BIXOLON®

Service Manual
SRP-F310/312

Front Exit Thermal Printer
Rev. 1.00

http://www.bixolon.com
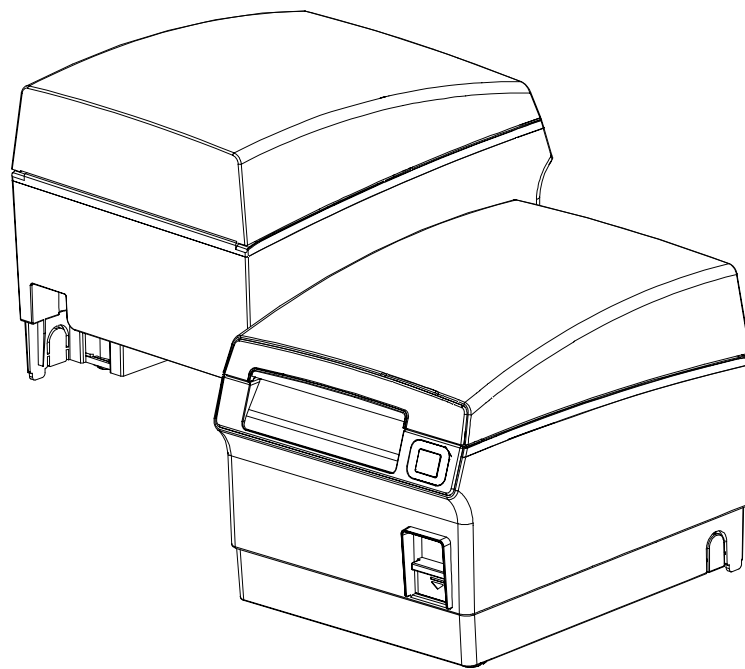
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1. Precaution Segment

1-1 Safety Precautions

1. Be sure that all of the built-in protective devices are replaced. Restore any missing protective shields.

2. When reinstalling the chassis and its assemblies, be sure to restore all protective devices including: nonmetallic control knobs and compartment covers.

3. Make sure that there are no cabinet openings through which people – particularly children - might insert fingers and contact dangerous voltages. Such openings include excessively wide cabinet ventilation slots and improperly fitted covers and drawers.

4. Leakage Current Hot Check:
   WARING: Do not use an isolation transformer during this test.
   Use a leakage-current tester or a metering system that complies with American National Standards Institute (ANSI C101.1, Leakage Current for Applications), and Underwriters Laboratories (UL Publications UL1410, 59.7).
   With the unit completely reassembled, plug the AC line cord directly into a 100VAC or 240VAC outlet of the Adaptor.
   With the unit's AC switch first in the ON position and then OFF, measure the current between a known Earth ground (metal water pipe, conduit, etc.) and all exposed metal part, including: metal cabinet, frame, and screw-heads and printer. The current measure should not exceed 0.1 milliamp. Reverse the power-plug prong in the AC outlet and repeat the test.

5. Design Alteration Warning:
   Never alter or add to the mechanical or electrical design of the ECR. Unauthorized alterations might create a safety hazard. Also any design changes or additions will void the manufacture's warranty.

6. Components, parts and wiring that appear to have overhead or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damaged or overheating and correct any potential hazards.

7. Observe the original lead dress, especially near the following areas: sharp edges, and especially the AC and high voltage supplies. Always inspect for pinched, out-of-place, or frayed wiring.
   Do not change the spacing between components and the printed circuit board. Check the AC power cord for damage. Make sure that leads and components do not touch thermally hot parts.

8. Product Safety Notice:
   Some electrical and mechanical parts have special safety-related characteristics, which might not be obvious from visual inspection. These safety features and the protection they give might be lost if the replacement component differs from the original-even if the replacement is rated for higher voltage, wattage, etc.
   Components that are critical for safety are indicated in the circuit diagram by shading, (⚠)or (⚠).
   Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications. A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards.

1-2 Servicing Precaution

WARNING 1: First read the Safety Precaution section of this manual. If some unforeseen
circumstance creates a conflict between the servicing and safety precautions,
always follow the safety precaution.

WARNING 2: An electrolytic capacitor installed with the wrong polarity might explode.

1. Always unplug the unit's AC power cord from the AC power source or the Power Switch off before
   attempting to:
   (a) Remove or reinstall any component or assembly,
   (b) Disconnect an electrical plug or connector,
   (c) Connect a test component in parallel with an electrolytic capacitor.

2. Some components are raised above the printed circuit board for safety.
   An insulation tube or tape is
   sometime used. The internal wiring is sometimes clamped to prevent contact with thermally hot
   components. Reinstall all such elements to their original position.

3. After servicing, always check that the screws, components and wiring have been
   correctly reinstalled.
   Make sure that the portion around the serviced part has not been damaged.

4. Check the insulation between the blades of the AC plug and accessible conductive parts
   (example: metal panels and input terminals).

5. Insulation Checking Procedure: Disconnect the power cord from the AC source and
   turn the power switch
   ON. Connect an insulation resistance meter (500V) to the blades of the AC plug.
   The insulation resistance
   between each blade of the AC plug and accessible conductive parts (see above) should be
   greater than 1 mega-ohm.

6. Never defeat any of the B+ voltage interlock. Do not apply AC power to the unit
   (or any of its assemblies)
   unless all solid-state heat sinks are correctly installed.

7. Always connect an instrument's ground lead to the instrument chassis ground before
   connecting the positive lead; always remove the instrument's ground lead last.

1-3 Precaution for Electrostatically Sensitive Devices (ESDs)

1. Some semiconductor (solid state) devices are easily damaged by static electricity. Such components are called Electrostatically Sensitive Devices (ESDs); examples include integrated circuits and some field-effect transistors. The following techniques will reduce the occurrence of component damaged caused by static electricity.

2. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. (Be sure to remove it prior to applying power-this is an Electric shock precaution.)

3. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of electrostatic charge.

4. Do not use freon-propelled chemical. These can generate electrical charges that damage ESDs.

5. Use only a grounded-tip soldering iron when soldering or unsoldering ESDs.

6. Use only an anti-static solder removal device. Many solder removal devices are not rated as anti-static; these can accumulate sufficient electrical charge to damage ESDs.

7. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.

8. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the device will be installed.

9. Minimize body motions when handling unpacked replacement ESDs. Motions such as brushing clothes together, or lifting a foot from a carpeted floor can generate enough static electricity to damaged an ESD.

1-4 Operational Precautions

1. The heating element of the printer mechanism's thermal head and the driver IC are easily damaged. Never allow these components to come into contact with metal or other hard objects.

2. Never touch the printer mechanism's heating element with your hand. Doing so can damage the heating element and affect proper operation.

3. The head and motor areas are very hot during and immediately after printing. Do not touch components in these areas directly with your hand.

4. Do not use any paper other than these specified in this manual otherwise print head reliability and print quality are affected adversely.

5. Thermal paper starts to color at around 70ºC. Take care to protect unused and printed thermal paper against the affects of heat, light and characters on the paper to feed.

6. Take the roll paper out of the printer when you will not use the printer for a long time in a high temperature and humidity environment.

2. Installation and Operation

2-1 Installation

2-1-1 AC Adapter Installation
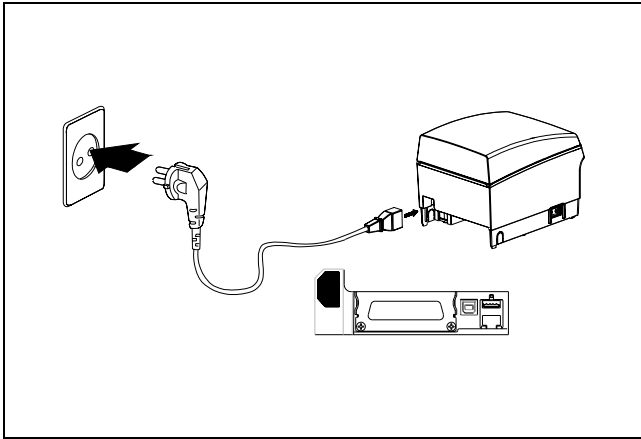
Figure 2-1 AC Adapter Installation

1. Make sure the printer is turned off with the side of the switch.
2. Plug the power cord into the SMPS on the printer.
3. Plug the AC Adapter power cord into the wall outlet.

2-1-2 Interface Cable Installation

Interface Cable

Interface connector
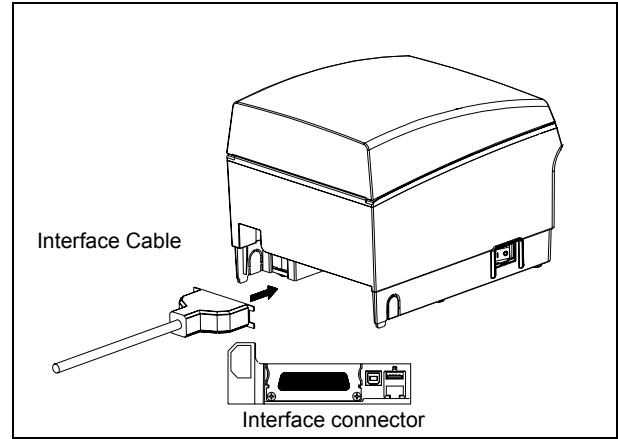
Figure 2-2 I/F Cable Installation

1. Turn off the printer, host ECR and Computer.
2. Plug RS-232, USB or Parallel Cable connector into the I/F connector on the printer.
3. Tighten the screws on both sides of the connector.
4. Turn on the printer, host ECR and Computer.

2-1-3 USB Cable Installation

USB Connector

UAB-B Cable
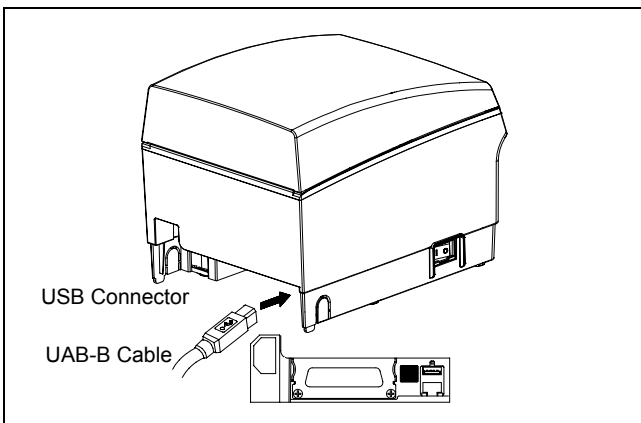
Figure 2-3 USB B-TYPE Cable Installation

1. Turn the printer off.
2. Plug USB cable connector into the connector on the printer.

2-1-4 Cash Drawer Cable Installation
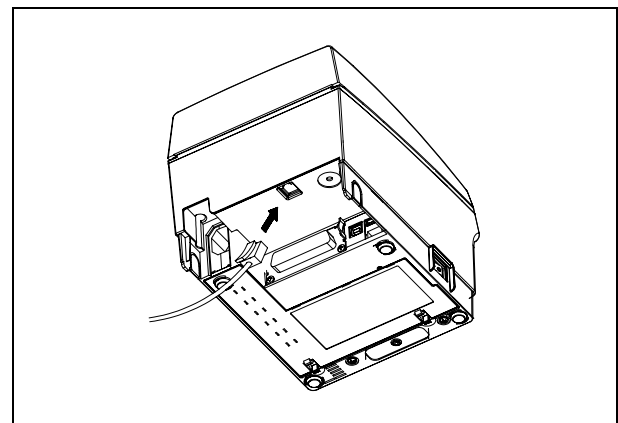
Figure 2-4 Cash Drawer Cable Installation

1. Turn the printer off.
2. Plug the cash drawer cable connector into the connector on the printer.
   (To remove the cash drawer cable, press the clip on the connector, grasp the connector and pull it out.)

2-1-5 ETHERNET Cable Installation
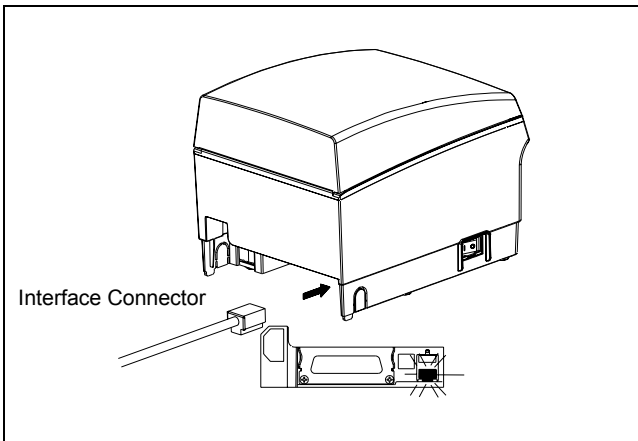
Figure 2-5 ETHERNET Cable Installation

1. Turn the printer off..
2. Plug the ETHERNET Cable   into
   the connector on the printer.

2-1-6 Dongle(Usb A-Type) Cable Installation
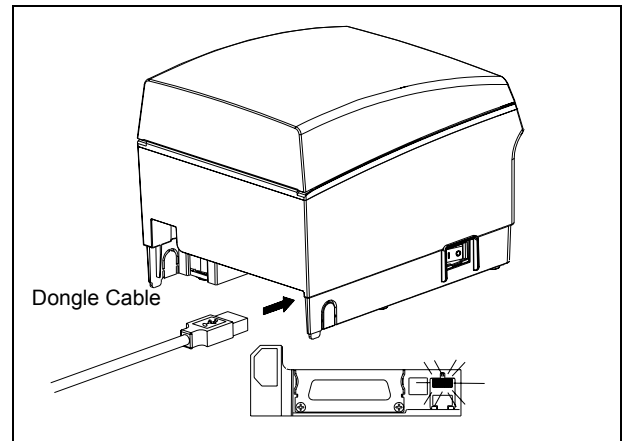
Figure 2-6 Dongle Cable Installation

1. Turn the printer off..
2. Plug the Dongle   Cable   into
   the connector on the printer.

2-1-7 Cover Open Installation
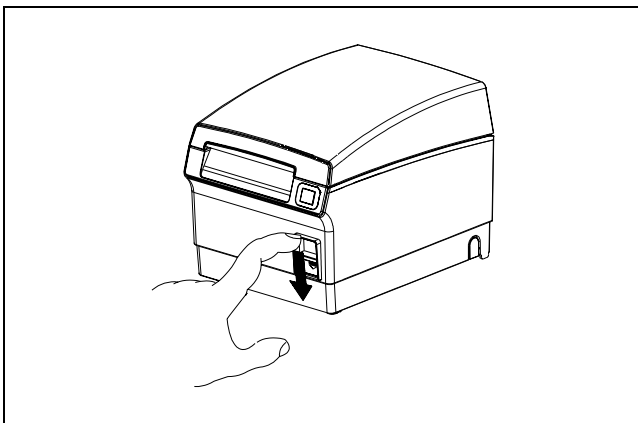
Figure 2-7 Cover Open Installation

1. Turn the printer off.
2. Push the Cover-open Button

2-1-8 Paper Roll Installation
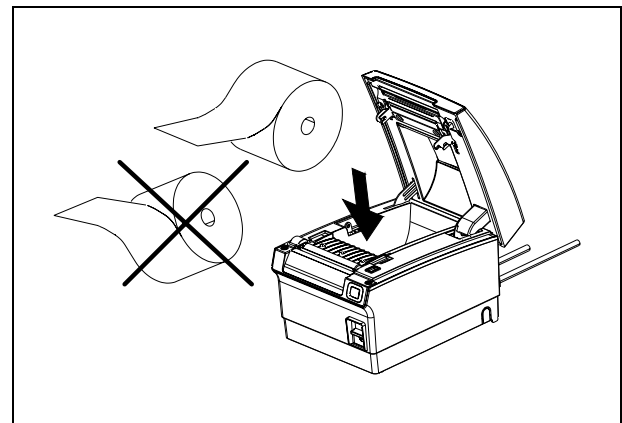
Figure 2-8 Paper Roll Installation

1. Open the cover printer and remove the used
   paper roll core if there is one.
2. Load the paper roll on the paper holder as
   shown.
3. Close the cover printer.

2-2 Operation

2-2-1 Setting the DIP switches

The DIP switches are located on the bottom of the printer. The DIP switches are used to set the printer to perform various functions. Follow these when changing DIP switches setting:

1. Turn the printer power switch off.
   Open the Cover .
2. Flip the DIP switches using tweezers or another marrow-ended tool. Switches are in when up and off when off down in the Figure 2-9.
3. The new setting takes effect when you turn on the printer.

Note: Always change DIP switch settings only when the printer is turned off. Change made with the power on have no effect and then on again**.**
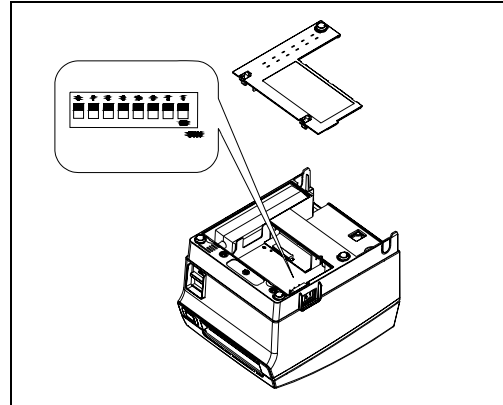
Figure 2-9 Setting the DIP switches

2-2-2 Setting the DIP switch (RS-232C Serial Interface)

• DIP Switch

SW	Function	ON	OFF	Default
1-1	Auto-Cutter Selection	Disable	Enable	OFF
1-2	Handshaking	XON/XOFF	DTR/DSR	OFF
1-3	Data Length	7bits	8bits	OFF
1-4	Parity Check	Yes	No	OFF
1-5	Parity Selection	EVEN	ODD	OFF
1-6				OFF
1-7	Baud Rate Selection (bps)	Refer to the following table		ON
1-8				OFF

2-2-3 Setting the DIP switch (IEEE1284 Parallel, USB Interface)

• DIP Switch

SW	Function	ON	OFF	Default
1-1	Auto-Cutter Selection	Disable	Enable	OFF
1-2 ~ 1-8	Reserved	-	-	OFF

• Table – Baud rate (bps) Selection

Transmission Speed	SW 1-6	SW 1-7	SW 1-8	Default
2400	ON	OFF	OFF	
4800	ON	OFF	ON	
9600	OFF	ON	OFF	
19200	OFF	OFF	OFF	9600
38400	OFF	ON	ON	
57600	OFF	OFF	ON	
115200	ON	ON	ON	

※ **Auto Cutter Enable / Disable selection**

Dip Switch Set 1		
SW 1-1	ON	Auto Cutter Disabled
	OFF	Auto Cutter Enabled
Application	Ignores Auto Cutter error for continuous printing.	

2-2-4 Hexadecimal Dumping

This feature allows experienced users to see exactly what data is coming to the printer. This can be useful in finding software problems. when you turn on the hexadecimal dump function, the printer prints all commands and data in hexadecimal format along with a guide section to help you find specific commands.
To use the hexadecimal dump function, follow these steps:

1. After you make sure that the printer is off.
   Open the cover.
2. Turn on the printer, while holding down the FEED button with beep.
3. close the cover, then the printer enters the hexadecimal dump mode.
   Run any software program that sends data to the printer. The printer will print all the codes it receives in a two-column format. The first column contains the hexadecimal codes and the second column gives the ASCII characters that corresponds to the codes.

```
1B 21 00 1B 26 02 40 40        . ! . . & @ @
02 0D 1B 44 0A 14 1E 28        . . . D . . . . (
00 01 0A 41 0D 42 0A 43        . . . A . B . C
```

Note: A period(.) is printed for each code that no ASCII equivalent.
Note: During the hex dump all commands expect DLE EOT and DLE ENQ are disabled.

4. When the printing finishes, turn off the printer.
5. Turn on the printer and then the hexadecimal model is off.

2-2-5 The self Test Mode

The self-test checks whether the printer has any problem. If the printer does not function properly, contact your dealer The self-test checks the following:

1. Make sure paper roll ahs been installed properly.
2. Turn on the power while holding down the FEED button with beep. The self-test begins.
3. Tue self-test prints the current printer status, which provides the control ROM version and the DIP witch setting.
4. After printing the current printer status, self-test printing will print the following and pause (The PAPER LED light blinds).

> **SELF-TEST PRINTING.**
> **PLEASE PRESS THE FEED BUTTON.**

5. Press the FEED button to continue printing. The printer prints a pattern using the built-in character set.
6. The self-test automatically ends and cuts the paper after printing the following.

