SHARP TECHNICAL MANUAL
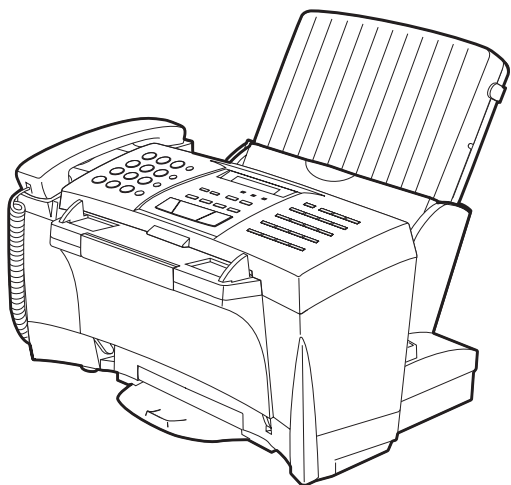
FACSIMILE INK JET PRINTER

UX-2200CM
MODEL FO-2150CM

This Technical Manual contains detailed information about the printer for the UX- 2200CM / FO-2150CM to the Service Manual already issued.

CONTENTS

Parts marked with " ⚠ " is important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

This document has been published to be used for after sales service only.
The contents are subject to change without notice.

[1] Engine Specifications

1. Mechanism

Resolution	: 600 dpi x 600 dpi addressability
Print Speed	: 3 PPM draft text with black cartridge
Print Swath	: 8 inches
Duty Cycle	: Up to 500 pages per month maximum, 170 pages per month average
Dimensions (approximate)	: 350mm x 125mm x 60mm
Weight (approximate)	: 1.2 pounds
Acoustics	: 45 dBA in letter quality mode (using Lexmark paper feed and covers which is not included)

2. Electrical

No electrical hardware included with the type B engine except for the carrier drive stepping motor and the Sensor FPC assembly whitch includes a photo interrupter for sensing home position, the carrier cables and the printhead cable.

3. Print Cartridges (Print Cartridges are supply items and sold separately)

Black Print Cartridge :	56 Nozzles
	Pigment based(water proof)
	High yield cartridge Up to 1000 pages at 5% coverage
Color Print Cartridge :	48 Nozzles(16 Nozzles each of cyan, magenta and yellow)
	Fade resistant ink
	300 pages average at 15% coverage of 3 colors (5% coverage of each color)

[2] Abbreviations

EOF	End-of Form
ESD	Electrostatic Discharge
FRU	Field Replaceable Unit
HVPS	High Voltage Power Supply
LVPS	Low Voltage Power Supply
NVRAM	Nonvolatile Random Access Memory
OEM	Original Equipment Manufacturer
POST	Power-On Self Test
V ac	Volts alternating current
V dc	Volts direct current
ZIF	Zero Insertion Force

[3] Diagnostic Information

Start

Power-OnSelf Test (POST) Sequence

When you turn the printer on it performs a POST. Turn the machine on and check for a correct POST operation by observing the following:

1. The carrier moves.
2. The paper feed gears turn.
3. After 30 seconds the carrier moves over the maintenance station and caps the printhead.
4. All motors stop.

[4] Circuit description

1. General description

The compact design of printer PWB is obtained by using 8 bit microprocessor(CPU) and ASIC in the printer control section.

2. Electrical System

The PWB provides mechanical control for Ink Jet Printer.
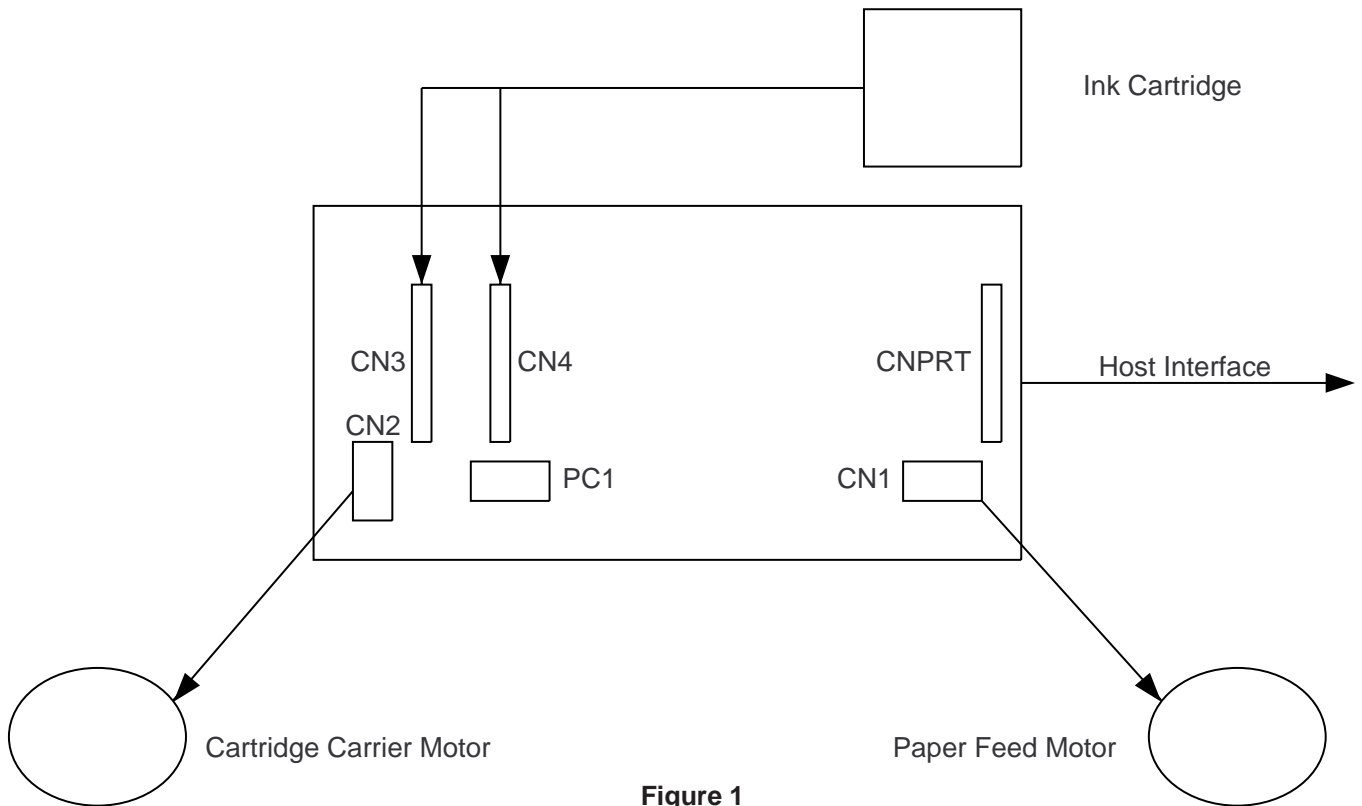Figure 1 shows the interconnection of PWB and other electrical component in the print mechanism.

Figure 1

3. Electricai Overview

The information in this section appears in a sequence relative to the system diagram in the following figure.
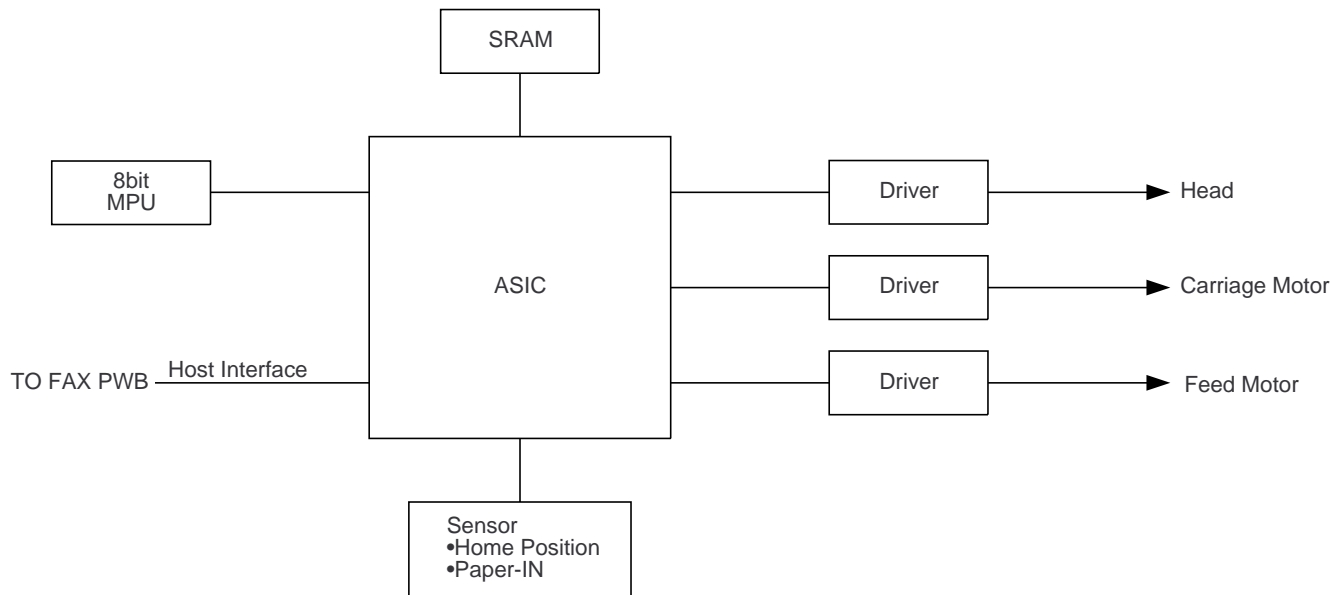
Figure 2 System of printer Block diagram

4. Power Supply Connector

The mechanism requires two voltages (+5V and +24V).
These two voltages supplied from CNPRT connector.

