

SERVICE MANUAL



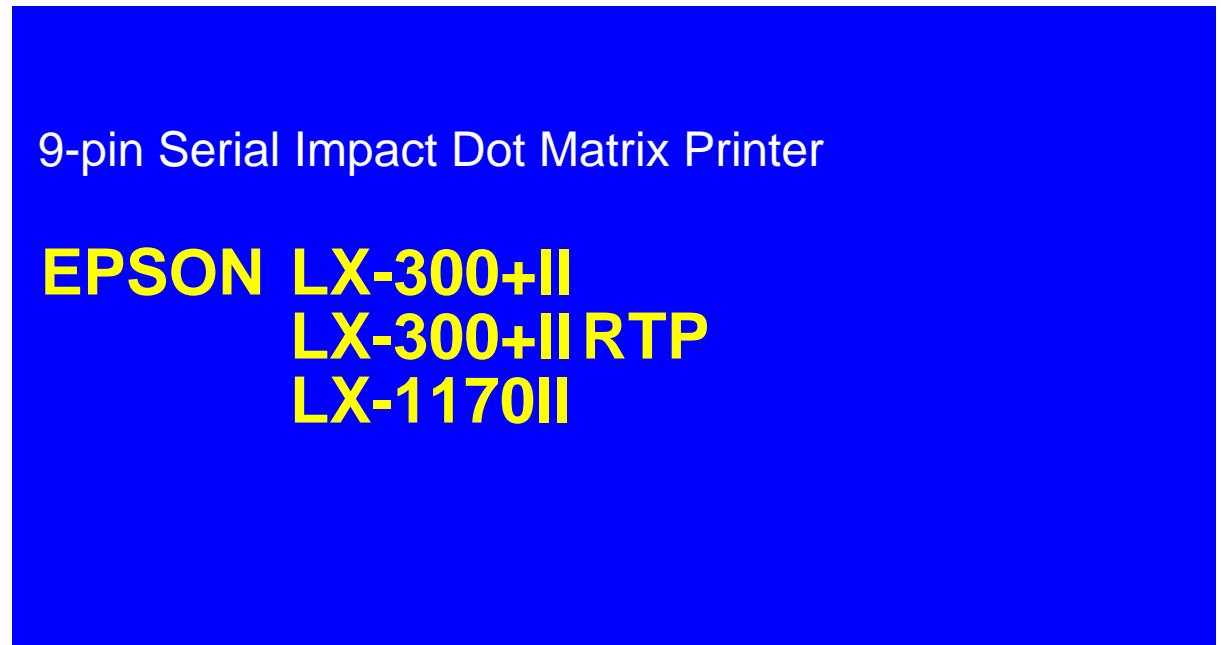
LX-300+II



LX-300+II
RTP



LX-1170II



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PRECAUTIONS

Precautionary notations throughout the text are categorized relative to 1)Personal injury and 2) damage to equipment.

DANGER Signals a precaution which, if ignored, could result in serious or fatal personal injury. Great caution should be exercised in performing procedures preceded by DANGER Headings.

WARNING Signals a precaution which, if ignored, could result in damage to equipment.

The precautionary measures itemized below should always be observed when performing repair/maintenance procedures.

DANGER

1. ALWAYS DISCONNECT THE PRODUCT FROM THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURES.
2. NO WORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.
3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS.
4. WHEN DISASSEMBLING OR ASSEMBLING A PRODUCT, MAKE SURE TO WEAR GLOVES TO AVOID INJURIES FROM METAL PARTS WITH SHARP EDGES.
5. WHEN USING COMPRESSED AIR PRODUCTS, SUCH AS AIR DUSTER, FOR CLEANING DURING REPAIR AND MAINTENANCE, THE USE OF SUCH PRODUCTS CONTAINING FLAMMABLE GAS IS PROHIBITED.

WARNING

1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.
2. MAKE CERTAIN THAT THE SOURCE VOLTAGES IS THE SAME AS THE RATED VOLTAGE, LISTED ON THE SERIAL NUMBER/RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.
3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS.
4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.
5. DO NOT REPLACE IMPERFECTLY FUNCTIONING COMPONENTS WITH COMPONENTS WHICH ARE NOT MANUFACTURED BY EPSON. IF SECOND SOURCE IC OR OTHER COMPONENTS WHICH HAVE NOT BEEN APPROVED ARE USED, THEY COULD CAUSE DAMAGE TO THE EPSON PRODUCT, OR COULD VOID THE WARRANTY OFFERED BY EPSON.

About This Manual

This manual describes basic functions, theory of electrical and mechanical operations, maintenance and repair procedures of the printer. The instructions and procedures included herein are intended for the experienced repair technicians, and attention should be given to the precautions on the preceding page.

Manual Configuration

This manual consists of six chapters and Appendix.

CHAPTER 1.PRODUCT DESCRIPTIONS

Provides a general overview and specifications of the product.

CHAPTER 2.OPERATING PRINCIPLES

Describes the theory of electrical and mechanical operations of the product.

CHAPTER 3.TROUBLESHOOTING

Describes the step-by-step procedures for the troubleshooting.

CHAPTER 4.DISASSEMBLY / ASSEMBLY

Describes the step-by-step procedures for disassembling and assembling the product.

CHAPTER 5.ADJUSTMENT

Provides Epson-approved methods for adjustment.

CHAPTER 6.MAINTENANCE

Provides preventive maintenance procedures and the lists of Epson-approved lubricants and adhesives required for servicing the product.

APPENDIXProvides the following additional information for reference:

- Connector pin assignments
- Electric circuit boards components layout
- Electrical circuit boards schematics
- Exploded diagram & Parts List

Symbols Used in this Manual

Various symbols are used throughout this manual either to provide additional information on a specific topic or to warn of possible danger present during a procedure or an action. Be aware of all symbols when they are used, and always read NOTE, CAUTION, or WARNING messages.



Indicates an operating or maintenance procedure, practice or condition that is necessary to keep the product's quality.



Indicates an operating or maintenance procedure, practice, or condition that, if not strictly observed, could result in damage to, or destruction of, equipment.



May indicate an operating or maintenance procedure, practice or condition that is necessary to accomplish a task efficiently. It may also provide additional information that is related to a specific subject, or comment on the results achieved through a previous action.



Indicates an operating or maintenance procedure, practice or condition that, if not strictly observed, could result in injury or loss of life.

Revision Status

Revision	Issued Date	Description
A	May 11, 2006	First Release
B	August 4, 2006	<p>Revision:</p> <ul style="list-style-type: none"> • page -10, 13, 106 Input buffer: 8Kbytes-> 64Kbytes • page -10 Total print volume-> Mean print volume between failure (MVBF)(MTBF 25% duty cycle) • page -35 Reply EEPROM data in the specific address request for LX-300+II is added • page -35 Reply EEPROM data in the specific address request for LX-1170II is added • page -37 Total thickness (Maximum): (0.015) -> (0.0154) • page -38 Total thickness (Maximum): (0.015) -> (0.0154) • page -87-93 Descriptions on adjustment are added. • page -106 3BH: TEAR OFF/BIN Function -> TEAR OFF function • page -107 3CH: Font selection -> Font function • page -107 75H-7BH is added. • page -107 7CH is added. • page -107 7DH is added. • page -107 7EH is added. • page -107 7FH is added.
C	May 25, 2007	<ul style="list-style-type: none"> • Page -63 Resistance values of the CR motor and PF motor are corrected.
D	March 19, 2010	CHAPTER 7 LX-300+II RTP is added.

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CHAPTER

1

PRODUCT DESCRIPTION

1.1 FEATURES

EPSON LX-300+II/300+II RTP/1170II is a 9 pin serial impact dot matrix printer. The main difference between LX-300+II and LX-1170II is the width: 80 columns for LX-300+II and 136 columns for LX-1170II. The major features are as follows:

- Printing speed: High speed draft 300 cps at 10 cpi
High speed draft 337 cps at 12cpi (LX-300+II only)
Draft 225 cps at 10 cpi
NLQ 56 cps at 10 cpi
- Feeding method: Friction feed (rear)
Push tractor feed (rear)
Push and Pull tractor feed (rear)
Pull tractor feed (rear, bottom)
- Feeder: Rear push tractor, CSF single-bin (Option),
Pull tractor (Option) and Roll paper holder (Option)
- Paper/ Media: Single sheet, Continuous paper, Multi part paper,
Envelope, Label and Roll paper
- Fonts: 2NLQ and 1 Draft Bitmap typefaces
8 Barcode fonts
- Character tables: Standard version 13 tables
NLSP version 38 tables
- Input buffer: 64 Kbytes
- Acoustic noise: 49 dB(A) (ISO 7779 pattern)
- Reliability: Mean print volume between failure (MVBF)(MTBF 25% duty cycle) 12 million lines (except printhead)
MTBF 6000 POH (25% Duty)
Printhead life 400 million strokes/ wire
Ribbon life 3 million characters
For details, see "Reliability" (p. 14)
- Interface: Bi-directional parallel interface
(IEEE-1284 nibble mode supported)
Serial I/F
USB (ver 1.1) I/F

- Control code: LX-300+II ESC/P and IBM 2380 Plus emulation
LX-1170II ESC/P and IBM 2381 Plus emulation
- Copy capability: 1 original + 4 copies
- Control panel functions: Font, Pause, Tear off, LF/FF, Load/ Eject,
Micro Adjust, Self test, Data dump
and the default settings

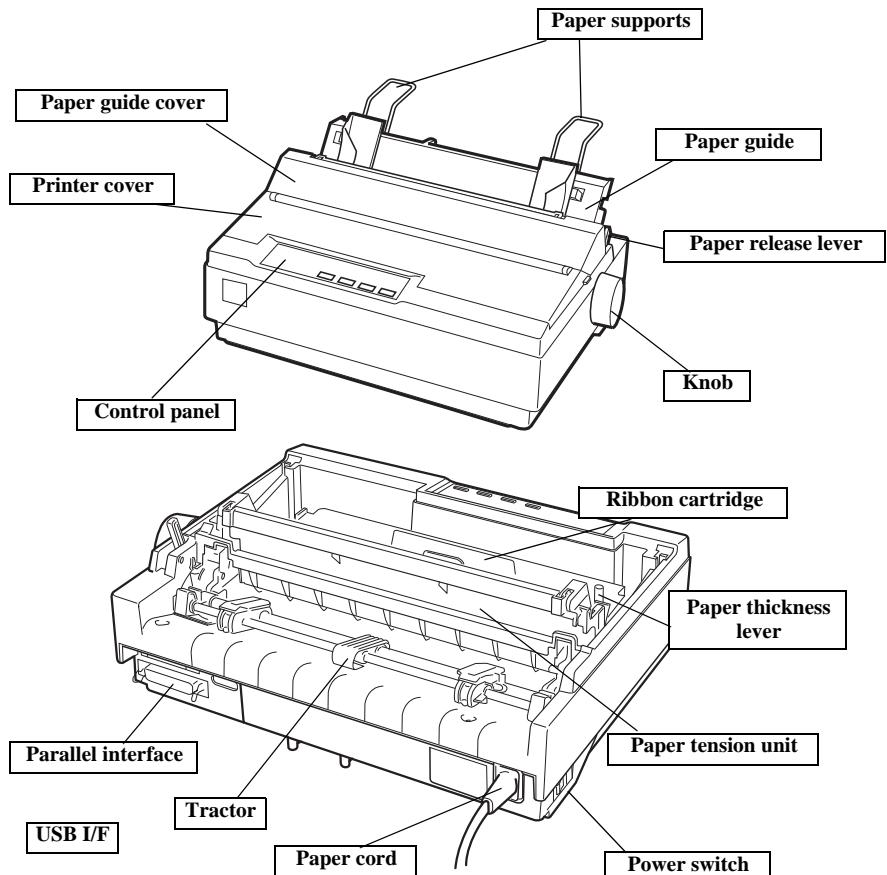


Figure 1-1. EPSON LX-300+II/300+II RTP/1170II Printer Parts

1.2 SPECIFICATIONS

1.2.1 Printing Specification

- Print method: Impact dot matrix
- Number of pins: 9 pins
- Print pin arrangement: 9 x 1
- Print pin diameter: 0.29 mm (0.0114 inch)
- Color (Option): Black,
Magenta, Cyan, Yellow (LX-300+II only)
- Print direction: Bi-direction with logic seeking
- Print speed and printable columns:

Table 1-1. Print Speed and Printable Columns

Printing mode	Character pitch (cpi)	Printable columns		Printing speed 9:15(cps)
		LX-300+II	LX-1170II	
High speed draft	10	80	136	300
	12	96	163	337
	15	120	204	337
High speed draft condensed	17	137	233	321
	20	160	272	300
Draft	10	80	136	225
	12	96	163	270
	15	120	204	225
Draft condensed	17	137	233	191
	20	160	272	225
Draft emphasized	10	80	136	112

Table 1-1. Print Speed and Printable Columns (continued)

Printing mode	Character pitch (cpi)	Printable columns		Printing speed 9:15(cps)
		LX-300+II	LX-1170II	
NLQ	10	80	136	56
	12	96	163	67
	15	120	204	56
	17	137	233	47
	20	160	272	56

Note1: When the power supply voltage drops to the lower limit, the printer stops printing and then starts printing the rest on the line more slowly than before.

Note2: When the head temperature rises to the upper limit, the printer stops printing. When the head temperature falls to the normal level, the printer starts printing again.

- Resolution:

Table 1-2. Resolution

Printing mode	Horizontal density (dpi)	Vertical density (dpi)	Adjacent dot print
High speed draft	90	72	No
Draft	120	72	No
Draft condensed	240	72	No
Draft emphasized	120	72	Yes
NLQ	240	144	No
Bit image	60, 72, 80, 90 or 120	72	Yes
	120 or 240	72	No

- Control code:

LX-300+II ESC/P and IBM 2380 Plus emulation
 LX-1170II ESC/P and IBM 2381 Plus emulation
 (Refer to 1.5 "Control codes")

Character tables:**■ Standard version (13 character table)**

Italic table	PC437 (US, Standard Europe)
PC850 (Multilingual)	PC860 (Portuguese)
PC863 (Canadian-French)	PC865 (Nordic)
PC861 (Icelandic)	BRASCI
Abicomp	Roman 8
ISO Latin 1	PC858
ISO 8859-15	

■ NLSP version (38 character tables)

Italic table	PC437 (US, Standard Europe)
PC850 (Multilingual)	PC437 Greek
PC853 (Turkish)	PC437 Slovenia
PC852 (East Europe)	PC855 (Cyrillic)
PC866 (Russian)	PC857 (Turkish)
PC869 (Greek)	MAZOWIA (Poland)
Code MJK (CSFR)	ISO 8859-7 (Latin / Greek)
ISO Latin 1T (Turkish)	Bulgaria (Bulgarian)
PC774 (LST 1283:1993)	Estonia (Estonia)
ISO 8859-2	PC 866 LAT. (Latvian)
PC866 UKR (Ukrainia)	PC860 (Portuguese)
PC861 (Icelandic)	PC865 (Nordic)
PC APTEC (Arabic)	PC708 (Arabic)
PC720 (Arabic)	PCAR864 (Arabic)
PC863 (Canadian-French)	Abicomp
BRASCI	Roman 8
ISO Latin 1	Hebrew 7 ^{*1}
Hebrew 8 ^{*1}	PC862 (Hebrew) ^{*1}
PC858	ISO 8859-15
PC771 (Lithuania)	PC1250
PC MC	PC1251

*NOTE.*1: This item is not displayed in a default setting mode.*

Only for customized models.

 International character sets: 13 countries

U.S.A	France	Germany	U.K.
Denmark 1	Sweden	Italy	Spain 1
Japan	Norway	Denmark 2	Spain 2
	Latin America		

*NOTE:The international and legal characters are the following 12 codes;
23H, 24H, 40H, 5BH, 5CH, 5DH, 5EH, 60H, 7BH, 7CH, 7DH, 7EH.*

 Typeface**■ Bit map fonts:**

EPSON Draft	10cpi, 12cpi, 15cpi
EPSON Roman	10cpi, 12cpi, 15cpi, Proportional
EPSON Sans serif	10cpi, 12cpi, 15cpi, Proportional
EPSON OCR-B	10cpi ^{*1}

*NOTE: *1: Only for customized models.*

 Bar codes

EAN-13	EAN-8	Interleaved 2 of 5
UPC-A	UPC-E	Code 39
Code 128	POSTNET	Coda bar (NW-7) ^{*1}
Industrial 2 of 5 ^{*1}	Matrix 2 of 5 ^{*1}	

*NOTE: *1: Only for customized models.*

- Character tables and typefaces:

Table 1-3. Character Tables and Typefaces

	Character table		Bitmap font
Standard Version	Italic table PC 437 (US, Standard Europe)		EPSON Draft EPSON Roman EPSON Sans serif EPSON OCR-B
	PC 850 (Multilingual) PC 860 (Portuguese) PC 863(Canadian-French) PC 865 (Nordic) PC 861 (Icelandic)	BRASCI Abicomp Roman 8 ISO Latin 1 PC 858 ISO 8859-15	EPSON Draft EPSON Roman EPSON Sans serif
NLSP version	Italic table PC 437(US, Standard Europe)		EPSON Draft EPSON Roman EPSON Sans serif EPSON OCR-B
	PC 860(Portuguese) PC 865(Nordic) BRASCI Roman 8 PC437 (Greek) PC 855 (Cyrillic) PC 857 (Turkish) PC 869 (Greek) Code MJK (CSFR) ISO Latin 1T (Turkish) PC774 (LST 1283: 1993) 1ISO 8859-2 PC 866 UKR (Ukrania) PC 708 (Arabic) PCAR864 (Arabic) Hebrew 8* ¹ PC 858 PC 771 (Lithuania) PC 437 (Slovenia) PC 1250	PC 850 (Multilingual) PC 861 (Icelandic) PC863 (Canadian-French) Abicomp lSOLatin1 PC 853 (Turkish) PC 852 (East Europe) PC 866 (Russian) MAZOWIA (Poland) ISO 8859-7 (Latin/Greek) Bulgaria (Bulgarian) Estonia (Estonia) PC 866 LAT. (Latvian) PC APTEC (Arabic) PC 720 (Arabic) Hebrew7* ¹ PC862 (Hebrew)* ¹ ISO 8859-15 PC MC PC 1251	EPSON Draft EPSON Roman EPSON Sans serif

Note: ESC R command is effective on all the character tables.

*1: These items are not displayed in the default setting mode. Only for customized models.

1.2.2 Paper Feeding

- Feeding method: Friction feed (rear)
Push tractor feed (rear)
Push and Pull tractor feed (rear)
Pull tractor feed (rear, bottom)
- Feeder: Rear push tractor, CSF single-bin (Option), Pull tractor (Option) and Roll paper holder (Option)
- Paper path: Manual insertion Rear in, top out
CSF Rear in, top out
Push Tractor Rear in, top out
Pull Tractor Rear or bottom in, top out
- Line spacing: 4.23 mm (1/6 inch) or programmable in increments of 0.118 mm (1/216 inch)
- Feed speed: 4.23 mm (1/6 inch feed)
LX-300+II 88 msec
LX-1170II 63 msec
Continuous feed 0.76 MPS (m/sec)
[3.0 IPS (inches/sec)]
- Input Data Buffer: 64Kbytes
- Release lever:
The release lever must be set according to the following table;

Table 1-4. Release Lever

Lever position	Paper path/ Feeder	Paper/ Media
Friction	Manual insertion (rear)	Cut sheet (Single sheet and Multi part) Envelop
	CSF single-bin	Cut sheet (Single sheet)
	Roll paper holder feed (rear)	Roll paper
Tractor	Push tractor feed (rear)	Continuous paper (Single sheet and Multi part)
	Push and Pull tractor feed (rear)	Continuous paper (Single sheet and Multi part)
	Pull tractor feed (rear)	Continuous paper (Single sheet and Multi part)
	Pull tractor feed (bottom)	Continuous paper (Single sheet and Multi part) Labels

Paper thickness lever:

The paper thickness lever must be set at the proper position as shown below.

Table 1-5. Paper Thickness Lever

LX-300+II			LX-1170II			
Lever position	Paper thickness (inch)		Paper thickness (mm)	Paper thickness (inch)		Paper thickness (mm)
	Min.	Max.		Min.	Max.	
—1	—	—	—	—	—	—
0	(0.0024)	(0.0071)	over 0.06 up to 0.18	(0.0024)	(0.0071)	over 0.06 up to 0.18
1	(0.0071)	(0.0102)	over 0.18 up to 0.26	—	—	—
2	(0.0102)	(0.0130)	over 0.26 up to 0.33	(0.0071)	(0.0102)	over 0.18 up to 0.26
3	(0.0130)	(0.0154)	over 0.33 up to 0.39	—	—	—
4	(0.0154)	(0.0205)	over 0.39 up to 0.52	(0.0102)	(0.0130)	over 0.26 up to 0.33
5	—	—	—	(0.0130)	(0.0154)	over 0.33 up to 0.39
6	—	—	—	(0.0154)	(0.0205)	over 0.39 up to 0.52

1.2.3 Electrical Specification

Table 1-6. Electrical Specification

	120V version	230V version
Rated voltage	AC 120 V	AC 220 to 240 V
Input voltage range	AC 99 to 132 V	AC 198 to 264 V
Rated frequency range	50 to 60 Hz	
Input frequency range	49.5 to 60.5 Hz	
Rated current	0.6 A (max. 1.4 A)	0.3 A (max. 0.7 A)
Power consumption	Approx. 23 W (ISO/IEC 10561 Letter pattern) Energy Star Compliant	
Dielectric strength	AC 1000 Vrms. 1 min. or AC 1200 Vrms. 1 sec. (between AC line and chassis)	AC 1500 Vrms. 1 min. (between AC line and chassis)

1.2.4 Environmental Condition

- Temperature: 5 to 35 °C (operating*¹)
15 to 25 °C (operating*^{1,*2})
-30 to 60 °C (non-operating)
- Humidity: 10 to 80% RH (operating*¹)
30 to 60% RH (operating*^{1,*2})
0 to 85% RH (non-operating*¹)
- Resistance to shock: 1 G, within 1 ms (operating)
2 G, within 2 ms (non-operating*³)
- Resistance to vibration: 0.25 G, 10 to 55 Hz (operating)
0.50 G, 10 to 55 Hz (non-operating*³)

*1: without condensation

*2: during printing on reclaimed paper, multi part paper, envelop, label or roll paper.

*3: without shipment container

1.2.5 Reliability

- Mean print volume between failure (MVBF)(MTBF 25% duty cycle):
12 million lines (except printhead)
- MTBF: 6000 POH(25% Duty)
- Printhead life: Black 400 million strokes / wire
Color 100 million strokes / wire (LX-300+II only)

1.2.6 Ribbon Cartridge

Table 1-7. Ribbon Cartridge

	Black Cartridge	Color Cartridge*1
Type	Fabric	
Color	Black	Black, Magenta, Cyan and Yellow
Ribbon life*2	3 million characters	Black : 1 million characters Magenta : 0.7 million characters Cyan : 0.7 million characters Yellow : 0.5 million characters

*1 LX-300+II only

*2 Draft 10 cpi, 14 dots/character

1.2.7 Safety Approvals

- LX-300+II

Table 1-8. Safety Approvals (LX-300+II)

	Type	Standards
120V version	Safety standards	UL60950 CSA C 22.2 No.60950
	EMI	FCC part15 subpart B class B CAN/CSA-CEI/IEC CISPR22 Class B
230V version	Safety standards	EN60950
	EMC	EN55022 class B EN61000-3-2 EN61000-3-3 EN55024 AS/NZS CISPR22 class B

- LX-1170II

Table 1-9. Safety Approvals (LX-1170II)

	Type	Standards
230V version	Safety standards	EN60950
	EMC	EN55022 class B EN61000-3-2 EN61000-3-3 EN55024

1.2.8 CE Marking

230 V & UPS version:

- Low voltage directive 73/23/EEC: EN60950
- EMC Directive 89/336/EEC: EN55022 class B
EN61000-3-2
EN61000-3-3
EN55024

1.2.9 Recommended Printable Area

NOTE: For best results, print within the recommended printable area. The printer may not print outside this area.

- Cut sheets

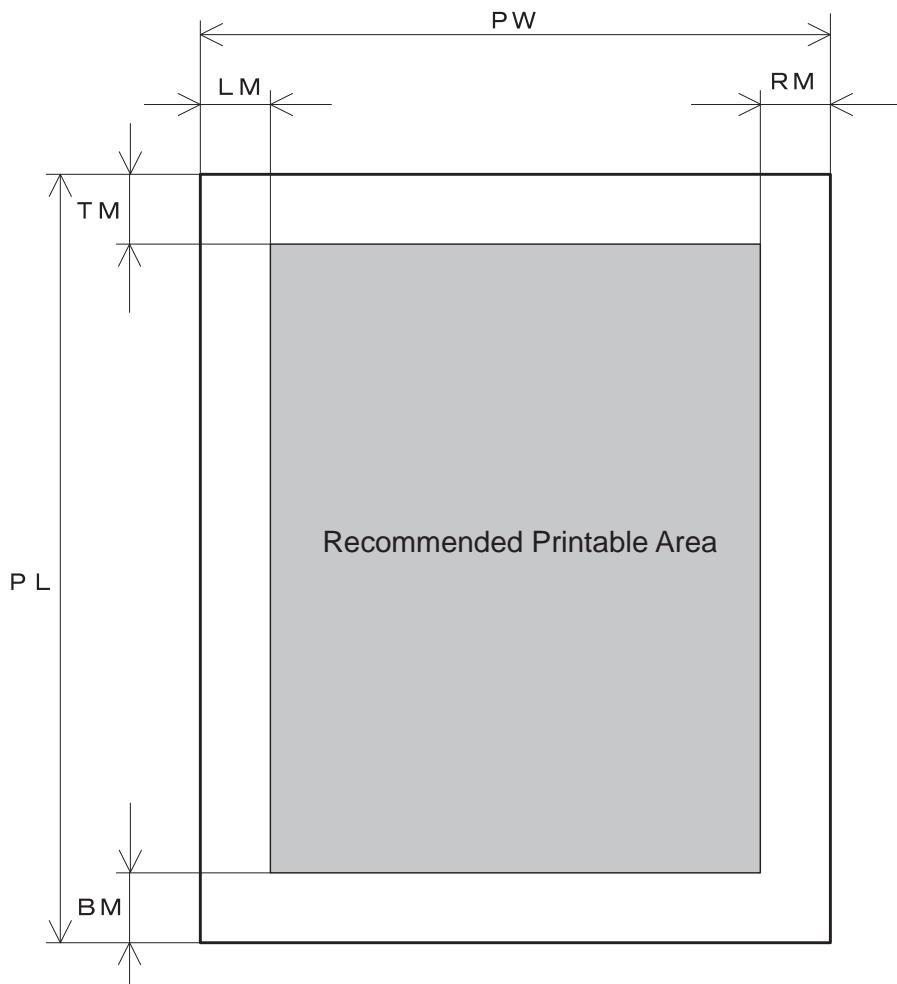


Figure 1-2. Recommended Printable Area for Cut Sheet

Table 1-10. Recommended Printable Area for Cut Sheet

	Single Sheet	Multi Part
PW (Width)	Refer to 1.7 "Paper Specifications"	Refer to 1.7 "Paper Specifications"
PL (Length)	Refer to 1.7 "Paper Specifications"	Refer to 1.7 "Paper Specifications"
LM (Left Margin)	LX-300+II: 3 mm or more (PW<=229 mm) 24mm or more(PW=257 mm) LX-1170II: 3 mm or more (PW<=364 mm) 29mm or more(PW=420 mm)	LX-300+II: 3 mm or more (PW<=229 mm) 24mm or more(PW=257 mm) LX-1170II: 3 mm or more (PW<=364 mm) 29mm or more(PW=420 mm)
RM (Right Margin)	LX-300+II: 3 mm or more (PW<=229 mm) 24mm or more(PW=257 mm) LX-1170II: 3 mm or more (PW<=364 mm) 29mm or more(PW=420 mm)	LX-300+II: 3 mm or more (PW<=229 mm) 24mm or more(PW=257 mm) LX-1170II: 3 mm or more (PW<=364 mm) 29mm or more(PW=420 mm)
TM (Top Margin)	4.2 mm or more	4.2 mm or more
BM (Bottom Margin)	4.2 mm or more	4.2 mm or more

NOTE: The maximum horizontal recommended printable area is 203.2 mm for LX-300+II/ 345.44 for LX-1170II.

Envelop

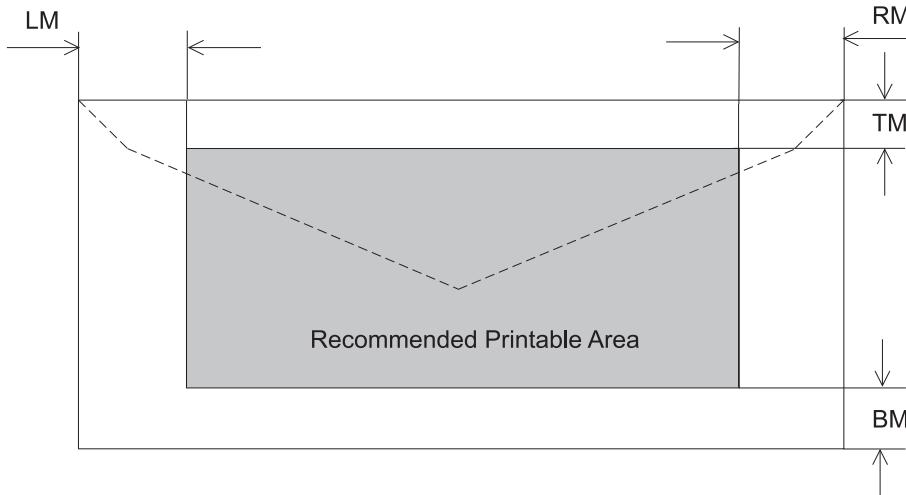


Figure 1-3. Recommended Printable Area for Envelop

Table 1-11. Recommended Printable Area for Envelop

Envelope	
PW (Width)	Refer to 1.7 "Paper Specifications"
PL (Length)	Refer to 1.7 "Paper Specifications"
LM (Left Margin)	3 mm or more
RM (Right Margin)	3 mm or more
TM (Top Margin)	4.2 mm or more
BM (Bottom Margin)	4.2 mm or more

NOTE: The maximum horizontal recommended printable area is 203.2mm.

Continuous paper

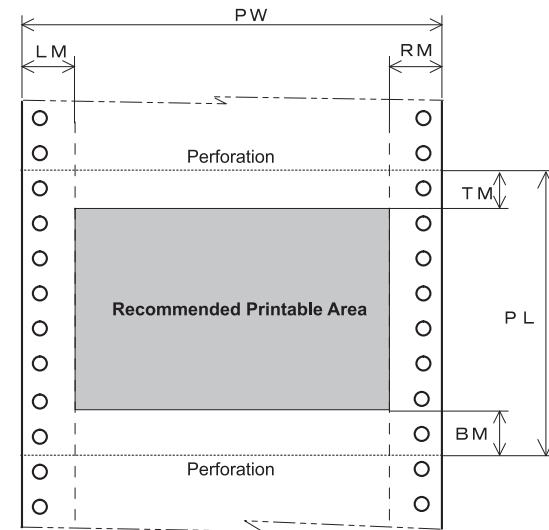


Figure 1-4. Recommended Printable Area for Continuous Paper

Table 1-12. Recommended Printable Area for Continuous Paper

	Continuous Paper	
	LX-300+II	LX-1170II
PW (Width)	Refer to 1.7 "Paper Specifications"	
PL (Length)	Refer to 1.7 "Paper Specifications"	
LM (Left Margin)	13 mm or more (PW<=254 mm) 24mm or more(PW=254 mm)	13 mm or more (PW<=377.8mm) 18 mm or more(PW=406.4 mm)
RM (Right Margin)	13 mm or more (PW<=254 mm) 24mm or more(PW=254 mm)	13 mm or more (PW<=377.8mm) 18 mm or more(PW=406.4 mm)
TM (Top Margin)	4.2 mm or more	
BM (Bottom Margin)	4.2 mm or more	

NOTE: The maximum horizontal recommended printable area is 203.2mm for LX-300+II/345.44 for LX-1170II.

Roll paper

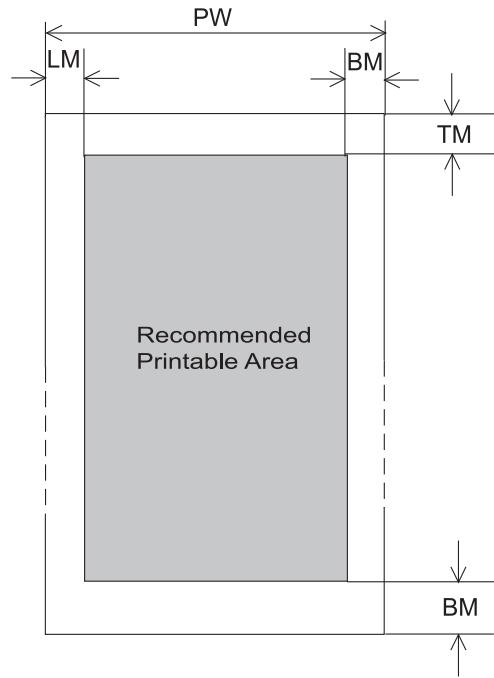


Figure 1-5. Recommended Printable Area for Roll Paper

Table 1-13. Recommended Printable Area for Roll Paper

Continuous Paper	
PW (Width)	Refer to 1.7 "Paper Specifications"
PL (Length)	Refer to 1.7 "Paper Specifications"
LM (Left Margin)	3 mm or more
RM (Right Margin)	3 mm or more
TM (Top Margin)	4.2 mm or more
BM (Bottom Margin)	4.2 mm or more

NOTE: The maximum horizontal recommended printable area is 203.2mm for LX-1170II.

1.3 Interface Specifications

LX-300+II/LX-1170II is provided with bi-directional 8 bit parallel interface and serial interface and USB interface. Optional interface board is not supported on this model.

1.3.1 Parallel Interface (Forward Channel)

- Transmission mode: 8 bit parallel
IEEE-1284 compatibility mode
- Adaptable connector: 57-30360 (Amphenol) or equivalent
- Synchronization: -STROBE pulse
- Handshaking: BUSY and -ACKLG signals
- Signal level: TTL compatible
(IEEE-1284 level 1 device)

Table 1-14. Parameter

Parameter	Minimum	Maximum	Condition
V_{OH}^*	--	5.5V	
V_{OL}^*	-0.5V	--	
I_{OH}^*	--	0.32mA	$V_{OH}=2.4V$
I_{OL}^*	--	12mA	$V_{OL}=2.4V$
C_O	--	50pF	
V_{IH}	--	2.0V	
V_{IL}	0.8V	--	
I_{IH}	--	0.32mA	$V_{IH}=2.0V$
I_{IL}	--	12mA	$V_{IL}=0.8V$
C_I	--	50pF	

NOTE: *Logic-H signal is 2.0V or lower when the printer is off and the signal is 3.0V or higher when the printer is on. The receiver has impedance which is equivalent to $7.5\text{ k}\Omega$

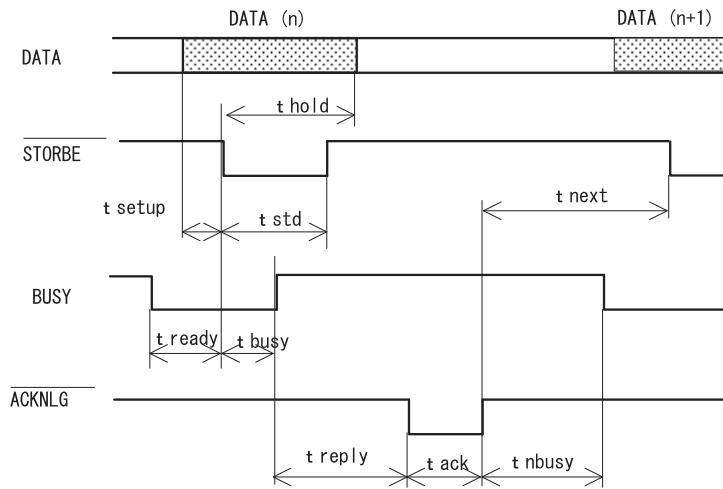


Figure 1-6. Data Transmitting Timing

Table 1-15. Maximum & Minimum Timings for Data Transmission

Parameter	Minimum	Maximum
t_{setup}	500 nsec	--
t_{hold}	500 nsec	--
t_{stb}	500 nsec	--
t_{ready}	0	--
t_{busy}	--	500 nsec
t_{reply}	--	--
t_{ack}	500 nsec	10 us
t_{nbusy}	0	--
t_{next}	0	--
t_{tout}^*	--	120 nsec
t_{tin}^{**}	--	200 nsec

NOTE: * Rise and fall time of output signals.

** Rise and fall time of input signals.

- BUSY signal is active (HIGH level) under the conditions below:
 - In the process of receiving data
 - In the condition of being input buffer full
 - In the condition of being -INIT signal active (low level)
 - During hardware initialization
 - In the condition of being -ERROR or PE signal is active (low level, high level, respectively)
 - In the self test mode
 - In the adjustment mode
 - In the default-setting mode

- ERROR signal is active (low level) under the conditions below:
 - In the condition of the printer hardware error (fatal error)
 - In the condition of a paper-out error
 - In the condition of a release lever error

- PE signal is active (high level) under the condition below:
 - In the condition of a paper-out error

Table 1-16. Connector Pin Assignment and Signals (Forward Channel)

Pin No.	Signal Name	Return GND Pin	In/Out	Functional Description
1	-STROBE	19	In	Strobe pulse. Input data is latched at falling edge of the signal.
2	DATA1	20	In	Parallel input data to the printer. bit 0: LSB
3	DATA2	21	In	bit 1
4	DATA3	22	In	bit 2
5	DATA4	23	In	bit 3
6	DATA5	24	In	bit 4
7	DATA6	25	In	bit 5
8	DATA7	26	In	bit 6
9	DATA8	27	In	bit 7: MSB
10	-ACKNLG	28	Out	This signal (negative pulse) indicates that the printer has received data and is ready to accept next one.
11	BUSY	29	Out	This signal's high level means that the printer is not ready to accept data.
12	PE	28	Out	This signal's high level means that the printer is in a state of paper-out error.
13	SLCT	28	Out	Always at high level when the printer is powered on.
14	-AFXT	30	In	Not used.
31	-INIT	30	In	This signal's negative pulse initializes printer.
32	-ERROR	29	Out	This signal's low level means the printer is in a state of error.
36	-SLIN	30	In	Not used.
18	Logic H	--	Out	This line is pulled up to +5V through 3.9 kΩ resister.
35	+5V	--	Out	This line is pulled up tp +5V through 1.0 kΩ resister.
17	Chassis	--	--	Chassis GND.
16, 33, 19-30	GND	--	--	Signal GND.
15, 34	NC	--	--	Not connected.

NOTE: In/Out shows the direction of signal flow as viewed from the printer.

1.3.2 Parallel Interface (Reverse Channel)

- Transmission mode: IEEE-1284 nibble mode
- Adaptable connector: See 1.3.1 “Parallel Interface (Forward Channel)”
- Synchronization: Refer to the IEEE-1284 specification
- Handshaking: Refer to the IEEE-1284 specification
- Signal level: IEEE-1284 level 1 device
See 1.3.1 “Parallel Interface (Forward Channel)”
- Data transmission timing: Refer to the IEEE-1284 specification
- Extensibility request: The printer responds to the extensibility request affirmatively, when the request is 00H or 004H, which means;
 - 00H: Request for nibble mode of reverse channel transfer
 - 04H: Request device ID in nibble mode of reverse channel transfer
- Device ID: The printer sends following device ID string when it is requested.
 - When IEEE1284.4 is enabled;

[00H][4EH]
MFG: EPSON;
CMD: ESCP9,PRPII9,BDC,D4;
MDL: LX-300+II;
CLS: PRINTER;
DES: EPSON[SP]LX-300+II;

LX-300+II

[00H][4EH]
MFG: EPSON;
CMD: ESCP9,PRPII9,BDC,D4;
MDL: LX-1170II;
CLS: PRINTER;
DES: EPSON[SP]LX-1170II;

LX-1170II

- When IEEE1284.4 is disabled;

[00H][4BH]
MFG: EPSON;
CMD: ESCP9,PRPII9,BDC;
MDL: LX-300+II;
CLS: PRINTER;
DES: EPSON[SP]LX-300+II;

LX-300+II

[00H][4BH]
MFG: EPSON;
CMD: ESCP9,PRPII9,BDC;
MDL: LX-1170II;
CLS: PRINTER;
DES: EPSON[SP]LX-1170II;

LX-1170II

Table 1-17. Connector Pin Assignment and Signals (Reverse Channel)

Pin No.	Signal Name	Return GND Pin	In/Out	Functional Description
1	HostClk	19	In	Host clock signal.
2	DATA1	20	In	Parallel input data to the printer. bit 0: LSB
3	DATA2	21	In	bit 1
4	DATA3	22	In	bit 2
5	DATA4	23	In	bit 3
6	DATA5	24	In	bit 4
7	DATA6	25	In	bit 5
8	DATA7	26	In	bit 6
9	DATA8	27	In	bit 7: MSB
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.
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	This line is pulled up to +5V through 3.9 kΩ resister.
35	+5V	--	Out	This line is pulled up tp +5V through 1.0 kΩ resister.
17	Chassis	--	--	Chassis GND.
16, 33, 19-30	GND	--	--	Signal GND.
15, 34	NC	--	--	Not connected.