> ***** COMPLETED *****

The printer is ready to receive data as soon as it completes the self-test.

```
SRP-F310 V01.00 STD 010110
================================

FPGA INFORMATION
    BOARD VER.: 0x3
    PROGRAM VER. : 0x11

DIP SWITCH STATUS
            12345678
    ON:           *
    OFF: ****** *

MEMORY SWITCH STATUS
    MSW1   12345678
    MSW2   12345678
    MSW3   12345678
    MSW4   12345678
    MSW5   12345678
    MSW6   12345678
    MSW11  12345678
    MSW12  12345678

SERIAL SETTING
    BAUD RATE    : 115200 BPS
    DATA BITS    : 8 BITS
    PARITY CHECK : NONE
    STOP BITS    : 1 BIT OR MORE
    HANDSHAKING : DTR/DSR

ETHERNET SETTING
    MAC ADDR: 00:11:22:33:44:55
    LAN_DHCP disabled
    IP ADDR   : 192.168.192.123
    NETMASK : 255.255.255.0
    GATEWAY : 192.168.192.254

WLAN SETTING
    NETWORK: adhoc
    AUTH: open
    ENCRYPT: none
    ESSID: BIXOLON_adhoc
    WLAN_DHCP disabled
    IPADDR: 192.168.1.1
    NETMASK: 255.255.255.0
    GATEWAY: 192.168.1.2

BUFFER CAPACITY: 512KBYTES

PRINT DENSITY
    LIGHT [ 1 2 3 4 ] DARK
                *


          SELF-TEST PRINTING
    PLEASE PRESS THE FEED BUTTON
```

```
ASCII
!"#$%&'()*+,-./0123456789:;<=>?@
"#$%&'()*+,-./0123456789:;<=>?@A
#$%&'()*+,-./0123456789:;<=>?@AB
$%&'()*+,-./0123456789:;<=>?@ABC
%&'()*+,-./0123456789:;<=>?@ABCD
&'()*+,-./0123456789:;<=>?@ABCDE
'()*+,-./0123456789:;<=>?@ABCDEF
()*+,-./0123456789:;<=>?@ABCDEFG
)*+,-./0123456789:;<=>?@ABCDEFGH
*+,-./0123456789:;<=>?@ABCDEFGHI
+,-./0123456789:;<=>?@ABCDEFGHIJ
,-./0123456789:;<=>?@ABCDEFGHIJK
-./0123456789:;<=>?@ABCDEFGHIJKL
./0123456789:;<=>?@ABCDEFGHIJKLM
/0123456789:;<=>?@ABCDEFGHIJKLMN
0123456789:;<=>?@ABCDEFGHIJKLMNO
123456789:;<=>?@ABCDEFGHIJKLMNOP
23456789:;<=>?@ABCDEFGHIJKLMNOPQ
3456789:;<=>?@ABCDEFGHIJKLMNOPQR
456789:;<=>?@ABCDEFGHIJKLMNOPQRS
56789:;<=>?@ABCDEFGHIJKLMNOPQRST
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTU
789:;<=>?@ABCDEFGHIJKLMNOPQRSTUV
89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVW
9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWX


PC437
ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥Ptƒ
üéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥Ptƒá
éâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥Ptƒáí
âäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥Ptƒáíó
äàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥Ptƒáíóú
àåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥Ptƒáíóúñ
åçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑ
çêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑª
êëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº
ëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿
èïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐
ïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬
îìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½
ìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½¼
ÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½¼¡
ÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½¼¡«
ÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½¼¡«»
æÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½¼¡«»▓
Æôöòûùÿ ÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½¼¡«»▓
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öòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½¼¡«»▓    │
òûùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½¼¡«»▓   │┤
ûùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½¼¡«»▓  │┤┤
ùÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½¼¡«»▓  │┤┤┤
ÿÖÜ¢£¥PtƒáíóúñÑªº¿ ⌐¬½¼¡«» │┤┤╢╖
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Figure 2-10 The Self-Test Sheet

2-2-6 Setting the Memory Switches

This printer has Memory Switch set which is software switches. Memory Switch set has MSW1, MSW2,MSW3, MSW4, MSW5, MSW6, MSW11, MSW12, Customize value.
Memory Switch setting utility can change the Memory Switch set to ON or OFF as shown in the table below (default: all OFF):
Settings of the Memory Switch are stored in the NV memory: therefore, even if the printer is turned off, the settings are maintained.

※ **Notes:** The Memory Switch is available to be changed by three methods**:**
- Memory Switch setting utility.
- Control from BXL/POS command.

MSW1

Switch	Function	ON	OFF
MSW 1-1	Select Print Speed	Refer to following Table	
MSW 1-2			
MSW 1-3			
MSW 1-4~5		--	Fixed to OFF
MSW 1-6	Select Print Density	Refer to following Table	
MSW 1-7			
MSW 1-8		--	Fixed to OFF

MSW1-1~MSW1-3

MSW 1-3	MSW 1-2	MSW 1-1	Print speed	Remark
OFF	OFF	OFF	Print speed level 4	270 mm/s
OFF	OFF	ON	Print speed level 3	250 mm/s
OFF	ON	OFF	Print speed level 2	230 mm/s
OFF	ON	ON	Print speed level 1	200 mm/s

MSW1-6~MSW1-7

MSW 1-7	MSW 1-6	Print density	Remark
ON	OFF	Density level 3	Dark
OFF	ON	Density level 2	
OFF	OFF	Density level 1	Light(Default)

MSW2

Switch	Function	ON	OFF
1	Specification for Destination	Double byte Country	Single byte Country
2	Reserved	--	Fixed to OFF
3~8	Code Page Selection	Refer to following Table	

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MSW2-3~MSW2-8

MSW2-8	MSW2-7	MSW2-6	MSW2-5	MSW2-4	MSW2-3	Character Table	
OFF	OFF	OFF	OFF	OFF	OFF	Page 0	437 (USA, Standard Europe)
OFF	OFF	OFF	OFF	ON	OFF	Page 1	Katakana
OFF	OFF	OFF	ON	OFF	OFF	Page 2	850 (Multilingual)
OFF	OFF	OFF	ON	ON	OFF	Page 3	860 (Portuguese)
OFF	OFF	ON	OFF	OFF	OFF	Page 4	863 (Canadian-French)
OFF	OFF	ON	OFF	ON	OFF	Page 5	865 (Nordic)
OFF	OFF	ON	ON	OFF	OFF	Page 16	1252 (Latin I)
OFF	OFF	ON	ON	ON	OFF	Page 17	866 (Cyrillic #2)
OFF	ON	OFF	OFF	OFF	OFF	Page 18	852 (Latin 2)
OFF	ON	OFF	OFF	ON	OFF	Page 19	858 (Euro)
OFF	ON	OFF	ON	OFF	OFF	Page 21	862 (Hebrew DOS code)
OFF	ON	OFF	ON	ON	OFF	Page 22	864 (Arabic)
OFF	ON	ON	OFF	OFF	OFF	Page 23	Thai42
OFF	ON	ON	OFF	ON	OFF	Page 24	1253 (Greek)
OFF	ON	ON	ON	OFF	OFF	Page 25	1254 (Turkish)
OFF	ON	ON	ON	ON	OFF	Page 26	1257 (Baltic)
ON	OFF	OFF	OFF	OFF	OFF	Page 27	Farsi
ON	OFF	OFF	OFF	ON	OFF	Page 28	1251 (Cyrillic)
ON	OFF	OFF	ON	OFF	OFF	Page 29	737 (Greek)
ON	OFF	OFF	ON	ON	OFF	Page 30	775 (Baltic)
ON	OFF	ON	OFF	OFF	OFF	Page 31	Thai14
ON	OFF	ON	OFF	ON	OFF	Page 32	Hebrew Old code
ON	OFF	ON	ON	OFF	OFF	Page 33	1255 (Hebrew New code)
ON	OFF	ON	ON	ON	OFF	Page 34	Thai11
ON	ON	OFF	OFF	OFF	OFF	Page 35	Thai18
ON	ON	OFF	OFF	ON	OFF	Page 36	855 (Cyrillic)
ON	ON	OFF	ON	OFF	OFF	Page 37	857 (Turkish)
ON	ON	OFF	ON	ON	OFF	Page 38	928 (Greek)
ON	ON	ON	OFF	OFF	OFF	Page 39	Thai16
ON	ON	ON	OFF	ON	OFF	Page 40	1256 (Arabic)
ON	ON	ON	ON	OFF	OFF	Page 41	1258 (Vietnam)
ON	ON	ON	ON	ON	OFF	Page42	Khmer(Cambodia)
OFF	OFF	ON	OFF	OFF	ON	Page47	1250 (Czech)

MSW3

Switch	Function	ON	OFF
MSW 3-1	Select Emulation	Refer to following Table	
MSW 3-2			
MSW 3-3			
1~8	Reserved	--	Fixed to OFF

MSW3-1~MSW3-3

MSW 3-3	MSW 3-2	MSW 3-1	Emulation	Remark
OFF	ON	ON	Emulation 4	
OFF	ON	OFF	Emulation 3	
OFF	OFF	ON	Emulation 2	
OFF	OFF	OFF	Emulation 1	BXL/POS

MSW4

Switch	Function	ON	OFF
MSW 4-1	ASCII font selection	Customized font	Resident font
MSW 4-2	Extended font selection	Customized font	Resident font
MSW 4-3	Single byte Font Selection	Refer to following Table	
MSW 4-4			
MSW 4-5	Double byte Font selection	Refer to following Table	
MSW 4-6			
MSW 4-7			
MSW 4-8	Reserved	--	Fixed to OFF

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MSW\4-3~MSW4-4

MSW 3-4	MSW 3-3	Single byte Font Selection	Remark
OFF	OFF	Font A	12x24
OFF	ON	Font B	9x17
ON	OFF	Font C	9x24

MSW\4-5~MSW4-7

MSW 4-7	MSW 4-6	MSW 4-5	Double byte font type	Remark
OFF	OFF	OFF	KS5601	
OFF	OFF	ON	SHIFT-JIS	
OFF	ON	OFF	BIG5	
OFF	ON	ON	GB2312	
ON	OFF	OFF	GB18030	

MSW5

Switch	Function	ON	OFF
MSW 5-1	Auto cutter function	Full cutting	Partial cutting
MSW 5-2	Reserved	--	Fixed to OFF
MSW 5-3	2 color support	Enable	Disable
MSW 5-4	Auto Line Feed	Enable	Disable
MSW 5-5	Near-End Sensor	Disable	Enable
MSW 5-6	Reserved	--	Fixed to OFF
MSW 5-7	Reserved	--	Fixed to OFF
MSW 5-8	Reserved	--	Fixed to OFF

MSW6

Switch	Function	ON	OFF
MSW 6-1	Auto generate pulse to internal buzzer	Enable	Disable
MSW 6-2	Internal buzzer control	Disable	Enable
MSW 6-3	Internal buzzer with cash drawer pulse	Enable	Disable
MSW 6-4	Reserved	--	Fixed to OFF
MSW 6-5	Offline status condition	Pulse mode	Step mode
MSW 6-6	Select watermark printing function	Enable	Disable
MSW 6-7	Reserved	--	Fixed to OFF
MSW 6-8	NearEnd sensor detect signal	Enable	Disable

MSW11

Switch	Function	ON	OFF
11-1~8	Reserved	--	Fixed to OFF

MSW12

Switch	Function	ON	OFF
12-1~8	Reserved	--	Fixed to OFF

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3. Product Specifications

3-1 Appearance

3-1-1 Printer Dimensions (mm)
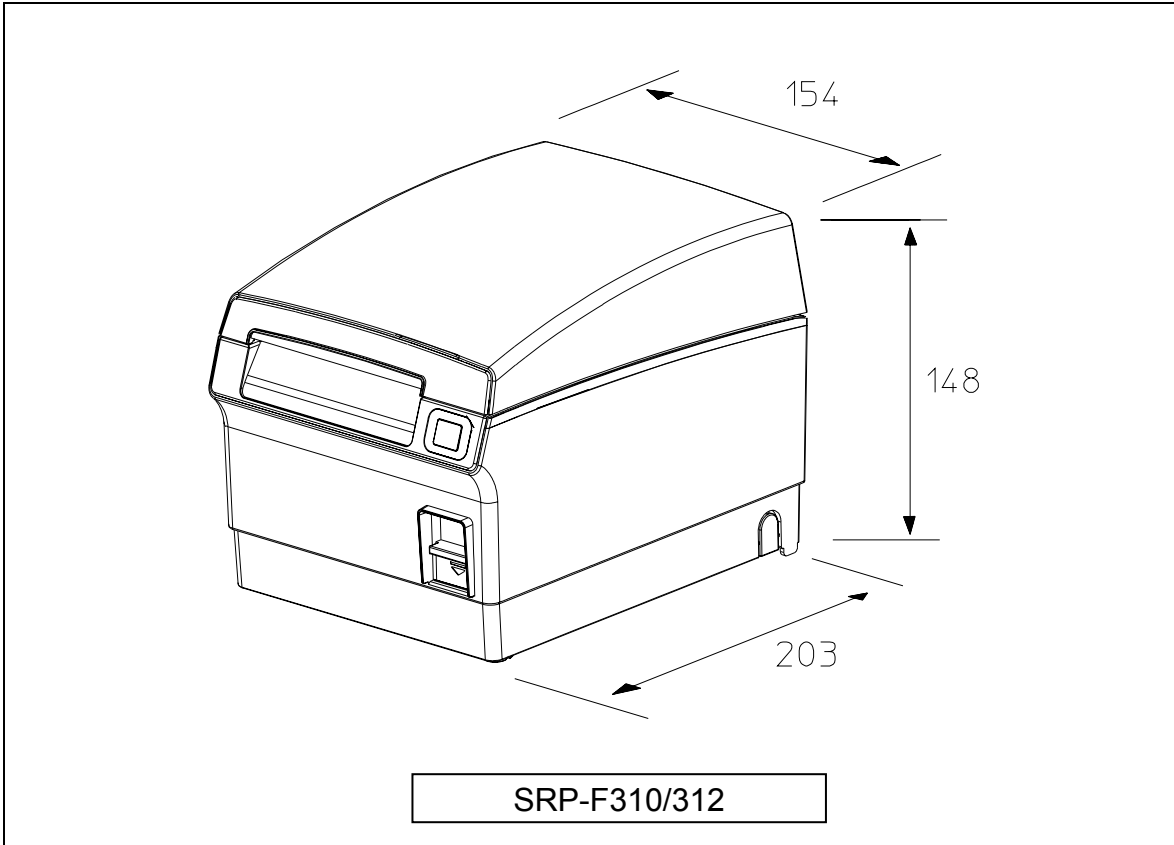
Figure 3-1 Printer Dimension

3-1-2 AC Adapter Dimensions (mm)
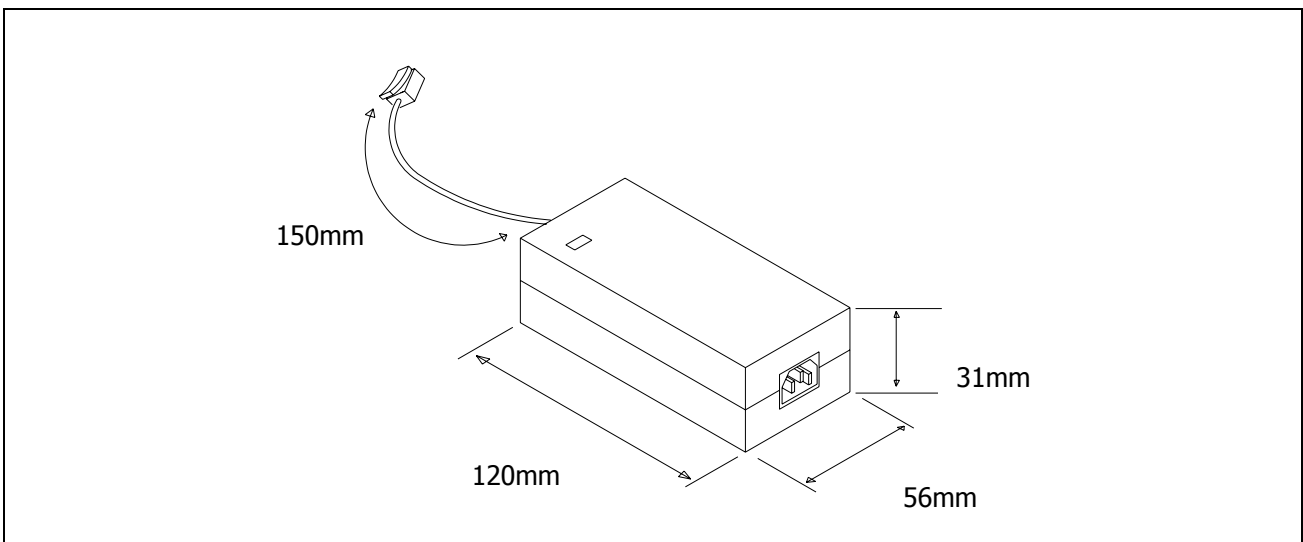
Figure 3-2 Adapter Dimension

3-1-3 Feature Locations-SRP-F310/312

IEEE-1284

RS-232C

DEFAULT

1.	cover-open	10.	Paper Sensor Control
2.	case-lower	11.	Auto-Cutter
3.	function-led	12A.	Parallel interface(IEEE-1284)
4.	feed-button	12B.	Serial interface(RS-232C)
5.	Push Button	12C.	Default interface
6.	Power Button	13.	USB B-TYPE 2.0
7.	cover Dip Switch	14.	ETHERNET
8.	SMPS	15.	Dongle
9.	TPH	16.	ETHERNET, WLAN Reset
		17.	DK(RJ11)

Figure 3-3 Feature Location

3-2 General Specifications

Item		Description	Remark
Product		• SRP-F310/312: Default Communication • SRP-F310/312P: IEEE1284 Parallel Communication • SRP-F310/312S: RS-232C Serial Communication	

Processor		• ST SPEAR-09-B042(ARM926EJ-S core @ 333MHz)
		  Internal boot ROM Size: 32KBytes
		  Internal static RAM Size: 8KBytes	

Memory		• RAM
		  DDR2 SDRAM: 256Mbits (MT47H16M16BG-3:G)
		  NAND FLASH: 128Mbits (NAND128W3A2CN6F)	

Interface Serial (RS-232C)		• Flow Control:
		  1) DTR / DSR (H/W Flow Control)
		  2) XON / XOFF (S/W Flow Control)
		• Baud Rate: 2400 / 4800 / 9600 / 19200 / 38400
		  / 57600 / 115200 bps
		• Receive Buffer: 4 Kbytes
		• Connector: DB25P Female (I/F PBA Side)
			The Flow Control, Baud Rate, Stop Bit and Parity Are determined by DIP S/W position.

Interface Parallel		• Mode:
		  1) Forward Mode: Compatibility Mode
		  2) Reverse Mode: Nibble / Byte Mode
		• Connector: 36 Pin Centronics (Ribbon Type)	

USB		• Transfer Type: BULK • Speed: 12 Mbps (Full-Speed) • Power: Self-Powered	
USB2.0		• Transfer Type: BULK • Speed: 480 Mbps (High-Speed) • Power: Self-Powered	

Printer		• Printing Method: Thermal Line Printing
		• Printing Speed
		  1) SRP-F310: Mono 270mm/Sec, 63.82 Line/Sec
		    2Color 130mm/Sec, 30.73Line/sec
		  2) SRP-F312: Mono 270mm/Sec, 72 Line/Sec
		    2Color 130mm/Sec, 34.6Line/sec	

Auto Cutter		• Type: Guillotine • Cutting Method: 1 Point Partial Cutting	
Power Consumption		• Approx. 27W (Peak)	
AC Adapter (SMPS)	Electrical Condition	• Input: AC 100V ~ 240V, 50Hz/60Hz • Output: DC 24V±5%, 2.5A	
	Environment Condition	Temperature: • Operating: 0°C ~ +45°C / • Storage: -20°C ~ +60°C Humidity: • Operating: 10% to 80% non-condensing / • Storage: 10% to 90% non-condensing Altitude: • Operating: 10,000ft(Max) / • Storage: 10,000ft(Max)	
Weight		• 3.1 Kg (With Packing)	
Dimensions(mm)		• 203(W) x 154(D) x 148(H)	

Table 3-1 General Specification

3-3 Thermal Printer Specifications

3-3-1 Printer Specification

1) 180dpi

Item	Description	Remark
Model	• SRP-F310 (TPH: KRB-72-7TA02-BIX2,KYOCERA CORPORATION)	
Print Method	• Thermal Line Printing	
Dot Density	• 0.141 mm(7 Dots/mm)	
Printing Direction	• Unidirection with friction feed	
Printing Width	• 72.2mm, 512 dot Position	
Character / Line	• 42 (Font A: 12x24) • 56 (Font B: 9x17)	
Character Spacing	• 0.28mm (0.01) (2 dots) (Font A) • 0.28mm (0.01) (2 dots) (Font B)	
Printing Speed	• Mono Max. 270mm (63.82 Lines/sec, 1/6inch feed) • 2color Max. 130mm (30.73 Lines/sec, 1/6inch feed) • Ladder Barcode: Mono 270mm/sec, 2Color 130mm/sec	
Paper feeding Speed	• Approx. 270mm/sec	

Table 3-2 Thermal Printer Specification

2) 203 dpi

Item	Description	Remark
Model	• SRP-F312 (TPH: KRC-80-8TA02-BIX2,KYOCERA CORPORATION)	
Print Method	• Thermal Line Printing	
Dot Density	• 0.125mm(8 Dots/mm)	
Printing Direction	• Uni-direction with friction feed	
Printing Width	•80.0mm, 640 dot Position	
Character / Line	• 48 (Font A: 12x24) • 64 (Font B: 9x17)	
Character Spacing	• 0.25mm (0.01) (2 dots) (Font A) • 0.25mm (0.01) (2 dots) (Font B)	
Printing Speed	• Mono Max. 270mm (72 Lines/sec, 1/7inch feed) • 2color Max. 130mm (34.6 Lines/sec, 1/7inch feed) • Ladder Barcode: Mono 270mm/sec, 2Color 130mm/sec	
Paper feeding Speed	• Approx. 270mm/sec	

Table 3-3 Thermal Printer Specification

3-3-2 Character Specification

Item	Description	Remark
Number of Character	• Alphanumeric Characters: 95 • Extended Characters: 128 x 34 Page (Including one space page) • International Characters: 32	
Character Structure	• 12 x 24 (Font A) (Including 2-dot spacing in horizontal) • 9 x 17 (Font B) (Including 2-dot spacing in horizontal) Font A is selected as the default	

Table 3-4 Thermal Printer Character Specification

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3-3-3 Paper Specification

Item	Description	Remark
Paper Type	• Mono:TF50KS-E(Nippon paper) • 2Color: PB-70(Mitsubishi)	
Paper Form	• Paper Roll	
Paper Width	• 80mm / 83mm	
Paper Roll Size	• Max 105mm(3.26")	
Spool Inside Dia.	• 12mm (0.47)	
Spool Outside Dia.	• 18mm (0.71)	

Table 3-5 Thermal Printer Paper Specification

※ **Note**

　* Mono: The Following paper can be used instead of the specified paper above.

　　　　TF50KS-E(Paper thickness: 65μm): Nippon Paper industries Co., Ltd.

　　　　PD 160R 　(　　　" 　　　: 75μm): New Oji Paper Mfg, Co., Ltd.

　　　　P350 　　(　　　" 　　　: 62μm): Kansaki Specialty Paper, Inc. (USA)

　* 2Color: PB-670 　(　　　" 　　　: 75μm): Mitsubishi

　　　　PD750R 　(　　　" 　　　: 75μm): Oji paper Mfg. Co.,Ltd.

3-3-4 Reliability and Environment Specification

Item	Description	Remark
Life	• Mechanism:　Monochrome: 20,000,000 Lines 　　　　　　　　2Color 　　: 10,000,000 Lines 　The reliability values above are assumed When a 15-Line feed and a 10-Line print repeat alternately • Head: 1×10^8 Pulses, Monochrome: 150Km, 2Color: 75Km • Auto Cutter: 1,800,000 Cut,	
MCBF	• Monochrome:70,000,000Lines, 2Color:35,000,000Lines	
Environmental Temperature	• Operating: 0°C ~ +45°C • Storage: -20°C ~ +60°C (Except for Paper)	
Humidity	• Operating: 10% ~ 80% RH(non-condensing) • Storage: 10% ~ 90% RH(non-condensing)	

Table 3-6 Thermal Printer Reliability Specification

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3-3-5 Printable Area
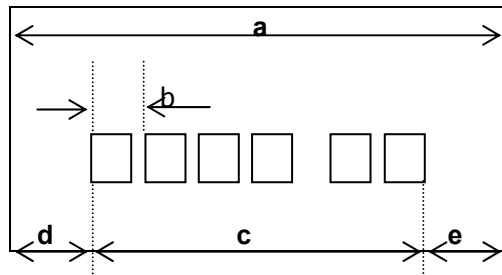
Figure 3-4 Printable Area

1) 180dpi

Item	Description	Remark
a	80±0.5mm(3.15 ±0.0197)	
b	0.141 (0.0056)	
c	72.2±0.2mm(2.83 ±0.0079)	
d	2.75mm~4.25mm	
e	2.75mm~4.25mm	
Dots	512	
Font 9X17	56 Character	
Font 12X24	42 Character	

* 'd' & 'e' position can be shifted while printing according to the paper position.

2) 203dpi

Item	Description	Remark
A	80±0.5mm(3.15 ±0.0197)	
B	0.125 (0.0049)	
C	80mm±0.2mm (2.83±0.0079)	
D	2.75mm~4.25mm	
E	2.75mm~4.25mm	
Dots	640	
Font 9X17	64 Character	
Font 12X24	48 Character	