5. Host interface connector

Connector CNPRT on the printer PWB provides 28 lines from the host unit, for control of various operating options available to the host.
The two primary functions of the host interface are:
✂Printing data for the Ink Jet Printer.
✂Error status to the host.

6. ASIC, RAM, and CPU

The Application Specific Integrated Circuit(ASIC) combines several blocks of circuitry into one chip.
Descriptions of circuitry within the ASIC appear later in the section.
A microprocessor bus, which extends inside the ASIC, carries data among the CPU(include internal ROM), RAM, and ASIC circuitry.
The ROM (inside CPU) is a 8K Byte chip that contains the software code (firmware) for the Ink Jet Printer.
The RAM is a 32 K Byte chip that stores print data and other variable information.

7. Driver IC

The paper motor and carriage motor require current that cannot be driven directly from ASIC chip.
Motor driver IC provide the additional current and voltage capability.
The driver IC (IC1 and IC2) located near the respective motor connector on the printer PWB also connect back to the ASIC.
Two additional drivers IC drive 56 nozzles on the cartridge.
These driver ICs , located between the two flex-circuit connector (CN3 and CN4) on the printer PWB , also connected back to the ASIC.
The out-of-paper sensor do not require drivers, and connect directly to the ASIC.
The Host interface also connects directory to the ASIC.

8. Paper Motor

The ASIC controls the paper motor, which is a stepper motor that connects via a 5 pin connector to CN1 on the printer PWB.
The stepper motor is a 4-coil motor, which must be stepped in proper sequence, requiring four signal lines to initiate each line.
This is an open-loop system that does not provide feedback to the logic circuit on printer PWB.
The Paper motor drives the recording paper movement.
The planetary gear is changed over according to the rotation direction of this motor.
Accordingly,hand paper feed or automatic paper feed is selected.

(1) Paper feed(paper feed from tray)
    The planetary gear turns counterclockwise and is connected to the PU gear,so that paper is fed automatically.

HAND FEED PAPER

The automatic paper feed or
hand paper feed is selected by
changing the rotation direction of
motor as a result of changing-over
of this planetary gear.

MOTOR GEAR

AUTOMATIC
FEED PAPER

PU GEAR

PRINTER FEED GEAR

4
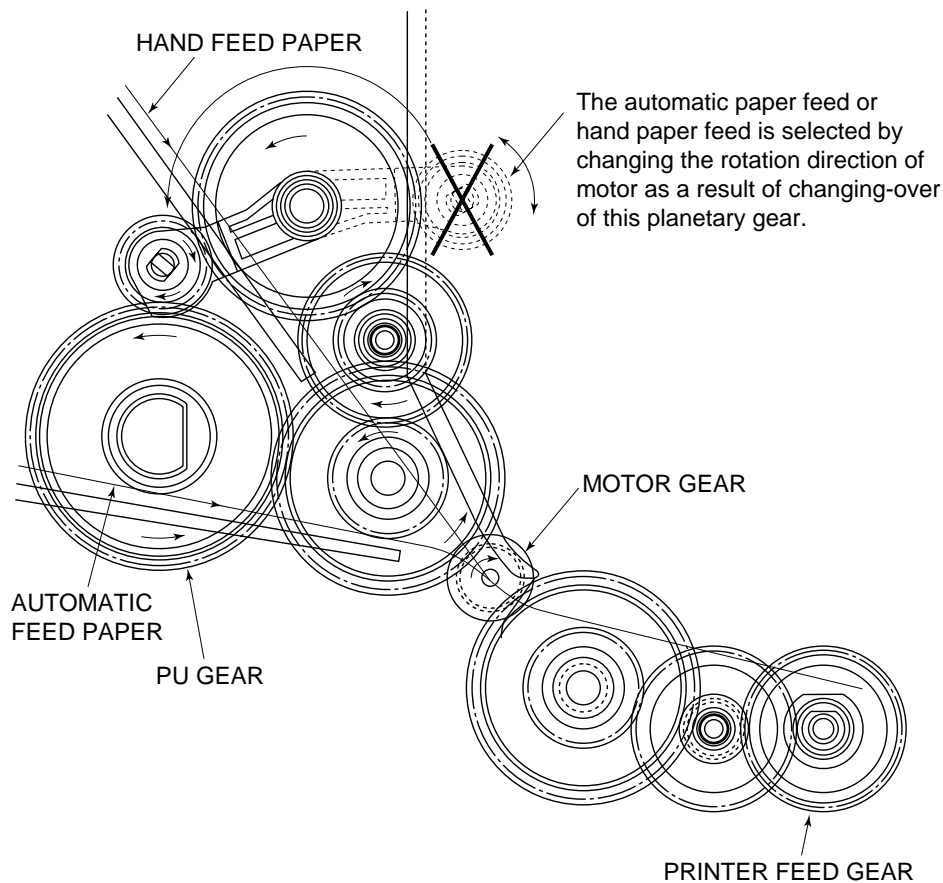
(2) Print transfer

The planetary gear turns clockwise and is disconnected from the PU gear,so that the paper is not fed automati cally. In case of hand paper feed the paper is fed directly to the transfer roller.

HAND FEED PAPER

PLANET GEAR

MOTOR GEAR

AUTOMATIC
FEED PAPER

PU GEAR

When the mechanism stops,
the automatic paper feed
is not performed

PRINTER FEED GEAR

9. Carriage Motor

The ASIC controls the carriage motor, which is a stepping motor that connects
via a 4-pin connector to CN2 on the printer PWB.

10. INK Cartridge Carriage

The carriage connects via a flex circuit that plugs into the 32 pin connectors, CN3 and CN4 on the printer PWB.
The ink cartridge contacts connect to the carriage contacts.
The ASIC controls the carriage , and ink cartridge.

11. Paper IN Sensor

The Peper-IN-Sensor exists on printer PWB.
This sensor is an optical sensor.If the optical route is interrupted,Collector PIN(pin-C)of this sensor indicates Hi-Level(5V).If the optical route is opend,pin-C indicates Low-Level(0V).
This sensor provides information of front and end edge location of recording paper and information of paper jam.
The change between Hi and Low of this sensor(PC1 pin-C)is used as follows.
   1. In the case of manual paper feeds
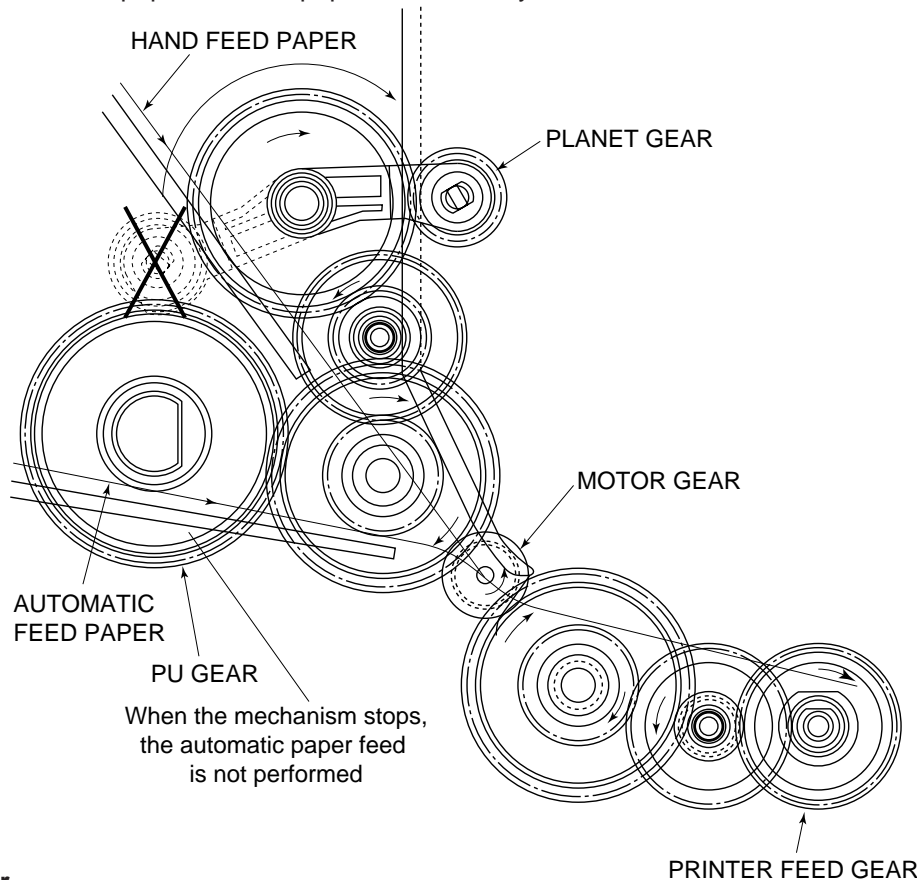   When the recording paper is inserted from By-pass route,the front edge of this recording paper pushes the lever,and this sensor indicates L.
      Paper feed action is happened by this change and recording paper is fed in constant length.
      As paper feeds out of paper path,the lever returns,this sensor indicates H and provides information of end edge of the recording paper.
   2. In the case of auto paper feeds
      When printing action happens and there is no recording paper at By-pass route and there are some recording papers at auto paper providing unit,the feed motor is driven and the recording paper is fed from auto paper provid-ing unit.
      At this time,the change from H to L of this sensor provides the front edge of the recording paper.And this sensor provides information of paper jam ,when this sensor DOES NOT change from H to L after some time.
      As paper feeds out of paper path,the lever returns,this sensor indicates H from L and provides the infomation of end edge of the recording paper.
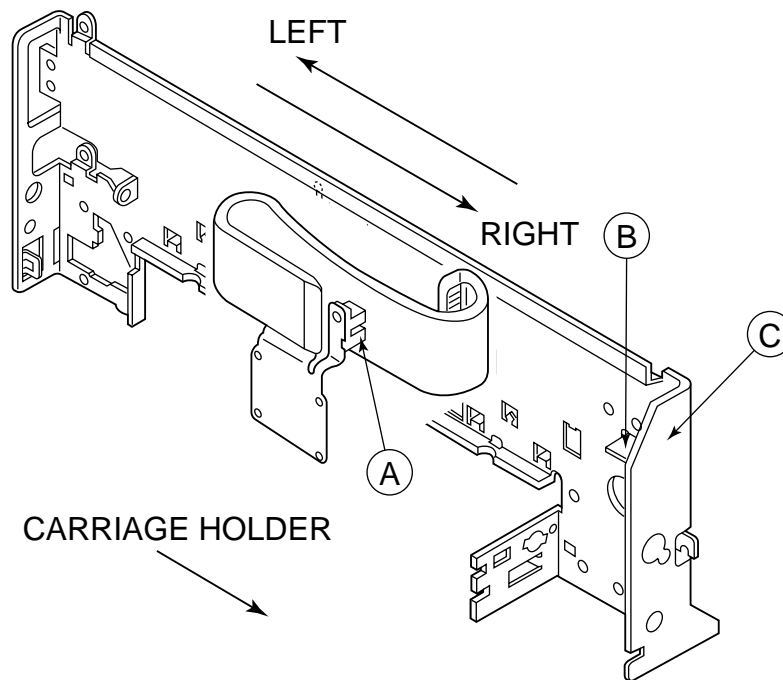
12. Home Position Sensor

