BIXOLON®
SAMSUNG mini printers

Service Manual
SRP-350/352plusA&C

Thermal Printer
Rev. 2.01

http://www.samsungminiprinters.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
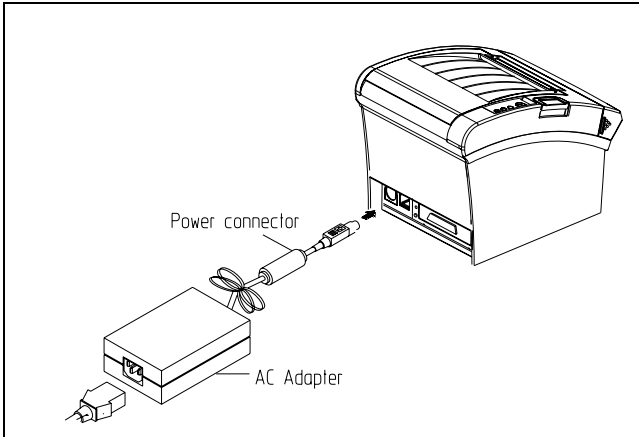
Figure 2-1 AC Adapter Installation

1. Mack sure the printer is turned off with the side of the switch.
2. Plug the DC cord connector into the power jack on the printer. (Plug the flat side down)
3. Plug the AC Adapter power cord into the wall outlet.

2-1-2 Interface Cable Installation
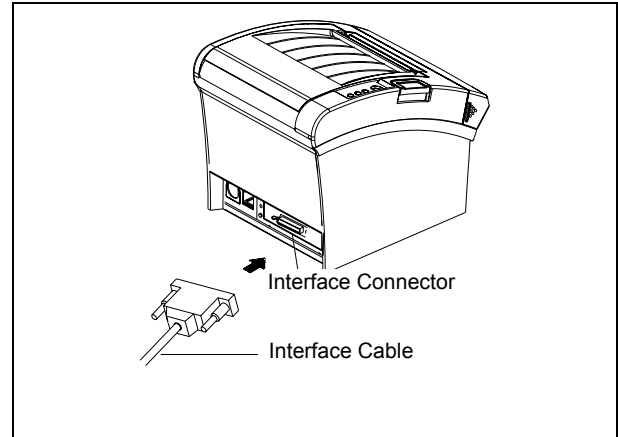
Figure 2-2 I/F Cable Installation

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 Cash Drawer Cable Installation
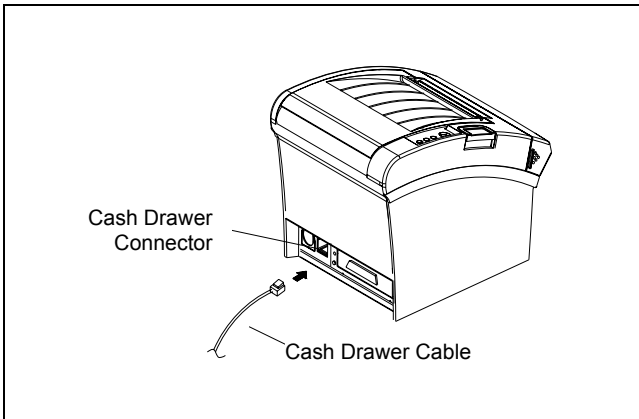
Figure 2-3 Cash Drawer Cable Installation

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.)

2-1-4 Paper Roll Installation
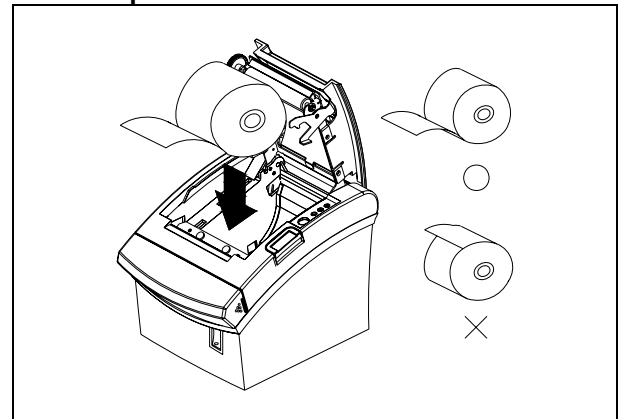
Figure 2-4 Paper Roll Installation

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.