* 'd' & 'e' position can be shifted while printing according to the paper position.

3-3-6 TPH (Thermal Printer Head) Specification

1) 180dpi

Item	Description	Remark
Heat Element Structure	2 Heaters / Dot	
Number of Heat Element	512 Dots	
Heat Element Pitch	0.141mm/dot, 7Dot/mm (180DPI)	
Print Width	72.2±0.2mm	
Average Resistance	800Ω ± 3%	
Thermister	1) Resistance R25: 30kΩ ± 5% (At 25℃) 2) B Value: 3950K ± 2% 3) Temperature: - 40℃ ~ +80℃	

Table 3-7 TPH Specification

Item	Maximum	Unit	Conditions
Print Cycle (S.L.T.)	0.46	ms/Line	T=25℃
Supply Energy	0.20	mJ/Dot	
Supply Voltage	24	V	Voltage among the connector terminals
Substrate Temperature	70	℃	Temperature detected by Thermistor
Number of heating dots at same time	256	Dots	
Logic Supply Voltage (V_{DD})	3.3	V	
Logic Supply Current (I_{DD})	204	mA	ALL-HIGH

Table 3-8 TPH Maximum Condition (At 25℃)

2) 203dpi

Item	Description	Remark
Heat Element Structure	2 Heaters / Dot	
Number of Heat Element	640 Dots	
Heat Element Pitch	0.125mm/dot, 8Dot/mm (203DPI)	
Print Width	80±0.2mm	
Average Resistance	800Ω ± 3%	
Thermister	1) Resistance R25: 30kΩ ± 5% (At 25℃) 2) B Value: 3950K ± 2% 3) Temperature: - 40℃ ~ +80℃	

Table 3-9 TPH Specification

Item	Maximum	Unit	Conditions
Print Cycle (S.L.T.)	0.42	ml/Line	T=25℃
Supply Energy	0.09	mJ/Dot	
Supply Voltage	24	V	Voltage among the connector terminals
Substrate Temperature	70	℃	Temperature detected by Thermistor
Number of heating dots at same time	320	Dots	
Logic Supply Voltage (V_{DD})	3.3	V	
Logic Supply Current (I_{DD})	255	mA	ALL-HIGH

Table 3-10 TPH Maximum Condition (At 25℃)

3-3-7 Other Component Specification

Item	Description	Remark
Auto Cutter	• Model: ORC-RWB80 (OHYANE RIKI MFG, Co., Ltd) • Type: Guillotine Type • Motor: DC Brush Motor FK-180SH-12280 (Mabuchi Motor) • Voltage: 24V DC ± 5%(Motor), 5V DC ± 5%(Switch) • Current: 200mA (Average), 1.5A(Peak)	
Paper Feed Motor	• Model: STH-39H0001 (SHINANO MOTOR CO, LTD.) • Type: 2-Phase, Bi-Polar chopper dual,3.75 Step angle • Voltage: 4.13V ± 10% DC • Drive Current: 0.7A [PHASE] • Winding Resistance: 5.9Ω ±10% @ 25℃ • Winding Inductance: 4.2mH ±20% @ 1KHz 1Vrms	
Paper End Sensor	• Reflection Type Photo Sensor	
Paper Roll Near End Sensor	• Reflection Type Photo Sensor	

Table 3-11 Other Component Specification

3-4 SMPS Specifications

3-4-1 SMPS (Switching Mode Power Supply) Specification

Item	Description	Remark
Input Voltage	• Typical: 100V ~ 240V AC • Min: 90V AC • Max: 264V ac	
Input Current	• Max: 1.5A (When 120V)	
Inrush Current Limiting	• Max: 30A at 115Vac input Voltage for a cold start at 25℃ ambient conditions	
Load Regulation	• +24V ±5% @ 0~2.5A Static • +24V +5/-10% @ 2~6.5A Dynamic	
Ripple Noise	• ±200mV @ 24Vdc	
Short-Circuit Protection	• The power supply shall not be damaged from the condition that between DC output and DC ground are shorted. An output short circuit is defined as output impedance of less than 300mΩ for greater than 1 second. The power supply will operate normally when this condition is removed promptly within 2 seconds.	
O.V.P (Over Voltage Protection)	• 26Vdc~30Vdc	
O.T.P (Over-temperature Protection)	• The power supply will be shutdown at an over-temperature condition. This shutdown shall be cleared by removal of this abnormal condition and input power recycling.	

Table 3-12 Power Adapter (SMPS) Specification

3-4-2 SMPS Output Connector

Pin Number	Signal Name
1	+24 VDC
2	GND
3	N.C
Shield	Frame GND

Table 3-13 Power Connector Pin Description
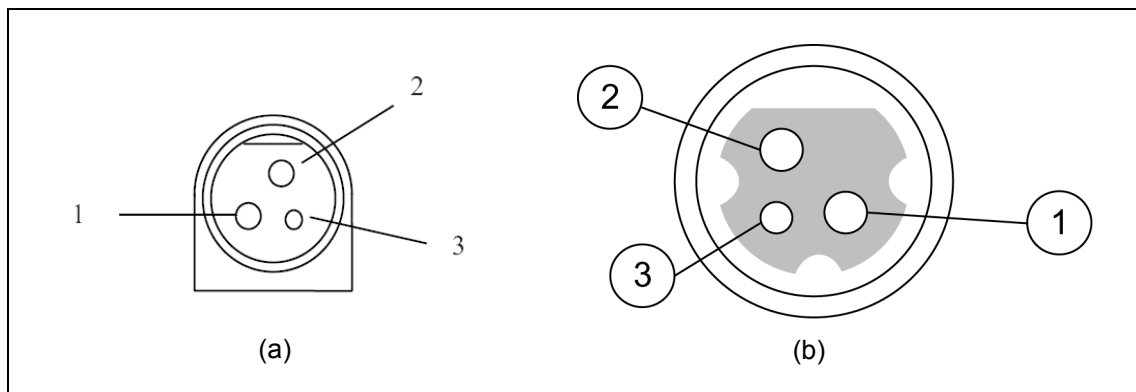
Figure 3-5 SMPS DC Output Connector(a) & Printer Power Connector(b)

3-5 Interface Specifications

3-5-1 RS-232C Serial Interface

3-5-1(a) Specification

Item	Description	Remark
Data Transmission	• Serial	
Synchronization	• Asynchronous	
HandShaking (Flow Control)	• H/W: DTR/DSR • S/W: XON/XOFF	XON: ASC Code 11h XOFF:ASC Code 13h
Signal Level	• Logic1 (MARK): -3V ~ -15V • Logic0 (SPACE): +3V ~ +15V	
Baud Rate	• 2400/4800/9600/19200/38400/57600/115200 bps	
Data Word Length	• 8 bits	
Parity	• None	
Connector	• DB25P Female (I/F PBA)	

Table 3-14 RS-232C Specification

※ **Note:** The HandShaking (Flow Control) / Data Word Length / Baud Rate / Parity functions depend on the DIP Switch settings. Refer to the Operation Manual.

3-5-1(b) RS-232C I/F Cable

1850mm±50mm

Connector: User Spec.   Printer Side: D-SUB25P-Male
In Case PC: D-SUB25P-Female or D-SUB9P-Female
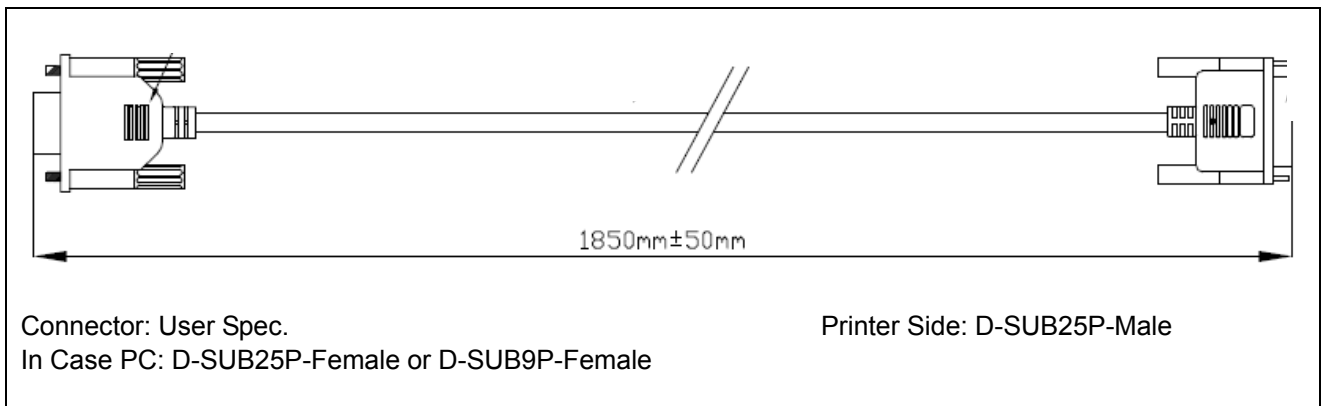
Figure 3-6 RS-232C Cable

3-5-1(c) Cable Connection
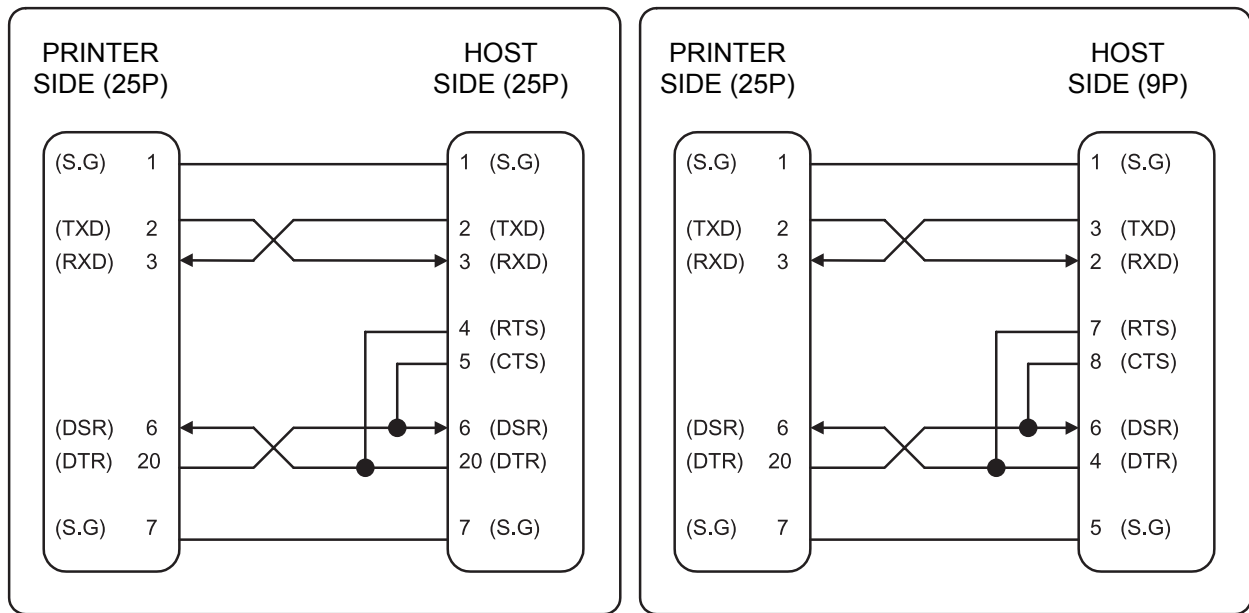
Figure 3-7 RS-232C Cable Connection

3-5-1(d) Signal Description

Pin No.	Signal name	Direction	Function
1	FG	-	Frame Ground
2	TxD	Output	Transmit Data
3	RxD	Input	Receive Data
4	RTS	Output	Ready To Send
5	CTS	Input	Clear To Send
6	DSR	Input	This signal indicates whether the host computer can receive data. (H/W flow control) 1) MARK(Logic1): The host can receive a data. 2) SPACE(Logic0): The host can not receive a data. 3) The printer transmits a data to the host, after confirming this signal. 4) When XON/XOFF flow control is selected, the printer does not check this signal.
7	SG	-	Signal Ground
20	DTR	Output	This signal indicates whether the printer is busy. (H/W flow control) 1) MARK(Logic1): The printer is busy. 2) SPACE(Logic0): The printer is not busy. 3) The host transmits a data to the printer, after confirming this signal. 4) When XON/XOFF flow control is selected, the host does not check this signal.

Table 3-15 RS-232C Pin Description

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3-5-1(e) H/W Flow Control

When DTR/DSR flow control is select, before transmitting a data, the Printer checks whether the host is BUSY or not. If the host is BUSY, the Printer does not transmit a data to the host. If the host is not BUSY, the Printer transmits a data to the Host. The host is the same. Refer to the Interface Part of Chapter 7 (Special Circuit Diagrams).

3-5-1(f) S/W Flow Control

When XON/XOFF flow control is selected, the printer transmits XON(ACSII 11h) or XOFF(ASCII 13h) signal through the TXD line.

If the Printer is BUSY, the Printer transmits XOFF(ASCII 13h) to host through the TXD line. Then the host recognize that the Printer is BUSY. So, the host does not transmit a data to the Printer. If the Printer is released from BUSY, the Printer transmits XON(ASCII 11h) to host through the TXD line. Then the host recognize that the Printer is not BUSY. And the host transmit a data to the Printer.

※ **Note:** Refer to the Operation Manual about XON/XOFF flow control.

3-5-2 IEEE1284 Parallel Interface

Bidirectional parallel interface: in accordance with the IEEE1284 Nibble/Byte mode.

3-5-2(a) Forward Mode Specification (Compatibility mode)

Data transmission from host computer to printer: Centronics compatible

Item	Description	Remark
Data Transmission	• 8-bits Parallel	
Synchronization	• External supplied nStrobe signals	
HandShaking	• nACK and Busy signals	
Signal Level	• TTL compatible	
Connector	• Centronics 36P	

Table 3-16 IEEE1284 Specification

3-5-2(b) Reverse Mode Specification (Nibble / Byte mode)

Data transmission from the printer to the host computer.

The STATUS data transmission from the printer to the host computer is accomplished in the Nibble or Byte mode. This mode allows data transmission from the asynchronous printer under the control of the host computer. Data transmission in the Nibble mode are made via the existing control lines in units of for bits (Nibble). In the Byte mode, data transmission in accomplished by making the 8-bit data lines bidirectional. Neither mode can operate at the same time as the compatibility mode, so switching is always required.

3-5-2(c) Signal Specification (Compatibility/Nibble/Byte mode)

Pin No.	Source	Compatibility Mode	Nibble Mode	Byte Mode
1	Host	nStrobe	HostClk	HostClk
2	Host / Printer	Data 0 (LSB)	-	Data 0 (LSB)
3	Host / Printer	Data 1	-	Data 1
4	Host / Printer	Data 2	-	Data 2
5	Host / Printer	Data 3	-	Data 3
6	Host / Printer	Data 4	-	Data 4
7	Host / Printer	Data 5	-	Data 5
8	Host / Printer	Data 6	-	Data 6
9	Host / Printer	Data 7 (MSB)	-	Data 7 (MSB)
10	Printer	nAck	PtrClk	PtrClk
11	Printer	Busy	PtrBusy/Data3,7	PtrBusy
12	Printer	Perror	AckDataReq /Data2,6	AckDataReq
13	Printer	Select	Xflag/Data1,5	Xflag
14	Host	nAutoFeed	HostBusy	HostBusy
15		NC	ND	ND
16		GND	GND	GND
17		FG	FG	FG
18	Printer	Logic-H	Logic-H	Logic-H
19~30		GND	GND	GND
31	Host	nInit	nInit	nInit
32	Printer	nFault	nDataAvail /Data0,4	nDataAvail
33		GND	ND	ND
34	Printer	DK_Status	ND	ND
35	Printer	+5V	ND	ND
36	Host	nSelectIn	1284-Active	1284-Active

Table 3-17 IEEE1284 Pin Description

3-5-2(c) IEEE1284 I/F Cable

Host Side: DB25M   Printer Side: CN36M
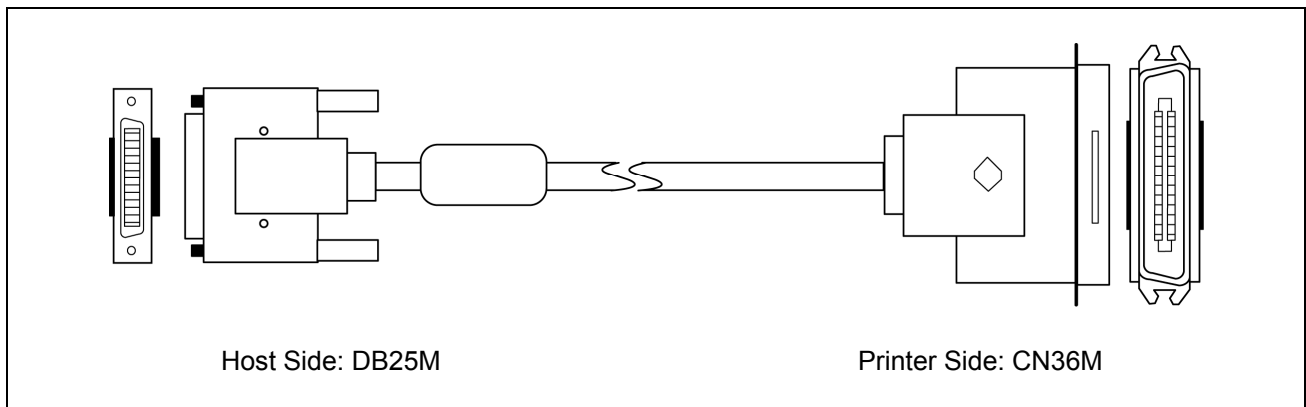
Figure 3-8 IEEE1284 Cable

3-5-3 USB2.0 Interface

SRP-F310/312 support the USB (Universal Serial Bus) Serial Communication.

3-5-3(a) Specification

Item	Description	Remark
Transfer Type	• BULK	
Data Signal	• Bi-direction, Half-Duplex • Differential Signal Pair (D+ / D-)	
Data Format	• NRZI Format • Zero Bit Stuffing after 6 ones	
Speed	• 480 Mbps	
Cable & Connector	• Cable: 5m / 2m • Connector: B Type(Device) / A Type(Host)	
Other	• Supports the 480 Mbps high-speed mode (HS) for USB 2.0, as well as the 12 Mbps full-speed (FS) and the low-speed (LS modes) for USB 1.1	

Table 3-18 USB Specification

3-5-3(b) Signal Description

Pin No.	Signal Name	Assignment(Color)	Function
Shell	Shield	Drain Wire	Frame Ground
1	VBUS	Red	Host Power: DC5[V] / 500[mA]
2	D-	White	Differential Data Line
3	D+	Green	Differential Data Line
4	GND	Black	Signal Ground

Table 3-19 USB Pin Description

3-5-3(c) Cable

USB cable consists of four conductors, two power conductors, and two signal conductors.
High-/full-speed cable consists of a signaling twisted pair, VBUS, GND, and an overall shield. High-/full speed cable must be marked to indicate suitability for USB usage. High-/full-speed cable may be used with either low-speed, full-speed, or high-speed devices. When high-/full-speed cable used with low-speed devices, the cable must meet all low-speed requirements.
Low-speed recommends, but does not require the use of a cable with twisted signaling conductors.
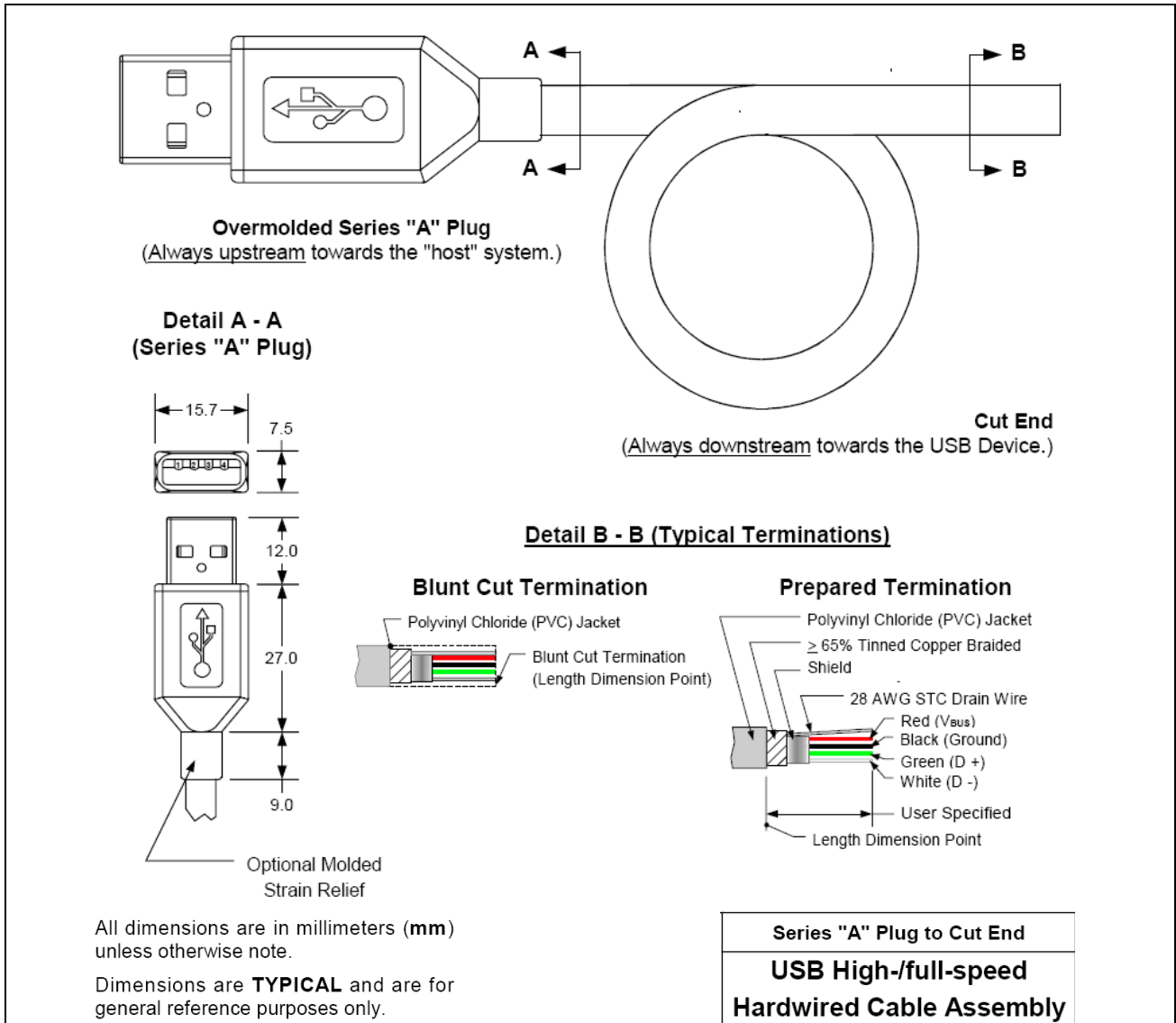
Figure 3-9 USB Cable

3-5-4(d) Construction

Raw materials used in the fabrication of this cable must be of such quality that the fabricated cable is capable of meeting or exceeding the mechanical and electrical performance criteria of the most current USB Specification revision and all applicable domestic and international safety/testing agency requirements; e.g., UL, CSA, BSA, NEC, etc., for electronic signaling and power distribution cables in its category.

American Wire Gauge (AWG)	Nominal Conductor Outer Diameter	Stranded Tinned Conductors
28	0.381 mm (0.015) 0.406 mm (0.016)	7 x 36 19 x 40
26	0.483 mm (0.019) 0.508 mm (0.020)	7 x 34 19 x 38
24	0.610 mm (0.024) 0.610 mm (0.024)	7 x 32 19 x 36
22	0.762 mm (0.030) 0.787 mm (0.031)	7 x 30 19 x 34
20	0.890 mm (0.035) 0.931 mm (0.037)	7 x 28 19 x 32

Table 3-20 Power Pair

※ **Note:** Minimum conductor construction must be stranded tinned copper.

To minimize end user termination problems, USB uses a keyed connector protocol. The physical difference in the Series A and B connectors insures proper end user connectivity. The A connector is the principle means of connecting USB devices directly to a host or to the downstream port of a hub. All USB devices must have the standard Series A connector specified in this chapter. The B connector allows device vendors to provide a standard detachable cable. This facilitates end user cable replacement.
Figure 2-10 illustrates the keyed connector protocol.

Series A Connectors

◆Series A plugs are

always oriented upstream

towards the *Host System*
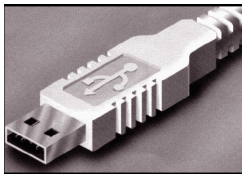
A Plugs
(*From the*

USB Device)

Series B Connectors

◆Series B plugs are

always oriented downstream towards

the *U*SB *Device*
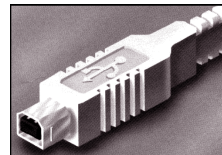
B Plugs
(*From the*

Host System)

A Receptacles

(*Downstream Output*

from the USB Host or Hub)
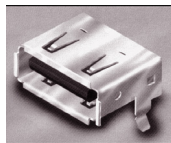
B Receptacles

(*Upstream Input to the*

USB Device or Hub)
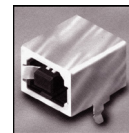
Figure 3-10 Keyed Connector Protocol

The following list explains how the plugs and receptacles can be mated:

• Series "A" receptacle mates with a Series "A" plug. Electrically, Series "A" receptacles function as outputs from host systems and/or hubs.
• Series "A" plug mates with a Series "A" receptacle. The Series "A" plug always is oriented towards the host system.
• Series "B" receptacle mates with a Series "B" plug (male). Electrically, Series "B" receptacles function as inputs to hubs or devices.
• Series "B" plug mates with a Series "B" receptacle. The Series "B" plug is always oriented towards the USB hub or device.

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3-6 Cash Drawer Specifications

3-6-1 Drawer Cable
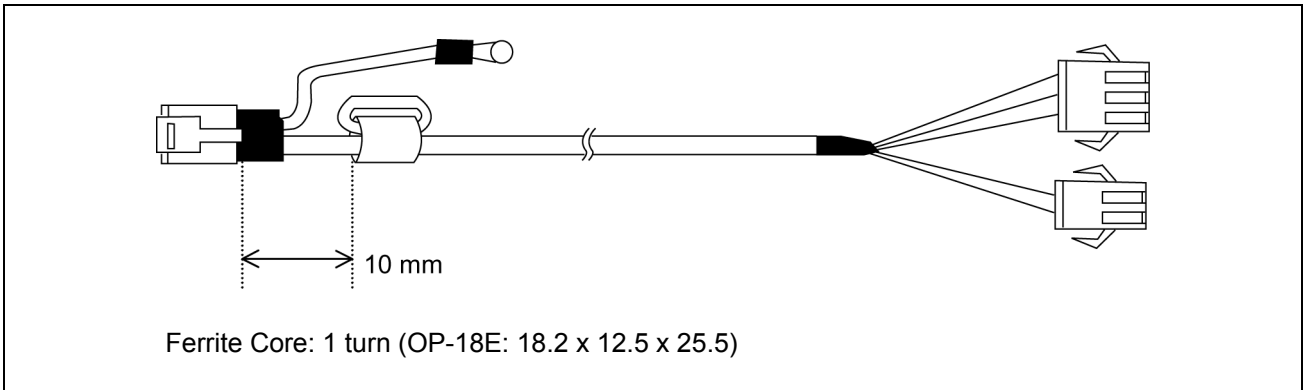
Figure 3-11 Drawer Cable

3-6-2 Cable Connection

Pin No.	Description	Direction
1	Frame GND	-
2	Drawer Kick-Out Driver Signal #1	Output
3	Drawer Open / Close Signal	Input
4	+24V	-
5	Drawer Kick-Out Driver Signal #2	Output
6	Signal GND	-

Table 3-21 Drawer Cable Connection

※ **Note:** +24V is always output through pin 4 during power on.

3-7 ETHERNET Specifications

3-7-1 Ethernet

1) Ethernet specifications
Network Interface: 10/100 Base-T All in one type (Auto detection)

[Protocol]

Layer	Protocol
Network Layers	ARP, IP, ICMP
Transport Layers	TCP, UDP
Application Layers	DHCP, DNS, Raw Print, SMTP(notify Printer status) HTTP, HTTPS(setting), FTP (settings), TELNET (settings)

2) Ethernet cable
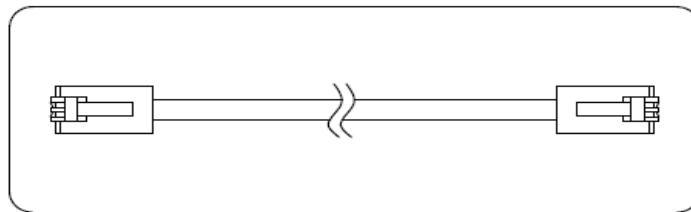
3) Ethernet signal descriptions

Pin No.	Signal name	Assignment (Color)	Function
1	TD+	White Orange	Transmit +
2	TD-	Orange	Transmit -
3	TCT	White Green	Receive +
4	NC	Blue	
5	NC	White Blue	
6	RCT	Green	Receive -
7	RD+	White Brown	
8	RD-	Brown	

* For more information, refer to the Network User Manual in Bixolon Web Site.

4) Ethernet MAC address
When you open the cover, you can see the 'ethernet MAC address' on the board.
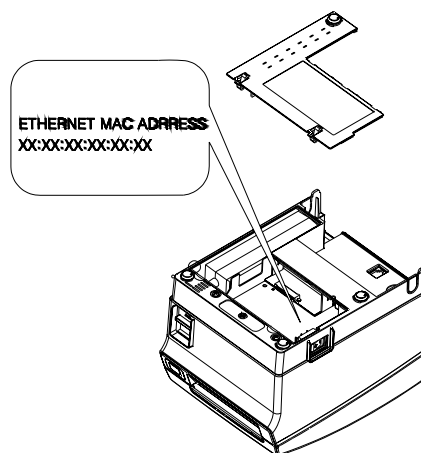
3-7-2 WLAN

1) WLAN specifications
Support IEEE 802.11b/g Infrastructure, Ad-hoc mode.

Frequency Band and Operating Channels]

Item	Description
Frequency band	2.4000 – 2.497 GHz
Modulation	OFDM with BPSK, QPSK, 16QAM, 64QAM (11g) BPSK, QPSK, CCK (11b)
Data rate	: 54/48/36/24/18/12/11/9/6/5.5/2/1 Mbps auto fallback

[Protocol]

Layer	Protocol
Network Layers	ARP, IP, ICMP
Transport Layers	TCP, UDP
Application Layers	DHCP, DNS, Raw Print, SMTP(notify Printer status) HTTP, HTTPS(settings), FTP (settings), TELNET (settings)

[Security]
  - WEP64/128
  - WPA/WPA2(TKIP/AES-CCMP) PSK
  - HTTPS(SSL2.0, SSL3.0, TLS1.0)

2) WLAN USB extension cable
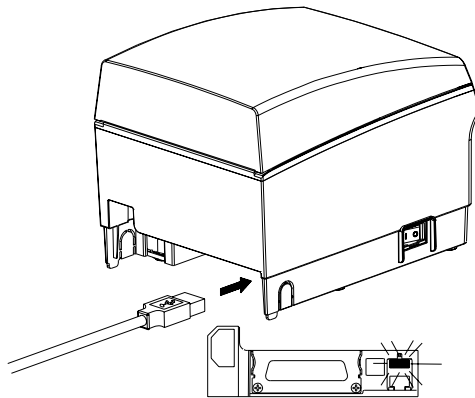