The home position of carriage is detected as a result of change of output of photointurrupter (A) which is caused due to shutting-off of optical path of photointerrupter (A) by the slit (B).
While the photointerrupter is shut off by the slit B, the output (pin 1 of CN3) of photointerrupter gets H level (+5V). If it is not shut off, the output gets L level (0V).
In the home position the output is L. In case of L direction movement the output is H during passing through the slit, and after passing the output gets again L level.
The operation logic is as follows.
Insignificant movement in L direction
(1) If in this case the output is L:
It is judged that the carriage exists in the L direction as compared to the slit (B). The carriage is moved in the R direction, so that the output changes from L to H (during passing through the slit (B)). Further the carriage is moved in the R direction. The position where H changes to L again is regarded as a home position.

(2) If in this case the output is H:
It is judged that the carriage exists near the home position, the carriage is moved in the R direction. The position where the output is changed from H to L is regarded as a home position.

Operation in case of malfunction of photointerrupter (A).
Case 1: When the output of photointerrupter remains H.

As is evident from the operation logic, the H output does not continue for a long time in case of normal operation. Hence, this state is judged to be abnormal. The carriage stops soon after it moves insignificantly.

Case 2: When the output of photointerrupter remains L.
The carriage is going to move according to the operation logic. Since the output remains L even when the sensor passes through the slit (B), the home position cannot be found, and the carriage moves continuously in the R direction. Finally, it contacts the frame (C), emitting an abnormal sound. The abnormal state is detected, and the motor stops.

[5] Overall Trouble Shooting Of Printer PWB

- **BOTH CARRIAGE MOTOR AND FEED MOTOR ARE NG.**

```
┌─────────────────────┐  OPEN  ┌──────────────────────────┐
│ FUSE "F100" AND "F101│───────▶│ REPLACE F100 AND F101    │
└─────────────────────┘        └──────────────────────────┘
         │ OK
         ▼
┌─────────────────────┐  NG  ┌─────────────────────┐  NG  ┌──────────────────────────┐  NO  ┌──────────────────────┐
│ +24V AT Q1-C        │─────▶│ +24V AT Q1-E        │─────▶│ CHECK RESISTANCE         │─────▶│ CHECK +24V PATTERN   │
│ (Figure 1)          │      │ (Figure 1)          │      │ BETWEEN +24V AND GND.    │      │                      │
└─────────────────────┘      └─────────────────────┘      │ SHORT OR NOT             │      └──────────────────────┘
         │ OK                        │ OK                   └──────────────────────────┘
         │                           │                              │ SHORT
         │                           ▼                              ▼
         │                  ┌─────────────────────┐  NG  ┌──────────────────────┐   ┌──────────────────────────┐
         │                  │ +5V AT Q101-B       │─────▶│ CHECK IC5 AND IC8 AND│──▶│ REPLACE IC5 OR IC8       │
         │                  │ (Figure 2)          │      │ R145,R144            │NG └──────────────────────────┘
         │                  └─────────────────────┘      └──────────────────────┘
         │                           │ OK                        │ OK
         │                           ▼                           ▼
         │                  ┌─────────────────────┐  NG  ┌──────────────────────┐
         │                  │ 0V AT Q101-C        │─────▶│ REPLACE Q101         │
         │                  │ (Figure 2)          │      │ (Figure 2)           │
         │                  └─────────────────────┘      └──────────────────────┘
         │                           │ OK
         │                           ▼
         │                  ┌─────────────────────┐
         │                  │ REPLACE Q1 (Figure 1)│
         │                  └─────────────────────┘
         │ OK
         ▼
┌─────────────────────┐  NG  ┌──────────────────────┐
│ CHECK IC5 AND IC8   │─────▶│ REPLACE IC5 OR IC8   │
└─────────────────────┘      └──────────────────────┘
         │ OK
         ▼
┌─────────────────────┐
│ REPLACE PRINTER PWB │
└─────────────────────┘
```

REPLACE PRINTER PWB (below CHECK RESISTANCE, SHORT branch)

REPLACE PRINTER PWB (below CHECK IC5 AND IC8 AND R145,R144, OK branch)
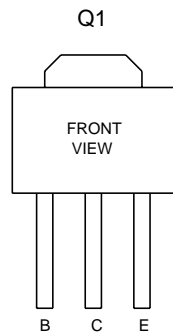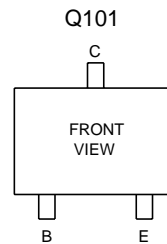
Q1

FRONT VIEW

B C E

Figure 1

Q101

C

FRONT VIEW

B   E

Figure 2

• FEED MOTOR IS NG (CARRIAGE MOTOR IS GOOD)

| FUSE "F101" | OPEN → | REPLACE F101 |

OK ↓

| CHECK WAVEFORMS IC2 (2,4,6,8 pin) (Figure 4) | NG → | CHECK IC5 | NG → | REPLACE IC5 |

OK ↓ (from CHECK IC5) → REPLACE PRINTER PWB

OK ↓

| CHECK WAVEFORMS IC2 (3,5,7,9 pin) (Figure 3) | NG → | CHECK IC2 | NG → | REPLACE IC2 |

OK ↓ (from CHECK IC2) → REPLACE PRINTER PWB

OK ↓

| REPLACE PRINTER PWB |

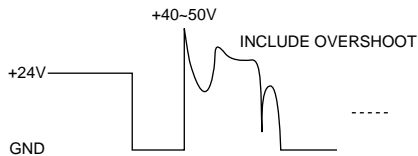+40~50V
INCLUDE OVERSHOOT
+24V
GND

Figure 3

IC2-2,4,6,8PIN
1.5V
GND
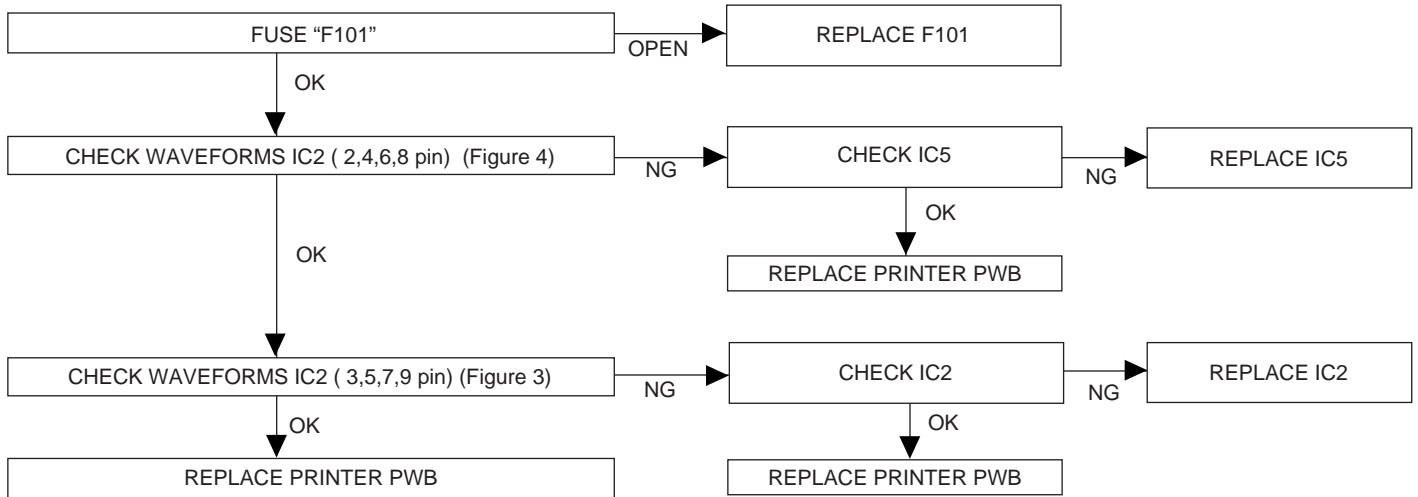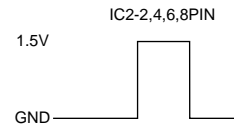
Figure 4

