal.
11	PtrBusy / DataBit-3,7	29	Out	Printer busy signal and reverse channel transfer data bit 3 or 7.
12	AckDataReq / DataBit-2,6	28	Out	Acknowledge data request signal and reverse channel transfer data bit 2 or 6.
13	Xflag / DataBit-1,5	28	Out	X-flag signal and reverse channel transfer data bit 1 or 5.
14	HostBusy	30	In	Host busy signal.
31	-INIT	30	In	Not used.

Table 1-13. Connector pin assignment and signals (continued)

Pin No.	Signal name	Return GND pin	In/Out	Functional description
32	-DataAvail / DataBit-0,4	29	Out	Data available signal and reverse channel transfer data bit 0 or 4.
36	1284-Active	30	In	1284 active signal.
18	Logic-H	-	Out	Pulled up to +5V via 3.9K ohm resistor.
35	+5V	-	Out	Pulled up to +5V via 3.3K ohm resistor.
17	Chassis GND	-	-	Chassis GND.
16,33, 19-30	GND	-	-	Signal GND.
15,34	NC	-	-	Not connected.

NOTE: *In/Out* refers to the direction of signal flow from the printer's point of view.

- Extensibility request

The printer responds affirmatively when the extensibility request values are 00H or 04H, that means,

00H : Request nibble mode reverse channel transfer.

04H : Request Device ID;
Return data using nibble mode reverse channel transfer.

2.1.3 Carriage Mechanism

The Carriage mechanism consists of CR motor, Carriage unit (including the Printhead and CR guide shaft), CR timing belt and CR home position sensor (HP/PE sensor) etc. Following figure shows you each component for the CR mechanism.

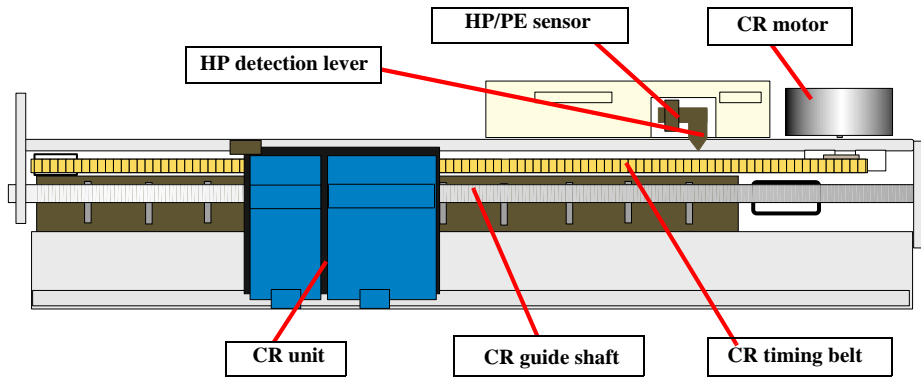


Figure 2-5. Carriage mechanism (Top view)

The following stepping motor controls the CR mechanism on this printer.

Table 2-1. Carriage motor specification

Items	Specifications
Type	4-Phase/ 200-Poles HB Stepping motor
Drive Voltage	+42 V +/- 5% (DRV IC voltage)
Coil Resistance	7.8 Ω +/- 10% (per phase at 25 degrees)
Inductance	14 mH +/- 20% (1KH 1Vrms)
Drive Method	Bi-Polar drive
Driver IC	LB1946

The drive of the CR motor is transmitted to the CR unit via the CR timing belt. And, the CR home position is detected with the HP/PE sensor. This sensor is available as the CR home position sensor while the CR motor operates in each sequence. (The function of this sensor varies depending on the running condition of the motors. It is available as the PE sensor when the PF motor operates in each sequence.)

When the detection plate molded on the CR unit pushes down the HP detection lever and the CR home position is detected with HP/PE sensor, HIGH signal is output to the CPU.