NOTE: In/Out shows the direction of signal flow as viewed from the printer.

1.3.3 Serial Interface

- Synchronization: Asynchronous
- Signal level: EIA-232D
 - MARK (logical 1): -3V to -25V
 - SPACE (logical 0): +3V to +25V
- Word length: Start bit: 1 bit
Data bit: 8 bits, 7 bits
Parity bit: Odd, Even, Non, Ignore
Stop bit: 1 bit or more
- Baud rate: 300, 600, 1200, 2400, 4800, 9600 or 19200 bps
- Handshaking: DTR signal and XON/XOFF
DTR=MAEK, XOFF: indicates that the printer cannot receive data.
DTR=SPACE, XON: indicates that the printer is ready to receive data.

NOTE: The DTR signal is MARK and XOFF code (DC3, 13H) is transmitted when the rest of the input buffer becomes 256 bytes. The DTR signal is SPACE and XON code (DC1, 11H) is transmitted when the rest of the input buffer is regained 256 byte.

- Error handling: Parity error is only detected. Overrun error and framing error are ignored.
- Connector: 25 pin subminiature D-shell connector (female)

Table 1-18. Connector Pin Assignment and Signals

Pin No.	Signal Name	In/Out	Functional Description
2	TXD	Out	Transmit data.
20	DTR	Out	Indicates that the printer is ready to receive data or not.
11	REV	Out	Connected directly to the DTR signal.
4	RTS	Out	Request to send. Always SPACE level when the printer is powered on. Pulled up to +12V via 4.7KΩ resistor.
3	RXD	In	Receive data.
7	Signal GND	--	Signal GND
1	Chassis GND	--	Chassis GND
other	NC	--	Not used. Not connected.

NOTE: In/Out shows the direction of signal flow as viewed from the printer.

1.3.4 USB interface

- Standard : based on
 - Universal Serial Bus Specifications Revision 1.1
 - Universal Serial Bus Device Class Definition for Printing Devices Version 1.1
- Bit rate : 12 Mbps (Full Speed Device)
- Data encoding : NRZI
- Adaptable connector : USB Series B
- Recommended cable length : 2 meters

Table 1-19. Connector Pin Assignment and Signals

Pin No.	Signal name	In/Out	Function description
1	VCC	-	Cable power. Maximum power consumption is 100mA
2	-Data	Bi-directional	Data
3	+Data	Bi-directional	Data, pull up to +3.3V via 1.5K ohm resistor
4	Ground	-	Cable ground

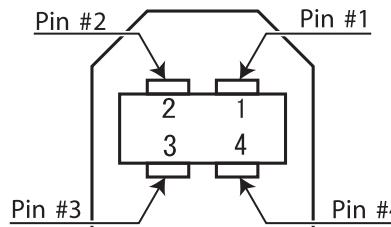


Figure 1-7. USB Interface Connector Pin Assignment

- Respond to an BULK OUT transaction with NAK handshake and other transaction with ACK under either of the following conditions:
 - In the condition of the paper-out error
 - In the condition of the release lever error
- Respond to an BULK OUT transaction with NAK and BULK IN transaction with NAK under any of the following conditions:
 - In the condition of being input buffer full

- During hardware initialization
- In the self test mode
- In the adjustment mode
- In the default-setting mode
- Respond to an BULK OUT transaction with STALL and BULK IN transaction with STALL under the following condition:
 - In the condition of the printer hardware error (fatal error)
- USB Device Requests for USB Printer as shown below
 - GET PORT STATUS
Reply specification for GET PORT STATUS as shown below:

Table 1-20. GET PORT STATUS

Bit	Field	Description
7, 6	Reserved	Reserved
5	Paper Empty	0: Paper Not Empty / 1: Paper Empty
4	Select	0: Not Select / 1: Select
3	Not Error	0: Error / 1: No Error
2, 1, 0	Reserved	Reserved

■ GET DEVICE ID

Device ID : The printer sends following device ID string when it is requested.

Table 1-21. GET DEVICE ID

	LX-300+II	LX-1170II
When IEEE1284.4 is enabled,	[00H][4EH] MFG:EPSON; CMD:ESCP9,PRPII9,BDC,D4; MDL:LX-300+; CLS:PRINTER; DES:EPSON[SP]LX-300+;	[00H][4EH] MFG:EPSON; CMD:ESCP9,PRPII9,BDC,D4; MDL:LX-1170; CLS:PRINTER; DES:EPSON[SP]LX-1170;
When IEEE1284.4 is disabled,	[00H][4BH] MFG:EPSON; CMD:ESCP9,PRPII9,BDC; MDL:LX-300+; CLS:PRINTER; DES:EPSON[SP]LX-300+;	[00H][4BH] MFG:EPSON; CMD:ESCP9,PRPII9,BDC; MDL:LX-1170; CLS:PRINTER; DES:EPSON[SP]LX-1170;

■ SOFT RESET

This USB Device Request is used when Host initializes printer's input buffer.

1.3.5 Interface Selection

The printer has 3 interfaces; the parallel interface, the serial interface and the USB interface. These interfaces are selected manually by Default Setting or selected automatically.

Manual Selection

One of 3 interfaces can be selected by Default setting.

Automatic Selection

The automatic interface selection is enabled by Default Setting. In this automatic interface selection mode, the printer is initialized to the idle state scanning which interface receives data when it is powered on. Then the interface that receives data first is selected. When the host stops data transfer and the printer is in stand-by state for the period of seconds specified by Default Setting, the printer is returned to the idle state. As long as the host sends data or the printer interface is busy state, printer keeps the interface selection status as it is.

Interface State and Interface Selection

When the parallel interface is not selected, the interface gets into a busy state. When the USB interface is not selected, the interface responds to an OUT transaction with NAK handshake. When the serial interface is not selected, the interface sends XOFF and sets the DTR signal MARK. When the printer is initialized or returned to the idle state, the parallel interface get into a ready state, the USB interface become to respond to an OUT transaction with ACK handshake, the serial interface sends XON and sets the DTR SPACE. Caution that the interrupt signal such as a -INIT signal on the parallel interface and software reset on the USB interface is not effective while that interface is not selected.

1.3.6 Prevention of Hosts from Data Transfer Time-out

Generally, hosts abandons data transfer to peripherals when a peripheral is in busy state for dozens of seconds continuously. To prevent hosts from this kind of time-out, the printer receives data very slowly, several bytes per minute, even if the printer is in busy state. This slowdown is started when the rest of the input buffer becomes several hundreds of bytes. At last, when the input buffer is full, the printer is in busy state continuously.

NOTE: This prevention basically operates on the parallel I/F and on the USB I/F.

NOTE: IEEE1284.4 on the parallel interface and that on the USB interface do not require this function.

1.3.7 IEEE1284.4 protocol

The packet protocol described by IEEE1284.4 is supported on the parallel I/F and the USB I/F.

Two function modes of IEEE1284.4 protocol, "Off" and "Auto", are available and one of them is selected according to the value of Default setting. (See 1.4.2.3 "Default Setting")

NOTE: *Packet protocol option "Off" & "Auto" in Default setting is effective in not only parallel I/F but also USB I/F.*

NOTE: *In the case that data is printed from printer driver of Windows-based PC, select the packet protocol to "Auto".*

NOTE: *The function mode of IEEE1284.4 protocol "Off" is not guaranteed only on the USB I/F.*

Auto:

Communication is carried out in the conventional mode until a magic string (1284.4 synchronous commands) is received. By receiving a magic string, communication in IEEE1284.4 packet mode is started.

Off:

Communication is carried out in the conventional mode.

NOTE: *The packet protocol of IEEE1284.4 allows a device to carry on multiple exchanges or conversations which contain data and/or control information with another device at the same time across a single point-to-point link.*

The protocol is not, however, a device control language. It does provide basic transport-level flow control and multiplexing services.

The multiplexed logical channels are independent of each other and blocking of one has no effect on the others. The protocol operates over IEEE1284.

1.4 Operation

1.4.1 Control Panel

4 switches and 4 LEDs are on the panel as shown below.

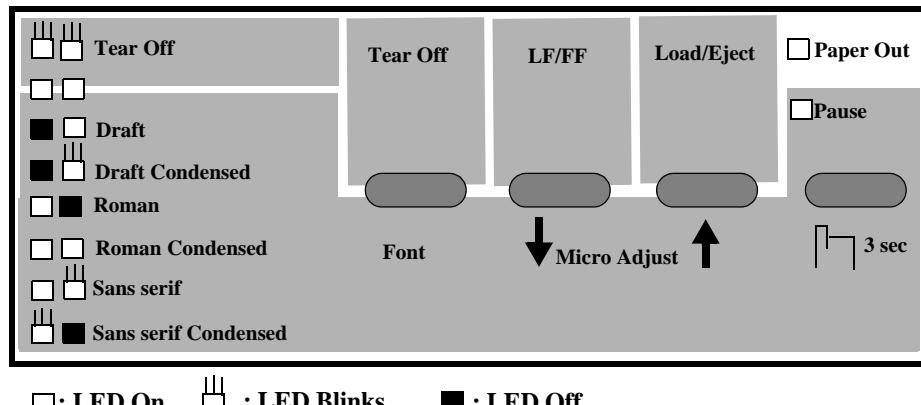


Figure 1-8. Control Panel

1.4.1.1 Switches

Operation in normal mode

In normal mode, pressing panel switches executes following function;

Table 1-22. Operation in Normal Mode

Switch	Function
Pause	-Alternates printing with non-printing status. -Enables Micro Adjustment function and Font selection when it is held down for 3 seconds.
Load/Eject	-Loads or ejects paper. -Execute micro feed forward when this function is enabled.
LF/FF	-Executes line feed when it is pressed shortly. -Executes form feed when it is held down for a few seconds. -Executes micro feed backward when this function is enabled.
Tear Off	-Advances continuous paper to the Tear-off position. -Select font, when this function is enabled.

Operation at power on

Turning the printer on while pressing panel switches executes the functions below;

Table 1-23. Operation at Power On

Switch	Function
Load/Eject	NLQ self test
LF/FF	Draft self test
Tear Off	Default setting
Load/Eject & LF/FF	Data dump
Load/Eject & LF/FF & Pause	Clear EEPROM
Tear Off & Load/Eject & LF/FF	Clear EEPROM for Diving Line count for ribbon change timing.
Load / Eject & Pause *2	Color printing position adjustment
Pause	Bi-d adjustment
Tear Off & Pause	Copy mode *1
Tear Off & LF/FF	Quiet mode *1
Load/Eject & Tear Off	Simple default setting *1
Tear Off & Load / Eject & Pause	Error analyzing mode *1
The others	Not available

*1 Only for customized models.

*2 LX-300+II only.

Operation in default setting mode

The switches are used in default setting mode as follows:

Table 1-24. Operation at Power On

Switch	Function
Tear Off	Selects the Menu.
LF/FF	Changes the setting.
The others	Not available.

1.4.1.2 Indicators

- Indication in normal mode

Table 1-25. Indication in normal mode

Printer Status	LED	Pause ^{*1}	Paper Out ^{*2}	Font
Pause		On	---	---
Paper out error		On	On	---
Release lever error		On	---	---
Paper eject warning		On	Blink	---
Head hot warning		Blink	---	---
Micro Adjust		Blink	---	---
Tear off		---	---	*3
Font selection		---	---	*3
Fatal error		Blink	Blink	Blink

*1 Pause (Orange)

- It is on when the printer is paused, and it is off when the printer is not paused.
- It blinks when Micro Adjust is enabled or the printer is in the head hot status.

*2 Paper Out (Red)

- It is on when the printer is in the Paper out status, and it is off when the printer is out of this status.

*3 Font (Green)

- 2 LEDs display the status of Font selection when continuous paper is out of the Tear-off position .
- Both LEDs blink when continuous paper is in the Tear-off position.

■□: Draft

■★: Draft Condensed

□■: Roman

□□: Roman Condensed

□★: Sans serif

★■: Sans serif Condensed

★★: Tear Off

(□: LED On, ■: LED Off, ★: LED Blinks)

1.4.1.3 Buzzer

- Paper out error: Beeper sounds (...)*
- Release lever operation error: Beeper sounds (...)*
- Fatal error: Beeper sounds (----)*

*The description (.) and (-) in the above shows how the beeper sounds.

(.): Beeper sounds approx. 100 ms and interval is approx. 100 ms.

(-): Beeper sounds approx. 500 ms and interval is approx. 100 ms.

1.4.2 Functions

1.4.2.1 Usual Operation

- Pause
 - This switch alternates printer activity between printing and non-printing.
 - Holding it down over 3 seconds when the printer is in the stand-by state, the Micro Adjust function is enabled. Pressing it again, this function is disabled.
- Load/Eject
 - Pressing it loads out sheet or continuous paper when the printer is out of paper.
 - Pressing it ejects out sheet to the stacker or continuous paper to the paper park.
- LF/FF
 - Pressing it shortly executes line feed.
 - Holding it down for a few seconds executes form feed when continuous paper is used, or ejects cut sheet to the stacker when cut sheet is used.
- Tear Off
 - When continuous paper is used, pressing it moves a page to the Tear-off position. And pressing it again moves a next page to the TOF position.
- Font
 - Pressing it selects one of the following fonts when Micro Adjust is enabled; Draft, Draft Condensed, Roman, Roman Condensed, Sans serif, Sans serif Condensed
- Micro Adjust
 - Micro Adjust ↓/ ↑ switches is effective when the Micro Adjust function is enabled by Pause switch.
 - Pressing the Micro Adjust ↓/ ↑ switches executes micro feed backward and forward by 0.118 mm (1/216 inch).
 - The TOF adjustment is enabled in the TOF position after loading, and the Tear-off adjustment is enabled in the Tear-off position.

1.4.2.2 Operation at Power-on

Table 1-26. Operation at Power-on

Function	Description of Operation
Self test	Prints the self test pattern. To cancel it, make printer pause and turn off the power.
Default setting	Starts the default setting mode. See “Default Setting” on page -27.
Data Dump	Starts the data dump mode, in which all the input data are printed as hexadecimal numbers and corresponding characters.
Clear EEPROM	Resets the printer to the factory default setting, which is not always proper setting for each market demand. (i.e. This function is for emergency.) Clear Area 1 EEPROM data except 00H to 1FH.
Clear EEPROM for Driving Line count for ribbon change timing	Resets the Driving Line count for ribbon change timing.
Color printing position adjustment *2	Starts the Color printing position adjustment mode. See “Color printing position adjustment (LX-300+II Only)” on page -28.
Bi-d adjustment	Starts the Bi-d adjustment mode. See “Bi-d. Adjustment” on page -28.
Copy mode *1	Starts the copy mode.
Quiet mode *1	Starts the quiet mode.
Simple default setting *1	Starts the simple default setting mode.
Error analyzing mode (acquire EEPROM information) *1	Beep once and starts the IEEE1284.4 Protocol mode. The host system can communicates with Printer in error state.
Program reload mode for test *1	Starts the program reload mode, which is reload BOOT area. (i.e. This function is for emergency.)
Mechanism prohibition mode *1	Starts the mechanism prohibition mode, which without initialization of mechanism. “Program reload” and “Reply firmware version” are possible without untying package of printer.
Demonstration	Not available.

*1 Only for customized models.

*2 LX-300+II only.

1.4.2.3 Default Setting

There are some parameters that can be changed by users and will be referred at the time of initialization of the printer.

Setting mode

1. Enters the Default setting mode.

The method of selecting language for “Usage of this mode” is printed.

2. Select language for “Usage of this mode” by LF/FF button.

Font LEDs show the language for “Usage of this mode” that is currently selected. This section will be advanced one by one as the button is pressed and the On/Off/Blink/2-Blink of those three LEDs will also be changed according to the selection.

3. Press Tear Off button.

The current setting and the “Usage of this mode” by selected language will be printed on the paper set in the paper path at that time.

4. Select Menu by Tear Off button.

Font LEDs show the menu which is selected at that time. The selection will be advanced one by one as the button is pressed and the combination of those three LEDs status of On/Off/Blink/2-Blinks will be changed according to the selection.

5. Select setting value by LF/FF button.

Font LEDs and Pause LED show that menu’s value by status of On/Off/Blink/2-Blinks. That value can be changed by pressing LF/FF button and the LEDs status of On/Off/Blink/2-Blinks will be changed as the button is pressed.

6. When LF/FF button is pressed, the printer stores the last setting value in memory.

7. Repeat (4) to (6).

The other items can be changed in the same manner.

The menu selection will return to the first menu after the last menu selection is over.

8. Turn the printer off.

The setting is stored into non-volatile memory.

Table 1-27. Setting Menu

Item		Setting / Value *2
Page length for tractor		3 inch, 3.5 inch, 4 inch, 5.5 inch, 6 inch, 7 inch, 8inch, 8.5 inch, 11 inch , 70/6 inch, 12 inch, 14 inch, 17 inch
Skip over perforation		OFF , ON
Auto tear off		OFF , ON
Auto line feed		OFF , ON
Print direction		Bi-d. , Uni-d., Auto
Software		LX-300+II: ESC/P2 , IBM 2380 Plus LX-1170II: ESC/P2 , IBM 2381 Plus
0 slash		OFF , ON
High speed draft		OFF, ON
I/F mode		Auto , Parallel, Serial, USB
Auto I/F wait time		10 seconds , 30 seconds
Baud rate		19200BPS , 9600BPS, 4800BPS, 2400BPS, 1200BPS, 600BPS, 300BPS
Parity		None , Odd, Even, Ignore
Data length		8 bit , 7 bit
Parallel I/F bidirectional mode		OFF, ON
Packet mode		Auto , OFF
Character table	Standard version	Italic, PC437 , PC850, PC860, PC863, PC865, PC861, BRASCII, Abicomp, Roman8, ISO Latin 1, PC858, ISO 8859-15
	NLSP version	Italic, PC437 , PC850, PC437, Greek, PC853, PC855, PC852, PC857, PC866, PC869, MAZOWIA, Code MJK, ISO 8859-7, ISO Latin 1T, Bulgaria, PC774, Estonia, ISO 8859-2, PC 866 LAT., PC 866UKR, PC APTEC, PC708, PC720, PCAR 864, PC860, PC865, PC861, PC863, BRASCII, Abicomp, Roman8, ISO Latin 1, PC858, ISO 8859-15, PC771, PC437 Slovenia, PC MC, PC1250, PC1251
International character set for Italic table		Italic U.S.A., Italic France, Italic Germany, Italic, U.K., Italic Denmark 1, Italic Sweden, Italic Italy, Italic Spain 1
Manual feed wait time		1 second, 1.5 seconds , 2 seconds, 3 seconds
Buzzer		OFF, ON
Auto CR (IBM 2380/2381 Plus)*1		OFF , ON
IBM character table *1		Table2 , Table1

*1 This setting is effective when IBM 2380 (LX-300+II) or IBM2381 (LX-1170II) Plus emulation is selected.

*2 Settings with bold weight mean the standard factory settings.

1.4.2.4 Bi-d. Adjustment

Bi-d. adjustment can be made by users. Bi-d. adjustment method is as follows.

1. Turning the printer on while pressing Pause switch. The guide to adjust Bi-d alignment in this mode and the first alignment pattern will be printed.
2. Select the most closely aligned number by pressing LF/FF (↓) and Load/Eject (↑) switches.
Font LEDs and Pause LED show the pattern number which is selected at that time. The selection is advanced one by one as the switch is pressed, and the combination of On/Off/Blink of those three LEDs is also changed according to the selection.
3. Fix the selected number by pressing Tear Off switch.
Selected number is fixed and the next alignment pattern is printed.
4. Repeat step 2 to 3 until finishing Bi-d adjustment for NLQ mode.
Following adjustment is executed.
 - Bi-d. adjustment for high speed draft mode
 - Bi-d. adjustment for draft mode
 - Bi-d. adjustment for NLQ mode
5. Turn the printer off.
The setting is stored into non-volatile memory.

1.4.2.5 Color printing position adjustment (LX-300+II Only)

Color printing position alignment can be adjusted by users. Color printing position adjustment method is as follows.

1. Turning the printer on while pressing Load/Eject & Pause switch.
The guide to adjust color print position alignment in this mode is printed and first alignment pattern is printed.
2. Check the alignment pattern.
If there is an incorrect color or parts of the print are missing at any of the patterns, move the motor unit lever.
3. Press the Load/Eject switch.
The alignment pattern is printed again.
4. Repeat (2) and (3) until finishing color printing position adjustment.
5. Turn the printer off.

1.4.3 Errors

- Paper out error:
When the printer fails to feed a sheet, it goes into a paper out error.
- Release lever error:
When release lever position is wrong, it goes into a release lever error.
- Fatal errors:
Carriage control error and Power supply voltage error.

1.5 Control codes

1.5.1 ESC/P2

Table 1-28. ESC/P2

Classification	Operation	Command
General Operation	Initialize Printer	ESC@
	Unidirectional Printing	ESC U
	CSF Mode Control	ESC EM
Paper feeding	Form Feed	FF
	Line Feed	LF
	Line Spacing	ESC 0, ESC 1, ESC 2, ESC3, ESC A
	Carriage Return	CR
Page format	Page Length	ESC C, ESC C0, ESC (C
	Left / Right Margin	ESC Q, ESC1
	Top / Bottom Margin	ESC N, ESC O, ESC (c
	Define Unit	ESC (U
Print position motion	Horizontal Print Position	ESC\$, ESC¥
	Tab Horizontally	ESC D, HT
	Tab Vertically	ESC B, VT
	Advance paper	ESC J
Font selection	Typeface	ESC k, ESC x, ESC y
	Pitch	ESC P, ESC M, ESC g, ESC p
	Italic Font	ESC 4, ESC 5
	Bold Font	ESC E, ESC F
	Master Select	ESC!

Table 1-28. ESC/P2 (continued)

Classification	Operation	Command
Font enhancement	Double-Width	ESC W, DC4, SO
	Condensed	DC2, SI
	Double-height	ESC w
	Double-Strike	ESC G, ESC H
	Super-/ Subscript	ESC T, ESC S
	Underline	ESC-
Spacing	Intercharacter Space	ESC Space
Character handling	Character Table	ESC t, ESC (t
	International Character	ESC R
	User-Defined Characters	ESC%, ESC &, ESC:
	Control code selection	ESC1
	Upper Control Codes	ESC6, ESC7
Bit image	8 pin Bit Image	ESC K, ESC L, ESC Y, ESC Z, ESC*
	9 pin Bit Image	ESC ^
Printing color*	Select color	ESC r
Bar code	Bar code	ESC (B
Production	EEPOM write, etc.	ESC

* LX-300+II only

1.5.2 IBM 2380/2381 Plus Emulation

LX-300+II/LX-1170II supports not only ESC/P2 but also the following control code.

- LX-300+II: IBM2380
- LX-1170II: IBM2381

Table 1-29. IBM 2380/2381 Plus emulation

Classification	Operation	Command
General Operation	Nop	NUL, DC3
	Off Line	ESC j
	Buzzer	BEL
	Cancellation	CAN
	Select / Deselect	DC1, ESC Q
	Initialize Printer	ESC [K
	Unidirectional Printing	ESC U
	Select Auto Sheet Feeder	ESC [F
Paper feeding	Form Feed	FF
	Line Feed, Auto Line Feed	LF, ESC5
	Line Spacing	ESC A, ESC 0, ESC 1, ESC 2, ESC3
	Carriage Return	CR
	Reverse Line Feed	ESC]
Page format	Page Length	ESC C, ESC C0
	Left / Right Margin	ESC X
	Skip Over Perforation	ESC N, ESC O
	Set TOF	ESC 4

Table 1-29. IBM 2380/2381 Plus emulation (continued)

Classification	Operation	Command
Print position motion	Horizontal Print Position	ESC d
	Initialize Tab Position	ESC R
	Tab Horizontally	ESC D, HT
	Tab Vertically	ESC B, VT
	Advance paper	ESC J
Font selection	Pitch	DC 2, ESC P, ESC:
	Bold Font	ESC E, ESC F
	Master Select	ESC I
	Print Quality	ESC [d
	Select Font and Pitch	ESC [I
Font enhancement	Double-Width	DC4, SO, ESC SO, ESC W
	Enlarge and Life Space	ESC [@
	Condensed	SI, ESC SI
	Double-Strike	ESC G, ESC H
	Super-/ Subscript	ESC T, ESC S
Spacing	Underline	ESC -
	Line / Score	ESC_-
	Back Space	BS
Character handling	Space	SP
	Character Table	ESC 6, ESC 7, ESC [T
Bit image	Print Data as Characters	ESC ^, ESC ¥
	Bit image	ESC K, ESC L, ESC Y, ESC Z
	Bar code	Set up Bar code
Bar code	Transfer Bar code	ESC [p
	Download	Download
		ESC=(only Draft mode)

1.5.3 Bi-Directional Commands

Reply printer ID

Reply printer ID: [ESC][SOH]@EJL[SP]ID[CR][LF]

The printer sends the following ID string in reply to this command.

@EJL[SP]ID[CR][LF]
MFG: EPSON;
CMD: ESCP9, PRPII9,BDC;
MDL: LX-300+II;
CLS: PRINTER;
DES: EPSON[SP]LX-300+II;
[FF]

LX-300+II

@EJL[SP]ID[CR][LF]
MFG: EPSON;
CMD: ESCP9,PRPII9,BDC;
MDL: LX-1170II;
CLS: PRINTER;
DES: EPSON[SP]LX-1170II;
[FF]

LX-1170II

Enter / Exit Remote Mode

- Enter Remote Mode: [ESC](R[08H][00H][00H]REMOTE1)
- Exit Remote Mode: [ESC][NUL][00H][00H]

Remote Commands

- Change Printer Settings: XX[nL][nH][00H][ml]...[mx]
- Reply Printer Settings: XX[nL][nH][01H][ml]...[mx]

XX is a string of 2 ASCII characters of defining a feature of the command. Following [nL][nH] is two byte hexadecimal value that denotes the length of the [00H] and [ml]...[mx] parameters. Last [m1] ... [mx] parameters are used to describe the detailed command function and represent printer settings.

The printer sends the following string in reply to the commands of this type:

@BDC[sp]PS[CR][LF]
XX: *Reply-Data*;
[FF]

Table 1-30 shows the XXs that are provided in this printer.

<Remote commands>

-[Save] column shows whether SV commands are effective to each feature or not.

-○: All parameters are saved., Δ: Some limited parameters are saved.-: No parameter is saved.

Table 1-30. Bi-Directional Commands

Function	Code/ Parameter	Save
Enter Remote-1	ESC"(R"08H 00H 00H "REMOTE1"	-
Exit Remote-1	ESC 00H 00H 00H	-
Save settings	"SV" 00H 00H	-
Initialize	"RS" 00H 00H	-
Load power-on default	"LD" 00H 00H	-
Select typeface	"FO" 02H 00H 00H m1 m1=0(Roman), 1(Sans serif), 5(OCR-B)*1	Δ*2
Select character pitch	"CP" 02H 00H 00H m1 m1=0(10cpi), 1(12cpi), 2(15cpi), 3 (17.1cpi), 4(20cpi), 5(Propotional)	○
Select draft or NLQ	"CQ" 02H 00H 00H m1 m1=0(Draft), 1(NLQ), 2(High speed draft)	○
Select character table	"CT" 02H 00H 00H m1 m1=0 (Table0), 1(Table1)	Δ*3
Assign character table	"AT" 04H 00H 00H m1 m2 m3 m1=0(Table0), 1(Table1) m2, m3=(ESC/P2 Character Table No.)*4	Δ*3
Select an international character set	"IC" 02H 00H 00H m1 m1=0(U.S.A), 1(France), 2(Germany), 3(U.K.), 4(Denmark1), 5(Sweden), 6(Italy), 7(Spain1), 8(Japan), 9(Norway), 10(Denmark2), 11(Spain2), 12(Latin America)	Δ*5
Turn 1 inch skip perforation on/off	"SK" 02H 00H 00H m1 m1=0(off), 1(on)	○

*1 Only for customized models.

*2 m1=0 to 1 only

*3 Only the following parameters are stored in memory. (Table 1-31)

Table 1-31. Note for Table 1-30

m1 set by AT/CT	m2 set by AT	m3 set by AT
0	0	0
1	All parameters that can be set	

*4 m2 and m3 apply to the following ID number. (See Table 1-32 & Table 1-33.)

Table 1-32. Std and NLSP ver.

m2	m3	Character table	m2	m3	Character table
00H	00H	Italic	19H	00H	BRASCI
01H	00H	PC437	1AH	00H	Abicomp
03H	00H	PC850	7FH	01H	ISO Latin1
07H	00H	PC860	23H	00H	Roman8
08H	00H	PC863	2CH	00H	PC858
09H	00H	PC865	1DH	0FH	ISO 8859-15
18H	00H	PC861			

Table 1-33. NLSP ver. only

m2	m3	Character table	m2	m3	Character table
01H	10H	PC437 Greek	20H	00H	Bulgaria
05H	00H	PC853	21H	00H	Hebrew 7
06H	00H	PC855	22H	00H	Hebrew 8
0AH	00H	PC852	24H	00H	PC 774
0BH	00H	PC857	25H	00H	Estonia
0CH	00H	PC862	28H	00H	PC APTEC
0EH	00H	PC866	29H	00H	PC 708
0EH	20H	PC866 LAT.	2AH	00H	PC720
0EH	30H	PC866 UKR	7FH	02H	ISO 8859-2
0FH	00H	PC869	2DH	00H	PC771
0DH	20H	PCAR_864	01H	20H	PC437 Slovenia
1BH	00H	MAZOWIA	2FH	00H	PC MC
1CH	00H	Code MJK	30H	00H	PC1250
1DH	07H	ISO 8859-7	31H	00H	PC1251
1FH	00H	ISO Latin 1T			

*5 m1=0 to 7 only

<Remote commands>

Table 1-34. Bi-Directional Commands

Function	Code/ Parameter	Save
Set page length	"PG" 05H 00H 00H p1 p2 m1 m2 p1=0(Continuous paper), p2=0(Rear), p1=1(CSF), p2=0(bin1) p1=2(Manual insertion), p2=0(Rear) -Page length=m1+256*m2, 0.118mm (1/216inch) 648 (76.2mm(3inch)) <= m1+256*m2 <= 4752(558.8mm(22 inch))	○
Set Top margin	"TP" 05H 00H 00H p1 p1 m1 m2 p1=0(Continuous paper), p2=0(Rear), p1=1(CSF), p2=0(bin1) p1=2(Manual insertion), p2=0(Rear) -Top margin=m1+256*m2, 0.118mm (1/216inch) 36 (4.2mm) <= m1+256*m2 <= 288 (8.5mm + 25.4mm(1inch))	○
Turn unidirectional mode on/off	"PD" 02H 00H 00H m1 m1=0(Bi-d.), 1(Uni-d.)	○
Turn auto tear-off on/off	"TO" 02H 00H 00H m1 m1=0(off), 1(on)	○
Turn auto line feed on/off	"LF" 02H 00H 00H m1 m1=0(off), 1(on)	○
Select control language	"PM" 02H 00H 00H m1 m1=0(ESC/P), 2(IBM 238x Plus emulation)	○
Turn printer state reply on/off	"ST" 02H 00H 00H m1 m1=0, 1, 2, 3	-
Turn Slash zero on/off	"EX" 06H 00H 00H 00H 00H 01H m1 m1=0(off), 1(on)	○
Turn Buzzer on/off	"EX" 06H 00H 00H 00H 00H 02H m1 m1=0(enable), 1(disable)	○
Turn IBM emulation Auto CR on/off	"EX" 06H 00H 00H 00H 00H 04H m1 m1=0(off), 1(on)	○

Table 1-34. Bi-Directional Commands (continued)

Function	Code/ Parameter	Save
Set starting data/month/year	“SD” 04H 00H 00H m1 m2 m3 00<=m1<=99, 01<=m2<=12, 01<=m3<=31	<input checked="" type="radio"/>
Inquire printer state reply on/off	“ST” 01H 00H 01H “@BDC” SP “PS” CR LF “ST:” <nn> “;” FF	-
Echo parameters	“??” nL nH 01H <chr-str> “@BDC” SP “PS” CR LF “??” <chr-str> “;” FF	-
Inquire starting date/month/year	“SD” 01H 00H 01H “@BDC” SP “PS” CR LF “SD:” <nn1> <nn2> <nn3>“;” FF	-
Inquire total printing lines/power on hours	“TL” 01H 00H 01H “@BDC” SP “PS” CR LF “TL:” “;” “TPL:” <nnnnnnnn2> “;” “TPH:” <nnnn3>“;” “TPR:” <nnnnnnnn4> “;” FF	-

1.5.3.1 Reply Printer Status

The printer sends back one of the five strings shown below every few seconds according to the printer status at that time.

“@BDC”SP “ST” CR LF
“ST:” <status code>“;”
[“ER:” <error code>“;”]
[“PP:”<paper_path>“;”]
[“CD:”<printer status codes>“;”]
[“IG:”<nn1><nn2><n3>[“...<nnx1><nnx2><nnx3>”;”]
[“TEC:”<ii1>“;”]
FF

status_code

Table 1-35. Status_Code

Status	“<status code>”
In the error state	“00”
In the busy state	“02”
In the waiting state	“03”
In the idle state	“04”
In the pause state	“05”

error_code

Table 1-36. Error_Code

Error	“<error code>”
Fatal error	“00”
Port is not selected	“01”
Release lever position error	“03”
Paper out	“06”

Paper_path

Table 1-37. Paper_Path

paper_path	“<paper_path code>”
Continuous paper (rear)	“0000”
Continuous paper (bottom)	“0001”
Cut sheet (rear)	“0200”
CSF Single bin	“0100”

characteristic status code

Table 1-38. Characteristic Status Code

	location	size	type	Refer to
Structure version	+0	2bytes	“02” fixed	-
Starting date	+2	6bytes	“yy”, “mm”, “dd”	“SD” command
Total printing line number	+8	8bytes	“nnnnnnnn”	“TL” command
Total power on hour	+16	4bytes	“nnnn”	“TL” command
Total printing line number for ribbon charge timing	+20	8bytes	“nnnnnnnn”	“TL” command

MIB proxy information

- “IG:”
- “0305NA,” Sheet feeder bin 1 (removable), capacity 5 mm,
quantity of paper N.A.
- “09NANA,” Manual feed rear, capacity N.A., quantity of paper N.A.
- “0CNANA;” Tractor rear, capacity N.A., quantity of paper N.A.
- “TEC:06;” 9-pin SIDM

1.5.3.2 Packet commands**Table 1-39. Packet Commands**

Function	Code
Device ID request	“di” 01H 00H 01H
Device ID reply *1	“@EJL” SP “ID” CR LF <Device ID string> FF
State-Reply request	“st” 01H 00H 01H
State-Reply *2	“@BDC” SP “ST” CR LF <printer status string> FF
Reply EEPROM data in the specific address request (LX-300+II)	“ ” 06H 00H r1 r2 41H BEH A0H d1 r1, r2 means R code. (e.g. r1=A8, r2=5Ah) d1 : EEPROM address (00h - FFh)
Reply EEPROM data in the specific address request (LX-1170II)	“ ” 06H 00H r1 r2 41H BEH A0H d1 r1, r2 means R code. (e.g. r1=A8, r2=6Ah) d1 : EEPROM address (00h - FFh)
EEPROM data reply	“@BDC” SP “PS” CR LF “EE:” <addr> <data> “;” FF
No support command	“XX;” FF (XX is the command string being invalid.)

*1 The reply string is the same as BDC-ID Reply.

*2 The reply string is the same as BDC-ST Reply.

1.6 Initialization

Power-on initialization

The initialization of this level is activated by power-on or cold-reset command (remote RS command).

This initialization is;

- to initialize the printer mechanism.
- to execute Operator initialization.

Operator initialization

The initialization of this level is activated by -INIT signal (negative pulse).

This initialization is;

- to clear all the buffers of data.
- to cancel the download character definition.
- to make the printer stand-by state, if no errors occur.
- to execute Software initialization.

Software initialization

The initialization of this level is activated by the control code ESC@.

This initialization is;

- to clear the unprinted data.
- to make the printer's setting defaults.

1.7 Paper Specifications

Cut sheet (single sheet, not multi part)

Table 1-40. Cut Sheet (single sheet, not multi part)

		Manual insertion		CSF single-bin	
		Minimum	Maximum	Minimum	Maximum
Width	inch	3.9 (5.8)	10.1 (16.5)	7.2	8.5 (16.5)
	mm	100 (148)	257 (420)	182	216 (420)
Length	inch	3.9	14.3	10.1	14.0 (14.3)
	mm	100	364	257	356 (364)
Thickness	inch	0.0025	0.0055	0.0028	0.0055
	mm	0.065	0.14	0.07	0.14
Weight	g/m ²	52	90	64	90
	lb.	14	24	18	24
Quality		Plain paper, Reclaimed paper Not curled, not folded, not crumpled	Plain paper, Reclaimed paper Not curled, not folded, not crumpled		

Note: The value in parentheses represents the size available with LX-1170II.

Note: Printing on reclaimed paper is available only under normal temperature and humidity conditions.

Cut sheet (multi part)

Table 1-41. Cut Sheet (Multi part)

		Minimum	Maximum
Width	inch	3.9 (5.8)	10.1 (16.5)
	mm	100 (148)	257 (420)
Length	inch	3.9	14.3
	mm	100	364
Copies		1 original + 4 copies	
Total Thickness	inch	0.0047	0.0154
	mm	0.12	0.39
Weight (one sheet of multipart)	g/m ²	40	50
	lb.	12	15
Quality		Plain paper, Reclaimed paper Not curled, not folded, not crumpled.	
Jointing		Line glue at the top or one side of form.	

Note: The value in parentheses represents the size available with LX-1170II.

Note: Printing on multi part paper is available only under normal temperature and humidity conditions.

Envelope

Table 1-42. Envelope

		Minimum	Maximum	
Envelop (No. 6)	Width	inch	6.5	
		mm	165	
	Length	inch	3.6	
		mm	92	
Envelop (No. 10)	Width	inch	9.5	
		mm	241	
	Length	inch	4.1	
		mm	105	
Total Thickness		inch	0.0063 0.0205	
		mm	0.16 0.52	
Weight		g/m ²	45 90	
		lb.	12 24	
Quality		BOND paper, PLAIN paper or AIR MAIL No glue at a flap Not curled, not folded, not crumpled		

Note: Printing on envelope is available only under normal temperature and humidity conditions.

Note: Set the longer side of envelope horizontally.

Continuous paper (Single sheet and Multipart)

Table 1-43. Continuous Paper (Single sheet and Multi Part)

		Rear Entry		Bottom Entry	
		Min.	Max.	Min.	Max.
Width	inch	4	10 (16)	4	10 (16)
	mm	101.6	254 (406.4)	101.6	254 (406.4)
Length (one page)	inch	4	22	4	22
	mm	101.6	558.8	101.6	558.8
Copies		1 original + 4 copies		1 original + 4 copies	
Total Thickness	inch	0.0025	0.0154	0.0025	0.0154
	mm	0.065	0.39	0.065	0.39
Weight (not multipart)	g/m ²	52	82	52	82
	lb.	14	22	14	22
Weight (one sheet of multipart)	g/m ²	40	58	40	58
	lb.	12	15	12	15
Quality		Plain paper, Reclaimed paper, Carbonless multipart paper		Plain paper, Reclaimed paper, Carbonless multipart paper	
Jointing		Point glue or paper staple (both sides)		Point glue or paper staple (both sides)	

Note: The value in parentheses represents the size available with LX-1170II.