2-1-5 Wall Mount Installation

1. Remove the three screw from the bottom of
   The Case lower. Separate the Case lower
   From the Main body.
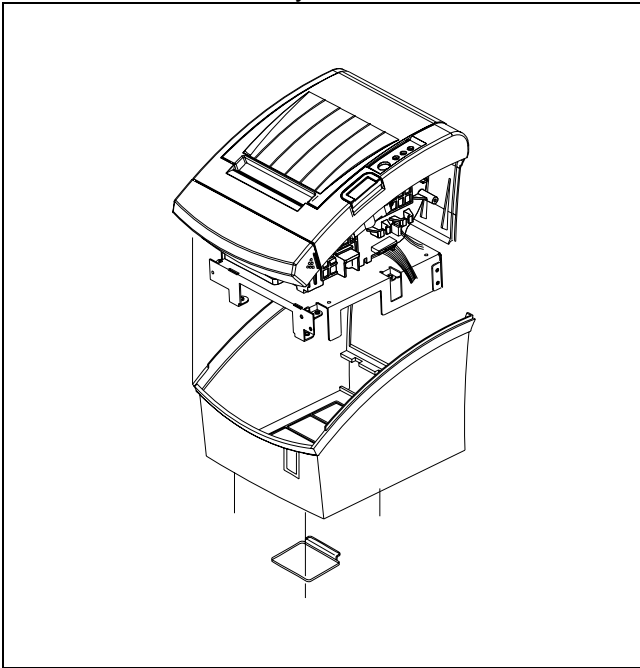
2. Attach the Plate-Spring to the right side of
   Frame-body and tighten a screw as illustrated.
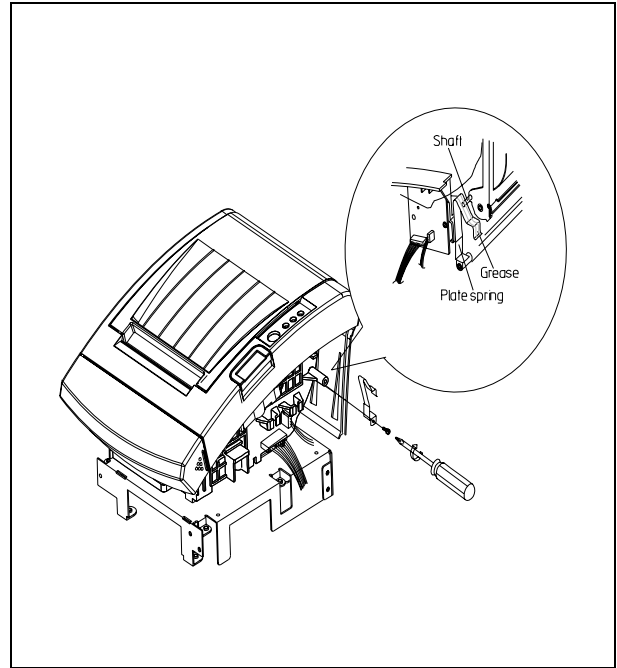
3. After assembling the Case lower to set Body,
   Turn the Set over and attach the BRKT Hanger
   To the Case lower then tighten four screws.
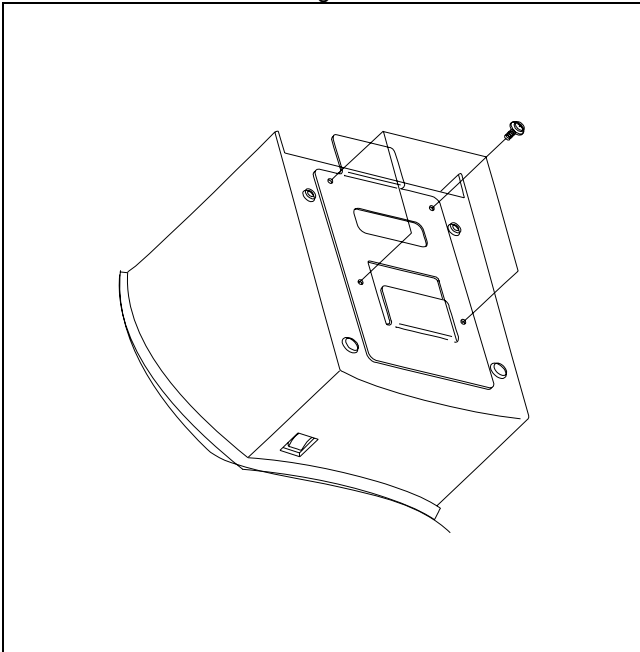
4. Attach the BRKT Mount to the wall firmly
   With the eight screws.
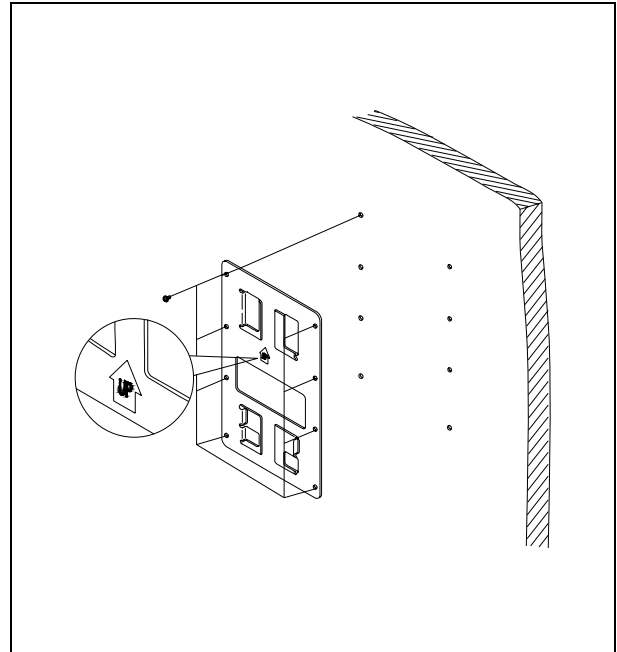
5. Be sure that the BRKT attached properly to match
the direction of arrow as follow. and the   BRKT
Mount should be always fixed vertically.
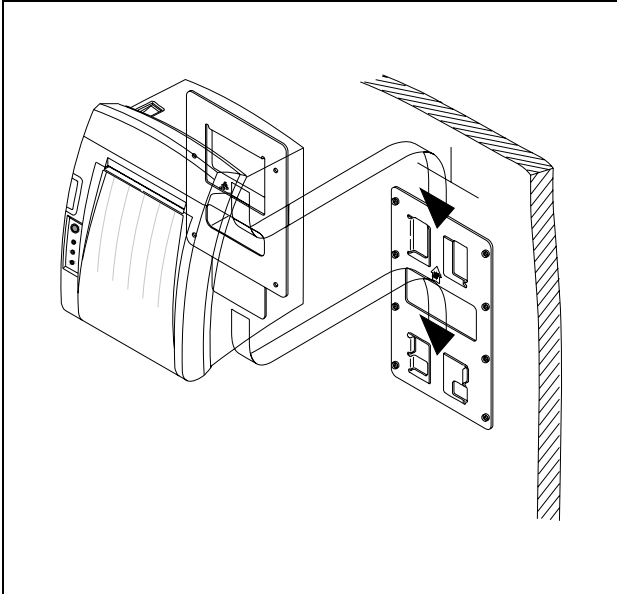
2-2 Operation