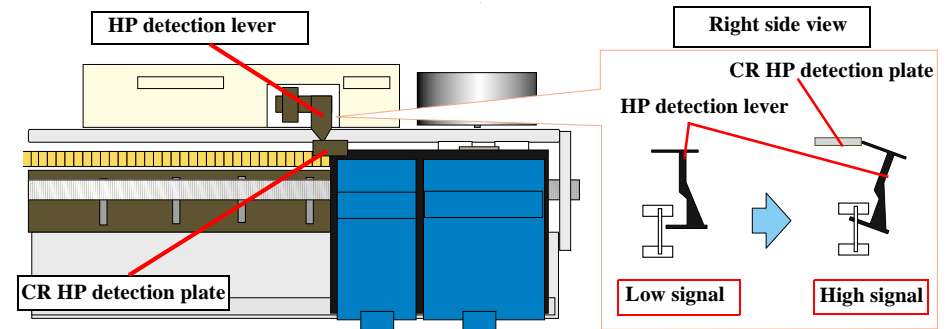


Figure 2-6. CR home position detection

Moreover, like the previous printers (Stylus COLOR 480/580), this printer does not also have the PG adjustment mechanism. Therefore, the CR guide shaft is assembled with the defined PG value (1.7 ± 0.2 mm).

For your reference, in case that the CR home position is not detected with the HP/PE sensor although the CR unit moves correctly, the printer indicates the "Fatal error". And also, in case that the CR unit cannot move outside the home position and the CR home position is not detected with the HP/PE sensor, the printer indicates the "Paper jam error".

- CL1"
 - Ink absorption
Black Ink: 1.55g, Color Ink: 1.55g
 - Wiping operation
Wipes the nozzle plate by the rubber part on the Cap unit.
 - Flashing operation
Prevents color from mixing and stabilizes ink surface inside the nozzle.
- CL2
 - Ink absorption
Black Ink: 0.55g, Color Ink: 0.55g
 - Wiping operation
Wipes the nozzle plate by the rubber part on the Cap unit.
 - Flashing operation
Prevents color from mixing and stabilizes ink surface inside the nozzle.

In case that the manual CL and the nozzle check pattern printing is alternately performed, the CL order is CL1 → CL1' → CL2. (In case that the printer keeps the power off condition more than the specific period, the CL order is CL2 → CL1 → CL1' → CL2 → CL1" → CL2 → CL1 → CL1'.)

Like the previous printers (Stylus COLOR 480/580), CL1 is selected automatically and performed. In case that any printing operation is not performed between each manual CL. Additionally, if the manual CL is performed with over 5 pages printing cycle, CL1 is always selected and performed. Additionally, if either black or color I/C is ink low or end condition, any manual cleaning is prohibited and it is displayed on the LED indicators.

- Timer Cleaning
Like the previous printers (Stylus COLOR 480/580), this printer does not have Timer IC and Lithium battery which is used for the backup power source for Timer IC. So, this printer manages the printer off period or cleaning cycle by using the following method.
The printer driver sends the timer command to the printer before printing. The timer command is generated based on the PC's timer and it consists of year, month, date, hour, minute and second. As soon as the printer receives the timer command from the printer driver, the printer stores its command in address 04 <H> and 05 <H> in the EEPROM. Then, it is compared with the latest CL time which is stored in address 02 <H> and 03 <H> in the EEPROM. And, in case that the timer

cleaning period is over the specific period, the printer performs the timer cleaning automatically. In this time, the printer stores the timer command in 02 <H>, 03 <H>, 04 <H> and 05 <H> of the EEPROM.

Maximum 0.5 ml of the ink is consumed in the timer cleaning. (0.25 ml of each black and color ink is consumed.)

- Flashing
This printer performs the following two kinds of the Flashing for the following purpose.
 - Periodical Flashing
This is due to avoid the increment of both ink's viscosity in the printhead nozzle during the continuous printing and the specific small amount of the ink is ejected in the cap based on the periodical flashing timer.
 - Periodical large amount Flashing
This is due to avoid the increment of black ink's viscosity in the printhead nozzle during the continuous printing and large amount of the ink is ejected in the cap based on the periodical large amount flashing timer.