3) Compatible WLAN USB adaptor list
SRP-F310/312 is compatible with WLAN USB adaptor using RT73(RT2571W/RT2573/RT2671) chipset.
You can use WLAN printer with WLAN USB adaptor offered by BIXOLON Co.,Ltd. or purchased by personally.
Tested WLAN USB adaptor list is below.

  - CNET CWD-854
  - TP-Link TL-WN32G
  - D-Link DWA-110
  - Buffalo WLI-U2-SG54HP

We recommand using WLAN USB adaptor in a list.
* For more information, refer to the Network User Manual in BIXOLON Co.,Ltd. Web Site.

4. Hardware

4-1 Wiring Diagram
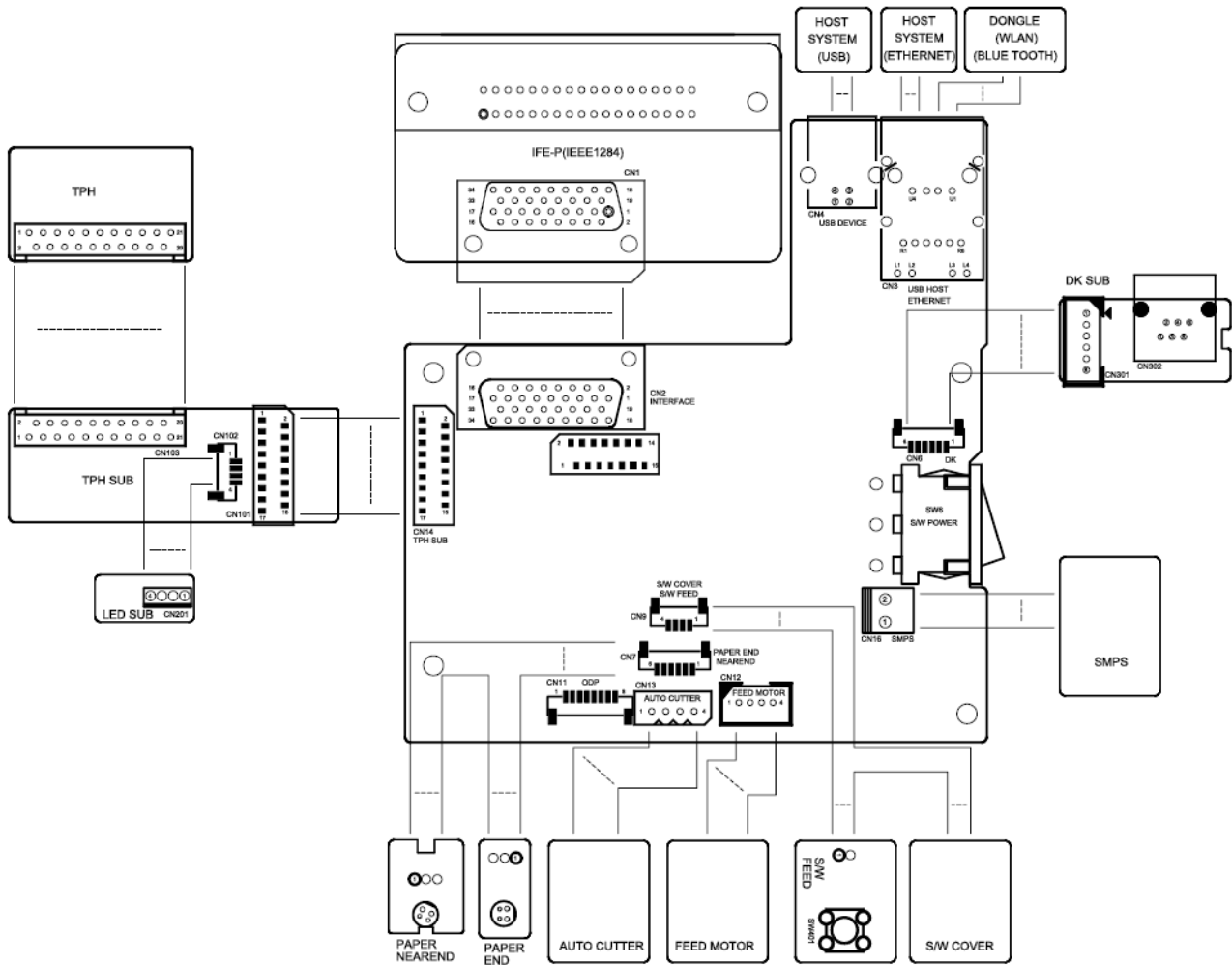
[Figure 4-1 Board Wiring Diagram]

4-2 Block Diagram

Power Source Control Parts

SPEAr Basic Power

Power Parts

A4490SES_T

EPS(SMPS)

SWITCH

HOST[1:0]_VDDb3: +3.3V
VDD3: +3.3V
DEVICE_VDDb3: +3.3V

VDD5V0
VDD3V3

VDD24V0

HOST[1:0]_VDDbc: +2.5V
DEVICE_VDDbc: +2.5V
MCLK_VDD2v5: +2.5V
DITH[2:1]_AVDD: +2.5V
ADC_VDD: +2.5V

VDD2V5

DDR_COMP_1V8: +1.8V
SSTL_VDDe: +1.8V

VDD1V8

RTC_VDD

VDD1V5

VDD_CORE: +1.2V
MCLK_VDD: +1.2V
USB_VDDbs: +1.2V

VDD1V2

PL_GPIO

SW_POWER_ON_OFF

POWER_ON_OFF_CTL

POWER
CONTROL
PARTS

SPEAr BASIC to FPGA ProASCI3(A3P250) Interface

SPEAr Basic

FPGA ProASIC3 A3P250

FSMC_A[7:0]
FSMC_D[7:0]
FSMC_nCS[2:1]
FSMC_nW
FSMC_nR
FSMC_RnB
FPGA_IRQ[1:0]
FPGA_CLK[3:0]
FPGA_nCS_SEL
nRESET

FSMC_A[7:0]
FSMC_D[7:0]
FSMC_nCS[2:1]
FSMC_nW
FSMC_nR
FSMC_RnB
FPGA_IRQ[1:0]
FPGA_CLK[3:0]
FPGA_nCS_SEL
nRESET

VDD3V3

10K

100nF

GND
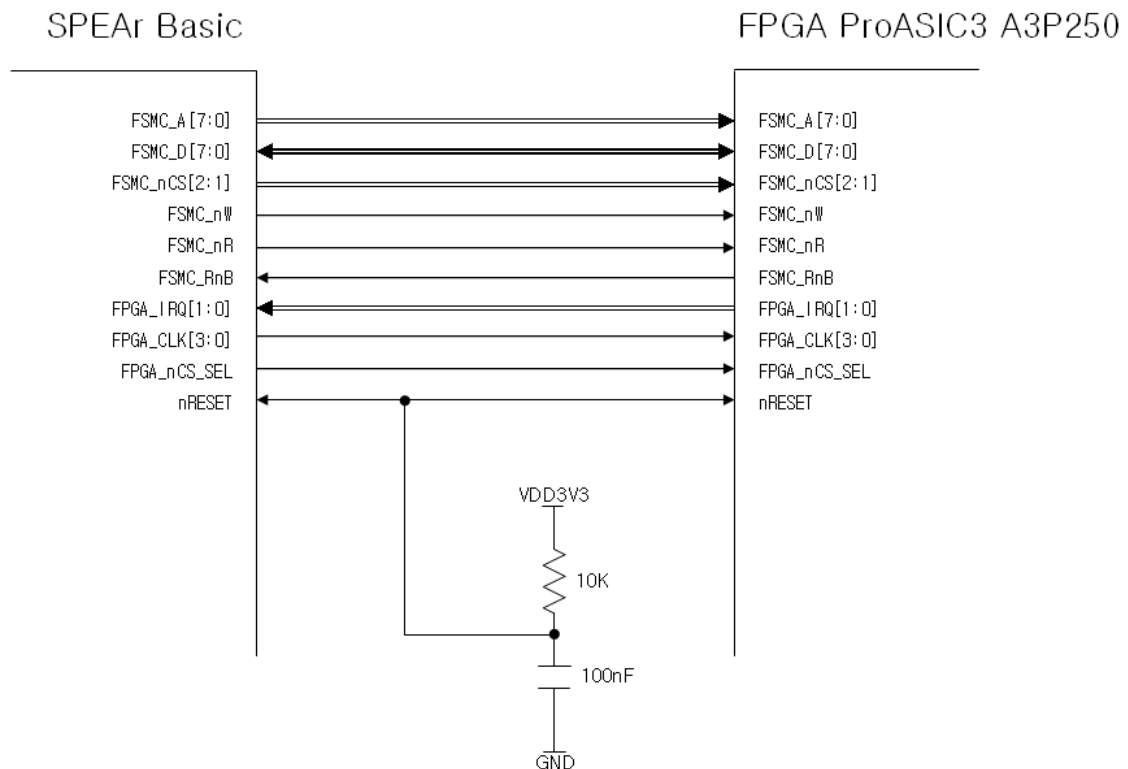
Memory Parts (DDR Memory)
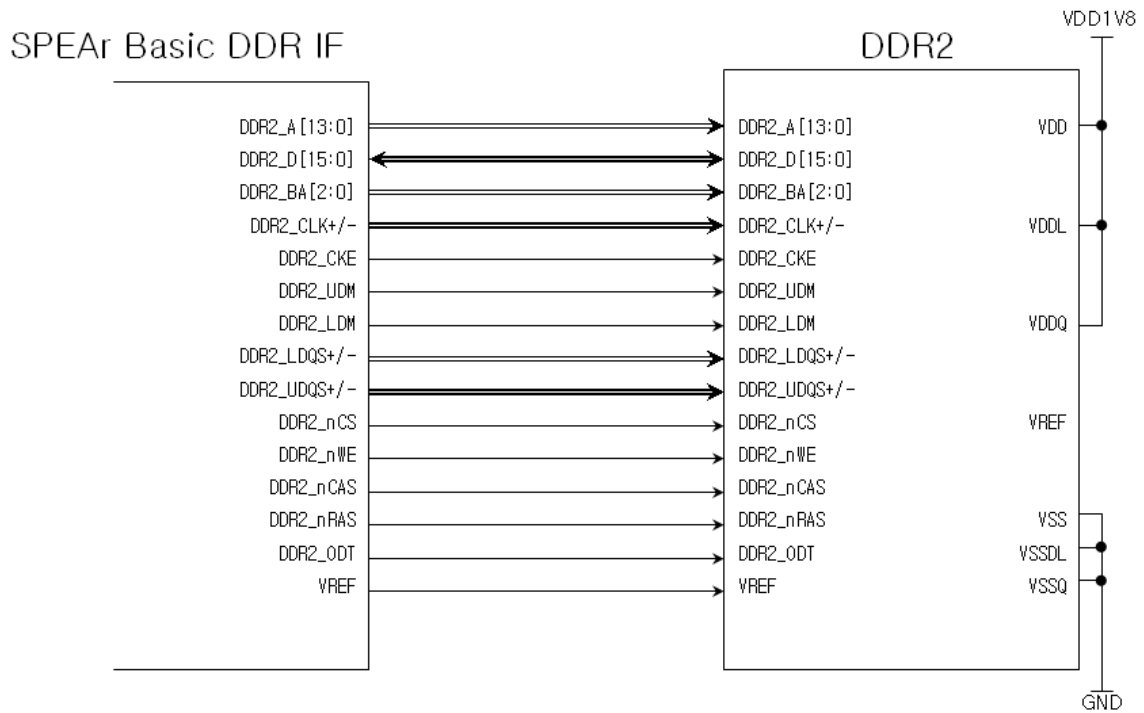
Memory Parts (NAND Flash Memory)
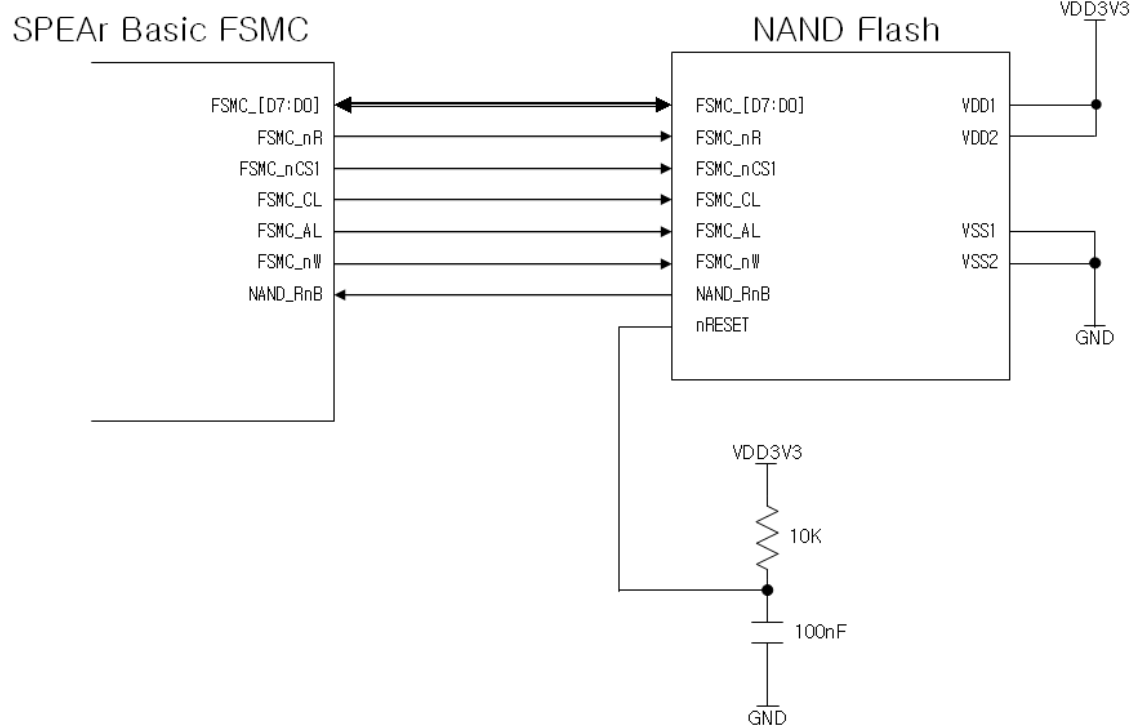
Interface (USB Host, USB Device)

SPEAr Basic USB

HOST0_VBUS
USB_HOST0_DN & DP
HOST0_OVERCURR

HOST1_VBUS
USB_HOST1_DN & DP
HOST1_OVERCURR

DEV_VBUS
USB_DEVICE_DN & DP

USB A Connector

HOST0_VBUS
USB_HOST0_DN & DP

BLUE TOOTH
WLAN
WUSB

Load Switch

HOST0_VBUS
HOST0_OVERCURR

HOST1_VBUS
HOST1_OVERCURR

USB B Connector

DEV_VBUS
USB_DEVICE_DN & DP
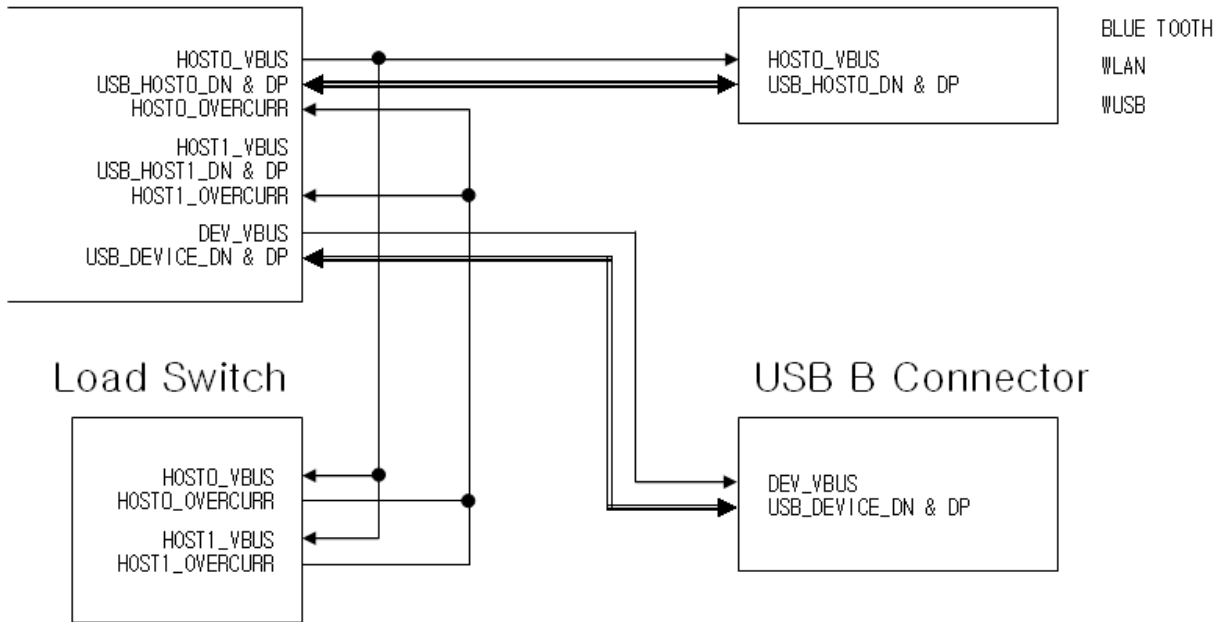
Interface (Ethernet)

SPEAr Basic FSMC

MII_TXD[3:0]
MII_TXEN
MII_TXCLK
MII_TXERR
MII_RXD[3:0]
MII_RXCLK
MII_RXERR
MII_RXDV
MII_MDC
MII_MDIO
MII_MDINT
MII_CRS
MII_COL

MII_CFG[1:0]
MII_FDE
MII_MF[4:0]

FPGA ProASIC3 A3P250

NAND_RnB

E-STE100P

MII_TXD[3:0]   VCCA[5:1]
MII_TXEN   DVDD[3:1]
MII_TXCLK
MII_TXERR
MII_RXD[3:0]   VSCCA[5:1]
MII_RXCLK   DVDD[3:1]
MII_RXERR
MII_RXDV
MII_MDC
MII_MDIO
MII_MDINT
MII_CRS   TX_P & TX_N
MIICOL   RX_P & RX_N

MII_CFG[1:0]   LEDLM
MII_FDE   LEDSP
MII_MF[4:0]
MII_RIP

nRESET

VDD3V3

GND

Engine Parts (TPH, Feed Motor & Auto Cutter Control)

SPEAr Basic

| | | | VDD24V0 | ## TPH |

TPH_DO
TPH_nLAT
TPH_CLK
TPH_nSTB[1:0]
TPH_PWR_CTL

MOTOR DRIVER IC   ## STEP MOTOR

MOT_PHASE[1:0]
MOT_IN[11:01]

CUT_ENABLE
CUT_PHASE
CUT_MODE

AUTO CUTTER

VDD3V3

Digital Input

SW_CUTTER
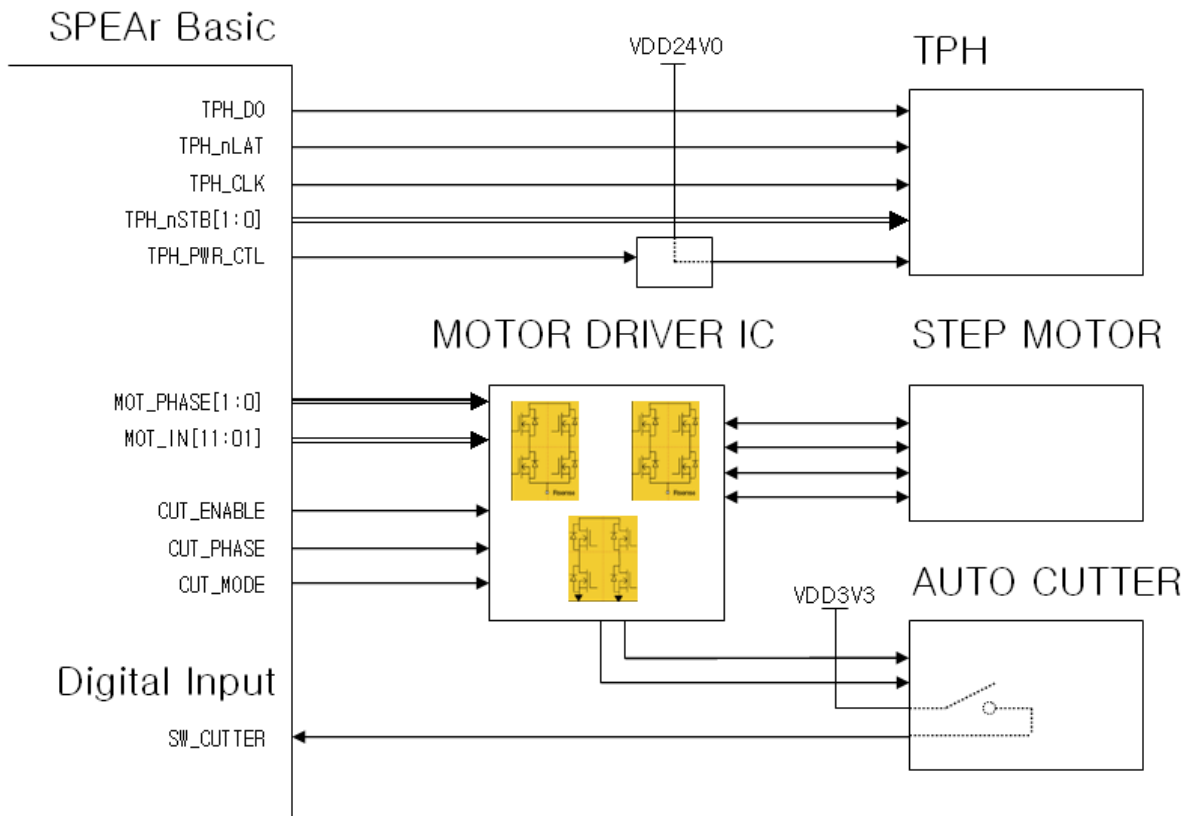
SPEAr BASIC Sensor, Etc. Parts (PL_GPIO & Interrupt)

Digital Input

PAPER_NEAREND
SW_COVER
SW_ETHERNET
SW_DK
SW_FEED

Digital Output

LED_PAPER
SW_POWER_ON_OFF

ADC Input

TPH_TM
BLACK_MARK
Power Level [2:0]

Configuration

TEST_ [4:0]
BOOT_SEL
MODE_BOOT[3:0]
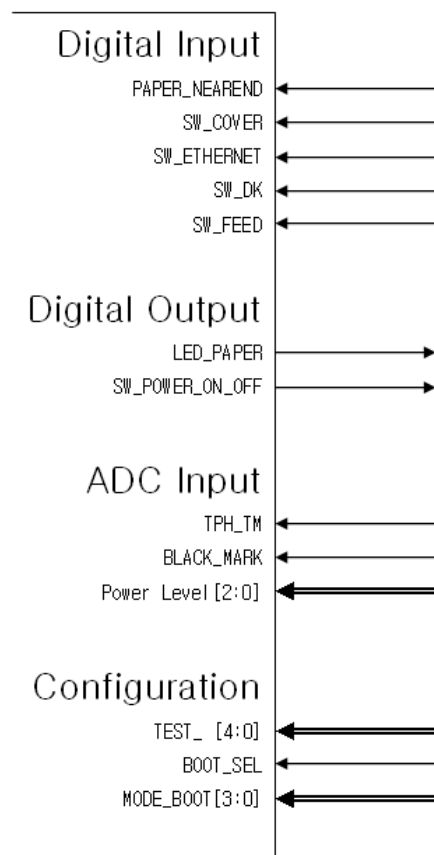
FPGA A3P250 Sensor, Etc. Parts (PL_GPIO & Interrupt)
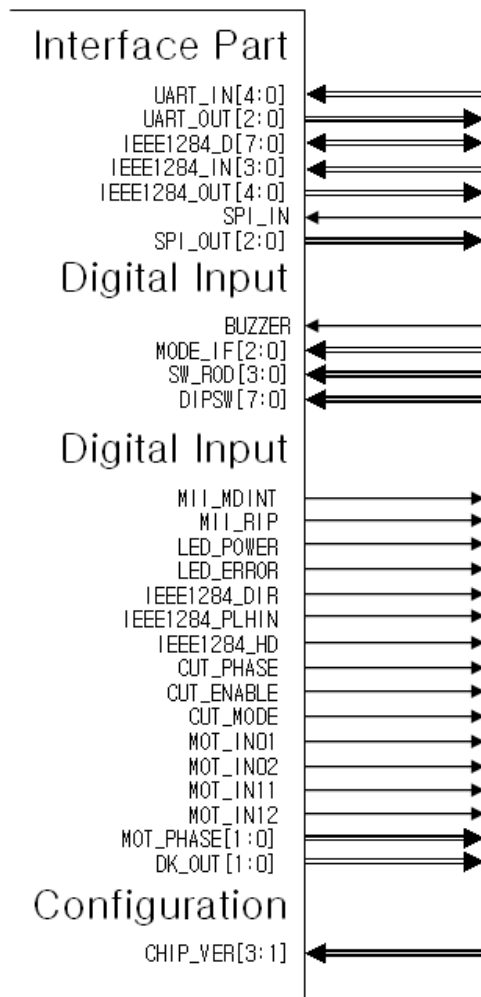
[Figure 4-2 Block Diagram]

4-3 Special Circuit Descriptions

4-3-1 Power Circuit

This system is operated under 100Vac or 240Vac. The power circuit supplies the three differential DC voltage sources.
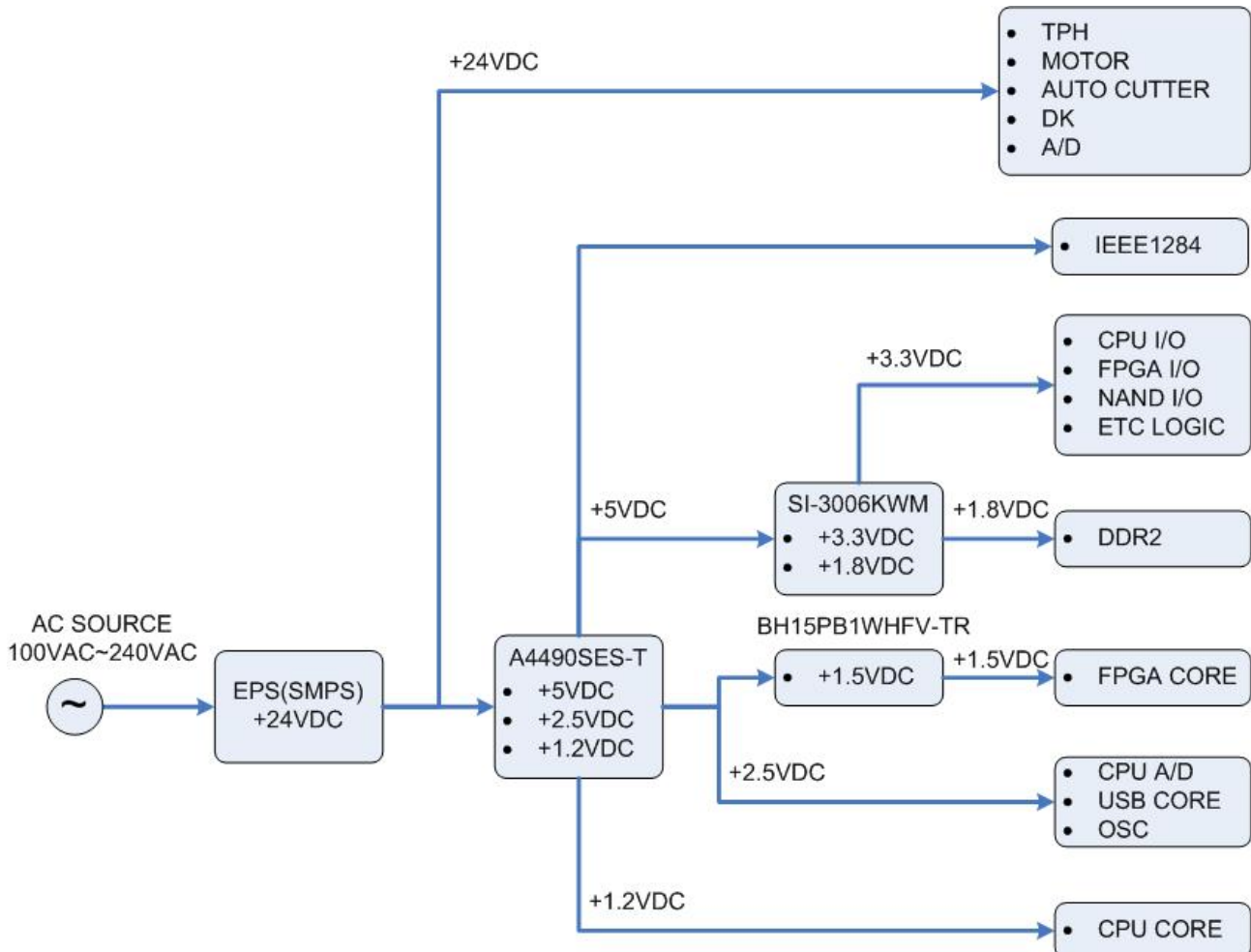
[Figure 4-3 Power Block Diagram]

1) Drawer Driving and Feed, Auto Cutter Motor Voltage and TPH Driving Voltage: +24VDC
+24VDC is supplied from SMPS. This Voltage is smoothed by capacitors (CE1).
This voltage is used as a Cash Drawer Solenoid Driving voltage, Step motor driving voltage and a source voltage of the other voltage sources and TPH Driving Voltage.

2) IEEE1284 Logic IC Driving Voltage: +5VDC
Step down voltage the input +24VDC to +5VDC by a switching regulation U13(A4490SES-T)

3) CPU I/O, FPGA I/O, NAND Flash and etc. LOGIC Voltage: +3.3VDC
Step down voltage the input +5VDC to +3.3VDC by a regulation.U15(SI-3006KWM)

4) CPU A/D, USB core and OSC Voltage: +2.5VDC
Step down voltage the input +24VDC to +2.5VDC by a switching regulation.U13(A4490SES-T)

5) DDR2 Voltage: +1.8VDC
Step down voltage the input +5VDC to +1.8VDC by a regulation.U15(SI-3006KWM)

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6) FPGA core Voltage: +1.5VDC
   Step down voltage the input +2.5VDC to +1.5VDC by a regulation.U16(BH15PB1WHFV-TR)

7) CPU core Voltage: +1.2VDC
   Step down voltage the input +24VDC to +1.2VDC by a switching regulation.U13(A4490SES-T)

4-3-2 RESET Circuit

Reset signal is signal in order to start-up CPU under Power-on.
Reset circuit uses a reset ASM811REUSF-T(U8). When 3.3Vdc is fallen under 2.7Vdc by Power-off,
reset signal prohibits the system from miss-operating by lowering down to 0V.
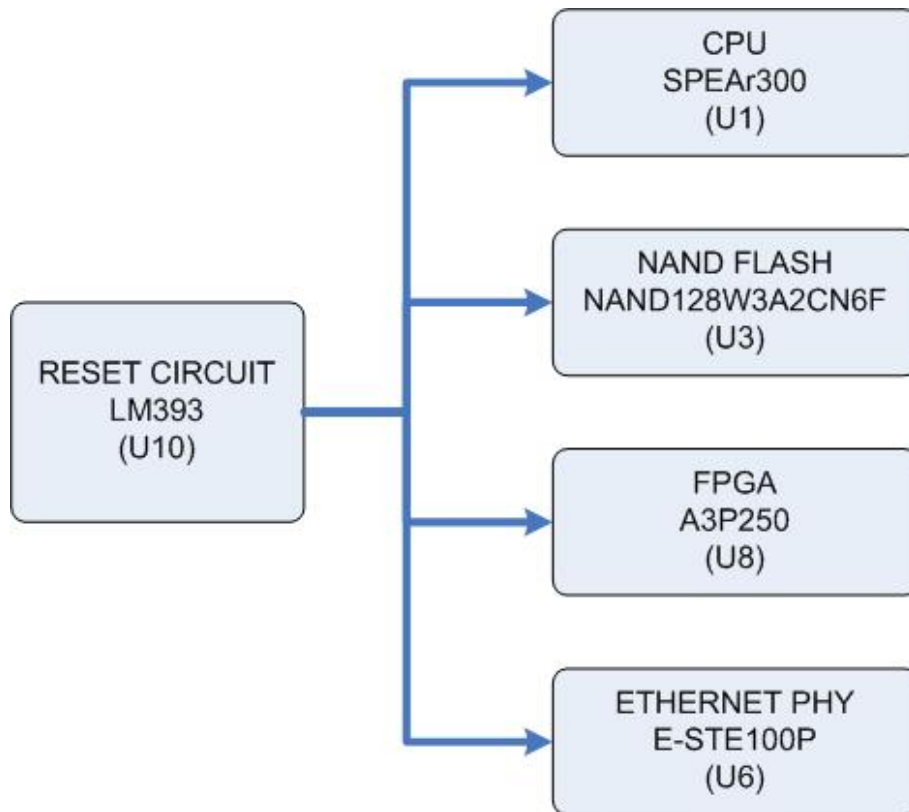
[Figure 4-4 Reset Block Diagram]
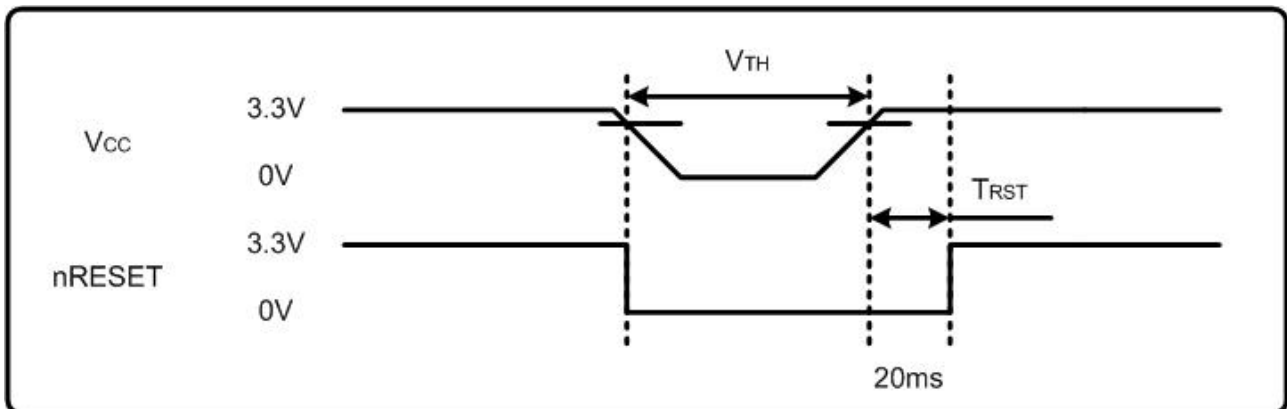
[Figure 4-5 Reset Waveform]

4-3-3 Buzzer and Cash Drawer Circuits

1) Buzzer Driving Circuit

The Buzzer is used to inform several kinds of states which occur under system operating and gives some information to users by controlling the CPU (SPEAr300)
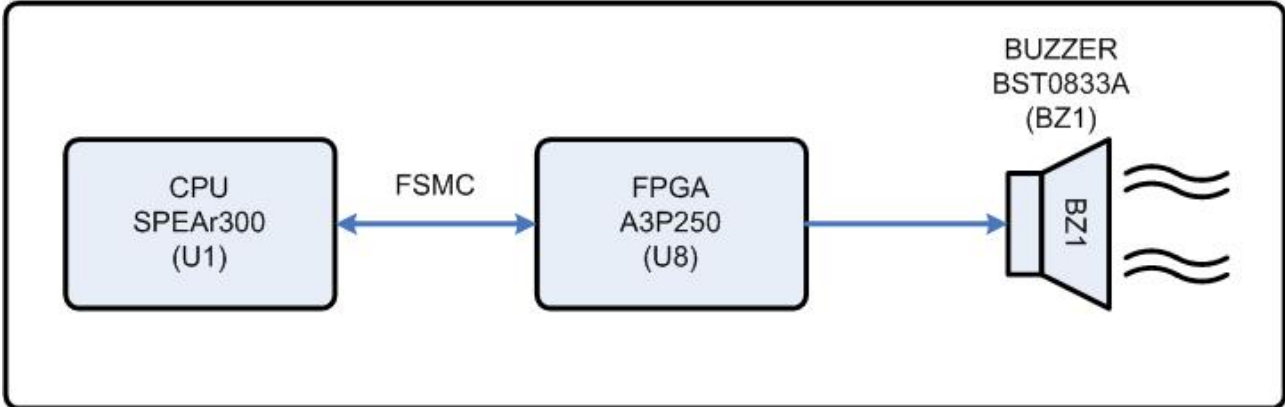
[Figure 4-6 Buzzer Block Diagram]

2) Cash Drawer Driving Circuit

The circuit is used for opening cash drawer and driven by the Q301, Q302(2SD2170). When its state is high level signal, Q301 or Q302 (2SD2170) drive the solenoid to open the cash drawer. As an optional item, we provide sensor switch (we call it a compulsory switch) which checks the drawer whether it is opened or not. This sensor switch turns on for the drawer open condition, and turns off for the other.

※ **Caution:** Make sure that the Cash Drawer solenoid resistance is more than 20Ω**.**
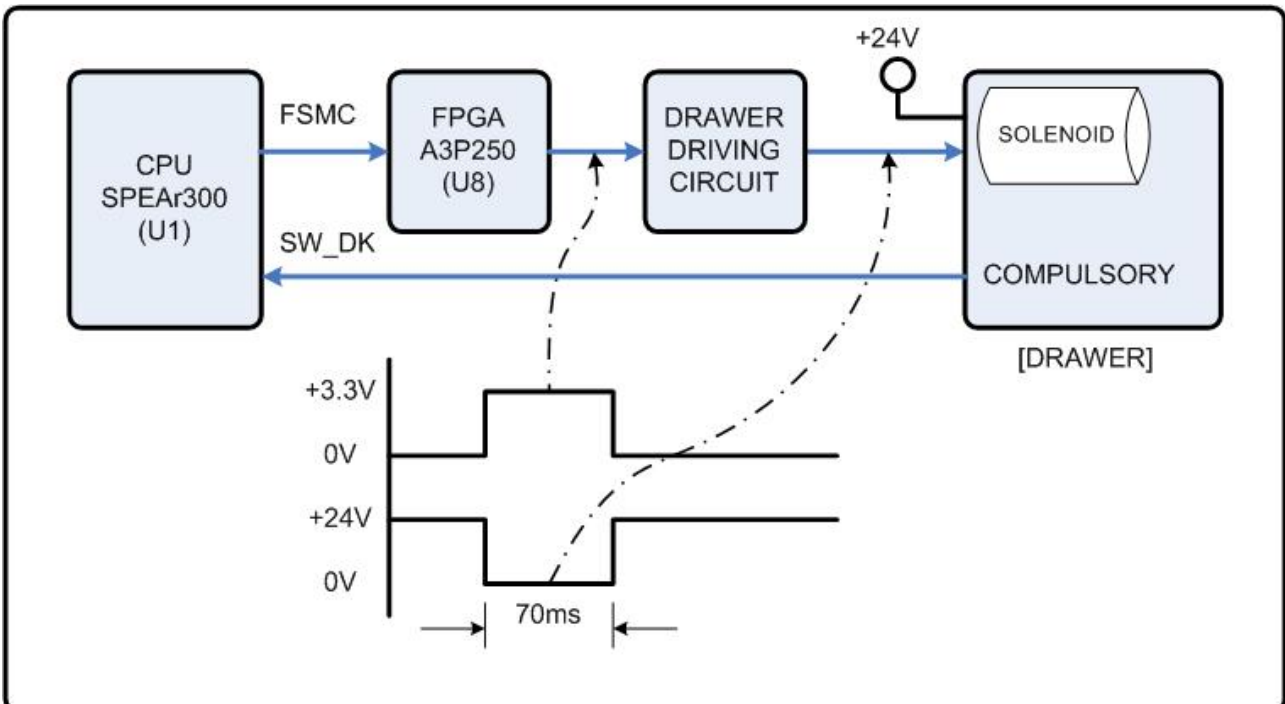
[Figure 4-7 Cash Drawer Block Diagram]

4-3-4 I/F PBA Detect Block Diagram

When the printer is ON, the printer checks what kind of the I/F PBA is installed. After detection, the CPU specify the I/O port properly. The following is the method of I/F PBA detection.
The I/F PBA has the three return Signal (MD0~2).
The CPU recognize the I/F PBA by the value of the three return signal.

I/F PBA	MD0	MD1	MD2
RS-232C	L	H	L
IEEE1284	H	L	L
No Connection	L	L	L

4-3-5 RS-232C Communication Block Diagram

The CPU is used for serial communication. And also RS-232C Driver (MAX232), is used to serial communication. Show following block diagram.
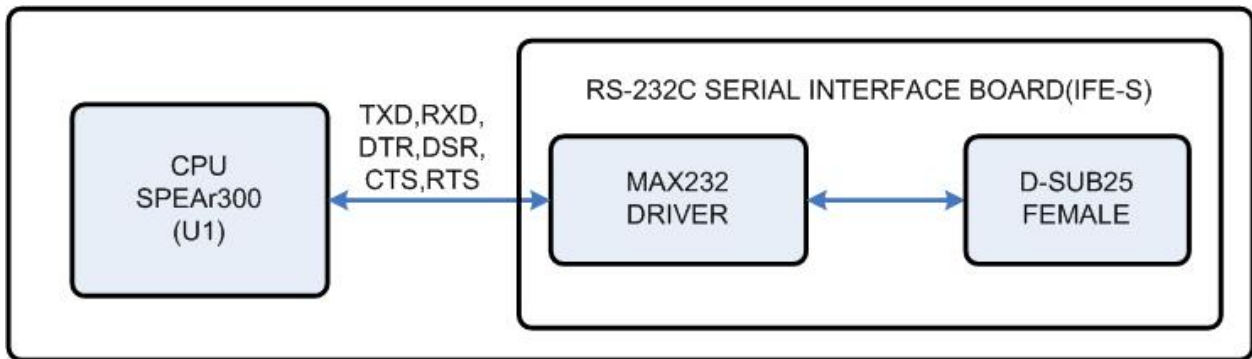
[Figure 4-8 RS-232C Communication Block Diagram]
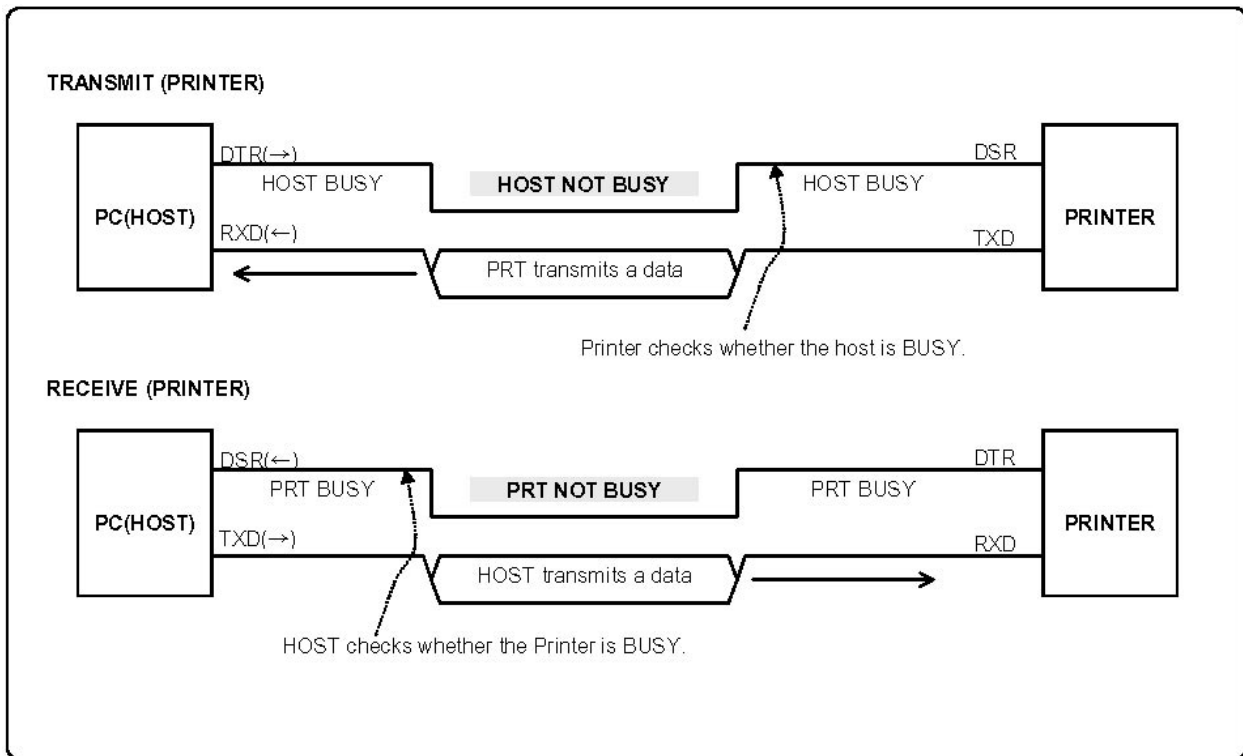
[Figure 4-9 RS-232C Communication Waveform]

4-3-6 Parallel Communication Block Diagram

The printer support the bidirectional Parallel Interface with Centronics, Nibble, Byte Mode.
The Centronics is Forward and the Nibble, Byte are reverse Mode.
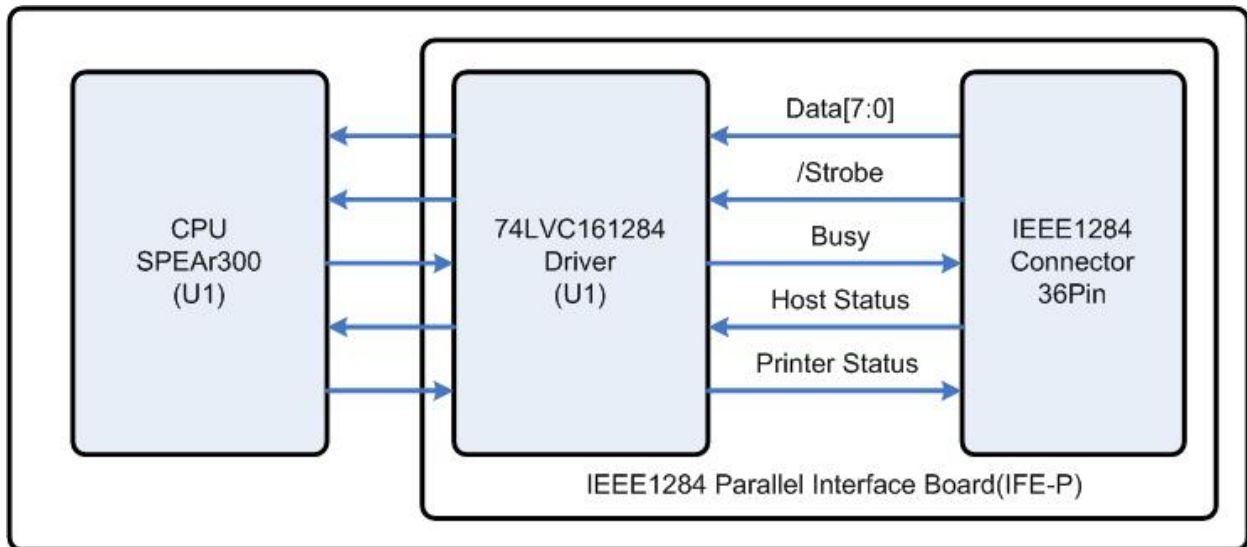
[Figure 4-10 IEEE1284 Communication Block Diagram]

4-3-7 USB Communication Block Diagram

The printer support the USB (Universal Serial Bus). The transfer type of the printer is the BULK.
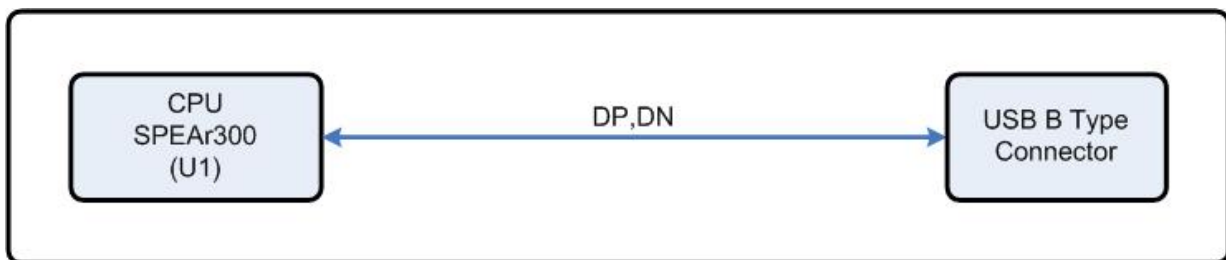
[Figure 4-11 USB2.0 Communication Block Diagram]

4-3-8 DIP Switch Circuit

The key board circuit consist of the scan signal of 3 lines and the return signal of 2-line. The CPU sends repeatedly and continuously the scan data DIP_A~DIP. The DIP S/W information input in the return signal if the specific DIP S/W is ON status during the given time. The CPU reads the data through DIP IN1~IN2 and analyzes what DIP S/W is ON and performs the selected function.
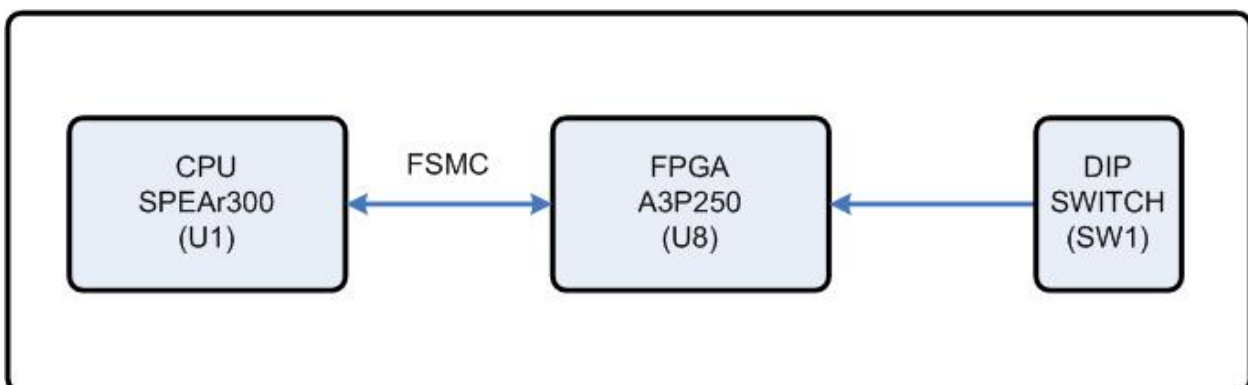
[Figure 4-12 USB Communication Block Diagram]

Rev. 1.00

4-3-9 Thermal Printer Head Circuit

First, the CPU sends a Serial Clock and Serial Data 256bits(32Bytes) to the Shift Register of the Thermal Printer. The Serial Data are stored to each Shift Register in the Thermal Printer. Because the Data#1 Pin and the Data#2 pin are shorted on Main PCB, the Data(256bits) are stored in both Shift Register#1 and #2. Second, the CPU send a Latch Signal to the Thermal Printer. Then, the Data of both Shift Register#1 and #2 (256*2=512bits) are moved to the Latch Register. After that, the CPU sends a Strobe Signal to the Thermal Printer. Then, the Printer outputs the Serial Data. Each Strobe Signal manages the Printer Dot.

STB No.	DOT No.	DOTs/STB	SRP-F310/312 Strobe Processing
STB1	1 ~ 256	256	The content of data is same.
STB2	257 ~ 512	256	
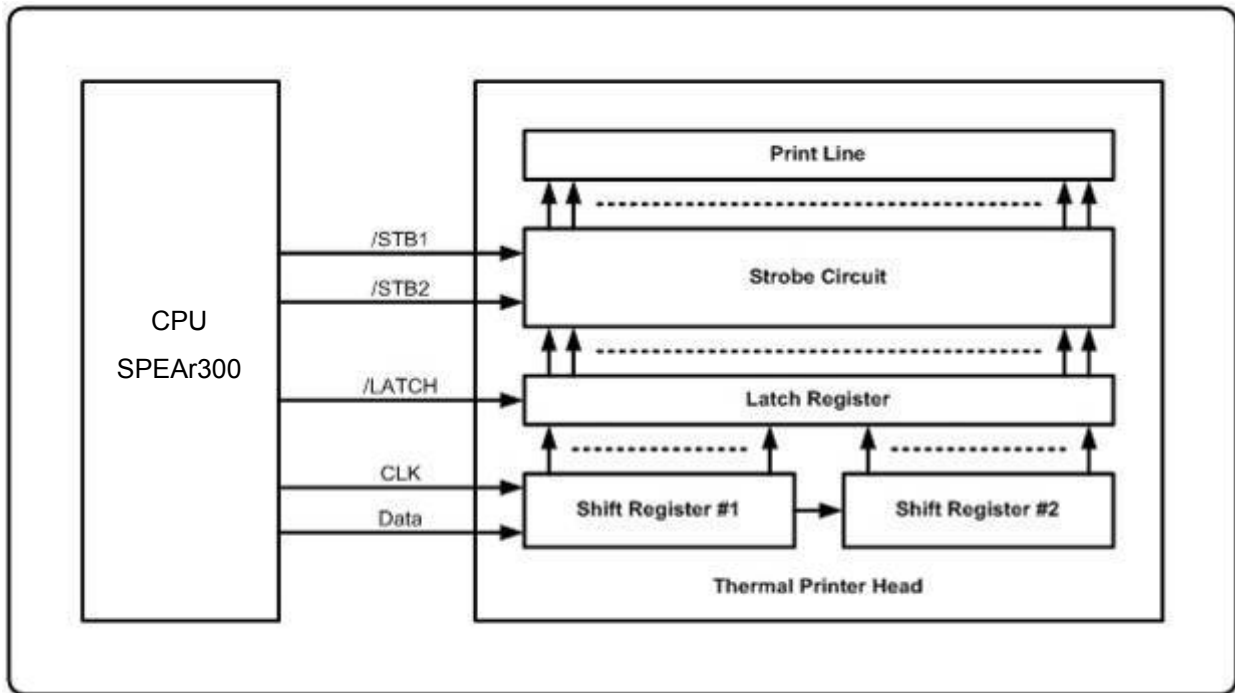
[Figure 4-13 Thermal Printer Block Diagram]
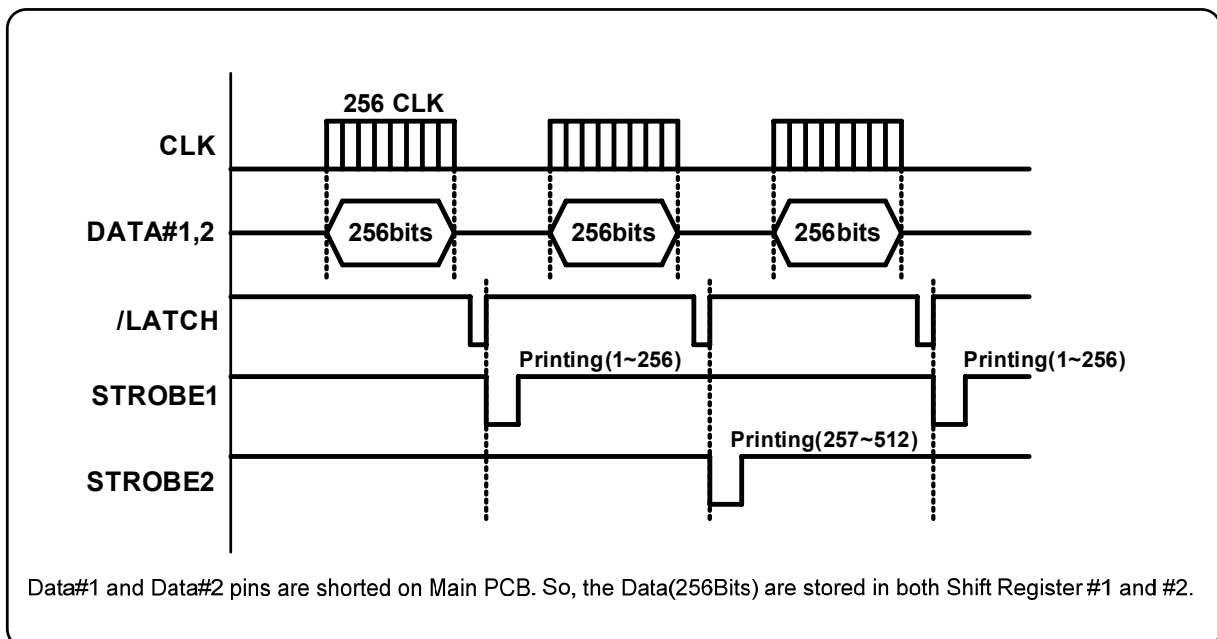
Data#1 and Data#2 pins are shorted on Main PCB. So, the Data(256Bits) are stored in both Shift Register #1 and #2.

[Figure 4-14 Thermal Printer Timing Waveform]

5. Disassembly and Assembly

5-1 Case lower block
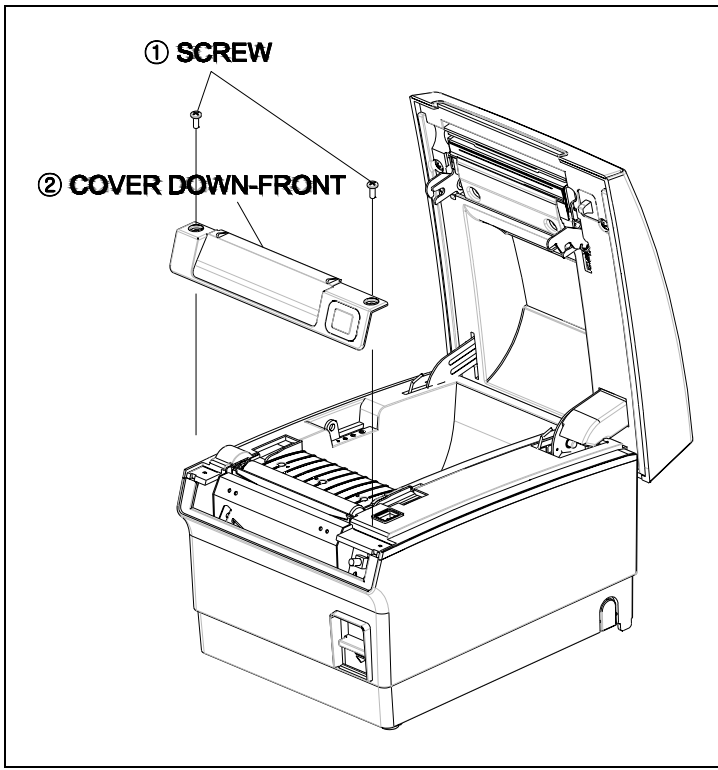
1. Remove the ①two screws.
2. Separate the ②COVER DOWN-FRONT
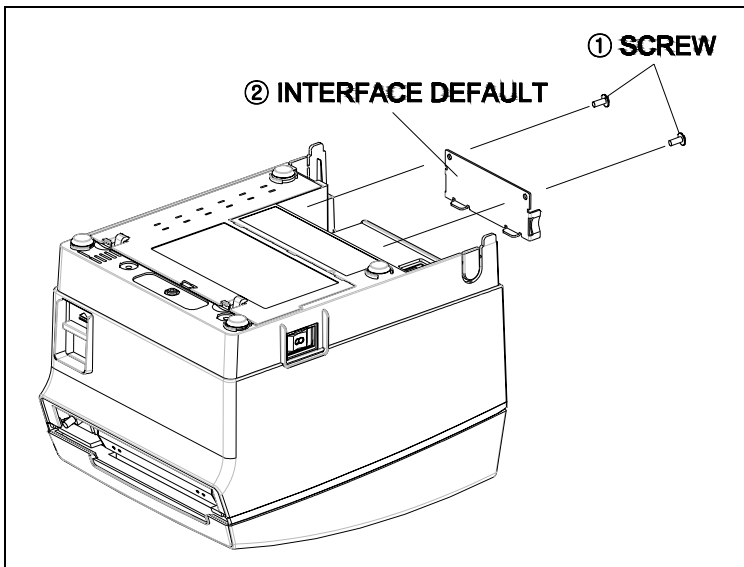
1. Remove the ①two screws.
2. Separate the ②INTERFACE DEFAULT

① **COVER DIP-SWITCH**
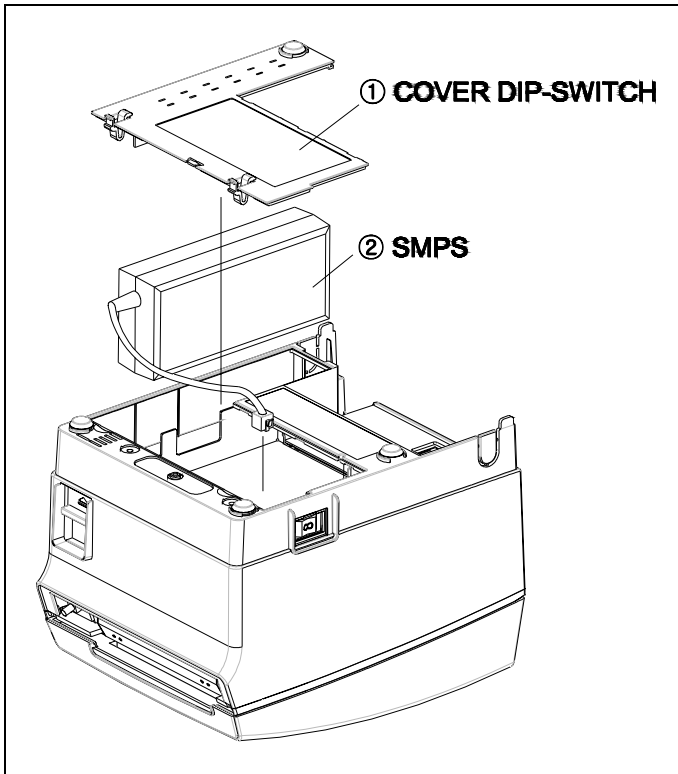
② **SMPS**

1. Separate   the ①COVER DIP-SWITCH
   form the SRP-F310/312
2. Remove the ②SMPS
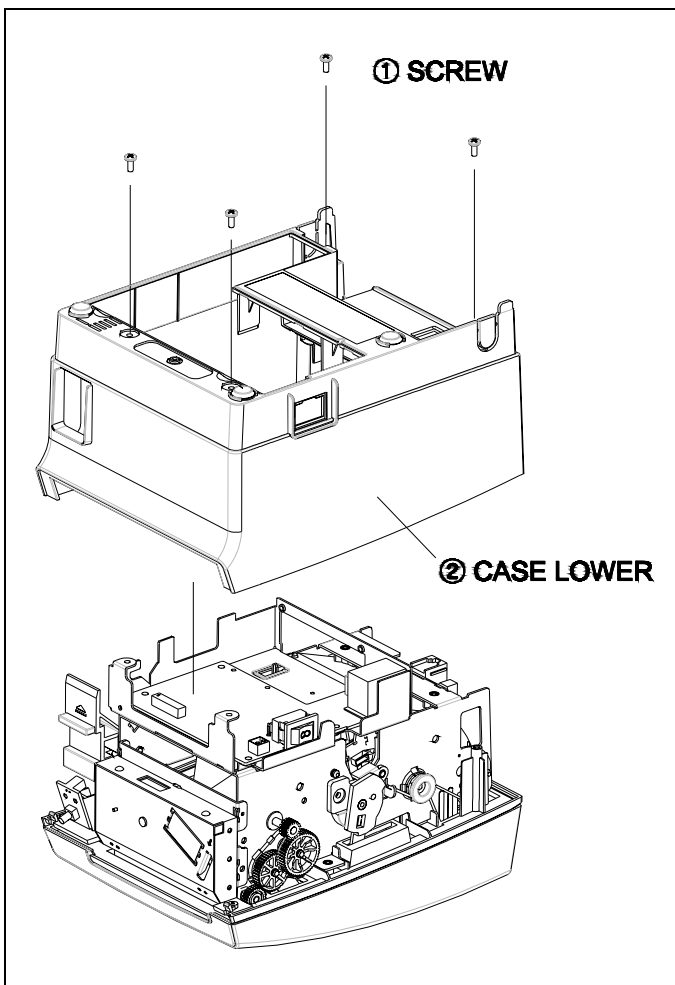
① **SCREW**

② **CASE LOWER**

1. Remove the ①two screws.
2. Separate the ②ASE LOWER
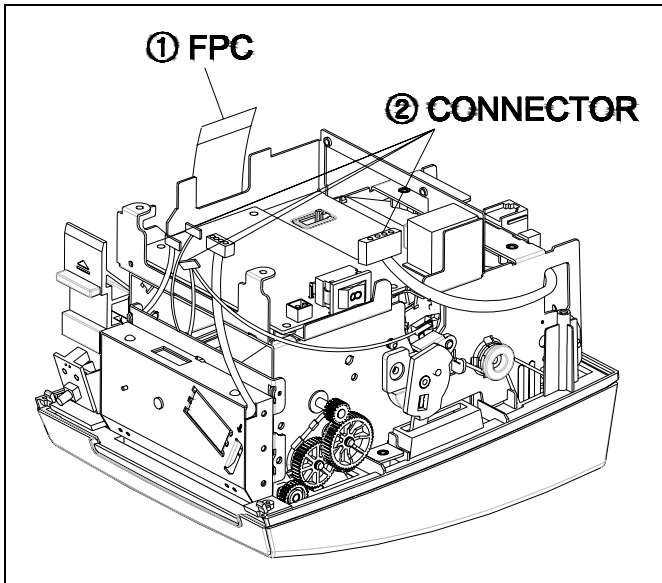
1. Separate the ①FPC from MAIN PCB
2. Separate the ②FIVE CONNECTOR
   from MAIN PCB
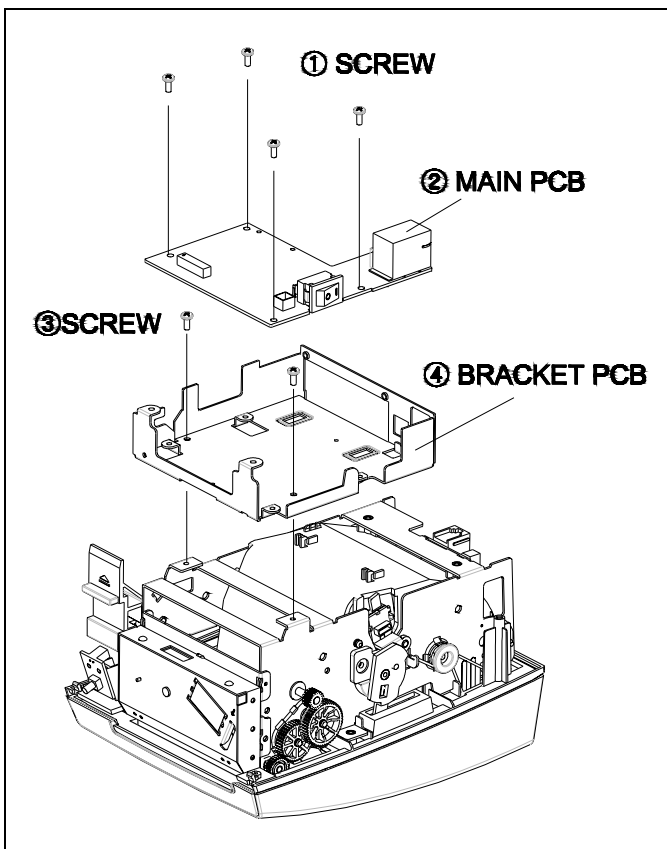
1. Remove the ①four screws.
2. Separate the ②MAIN PCB
   from ④BRACKET PCB.
3. Remove the ③two screw.
4. Separate the ④BRACKET PCB
   from SRP-F310/312.

5-2 Case Upper block
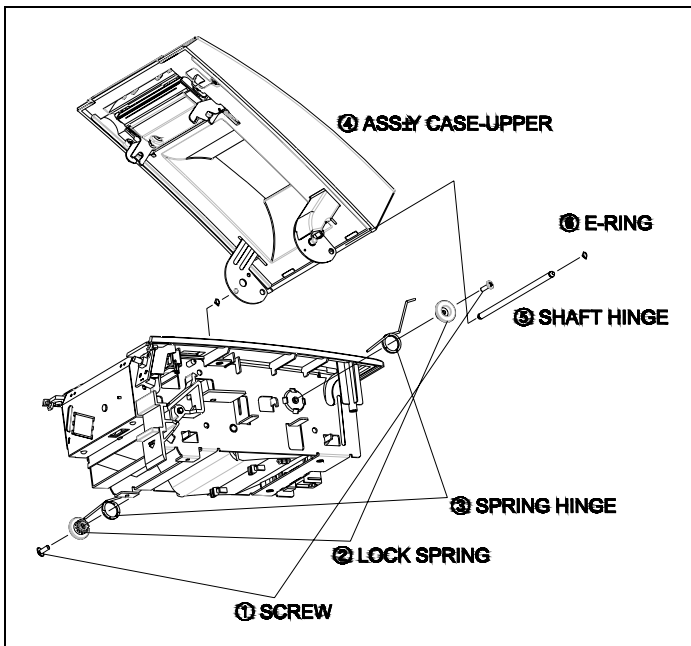
1. Remove the ①screw
2. Separate the ②LOCK SPRING, ③SPRING HINGE
3. Remove the ⑥E-Ring.
4. Separate the ⑤SHAFT HINGE From ④ASS`Y CASE-UPPER
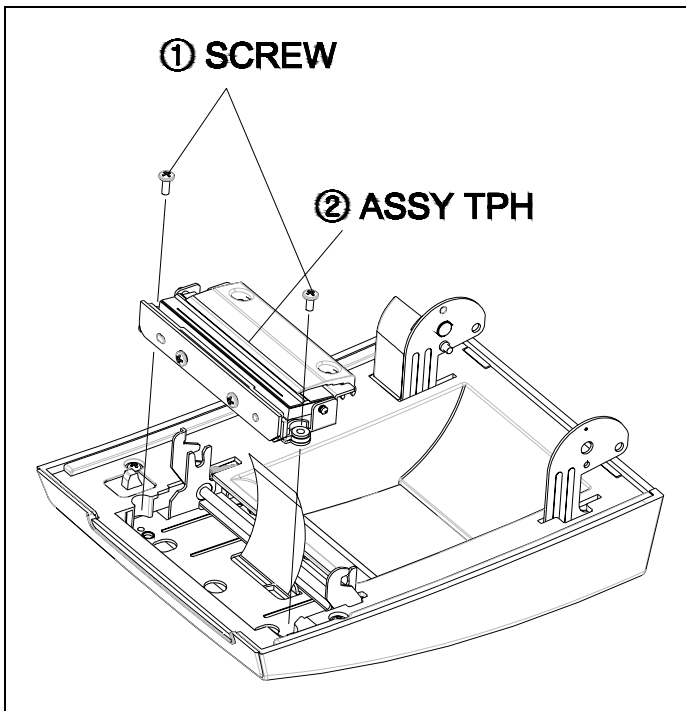
1. Remove ①two screws.
2. Separate the ②ASS`Y TPH From ASS`Y CASE-UPPER
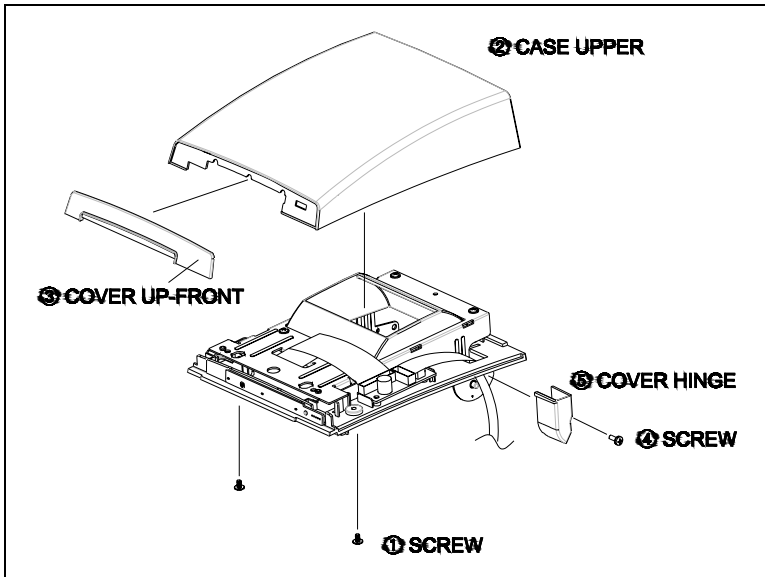
1. Remove the ①two screws.

2. Separate the ②CASE UPPER
   from the ASSY HOUSING.

3. Separate the ③COVER UP-FRONT
   from ②CASE UPPER

4. Remove the ④screw.

5. Separate the ⑤COVER HINGE
   from the ASSY HOUSING.
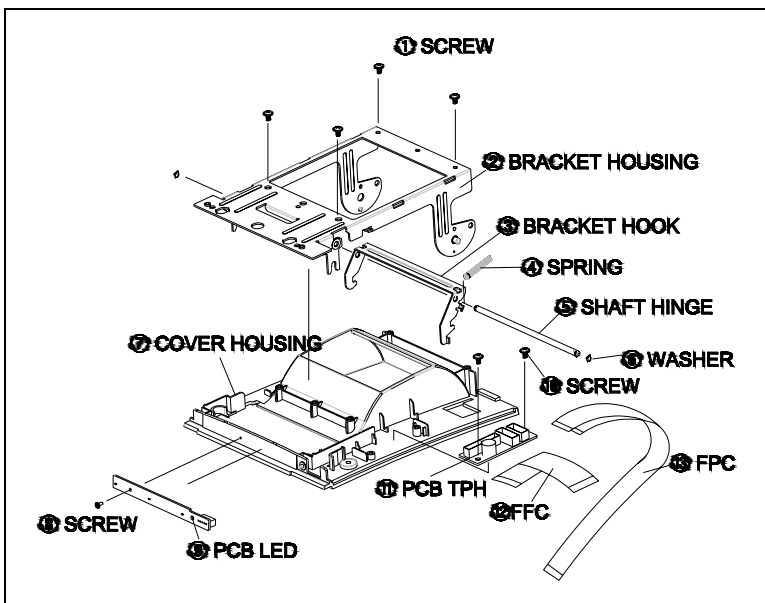
1. Remove the ①four screws.

2. Separate the ②BRACKET HOUSING
   from the ASSY HOUSING

3. Separate the ⑥two WASHER
   from the ⑤SHAFT HINGE

4. Separate the ⑤SHAFT HINGE and
   ③BRACKET HOOK and ④SPRING
   from the ②BRACKET HOUSING

5. Remove the ⑧screw.

6. Separate the ⑨PCB LED
   from the ⑦COVER HOUSING

7. Remove the ⑫⑬FFC,FPC
   from the ⑪PCB TPH

8. Remove the ⑩two screws.

9. Separate the ⑪PCB TPH
   from the ⑦COVER HOUSING

① SCREW
④ CUTTER
⑤ GUIDE CUTTER
② GUIDE TPH
⑦ TPH
⑧ SPRING TPH
⑨ BRACKET TPH
③ SCREW
⑩ SHAFT TPH
⑥ SCREW
⑫ SPECIAL SCREW
⑪ E-RING

1. Remove the ①two screws.

2. Separate the ②GUIDE TPH
   from the ASSY TPH

3. Remove the ⑥screw.

4. Separate the ASSY FIXED CUTTER
   from the ASSY TPH

5. Remove the ③two screws.

6. Separate the ④CUTTER
   from the ⑤GUIDE CUTTER

7. Remove the ⑫SPECIAL SCREW.

8. Separate the ⑪E-RING, ⑩SHAFT TPH
   from the ⑦TPH

9. Remove the ⑧SPRING TPH, ⑦TPH
   from the ⑨BRACKET TPH

5-3 Frame block
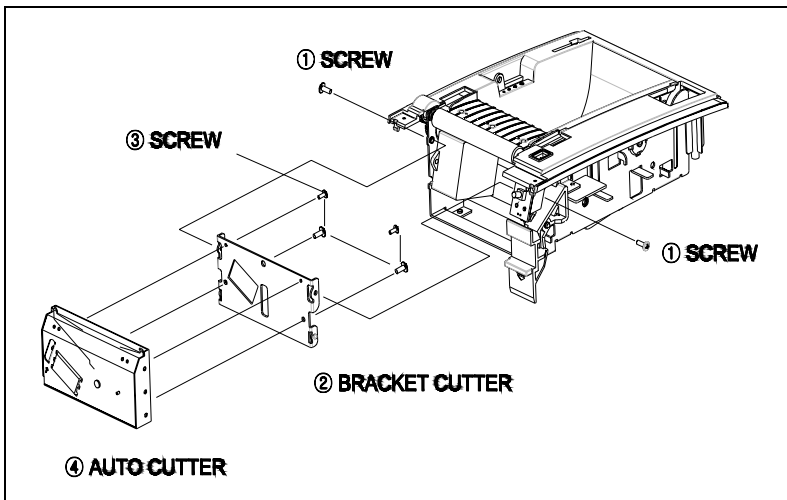
1. Remove the ①two screws.
2. Separate the ASSY CUTTER
   from the FRAME MAIN
3. Remove the ③four screws.
4. Separate the ④AUTO CUTTER
   from the ②BRACKET CUTTER
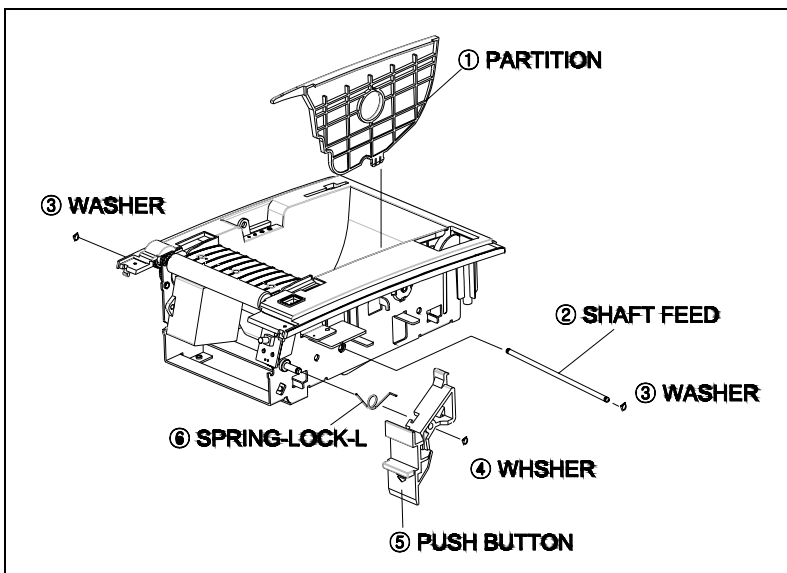
1. Separate the ①PARTITION
   from the FRAME MAIN
2. Remover the ③WASHER.
3. Separate the ②SHAFT FEED
   from the FRAME MAIN
4. Remover the ④WASHER.
5. Separate the ⑤PUSH BUTTON
   And ⑥SPRING LOCK-L
   from the FRAME MAIN
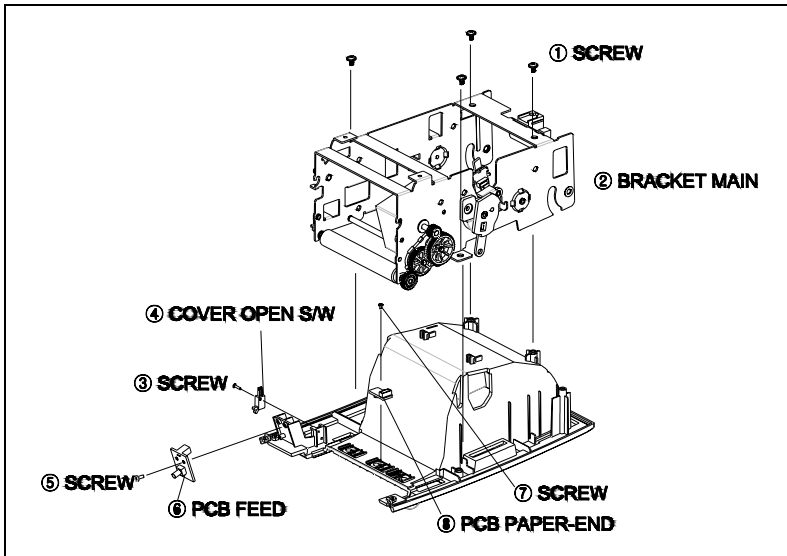
1. Remove the ①four screws.
2. Separate the ②BRACKET MAIN
   From the FRAME MAIN
3. Remove the ③screw.
4. Separate the ④COVER OPEN S/W
   From the FRAME MAIN
5. Remove the ⑤screw.
6. Separate the ⑥PCB FEED
   From the FRAME MAIN
7. Remove the ⑦screw.
8. Separate the ⑧PCB PAPER-END
   From the FRAME MAIN
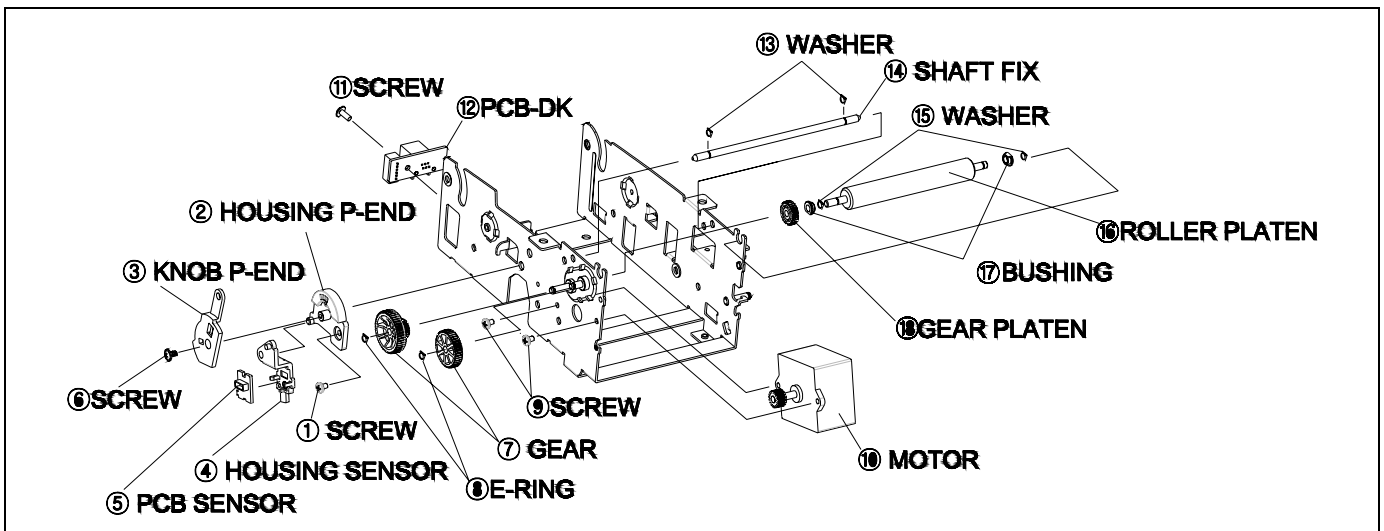
1. Remove the ①screw, And separate the NEAR END SENSOR from the BRACKET MAIN.\
2. Remover the ⑥SCREW.
3. Separate the ③KNOB P-END and ④HOUSING SENSOR from the ②HOUSING P-END
4. Separate the ⑤PCB SENSOR from the ④HOUSING SENSOR
5. Remover the ⑧E-RING
6. Separate the ⑦two GEARS from the BRACKET MAIN
7. Remove the ⑨two SCREWS

8. Separate the ⑩MOTOR from the BRACKET MAIN
9. Remove the ⑪SCREW.
10. Separate the ⑫ PCB-DK from the BRACKET MAIN
11. Remover the⑬ WASHER
12. Separate the ⑭SHAFT FIX
13. Remover the ⑮WASHER
14. Separate the ASSY ROLLER PLATEN from the BRACKET MAIN
15. Remover the BUSHING
17. Remover the GEAR PLATEN

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6. Adjustments and Maintenance

6-1 Adjustment

6-1-1 Remaining Roll Paper Adjustment

This sensor is set to the step4 position at the factory. If you find that there is not or too enough paper remaining on the roll when the near-end sensor is triggered, you can change the setting to the upper or Lower position as described below.

Note: The factory setting is based on a paper roll core with an outside diameter of 18mm. If you use a paper roll with a core with an outside diameter of more than 18mm, it is better to change to the upper position(Rotate the tab at front side) as described below.

1. Open the paper roll cover.
2. Rotate the tab at front or rear Position.

Near End Sensor Tap
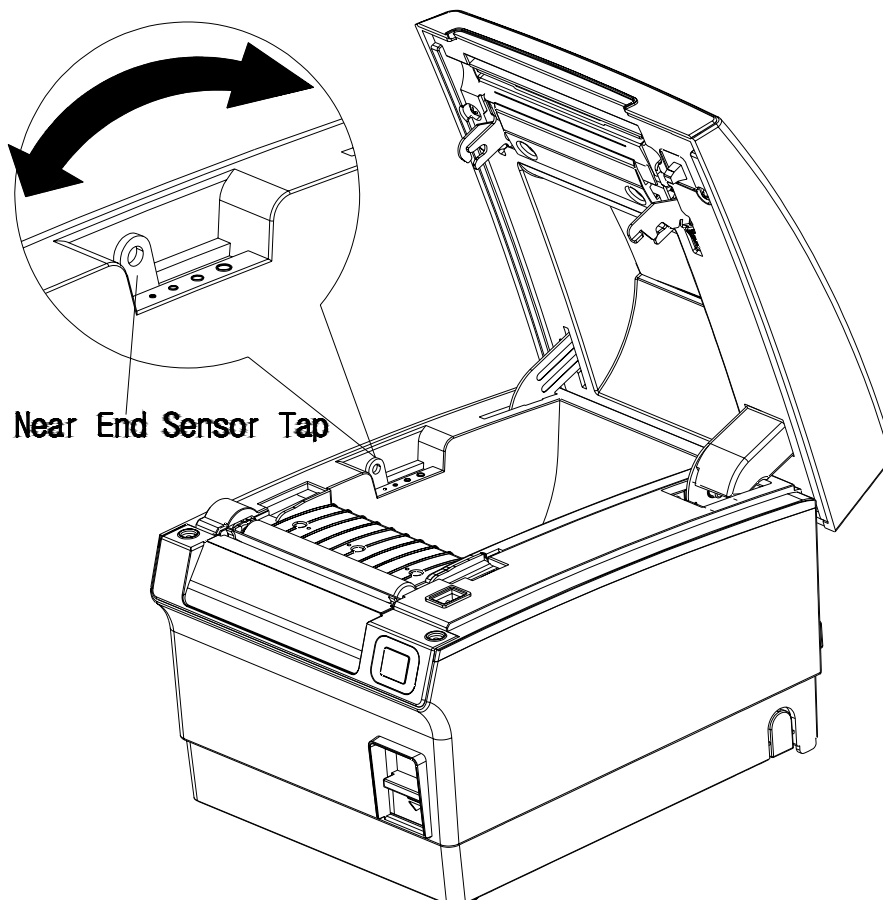
6-2 Maintenance

Paper dust in the heating elements may lower the print quality.
In this case, clean the print head as follow;

※ **Caution:** Turn off the printer power before cleaning.
※ **Caution:** Note that the thermal head (Thermal element and Radiation plate) becomes very hot during normal operation, creating the danger of burn injury. Be sure to wait for about 10 minutes after turning printer power off before beginning the cleaning.

  1. Open the cover-open.
  2. Clean the thermal element (the area that looks like it is marked a thin black line) of the thermal head with a cotton swab moistened with an alcohol solvent. (ethanol, methanol, or IPA)
  3. After confirming that the alcohol solvent has been dried up completely, close the cover open.
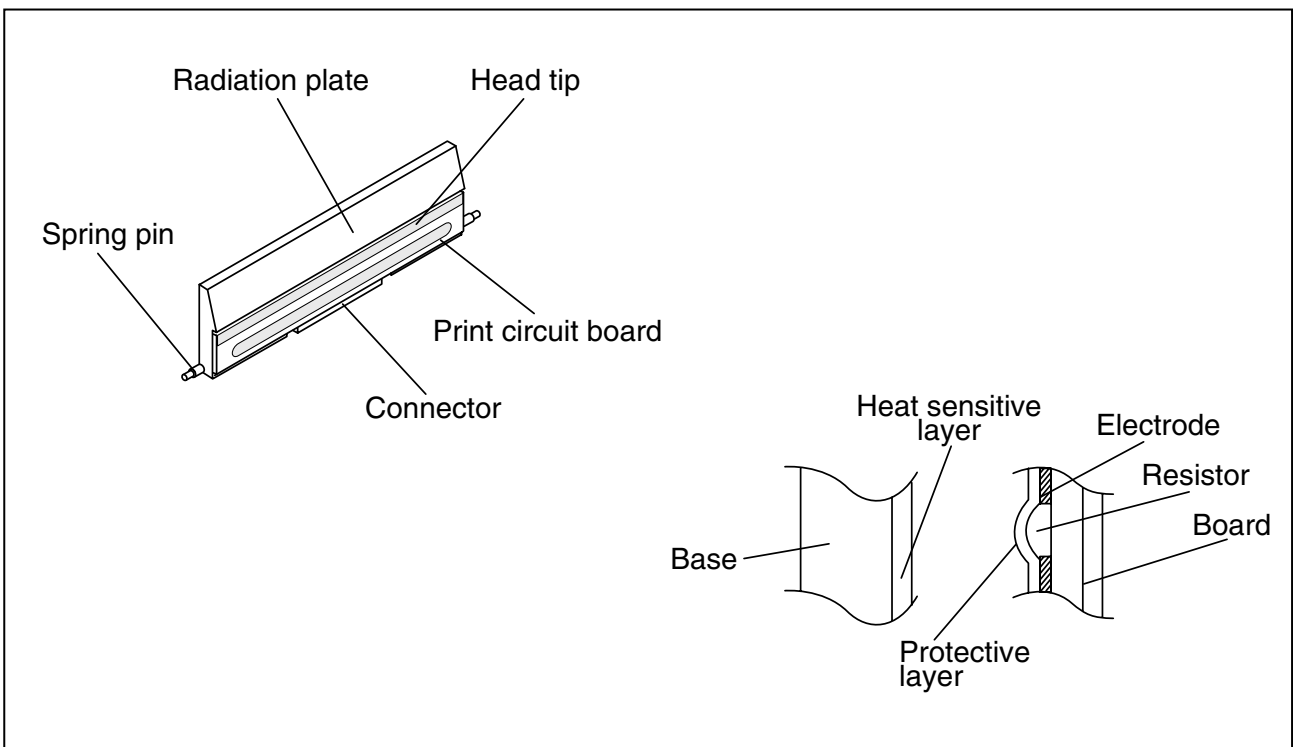
※ **Note:** Never touch the thermal element with your hand.
     Doing so can damage the thermal element.

※ **Note:** Do not scratch the printer head.

7. Troubleshooting

This chapter describes the methods for troubleshooting in this Receipt Printer.

7-1 Troubleshooting flow chart

If the source of a problem is not clear, use the flowchart below to find and replace a defective component. Normally, servicing should be performed by component replacement. Repairs of the PCBs and other components should be performed only by technicians.

7-1-1 POWER LED does not light