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.
2. Remove the screw on the bottom of the printer and open the bracket.
3. Flip the DIP switches using tweezers or another marrow-ended tool. Switches are in when up and off when off down in the Figure 3-12.
4. 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.
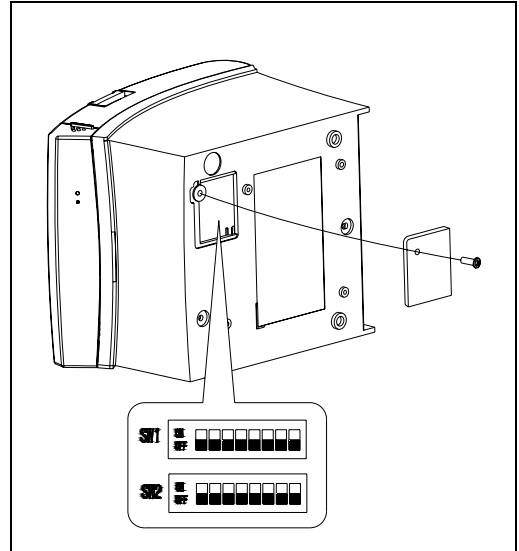
Figure 2-5 Setting the DIP switches

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

• DIP Switch 1

SW	Function	ON	OFF	Default
1-1	Auto Line Feed	Enable	Disable	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 1		ON
1-8				OFF

• DIP Switch 2

SW	Function	ON	OFF	Default
2-1	Reserved	-	-	OFF
2-2	Internal bell control	Internal bell disable	Internal bell enable	OFF
2-3	Auto Cutter	Disable	Enable	OFF
2-4	BUSY Condition	Receive Buffer Full	* Offline * Receive Buffer Full	OFF
2-5				OFF
2-6	Print Density	Refer to the following table 2		OFF
2-7				OFF
2-8	Near-End Sensor Status	Disable	Enable	OFF

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

• DIP Switch 1

SW	Function	ON	OFF	Default
1-1	Auto Line Feed	Enable	Disable	OFF
1-2 ~ 1-8	Reserved	-	-	OFF