• CARRIAGE MOTOR IS NG (FEED MOTOR IS OK).

| IS THE FLEXIBLE CABLES INSERTED CORRECTLY? | NG → | PLS INSERT THE CABLES CORRECTLY. |

OK ↓

| FUSE "F100" | OPEN → | REPLACE F100 |

OK ↓

| CHECK WAVEFORMS IC1 (18,20,21,22,23,25 pin) (Figure 6) | NG → | CHECK IC5 | NG → | REPLACE IC5 |

OK ↓ (from CHECK IC5) → REPLACE PRINTER PWB

OK ↓

| CHECK WAVEFORMS IC1 (6-9 pin) (Figure 5) | NG → | CHECK IC1 | NG → | REPLACE IC1 |

OK ↓ (from CHECK IC1) → REPLACE PRINTER PWB

OK ↓

| REPLACE PRINTER PWB |

+24V
GND

Figure 5

+5V
GND

Figure 6

8

• MISSING NOZZLES (RESULT OF CHECK PATTERN OR CLEAN NOZZLES

CLEAN NOZZLES

↓ NG

REPLACE ANOTHER CARTRIDGE

↓ NG

MISSING MANY NOZZLES —— NO ——→ CHECK IC AND CONNECTOR BY REFERING TO THE TABLE 1&2

↓ YES

CHECK THE SOLDER
IC4, IC6 COMMON pin
IC 5 82-89 pin
IC4 1,4,40,41,43,44 pin
IC6 1,4,40,41,43,44 pin —— NG ——→ CORRECT SOLDER

↓ OK

CHECK +24V AT R1,R2,R6, AND R7 —— NG ——→ CHECK RESISTANCE BETWEEN +24V AND GND. SHORT OR NOT —— NO ——→ CHECK +24 PATTERN

↓ SHORT

REPLACE PRINTER PWB

↓ OK

CHECK +5V AT IC4 AND IC6 —— NG ——→ CHECK +5V PATTERN

↓ OK

REPLACE IC4 OR IC6

[6]How to Decide the Number of the Wrong Nozzle

FUNC + ⑥ + ⊛ + ⊛   "CLEAN NOZZLES"

Ⓐ ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖

██

██

██

Ⓑ ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖

Nozzle 1   Nozzle 56
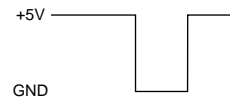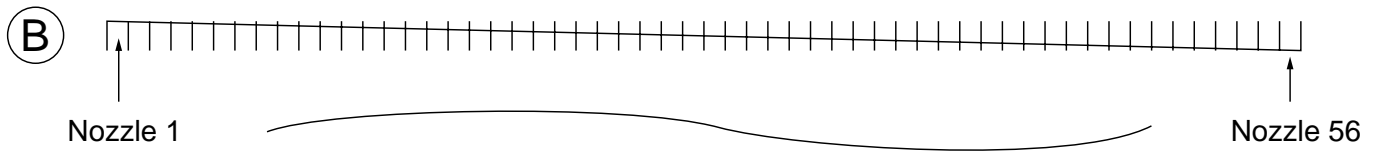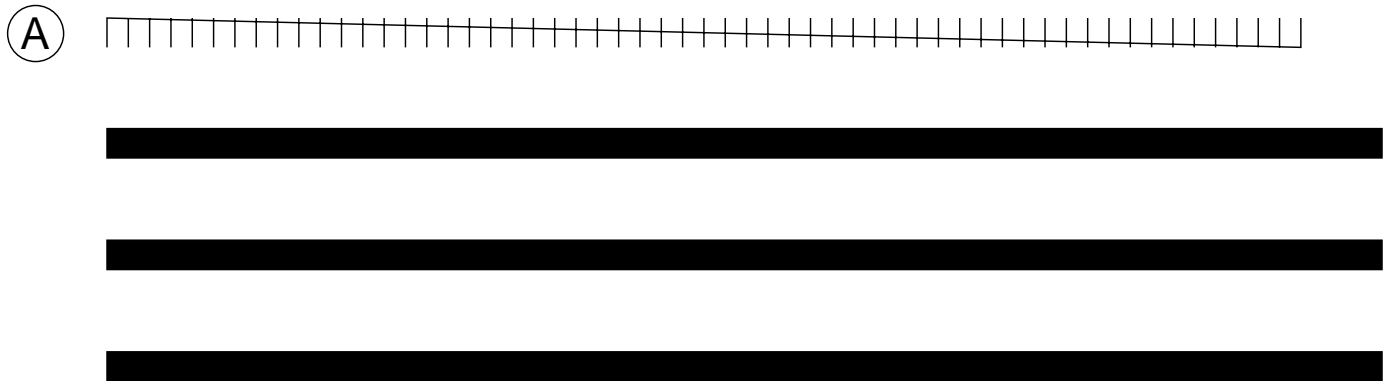
Horizontal lines on Ⓐ and Ⓑ correspond to nozzle #1,#2····#56 from left side to right side.
If there are missing horizontal lines, you can decide the number of wrong nozzle from pattern Ⓐ or Ⓑ.

Note) Don't use the check pattern to decide the number of wrong nozzle.

TABLE 1.

(Nozzle# IC-PIN CONNECTOR-PIN)

Nozzle#	IC	PIN	CN	PIN	Nozzle#	IC	PIN	CN	PIN
1	6	39	3	9	29	6	10	3	20
2	4	39	4	28	30	4	10	4	17
3	6	35	3	10	31	6	14	3	21
4	4	35	4	27	32	4	14	4	16
5	6	31	3	11	33	6	22	3	30
6	4	31	4	26	34	4	22	4	7
7	6	25	3	12	35	6	9	3	22
8	4	25	4	25	36	4	9	4	15
9	6	36	3	13	37	6	13	3	23
10	4	36	4	24	38	4	13	4	14
11	6	32	3	14	39	6	21	3	29
12	4	32	4	23	40	4	21	4	8
13	6	26	3	15	41	6	8	3	24
14	4	26	4	22	42	4	8	4	13
15	6	37	3	7	43	6	12	3	25
16	4	37	4	30	44	4	12	4	12
17	6	33	3	16	45	6	20	3	28
18	4	33	4	21	46	4	20	4	9
19	6	27	3	17	47	6	6	3	26
20	4	27	4	20	48	4	6	4	11
21	6	38	3	6	49	6	11	3	27
22	4	38	4	31	50	4	11	4	10
23	6	34	3	18	51	6	15	3	31
24	4	34	4	19	52	4	15	4	6
25	6	30	3	19	53	6	23	3	32
26	4	30	4	18	54	4	23	4	5
27	6	24	3	5	55	6	7	4	1
28	4	24	4	32	56	4	7	4	4

TABLE 2.

(Nozzle Common CN)

Nozzle#	PIN	CN	PIN
1,3,5,7,9,11,13,15, 17,19,21,23,25,27	1	3	8
2,4,6,8,10,12,14,16, 18,20,22,24,26,28	2	4	29
29,31,33,35,37,39,41, 43,45,47,49,51,53,55	3	4	2
30,32,34,36,38,40,42, 44,46,48,50,52,54,56	4	4	3