CHAPTER

3

TROUBLESHOOTING

Table 3-6. Paper jam error condition and possible cause

Error condition	LED indication STM3 message	Occurrence timing	CR position at the power on timing	Unit/Part name	Possible cause	Check table	
Paper jam error	Power : On Error : On Paper jam	Operation	Outside HP	Holder shaft unit	The Torsion spring 0.22 for HP sensor lever comes off.	Refer to Table 3-7	
					The HP/PE sensor cable is not placed correctly.		
			-	-	ASF unit		The Compression spring 29.1 comes off.
					Front frame		The Star wheel comes off.
							The Front frame is bent down.
							The Front frame is not assembled correctly.
					Holder shaft unit		The Torsion spring 0.22 for PE sensor lever comes off.
					Paper eject roller unit		The Paper eject roller shaft comes off. *
							The Spur gear 60 comes off.
Paper guide upper/left	The Paper guide upper/left comes off completely.						

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Table 3-16. Abnormal noise

Error condition	LED indication STM3 message	Occurrence timing	CR position at the power on timing	Unit/Part name	Possible cause	Check table
Abnormal noise	Power : - Error : - No appear	Anywhen	Anywhere	CR unit	The lubrication amount of the grease is insufficient.	Refer to Table 3-17
				Front frame	The Front frame is bent up.	
					The lubrication amount of the grease is insufficient.	
				Paper guide upper/left	The Paper guide upper/left comes off.	
Pump unit	The Change lever is not moved smoothly.					

Table 3-17. Check point for the abnormal noise

Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
Anywhen Anywhere	The abnormal noise occurs at the first power on timing and during each operation although the printing operation is performed.	CR unit	1. Check if the grease on the CR guide shaft is sufficient.	1. Wipe off the remaining grease on the CR guide shaft and lubricate it on its shaft.
		Front frame	1. Check if the grease on the Front frame is sufficient.	1. Wipe off the remaining grease on the Front frame and lubricate it on its frame.
		Pump unit	1. Check if the Change lever moves smoothly.	1. Replace the Printer mechanism with new one.
	The bottom of the CR unit contacts the surface of the Front frame.	Front frame	1. Check if the Front frame is bent up.	1. Replace the Front frame with new one.
	The CR unit collides to the Paper guide upper/left during each operation.	Paper guide upper/ left	1. Check if the Paper guide upper/left comes off from the Main frame.	1. Reassemble the Paper guide upper/left to the Main frame.

4.1.2 Tools







Use only specified tools to avoid damaging of the printer.

Table 4-1. Tools

Name	Supplier	Parts No.
Phillips Screw Driver (No.1)	EPSON	B743800100
Phillips Screw Driver (No.2)	EPSON	B743800200
Nipper	EPSON	B740500100
Tweezers	EPSON	B741000100
POM Puller	EPSON	2035659 (#F749)
Hexagon Box Driver (Opposite side : 5.5 mm)	EPSON	B741700100

4.1.3 Screws

Table 4-2. Screws

No	Name and specification	Outward form	pcs
1	C.B.S. SCREW, 3 x 6, F/Zn		10
2	C.C.S-TITE SCREW, 3 x 6, F/Zn		1
3	C.B.P-TITE SCREW, 3 x 8, F/Zn		3
4	C.B.S. SCREW, 3 x 14, F/Zn		2
5	C.B.S-TITE (P4), 3 x 6, F/Zn		1
6	+BIND B-TITE SEMS W2, 2.5 X 5, F/Zb		1
7	C.B.(O). SCREW, 4 x 5, F/Zg		1
8	C.B.P-TITE SCREW, 3 x 10, F/Zn		1

4.2.4 CR motor removal

1. Remove the Upper housing from the printer. (Refer to Section 4.2.1)
2. Remove the CR unit from the printer. (Refer to Section 4.2.3)
3. Disconnect the CR motor connector cable from the connector (CN12) on the Main board, and release the CR motor connector cable from five hooks on the LD roller shaft holder.
4. Remove four nots (HEXAGON NOT NORMAL M3) for securing the screw of the CR motor while holding the CR motor by hand.