• DIP Switch 2

SW	Function	ON	OFF	Default
2-1	Reserved	-	-	OFF
2-2	Internal bell control	Internal bell disable	Internal bell enable	OFF
2-3	Auto Cutter	Disable	Enable	OFF
2-4	BUSY Condition	Receive Buffer Full	* Offline * Receive Buffer Full	OFF
2-5	Print Density	Refer to the following Table 2		OFF
2-6				OFF
2-7				OFF
2-8	Near-End Sensor Status	Disable	Enable	OFF

• Table 1 – Baud rate (bps) Selection

Transmission Speed	1-6	1-7	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	

• Table 2 – Print Density Selection

2-5	2-6	2-7	Print Density (Mono color)	Default
ON	ON	Reserved	1(Light)	
OFF	OFF	Reserved	2	2
ON	OFF	Reserved	3	
OFF	ON	Reserved	4(Dark)	
2-5	2-6	2-7	Print Density (Two colors)	Default
ON	ON	ON	80%	
ON	ON	OFF	90%	
OFF	OFF	ON	95%	
OFF	OFF	OFF	100%	100%
ON	OFF	ON	105%	
ON	OFF	OFF	110%	
OFF	ON	ON	120%	
OFF	ON	OFF	130%	

※ **Auto Cutter Enable / Disable selection**

Dip Switch Set 2		
SW 2-3	ON	Auto Cutter Disabled
	OFF	Auto Cutter Enabled
Application	Ignores Auto Cutter error for continuous printing.	

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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.
3. close the cover, then the printer enters the hexadecimal dump mode.
4. 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.

<pre>
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
</pre>

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.

5. When the printing finishes, turn off the printer.
6. 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. 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).

<pre>
Self-Test printing
Please press the Feed button
</pre>

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.

<pre>
*** Completed ***
</pre>

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

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SRP-350plus VER.6.02 STD 2007.04.17
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DIP SWITCH SW1/SW2 STATUS
    DIP SW1    12345678
        ON :            ***
        OFF :     *****
    DIP SW1    12345678
        ON :
        OFF :     ********

MEMORY SWITCH STATUS
    MSW1    12345678
    MSW2    12345678 (Codepage Selection)
    MSW8    12345678 (Reserved)
    MSW9    12345678 (Reserved)
    MSW10   12345678 (Special Function1)
    MSW11   12345678 (Special Function2)

Serial(RS-232C) Interface
    Baud Rate    : 115200 bps
    Data bits    : 8 bits
    Parity Check  : None
    Stop bit     : 1 bit or more
    Handshaking  : DTR/DSR

Buffer CAPACITY    : 64K Byte

Handshaking (Busy condition) [Dip S/W 2-4]
    Offline or Receive buffer full

EPSON EMULATION MODE

Print Density
    LIGHT [ 1 2 3 4 ] DARK
                ■

Self-test printing,
please press the FEED button.
```

```
ASCII

!"#$%&'()*+,-./0123456789:;<=>?@
"#$%&'()*+,-./0123456789:;<=>?@Å
#$%&'()*+,-./0123456789:;<=>?@ÅB
$%&'()*+,-./0123456789:;<=>?@ÅBC
%&'()*+,-./0123456789:;<=>?@ÅBCD
&'()*+,-./0123456789:;<=>?@ÅBCDE
'()*+,-./0123456789:;<=>?@ÅBCDEF
()*+,-./0123456789:;<=>?@ÅBCDEFG
)*+,-./0123456789:;<=>?@ÅBCDEFGH
*+,-./0123456789:;<=>?@ÅBCDEFGHI
+,-./0123456789:;<=>?@ÅBCDEFGHIJ
,-./0123456789:;<=>?@ÅBCDEFGHIJK
-./0123456789:;<=>?@ÅBCDEFGHIJKL
./0123456789:;<=>?@ÅBCDEFGHIJKLM
/0123456789:;<=>?@ÅBCDEFGHIJKLMN
0123456789:;<=>?@ÅBCDEFGHIJKLMNO
123456789:;<=>?@ÅBCDEFGHIJKLMNOP
23456789:;<=>?@ÅBCDEFGHIJKLMNOPQ
3456789:;<=>?@ÅBCDEFGHIJKLMNOPQR
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6789:;<=>?@ÅBCDEFGHIJKLMNOPQRSTU
789:;<=>?@ÅBCDEFGHIJKLMNOPQRSTUV
89:;<=>?@ÅBCDEFGHIJKLMNOPQRSTUVW
9:;<=>?@ÅBCDEFGHIJKLMNOPQRSTUVWX


PC437
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üéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥Ptƒá
éâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥Ptƒáí
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äàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥Ptƒáíóú
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åçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑ
çêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑª
êëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº
ëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿
èïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿⌐
ïîìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿⌐¬
îìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿⌐¬½
ìÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿⌐¬½¼
ÄÅÉæÆôöòûùÿÖÜ¢£¥PtƒáíóúñÑªº¿⌐¬½¼¡
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ùÿÖÜ¢£¥PtƒáíóúñÑªº¿⌐¬½¼¡«»      ┤┤┤
ÿÖÜ¢£¥PtƒáíóúñÑªº¿⌐¬½¼¡«»     ┤┤┤┐π
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Figure 3-13 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,MSW8, MSW9,MSW10,MSW11,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 ESC/POS command.