[7] Waveforms

FEED MOTOR WAVEFORMS WHEN FEEDING PAPER

Stopped

| CH1=50V | CH2=50V | CH3=50V | CH4=50V | 2ms / d |
| DC P:10 | DC P:10 | DC P:10 | DC P:10 | |

⊿T:1.92ms   1/⊿T:520.8Hz

CN1-2 ... 1
CN1-3 ... 2
CN1-4 ... 3
CN1-5 ... 4

Ⓖ : 0V

Figure 1

– 12 –

CARRIAGE MOTOR WAVEFORMS

Stopped

CH1=20V	CH2=20V	CH3=20V	CH4=20V	20s / d
DC P:10	DC P:10	DC P:10	DC P:10	
⊿T:19.2 s	1/⊿T:52.08kHz			

CN2-1

CN2-2

CN2-3

CN2-4
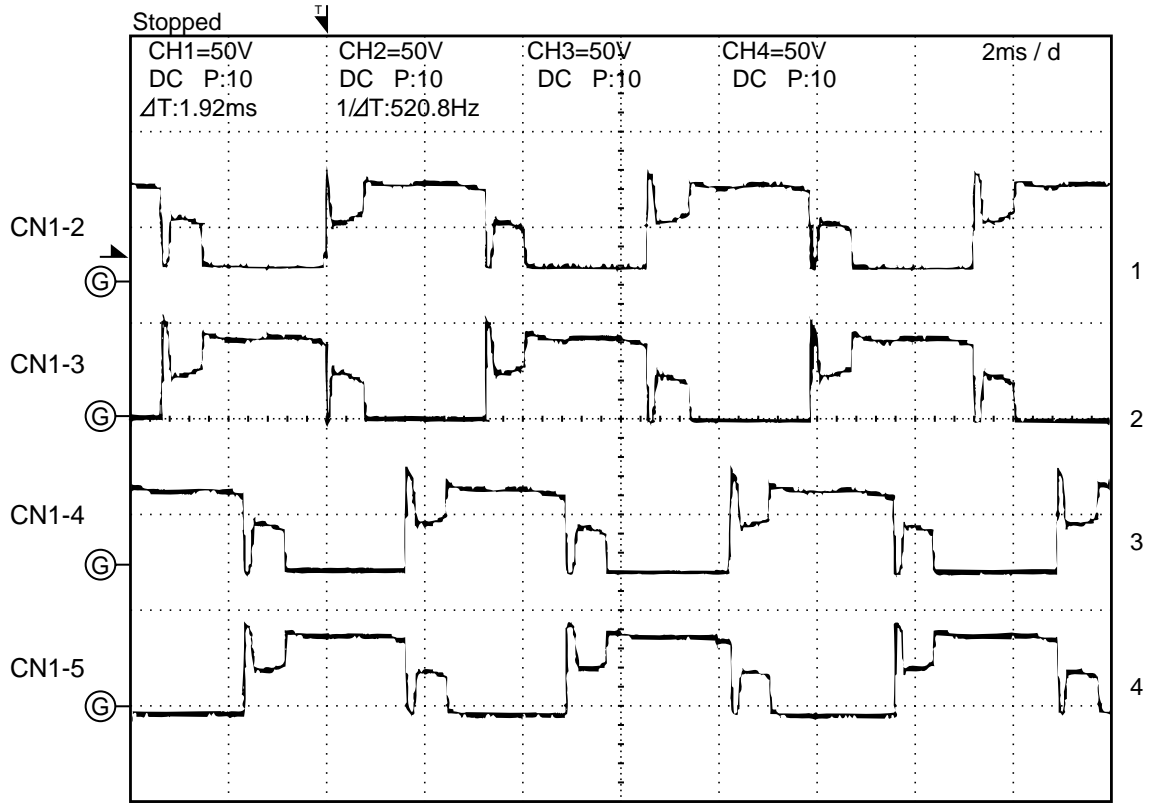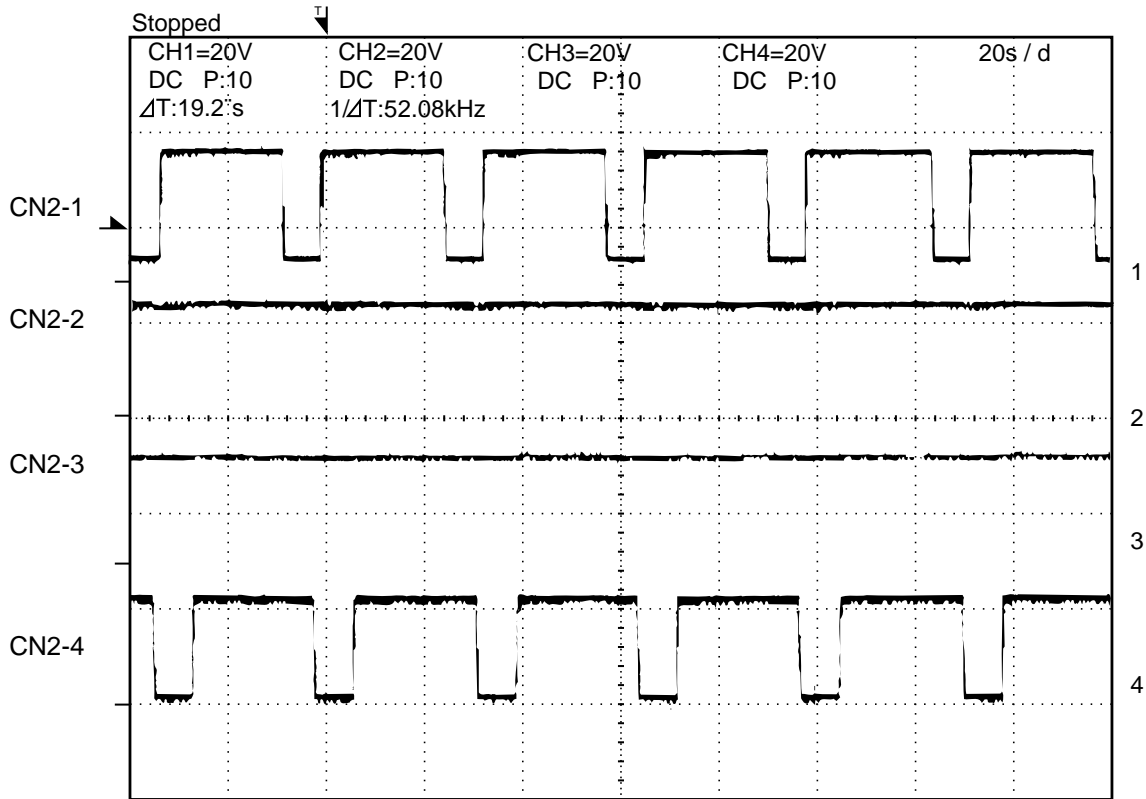
When the cartridge holder is at the position of replacing cartridge.

Figure 2

Stopped

CH1=20V	CH2=20V	CH3=20V	CH4=20V	1ms / d
DC P:10	DC P:10	DC P:10	DC P:10	
⊿T:960 s	1/⊿T:1.042kHz			

CN2-1

CN2-2

CN2-3

CN2-4
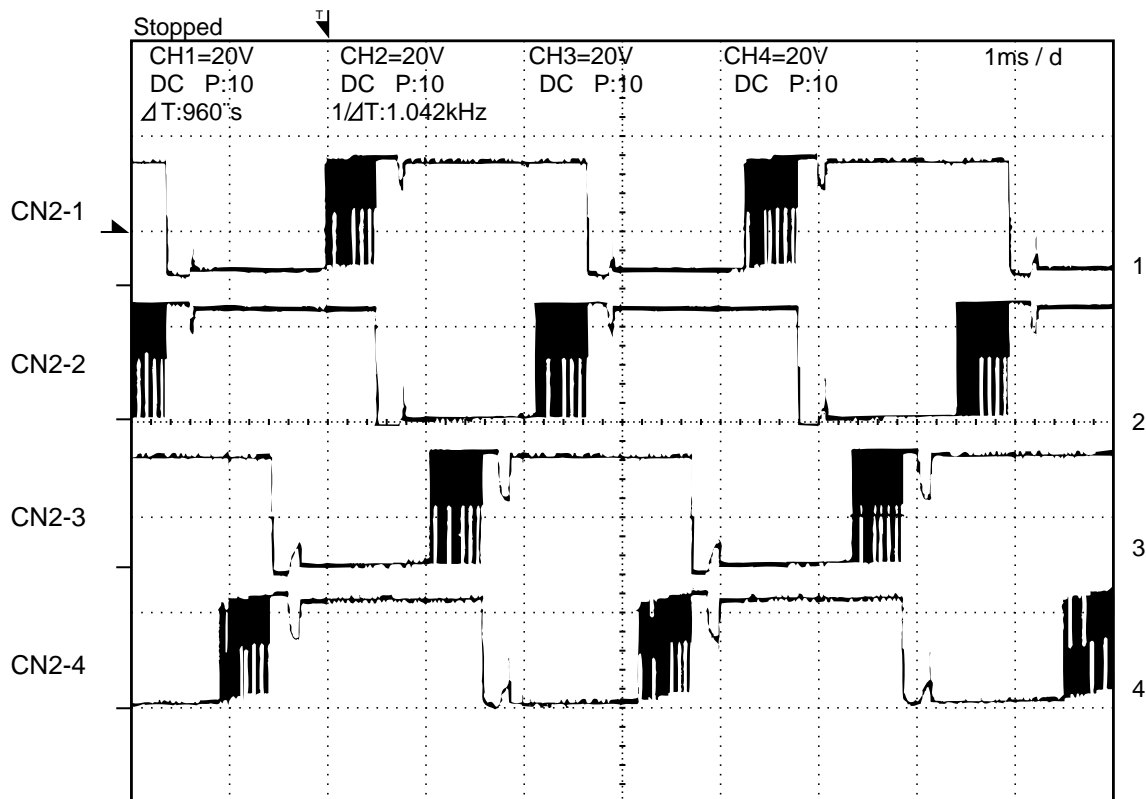
Measured for printing check pattern