```
                              ┌───┐
                              │ A │
                              └─┬─┘
                                │
                      ╱─────────┴─────────╲
                     ╱  Is AC adaptor &    ╲        NO      Connect AC adaptor & power cord
                     ╲  power cord          ╱───────────►   properly.
                     ╲  connected properly?╱                     │
                      ╲─────────┬─────────╱                      ▼
                          YES   │                        ╱───────┴───────╲
                                │           NO          ╱                 ╲
                                ◄──────────────────────╲      OK?          ╱
                                │                        ╲               ╱
                                │                         ╲──────┬──────╱
                                │                            YES │
                                │                                ▼
                                │                            ( END )
                                │
                      ╱─────────┴─────────╲
                     ╱  Does AC adaptor     ╲       NO
                     ╲  have proper output   ╱──────────────►  Replace AC adaptor.
                     ╲  voltage rating?      ╱                      │
                     ╲  (approx. +24V)      ╱                       ▼
                      ╲─────────┬─────────╱                 ╱───────┴───────╲
                          YES   │            NO            ╱                 ╲
                                ◄────────────────────────╲      OK?          ╱
                                │                          ╲               ╱
                                │                           ╲──────┬──────╱
                                │                              YES │
                                │                                  ▼
                                │                              ( END )
                                │
                      ╱─────────┴─────────╲
                     ╱  Has fuse F1 on      ╲      YES
                     ╲  main PCB blown?      ╱─────────────►  Replace fuse F1
                      ╲─────────┬─────────╱                       │
                          NO    │            NO                   ▼
                                ◄────────────────────────╱───────┴───────╲
                                │                        ╲      OK?        ╱
                                │                         ╲──────┬──────╱
                                │                            YES │
                                │                                ▼
                                │                            ( END )
                                │
                      ╱─────────┴─────────╲
                     ╱  Is POWER LED        ╲      NO
                     ╲  continuity normal?   ╱─────────────►  Replace Operation panel ass'y
                      ╲─────────┬─────────╱                       │
                          YES   │            NO                   ▼
                                ◄────────────────────────╱───────┴───────╲
                                │                        ╲      OK?        ╱
                                ▼                         ╲──────┬──────╱
                    Replace PCB-main ass'y                   YES │
                                │                                ▼
                                ▼                            ( END )
                            ( END )
```
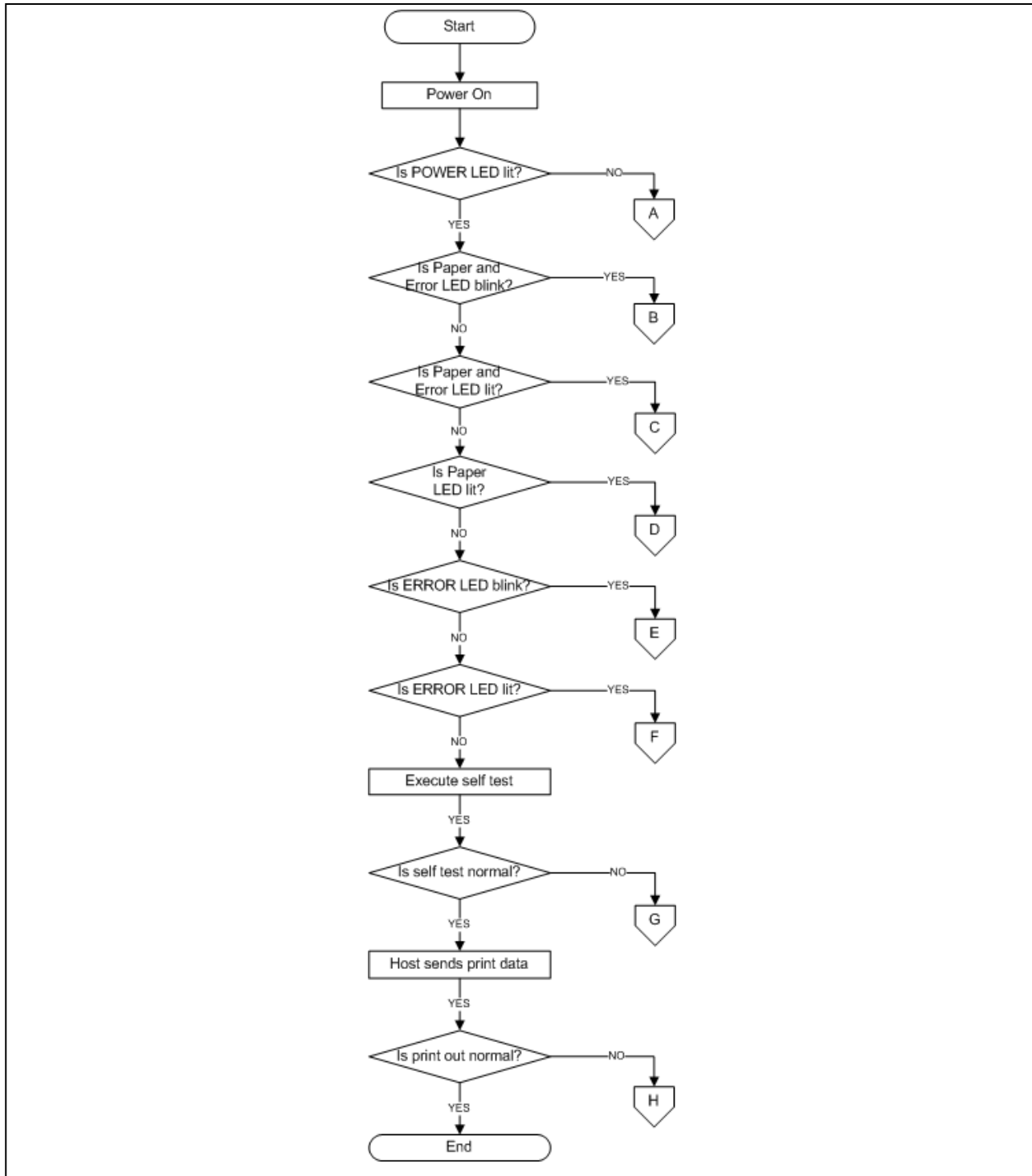
7-1-2 Paper and Error led blink
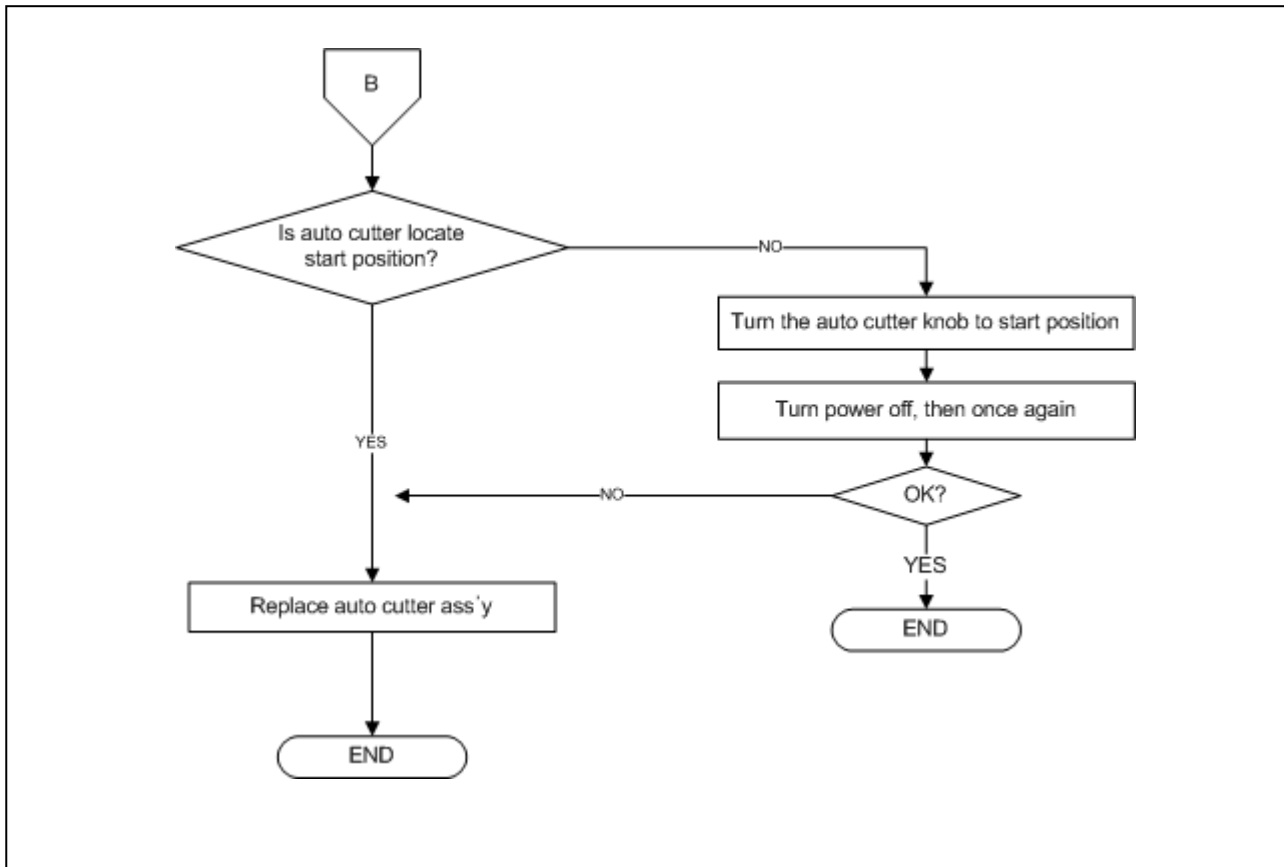
7-1-3 Paper and Error led lit