MSW1

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

MSW2

Switch	Function	ON	OFF
1	Font Selection	Font B (9x24)	Font A (12x24)
2	Auto Cutter Function	Full Cutting	Partial Cutting
3~8	Code Page Selection	Refer to following Table	

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)

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MSW8

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

MSW9

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

MSW10 (Special Function 1)

Switch	Function	ON	OFF
1	External buzzer control (This functions operate only after cutting)	External buzzer enable	External buzzer disable
2~4	Reserved	--	Fixed to OFF
5	Printing width	2 inch	3 inch
6	2 Color support	Enable	Disable
7~8	Reserved	--	Fixed to OFF

MSW11 (Special Function 2)

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

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3. Product Specifications

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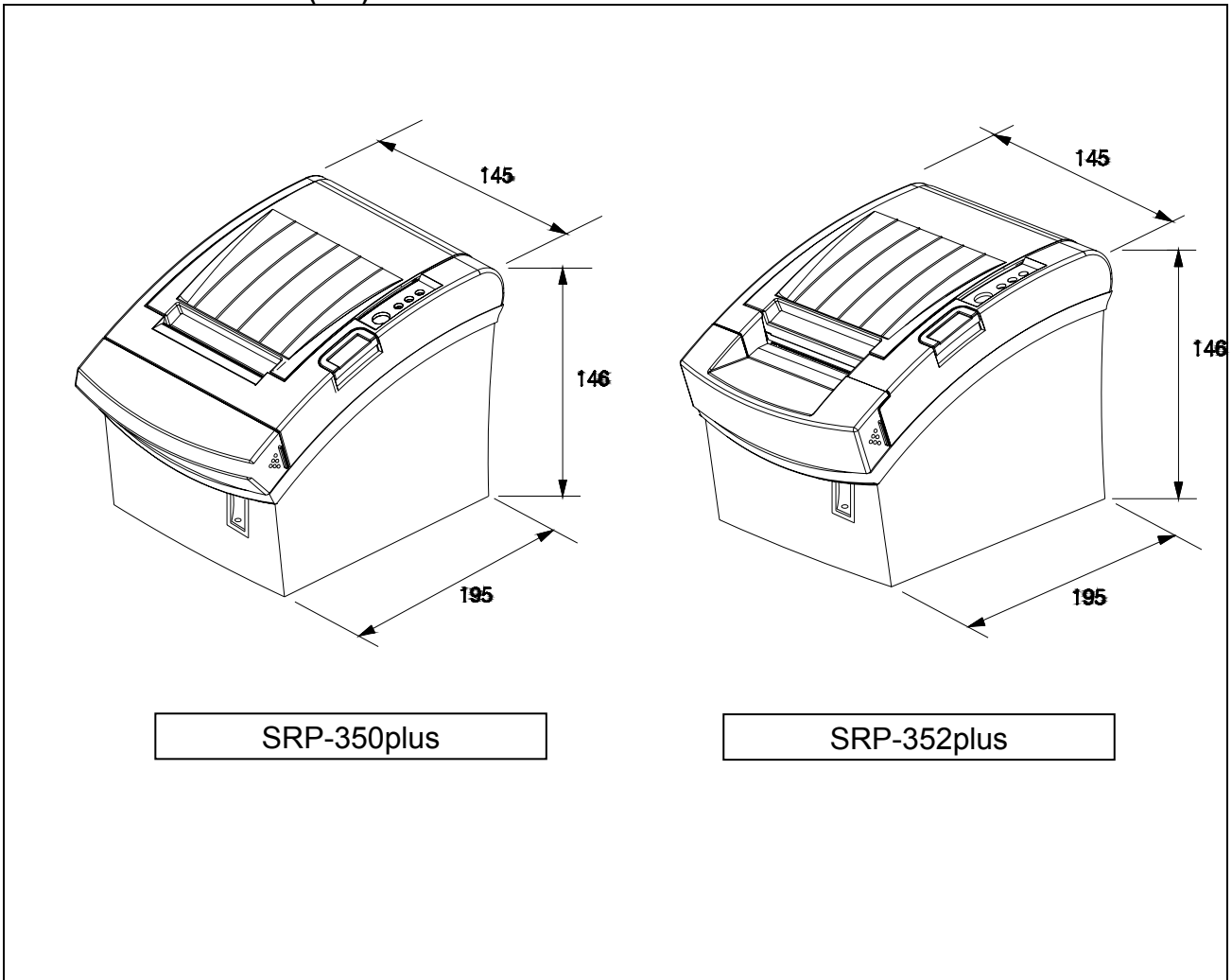
Figure 3-1 Printer Dimension