Figure 3

CARRIAGE MOTOR WAVEFORMS MEASURED FOR CHECKING OUT OF INK

Figure 4

Figure 5

−14−
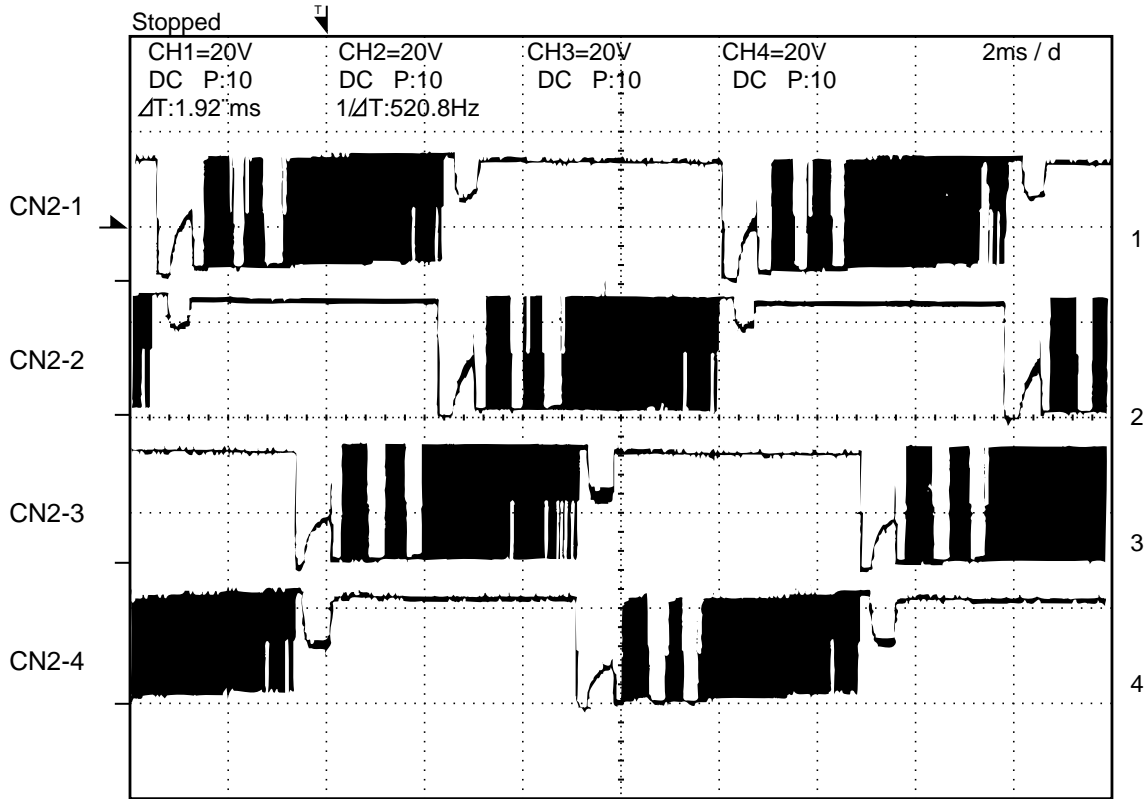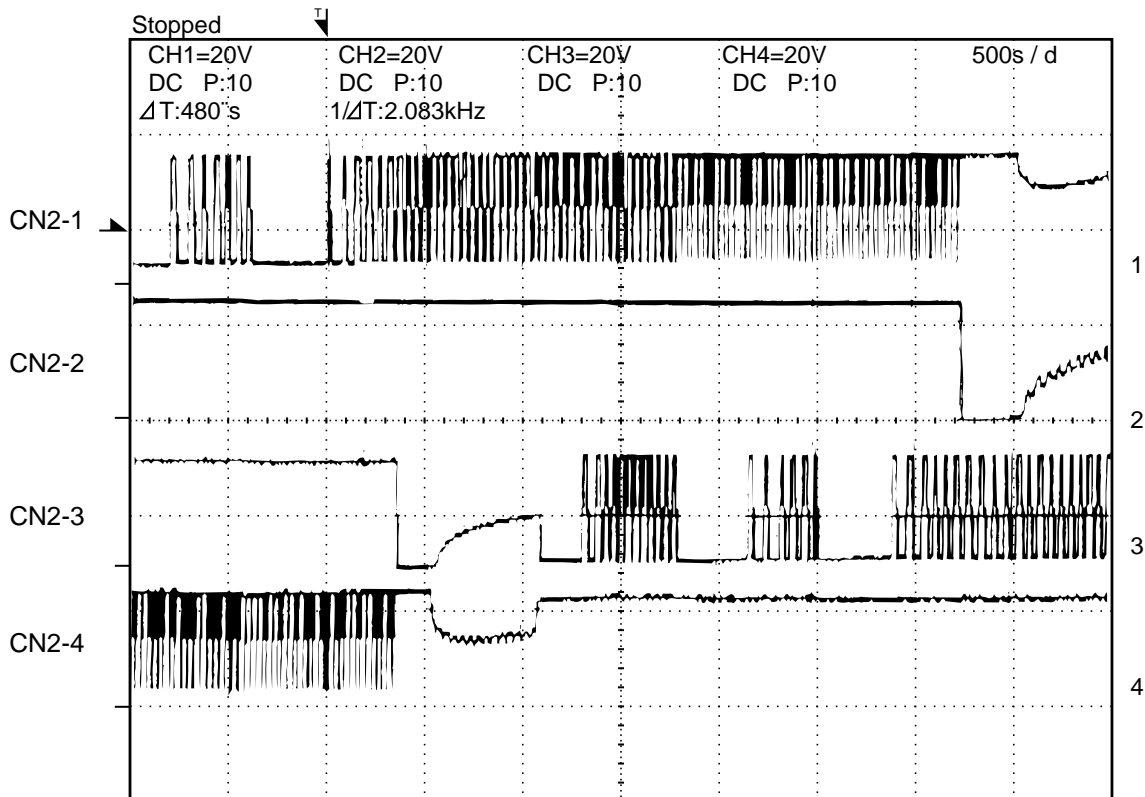
[8] Service Checks

1. Carrier Transport Service Check

	FRU	Action
1	System Board	Check the motor for binds,or loose motor pulley. Turn the printer off and disconnect CN2 from the system board.Check for motor pins shorted to the motor housing.If you find a pin shorted to the housing,replace the motor. If the failure remains,replace the system board.

2	Carrier Transport Motor	A noisy or chattering motor or a motor that fails to turn can be caused by:
		• An open or short in the motor.
		• An open or short in the motor driver on the system board.
		• A bind in the carrier transport mechanism.
		With the carrier transport motor cable disconnected from the system board,check for zero to ten (0-10)ohms between the following pins on the motor:
		        CN2-1 and CN2-2
		        CN2-3 and CN2-4
		If the readings are incorrect,replace the motor.

3	Carrier Guide Rod	Clean the carrier rod. **Note**:Lubricate the carrier guide rod and the carrier rod bearing surface with grease.
4	Carrier Transport Belt Idler Pulley Parts Carrier Frame	Check for worn,loose or broken parts. Check for obstructions blocking carrier movement. Carrier to carrier frame engagement should be lubricated with grease.
5	Home Position Sensor	Be sure the carrier returns to the home position after turning the printer on. If the carrier moves half way,or if there is an abnormal sound,turn the printer off and disconnect CN3 from the system board. Turn the printer on and check for 5V dc between CN3-4 and CN3-2 on the system board. If the voltage is present,replace the home position sensor. If the voltage is not present,replace the system board.
6	Maintenance Station	A problem with the maintenance station can cause carrier movement problems at the right margin. Go to the 'Maintenance Station Service Check' on page 3.

2. Envelope Feed Service Check

	FRU	Action
1	Envelope Guide	Be sure the envelope guide has been turned to the envelope load position. Be sure the envelope guide is against the envelopes. Perform the 'Paper Feed Service Check'on page 4.

3. Maintenance Station Service Check

The maintenance station has two functions:

- Cleans the printhead nozzles during the print operation.
- Seals the printhead when it is not being used to prevent the nozzles from drying.

	FRU	Action
1	Maintenance Station Assembly	As the carrier moves to the right over the maintenance station,a slot on the bottom of the carrier engages a tab on the sled of the maintenance station causing the cap to rise and seal the printhead. Carrier movement to the left uncaps the printhead. The wiper cleans the printhead nozzles as the carrier leaves the maintenance station. The wiper cleans the printhead only when the carrier is moving to the left. There should be no wiping action of the printhead nozzles when the carrier is moving to the right. After the cleaning operation is complete,a tab on the maintenance station engages a tab on the carrier,causing the wiper to lower. Check the maintenance station for worn or broken parts.
2	Wiper	A worn wiper causes degraded print quality just after a maintenance cleaning. Check for a loose or worn wiper.
3	Cap	A worn cap causes the printhead nozzles to dry and clog. Check for a loose or worn cap.

4. Paper Feed Service Check

If your machine does not have paper jam problems, continue with the service check. If your machine does have a paper jam problem,examine it for the following before you begin the service check:

- Check the entire paper path for obstructions.
- Be sure there is not too much paper in the sheet feeder.
- Be sure the correct type of paper is being used.
- Check for static in the paper.

	FRU	Action
1	System Board	Turn the printer on and verify the paper feed motor activates. Be sure the end-of-form sensor lever is in the down position. Turn the printer off and disconnect CN1 from the system board. Check for motor pins shorted to the motor housing. If you find a shorted pin,replace the paper feed motor. If you still have a failure after replacing the paper feed motor,replace the system board.
2	Paper Feed Motor	A noisy or chattering motor or a motor that fails to turn,can be caused by an open or short in the motor,an open or short in the motor driver on the system board,or a bind in the paper feed mechanism. With the paper feed motor cable CN1 disconnected from the system board, check for 140 ohms(±7%)between the follwing pins on the motor : Pin 1 to Pin 2,Pin 1 to Pin 4 280 ohms(±7%)between pins 2 and 4. If the readings are incorrect,replace the paper feed motor and drive train assembly. Although the paper feeds in a forward direction only,the paper feed motor turns in two directions. If the paper feed motor turns in one direction only,replace the system board. Binds in the paper feed motor or gear train can cause intermittent false paper jam errors. Remove the paper feed motor and check the shaft for bins. Also check for loose or worn motor gear.
3	Drive Train Assembly	Check for binds in the gear train and paper feed machanism by remov-ing the paper feed motor and rotating the large gear by hand . If you notice a bind,replace the drive train assembly. Check the feed clutch gear on the left side of the auto sheet feeder. Turn the clutch gear and check that it rotates freely in one direction and locks when turned in the opposite direction.
4	Auto Sheet Feeder	Check the pick rollers for wear.
5	Mid-Frame Asm Access Cover Asm	Check the following for wear: • Exit roller • Star rollers
6	End-of-Forms Flag and Spring	Check for binds or damage. If binds are found,replace the end-of-forms flag.
7	End-of-Forms Sensor	Check the sensor for birt. Be sure the sensor lever is in the down position. If the failure remains,replace the system board.