- When the CR motor is removed or replaced with new one, the following adjustment must be performed in the order below.
- 1) Gap adjustment (Bi-d adjustment)
 - 2) 1st dot position adjustment



- When assembling the CR motor to the Main frame,
- Make sure to connect the CR motor connector cable to the connector (CN12) on the Main board.
 - Fasten four Hexagon nut (HEXAGON NUT NORMAL M3) for securing the CR motor in the order indicated in the following figure.

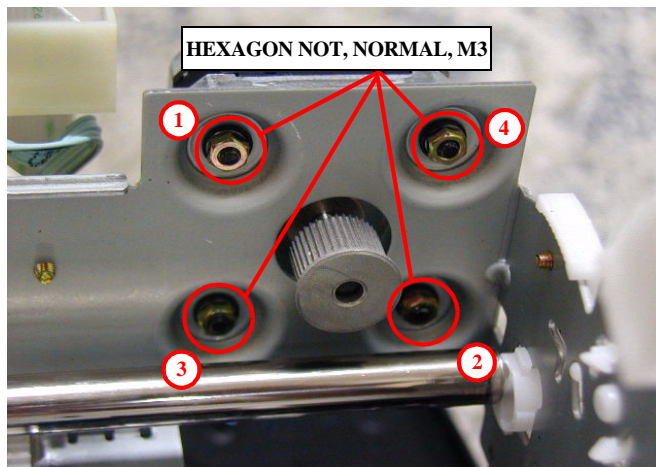


Figure 4-17. CR motor assembling

Tightening torque for the CR motor hexagon nut is as follows.

- HEXAGON NUT, NORMAL, M3 (4 pcs) : 6 ± 1 kgf.cm
- Make sure that the CR motor is correctly fixed.

4.2.8 Circuit board removal

1. Remove the Upper housing from the printer. (Refer to Section 4.2.1)
2. Remove the ASF unit from the printer. (Refer to Section 4.2.5)
3. Release two hooks for securing the SW button to the M/B mounting plate, and remove the SW button.

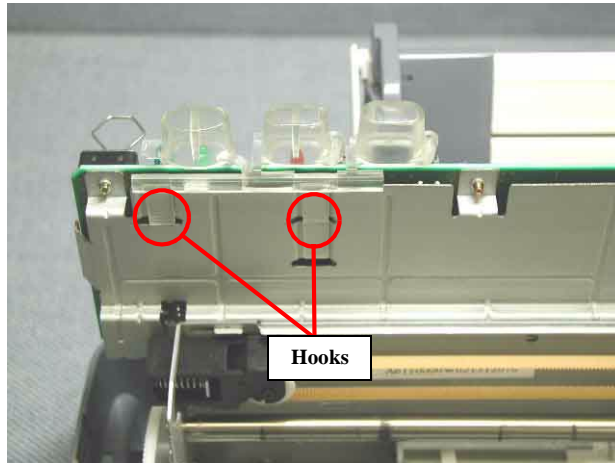


Figure 4-39. SW button removal

4. Disconnect the following six cables from the corresponding connectors on the Main board.
 - CR motor connector cable : CN12
 - PF motor connector cable : CN7
 - Head FFC : CN8, CN9
 - HP/PE sensor cable : CN4
 - Power supply connect cable : CN2

5. Remove four screws (C.B.S. SCREW 3x6 F/Zn, C.B.S. SCREW 3x14 F/Zn) for securing the Main board shield plate and Main board, and remove them.