```
                              ┌───┐
                              │ C │
                              └─┬─┘
                                │
                                ▼
              ┌─────────────────────────────────┐
              │  Turn power off, then once again │
              └────────────────┬────────────────┘
                                │
                                ▼
                             ◇ OK? ◇──────YES──────┐
                                │                  │
                                NO                 ▼
                                │              ( END )
                                ▼
              ◇ Is paper roll not inserted? ◇────NO────┐
                                │                       ▼
                               YES        ┌──────────────────────────────┐
                                │         │   Replace or insert paper roll │
                                │         └───────────────┬──────────────┘
                                │                         │
                                │                         ▼
                                ◀───────NO───────────◇ OK? ◇
                                │                         │
                                ▼                        YES
                                │                         │
                                │                         ▼
                                │                      ( END )
                                ▼
              ◇ Is paper-end sensor, continuity normal? ◇────NO────┐
                                │                                    ▼
                               YES              ┌──────────────────────────────┐
                                │               │  Replace Sensor-paper-end ass'y │
                                │               └───────────────┬──────────────┘
                                │                               │
                                │                               ▼
                                ◀───────NO─────────────────◇ OK? ◇
                                │                               │
                                ▼                              YES
              ┌─────────────────────────┐                      │
              │  Replace PCB-main ass'y  │                      ▼
              └────────────┬────────────┘                   ( END )
                           │
                           ▼
                       ( END )
```

7-1-4 Paper led lit