Labels**Table 1-44. Continuous Paper with Labels**

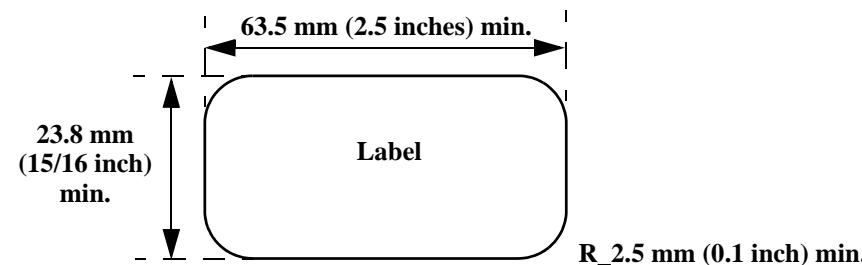
		Rear Entry		Bottom Entry	
		Min.	Max.	Min.	Max.
Label size		---		See the figure below.	
Base sheet width	inch	---	---	4	10 (16)
	mm			101.6	254 (406.4)
Base sheet length (one page)	inch	---	---	4	22
	mm			101.6	558.8
Base sheet thickness	inch	---	---	0.0028	0.0035
	mm			0.07	0.09
Total thickness	inch	---	---	0.0063	0.0075
	mm			0.16	0.19
Label weight	g/m ²	---	---	64	
	lb.			17	
Quality		---		AVERY CONTINUOUS FORM LABELS, AVERY MINI-LINE LABELS or the same quality labels	

Note: The value in parentheses represents the size available with LX-1170II.

Note: Printing on labels is available only under normal temperature and humidity conditions.

Note: The base sheet of labels must be continuous paper.

Note: Continuous paper with labels should be inserted from the bottom entrance.

**Figure 1-9. Recommended Printable Area for Label** Roll paper**Table 1-45. Roll Paper**

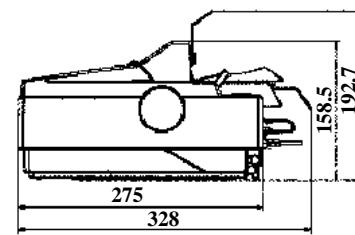
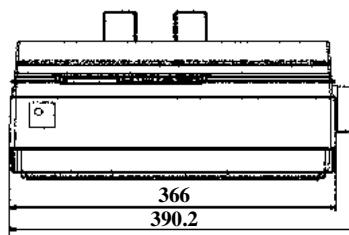
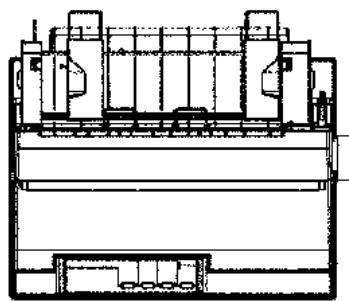
		Minimum	Maximum
Width	inch	8.5	
	mm	216	
Length	inch	---	
	mm	---	
Thickness	inch	0.0028	0.0035
	mm	0.07	0.09
Weight	g/m ²	52	82
	lb.	14	22
Quality		Plain paper, Not curled, not folded, not crumpled	

1.8 Physical Specifications

1.8.1 Physical Specifications for LX-300+II

Physical Specifications (Without pull tractor)

- Dimensions: 366 x 275 x 159 mm (WxDxH)
Except knob, paper guide & paper supports
- Mass: Approx. 4.4 kg
- Appearance: See the figure below.



Physical Specifications (CSF)

- Dimensions: 366 x 441 x 370 mm (WxDxH)
Except knob, paper guide & paper supports
- Mass: Approx. 4.6 kg
- Appearance: See the figure below.

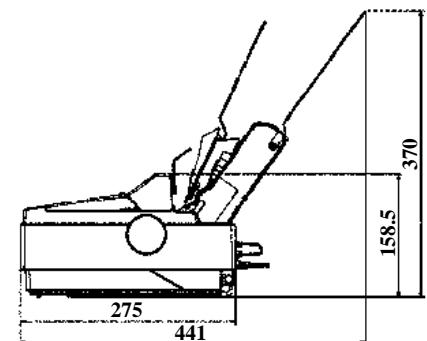
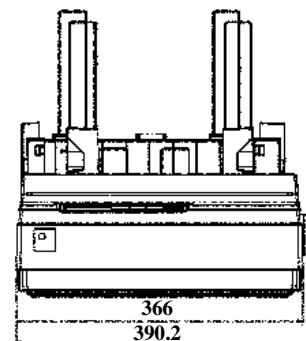
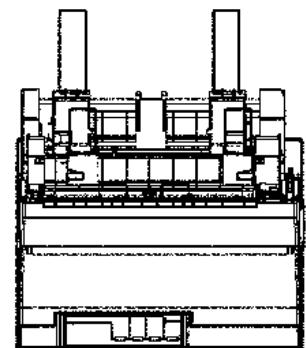


Figure 1-10. Appearance Without Pull Tractor (LX-300+II)

Figure 1-11. Appearance With CSF (LX-300+II)

1.8.2 Physical Specifications for LX-1170II

Physical Specifications (Without pull tractor)

- Dimensions: 546 x 275 x 159 mm (WxDxH)
Except knob, paper guide & paper supports
- Mass: Approx. 6.6 kg
- Appearance: See the figure below.

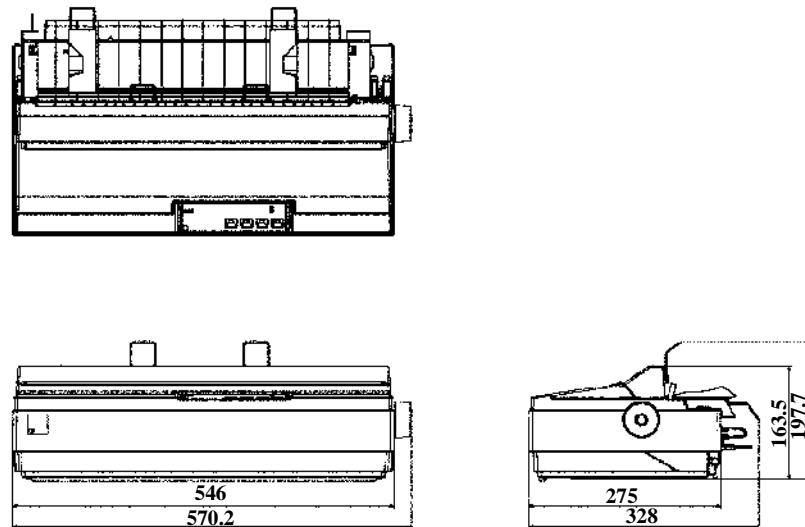


Figure 1-12. Appearance Without Pull Tractor (LX-1170II)

Physical Specifications (CSF)

- Dimensions: 546 x 440 x 377 mm (WxDxH)
Except knob, paper guide & paper supports
- Mass: Approx. 7.2 kg
- Appearance: See the figure below.

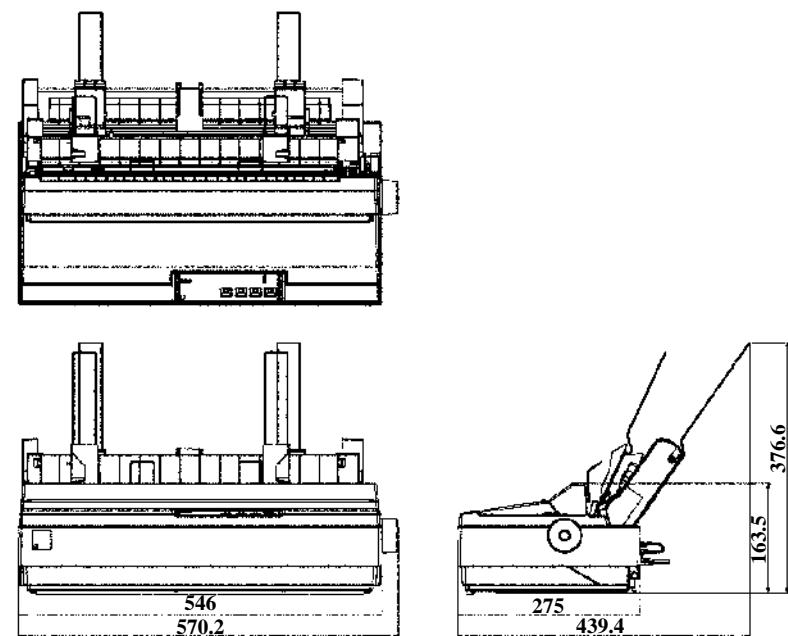


Figure 1-13. Appearance With CSF (LX-1170II)

1.9 Accessories

Enclosed Parts

Table 1-46. Enclosed Parts

Enclosed Items	Quantity
User's manual	1
Driver disk	1
Ribbon cartridge (Black)	1
Power supply cable (230 V Version)	1

Expendables

Table 1-47. Expendables

Enclosed Items	Description	
	LX-300+II	LX-1170II
Ribbon cartridge (Black)	#8750	#8755
Ribbon pack (Black)		#8758
Ribbon cartridge (Color)	S015073	—



The ribbon cartridges and ribbon pack for LX-300+II and LX-1170II are the same as those for LX-300+ and LX-1170, respectively.

Options

Table 1-48. Options

Unit	Description	
	LX-300+II	LX-1170II
Cut sheet feeder *	C80637*	C80639*
Pull tractor unit *	C80030*	C80034*
Roll paper holder *		#8310
Color upgrade kit *	C83208*	—
EpsonNet 802.11b/g Wireless and 10/100 Base Tx Ext. Print Server		C82437*

* These options for LX-300+II and LX-1170II are the same as those for LX-300+ and LX-1170, respectively.



EpsonNet 802.11b/g Wireless and 10/100 Base Tx Ext.Print Server can be used also with the predecessor model, or LX-300+/1170. In addition, EpsonNet 10/100 Base TX Ext. Print Server (C82378*), which is an old model, can be used also with LX-300+II/LX-1170II.

CHAPTER

2

OPERATING PRINCIPLES

2.1 Overview

LX-300+II/1170II consists of the printer mechanism and electric circuit boards.

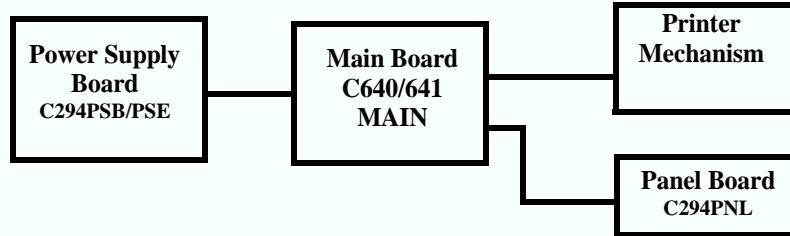


Figure 2-1. Component Unit

- Circuit board

Table 2-1.

	LX-300+II	LX-1170II
Main Board (control circuit)	C604Main	C641Main
Power Supply Board	C294PSB/C294PSE	
Panel Board	C294PNL	

The following sections describe the operating principles of each unit.

2.2 Printer Mechanism

The following are main components of the LX-300+II/1170II printer mechanism.

- Printhead
- Carriage mechanism
 - Carriage (CR) motor, Carriage home position (HP) detector

- Ribbon mechanism
 - Color ribbon drive mechanism (option)
- Platen gap adjustment mechanism
 - Adjust lever, Platen gap detector
- Paper feed mechanism
 - PF motor, rear paper end (RPE) detector, bottom paper end (BPE) detector
- Release mechanism
 - Release detector (REL)

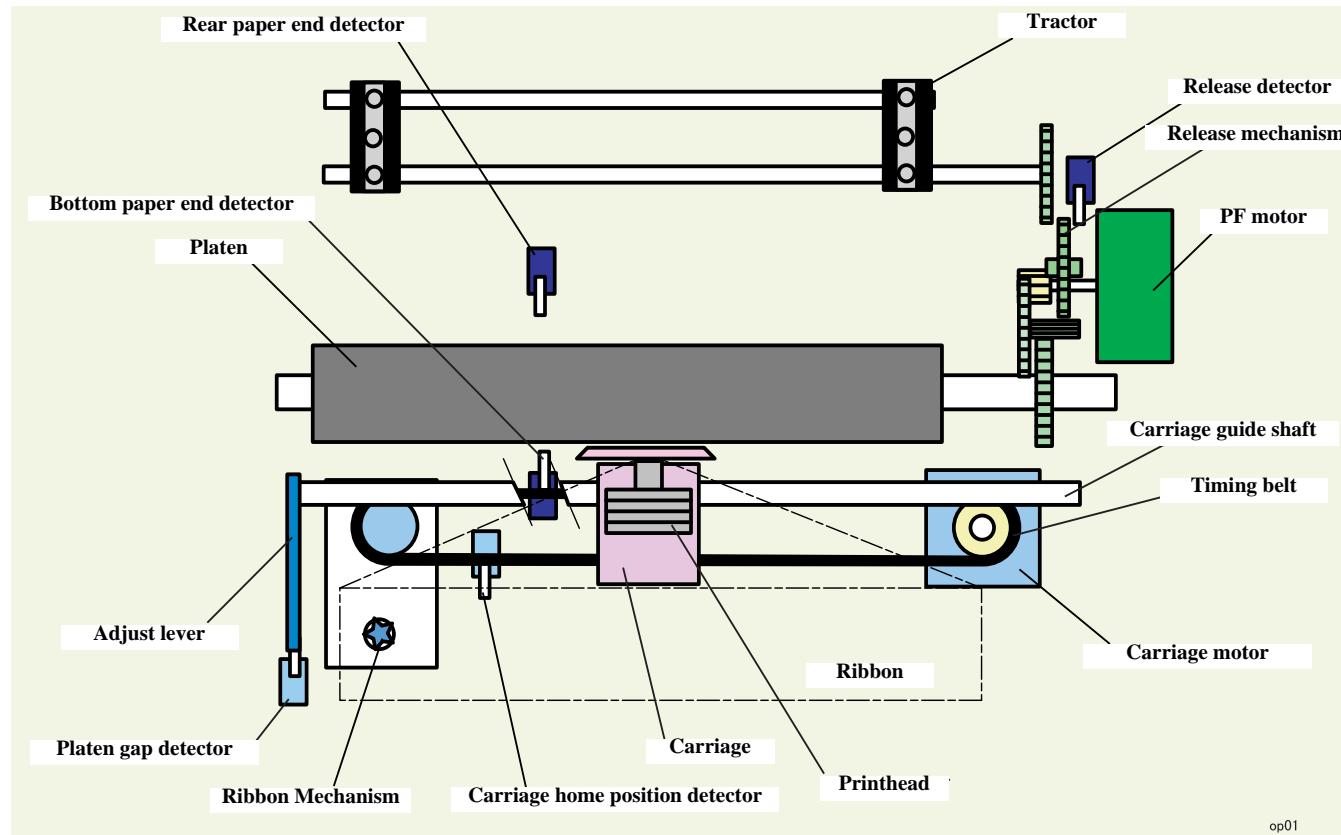


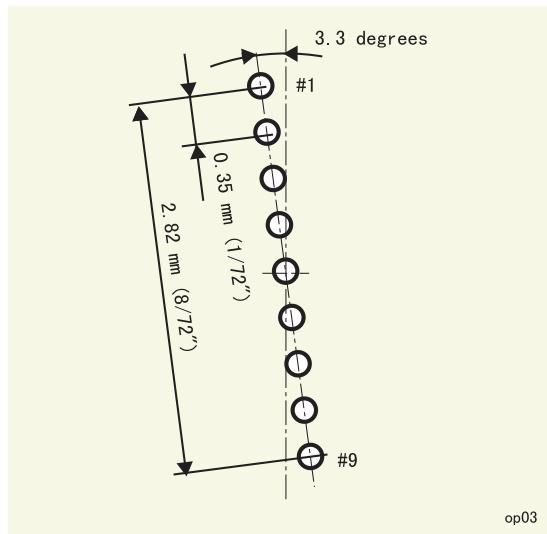
Figure 2-2. Printer Mechanism Block Diagram

2.2.1 Printhead

The table below shows the printhead specifications.

Table 2-2. Printhead Specifications

Item	Specification
Number of wires	9
Diameter of wire	Ø0.29 mm
Wire configuration	See Figure 2-3 "Wire Configuration". Note: The figure is seen from the back of the head facing printing side.
Direct current coil resistance	33.3 ±3.3 Ω(25°C)
Head drive method	Rated voltage drive
Head drive voltage	35+2.1/-3.5 V
Peak current	<ul style="list-style-type: none"> Normal: 0.75 A (Standard) Copy: 0.85 A (Standard) 1.0 A (Maximum)
Head drive frequency	<ul style="list-style-type: none"> Normal: 1350Hz or less Copy: 1350Hz or less
Head life	<ul style="list-style-type: none"> Black ribbon: 0.2 billion strokes/ wire or more Color ribbon: 0.1 billion strokes/ wire or more
Environmental condition	<ul style="list-style-type: none"> Temperature: 5 to 55°C Humidity: 10 to 85%



op03

Figure 2-3. Wire Configuration

2.2.1.1 Buzzer Function

This printhead also works as a buzzer. The table below shows buzzer specification.

Table 2-3. Buzzer Function -- Specification

Item	Specification
Head voltage	35 +2.1 / -3.5 V
Drive frequency	2kHz, 1.5kHz

2.2.2 Carriage Mechanism

The following are the components of the LX-300+II/1170II carriage mechanism and their explanation. (Figure 2-2, "Printer Mechanism Block Diagram")

- Carriage: Mounts the printhead.
- CR motor: Drives carriage in the printing column direction.
- Timing belt: Transfers the drive from the CR motor to the carriage.
- Carriage guide shaft: Shifts the carriage parallel to the platen.
- HP detector: Detects carriage home position.

CR MOTOR

This printer uses a stepping motor for CR motor. Open loop control switches the phases according to the setting period and this mechanism enables the carriage to move until the appointed position. The table below is the CR motor specifications.

Table 2-4. CR Motor Specifications

Item	Specification
Motor type	2-phase/200-pole hybrid stepping motor
Coil resistance	$4.5\Omega \pm 10\%$ (25°C)
Control method	Bi-polar drive
Phase drive	2-2 phase, 1-2 phase, W1-2 phase
Drive voltage	35 VDC +5/-10 %
CR feed pitch	Minimum Resolution: 0.212 mm (1/120") (2-2 phase, 1 pass)

Table 2-5. Carriage Speed Mode

Carriage speed mode	CR drive frequency [Hz]	Printing mode	Phase drive [pps]	Current limit (A/phase)					Adjacent dot resolution [dpi]	Head drive frequency [Hz]	Printing speed	Carriage speed mode at power down	High or low speed printing
				Front rush	High speed	Normal speed	Low speed	Rear rush					
A	3600	Color	2-2	0.79	0.79	0.70	0.70	0.70	45	1350	High speed draft 10 cpi	C	○
		BW	2-2	0.70	0.59	0.59	0.59	0.59					
B	3375	Color	2-2	0.79	0.79	0.70	0.70	0.70	48	1350	High speed draft 12 cpi	E	○
		BW	2-2	0.70	0.59	0.59	0.59	0.59					
C	2700	Color	2-2	0.79	0.79	0.70	0.70	0.70	60	1350	High speed draft 15 cpi Draft 10 cpi Bit image 60 dpi	F	○
		BW	2-2	0.70	0.59	0.59	0.59	0.59					
D	2250	Color	2-2	0.79	0.79	0.70	0.70	0.70	1440/21	1286	High speed draft 17 cpi	F	○
		BW	2-2	0.70	0.59	0.59	0.59	0.59					
E	1800	Color	2-2	0.79	0.79	0.70	0.70	0.70	80	1200	Bit image 80 dpi	G	x
		BW	1-2	0.65	0.65	0.59	0.59	0.59					
F	1350	Both	1-2	0.65	0.65	0.59	0.59	0.59	120	1350	Draft 20/17 cpi NLQ 10 cpi Bit image 120 dpi	I	x
G	1125	Both	1-2	0.65	0.65	0.59	0.59	0.59	144	1350	Bit image 144 dpi	I	x
H	900	Both	1-2	0.65	0.65	0.59	0.59	0.59	180	1350	NLQ 15 cpi	I	x
I	675	Both	1-2	0.65	0.65	0.59	0.59	0.59	240	1350	NLQ 17/20 cpi	J	x
J	450	Both	1-2	0.65	0.65	0.59	0.59	0.59				-	x

CARRIAGE HOME POSITION (HP) DETECTOR

The table below shows the HP detector specifications.

Table 2-6. HP detector Specifications

Item	Specification
Method	Mechanical contact method
Switching rate	0.6 to 1.0 mA, 5 VD \pm 5%
Switching mode	<ul style="list-style-type: none"> • out of HP: close • within HP: open

HP detector detects the signal right after when the CR motor switches the phase.

2.2.2.1 High speed skip method

At no-printing area, the carriage moves at high speed compared to the normal carriage speed at printing. This is called carriage control.

2.2.3 Ribbon Mechanism

2.2.3.1 Ink Ribbon Shifting Mechanism

Ink ribbon shifting mechanism: CR motor drives the timing belt and the timing belt driven pulley drives the ribbon shifting gears.

2.2.3.2 Color Ribbon Driving Mechanism (Option)

Color ribbon driving is only available for LX-300+II.

Color ribbon driving mechanism: shifts the color ribbon up and down to change the color area of the ribbon to be used for printing.

Color ribbon mechanism consists of the color shift (CS) motor, CS cam, ribbon detector, CS lever assembly and color cartridge holder. Color ribbon is installed on the color cartridge holder.

When CS motor runs, 1) the pinion revolves CS cam, 2) the CS lever assembly on the CS cam shifts the color cartridge holder up and down and 3) drives ribbon up and down.

Table 2-7. CS Motor Specifications

Item	Specification
Motor type	2-phase/48-pole PM stepping motor
Coil resistance	150Ω \pm 5% (25°C, per 1 phase)
Control method	uni-polar rated voltage drive
Phase drive	2-2 phase
Drive voltage	36.75 ± 1.75 VDC
Consuming current	<ul style="list-style-type: none"> • Operating, peak current: 245 mA • Non-operating: 20 mA
Drive frequency	500 pps

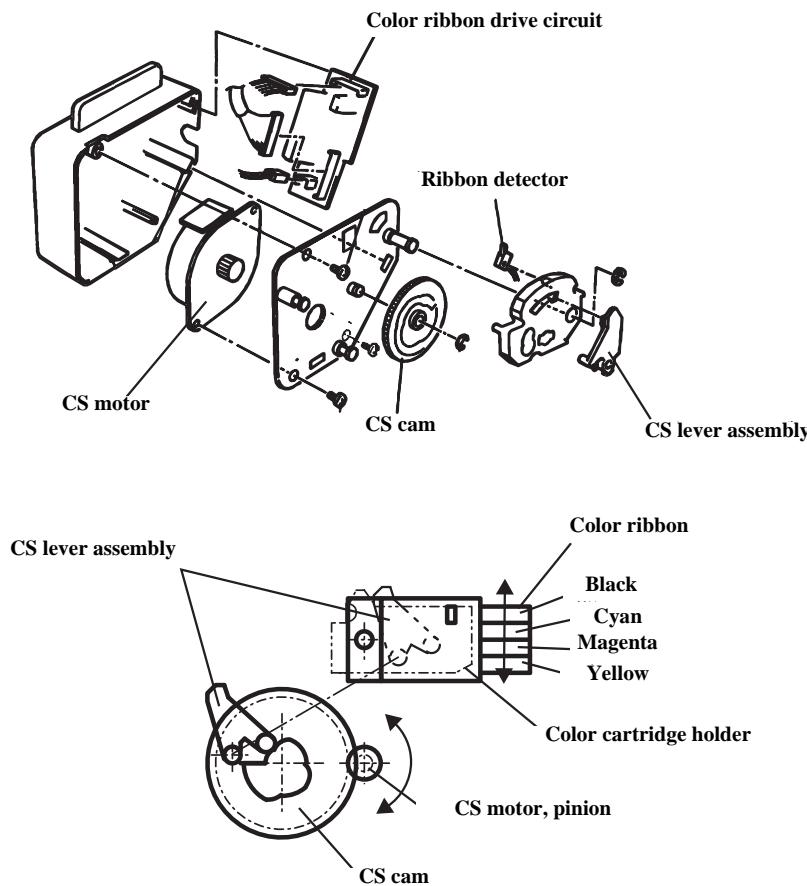


Figure 2-4. Color Ribbon Driving Mechanism

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RIBBON CARTRIDGE DETECTOR

Ribbon detector detects if the color ribbon is installed or not.

Detect Timing

- When the power is applied.
- When recovering from the economy mode.
- When the printing is started.

Table 2-8. Ribbon Detector Specifications

Item	Specification
Method	Mechanical contact method
Switching rate	0.6 to 1.0 mA
Switching mode	<ul style="list-style-type: none"> • Color ribbon cartridge is installed: High • Black ribbon cartridge is installed or no ribbon is installed: Low

AVOID STAINING COLOR RIBBON WITH DIFFERENT COLORS

To minimize staining the color areas on the ribbon with different colors, printing in green, violet or orange is performed in the following order.

Table 2-9. Color Printing Order

Color	First color	Second color
Green	Yellow	Cyan
Orange	Yellow	Magenta
Violet	Magenta	Cyan

COLOR MECHANISM INITIALIZATION

The printer mechanism is initialized when the power is applied or when recovering from the energy saving mode.

- Color mechanism initialization

Color mechanism initialization shifts color mechanism for the black ink area to be at the home position. Color mechanism initialization shifts the carriage at the same time to prevent the ribbon from hanging on the printhead.

When the buffer is cleared or when the printer is under the pause condition, the color mechanism is initialized and waits for the next printing command.

2.2.4 Platen Gap Adjustment Mechanism

This mechanism is to adjust the distance between the platen and the printhead (platen gap) according to the paper thickness.

The following are the components of the LX-300+II/1170II platen gap adjustment mechanism and their explanation. (Refer to Figure 2-5, "Platen Gap Adjustment Mechanism")

- Carriage: Mounts the printhead.
- Carriage guide shaft: Shifts the carriage horizontally.
- Adjust lever and Parallelism adjust bushing: Installed at both ends of the carriage guide shaft
- Platen gap detector (PG_SW)

Carriage guide shaft is eccentric toward the adjust lever rotating center. Due to this, when rotating the adjustment lever back and forth, the printhead shifts toward and against the platen to adjust the platen gap. When printing on thick paper such as postcards and envelopes, set the adjust lever over the 1st level. PG detector shifts the printer to the copy mode from the printing mode. Printing speed will be lowered but it prevents wire from breaking off.

PLATEN GAP (PG_SW) DETECTOR

The following is PG_SW specification.

Table 2-10. PG_SW Detector Specifications

Item	Specification
Method	Mechanical contact method
Switching rate	0.6 to 1.0 mA, 5 VD±5%
Switching mode	<ul style="list-style-type: none"> • PG=0: close • PG=0-4: open

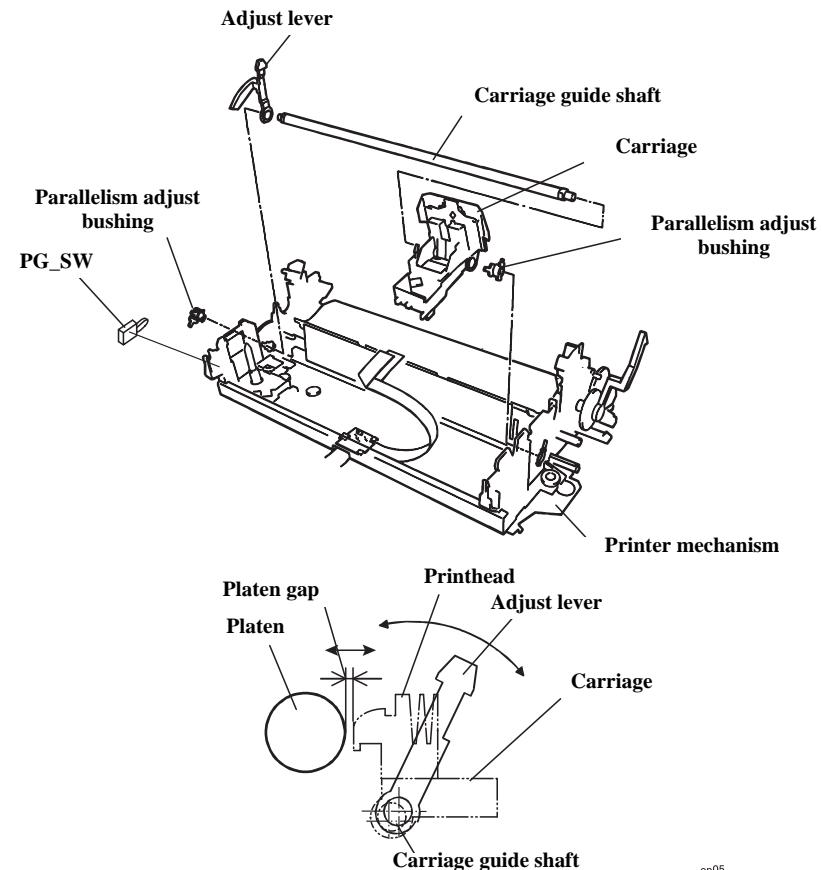


Figure 2-5. Platen Gap Adjustment Mechanism

2.2.5 Paper Feed Mechanism

This mechanism consists of the paper feed motor (PF motor), paper feed gears, platen, rear paper end detector, bottom paper end detector and push tractor unit. (Refer to Figure 2-2, "Printer Mechanism Block Diagram")

Paper Feed Method

- Friction feed
- Push tractor feed
Uses standard push tractor
- Push-pull tractor feed
Uses standard push tractor + Option tractor
- Pull tractor feed
Replace the standard push tractor with option tractor

Feeder

- Simple CSF (option)
- Tractor (standard)
Push / Pull
- Pull tractor (option)
- Roll paper holder

Paper path

- Manual loading
Rear paper load, top paper load
- CSF
Rear paper load, top paper load
- Push tractor
Rear paper load, top paper load
- Pull tractor
Rear / Bottom paper load, top paper load

Auto loading

When loading paper manually, push paper between the platen and the driven paper load roller. Paper will be loaded automatically.

PF MOTOR

LX-300+II/1170II uses a stepping motor for PF motor. Open loop control switches the phases according to the setting period and this mechanism loads and carries paper to the appointed position and eject paper.

The table below shows the PF motor specifications.

Table 2-11. PF Motor Specifications

Item	Specification
Motor type	2-phase/96-pole Hybrid stepping motor
Coil resistance	LX-300+II: $12\Omega \pm 10\%$ (25°C, per 1 phase) LX-1170II: $10.6\Omega \pm 10\%$ (25°C, per 1 phase)
Control method	bi-polar rated current drive
Phase drive	2-2 phase, 1-2 phase
Drive voltage	35 VDC +5/-10 % (This voltage is added to driver.)
Drive current	0.25, 0.72, 0.8A
Paper feed pitch	Minimum Resolution: 0.059 mm (1/432") (1-2 phase, 2 pass)

RPE DETECTOR

RPE detector is installed on the paper path at the back of the printer. The table below shows the RPE detector specifications.

Table 2-12. RPE Detector Specifications

Item	Specification
Method	Mechanical contact method
Switching rate	0.6 to 1.0 mA, 5 VD±5%
Switching mode	<ul style="list-style-type: none"> • Paper inside: open • No paper: close

BPE DETECTOR

BPE detector is installed right under the platen. The table below shows the BPE detector specifications.

Table 2-13. BPE Detector Specifications

Item	Specification
Method	Mechanical contact method
Switching rate	0.6 to 1.0 mA, 5 VD±5%
Switching mode	<ul style="list-style-type: none"> • Paper inside: open • No paper: close

2.2.5.1 Page Length Measurement

Page length measurement is a process to convert the following value to the number of printing lines.

Value = [The number of paper feed pulse from the paper top (top margin: 4.2mm) until RPE detector detects paper end] + [forms over-ride specified paper feed pulse] - [adjustment value]

When CSF is used:

The uncertainty of the paper end detector may vary the number of printing lines within the same paper size. To avoid this, when CSF is used, page length measurement calculates the printable lines and if the paper is longer than the printable lines, the number of printing lines is defined by the number of the printable lines (fixed value).

When paper is shorter than the printable lines, the printer prints the fixed number of lines by forms over-ride function (which allows the fixed number of lines to be printed even when RPE detector detects paper end).

When CSF is not used:

When paper is loaded manually or when tractor feed is used, the printing area at the paper end is determined by forms over-ride function after BPE or RPE detector detects the paper end.

2.2.6 Release Mechanism

This mechanism switches the flow of PF motor driving force between to the friction feed and to the tractor feed.

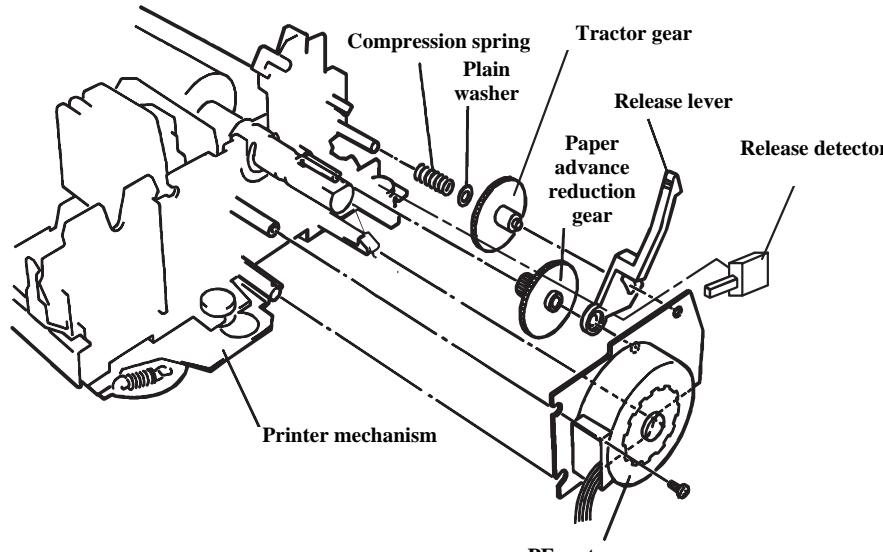


Figure 2-6. Release Mechanism

Release mechanism consists of the following.

- Release lever: Shifts tractor low speed gears back and forth.
- Tractor gear
- Paper advance reduction gear: Transfers the PF motor driving force to the tractor gear.
- Release detector (REL): Detects the release lever position.

The table below shows the release detector specifications.

Table 2-14. Release Detector Specifications

Item	Specification
Method	Mechanical contact method
Switching rate	0.6 to 1.0 mA, 5 VD \pm 5%
Switching mode	<ul style="list-style-type: none"> Friction: open Tractor: close

2.2.7 Other Special Functions

2.2.7.1 Energy saving mode

This function saves power consumption when the printer is in the standby mode. This mode turns hold current of PF motor, CR motor and CS motor OFF.

2.2.7.2 Quiet Mode

Quiet mode lowers printing temperature. When this mode is selected, carriage speed will be lowered to the power down mode speed. Refer to Table 2-5, "Carriage Speed Mode," on page 47.

2.3 Electrical Circuit Operating Principles

2.3.1 MAIN Board Electric Circuit

NOTE: CS motor is only available for LX-300+II.

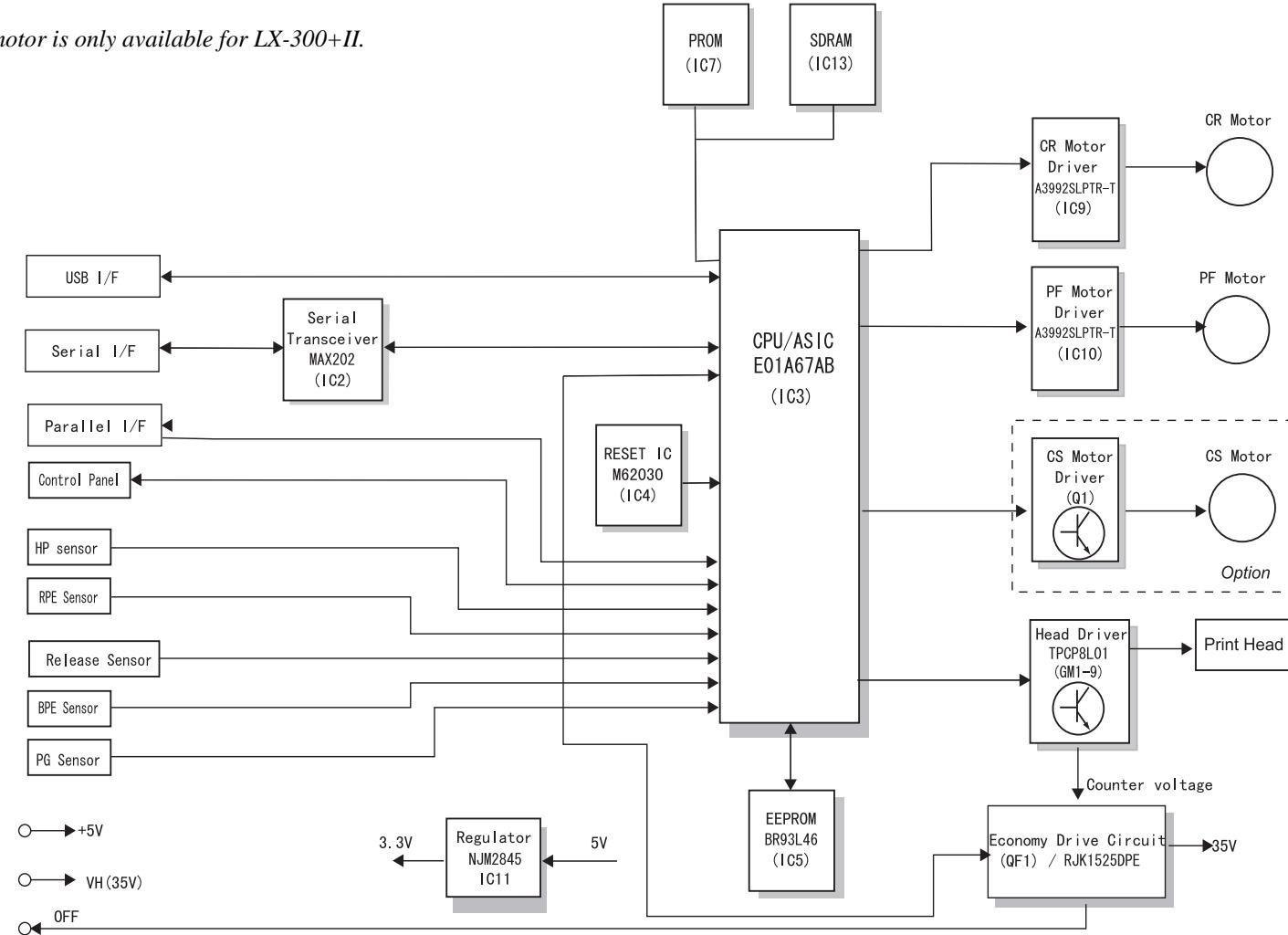


Figure 2-7. C640/C641 MAIN Board Block Diagram

Table 2-15. Main Elements

Elements	Location	Function
CPU (C640/641MAIN)	IC3	RISC C33208 CPU, QFP 128 pin <ul style="list-style-type: none"> • Outside clock 48 MHz/ Inside clock 48 MHz • 8KB RAM built-in • Various DMA • A/D converter
G/A * (C640/641MAIN)	IC6	Approximately 21000 gates, QFP 160 pin <ul style="list-style-type: none"> • Bit manipulation • Clock control • interface control (IEEE1284/Type-B I/F) • Input Buffer control • Motor control • Head control
CPU/GateArray (C640/641MAIN)	IC3	CPU: RISC C33208 CPU, QFP 128 pin <ul style="list-style-type: none"> • Outside clock 19.66 MHz/ Inside clock 39.32 MHz • 8KB RAM built-in • Various DMA • A/D converter Approximately 21000 gates, QFP 160 pin <ul style="list-style-type: none"> • Bit manipulation • Clock control • interface control (IEEE1284/Type-B I/F) • Input Buffer control • Motor control • Head control
PROM	IC7	4M / 8Mbit, DIP 40 / 42 pin <ul style="list-style-type: none"> • Stores firmware • CG
DRAM	IC8	1/2/4M bit switching method, SPJ package 40 pin <ul style="list-style-type: none"> • Various buffer, work area
EEPROM	IC5	AT93C46, 1kbit, SOP 8pin <ul style="list-style-type: none"> • Stores default value and various parameter
RESET IC	IC4	M62030 (SANYO), 8 pin <ul style="list-style-type: none"> • CPU and G/A reset

Table 2-15. Main Elements (continued)

Elements	Location	Function
CR Motor Driver	IC9	LB1847 (SANYO)
PF Motor Driver	IC10	LB1847 (SANYO)
Serial I/F Transceiver	IC2	HIN202CBN or equivalent
Regulator IC	IC11	BA033 (ROHM) or equivalent <ul style="list-style-type: none"> • Generates 3.3V logic voltage
Regulator IC	IC12	PD494 or equivalent <ul style="list-style-type: none"> • 95V rated voltage circuit • Detects over voltage (over 150V) and sends OFF signal to the power supply boards.
Thermistor	TH1	Measures temperature of the motor driver.