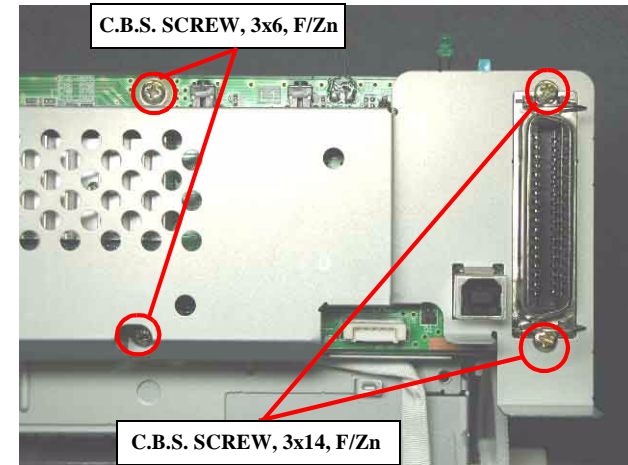


Figure 4-40. Circuit board removal

6. Slide the M/B mounting plate to the left side, and release the four hooks of the M/B mounting plate from the Main board.

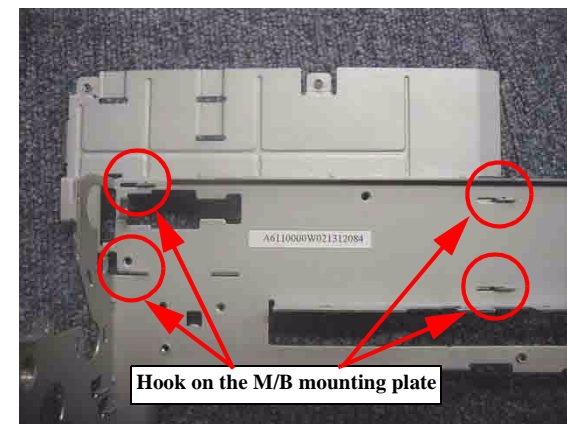


Figure 4-41. Hooks on the M/B mounting plate

10. Remove the Ink system unit (Cap unit and Pump unit) carefully.



- When removing the Ink system unit, be careful so that the gears do not come off from each shaft of the Ink system frame.

11. Remove four gears (Combination gear 16.32, Spur gear 25.6 with the Change lever, Spur gear 27.2, Combination gear 18.28) and the Pump pulley, and get out of the ink tube from the Ink system frame.

12. Remove the Waste drain ink pad under the Cap unit from the Lower housing.



- When getting out of the ink tube, check the marking on the ink tube in advance.

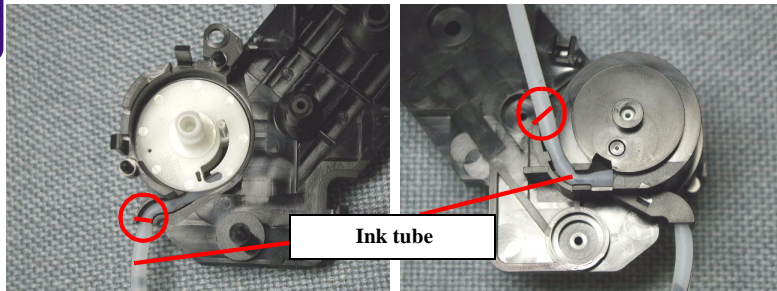


Figure 4-61. Marking position on the Ink tube



- When assembling as the Cap unit,

- Do not touch the sealing rubber portion and the Cleaner head of the Cap unit.
- Be careful not to crash or leave any stress on the Ink tube.
- Make sure to set the marking position of the ink tube as shown figure below.