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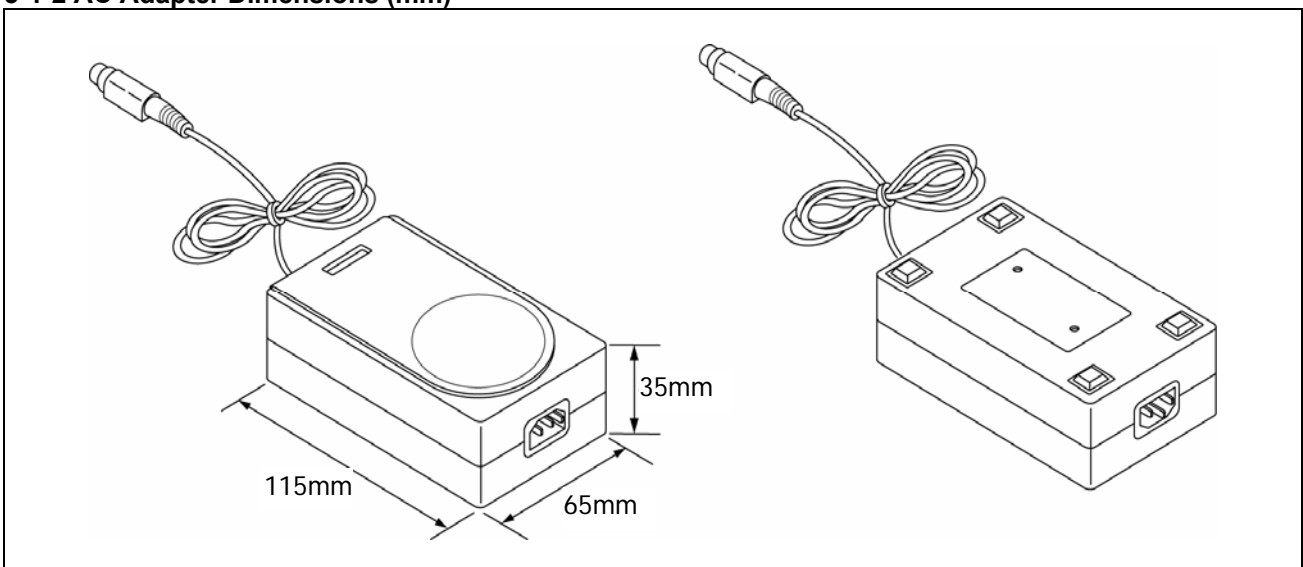
Figure 3-2 Adapter Dimension