2.3.2 C294PSB / C294PSE Board

LX-300+II/1170II generates power supply by a power supply boards: either C294PSB (100V) or C294PSE (200V) depending on local supplied voltage. The table below shows the power supply boards input voltage specifications.

Table 2-16. Power Supply Boards Input Voltage Specifications

Circuit	Input voltage	Fuse specification
C294PSB	99 - 132VAC	ULTSC-2.5A-NI
C294PSE	198 - 264VAC	HT 1.25A

2.3.2.1 Electric Circuit

The power supply board supplies two types of power for control circuit and driving mechanism. The table below shows output voltage and its use.

Table 2-17. Output Voltage and its Use

Output voltage	Use
35 V +5%/-10%	Drive
5 V ± 5%	Logic Voltage*

NOTE: *: Core voltage of CPU and G/A is 3.3V and it is generated by the regulator IC on the MAIN board from +5VDC.

CHAPTER

3

TROUBLESHOOTING

3.1 Overview

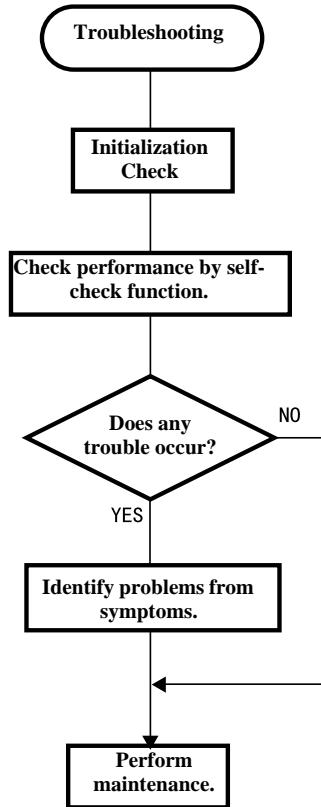
This chapter describes how to troubleshoot problems if any problems occur with the printer. Refer to troubleshooting flowcharts in this chapter to identify a defective part and an appropriate repair for it.



- Never touch printhead and any motors right after printing since they are highly heated.
- When disassembling the printer, be sure to disconnect the power cable and remove the interface cable.



- Be sure to use specified tools for servicing to maintain the quality.
- Make sure to apply specified oil, grease and glue.
- Perform adjustment as specified.



tr02

Figure3-1. Troubleshooting Procedure

3.2 Troubleshooting

3.2.1 Initialization Check

Before troubleshooting, check the following basic items.

1. When the printer can perform printing, perform self-test and check if any troubles occur.
2. When the printer cannot perform any printing, check the setting by “Default Setting”. (Refer to Chapter 1.)
3. Check if the outside and inside the printer is noticeably dirty or if any parts are broken. If there is dirt, perform cleaning referring to Chapter 6 “Maintenance”.
4. Make sure each harness is connected properly.
5. Make sure there is no remarkable friction among printer mechanism gears. Make sure all gears are linked properly.
6. Make sure there is no dirt nor scratch on rollers inside the printer.
7. Perform EEPROM clear as needed. Inside setting is reset to the factory default setting. (Refer to Chapter 1.)

3.2.2 Check Performance By Self-Check Function

LX-300+II has self-check function, which supervises the printer condition constantly. If any problem occurs, it indicates an error occurrence by indicator LED and in some cases it notifies the operator of the error occurrence by beeping the buzzer. Identify the error cause, referring to the indication first. If the error is not corrected, perform unit repair.

3.2.2.1 Indicator LED

The table below shows the indicator LED and the printer condition.

Table 3-1. Indicator LED

Printer Condition	Pause	Paper Out	Front	Buzzer
Pause	ON	-	-	-
Paper Out Error	ON	ON	-	Shoot beep x3
Release Lever Error	ON	-	-	Long beep x5
Paper Eject Warning	ON	BLINK	-	-
MICRO Adjust	BLINK	-	-	-
Tear Off	-	-	According to LED On/Off combination	-
Font Select	-	-	According to LED On/Off combination	-
Fatal Error	BLINK	BLINK	BLINK	-

Paper Out Error

This error will be indicated when printer fails to feed paper or paper is run out.

■ Solution

Set paper properly and try paper feed again.

Release Lever Error

This error will be indicated when wrong release lever operation is performed. For example, if you change the release lever setting when the printer already starts feeding paper, this error will be generated.

■ Solution

Reset the release lever.

Fatal Error

This error will be indicated when;

- carriage error has occurred
- input voltage is abnormal
- hardware problem has occurred

■ Solution

If it is carriage error, check if there is no obstacles for carriage to move.

If it is input voltage problem, check power supply voltage.

If it is hardware problem, check machine and electric circuit.

3.2.3 Identify Problems From Symptoms

This section describes the procedure for identifying the problems from the abnormal symptoms. Basically unit repair or replacement should be performed, but if necessary parts level replacement should be performed.

Find your symptom in the table below and check the corresponding table.

Table 3-2. Symptoms and Solutions

Symptom	Problems	Check Table
When power is applied, the printer does not operate.	Control panel LED does not operate at all.	Table 3-3 on page 60
	Printer mechanism does not operate at all.	Table 3-4 on page 60
When power is applied, the printer becomes fatal error.	<ul style="list-style-type: none"> Control panel indicates fatal error. The printer indicates error after initialization. 	Table 3-5 on page 60
Self-test print is abnormal.	<ul style="list-style-type: none"> Platen gap is not correct. Printhead or ribbon mask is abnormal or their life is over. Vertical direction printing quality is abnormal. 	Table 3-6 on page 61
Paper feed is abnormal.	<ul style="list-style-type: none"> Paper feed operation is not performed. Paper switching is abnormal. Line feed is not equal. Skew is generated. 	Table 3-7 on page 61
Control panel and switches do not operate properly.	<ul style="list-style-type: none"> LED indication is abnormal. Cannot input from switches. 	Table 3-8 on page 61
Printing operation is abnormal when it is online.	<ul style="list-style-type: none"> Self-test is normal, but the printing from host computer is abnormal. 	Table 3-9 on page 62

Table 3-3. Control Panel LED Does Not Light On.

Cause	Check Point	Y/N	Solution
Blowout of a fuse on the power board.	Is a fuse on the power board blown out?	YES	Check the electric circuit and printer mechanism. If there is no short circuit, replace the fuse.
Connector is not connected to the power board.	Are connectors connected to the power board properly?	NO	Replace the power board.
Power switch is defective.	Is conductivity of the switch is OK?	YES	Replace the power board.
Power board is defective.	Are +5VDC and +35VDC OK when the power is on?	NO	Replace the power board.
Power board and the main board are not connected properly.	Is CN8 connected properly?	NO	Connect CN8 properly.
Main board is defective.	-	-	Replace the main board.
Control panel harness is not connected properly.	Is the harness of the control panel connected properly?	NO	Connect the harness properly.
Control panel board or harness is defective.	-	-	Replace the control panel.

Table 3-4. Printer Mechanism Does Not Operate.

Cause	Check Point	Y/N	Solution
Any of CN3 to CN12 is not connected to the main board properly.	Are all connectors connected properly?	NO	Connect them properly.
Main board is defective.	-	-	Replace the main board.
Printer mechanism is defective.	-	-	Replace the printer mechanism.

Table 3-5. When Power is Applied, the Printer Becomes Fatal Error.

Cause	Check Point	Y/N	Solution
Carriage home position error (CR Error=30H)	Are CR motor, timing belt, and CR home position sensor normal?	YES	Replace the power supply circuit board.
		NO	Replace the defective component.
CG access error (CG Error=32H)	Is main board normal?	YES	See Table 3-10, "Electrical Noise is Caused.," on page 62.
		NO	Replace the main board.
Abnormal printhead voltage (Head Low Volt Error=33H)	Is printhead voltage (+42V line) normal?	YES	Replace the printhead.
		NO	Replace the power supply board.
Abnormal printhead temperature (Head Open Error=3AH)	Is the printhead connected to the main board properly?	YES	Replace the printhead.
		NO	Connect the FFC properly.
CR motor harness is not connected properly.	Is CR motor harness CN10 connected properly?	NO	Connect it properly.
CR motor is defective.	-	-	Replace the CR motor.
HP detector harness is not connected properly	Is HP detector harness CN3 connected properly?	NO	Connect it properly.
HP detector is defective.	-	-	Replace the HP detector.
Power board is defective.	Is power voltage normal?	NO	Replace the power board.
-	-	-	Replace the main board and printer mechanism.

Table 3-6. Self Test Print is Abnormal.

Cause	Check Point	Y/N	Solution
Any of CN3 to CN12 is not connected to the main board properly.	Are all connectors connected properly?	NO	Connect them properly.
Printhead driver is defective.	-	-	Replace the main board.
Bi-d is not correct.	Are rows aligned properly when bi-directional printing is proceeded?	NO	Adjust Bi-D.
Printhead is defective.	Is there any dot missing?	YES	Replace the printhead.
Head FFC is not connected properly or broken.	-	YES	Replace the head FFC.
Platen gap is not correct.	Is printing too light / weak?	YES	Adjust the platen gap.
	Is there any dirt on printed documents?	YES	Adjust the platen gap.
Ribbon mask is defective.	Is there any dirt on printed documents?	YES	Replace the ribbon mask.
Ribbon mechanism is defective.	Is ribbon advanced properly?	NO	Replace the ribbon mechanism parts.
Printer mechanism is defective.	-	-	Replace the printer mechanism.

Table 3-7. Paper Feed is Abnormal.

Cause	Check Point	Y/N	Solution
RPE detector or BPE detector is defective or not connected properly.	Check the sensors. Is there any abnormality?	NO	Replace the sensor.
	YES		Check the connection to the main board.
Paper switching mechanism is defective.	Switch the release lever. Is the paper loading direction switched?	NO	Replace the printer mechanism or check the connection.
	Can the release lever be switched?	NO	Replace the release sensor or check the connection.
Printer mechanism paper loading mechanism is defective.	When the power is off, can the printer feed paper by rotating the platen knob manually?	NO	Replace the printer mechanism or paper loading mechanism parts.
	PF motor is defective.	Is PF motor normal?	NO
PF motor driver is defective.	-	-	Replace the main board.

Table 3-8. Control Panel and Switches Do Not Operate.

Cause	Check Point	Y/N	Solution
Switch is defective.	Is conductivity of the switch is OK?	NO	Replace the control panel.
Connect the control panel harness.	Control panel harness is connected properly?	NO	Connect it properly.
Control panel board is defective or the harness is defective.	-	-	Replace the control panel.

**Table 3-9. Printing Operation is Abnormal When it is On-Line.
(Self-Test is Normal.)**

Cause	Check Point	Y/N	Solution
Initial setting is wrong.	Check the initial setting with the default setting. Is it OK?	NO	Reset the setting or use the EEPROM clear to reset setting to the default.
Interface cable is not connected properly.	Are cables connected properly?	NO	Connect them properly.
Interface cable is defective.	-	-	Replace the interface cable.
Main board is defective.	-	-	Replace the main board.
Firmware is defective.	Is the firmware version latest?	NO	Update the firmware.

Table 3-10. Electrical Noise is Caused.

Cause	Check Point	Y/N	Solution
External noise	Is there another electrical apparatus, such as a generator, radio transmitter or an apparatus incorporating a motor within 3 m from the printer?	YES	Turn off the power to the electrical apparatus or move the printer to a position at least 6m distant from the apparatus.
AC cable is not connected properly	Is the AC power cable connected and ground properly?	NO	Connect and ground the cable properly.
Harness of power switch is not grounded properly	Is the harness of the power switch grounded properly?	NO	Ground the harness properly.
Circuit board is not grounded properly	Is the circuit board connected and grounded properly?	NO	Ground and connect the circuit board properly.
Power supply board is defective	Is the power supply board normal?	NO	Replace the power supply board.
Main board is defective	Is the main board normal?	NO	Replace the main board.

3.2.4 Unit and Parts Check

This section describes the checking method of the printhead, motors and sensors to find the defective units and parts.



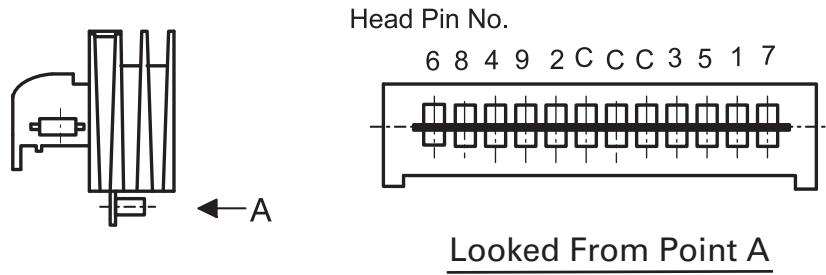
When repairing the unit, make sure to turn the printer off and plug off the power cable except when this manual specifies to keep the power on.

3.2.4.1 Printhead Check

By measuring the direct current resistance of the printhead coil, you can check if it is all right.

Table 3-11. Printhead Coil Resistance

Item	Operation	Specification
Printhead	1. Set the multimeter to the resistance measuring range. 2. Connect the one side of the probe to C. 3. Connect the other side of the probe to corresponding head pin No.	$33.3 \pm 3.3\Omega$ (at 25°C/phase)



trb01

Figure3-2. Head Coil Pin No.

3.2.4.2 Motor Check

By measuring the direct current resistance of the motor coil, you can check if the motor is all right.

Table 3-12. Motor Check

Item	Operation	Specification
CR motor	1. Set the multimeter to the resistance measuring range. 2. Connect the one side of the probe to pin 1 or 2. 3. Connect the other side of the probe to pin 3 or 4.	$4.5\Omega \pm 10\%$ (at 25°C/phase)
PF motor	1. Set the multimeter to the resistance measuring range. 2. Connect the one side of the probe to pin 1 or 2. 3. Connect the other side of the probe to pin 3 or 4.	LX-300+II: $12.0\Omega \pm 10\%$ LX-1170II: $10.6\Omega \pm 10\%$ (at 25°C/phase)
CS motor (option, LX-300+II only)	1. Disassemble the CS unit. 2. Set the multimeter to the resistance measuring range. 3. Connect the one side of the probe to brown [TBD] harness. 4. Connect the other side of the probe to other 4 harness.	$150\Omega \pm 5\%$ (at 25°C/phase)

3.2.4.3 Sensor Check

When the sensor is connected mechanically, you can check the sensor by its conductivity.

Table 3-13. Sensor Check

Item	Operation	Specification
HP detector	<ol style="list-style-type: none"> Set the multimeter to the resistance measuring range. Connect the one side of the probe to pin 1 of CN3. Connect the other side of the probe to pin 2 of CN3. 	When switching the sensor actuator, it should be switched ON/OFF.
RPE detector	<ol style="list-style-type: none"> Set the multimeter to the resistance measuring range. Connect the one side of the probe to pin 1 of CN4. Connect the other side of the probe to pin 2 of CN4. 	When switching the sensor actuator, it should be switched ON/OFF.
Release detector	<ol style="list-style-type: none"> Set the multimeter to the resistance measuring range. Connect the one side of the probe to pin 1 of CN5. Connect the other side of the probe to pin 2 of CN5. 	When switching the sensor actuator, it should be switched ON/OFF.
BPE detector	<ol style="list-style-type: none"> Set the multimeter to the resistance measuring range. Connect the one side of the probe to pin 1 of CN6. Connect the other side of the probe to pin 2 of CN6. 	When switching the sensor actuator, it should be switched ON/OFF.
PG detector	<ol style="list-style-type: none"> Set the multimeter to the resistance measuring range. Connect the one side of the probe to pin 7 of CN3. Connect the other side of the probe to pin 7 of CN3. 	When switching the sensor actuator, it should be switched ON/OFF.

3.2.4.4 Printhead Driver Check

Simple check of the printer driver (Q3 ~ Q11) can be done by the following method.

Table 3-14. Printhead Driver Check

Item	Operation	Specification
Printer driver (Q3~Q11)	<ol style="list-style-type: none"> Set the multimeter to the resistance measuring range. Connect the one side of the probe to the base of the transistor. Connect the one side of the probe to emitter of the transistor. 	The resistance should NOT be "0" or infinity.

CHAPTER

4

DISASSEMBLY AND ASSEMBLY

4.1 Overview

This chapter explains the disassembly and assembly of LX-300+II/1170II. Read the precautions below before disassembling and assembling the printer.

4.1.1 Precautions

See the precautions given under the handling “WARNING” and “CAUTION” in the following column when disassembling or assembling the product.



- Disconnect the power cable before disassembling or assembling the printer.
- Never touch the printer right after it finishes printing, for the printhead is highly heated.
- If you need to work on the printer with power applied, strictly follow the instructions in this manual.
- Always wear gloves for disassembly and reassembly to avoid injury from sharp metal edges.
- To protect sensitive microprocessors and circuitry, use static discharge equipment, such as anti-static wrist straps, when accessing internal components.



- Use only recommended tools for disassembling, assembling or adjusting the printer.
- Observe the specified torque when tightening screws.
- Apply lubricants and adhesives as specified.
- Make the specified adjustments when you disassemble the printer. (See Chapter 5 for details.)
- When performing an adjustment, follow the method described in this manual.
- When using compressed air products, such as air duster, for cleaning during repair and maintenance, the use of such products containing flammable gas is prohibited.

4.1.2 Tools

The table below lists the tools recommended to use for disassembly and assembly and adjustment. Use only tools specified here.

Table 4-1. Recommended Tools-1

Tools	Part No.
Needle-nose pliers	B740400100
Nipper	B740500100
Tweezers	B741000100
Soldering bit	B740200100
E ring holder #2.5	B740800400
+ driver No.2	B743800200
Box driver (opposite side distance: 7mm)	B741700200
Thickness gauge	B776702201

NOTE: All tools are available on the market.

Table 4-2. Recommended Tools-2

Device	Specification
Multimeter	-
Oscilloscope	50MHz

NOTE: Only component level repairing service requires oscilloscope.

Table 4-3. List of Screws

Screw	Name	Screw	Name
	C.B.P., Tite, 3x10 F/ZN		C.P., Screw, 3x4 F/ZN
	C.P.B., Screw, 3x14 F/ZN		C.B(O), Screw, 4x8 F/ZN
	C.B.S., Screw, 3x4 F/Zn		Jack Socket
	C.B.B., (W(13), 3x14 F/ZN		

4.1.3 Service Checks After Repair

Before returning the printer back to the user, use the check list below to confirm the quality of the repaired printer.

Table 4-4. Check List for Repaired Printer

Category	Component	Item to Check	Check
Printer Mechanism	Printhead	Is dot missing?	<input type="checkbox"/> OK <input type="checkbox"/> NG
		Are any wires broken?	<input type="checkbox"/> OK <input type="checkbox"/> NG
	Carriage mechanism	Does carriage move smoothly? <input type="checkbox"/> CR movement is not noisy? <input type="checkbox"/> CR mechanism is not dirty? <input type="checkbox"/> CR mechanism is not oily?	<input type="checkbox"/> OK <input type="checkbox"/> NG
		Is the CR motor assembly at the correct temperature? (Not overheating?)	<input type="checkbox"/> OK <input type="checkbox"/> NG
	Paper feed mechanism	Is paper advancing smoothly? <input type="checkbox"/> PF movement is not noisy? <input type="checkbox"/> PF mechanism is not dirty? <input type="checkbox"/> PF mechanism is not oily?	<input type="checkbox"/> OK <input type="checkbox"/> NG
		Is the PF motor assembly at the correct temperature? (Not overheating?)	<input type="checkbox"/> OK <input type="checkbox"/> NG
	Paper path	Are all the types of paper fed smoothly?	<input type="checkbox"/> OK <input type="checkbox"/> NG
		Does the tractor feed paper smoothly?	<input type="checkbox"/> OK <input type="checkbox"/> NG
		Is the paper path clear of obstructions?	<input type="checkbox"/> OK <input type="checkbox"/> NG
	Ribbon mask	Is the ribbon mask free of distortion?	<input type="checkbox"/> OK <input type="checkbox"/> NG
	Test printing	Is the test printing successful?	<input type="checkbox"/> OK <input type="checkbox"/> NG
	Online printing	Is the online printing successful?	<input type="checkbox"/> OK <input type="checkbox"/> NG
Adjustment	Printhead	Is the platen gap adjusted correctly?	<input type="checkbox"/> OK <input type="checkbox"/> NG
		Is Bi-d adjustment value correct?	<input type="checkbox"/> OK <input type="checkbox"/> NG
	Initial setting	Have all user changeable settings been reset to the default values?	<input type="checkbox"/> OK <input type="checkbox"/> NG

Table 4-4. Check List for Repaired Printer (continued)

Category	Component	Item to Check	Check
Version Up	ROM version	Latest ROM version _____	<input type="checkbox"/> OK <input type="checkbox"/> NG
	Ink ribbon	Is ribbon removed?	<input type="checkbox"/> OK <input type="checkbox"/> NG
Transportation	Accessories	Are all the relevant parts included in the shipment?	<input type="checkbox"/> OK <input type="checkbox"/> NG

4.2 Disassembly and Assembly

This section explains the disassembly and assembly of LX-300+II/LX-1170II. Unless otherwise specified, assembly can be done in the reverse order of the disassembly procedure.

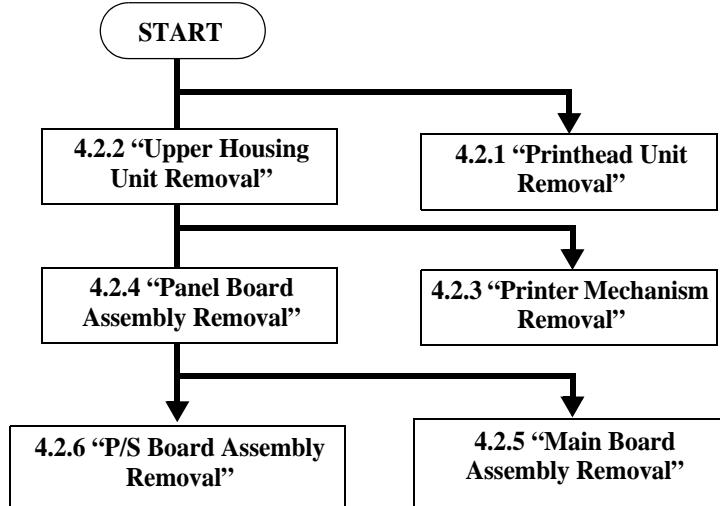
Anything that service person should pay attention to is described under “Check Point”. Any adjustment required after assembly is described under “Adjustment”.

When you have to remove parts that are not described in this chapter, refer to the exploded diagram on Appendix of this manual.



- Read 4.1.1 “Precautions” before start disassembling the printer.
- Remove ink ribbon and paper before disassembling the printer.

The figure below is the disassembly flowchart for main component.



Flowchart 4-1. Disassembly Flowchart (Main Component)

4.2.1 Printhead Unit Removal

1. Remove the cover of the printer.
2. Remove 1 screw (C.P.B., Screw, 3x14 F/ZN; Torque 0.59-0.78N.m) securing the printhead to the carriage assembly.
3. Lift the printhead a little bit. Unlatch 2 hooks securing the printhead FFC to carriage unit.
4. Remove FFC from the printhead.



Check if the printer is powered off before removing the printhead.



When the printhead unit is removed or replaced, perform the platen gap adjustment and Bi-D adjustment.

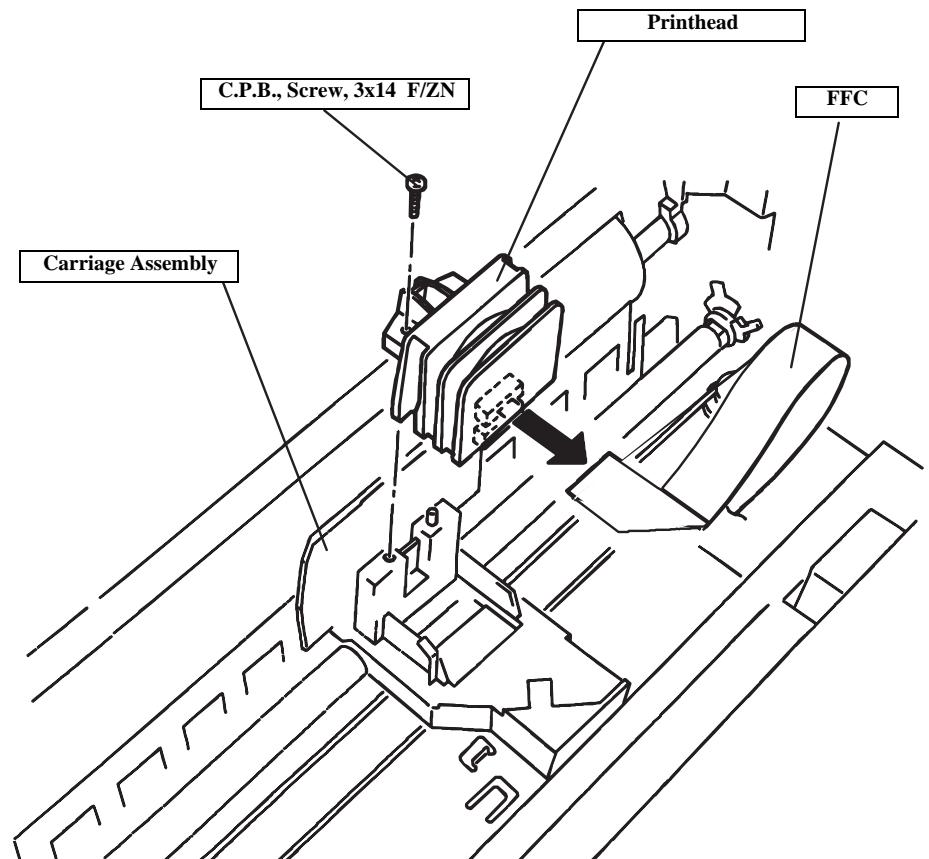


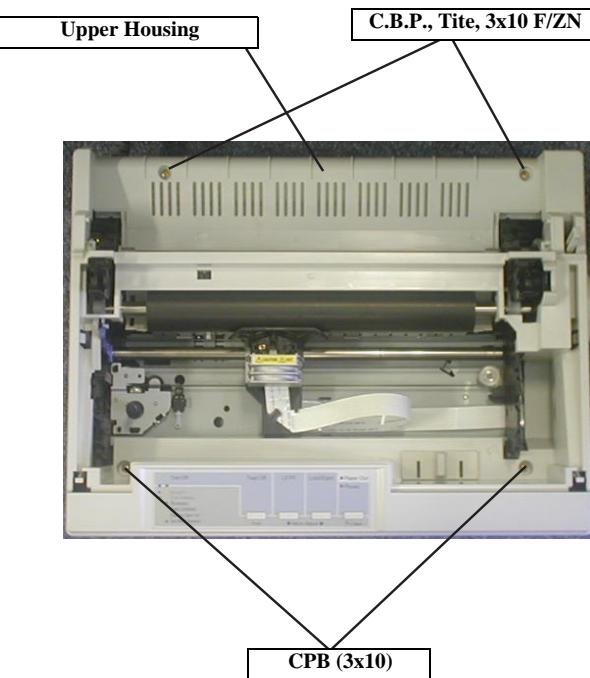
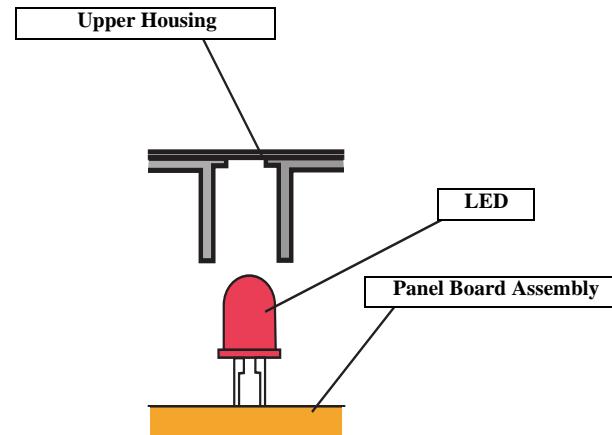
Figure4-1. Printhead Removal

4.2.2 Upper Housing Unit Removal

1. Remove the platen knob, cover assembly, printer, tractor unit and paper eject unit.
Remove the color upgrade kit if it is installed (LX-300+II only).
2. Set the release lever to the tractor feed.
3. Remove 4 screws for LX-300+II and 6 screws for LX-1170II (CBP, Tite, 3x10 F/Zn, Torque 0.78-0.98) securing the upper housing to the lower housing.
4. Remove the upper housing.



When installing the upper housing, be sure to insert LEDs on the panel board into the LED holes of the upper housing.



dis05

Figure4-2. Upper Housing Removal

4.2.3 Printer Mechanism Removal

1. Remove the upper housing. (See 4.2.2 “Upper Housing Unit Removal”.)
2. LX-300+II: Remove 3 screws (C.B.P., Tite, 3x10 F/ZN;Torque 0.78-0.98 N.M.) securing the upper shield plate to the lower housing.
- LX-1170II: Remove 4 screws (C.B.P., Tite, 3x10 F/ZN; Torque 0.78-0.98 N.M.) and 2 screws (C.B.S., Screw, 3x4 F/Zn;Torque 0.78-0.98 N.M.) securing the upper shield plate to the lower housing.
3. Remove the shield cover.

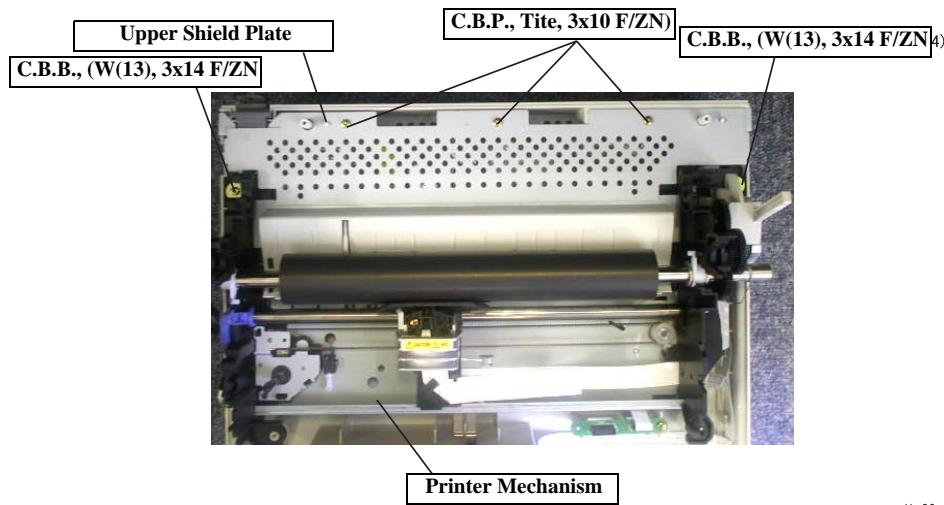


Figure4-3. Upper Shield Plate (LX-300+II)

4. LX-300+II: Remove 2 screws with washers (C.B.B., (W(13), 3x14 F/ZN) securing the printer mechanism to the lower housing.
See Figure 4-3 on page 72.

LX-1170II: Remove 4 screws with washers (C.B.B., (W(13), 3x14 F/ZN) securing the printer mechanism to the lower housing.
See Figure 4-4 below.

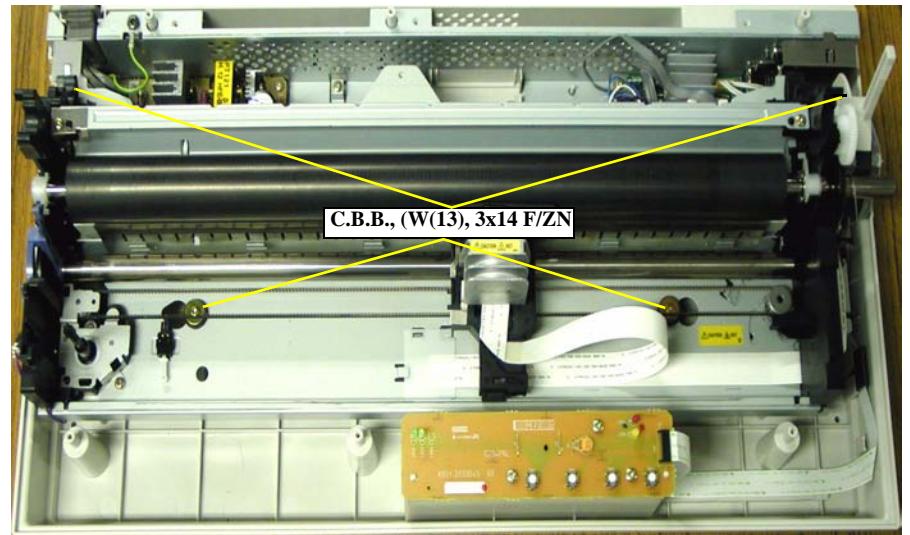


Figure 4-4. Printer Mechanism Removal (LX-1170II)

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5. Lift the printer mechanism a little bit and remove the harnesses from the main board assembly.

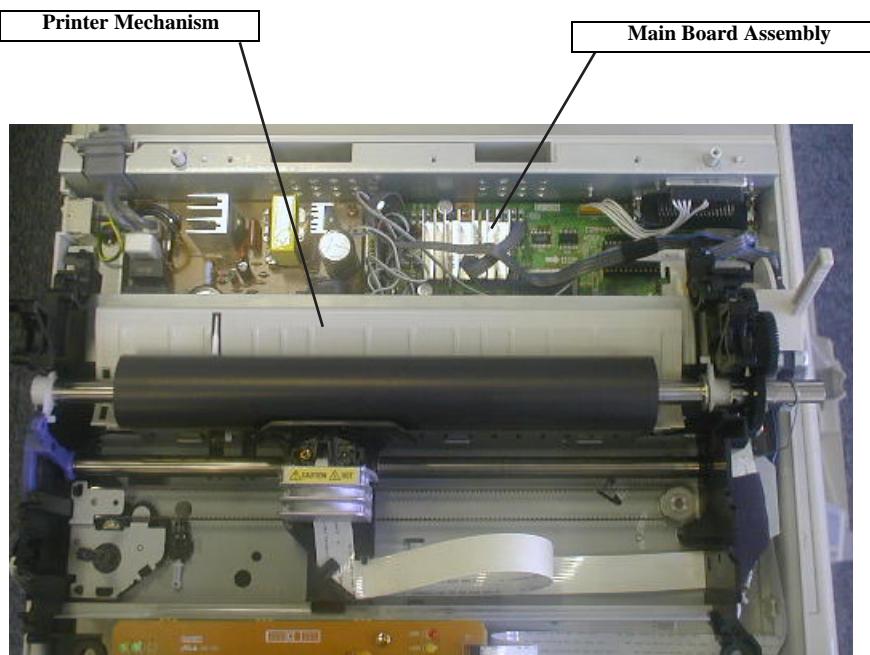


Figure4-5. Harness Removal

6. Remove the printer mechanism.



When the printer mechanism is removed, perform the Bi-D adjustment.
When the printer mechanism is replaced, perform the Bi-D adjustment, top margin adjustment, and bottom margin adjustment.

4.2.4 Panel Board Assembly Removal

1. Remove the upper housing. (See 4.2.2 “Upper Housing Unit Removal”.)
2. Disconnect the panel FFC from the connector of the panel board assembly.
3. Remove 3 screws (C.B.P., Tite, 3x10 F/ZN; Torque 0.78-0.98 N.M.) securing the panel board assembly to the lower housing.
4. Remove the panel board assembly from the lower housing.

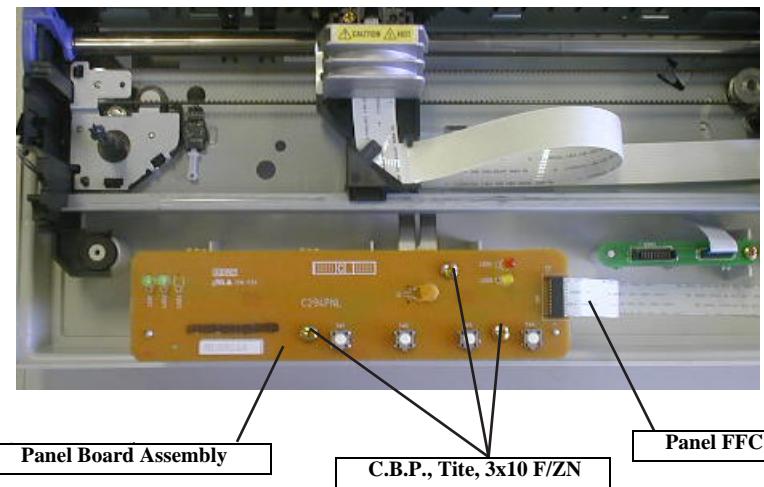


Figure4-6. Panel Board Assembly Removal

4.2.5 Main Board Assembly Removal

1. Remove the upper housing. (See 4.2.2 “Upper Housing Unit Removal”.)
2. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
3. LX-1170II: Remove 1 screw (C.B.P., Tite, 3x10 F/ZN; Torque 0.78-0.98 N.M.) and the right grounding plate.

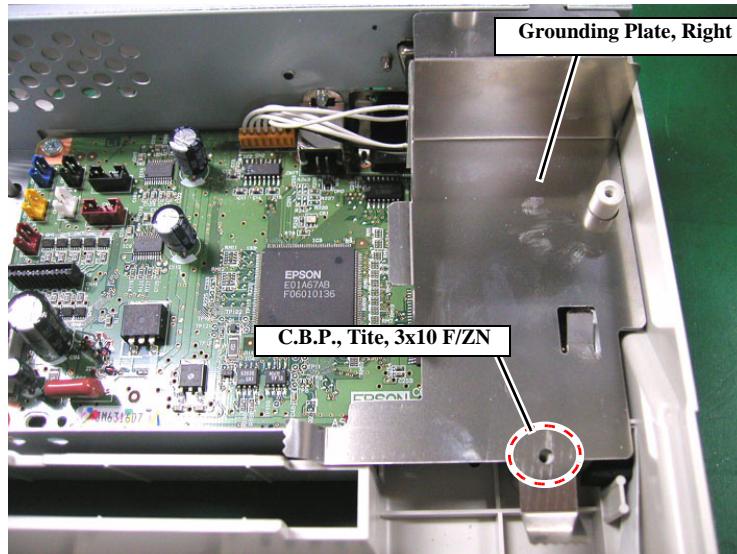


Figure 4-7. Right Grounding Plate Removal (LX-1170II)

4. Remove 2 Jack Sockets (Torque 0.29-0.49 N.M.) securing the serial interface connector to the lower shield plate.
5. Remove the serial interface connector from the installation hole of the lower shield plate.
6. Remove 2 screws (C.P., Screw, 3x4 F/ZN; Torque 0.48-0.78 N.M.) securing the parallel interface to the lower shield plate.
7. Disconnect the option FFC (LX-300+II only) and panel FFC from CN12 and CN13 on the board.
8. Disconnect the harness connected to the Power Supply Board Assembly from CN8. Press one edge of CN8 in order to remove or install the harness.

9. Remove 3 screws (C.B.P., Tite, 3x10 F/ZN) securing the main board assembly to the lower housing.



When the main board assembly is replaced, perform the destination setting, Bi-D adjustment, top margin adjustment, and bottom margin adjustment.