5. Paper Path Service Check

Examine the machine for the following before you being this service check:

- Check the entire paper path for obstructions
- Be sure the correct type of paper is being used.
- Be sure the printer is installed on a flat surface.

	FRU	Action
1	Large and Small Feed Rollers	Check for wear and binds.
2	Small Feed Roller Springs	Check for damage.
3	Auto Sheet Feeder	Check the pick rollers for wear.
4	Mid-Frame Asm Access Cover Asm	Check the following for wear: • Exit roller • Star rollers
5	End-of-Forms Flag	Check for binds or damage.

6. Power Service Check

	FRU	Action
1	Power Supply	Disconnect N1 from the system board and check the following voltages on the power supply cable: • CNPRT-22 to Gnd =+5V dc • CNPRT-26 to Gnd =+24V dc If you do not have correct voltage,replace the power supply. Be sure to unplug the machine before you reconnect the power supply to the system board.
2	Printhead Cable Carrier Home Sensor Parallel Cable	Turn off the printer.Disconnect one of the printhead cables and turn on the printer. Look for a symptom change. Check the failing part for shorts and replace as necessary. Repeat this procedure for the carrier home sensor and parallel cable.
3	System Board	If the symptom has not changed,replace the system board.

[9] IC Signal Name

IC 8 : VHiTMP87PH47U (TMP87C807U)

1. Pin Assignment (Top View)

Top pins (33-23):
P14(PPG), P13(DVO), P12(INT2/TC1), P11(INT1), P10(INT0), P51, P50, P67, P66, P65, P64

Pins 33, 32, 31, 30, 29, 28, 27, 26, 25, 24, 23

Left side:
- P15(TC2) — 34
- P16 — 35
- P17 — 36
- (INT5/STOP)P20 — 37
- (XTIN)P21 — 38
- (XTOUT)P22 — 39
- VDD — 40
- (HSO)P77 — 41
- (HSCK)P76 — 42
- (SO)P75 — 43
- (SI)P74 — 44

Right side:
- 22 — P63
- 21 — P62
- 20 — P61
- 19 — P60
- 18 — N.C.
- 17 — VSS
- 16 — XOUT
- 15 — XIN
- 14 — RESET
- 13 — TEST
- 12 — P00

Bottom pins (1-11): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

(SCK)P73, (PDO/PWM)P72, (INT4)P71, (INT3/TC3)P70, P07, P06, P05, P04, P03, P02, P01

2. Block Diagram

Power Supply: VDD, VSS

ALU, P S W (Flags, RBS), Stack Pointer, Data Memory (RAM), Register Banks, Program Counter, Program Memory (RAM)

Reset I/O Test pin: RESET, TEST

System Controller, Stand by Controller, Timming Generator, Interrupt Controller

Resonator Connecting pins: XIN, XOUT

High frequency, Low frequency, Clock Generator, Time Base Timer, Watchdog Timer

16bit Timer/Counters (TC7, TC2), 8bit Timer/Counters (TC3, TC5), Serial Interfaces (SIO, HSO), Register, Decoder

Ports: P2, P6, P0, P9, P7, P5

P22 to P20, P67 to P60, P07 to P00, P17 to P10, P77 to P70, P51 to P50

I/O Ports, I/O Ports, Output Ports

3. Pin Function

PIN Name	Input/Output	Function	
P07 to P00	I/O	Two 8-bit programmable input/output ports (tri-state).	
P17,P16	I/O		
P15(TC2)	I/O(Input)	Each bit of these ports can be individually configured as an input or an output under software control.	Timer/Counter 2 input
P14($\overline{\text{PPG}}$)	I/O(Output)		Programmsble pulse generator output
P13($\overline{\text{OVO}}$)		During reset,all bits are configured as inputs.	Divider output
P12(INT2/TC1)	I/O(Input)		External interrupt input 2 or Timer/Counter 1 input
P11(INT1)		When used as a divider output or a PPG output, the latch must be set to "1".	External interrupt input 1
P10($\overline{\text{INT0}}$)			External interrupt input 0
P22(XTOUT)	I/O(Output)	3-bit input/output port with latch.	Resonator connecting pins(32.8kHz). For inputting external clock,XTIN is used and XTOUT is opeded.
P21(XTIN)	I/O(Input)	When used as an input port,the latch must be set to "1".	
P20($\overline{\text{INT5}}$/STOP)			External interrupt input 5 or STOP mode retease signal input
P51,P50	Output	2-bit output port with latch.	
P67 to P60	I/O(Output)	8-bit programmable input/output port (tri-state). Each bit of the port can be individually configured as an input or an output under software control.	
P77(HSO)	I/O(Output)	8-bit programmable input/output port (tri-state).	HSO serial data output
P76($\overline{\text{HSCK}}$)			HSO serial clock output
P75(SO)			SIO serial data output
P74(SI)		When used as an input port, a SIO input/output on external interrupt input or a $\overline{\text{PWM}}$/$\overline{\text{PDO}}$ output, the latch must be set to "1".	SIO serial data input
P73($\overline{\text{SCK}}$)	I/O(I/O)		SIO serial clock input/output
P72($\overline{\text{PWM}}$/$\overline{\text{PDO}}$)	I/O(Output)		8-bit PWM output or 8-bit programmable divider output
P71(INT4)	I/O(Input)		External interrupt input 4
P70(INT3/TC3)			External interrupt input 3 or Timer/Counter 3 input
XIN/XOUT	Input,Output	Resonator connecting pins for high-frequency clock. For inputting external clock. XIN is used and XOUT is opend.	
$\overline{\text{RESET}}$	I/O	Reset signal input or watchdog timer output/address-trap-reset output/system-clock-reset output.	
TEST	Input	Test pin for out-going test. Be tied to low.	
VDD,VSS	Power Supply	+5V,0V(GND)	
N.C.		Be tied to low.	

IC 4 , 6 : VHil6451///-1 (L6451)

1. Pin Connection (Top View)
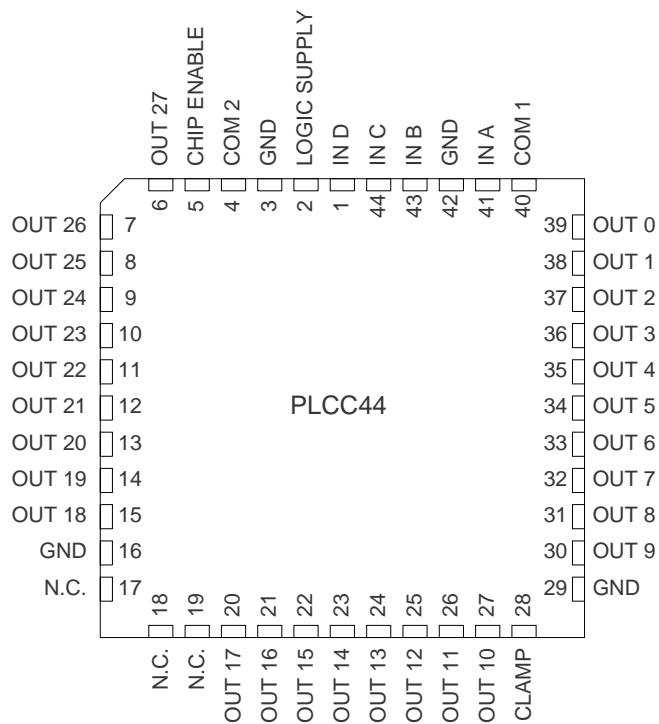
2. Block Diagram (case of 4 bit)
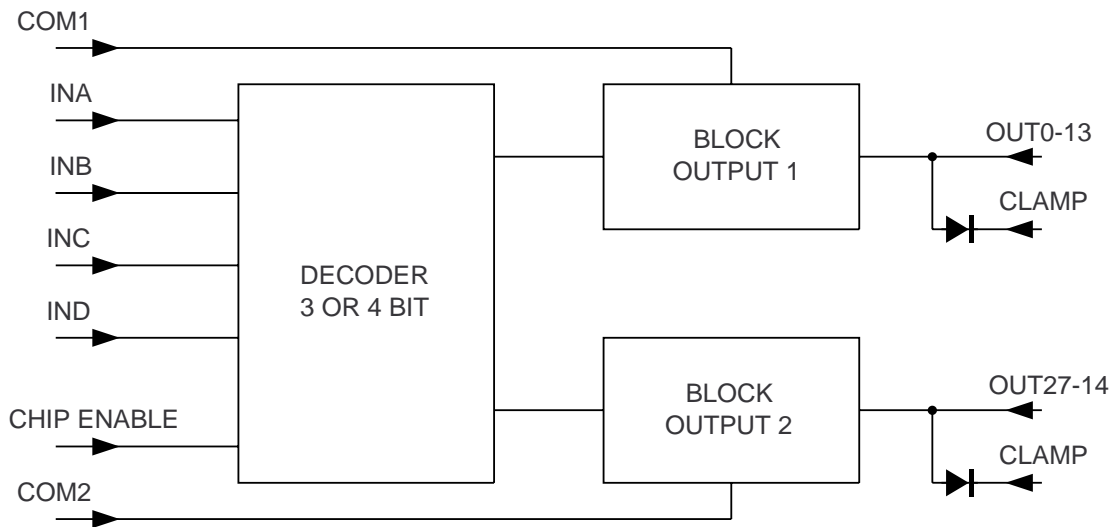
3. Description

The L6451 is realized in Multipower BCD Technology which combines isolated DMOS power transistors with CMOS and Bipolar circuits on the same IC. By using mixed technology it has been possible to optimize the logic circuitry and the power stage to achieve the best possible performances.