3-1-3 Feature Locations-SRP-350/352plusA/C TYPE
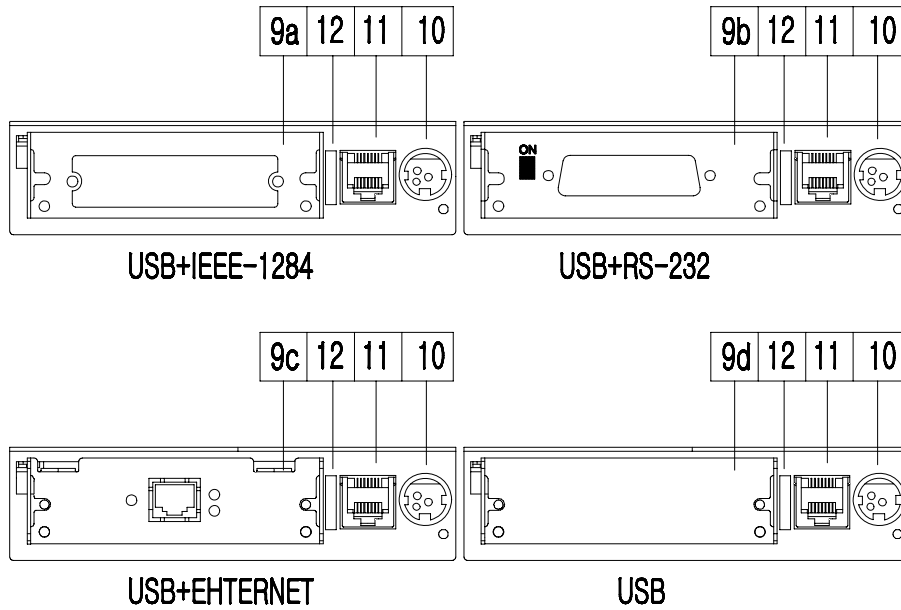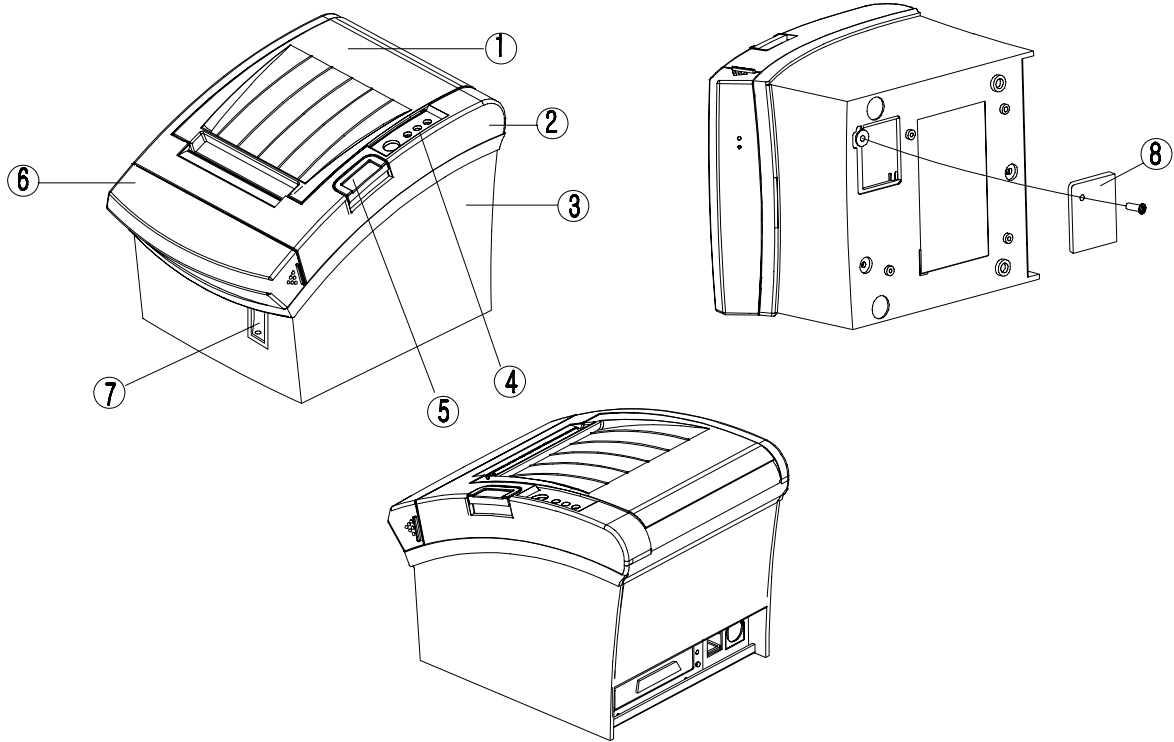
USB+IEEE-1284

USB+RS-232

USB+EHTERNET

USB

1.	Cover-Open	8.	Bracket Dip Switch
2.	Case-Upper	9a.	Parallel interface(IEEE-1284)
3.	Case-Lower	9b.	Serial interface(RS-232C)
4.	Label-Control	9c.	Ethernet interface(10BASE T)
5.	Push Button	9d.	-
6.	Cover-Cutter	10.	DC Power Jack
7.	Power Button	11.	Drawer Kick-Out Connector
		12.	USB 2.0

Figure 3-3 Feature Location

3-2 General Specifications

Item	Description	Remark
Product	• SRP-350/352plusCOS : RS-232 Serial Communication • SRP-350/352plusCOP : IEEE1284 Parallel Communication • SRP-350/352plusCO : USB Communication • SRP-350/352plusCOE : Ethernet	

Processor	• NEC UPD70F3107AGJ(32 Bit)
	    Internal ROM Size : 256K Byte
	    Internal RAM Size : 10240 Byte
		Flash ROM Version

Memory	• RAM
	    SRAM : 4Mbits (K6R4008VID-JU0000)
	    FLASH RAM : 16Mbits (M29W160EB-70N6)	