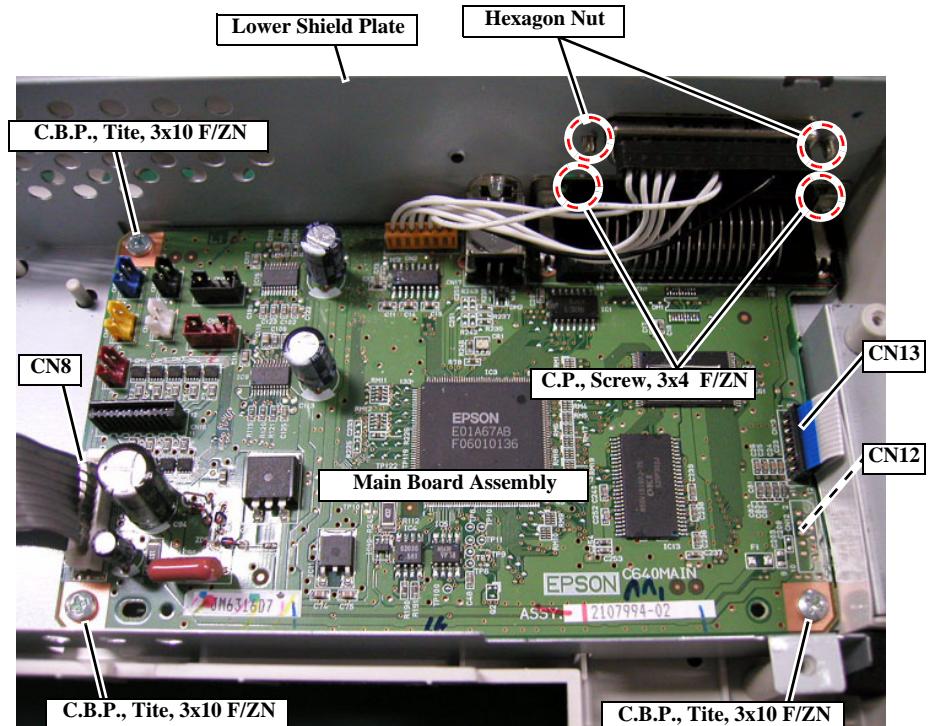


Figure 4-8. C640/641MAIN Board Assembly Removal

4.2.6 P/S Board Assembly Removal

1. Remove the upper housing. (See 4.2.2 “Upper Housing Unit Removal”.)
2. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
3. LX-300+II: Remove 1 screw(C.B.P., Tite, 3x10 F/ZN;Torque 0.78-0.98 N.M.) and the left grounding plate.
4. LX-1170II: Remove 1 screw (C.B(O), Screw, 4x8, F/ZN; Torque 0.98-1.18 N.M.) and the grounding cable.

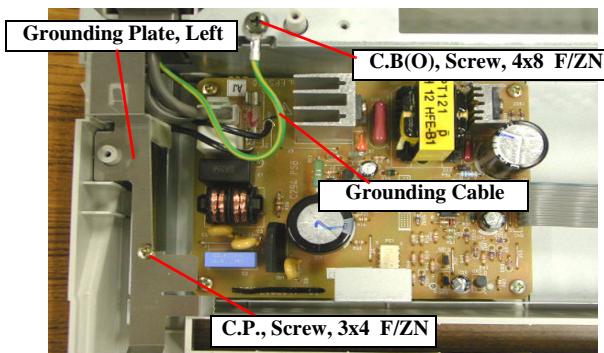


Figure 4-9. Ground Plate and Cable Removal (LX-1170II)

5. Remove the power cable (CN1) connecting to the Power Supply board assembly. Remove the power switch from the lower housing.
6. Disconnect the harness connecting the Power Supply board assembly to the main board assembly. (CN8 of the main board assembly)
Press one edge of CN8 in order to remove or install the harness.
7. Remove 4 screws (C.B.P., Tite, 3x10 F/ZN; Torque 0.78-0.98 N.M.) securing the Power Supply board assembly to the lower housing.
8. Remove the Power Supply board assembly.

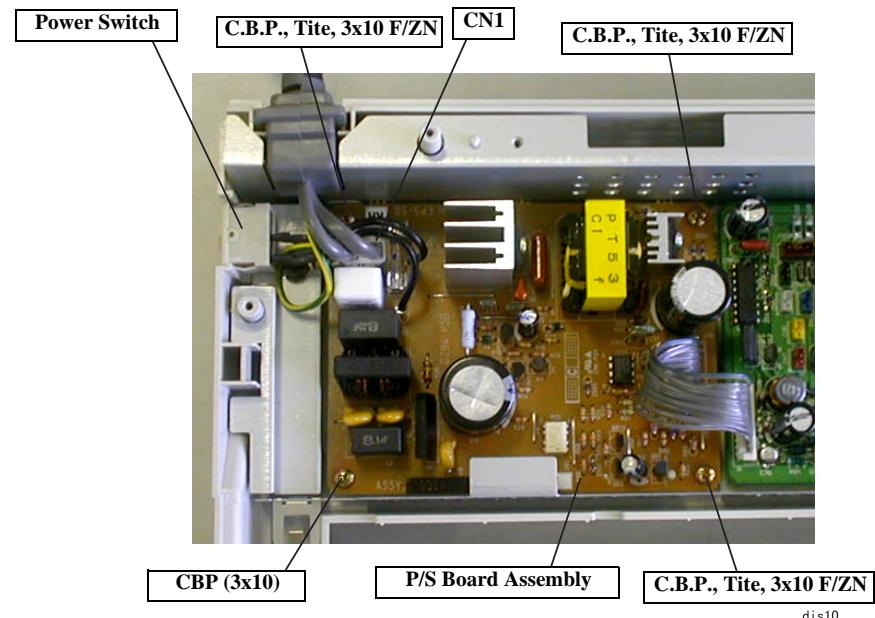


Figure 4-10. Power Supply Board Assembly Removal

4.2.7 Printer Mechanism Disassembly

This section explains the disassembling procedure of the printer mechanism. The disassembling procedure is shown in the flowchart below.

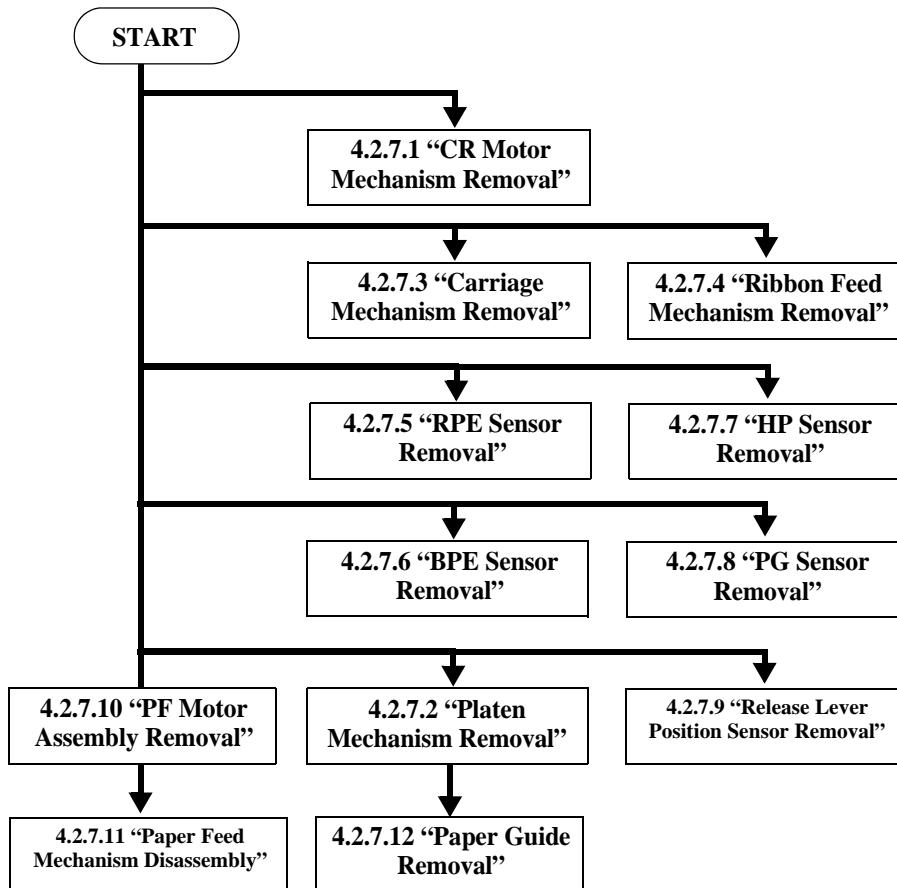


Figure4-11. Printer Mechanism Disassembling Procedure

4.2.7.1 CR Motor Mechanism Removal

1. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
2. Remove the tension spring, 8.10 and motor bracket and release the tension of the timing belt.
3. Remove the timing belt from the pulley of the CR motor assembly.
4. Rotate the CR motor assembly with the motor bracket clockwise to remove it.

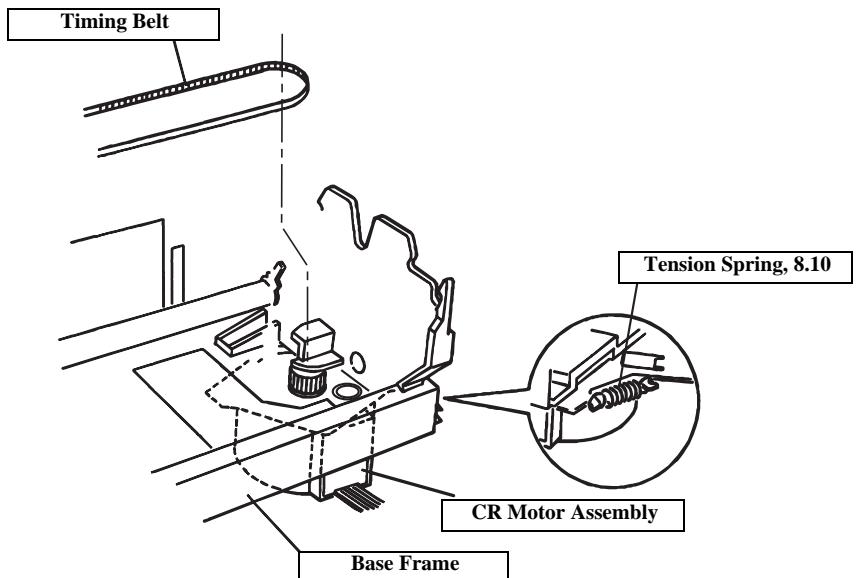


Figure4-12. CR Motor Assembly Removal



When the CR motor mechanism is removed or replaced, perform the platen gap adjustment and Bi-D adjustment.

4.2.7.2 Platen Mechanism Removal

1. Remove the printer mechanism. (See 4.2.3 "Printer Mechanism Removal".)
2. Remove the platen grounding wire from the platen.
3. Release 1 hook at the rotating hole of the combination gear 17.5, 27 and remove the gear from the right frame.

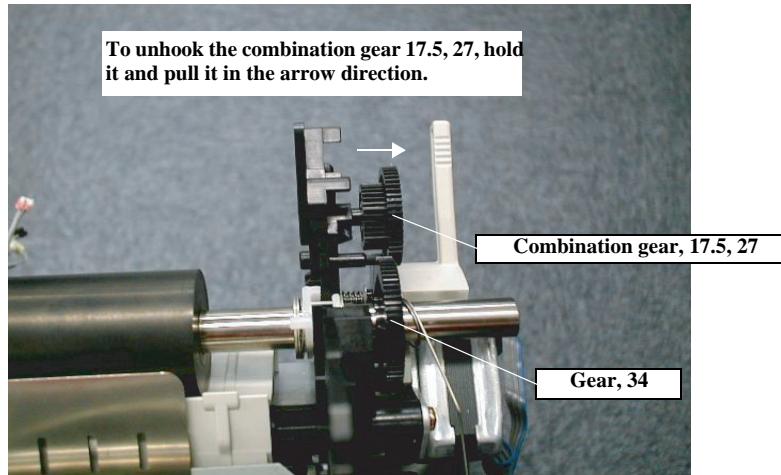


Figure4-13. Hook at the Combination Gear 17.5, 27

4. Rotate right and left bushing, 11 and remove them off from the right / left frame.
5. Remove the platen.

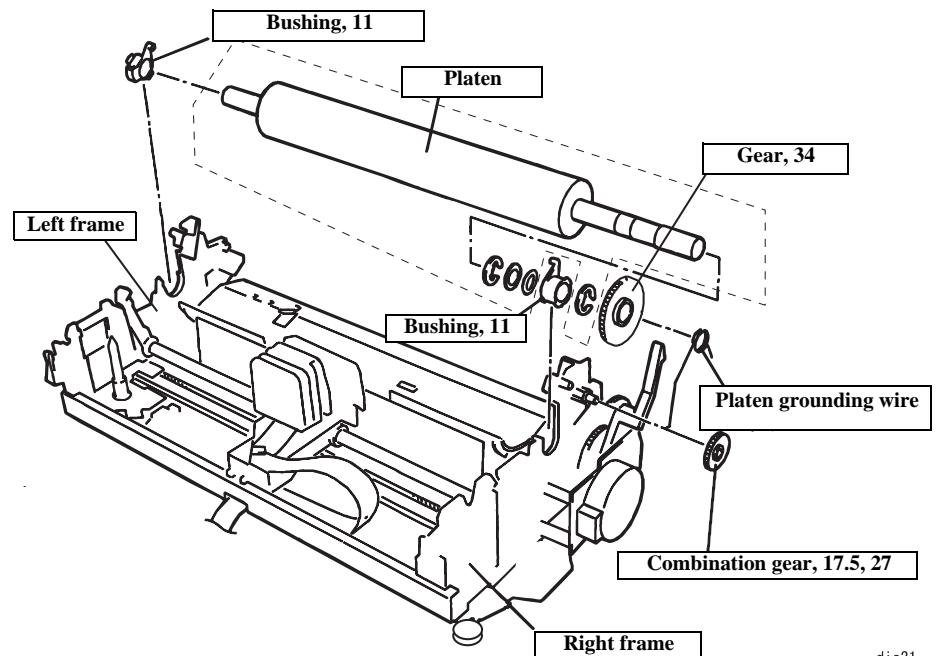


Figure4-14. Platen Removal



When the platen mechanism is removed or replaced, perform the platen gap adjustment.

4.2.7.3 Carriage Mechanism Removal

1. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
2. Remove the printhead. (See 4.2.1 “Printhead Unit Removal”.)
3. Remove the timing belt from the carriage installation point.

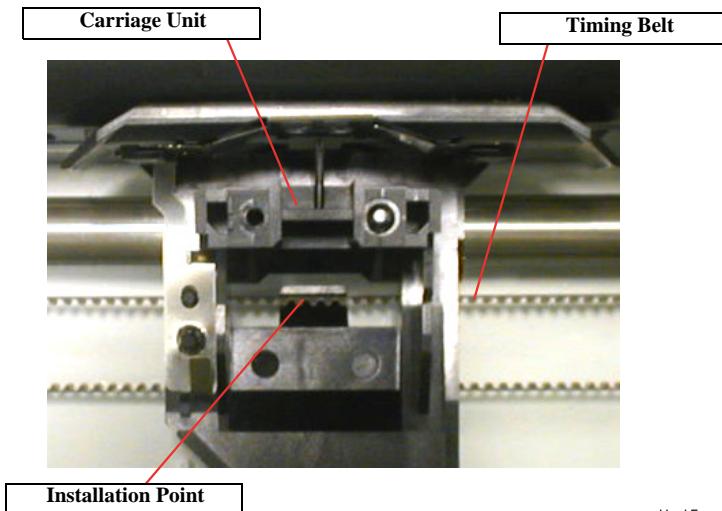


Figure4-15. Timing Belt Removal

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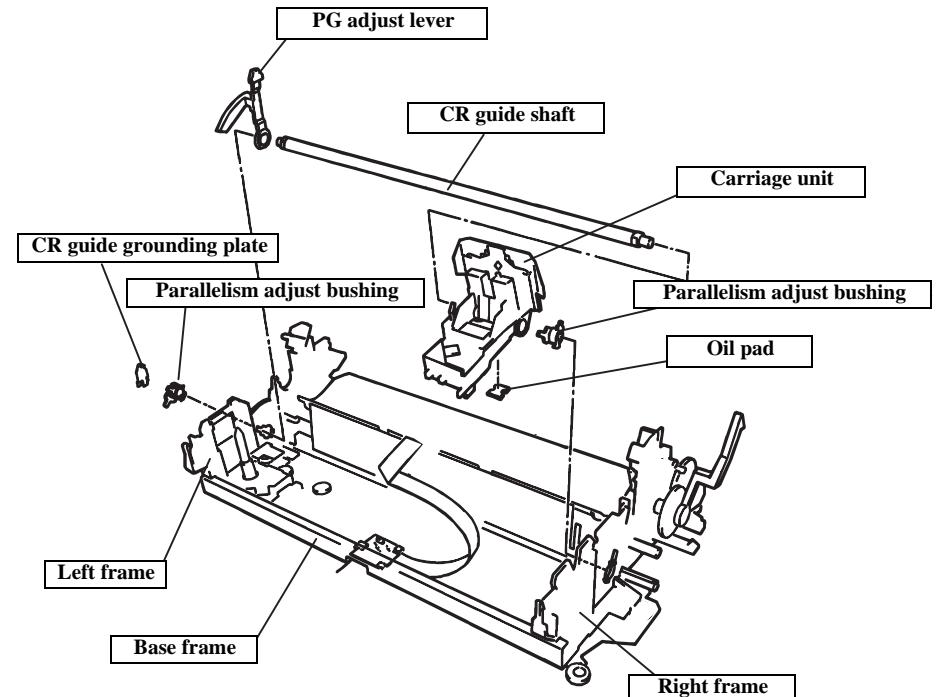


Figure4-16. Carriage Unit Removal

4. Remove the CR shaft grounding plate from the base frame on the left side of the printer.
5. Rotate the right and left parallelism adjust bushing and remove them from the respective frames.
6. Release the PG adjust lever hook, connecting to the left frame.

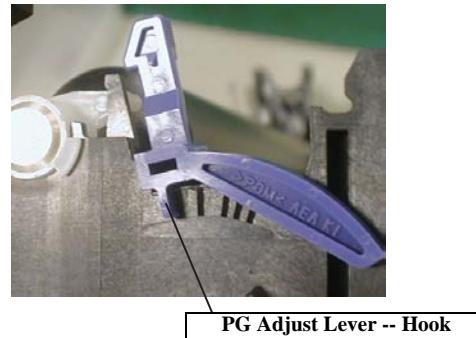


Figure4-17. Hook at the PG Adjust Lever

7. Remove the carriage unit along with the CR guide shaft and PG adjust lever from the printer mechanism.



When the carriage mechanism is removed or replaced, perform the platen gap adjustment and Bi-D adjustment.

4.2.7.4 Ribbon Feed Mechanism Removal

1. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
2. Remove the tension spring, 8.10 from the motor bracket and release the tension of the timing belt. (See 4.2.7.1 “CR Motor Mechanism Removal”.)
3. Release 3 hooks securing the RD cover to the left frame.
4. Remove the RD cover.

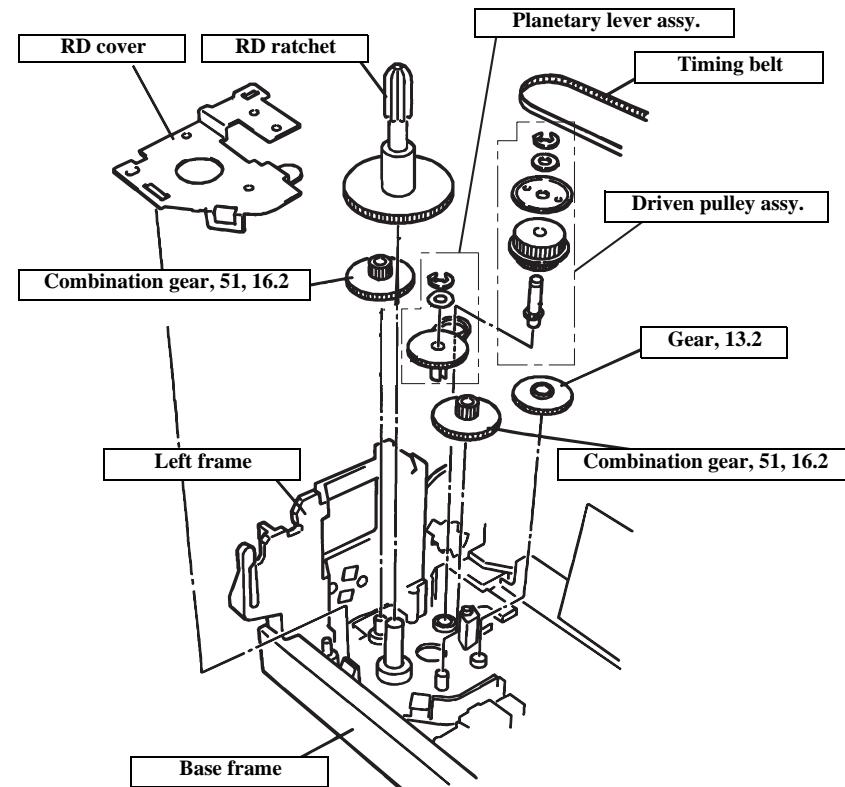


Figure4-18. Ribbon Feed Mechanism Removal



When the ribbon feed mechanism is removed or replaced, perform the platen gap adjustment and Bi-D adjustment.

4.2.7.5 RPE Sensor Removal

1. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
2. Release the hook of the RPE sensor installed at the paper guide.
3. Remove RPE sensor.
4. Disconnect the harness from the RPE sensor (white).

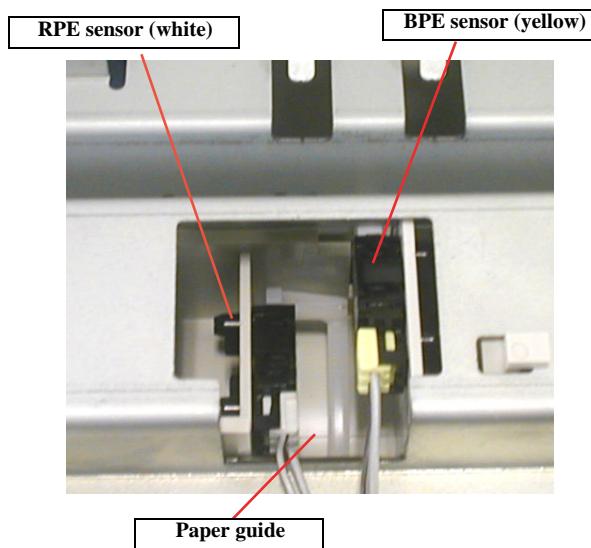


Figure 4-19. RPE/BPE Sensor Removal



When the RPE sensor is removed or replaced, perform the platen gap adjustment, Bi-D adjustment, top margin adjustment, and bottom margin adjustment.

4.2.7.6 BPE Sensor Removal

1. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
2. Release the hook of the BPE sensor installed at the paper guide.
3. Remove BPE sensor.
4. Disconnect the harness from the BPE sensor (yellow).



When the BPE sensor is removed or replaced, perform the platen gap adjustment, Bi-D adjustment, top margin adjustment, and bottom margin adjustment.

4.2.7.7 HP Sensor Removal

1. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
2. Release 2 hooks of the HP sensor securing it to the base frame with tweezers and remove the sensor.
3. Disconnect the harness from the sensor (black).

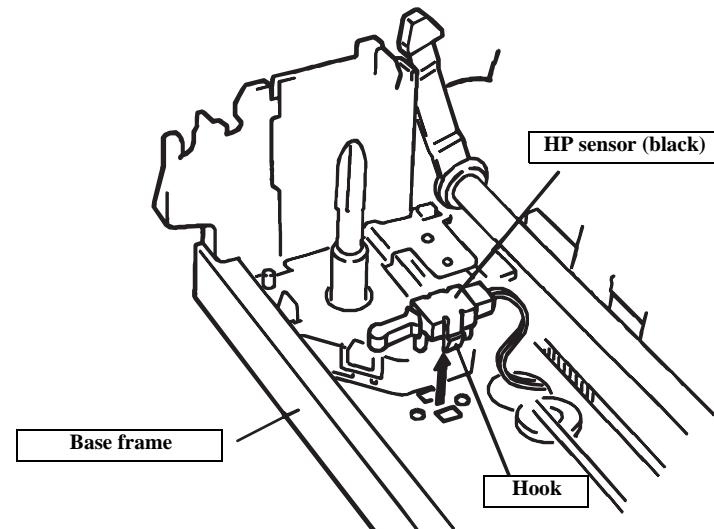


Figure 4-20. HP Sensor Removal

4.2.7.8 PG Sensor Removal

1. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
2. Release 2 hooks of the PG sensor securing it to the left frame with tweezers and remove the sensor.
3. Disconnect the harness from the sensor (white).

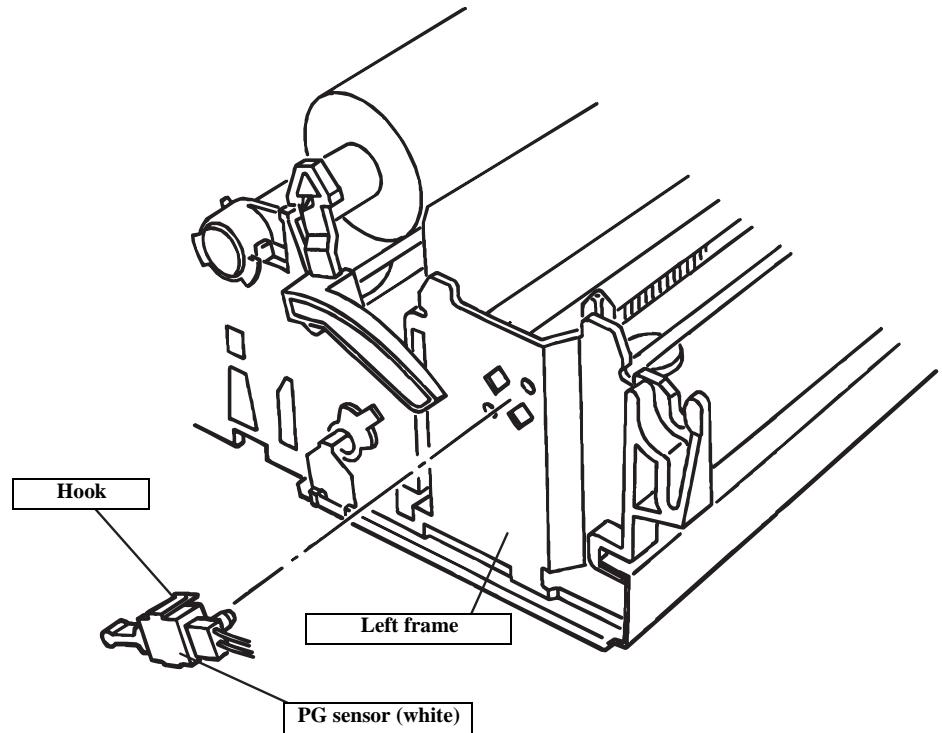


Figure4-21. PG Sensor Removal



When the PG sensor is removed or replaced, perform the platen gap adjustment and Bi-D adjustment.

4.2.7.9 Release Lever Position Sensor Removal

1. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
2. Release 2 hooks of the release lever position sensor securing it to the right frame with tweezers and remove the sensor.
3. Disconnect the harness from the sensor (blue).

Release lever position sensor (blue)

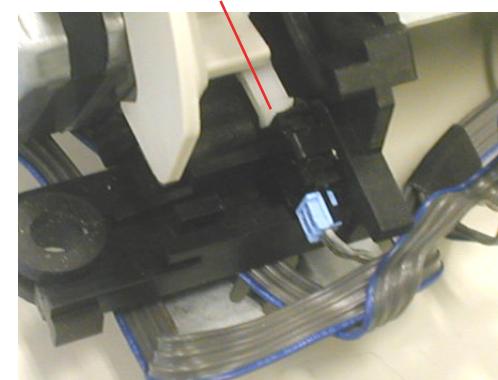


Figure4-22. Release Lever Position Sensor Removal



When installing the release lever position sensor, be sure to insert it between the release lever and the right frame.



When the release lever position sensor is removed or replaced, perform the platen gap adjustment and Bi-D adjustment.

4.2.7.10 PF Motor Assembly Removal

1. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
2. Remove the platen grounding wire from the platen.
3. Remove 1 screw (C.B.P., Tite, 3x10 F/ZN; Torque 0.59-0.78 N.M.) securing the PF motor assembly to the right frame.
4. Release 1 hook at the right frame securing the PF motor assembly to the right frame and remove the PF motor assembly.

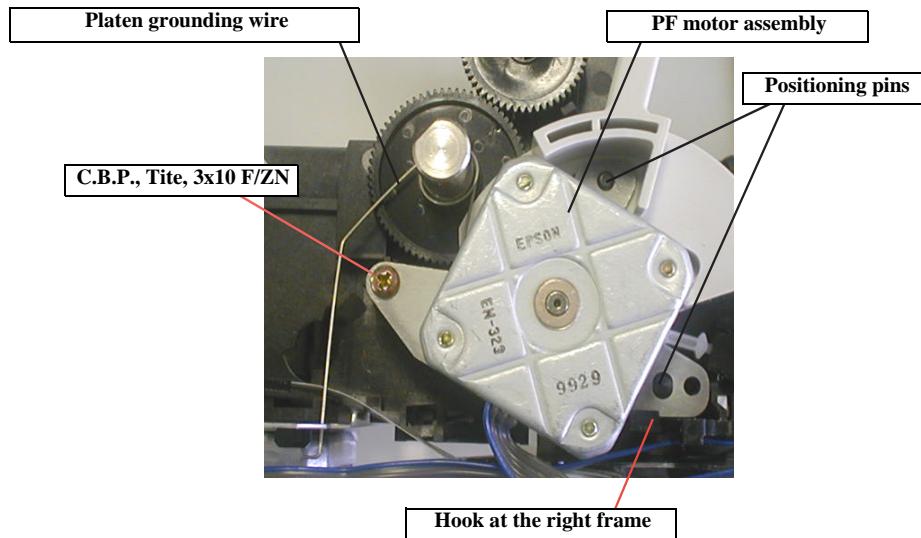


Figure 4-23. PF Motor Assembly Removal



CHECK POINT
When installing the PF motor assembly to the right frame, be careful to align the positioning pins with the respective positioning holes in the motor bracket.



ADJUSTMENT REQUIRED
When the PF motor assembly is removed or replaced, perform the platen gap adjustment, Bi-D adjustment, top margin adjustment, and bottom margin adjustment.

4.2.7.11 Paper Feed Mechanism Disassembly

1. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
2. Remove the PF motor assembly. (See 4.2.7.10 “PF Motor Assembly Removal”.)
3. Remove the release lever.

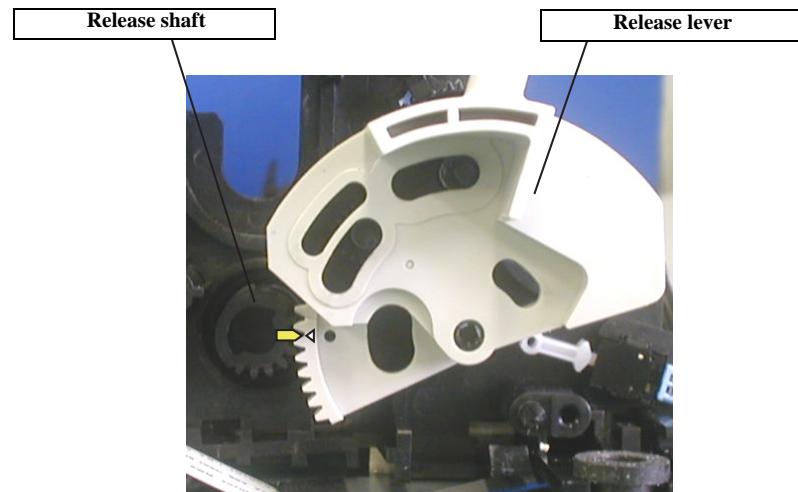


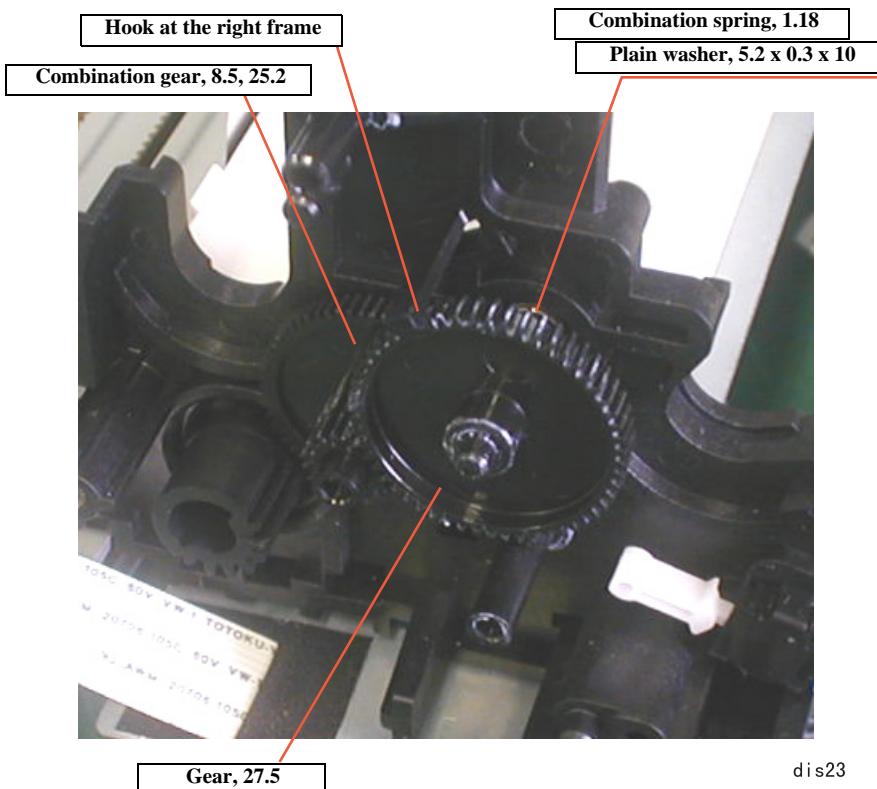
Figure 4-24. Release Lever Removal



CHECK POINT
When installing the release lever, be sure to align the marking on the release lever with the marking on the release shaft.

4. Release the hook of the right frame securing the gear, 27.5 and remove the gear, plain washer 5.2x0.3x10 and the compression spring, 1.18.

5. Remove the combination gear, 8.5, 25.2 from the right frame.



dis23

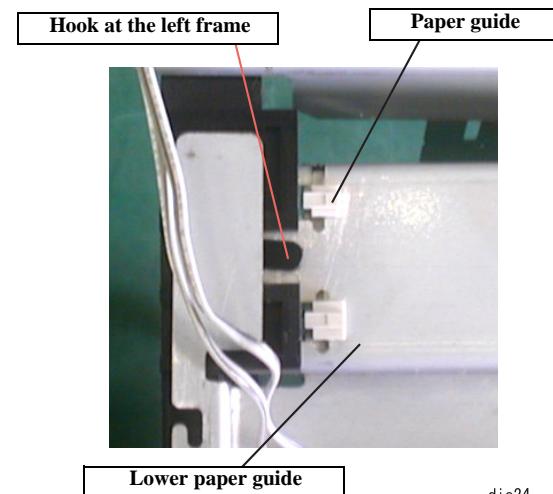
Figure4-25. Paper Feed Mechanism Disassembly



When the paper feed mechanism is removed or replaced, perform the platen gap adjustment, Bi-D adjustment, top margin adjustment, and bottom margin adjustment.

4.2.7.12 Paper Guide Removal

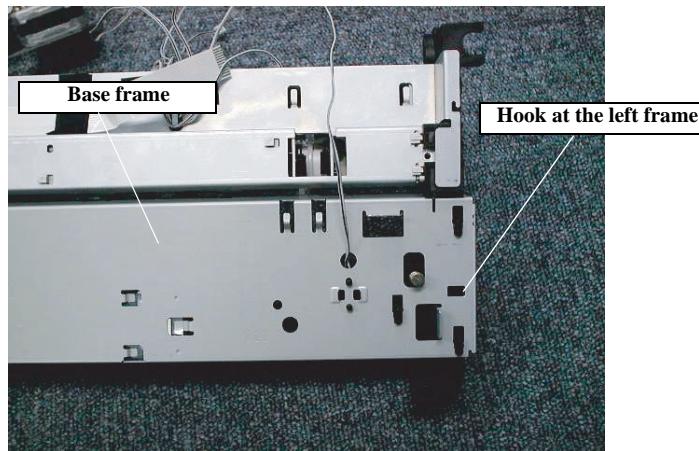
1. Remove the printer mechanism. (See 4.2.3 “Printer Mechanism Removal”.)
2. Remove the platen. (See 4.2.7.2 “Platen Mechanism Removal”.)
3. Remove the carriage unit. (See 4.2.7.3 “Carriage Mechanism Removal”.)
4. Remove the HP sensor. (See 4.2.7.7 “HP Sensor Removal”.)
5. Remove the PG sensor. (See 4.2.7.8 “PG Sensor Removal”.)
6. Remove the PF motor assembly and release lever. (See 4.2.7.10 “PF Motor Assembly Removal”.)
7. Release 1 hook securing the paper guide to the bottom of the paper guide to the lower paper guide, pull the paper guide to the rear and remove it.



dis24

Figure4-26. Lower Paper Guide Removal

8. Release 1 hook at the left frame securing the base frame and remove it by pulling it to the rear.



When the paper guide is removed or replaced, perform the platen gap adjustment, Bi-D adjustment, top margin adjustment, and bottom margin adjustment.

Figure4-27. Left Frame Removal

9. Release 1 hook securing the paper guide to the lower paper guide and remove the paper guide along with the release shaft by pulling it to the left.

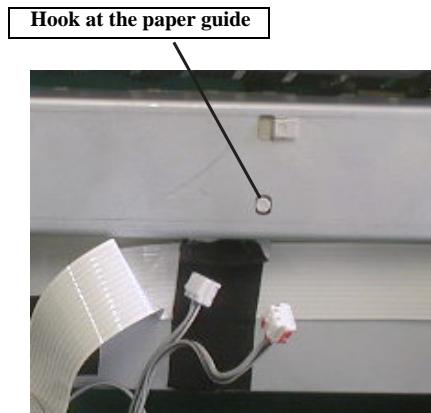


Figure4-28. Lower Paper Guide

CHAPTER

5

ADJUSTMENT

5.1 Adjustment Tool

With the Adjustment Tool for SIDM, you can perform:

- Get Printer Information
- PG Adjustment
- Bi-d Adjustment
- Top Margin Adjustment
- Bottom Margin Adjustment
- Print Test

You can also use the following additional functions:

- Get Counter information
- EEPROM read/write
- Printer Initial Setting
- Firmware Update
- Get Fatal Error Code

5.1.1 System Requirement

PC:

Windows-based PC equipped with a parallel and a USB interface

OS:

Windows 2000 Professional Edition SP3

Windows XP Professional Edition SP1

Windows98 SE

5.1.2 Running the Program

Start up the Adjustment Tool for SIDM, and you will see the following screen.

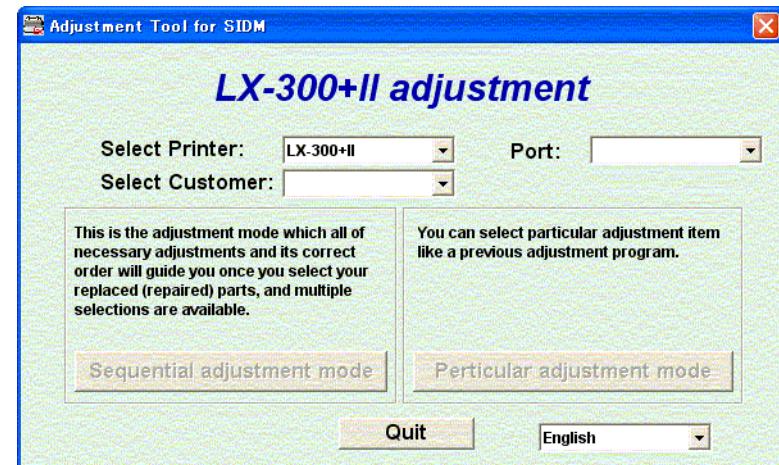


Figure 5-1. Adjustment Tool for SIDM

Select a printer, port, and customer from the pull-down menu, and then you can select either one of the two modes, **Sequential adjustment mode** and **Particular adjustment mode**.

Sequential adjustment mode:

This mode is specifically designed to assist repair/service technician; to perform all necessary adjustment/settings in proper order. A wizard like menu helps you to perform necessary adjustment in accordance with the type of repair you made.

Particular adjustment mode:

This mode is useful if specific adjustment item or setting needs to be performed individually. All available adjustment or setting item can be selected manually and can be performed independently.

Click either one of the two buttons to start the mode you selected.

5.1.2.1 Sequential adjustment mode

When you select the Sequential adjustment mode, the following screen will appear.