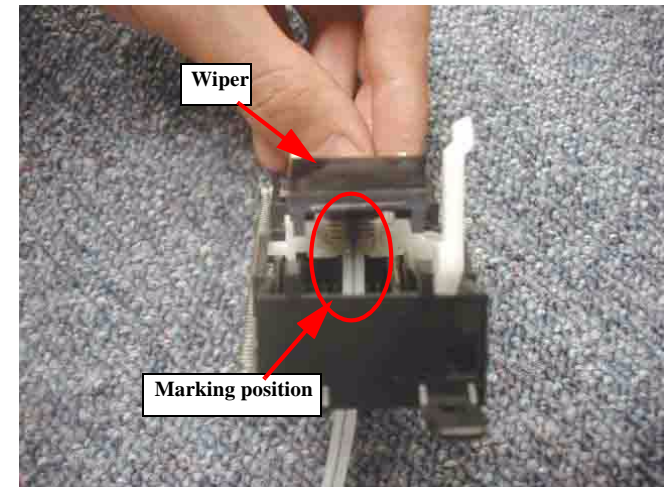


Figure 4-62. Pump tube setting position

6.1.3 Lubrication

The characteristics of the grease have great affects on the mechanical function and durability, especially does the characteristics about temperature environment. The type and amount of the grease used to lubricate the printer parts are determined based on the results of the internal evaluations. Therefore, be sure to apply the specified type and amount of the grease to the specified part of the printer mechanism during servicing.



- Never use oil or grease other than those specified in this manual. Use of different types of oil or grease may damage the component or give bad influence on the printer function.
- Never apply larger amount of grease than specified in this manual.

Table 6-1. Specified lubricants

Type	Name	EPSON code	Supplier
Grease	G-46	1039172	EPSON
Grease	G-58	1082176	EPSON

Table 6-2. Lubrication point

No.	Lubrication type/point	Remarks
1	<p><Lubrication point></p> <ul style="list-style-type: none"> • Along the circle of the CR guide shaft (4 points) Refer to Figure 6-4. <p><Lubrication type></p> <ul style="list-style-type: none"> • G-58 <p><Lubrication amount></p> <ul style="list-style-type: none"> • Total = 100 mg (25 mg for each point) 	<ul style="list-style-type: none"> • Do not attach the grease to other portion of the CR unit. • Use a syringe to apply it. • Move the CR unit from side to side in order to spread it evenly. • After lubrication, make sure that the CR unit moves smoothly.

Table 6-2. Lubrication point

No.	Lubrication type/point	Remarks
2	<p><Lubrication point></p> <ul style="list-style-type: none"> • Groove of the Pulley driven holder. (4 points) Refer to Figure 6-5. <p><Lubrication type></p> <ul style="list-style-type: none"> • G-58 <p><Lubrication amount></p> <ul style="list-style-type: none"> • Φ1mm x 1mm for each point 	<ul style="list-style-type: none"> • Use a syringe to apply it.
3	<p><Lubrication point></p> <ul style="list-style-type: none"> • Middle/Cutout portion of the Front frame. Refer to Figure 6-6. <p><Lubrication type></p> <ul style="list-style-type: none"> • G-58 <p><Lubrication amount></p> <ul style="list-style-type: none"> • Middle : Φ1mm x 300mm • Cutout portion : Φ1mm x 20mm 	<ul style="list-style-type: none"> • Use a syringe to apply it. • After lubrication, move the CR unit from side to side in order to spread it evenly.
4	<p><Lubrication point></p> <ul style="list-style-type: none"> • Upward area of the Paper eject roller (9 points). Then, rotate its roller 180 degrees to the backside of the printer. And lubricate grease on the same points. Refer to Figure 6-8. <p><Lubrication type></p> <ul style="list-style-type: none"> • G-46 <p><Lubrication amount></p> <ul style="list-style-type: none"> • Spread G-46 evenly by using the brush 	<ul style="list-style-type: none"> • Use a brush to apply it. <p>[Note] You need not to perform this lubrication unless the this part is established for the service part.</p>
5	<p><Lubrication point></p> <ul style="list-style-type: none"> • Upward teeth area of the Spur gear 60. Then, rotate it 90 degrees to the backside of the printer. Refer to Figure 6-9. <p><Lubrication type></p> <ul style="list-style-type: none"> • G-58 <p><Lubrication amount></p> <ul style="list-style-type: none"> • Φ1mm x 20mm 	<ul style="list-style-type: none"> • Use a syringe to apply it. • Do not touch the lubrication area. <p>[Note] You need not to perform this lubrication unless the this part is established for the service part.</p>