Intended to be used in ink jet Printer Applications as 4 to 28 (2x14) lines selectable decoder/driver,the L6451 device driver has the advantages of low power CMOS input and logic, with 28 high current and high voltage DMOS outputs capable of sustaining a maximum of 40V.

On system power up the output drivers are locked out using the chip enable function : two enable inputs are available for the different driver banks.

An internal power-on system is implemented in order to avoid wrong output commutation during the supply voltage transients.

Using a mask option during manufacturing allows a different decoding.

Control of the energy delivered to the print head is made by means of a special circuitry.

All driver outputs are capable of withstanding a contact discharge of ±8kV with the IC biased.

4. Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
VOUT	Output voltage	40	V
VCLAMP	Output Clamping Voltage	40	V
IOUT	Output Continuous Current	0.8	A
IPEAK	Output Peak Current (with duty cycle = 10% TON = 4µs)	2	A
TJ	Junction Temperature	150	°C
VDD	Logic Supply Voltage	7	V
VIN	Input Voltage Range	-0.3V to Vs +0.3	V
TAMB	Operating Temperature Range	0 to 70	°C
TSTG	Storage Temperature Range	-55 to 150	°C

5. Pin Functions

Name	Function
VDD	5V Logic Supply.
GND	Logic and Power Ground.
OUT0 to OUT27	DMOS Output.
CLAMP	This pin has to be connected to the power supply voltage of the head resistors. Each of the output DMOS have their drain connected with the anode of a protection diode, all the cathodes of the protection diodes are connected to the clamp pin. In order to have the device supplied, the CLAMP pin needs to be connected to the power.
INA, INB, INC, IND	Decoder inputs.
$\overline{COM1}$, $\overline{COM2}$	A low logic input on these pins enables the outputs selected by the decoder inputs.
CHIP ENABLE	A logic high enable the chip.

[10] Exploded View

8 Printer unit
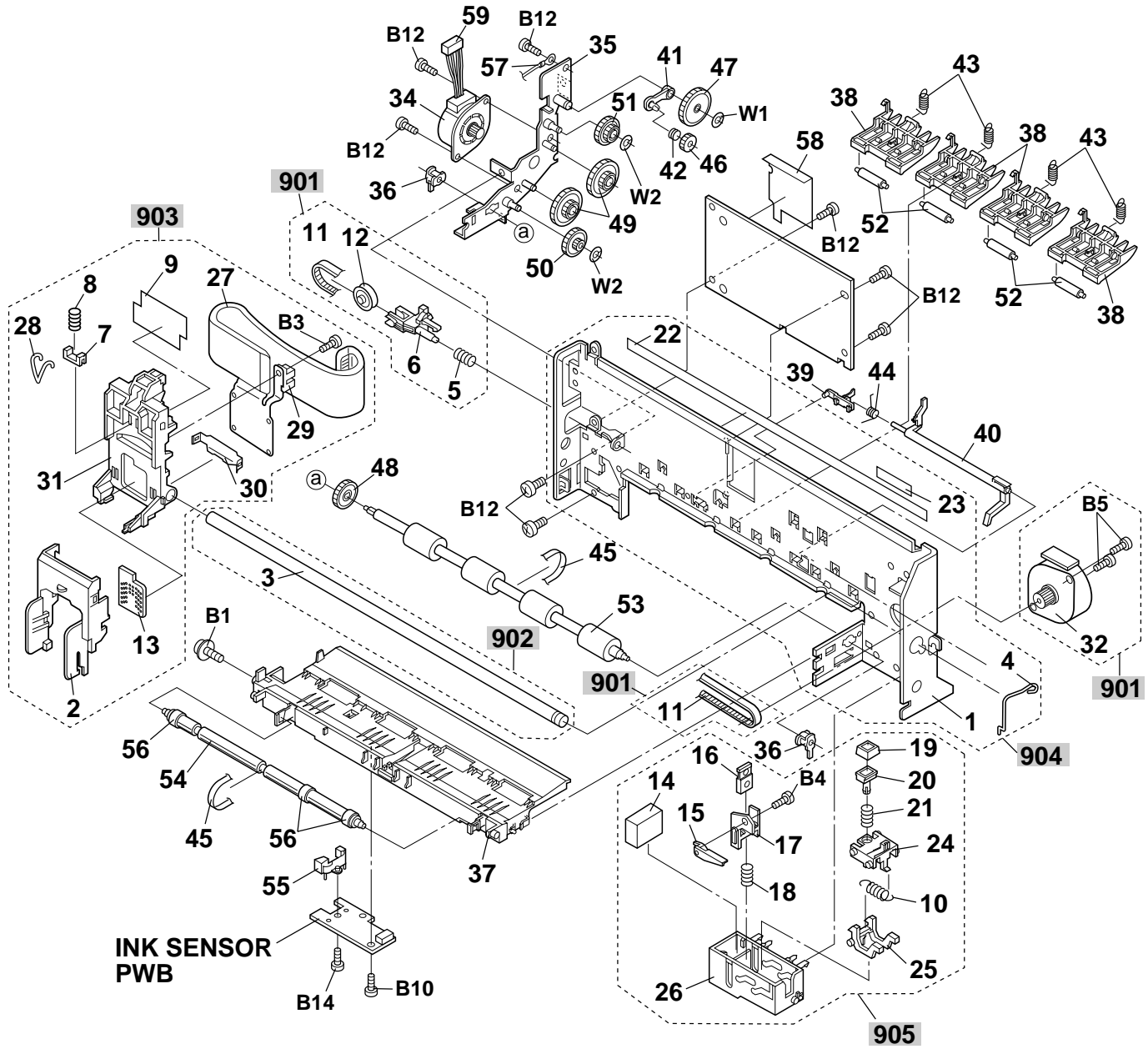
Note : Since the parts circled by dots can not be supplied, change it as a unit

[11] Replacement Parts List

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
\[8\] Printer unit					
1			N	C	Frame chassis
2			N	C	Carrier cover(K)
3			N	C	Main shaft
4			N	C	Main shaft holder
5			N	C	Belt tension spring
6			N	C	Idler pulley holder
7			N	C	Carrier latch
8			N	C	Carrier latch SP
9			N	C	FFC plate
10			N	C	Main spring B
11			N	C	Timing belt
12			N	C	Idler pulley
13			N	C	Contct pad
14			N	C	Ink felt
15			N	C	Wiper lever
16			N	C	Wiper
17			N	C	Wiper holder
18			N	C	Main spring A
19			N	C	Cap
20			N	C	Cap holder
21			N	C	Casp spring
22			N	D	Guide seal
23			N	D	Barcode label
24			N	C	Capslider
25			N	C	Maintenance lever
26			N	C	Maintenance base
27			N	C	Printer head cable
28			N	C	Main shaft stoper
29			N	B	Photo interrupter
30			N	C	Deflector A
31			N	C	Ink carrier
32			N	B	Steping CR motor
34	RMOTZ2137AXZZ	AZ	N	B	Paper feed motor
35	LBRC-2006AXZZ	AK	N	C	Motor braket
36	LBSHP2095AXZZ	AD	N	C	Bearing
37	LFRM-2192AXZZ	AL	N	C	Base frame
38	LHLDZ2168AXZZ	AS	N	C	Pinch roller holder
39	LHLDZ2169AXZZ	AD	N	C	Sensor lever holder
40	MLEVP2273AXZZ	AH	N	C	P-in sensor lever
41	MLEVP2274AXZZ	AD	N	C	Planet lever
42	MSPRC2735XHZZ	AC		C	Planet gear spring
43	MSPRC3008AXZZ	AC	N	C	Feed spring
44	MSPRD2975AXZZ	AC	N	C	Lever spring
45	NBLTK2056AXZZ	AF	N	C	Feed belt
46	NGERH2278XHZZ	AC		C	Planet gear
47	NGERH2279XHZZ	AC		C	Idler gear A
48	NGERH2396AXZZ	AD	N	C	PRT feed gear
49	NGERH2398AXZZ	AD	N	C	Secondry gear A
50	NGERH2399AXZZ	AD	N	C	Secondry gear B
51	NGERH2400AXZZ	AD	N	C	Secondry gear C
52	NROLP2382AXZZ	AC	N	C	Pinch roller
53	NROLR2380AXZZ	AX	N	C	PRT feed roller
54	NROLR2381AXZZ	AH	N	C	Exit roller
55	PCOVP2118AXZZ	AE	N	C	Sensor cover
56	PGUMM2152AXZZ	AD	N	C	Exit rubber
57	QCNW-4807AXZZ	AE	N	C	Ground cable
58	PSLDM2045AXZZ	AF		C	Print shield plate
59	QCNW-4778AXZZ	AZ	N	C	Printer cable
	(Unit)				
901	0MIMMM7E24MM0	BK	N	E	Carrier stepping motor with pulley ass'y
902	0MIOPM300356/	AY	N	C	Carrier shaft
903	0MIOPSA00195/	BS	N	E	Carrier asm, key "K" ass'y
904	0MIOPM100090/	AY	N	E	Frame chasis ass'y
905	0MIOPSA00100/	AV	N	E	Maintenance group ass'y

UX-2200CMU/CMC
FO-2150CMU/CMC

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