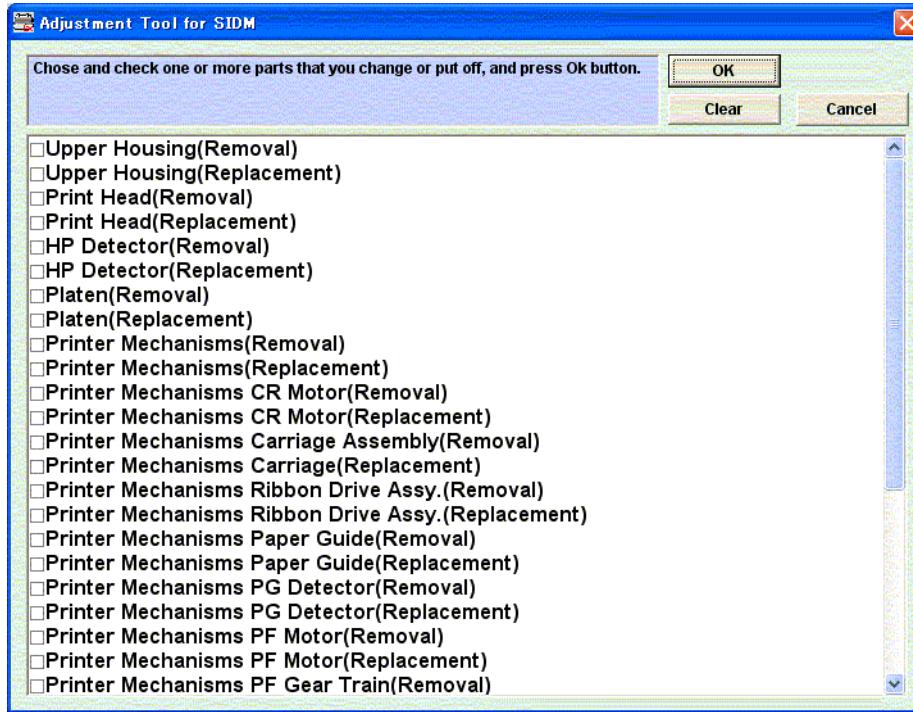


Figure 5-2. Sequential adjustment mode

Check the checkbox for one or more parts that you removed or replaced, and click the **OK** button.

An adjustment screen will appear as shown below. All the necessary adjustments will be shown on the left.

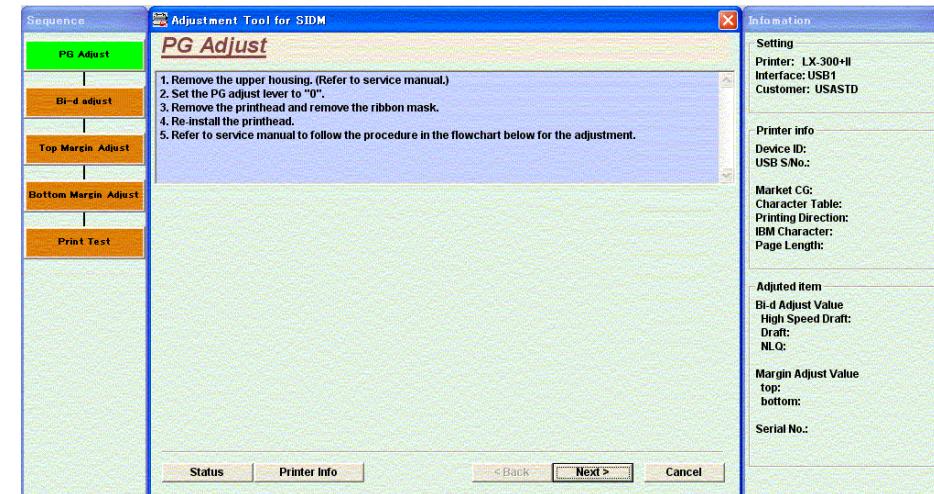


Figure 5-3. Adjustment screen

Follow the instruction shown on the screen to perform the adjustment. When you have performed one adjustment, a next adjustment screen will appear. Perform all the necessary adjustments.

5.1.2.2 Particular adjustment mode

When you select the Particular adjustment mode, the following screen will appear.

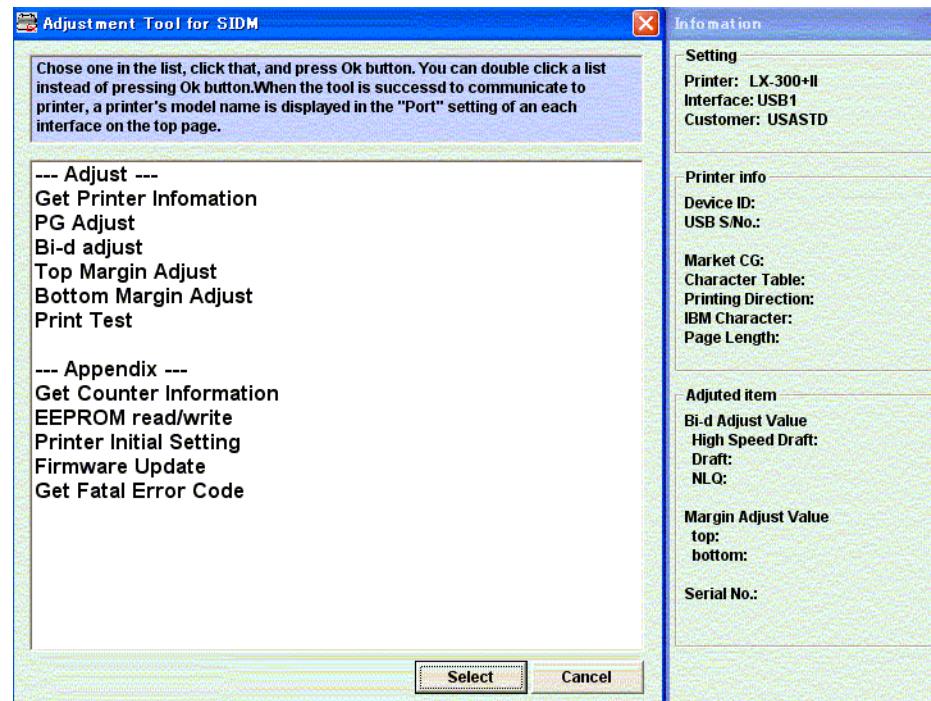


Figure 5-4. Particular adjustment mode

Select an adjustment or additional function you want to perform, and click the **OK** button.

An adjustment or additional function screen will appear as shown in the Figure 5-3. Follow the instruction shown on the screen to perform the adjustment or additional function.

5.2 Adjustments

5.2.1 Platen Gap Adjustment

Perform the platen gap adjustment when you have performed any of the following:

- Removing or replacing the printhead unit (See page 70.)
- Removing or replacing the CR motor mechanism (See page 76.)
- Removing or replacing the platen mechanism (See page 77.)
- Removing or replacing the carriage mechanism (See page 78.)
- Removing or replacing the ribbon feed mechanism (See page 79.)
- Removing or replacing the RPE sensor (See page 80.)
- Removing or replacing the BPE sensor (See page 80.)
- Removing or replacing the PG sensor (See page 81.)
- Removing or replacing the release lever position sensor (See page 81.)
- Removing or replacing the PF motor assembly (See page 82.)
- Removing or replacing the paper feed mechanism (See page 82.)
- Removing or replacing the paper guide (See page 83.)

Follow the steps below to perform the platen gap adjustment.

1. Remove the upper housing. (See page 71.)
2. Set the PG adjust lever to “0.”
3. Remove the printhead and remove the ribbon mask.
4. Re-install the printhead.
5. Follow the procedure in the flowchart below for the adjustment.

Platen Gap Setting	Judging Method
0415 ± 0.015mm	Thickness gauge 0.40mm falls down by its own weight: OK Thickness gauge 0.43 mm does NOT fall down by its own weight: NG

Rotational direction of the parallelism adjust bushing	Platen gap
Platen side	Widen
Front side	Narrowed

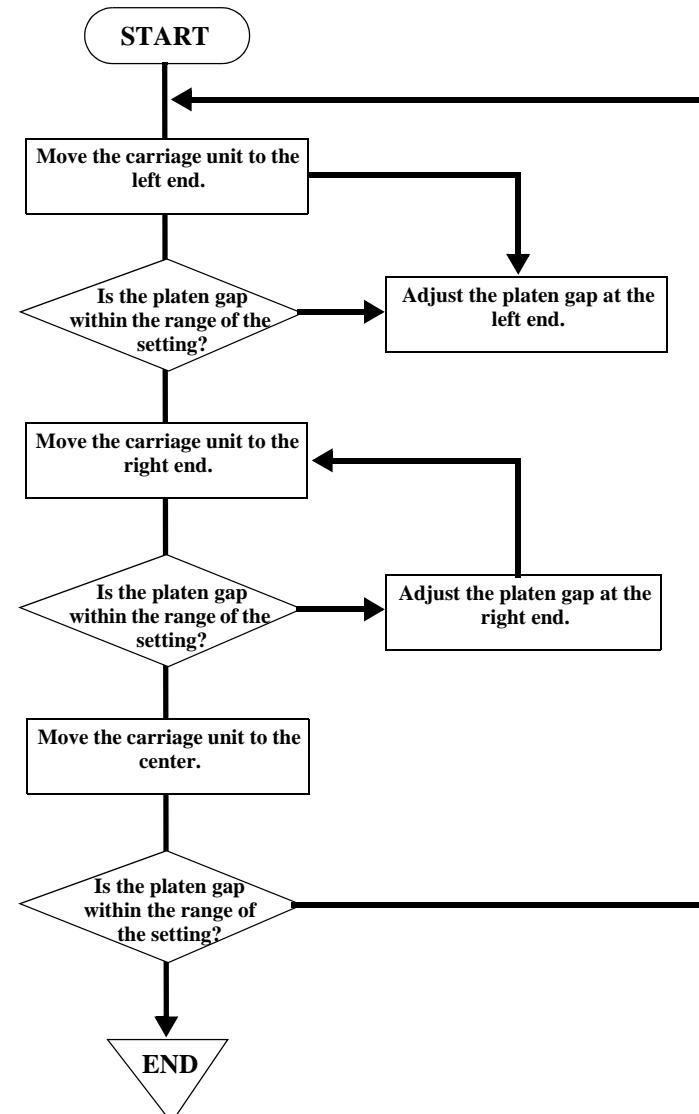


Figure 5-5. Platen Gap Adjustment

5.2.2 Bi-D Adjustment

Perform the Bi-D adjustment when you have performed any of the following:

- Removing or replacing the printhead unit (See page 70.)
- Removing or replacing the printer mechanism (See page 72.)
- Replacing the main board assembly (See page 74.)
- Removing or replacing the CR motor mechanism (See page 76.)
- Removing or replacing the carriage mechanism (See page 78.)
- Removing or replacing the ribbon feed mechanism (See page 79.)
- Removing or replacing the RPE sensor (See page 80.)
- Removing or replacing the BPE sensor (See page 80.)
- Removing or replacing the PG sensor (See page 81.)
- Removing or replacing the release lever position sensor (See page 81.)
- Removing or replacing the PF motor assembly (See page 82.)
- Removing or replacing the paper feed mechanism (See page 82.)
- Removing or replacing the paper guide (See page 83.)

Follow the instruction shown on the screen of the Adjustment Tool for SIDM to perform the Bi-D adjustment.

The gaps of Bi-D lines must be less than 0.25 mm.

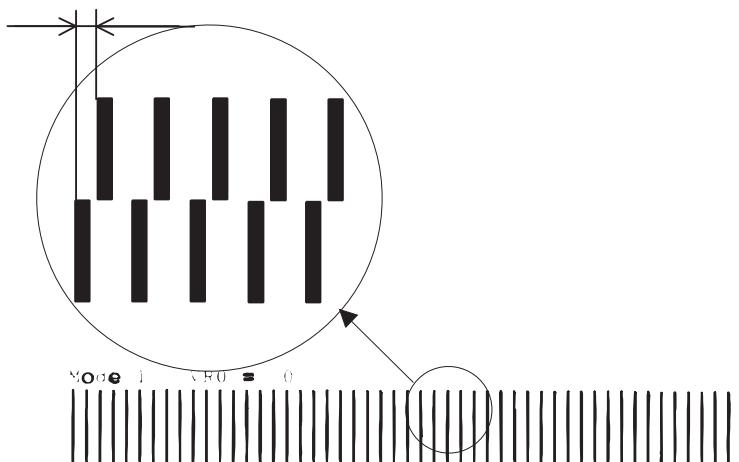


Figure 5-6. Bi-D Adjustment

5.2.3 Top Margin Adjustment

Perform the top margin adjustment when you have performed any of the following:

- Replacing the printer mechanism (See page 72.)
- Replacing the main board assembly (See page 74.)
- Removing or replacing the RPE sensor (See page 80.)
- Removing or replacing the BPE sensor (See page 80.)
- Removing or replacing the PF motor assembly (See page 82.)
- Removing or replacing the paper feed mechanism (See page 82.)
- Removing or replacing the paper guide (See page 83.)

Follow the steps below to perform the top margin adjustment.

1. Execute **Pattern Test**.
2. Check the print result, and take action according to the top margin value.

Top margin value	Action
4.9 mm or less	Replace the RPE sensor. (See page 80.)
5.0 ~7.4 mm	The top margin adjustment is required. Go to step 3.
7.5 ~9.5 mm	The top margin is correct and the top margin adjustment is not required.
9.6 ~12.5 mm	The top margin adjustment is required. Go to step 3.
12.6 mm or more	Replace the RPE sensor. (See page 80.)

3. Input the top margin value and click **Read**. An adjustment value (8.5 mm) will be displayed. Click **Input** to save the adjustment value.

5.2.4 Bottom Margin Adjustment

Perform the bottom margin adjustment when you have performed any of the following:

- Replacing the printer mechanism (See page 72.)
- Replacing the main board assembly (See page 74.)
- Removing or replacing the RPE sensor (See page 80.)
- Removing or replacing the BPE sensor (See page 80.)
- Removing or replacing the PF motor assembly (See page 82.)
- Removing or replacing the paper feed mechanism (See page 82.)
- Removing or replacing the paper guide (See page 83.)

Follow the steps below to perform the bottom margin adjustment.

1. Execute **Pattern Test**.
2. Check the print result, and take action according to the bottom margin value.

Bottom margin value	Action
1.6 ~6.8 mm	The bottom margin adjustment is required. Go to step 3.
0.0 ~1.5 mm	The bottom margin is correct and the bottom margin adjustment is not required.
6.9 mm or more	Replace the RPE sensor. (See page 80.)

3. Input the bottom margin value and click **Read**. An adjustment value (0.75 mm) will be displayed. Click **Input** to save the adjustment value.

CHAPTER

6

MAINTENANCE

6.1 Maintenance

Appropriate maintenance is necessary to keep the printer in the best condition and prevent troubles.

6.1.1 Cleaning

Use a neutral detergent or diluted alcohol to clean the exterior surfaces. Vacuum dust or small pieces of paper inside the printer.



- When performing the maintenance, remove the AC cable from the AC socket.
- Never touch the printhead right after printing, as it is highly heated.



- Never use thinner, trichloroethylene, or ketone solvent, as it may deform or deteriorate the plastic parts or rubber parts.
- Use the specified amount of the specified oil.
- When using compressed air products, such as air duster, for cleaning during repair and maintenance, the use of such products containing flammable gas is prohibited.

6.1.2 Lubrication

The lubrication points of LX-300+II/LX-1170II are as shown in the following table. Refer to the table for the type and the amount of oil to be used for each point. Oil and grease have a great affect on the performance of the product, especially on the durability and the performance at the lower temperature. EPSON determines what kind of and how much of oil to be applied based on the various information and analysis.

Table 6-1. Lubricants

Type	Name	Quantity	Availability	Part No.
Grease	G-26	40g	EPSON	B702600001
Oil	O-2	40cc	EPSON	B710200001

Table 6-2. Lubrication Points

Fig.	Lubrication Points	Lubricant	Quantity
6-1	3 shafts and 1 boss of the left frame	G-26	1/2 grain of rice
	Shaft of RD ratchet	G-26	1 grain of rice
6-2	Teeth of Gears at the left frame	G-26	1/2 grain of rice
6-3	3 places on the 3 shafts of the right frame	G-26	1 grain of rice
6-4	2 places on inside of cam at slope surface of the release lever	G-26	1 grain of rice
6-5	Shaft of the PF roller drive and the rear driven PF roller.	G-26	1/2 grain of rice
6-6	Paper guide from the back side at 4 places	G-26	1 grain of rice
6-7	Hole of the right tractor assy frame faces to the tractor assy guide shaft and the left TR frame.	G-26	1/2 grain of rice
6-8	Oil pad	O-2	0.28-0.32cc
6-9	Touching parts of the 2 sides of the base frame.	G-26	40 mm x 2 places
6-10	2 touching positions with the CR motor assembly from the inside of the base frame.	G-26	1/2 grain of rice x 2
6-11	Installing shaft of the combination gear, 17.5, 27 of the right frame.	G-26	1/2 grain of rice
6-12	Touching position of the grounding platen spring with platen shaft.	G-26	1 grain of rice
	Spur gear 34	G-26	10 mm

NOTE: Lubrication must be applied during the re-assembly process.
For lubrication points, refer to the following figures.

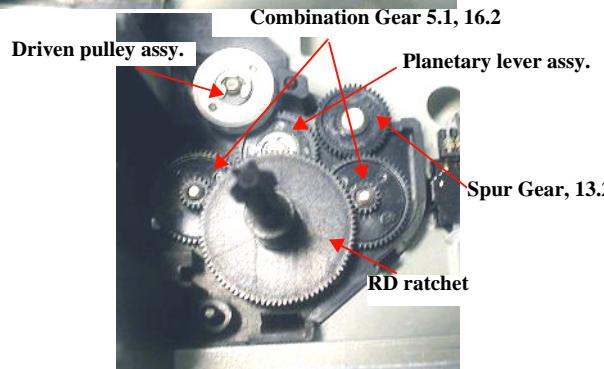
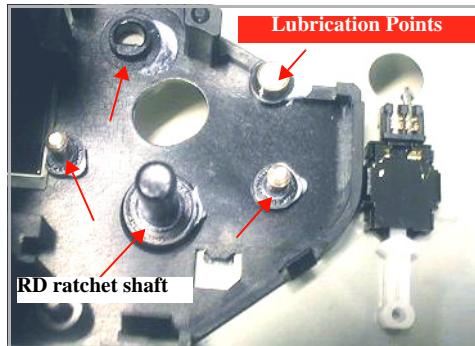


Figure 6-1. Left Frame Assembly

Lubricate G-26 on teeth of gears.
G-26, 1/2 grain of rice

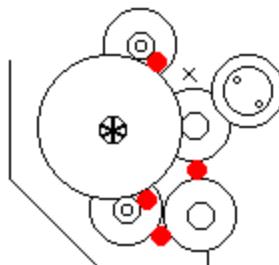
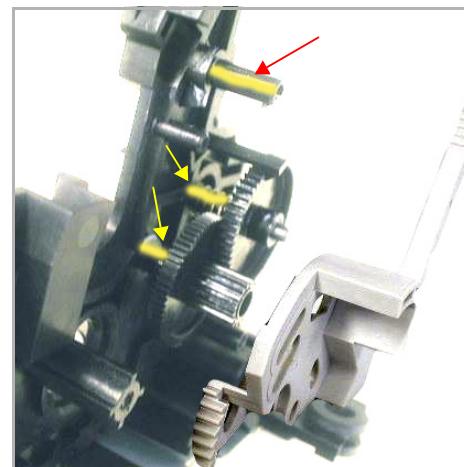
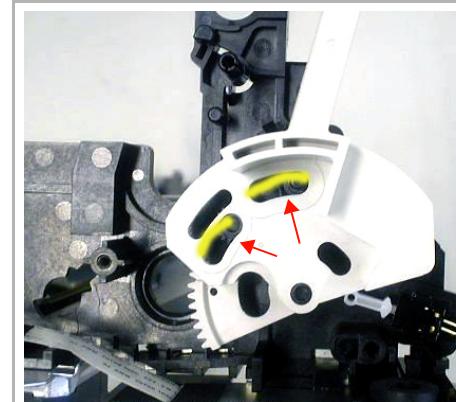


Figure 6-2. Teeth of Gears at the Left Frame



Lubricate G-26 at 3 places on 3 shafts at the right frame.
Shafts at the right frame assembly:
G-26, 1 grain of rice

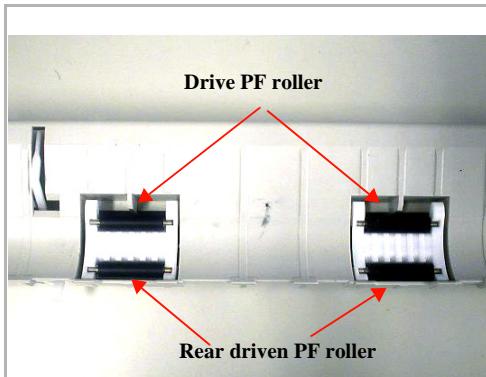
Figure 6-3. Shafts at the Right Frame Assembly



Lubricate G-26 at 2 places on inside of cam at slope surface of the release lever.

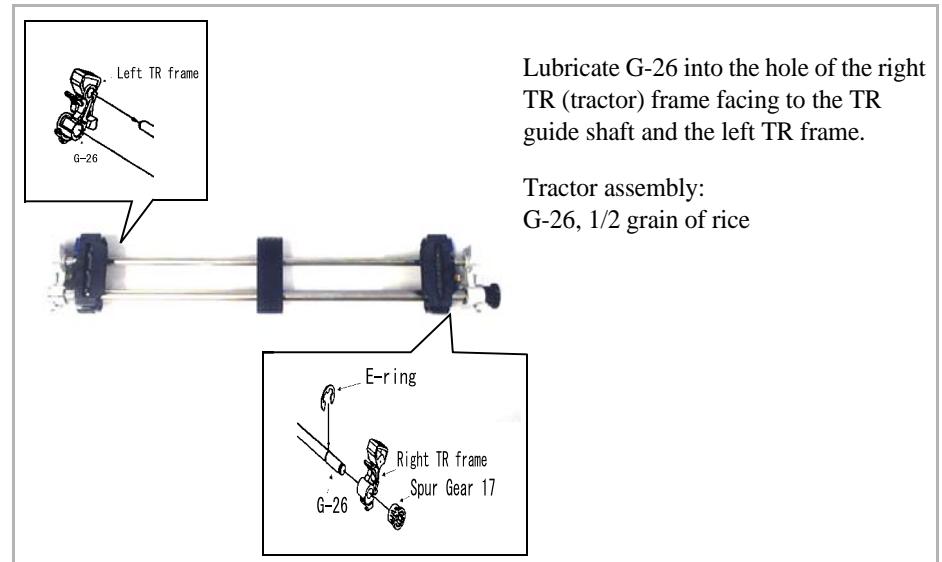
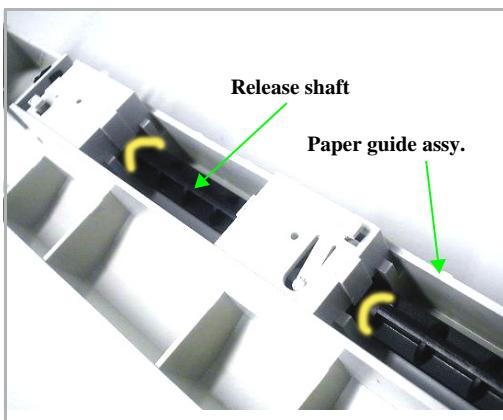
Release lever:
G-26, 1 grain of rice

Figure 6-4. Release Lever

**Figure 6-5. PF Roller Assembly**

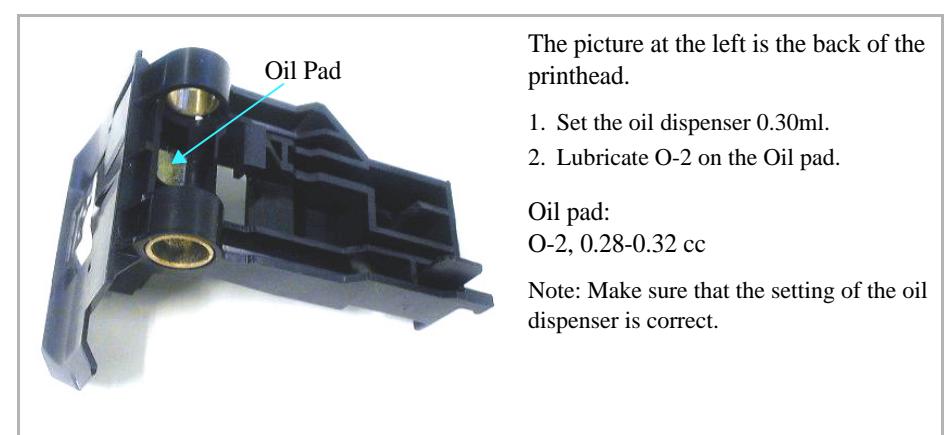
Lubricate G-26 to the shaft of the drive PF roller and the rear driven PF roller.
(4 places)

PF roller assembly:
G-26, 1/2 grain of rice

**Figure 6-7. Tractor Assembly****Figure 6-6. Paper Guide Assembly**

Set the paper guide assembly upside down and lubricate at the touching part of the PF roller assembly with the release shaft. (4 places)

Paper guide assembly:
G-26, 1 grain of rice

**Figure 6-8. Oil Pad**

The picture at the left is the back of the printhead.

1. Set the oil dispenser 0.30ml.
2. Lubricate O-2 on the Oil pad.

Oil pad:
O-2, 0.28-0.32 cc

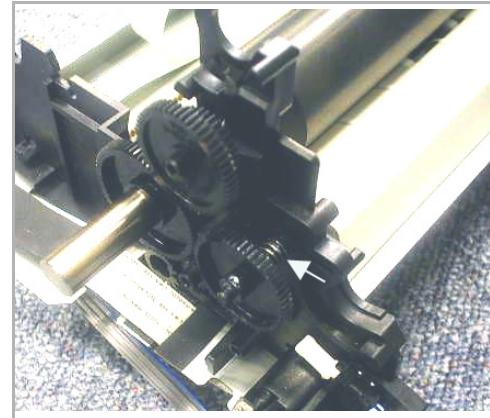
Note: Make sure that the setting of the oil dispenser is correct.



Move the carriage around the center, then lubricate G-26 on the touching parts of the 2 sides of the frame.

Carriage:
G-26, 40 mm x 2 places

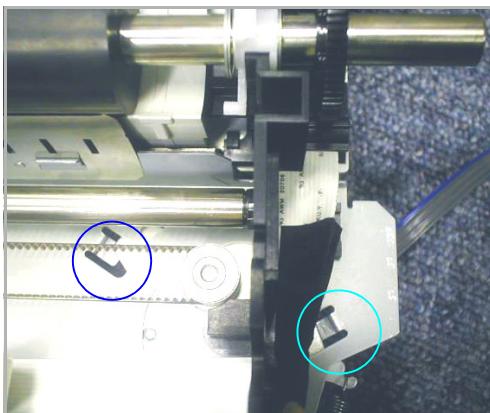
Figure 6-9. Carriage



Lubricate G-26 on the installing shaft of the Combination Gear, 17.5, 27 of the right frame.

Combination gear 17.5, 27:
G-26, 1/2 grain of rice

Figure 6-11. Combination Gear 17.5, 27



Lubricate G-26 on the 2 touching positions with CR motor assembly from the inside of the base frame.

CR motor assembly:
G-26, 1/2 grain of rice x 2

Figure 6-10. CR Motor Assembly



Lubricate G-26 to the touching position of the platen grounding spring with Platen shaft and the spur gear 34.

Platen grounding spring:
G-26, 1 grain of rice.

Spur Gear:
G-26, 10 mm

Figure 6-12. Platen Grounding Spring / Spur Gear

CHAPTER

7

LX-300+IRTP

About LX-300+II RTP, this service manual has only the chapters of the DISASSEMBLY AND ASSEMBLY, ADJUSTMENT, Parts List and Exploded Diagram.

7.1 DISASSEMBLY AND ASSEMBLY

This section explains the disassembly and assembly of LX-300+II. Unless otherwise specified, assembly can be done in the reverse order of the disassembly procedure.

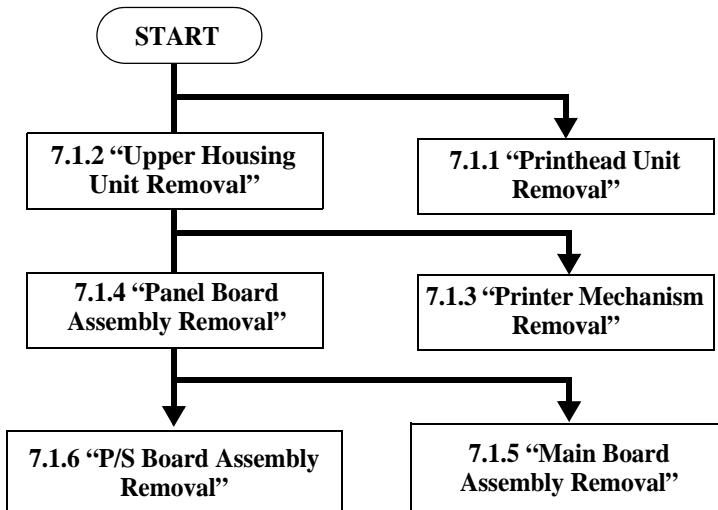
Anything that service person should pay attention to is described under "Check Point". Any adjustment required after assembly is described under "Adjustment".

When you have to remove parts that are not described in this chapter, refer to the exploded diagram on Appendix of this manual.



Remove ink ribbon and paper before disassembling the printer.

The figure below is the disassembly flowchart for main component.



Flowchart 7-1. Disassembly Flowchart (Main Component)

7.1.1 Printhead Unit Removal

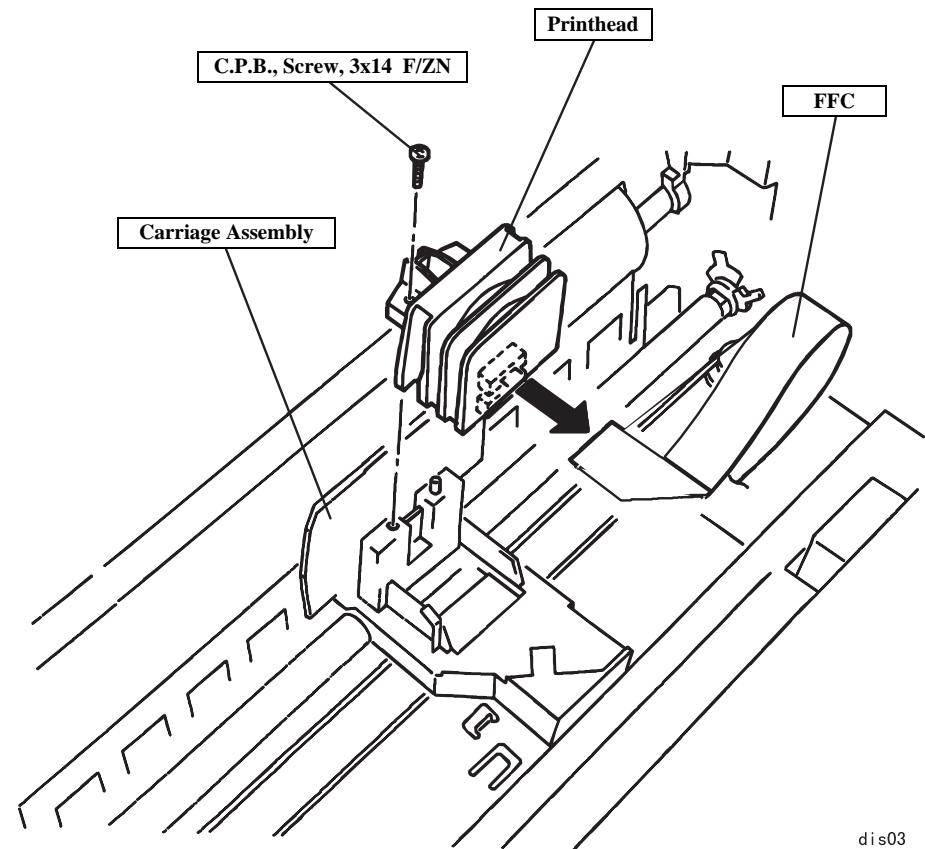
1. Remove 1 screw (C.P.B., Screw, 3x14 F/ZN; Torque 0.59-0.78N.m) securing the printhead to the carriage assembly.
2. Lift the printhead a little bit. Unlatch 2 hooks securing the printhead FFC to carriage unit.
3. Remove FFC from the printhead.



Check if the printer is powered off before removing the printhead.



When the printhead unit is removed or replaced, perform the platen gap adjustment and Bi-D adjustment.



dis03

Figure7-1. Printhead Removal

7.1.2 Upper Housing Unit Removal

1. Remove the tractor unit.
2. Set the release lever to the tractor feed.
3. Remove 4 screws securing the upper housing to the lower housing.
4. Detach the upper housing.
5. Disconnect the lead wire of cover open switch assy from the relay connector, and remove the Upper Housing.

CHECK POINT

When installing the upper housing, be sure to insert LEDs on the panel board into the LED holes of the upper housing.

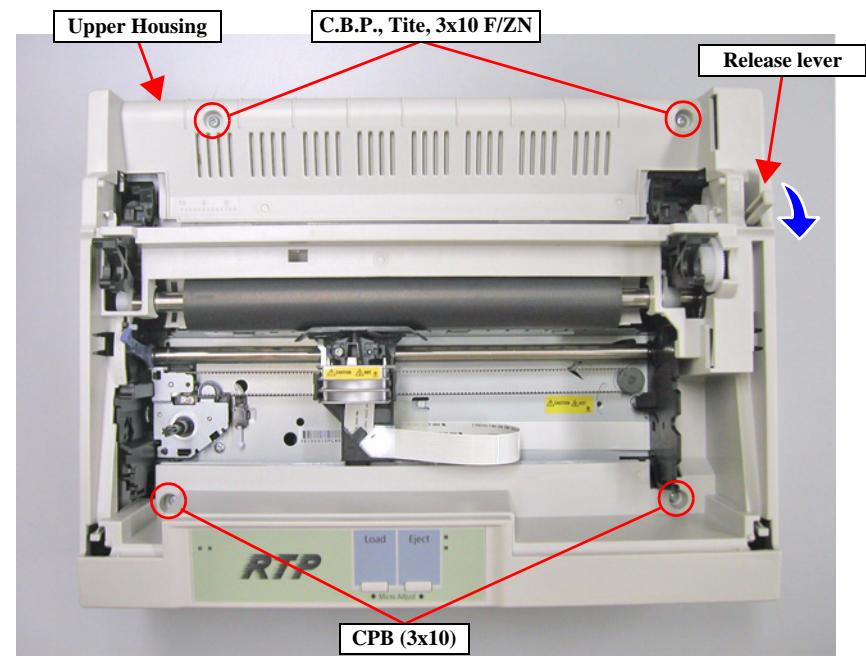
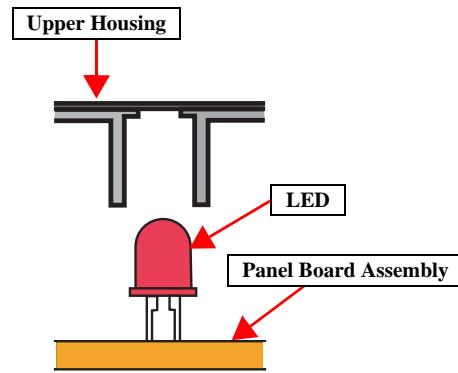


Figure7-2. Upper Housing Removal (1)

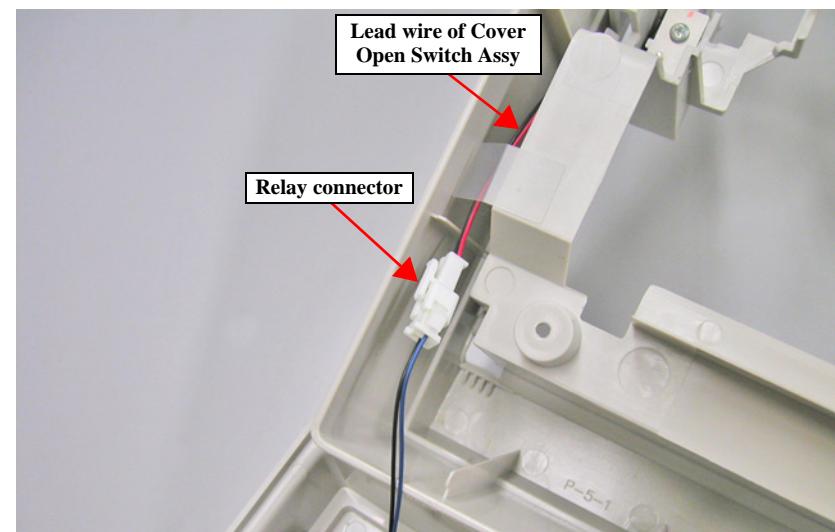


Figure7-3. Upper Housing Removal (2)

7.1.3 Printer Mechanism Removal

1. Remove the upper housing. (See 7.1.2 “Upper Housing Unit Removal”.)
2. Remove 3 screws (C.B.P., Tite, 3x10 F/ZN;Torque 0.78-0.98 N.M.) and 2 screws (C.B.S., Screw, 3x4 F/Zn;Torque 0.78-0.98 N.M.) securing the upper shield plate to the lower housing.
3. Remove the shield cover.
4. Remove 2 screws with washers (C.B.B., (W(13), 3x14 F/ZN) securing the printer mechanism to the lower housing.

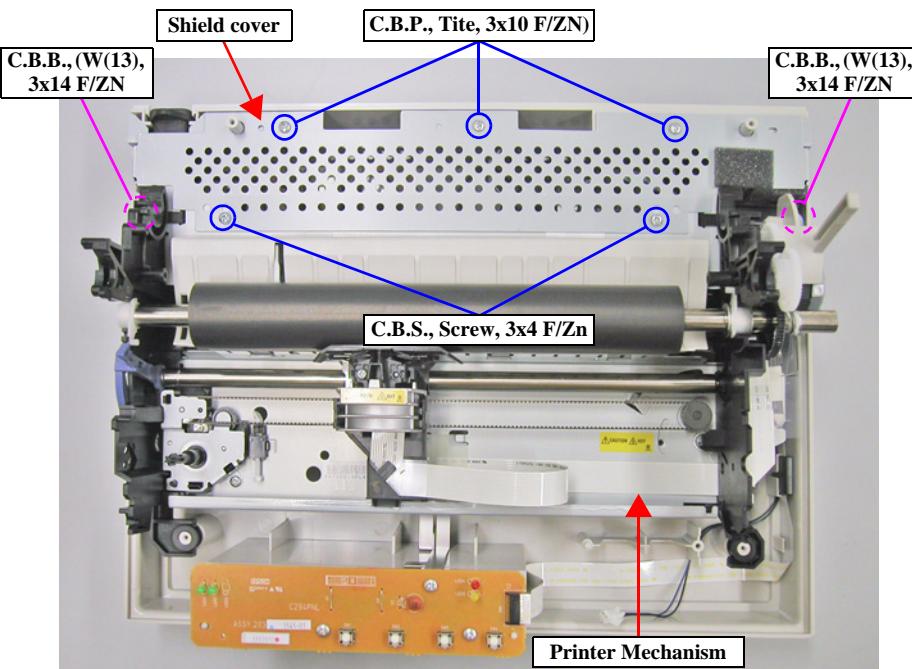


Figure7-4. Shield Cover

5. Lift the printer mechanism a little bit and remove the harnesses from the main board assembly.

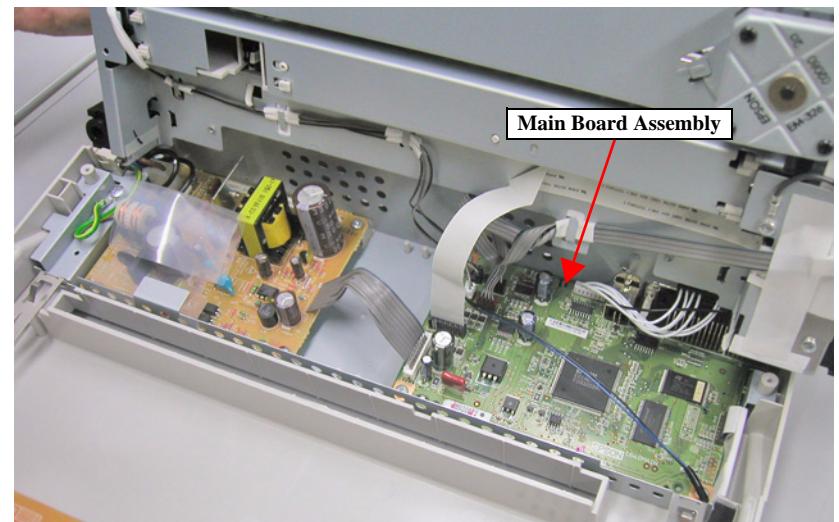


Figure7-5. Harness Removal

6. Remove the printer mechanism.



When the printer mechanism is removed, perform the Bi-D adjustment.
When the printer mechanism is replaced, perform the Bi-D adjustment, top margin adjustment, and bottom margin adjustment.