7.2 Component Layout

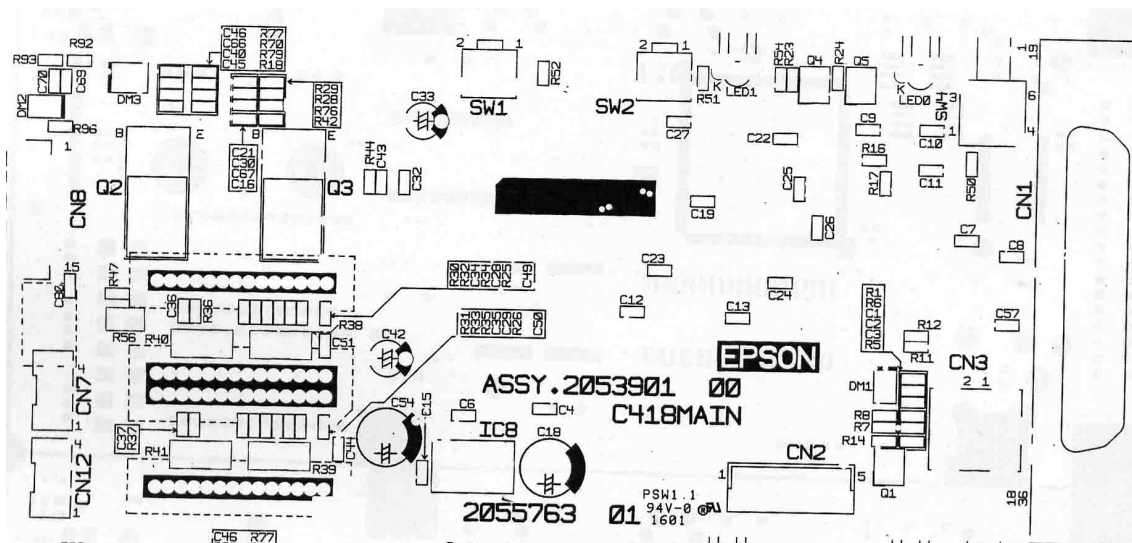


Figure 7-2. C418 Main board component layout (1)

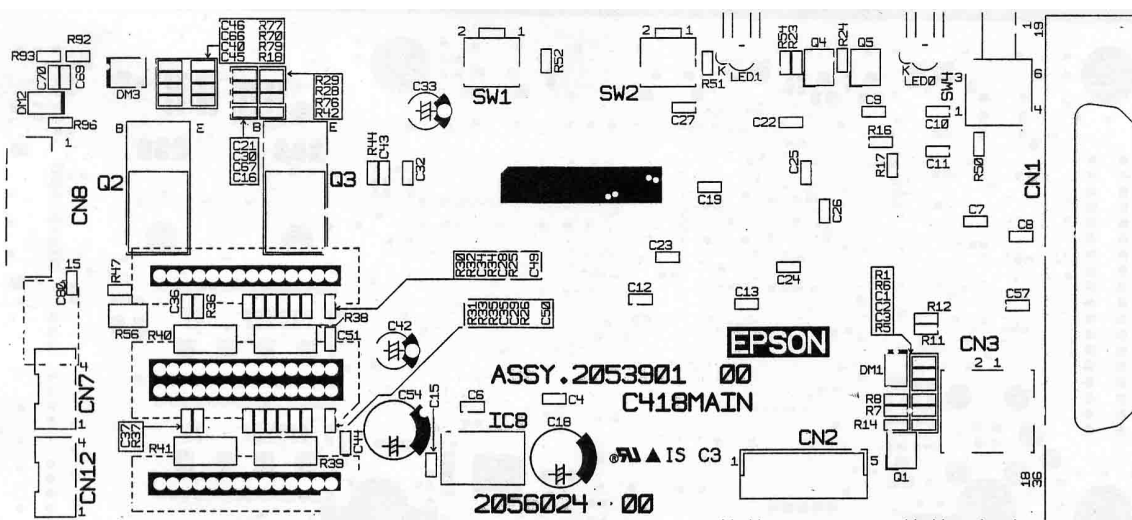


Figure 7-3. C418 Main board component layout (2)

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