```
                              ┌───────┐
                              │   D   │
                              └───┬───┘
                                  │
                    ┌─────────────▼──────────────┐
                    │ Turn power off, then once  │
                    │          again             │
                    └─────────────┬──────────────┘
                                  │
                              ◇ OK? ◇────YES────┐
                                  │              ▼
                                 NO         ┌─────────┐
                                  │         │   END   │
                                  ▼         └─────────┘
                        ◇ Is paper roll in ◇────NO────┐
                        ◇ paper near-end   ◇          ▼
                        ◇ condition?       ◇   ┌──────────────────┐
                                  │            │ Replace or insert │
                                  │            │   paper roll      │
                                  │            └─────────┬─────────┘
                                  │                      │
                                 YES◄──────NO───────◇ OK? ◇
                                  │                     YES
                                  │                      │
                                  ▼                      ▼
                                                   ┌─────────┐
                        ◇ Is paper near-end ◇      │   END   │
                        ◇ sensor continuity ◇──NO──┐└─────────┘
                        ◇ normal?           ◇      ▼
                                  │    ┌──────────────────────────┐
                                  │    │ Replace Sensor-paper-near │
                                  │    │       end ass'y           │
                                  │    └────────────┬──────────────┘
                                  │                 │
                                 YES◄─────NO────◇ OK? ◇
                                  │                YES
                                  ▼                 │
                    ┌────────────────────┐          ▼
                    │ Replace PCB-main    │     ┌─────────┐
                    │      ass'y          │     │   END   │
                    └──────────┬─────────┘      └─────────┘
                               │
                               ▼
                          ┌─────────┐
                          │   END   │
                          └─────────┘
```

7-1-5 Error led blink