7.1.4 Panel Board Assembly Removal

1. Remove the upper housing. (See 7.1.2 “Upper Housing Unit Removal”.)
2. Disconnect the panel FFC from the connector of the panel board assembly.
3. Remove 3 screws (C.B.P., Tite, 3x10 F/ZN; Torque 0.78-0.98 N.M.) securing the panel board assembly to the lower housing.
4. Remove the panel board assembly from the lower housing.

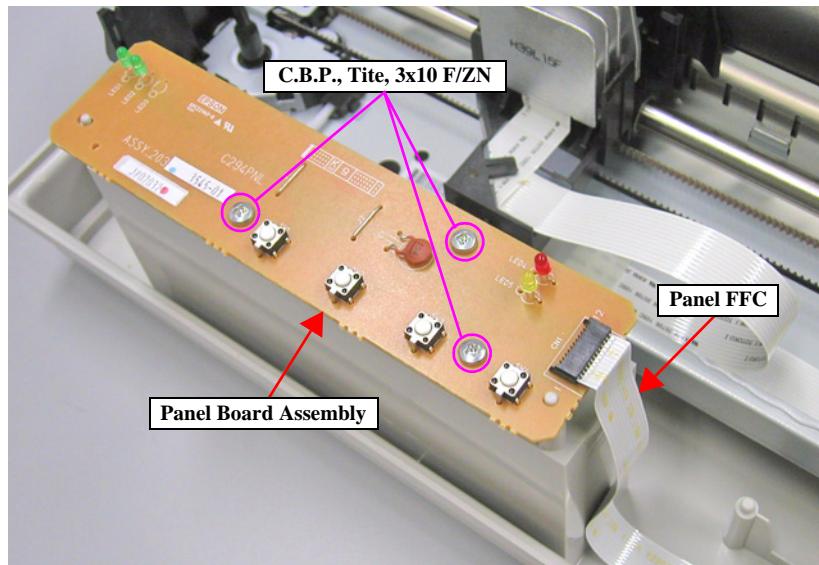


Figure 7-6. Panel Board Assembly Removal

7.1.5 Main Board Assembly Removal

1. Remove the upper housing. (See 7.1.2 “Upper Housing Unit Removal”.)
2. Remove the printer mechanism. (See 7.1.3 “Printer Mechanism Removal”.)
3. Remove 2 Jack Sockets (Torque 0.29-0.49 N.M.) securing the serial interface connector to the lower shield plate.
4. Remove the serial interface connector from the installation hole of the lower shield plate.
5. Remove 3 screws (C.P., Screw, 3x4 F/ZN; Torque 0.48-0.78 N.M.) securing the parallel interface and USB interface to the lower shield plate.
6. Disconnect the panel FFC from CN12 on the board.
7. Disconnect the harness connected to the Cover Open Switch Assy from CN6 on the board.
8. Disconnect the harness connected to the Power Supply Board Assembly from CN8.
Press one edge of CN8 in order to remove or install the harness.
9. Remove 3 screws (C.B.P., Tite, 3x10 F/ZN) securing the main board assembly to the lower housing.



When the main board assembly is replaced, perform the destination setting, Bi-D adjustment, top margin adjustment, and bottom margin adjustment.

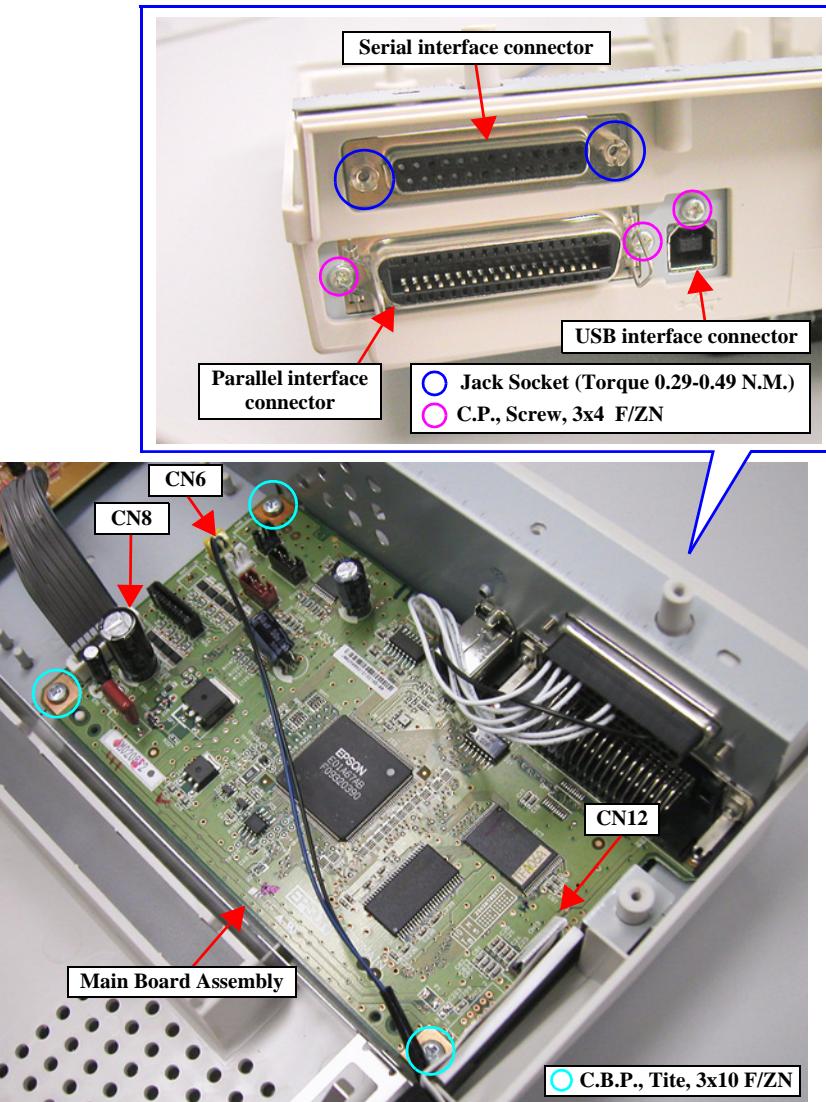


Figure 7-7. C640MAIN Board Assembly Removal

7.1.6 P/S Board Assembly Removal

1. Remove the upper housing. (See 7.1.2 "Upper Housing Unit Removal".)
2. Remove the printer mechanism. (See 7.1.3 "Printer Mechanism Removal".)
3. Remove 1 screw (C.B(O), Screw, 4x8, F/ZN; Torque 0.98-1.18 N.M.) and the grounding cable.
4. Remove the power cable (CN1) connecting to the Power Supply board assembly.
Remove the power switch from the lower housing.
5. Disconnect the harness connecting the Power Supply board assembly to the main board assembly. (CN8 of the main board assembly)
Press one edge of CN8 in order to remove or install the harness.
6. Remove 4 screws (C.B.P., Tite, 3x10 F/ZN; Torque 0.78-0.98 N.M.) securing the Power Supply board assembly to the lower housing.
7. Remove the Power Supply board assembly.

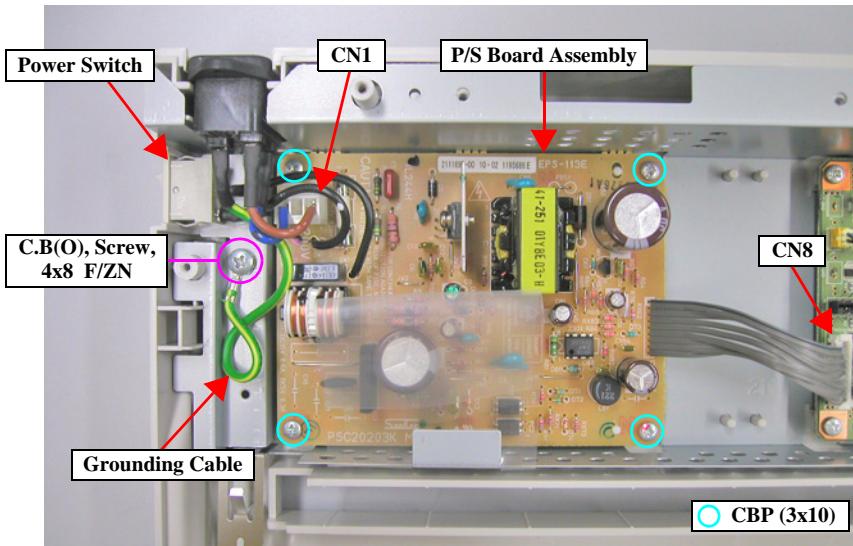


Figure 7-8. Power Supply Board Assembly Removal

7.1.7 Printer Mechanism Disassembly

About Printer Mechanism Disassembly for the LQ-300+II RTP, See Chapter 4 "Printer Mechanism Disassembly" on page -76.

7.2 Adjustment

When making the adjustment with the adjustment program, follow the steps below.

1. Hold pressing the two open cover sensors with a clip to set them ON. Refer to the figure.

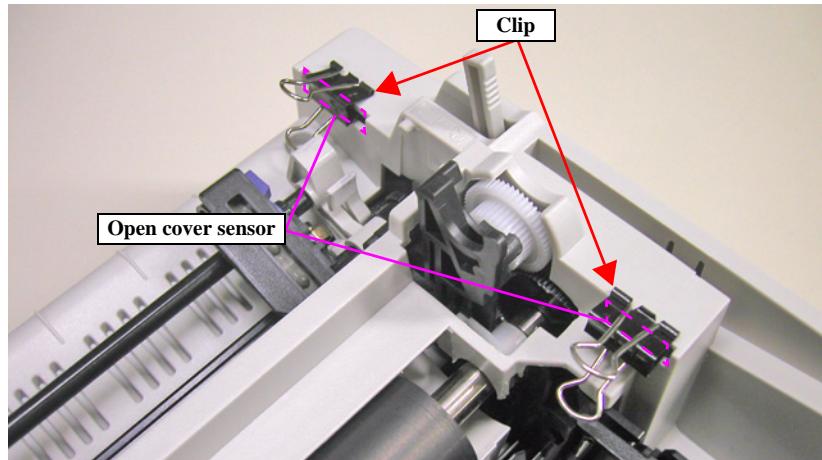


Figure 7-9. Hold pressing The two open cover sensors

2. Feed the paper as shown in the figure below. (Be sure the LEDs state is as shown in the figure.)

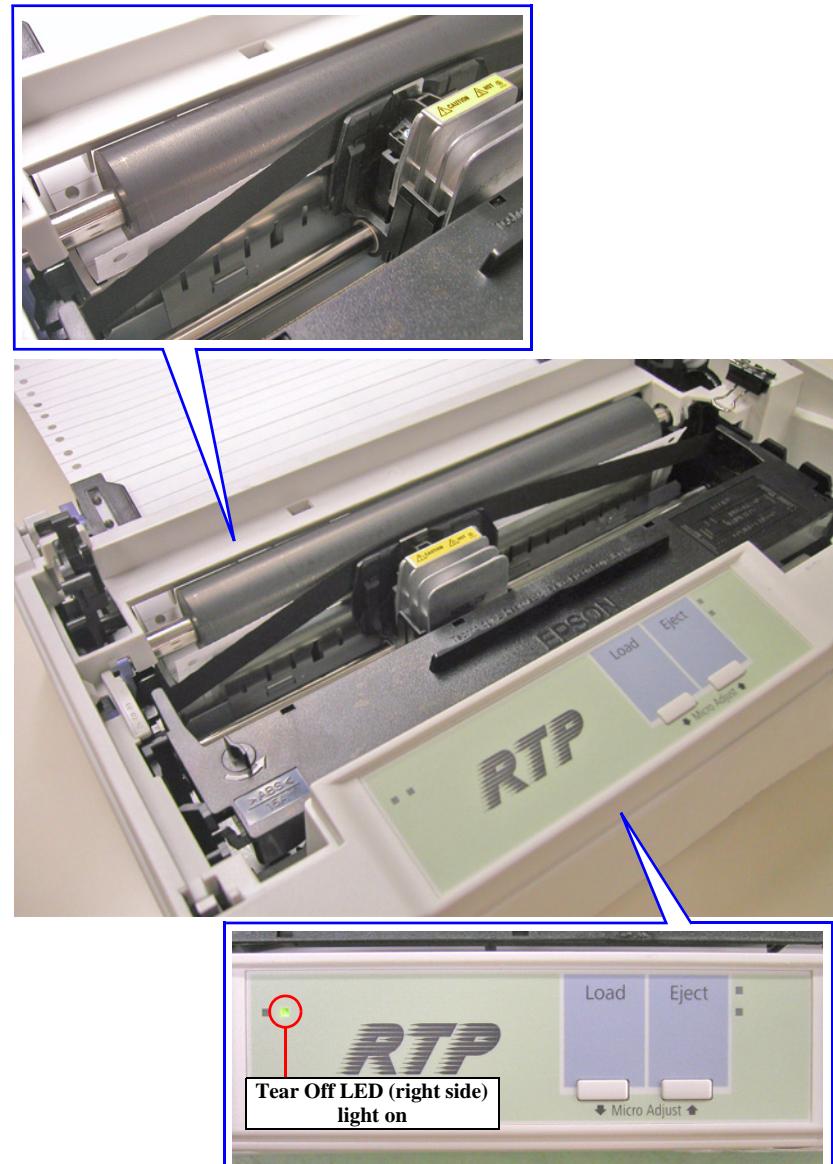


Figure 7-10. Position of the paper feeding

7.3 Parts List

Ref No.	Part Name	Qty
100	HOUSING ASSY LOWER	1
101	HOUSING,UPPER;B	1
120	LOGO PLATE;RTP	1
121	SHEET,PANEL;RTP	1
129	C.B.B-TITE(W(13))SCREW,3X14,F/ZN-3C	2
200	BOARD ASSY.,MAIN	1
300	BOARD ASSY., POWER SUPPLY	1
320	HARNESS	1
401	HARNESS	1
402	SWITCH ASSY.,COVER OPEN	1
450	BOARD ASSY.,PANEL	1
501	FRAME ASSY.,LEFT	1
502	FRAME,RIGHT	1
503	MOTOR ASSY.,CR	1
504	EXTENSION SPRING,8.10	1
505	LEVER ASSY.,PLANET	1
506	SHAFT,CR,GUIDE	1
509	SPURGEAR,13.2	1
510	COMBINATIONGEAR,5.1,16.2	2
511	MOTOR ASSY.,PF	1
512	COVER,RD	1
513	RATCHET,RD	1
514	DETECTOR,LEAF,B2	1
515	GROUNDING WIRE,PLATEN	1

Ref No.	Part Name	Qty
516	PULLEY ASSY.,DRIVEN	1
517	HARNESS,HP	1
520	PAPER GUIDE	1
521	DETECTOR,PE,REAR	1
522	HARNESS,PE,REAR	1
525	HOLDER,ROLLER,PF	2
526	ROLLER,PF,DRIVEN	2
527	ROLLER,PF,DRIVEN,REAR;C	2
528	COMPRESSION SPRING,13.72	2
529	SHAFT,RELEASE	1
530	PAPER GUIDE.,ASSY	1
531	E-RING,8,F/UC-3C	2
532	BUSHING,11	2
533	U-TYPE,11.2X0.13X16S/NA	1
534	PLAIN WASHER(B100166990)	1
535	PLATEN	1
536	CARRIAGE ASSY.	1
537	GROUNDING PLATE,HEAD	1
538	OIL PAD	1
539	LEVER,G,ADJUST	1
540	RIBBON MASK	1
541	TIMING BELT	1
542	BUSHING,PARALEL,ADJUST	2
543	CABLE,HEAD	1
559	DAMPER	4
560	FRAME,BASE	1

Ref No.	Part Name	Qty
561	PAPER GUIDE,SUPPORT	1
562	GROUNDING PALTE,SHAFT,CR	1
563	SHEET,CABLE,HEAD	1
564	GEAR,34	1
565	SPUR GEAR,27.5	1
566	PLAIN WASHER(B100153012)	1
567	COMPRESSION SPRING,1.18	1
568	COMBINATION GEAR,8.5,25.2	1
571	COMBINATION GEAR,17.5,27	1
575	GROUNDING WIRE,RIGHT	1
576	GROUNDING PLATE,PF	1
578	SHEET,PROTECT,M/B	1
579	SHEET,CABLE,CR	1
590	LEVER,RELEASE	1
650	PRINT HEAD,D3910-1	1
651	LABEL,WARNING	1
653	COVER,BOTTOM,CR	1
654	TRACTOR ASSY	1

7.4 Exploded Diagrams

Only numbered Service Parts are available.

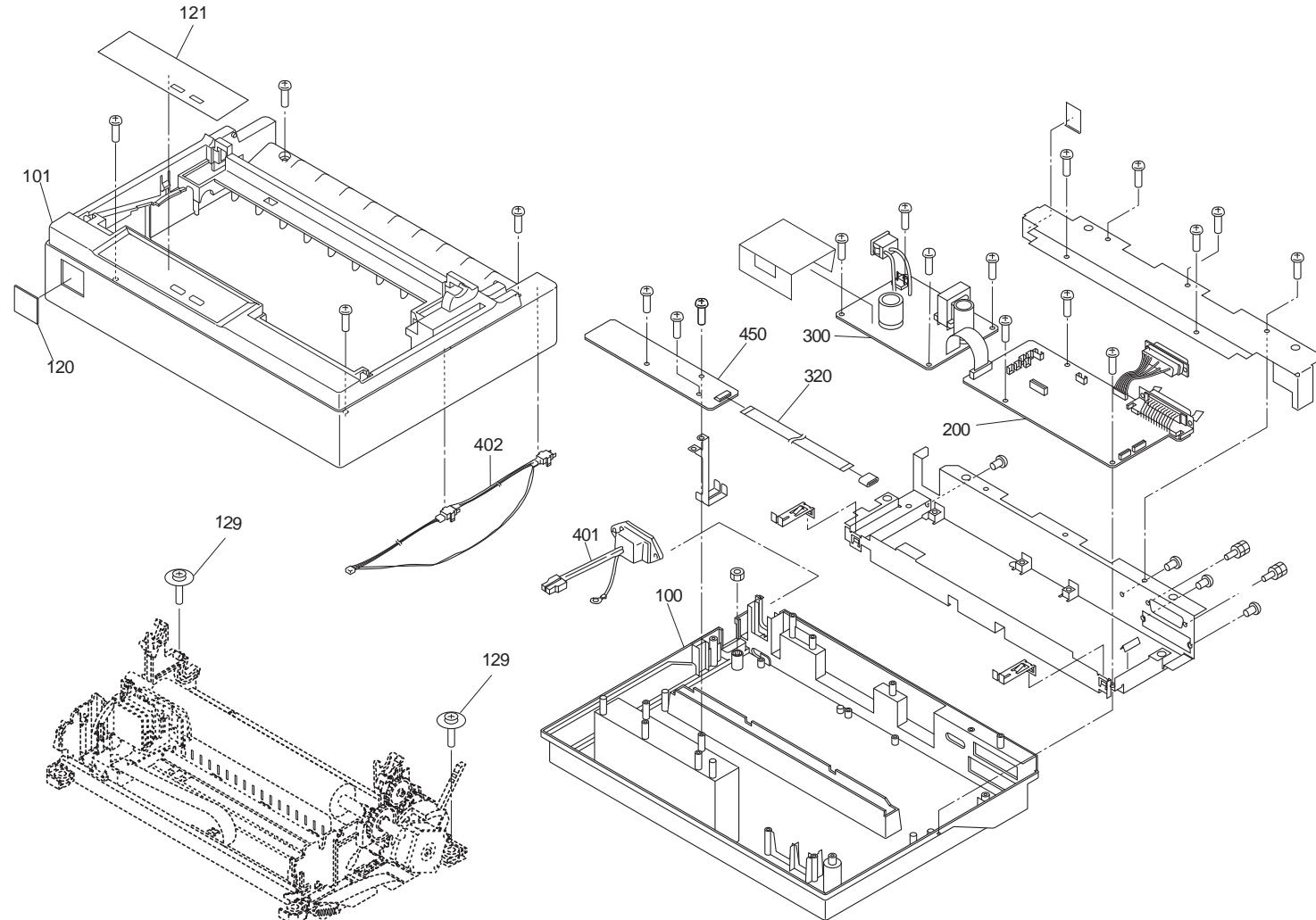


Figure 7-11. LX-300+II RTP Exploded Diagram 1

Only numbered Service Parts are available.

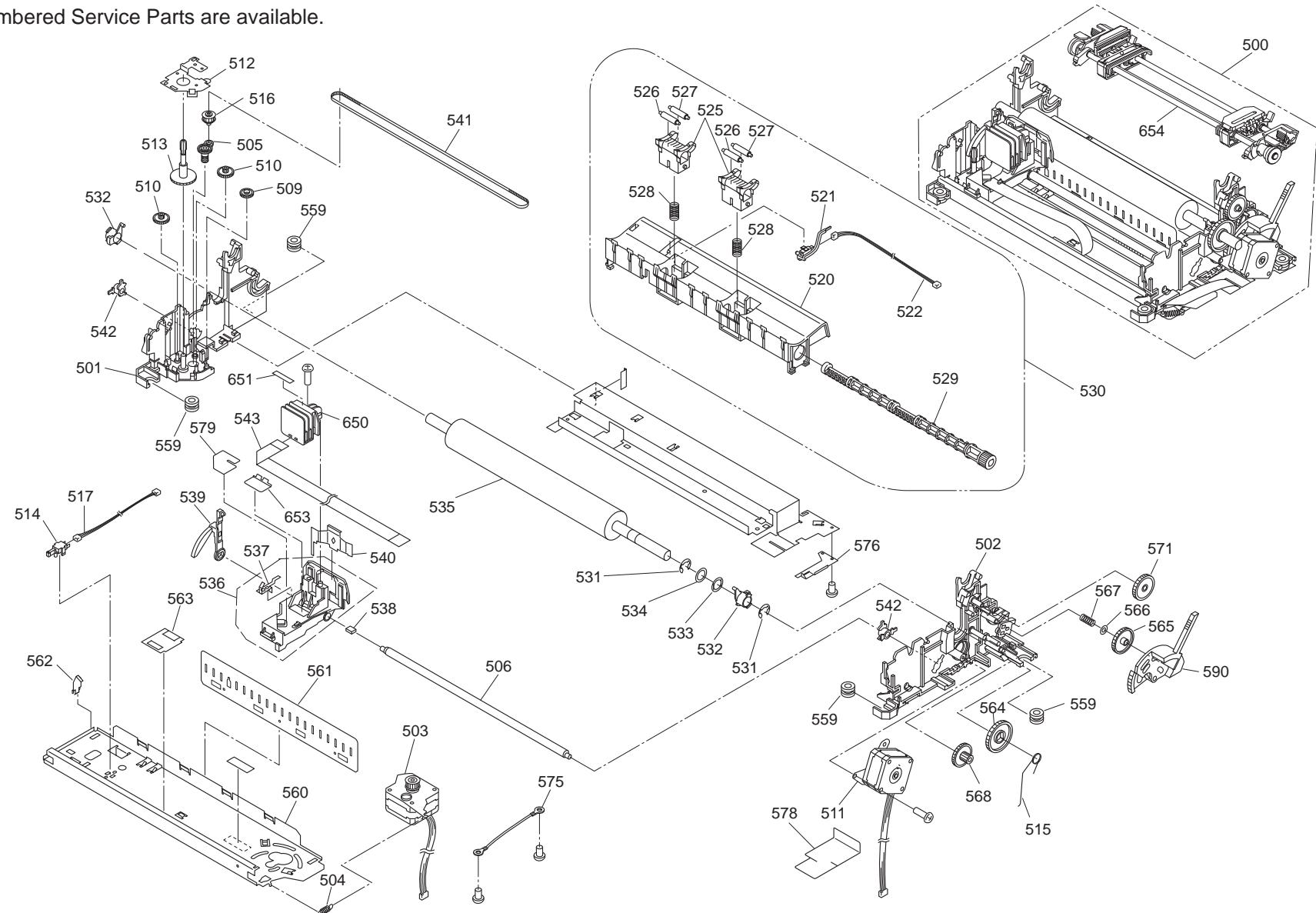


Figure 7-12. LX-300+II RTP Exploded Diagram 2

APPENDIX

A.1 Connector Summary

A.1.1 Major Component Unit

The figure below illustrates how the primary components are connected.

CS motor is only available for LX-300+II.

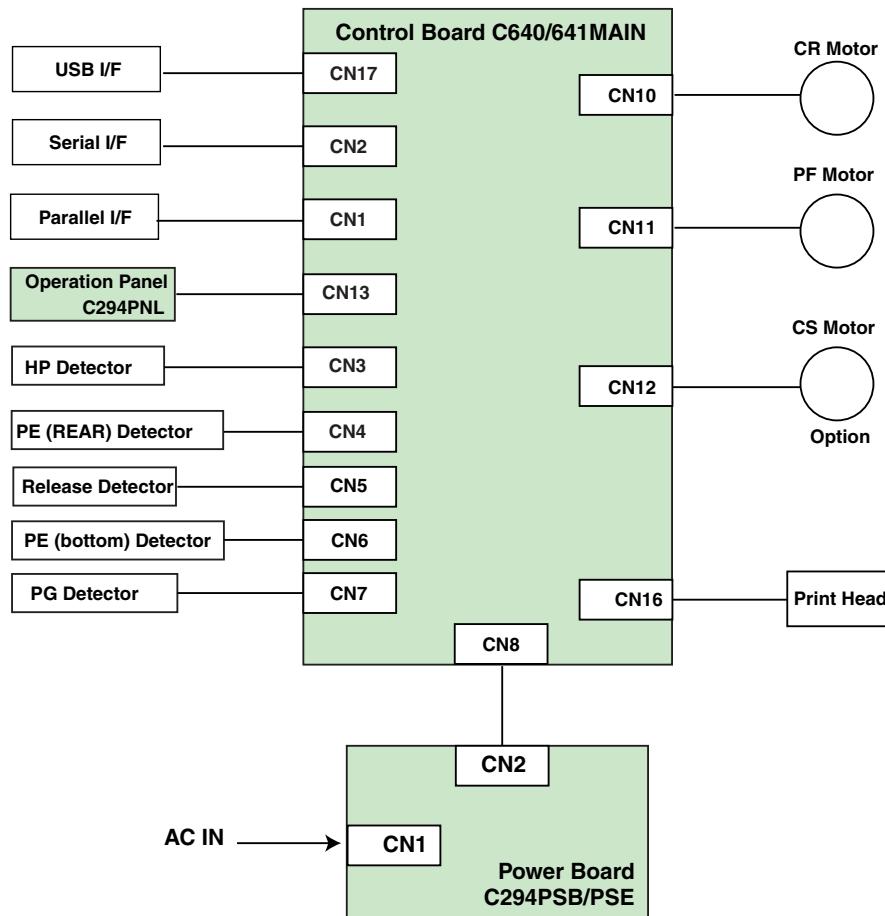


Figure A-1 Cable Connections

A.1.2 Pin Assignments

Table A-1. C640/641 MAIN Board Connector Summary

Connector	Function	Pins
CN1	Parallel I/F	36
CN2	Serial I/F	6
CN3	HP Detector	2
CN4	PE (Rear) Sensor	2
CN5	Release Detector	2
CN6	PE (bottom) Detector	2
CN7	PG Detector	2
CN8	Power Board C294PSB/PSE	9
CN16	Printhead	12
CN10	CR Motor	4
CN11	PF Motor	4
CN12	CS Motor (Option)	10
CN13	Operation Panel C294PNL	12
CN17	USB I/F	4

Table A-2. Connector Pin Assignments - CN3

Pin	I/O	Signal Name	Function
1	I	HP	Carriage home position sensor signal
2	-	GND	Signal ground

Table A-3. Connector Pin Assignments - CN4

Pin	I/O	Signal Name	Function
1	I	RPE	Rear paper end sensor signal
2	-	GND	Signal ground

Table A-4. Connector Pin Assignments - CN5

Pin	I/O	Signal Name	Function
1	I	RELEASE	Release sensor signal
2	-	GND	Signal ground

Table A-5. Connector Pin Assignments - CN6

Pin	I/O	Signal Name	Function
1	I	PE	Paper end sensor signal
2	-	GND	Signal ground

Table A-6. Connector Pin Assignments - CN7

Pin	I/O	Signal Name	Function
1	I	PG	Paper gap (copy mode) sensor signal
2	-	GND	Signal ground

Table A-7. Connector Pin Assignments - CN8

Pin	I/O	Signal Name	Function
1	-	VH	+35 VDC
2	-	VH	+35 VDC
3	-	GP	Signal ground
4	-	GP	Signal ground
5	O	PSC	Power save control
6	O	POFF	Power off signal
7	-	+5V	+5 VDC
8	-	+5V	+5 VDC

Table A-8. Connector Pin Assignments - CN16

Pin	I/O	Signal Name	Function
1	O	HD7	Head data 7
2	O	HD1	Head data 1
3	O	HD5	Head data 5
4	O	HD3	Head data 3
5	-	HDCOM	Common (VP)
6	-	HDCOM	Common (VP)
7	-	HDCOM	Common (VP)
8	O	HD2	Head data 2
9	O	HD9	Head data 9
10	O	HD4	Head data 4
11	O	HD8	Head data 8
12	O	HD6	Head data 6

Table A-9. Connector Pin Assignments - CN10

Pin	I/O	Signal Name	Function
1	O	CRA	Carriage motor phase A
2	O	CRĀ	Carriage motor phase Ā
3	O	CRB	Carriage motor phase B
4	O	CRB̄	Carriage motor phase B̄

Table A-10. Connector Pin Assignments - CN11

Pin	I/O	Signal Name	Function
1	O	PFA	Paper feed motor phase A
2	O	PFA $\bar{}$	Paper feed motor phase \bar{A}
3	O	PFB	Paper feed motor phase B
4	O	PFB $\bar{}$	Paper feed motor phase \bar{B}

Table A-11. Connector Pin Assignments - CN12

Pin	I/O	Signal Name	Function
1	-	VH	+35 VDC
2	-	CS/HOLD	+5 VDC
3	-	+5V	+5 VDC
4	O	CS \bar{A}	CS motor phase \bar{A}
5	O	CS $\bar{X}A$	CS motor phase \bar{XA}
6	O	CS \bar{B}	CS motor phase \bar{B}
7	O	CS $\bar{X}B$	CS motor phase \bar{XB}
8	-	GP	Signal ground
9	I	CSSW	Color ribbon sensor signal
10	-	GND	Signal ground

Table A-12. Connector Pin Assignments - CN13

Pin	I/O	Signal Name	Function
1	-	+5V	+5 VDC
2	O	LED5	LED 5
3	O	LED4	LED 4
4	O	LED3	LED 3
5	O	LED2	LED 2

Table A-12. Connector Pin Assignments - CN13

Pin	I/O	Signal Name	Function
6	O	LED1	LED 1
7	I	SW1	Switch 1
8	-	GND	Signal ground
9	-	GND	Signal ground
10	I	SW2	Switch 2
11	I	SW3	Switch 3
12	I	SW4	Switch 4

A.2 EEPROM Address Map

This section provides the EEPROM address map.

NOTE: The data of two or more bytes are assigned as lower byte to lower address and higher byte to higher address.

*1: The data are fixed by each printer hardware in the factory. The data should not be changed afterwards.

NOTE: The data is fixed by each printer hardware in the factory. The data should not be changed afterwards.

Table A-13. EEPROM Address Map

Address	Explanation	Setting	QPIT Settings	Factory Settings
Area 0				
00H-03H	Reserved		00H	00H
04H-07H	Driving Line count for ribbon change timing See Remote spec TLcmd	0-0xFFFFFFFF(count) 00000000H	00000000H	00000000H
08H-0BH	Driving Hour	0-0xFFFFFFFF(minute) See Remote spec TLcmd	00000000H	00000000H
0CH-0FH	Driving Line count	0-0xFFFFFFFF(count) See Remote spec TLcmd	00000000H	00000000H
10H	Starting Year	0-99(the last two figures of Anno Domini) See Remote spec SDcmd	00H	00H
11H	Starting Month	1-12 See Remote spec SDcmd	00H	00H
12H	Starting Data	1-31 See Remote spec SDcmd	00H	00H
13H	Backup Flags	b0: In Tear Off state 0: No 1: Yes b1 to b7: Reserved	00H	00H
14H-17H	Reserved		0000H	0000H
Area1				
18H,19H	Page length for tractor	1 to 22x432 by 0.0588 mm (1/432 inch), 0000H : 279.4 mm (11 inches: same as default)	0000H	0000H
1AH,1BH	Page length for CSF	1 to 22x432 by 0.0588 mm (1/432 inch), 0000H : 558.8 mm (22 inches: same as default)	0000H	0000H
1CH,1DH	Page length for rear manual insertion	1 to 22x432 by 0.0588 mm (1/432 inch), 0000H : 558.8 mm (22 inches: same as default)	0000H	0000H
1EH,1FH	TOF adjustment value for tractor	-144 to 432 (0.0 mm to 8.5 mm +25.4 mm (1 inch), by 0.0588 mm (1/432 inch))	0000H (8.5 mm)	0000H (8.5 mm)

Table A-13. EEPROM Address Map (continued)

Address	Explanation	Setting	QPIT Settings	Factory Settings
20H,21H	TOF adjustment value for CSF	-144 to 432 (0.0 mm to 8.5 mm +25.4 mm (1 inch), by 0.0588 mm (1/432 inch))	0000H (8.5 mm)	0000H (8.5 mm)
22H,23H	TOF adjustment value for rear manual insertion	-144 to 432 (0.0 mm to 8.5 mm +25.4 mm (1 inch), by 0.0588 mm (1/432 inch))	0000H (8.5 mm)	0000H (8.5 mm)
24H,25H	Bottom margin for tractor	1 to 22x432 by 0.0588 mm (1/432 inch), 0000H : 279.4 mm (11 inches: same as default)	0000H	0000H
26H,27H	TOF Minimum value	-144 to -72, 0 : -72(4.2 mm) In case that it is big than -72, a value considers as -72	0000H	0000H
28H	Font selection	0: Draft 1: Roman 2: Sans serif	00H (Draft)	00H (Draft)
29H	Pitch selection	0: 10 cpi 1: 12 cpi 2: 15 cpi 3: 17 cpi 4: 20 cpi 5: Proportional	00H (10 cpi)	00H (10 cpi)
2AH	Reserved			00H 00H
2BH,2CH	Reserved			0000H 0000H
2DH	Print direction setting	0: Bi-d. 1: Uni-d.	00H (Bi-d.)	00H (Bi-d.)

Table A-13. EEPROM Address Map (continued)

Address	Explanation	Setting		QPIT Settings	Factory Settings
2EH,2FH	Character table selection	0: PC 437	21: Code MJK	0000H (PC 437)	0000H (PC 437)
		1: PC 850	22: Bulgaria		
		2: PC 860	23: Estonia		
		3: PC 863	24: PC 774		
		4: PC 865	25: ISO 8859-2		
		5: PC 861	26: PC 866 LAT		
		6: BRASCI	27: PC 866 UKR		
		7: Abicomp	28: Hebrew7		
		8: ISO Latin 1	29: Hebrew8		
		9: Roman 8	30: PC862		
		10: PC 437Greek	31: PCAPTEC		
		11: PC 852	32: PC 708		
		12: PC 853	33: PC 720		
		13: PC 855	34: PCAR864		
		14: PC 857	35: PC 858		
		15: (reserved)	36: ISO8859-15		
		16: PC 866	37: PC771		
		17: PC 869	38: PC437 Slovenia		
		18: ISO Latin 1T	39: PC MC		
		19: ISO 8859-7	40: PC 1250		
		20: MAZOWIA	41: PC 1251		
		128: Italic U.S.A.	132: Italic DenmarkI		
		129: Italic France	133: Italic Sweden		
		130: Italic Germany	134: Italic Italy		
		131: Italic U.K.	135: Italic Spain I		
30H,31H	(reserved)			0000H	0000H
32H	Line Spacing	1 to 255 by 0.0588 mm(1/432 inch), 00H:4.2 mm(1/6 inch: same as default)		00H (4.2 mm)	00H (4.2 mm)
33H	Auto line feed	b0: Auto line feed	0: Off	00H	00H
	Auto tear off	b1: Auto tear off	0: Off		
	Skip over perforation	b2: Skip over perforation	0: Off		
	High speed draft	b3: High speed draft	0: On		
	-----	b4: (reserved)			
	-----	b5: (reserved)			
	Tear off without FF	b6: Tear off without FF	0:Off		
	-----	b7: (reserved)	1: On		
34H	Software 0 slash	b0: Software 0 slash	0: ESC/P 1: IBM 2380 Plus	00H	00H
	Buzzer	b1: 0 slash	0: Off		
	-----	b2: Buzzer	0: On		
	-----	b3: (reserved)			
	-----	b4: Auto CR (IBM)	0: Off		
	-----	b5: (reserved)	1: On		
	-----	b6: (reserved)			
	-----	b7: (reserved)			

Table A-13. EEPROM Address Map (continued)

Address	Explanation	Setting		QPIT Settings	Factory Settings		
35H	I/F mode selection	0: Auto I/F selection	2: Serial I/F	00H	00H		
		1: Parallel I/F	3: USB I/F	(Auto)	(Auto)		
36H	Auto I/F wait time setting	10: 10 sec.		00H	00H		
		30: 30 sec.		(10 sec.)	(10 sec.)		
		00: 10 sec.(same as default)					
37H	Serial baud rate	b0-b2:Serial baud rate		00H	00H		
		0: 19200 bps	3: 2400 bps				
		1: 9600 bps	4: 1200 bps				
		2: 4800 bps	5: 600 bps				
		b3:(reserved)					
38H	Serial parity	b4-b5:Serial parity		(None)	(None)		
		0: None	2: Odd				
		1: Even	3: Ignore				
		b6:Serial data length		(8bit)	(8bit)		
		0: 8bit	1: 7bit				
		b7:ETX/ACK protocol					
		0: Off	1: On				
39H	IEEE1284.4 for Parallel I/F	b0-b1:		00H	00H		
		0: Auto	1: On (for test)				
		b2-b3:					
		0: same as "IEEE1284.4 for Parallel I/F"					
		1: Auto (for test)	2: On (for test)				
		b4:		(On)	(On)		
		0: On(64Kbyte)	1: Off(1 byte)				
3AH	Input Buffer	b5:(reserved)					
		b6:Parallel I/F bidirectional mode					
		0: On	1: Off				
		b7:Pause Offline					
		0: Off	1: On				
39H	*ACK timing data			00H	01H		
3AH	*ACK timing data (complement of 39H)			00H	FEH		
3BH	Panel mask pattern 1	b0: LOAD/EJECT function		00H	00H		
		b1: LF/FF function					
		b2: TEAR OFF function					
		b3: Micro Adjust function					
		b4: (reserved)					
		b5: (reserved)					
		b6: (reserved)					
		b7: (reserved)					

Table A-13. EEPROM Address Map (continued)

Address	Explanation	Setting	QPIT Settings	Factory Settings
3CH	Panel mask pattern 2	b0: Font function b1: (reserved) b2: Pause function b3: (reserved) b4: (reserved) b5: (reserved) b6: (reserved) b7: (reserved)	00H	00H
3DH	Copy mode ---- ---- ---- Energy save mode ---- ---- ----	b0: copy mode 0: Off 1: On b1: (reserved) b2: (reserved) b3: (reserved) b4: Energy save mode 0: On 1: Off b5: (reserved) b6: (reserved) b7: (reserved)	00H	00H
3E,3FH	Tear-off adjustment value	-432 to +432 (-25.4 mm (-1inch) to 0 mm +25.4 mm (1inch), by 0.0588 mm (1/432 inch))	0000H	0000H
40H	Tear-off wait time	3 to 30 (by 0.1 sec.), 00H:3 sec.(same as default)	00H (3 sec.)	00H (3 sec.)
41H	Manual insertion wait time	3 to 30 (by 0.1 sec.), 00H:1.5 sec.(same as default)	00H (1.5 sec.)	00H (1.5 sec.)
42H-4FH	(reserved)		All 00H	All 00H
Area 2				
50H-51H	(reserved)		00H	00H
52H-5AH	USB ID		All 00H	*a)
5BH-63H			All 00H	*a)
64H	Fatal error (Latest)	00H: Error is not recorded 30H: CR Error 32H: CG Error 33H: Head Low Volt Error 3AH: Head open Error 3BH: EEPROM Compare Error	00H	00H
65H	Fatal error (Record #1)	(The same as the above)	00H	00H
66H	Fatal error (Record #2)	(The same as the above)	00H	00H
67H	Fatal error (Record #3)	(The same as the above)	00H	00H
68H-6AH	Sub-number for customization	00H to 09H	000000H (Standard)	000000H (Standard)
6BH	(reserved)		00H	00H
6CH	Market CG	0:Standard version 1:NLSP version	00H	00H

Table A-13. EEPROM Address Map (continued)

Address	Explanation	Setting	QPIT Settings	Factory Settings
6DH	IBM character table	0:Table2 1:Table1	00H	00H
6EH	(reserved)		00H	00H
6FH	(reserved)		00H	00H
Area 3				
70H	Vp adjustment value		*a)	*a)
71H	Vp adjustment value (complement of 70H)		*a)	*a)
72H	Bi-d adjustment value for high speed draft mode	-12 to +12 by 0.0353 mm(1/720 inch)	00H	*a)
73H	Bi-d adjustment value for draft mode	-12 to +12 by 0.0353 mm(1/720 inch)	00H	*a)
74H	Bi-d adjustment value for NLQ mode	-12 to +12 by 0.0353 mm(1/720 inch)	00H	*a)
75H-7BH	(reserved)		All 00H	00H
7CH	RPE (TOF) position adjustment for continuous	-128 to +127 by 0.0588 mm (1/432 inch)	00H	*a)
7DH	RPE (TOF) position adjustment for continuous	-128 to +127 by 0.0588 mm (1/432 inch)	00H	*a)
7EH	RPE (TOF) position adjustment for continuous	-128 to +127 by 0.0588 mm (1/432 inch)	00H	*a)
7FH	(reserved)		00H	00H

A.3 Parts List

The following tables show parts name of the products. Refer to the exploded diagrams for parts' number.