```
                          ┌───┐
                          │ E │
                          └─┬─┘
                            ▼
         ┌──────────────────────────────┐
         │ Turn power off, then once again │
         └──────────────┬───────────────┘
                        ▼
                    ◇ OK? ◇ ──── YES ───┐
                        │                ▼
                       NO            ( END )
                        ▼
         ◇ Is correct I/F PBA inserted? ◇ ──── NO ───┐
                        │                             ▼
                       YES              ┌─────────────────────┐
                        │               │   Replace I/F PBA    │
                        │               └──────────┬──────────┘
                        │                          ▼
                        ◄──── NO ──────────────◇ OK? ◇
                        │                          │
                        ▼                         YES
         ┌─────────────────────────┐               ▼
         │  Replace PCB-main ass'y  │           ( END )
         └────────────┬────────────┘
                      ▼
                  ( END )
```

7-1-6 Error led lit

7-1-7 Self test is not normal

```
                    ┌─────┐
                    │  G  │                                          ┌──────────────┐
                    └──┬──┘                                          │ *1           │
                       │                                             │ VH : +24V    │
                       │                                             │ VCC : +5V    │
                       ▼                                             └──────────────┘
                  ╱ Does not  ╲
                 ╱  printer    ╲ ──────── YES ────────┐
                 ╲ operate at  ╱                      │
                  ╲  all?     ╱                       ▼
                       │                     ╱ Is output voltage of ╲
                      NO                    ╱ regulator on PCB-main  ╲ ── NO ──┐
                       │                    ╲  within SPEC?(*1)      ╱          ▼
                       ▼                         ╲              ╱        ┌─────────────────┐
            ┌──────────────────────┐                  │                  │ Replace PCB-main│
            │ Printing is carried  │                 YES                 │    ass'y        │
            │ out, but print       │                  │                  └────────┬────────┘
            │ quality is deficient │                  │          ┌── NO ───╱ OK? ╲│
            │ or paper feeding is  │                  │◄─────────┘         ╲      ╱
            │ not normal           │                  ▼                      │
            └──────────┬───────────┘         ┌──────────────────┐          YES
                       │                     │ Replace printer  │           │
                       ▼                     │ mechanism ass'y  │           ▼
            ┌──────────────────────┐         └────────┬─────────┘        ┌──────┐
            │ Replace printer      │                  │                  │ END  │
            │ mechanism ass'y      │                  ▼                  └──────┘
            └──────────┬───────────┘              ┌──────┐
                       │                          │ END  │
                       ▼                          └──────┘
                    ╱ OK? ╲ ──── YES ───┐
                    ╲      ╱             │
                       │                 ▼
                      NO             ┌──────┐
                       │             │ END  │
                       ▼             └──────┘
            ┌──────────────────────┐
            │ Replace PCB-main ass'y│
            └──────────┬───────────┘
                       │
                       ▼
                   ┌──────┐
                   │ END  │
                   └──────┘
```
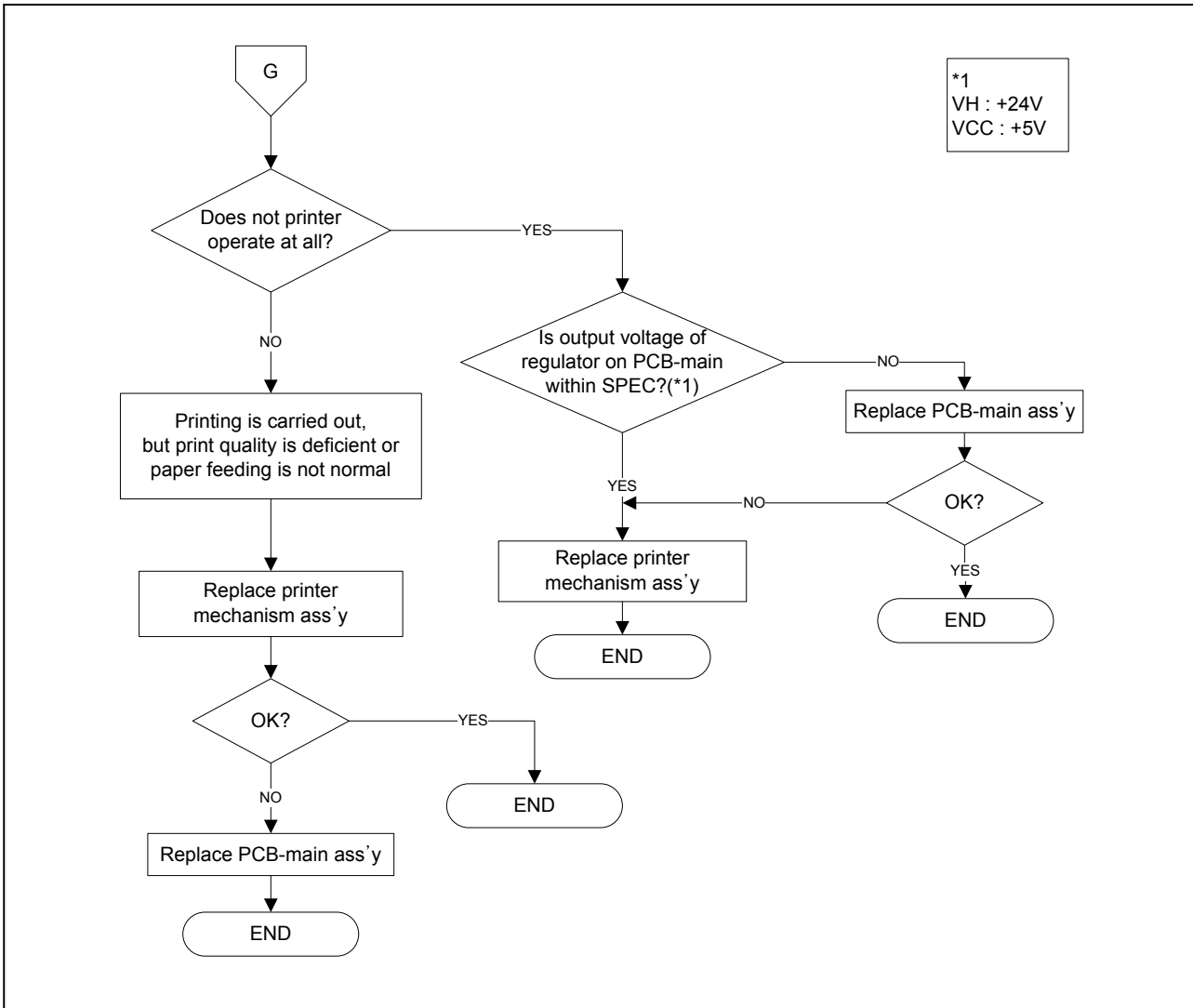
7-1-8 Data from host is not printed normally

```
                              ┌─────┐
                              │  H  │
                              └──┬──┘
                                 ▼
                    ┌────────────────────────┐
                    │ Send data from host to │
                    │        printer         │
                    └───────────┬────────────┘
                                ▼
                         ╱ OK? ╲────YES───►┌──────┐
                         ╲     ╱           │ END  │
                           │NO             └──────┘
                           ▼
                   ╱ Are interface   ╲
                  ╱ parameters set to ╲──NO──►┌──────────────────┐
                  ╲ identical values   ╱      │ Make settings    │
                   ╲ at host and      ╱       │   identical      │
                    ╲ printer?       ╱        └────────┬─────────┘
                           │YES                        ▼
                           │          NO◄──── ╱ OK? ╲
                           │                  ╲     ╱
                           │                    │YES
                           │                    ▼
                           │                 ┌──────┐
                           │                 │ END  │
                           ▼                 └──────┘
                  ╱ Does interface  ╲──NO──►┌────────────────────┐
                  ╲ cable match      ╱      │ Replace with a     │
                   ╲ specifications?╱       │   proper cable     │
                           │YES             └─────────┬──────────┘
                           │      NO◄──────── ╱ OK? ╲
                           ▼                  ╲     ╱
                  ┌──────────────────┐          │YES
                  │ Replace interface│          ▼
                  │   PCB ass'y      │       ┌──────┐
                  └────────┬─────────┘       │ END  │
                           ▼                 └──────┘
                         ╱ OK? ╲────YES───►┌──────┐
                         ╲     ╱           │ END  │
                           │NO             └──────┘
                           ▼
                  ╱ Is the interface ╲──YES──►┌────────────────────┐
                  ╲ wire broken?     ╱        │ Replace the        │
                           │NO                │  interface cable   │
                           │                  └─────────┬──────────┘
                           │       NO◄──────── ╱ OK? ╲
                           ▼                   ╲     ╱
                  ┌──────────────────┐           │YES
                  │ Replace printer  │           ▼
                  │ mechanism ass'y  │        ┌──────┐
                  └────────┬─────────┘        │ END  │
                           ▼                  └──────┘
                         ╱ OK? ╲────YES───►┌──────┐
                         ╲     ╱           │ END  │
                           │NO             └──────┘
                           ▼
                  ┌──────────────────┐
                  │  Check the host  │
                  └──────────────────┘
```

7-2 Power Problem

If a problem that can be verified by visual examination has occurred, use the tables below to determine the cause and perform repairs.

There are four tables, divided by symptom category:
• Printing Quality Problems
• Printer Mechanism Problems
• Auto cutter Mechanism Problems

The tables contains the following columns:

• Problem
  This is the symptom that can be verified
• Problem Causes
  This is a listing of one or several possible causes that should be examined.
• Level
  - Level A
    The problem can be corrected by persons who are familiar with the printer and have general knowledge, but special technical skills are not required.
  - Level B
    The problem requires thorough knowledge and familiarity with the printer as well as technical skills and experience.
• Checkpoint
  These are one or more areas in the printer that should be checked.
• Action
  These are the steps to correct the problem. If the problem persists after taking these steps, check the other possible causes listed.

7-2 Power Problem

7-2-1 Printing Quality Problems

Problem	Probable Cause	Level	Checkpoint	Action
Certain parts are printed with vertical white lines	Foreign substance on the head surface	A	Check the foreign substance on the head surface	Remove the foreign substance with a cleaning pen
	Head surface is damaged	B	Check the damage of the head surface such as dents	Replace the head
	Internal IC of the head is damaged	B	Damage of the internal IC of the head	Replace the head
	Vertical scratched trace on the paper	A	Check whether there are obstructions such as bumps	Remove the obstructions
Certain parts are printed with vertical black lines	Damage to the internal IC of the head	B	Damage of the internal IC of the head	Replace the head
Horizontal black lines are generated or the vertical width of the characters is reduced	Irregular feeding	B	Check for damage to the gears and for foreign substances in the gear profile	Replace the gears or remove the foreign substance
	Feeding motor failure	B	Check whether the motor runs smoothly without load	Replace the motor
	Roller rotation is not smooth	A	Check whether oil remains in the bearings holding the roller	Add oil for the bearings
Overall printing density is low	Roller and the head are not attached properly	A	Cover is not completely closed	Open the cover, then and completely close it
	The spring pushing the head is not strong enough	B	Check whether the screws mounting the spring are loose	Fasten the screws
	Head surface is damaged	B	Check for abrasions on the head surface	Replace the head

7-2-2 Printer Mechanism Problems

Problem	Probable Cause	Level	Checkpoint	Action
Paper feeding failure	Feeding motor failure	B	Check for short failure inside the motor	Replace the motor
	Gear is dislocated from the rotating axis	B	Check the assembly status of the washers holding the gears	Reassemble the gears and washers
	Paper jam o	B	Check for paper jam	Open the cover, and then remove the jammed paper
	Auto cutter jam	B	Check for auto cutter jam	Open the cover cutter, and then restart the printer
Cover cannot be opened when pressing the button	Auto cutter jam	B	Check for auto cutter jam	Open the cover cutter, and then restart the printer
Cover cannot be closed	Deformation of Hook	B	Check for deformation of Hook	Straighten the Hook with =pliers
Error LED is on and there is a long and continuous beep sound while the printer is in the ready state.	Cover Open sensor failure	B	Check for sensor failure	Replace the sensor Ass'y
Error LED is on and there is a short and continuous beep sound while the printer is in the ready state.	Paper End sensor failure	B	Check the sensor failure	Replace the sensor Ass'y
Error LED is on and there is no beep sound while the printer is in the ready state.	Near End sensor failure	B	Check for sensor failure	Replace the sensor Ass'y
Joint or bouncing sound during feeding operation	Gears are damaged or are impeded by foreign substances	B	Check for damage or foreign substances on the gears	Replace the gears or remove the foreign substance
Entered characters and printed characters are different	Check the communication speed	A	Communication speed is set by DP switches for Serial Mode	Check the DIP switch setting
	Communication cable failure	A	Check RS-232C null modem Cable	Replace the cable

7-2-3 Auto Cut Mechanism Problems

Problem	Probable Cause	Level	Checkpoint	Action
Auto cutter does not work at all	DIP switch setting failure	A	Check whether DIP switch 1-1 is ON	Change ON to OFF

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