Parts List for LX-300+II

Table A-14. LX-300+II Parts List

Code	Part Name
100	HOUSING ASSY LOWER
101	INSULATOR;A
102	INSULATOR;B
103	HOUSING,UPPER
104	SHIELDPLATE,LOWER
105	COVER ASSY.,PRINTER
106	KNOB;W
107	COVER ASSY.,PRINTER,REAR
109	SHEET GUIDE ASSY.
111	SHIELDPLATE,UPPER
115	COVER CONNECTOR,CS;W
116	HEXAGON NUT
117	GROUNDINGPLATE
118	GROUNDING PLATE,PANEL
119	EDGING;A
120	LOGO PLATE
123	FERRITE CORE,FPC-25-20
124	SHEET,PROTECT
125	CONNECTOR LOCK NUT
126	RIVET B-TITE (SCREW TYPE),3X12,F/ZN-3C
127	C.B.P-TITE SCREW,3X10,F/ZN-3C

Table A-14. LX-300+II Parts List

Code	Part Name
128	C.B.S-TITE SCREW,3X4,F/ZN-3C
129	C.B.B-TITE(W(13)) SCREW,3X14,F/ZN-3C
130	C.B.(O) SCREW,4X8,F/ZG-3C
131	C.P.SCREW,3X4,F/ZN-3C
132	C.B.S-TITE SCREW,3X6,F/ZN-3C
180	GUIDE,STACKER
200	BOARD ASSY.,MAIN
300	BOARD ASSY.,POWER SUPPLY
320	FFC HARNESS
400	POWER CABLE
401	HARNESS
450	BOARD ASSY.,PANEL
451	SHEET,PANEL;D
500	PRINTER MECHANISM,M-3M10-100
501	FRAME ASSY.,LEFT
502	FRAME,RIGHT
503	MOTOR ASSY.,CR
504	EXTENSION SPRING,8.10
505	LEVER ASSY.,PLANET
506	SHAFT,CR,GUIDE
510	COMBINATIONGEAR,5.1,16.2
511	MOTOR ASSY.,PF
512	COVER,RD
513	RATCHET,RD
514	DETECTOR,LEAF,B2

Table A-14. LX-300+II Parts List

Code	Part Name
515	GROUNDING WIRE,PLATEN
516	PULLEY ASSY.,DRIVEN
517	HARNESS,HP
518	C.P.B-TITE SCREW,3X14,F/ZN-3C
520	PAPER GUIDE
521	DETECTOR,PE,REAR
522	HARNESS,PE,REAR
523	DETECTOR,PE,BOTTOM
524	HARNESS,PE,BOTTOM
525	HOLDER,ROLLER,PF
526	ROLLER,PF,DRIVEN
527	ROLLER,PF,DRIVEN,REAR;C
528	COMPRESSION SPRING,13.72
529	SHAFT,RELEASE
530	PAPER GUIDE ASSY.
531	E-RING,8,F/UC-3C
532	BUSHING,11
533	U-TYPE,11.2X0.13X16S/NA
534	PLAIN WASHER
535	PLATEN
536	CARRIAGE ASSY.
537	GROUNDING PLATE,HEAD
538	OIL PAD
539	LEVER,G,ADJUST
540	RIBBON MASK

Table A-14. LX-300+II Parts List

Code	Part Name
541	TIMING BELT
542	BUSHING,PARALLEL,ADJUST
543	CABLE,HEAD
544	HARNESS,PG
545	PAPER GUIDE,LOWER
559	DAMPER
560	FRAME,BASE
561	PAPER GUIDE,SUPPORT
562	GROUNDING PALTE,SHAFT,CR
563	SHEET,CABLE,HEAD
564	GEAR,34
565	SPUR GEAR,27.5
566	PLAIN WASHER
567	COMPRESSION SPRING,1.18
568	COMBINATION GEAR,8.5,25.2
569	HARNESS,RELEASE
570	PAPER EJECT ASSY
571	COMBINATION GEAR,17.5,27
573	GROUNDING PLATE,CS
575	GROUNDING WIRE,RIGHT
576	GROUNDING PLATE,PF
577	SHEET,PROTECT,CABLE
578	SHEET,PROTECT,M/B
579	SHEET,CABLE,CR
580	C.B.P-TITE SCREW,3X10,F/ZN-3C

Table A-14. LX-300+II Parts List

Code	Part Name
581	C.B.S-TITE SCREW,3X4,F/ZN-3C
590	LEVER,RELEASE
650	PRINthead,D3910-1
651	LABEL,WARNING
652	ROLLER,PAPER EJECT;B
653	COVER,BOTTOM,CR
654	TRACTOR ASSY.

 Parts List for LX-1170II**Table A-15. LX-1170II Parts List**

Code	Part Name
100	HOUSING ASSY, LOWER
103	HOUSING,UPPER
104	SHIELDPLATE,LOWER
105	COVER ASSY.,PRINTER
106	KNOB
107	COVER ASSY.,PRINTER,REAR
109	SHEET GUIDE ASSY.
111	SHIELDPLATE,UPPER
116	HEXAGON NUT
117	GROUNDINGPLATE
118	GROUNDING PLATE,PANEL
119	C.B.P-TITE SCREW,3X10,F/ZN-3C
120	LOGO PLATE
121	GROUNDING PLATE,L
122	GROUNDING PLATE,R
123	FERRITE CORE,FPC-25-20
124	SHEET,PROTECT,L
125	CONNECTOR LOCK NUT
126	SHEET,PROTECT,R
128	C.B.S-TITE SCREW,3X4,F/ZN-3C
129	C.B.B-TITE(W(13)) SCREW,3X14,F/ZN-3C
130	C.B.(O) SCREW 4X8 F/ZG-3C
180	GUIDE,STACKER
200	BOARD ASSY.,MAIN

Table A-15. LX-1170II Parts List

Code	Part Name
300	BOARD ASSY.,POWER SUPPLY
320	HARNESS
400	POWER CABLE
401	HARNESS
450	BOARD ASSY.,PANEL
451	SHEET,PANEL;D
500	PRINTER MECHANISM(ASP),M-3N60-100
501	FRAME ASSY.,LEFT
502	FRAME,RIGHT
503	MOTOR ASSY.,CR
504	EXTENSION SPRING,8.10
505	LEVER ASSY.,PLANET
506	SHAFT,CR,GUIDE
508	GROUNDING PLATE,PAPER GUIDE,UPPER
509	SPURGEAR,13.2
510	COMBINATIONGEAR,5.1,16.2
511	MOTOR ASSY.,PF
512	COVER,RD
513	RATCHET,RD
514	DETECTOR,LEAF,B2
515	GROUNDING WIRE,PLATEN
516	PULLEY ASSY.,DRIVEN
517	HARNESS,HP
518	C.P.B-TITE SCREW,3X14,F/ZN-3C
519	ROLLER,PAPER EJECT

Table A-15. LX-1170II Parts List

Code	Part Name
520	PAPER GUIDE
521	DETECTOR,PE,REAR
522	HARNESS,PE,REAR
523	DETECTOR,PE,BOTTOM
524	HARNESS,PE,BOTTOM
525	HOLDER,ROLLER,PF
526	ROLLER,PF,DRIVEN
527	ROLLER,PF,DRIVEN,REAR;C
528	COMPRESSION SPRING,13.72
529	SHAFT,RELEASE
530	PAPER GUIDE ASSY.
531	E-RING,8,F/UC-3C
532	BUSHING,11
533	U-TYPE,11.2X0.13X16S/NA
534	PLAIN WASHER
535	PLATEN
536	CARRIAGE SUB ASSY.
537	GROUNDING PLATE,HEAD
538	OIL PAD
539	LEVER,G,ADJUST
540	RIBBON MASK
541	TIMING BELT
542	BUSHING,PARALLEL,ADJUST
543	CABLE,HEAD
544	HARNESS,PG

Table A-15. LX-1170II Parts List

Code	Part Name
545	PAPER GUIDE,LOWER
546	PAPER GUIDE,UPPER
547	BASE,PAPER EJECT;B
549	COVER,PAPER EJECT;B
550	LEAF SPRING,PAPER EJECT
551	PAPER SUPPORT
552	FRAME,TR,RIGHT
553	FRAME,TR,LEFT
554	TRACTOR,LEFT
555	TRACTOR,RIGHT
556	SHAFT,TR,DRIVE
557	SHART,TR,GUIDE
558	E-RING,5,F/UC-3C
559	DAMPER
560	FRAME,BASE
561	PAPER GUIDE,SUPPORT
562	GROUNDING PALTE,SHAFT,CR
563	SHEET,CABLE,HEAD
564	GEAR,34
565	SPUR GEAR,27.5
566	PLAIN WASHER
567	COMPRESSION SPRING,1.18
568	COMBINATION GEAR,8.5,25.2
569	HARNESS,RELEASE
571	COMBINATION GEAR,17.5,27

Table A-15. LX-1170II Parts List

Code	Part Name
574	SPUR GEAR,8
590	LEVER,RELEASE
592	SHEET,CABLE,CR
593	SPUR GEAR,17
594	E-RING,6,F/UC-3C
596	PAPER EJECT ASSY.
597	TRACTOR ASSY.
650	PRINthead,D3910-1
651	DUMPER,FRAME,BASE
652	COVER,BOTTOM,CR

A.4 Exploded Diagrams

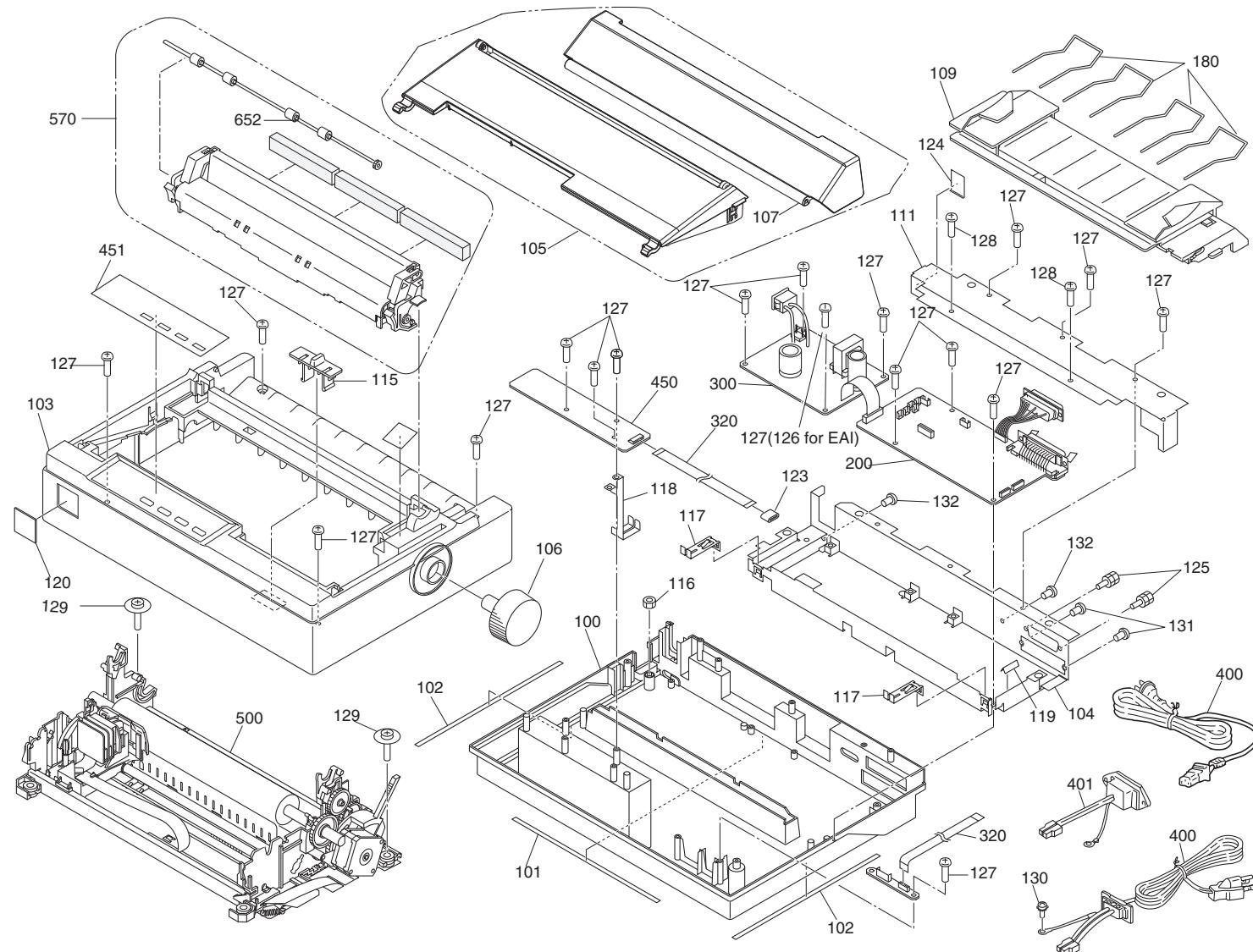


Figure A-2 LX-300+II Exploded Diagram 1

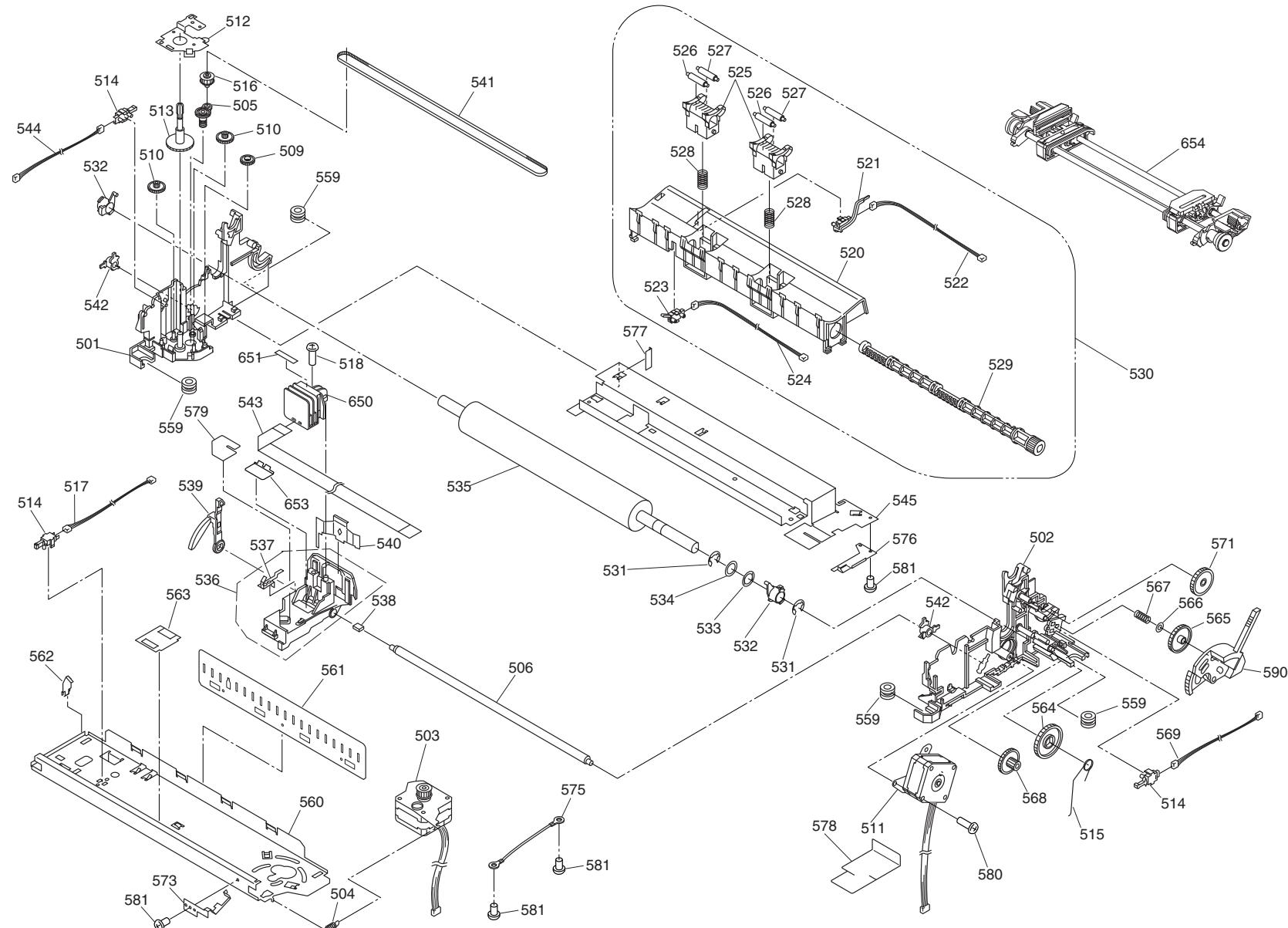


Figure A-3. LX-300+II Exploded Diagram 2

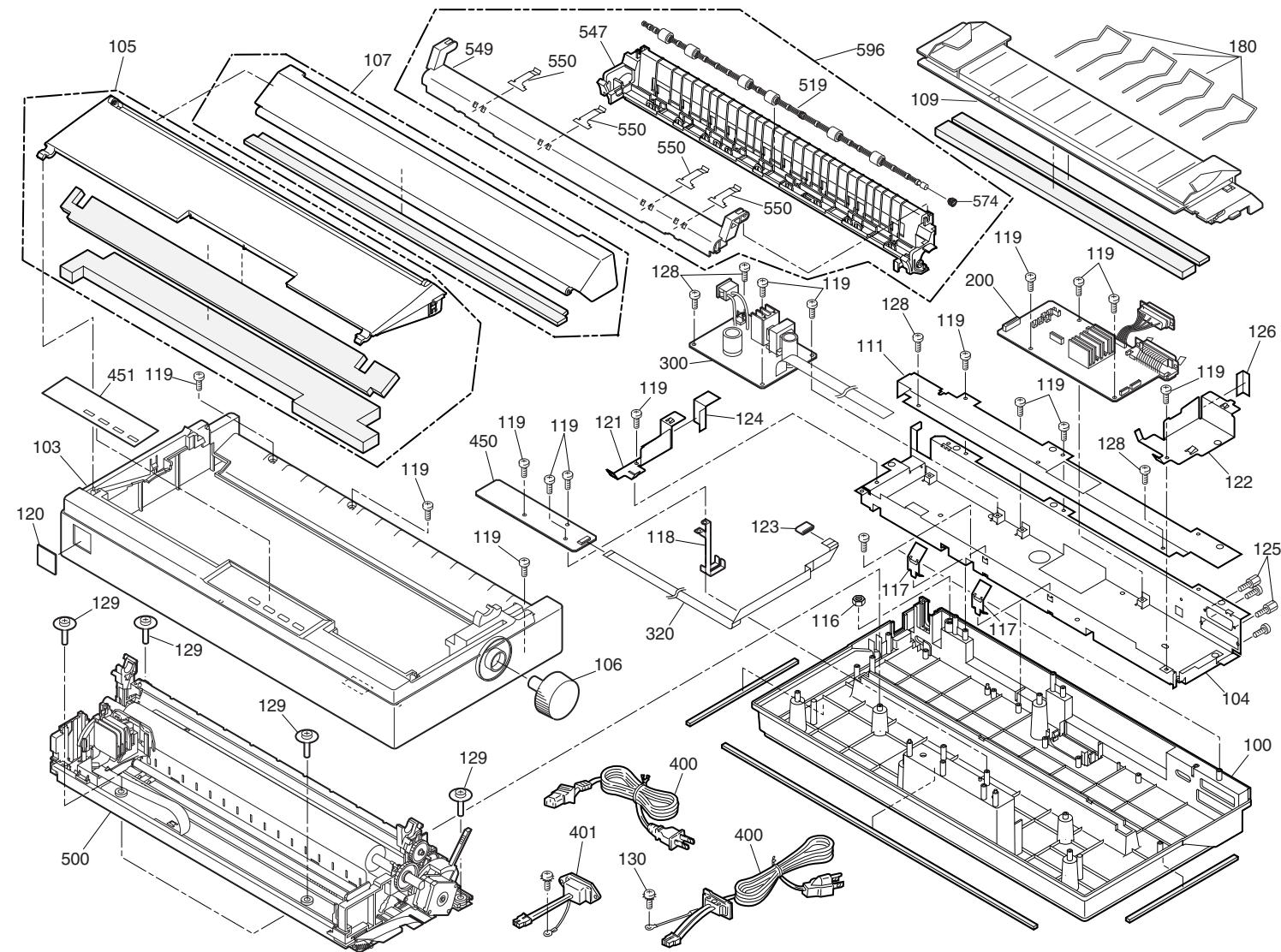


Figure A-4. LX-1170II Exploded Diagram 1

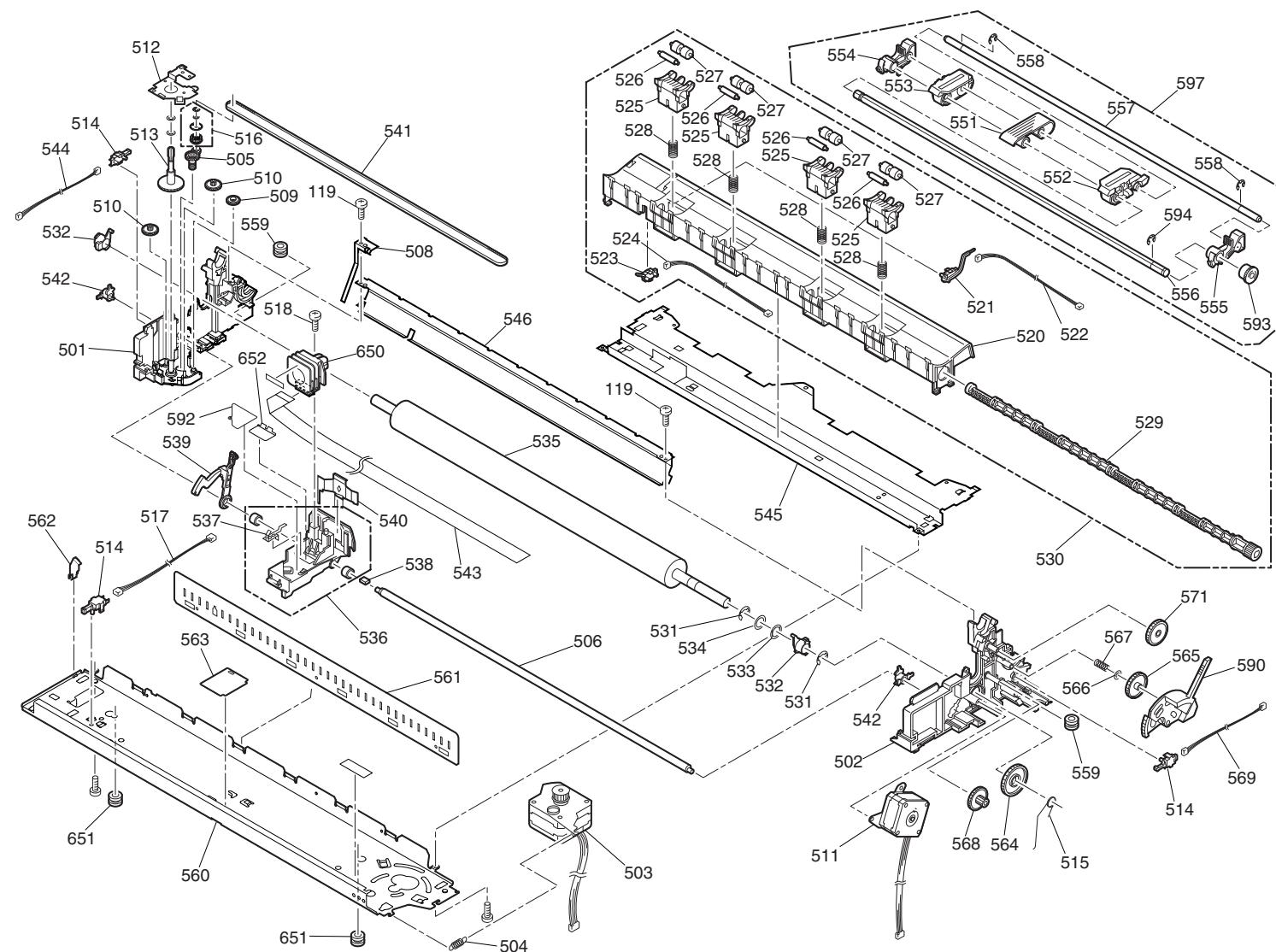
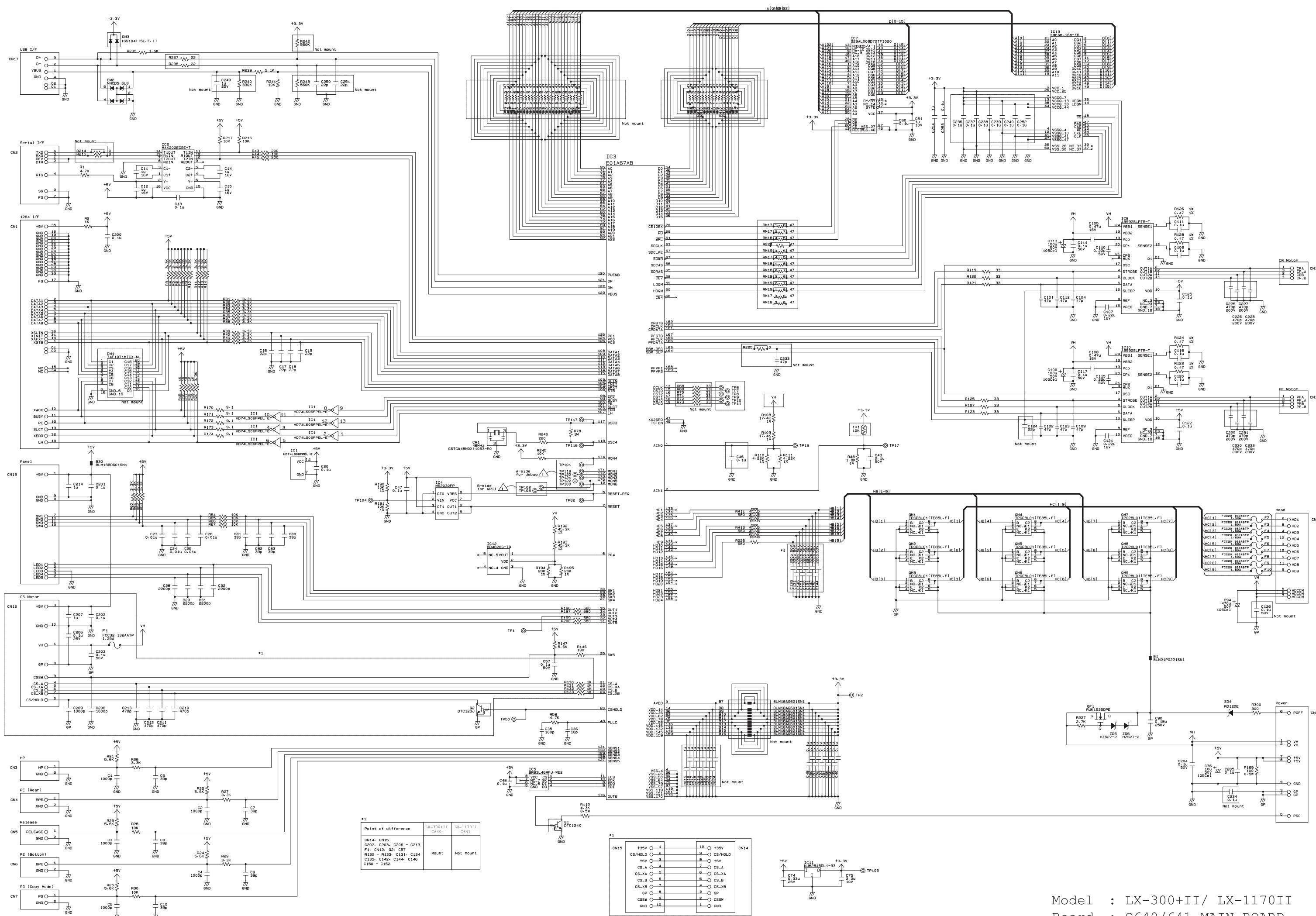


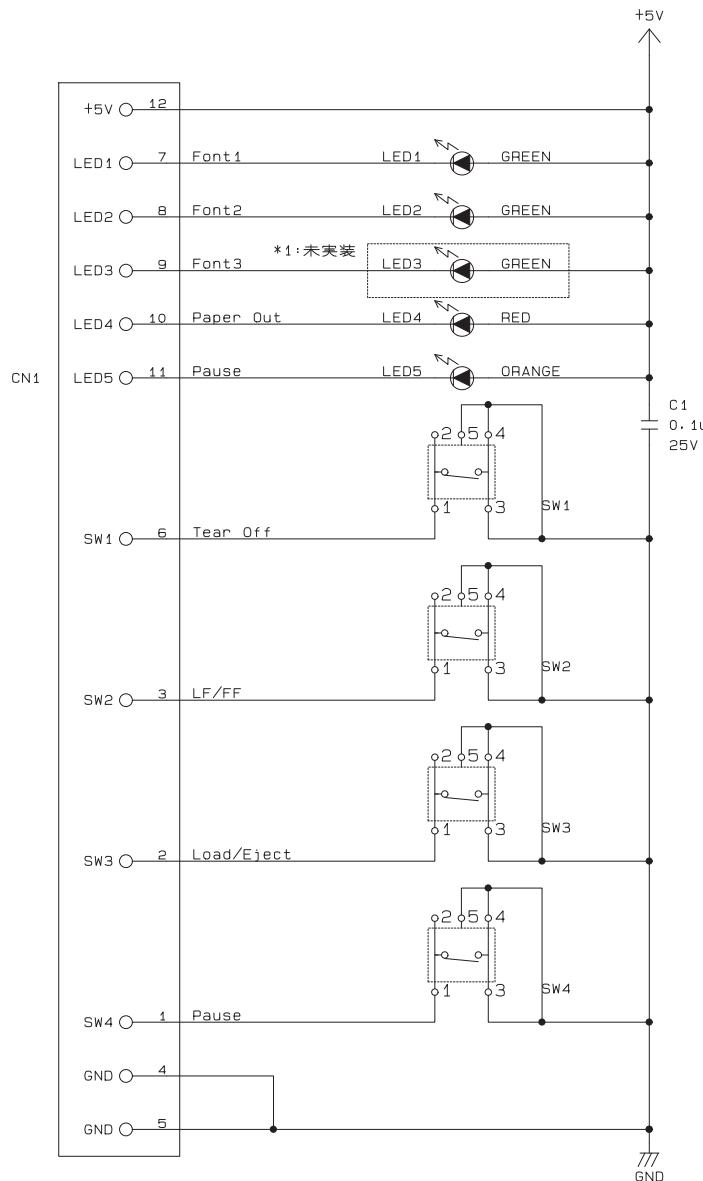
Figure A-5. LX-1170II Exploded Diagram 2

A.5 Electric Circuit Schematics

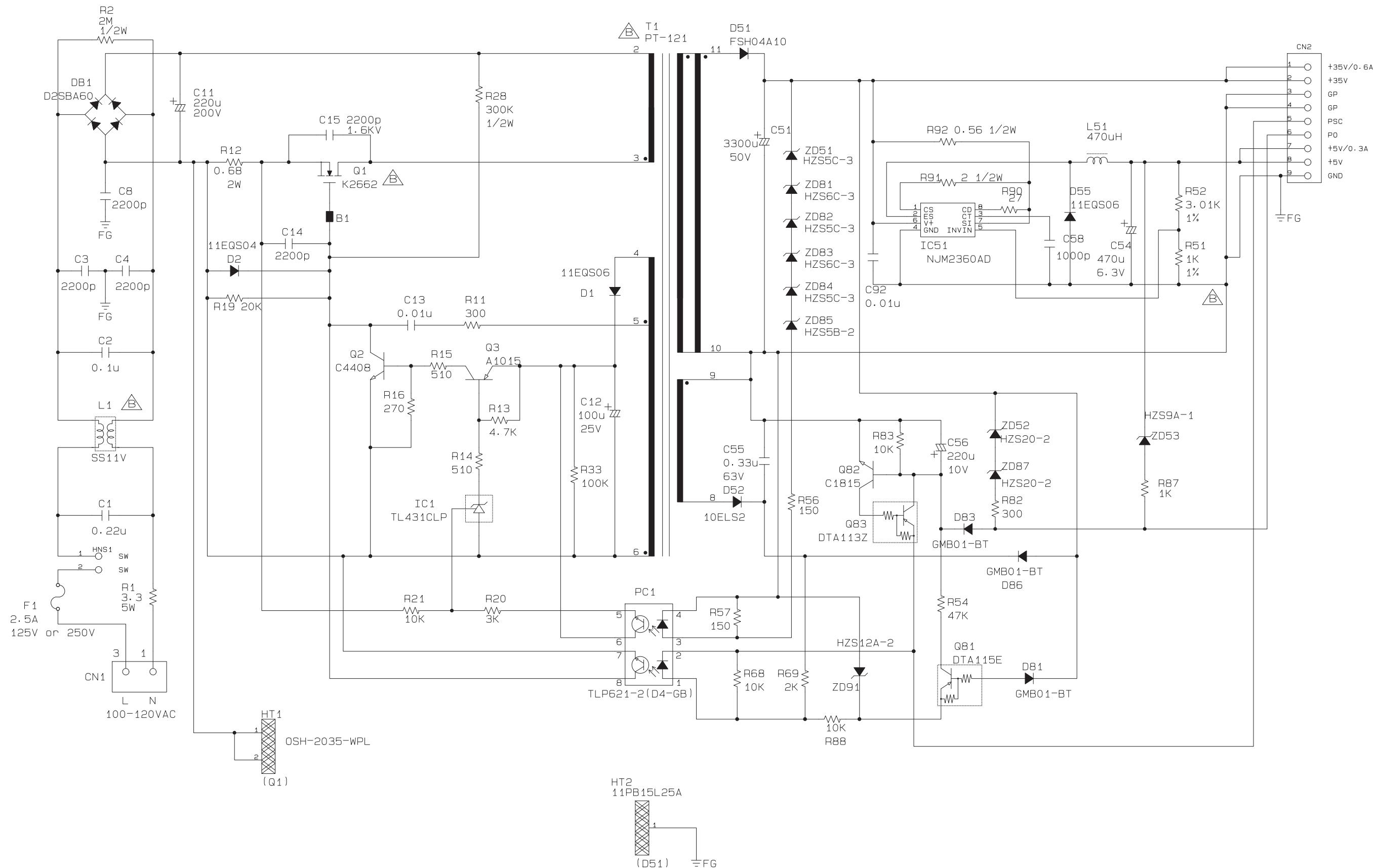
- C640/641MAIN Board
- C294PNL
- C294PSB
- C294PSE



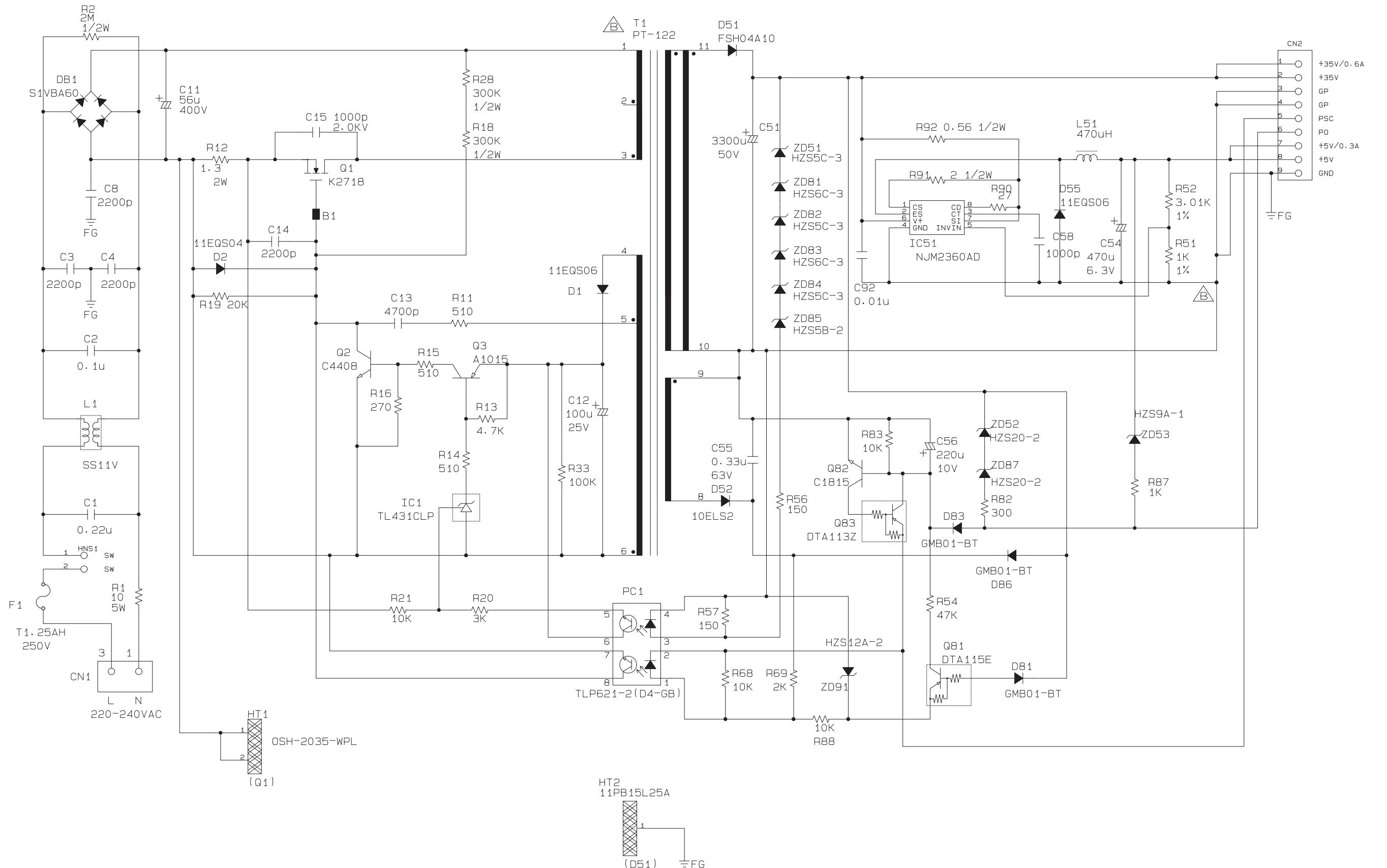
Model : LX-300+II / LX-1170II
Board : C640/641 MAIN BOARD



Model : LX-300+II/1170II
Board : C294PNL



Model : LX-300+II/1170II
 Board : C294PSB Board



Model : LX-300+II/1170II
Board : C294PSE Board