Interface Serial
(RS-232C / RS-485)
	• 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 : 64 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-350plus : Mono 200mm/Sec, 47.28 Line/Sec
	                   2Color 100mm/Sec, 23.6Line/sec
	  2) SRP-352plus : Mono 195mm/Sec, 52 Line/Sec
	                   2Color 90mm/Sec, 24Line/sec	

Auto Cutter	• Type : Guillotine • Cutting Method : 1 Point Partial Cutting	
Power Consumption	• Approx. 27W (Peak)	
AC Adapter	• Input : AC 100V ~ 240V, 50Hz/60Hz • Output : DC 24V±5%, 2.5A	
Environment Condition	• Input : AC 100V ~ 240V, 50Hz ~ 60Hz • Output : DC24V±5%, 2.5A	
Weight	• 2.3 Kg (With Packing)	
Dimensions(mm)	• 195(W) x 145(D) x 146(H)	

Table 3-1 General Specification

3-3 Thermal Printer Specifications

3-3-1 Printer Specification

1) 180dpi

Item	Description	Remark
Model	• SRP-350plusA/C(TPH : AG072-H7E817,AOI Electronoics)	
Print Method	• Thermal Line Printing	
Dot Density	• 0.141 mm (7.09 Dots/mm)	
Printing Direction	• Unidirection with friction feed	
Printing Width	• 72±0.2mm, 512 dot Position	
Character / Line	• 42 (Font A : 12x24) • 56 (Font B : 9x24)	
Character Spacing	• 0.28mm (0.01) (2 dots) (Font A) • 0.28mm (0.01) (2 dots) (Font B)	
Printing Speed	• Mono Max. 200mm (47.28 Lines / Sec, 1/6inch feed) • 2color Max. 100mm(23.6 Line/ Sec, 1/6inch feed) • Ladder Barcode : Mono 200mm/sec, 2Color 100mm/sec	
Paper feeding Speed	• Approx. 200mm /Sec	

Table 3-2 Thermal Printer Specification

2) 203 dpi

Item	Description	Remark
Model	• SRP-352plusA/C (TPH : AG072-H7E813 ,AOI Electronoics)	
Print Method	• Thermal Line Printing	
Dot Density	• 0.125 mm (8 Dots/mm)	
Printing Direction	• Unidirection with friction feed	
Printing Width	• 72±0.2mm, 576 dot Position	
Character / Line	• 48 (Font A : 12x24) • 64 (Font B : 9x24)	
Character Spacing	• 0.25mm (0.01) (2 dots) (Font A) • 0.25mm (0.01) (2 dots) (Font B)	
Printing Speed	• Mono Max. 195mm (52 Lines / Sec, 1/6inch feed) • 2color Max. 90mm(24 Line/ Sec, 1/6inch feed) • Ladder Barcode : Mono 180mm/sec, 2Color 90mm/sec	
Paper feeding Speed	• Approx. 200mm /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 24 (Font B) (Including 2-dot spacing in horizontal) Font A is selected as the default	

Table 3-4 Thermal Printer Character Specification

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(+0,-0.5)	
Paper Roll Size	• Max 83mm(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, 700,000 cut(In case of KF50)	
MCBF	• Monochrome :70,000,000Lines, 2Color:35,000,000Lines	
Environmental Temperature	• Operating : 0°C ~ +45°C • Storage : -10°C ~ +50°C (Except for Paper)	
Humidity	• 10% ~ 90% RH	

Table 3-6 Thermal Printer Reliability Specification

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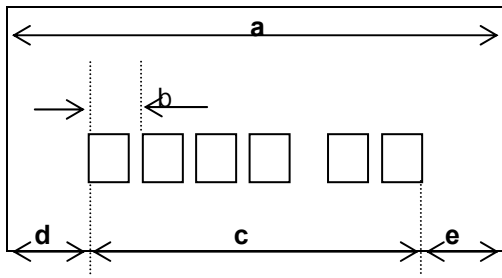
Figure 3-4 Printable Area

1) 180dpi

Item	Description	Remark
a	80±0.5mm(3.15 ±0.0197)	
b	0.141 (0.0056)	
c	72±0.2mm(2.83 ±0.0079)	
d	2.75mm~4.25mm	
e	2.75mm~4.25mm	
Dots	512	
Font 9X24	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	72mm±0.2mm (2.83±0.0079)	
d	2.75mm~4.25mm	
e	2.75mm~4.25mm	
Dots	576	
Font 9X24	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, 7.09Dot/mm (180DPI)	
Print Width	72±0.2mm	
Average Resistance	800Ω ± 3%	
Thermister	1) Resistance R25 : 30kΩ ± 5% (At 25℃)	
	2) B Value : 3950K ± 2%	
	3) Temperature : - 40℃ ~ +125℃	

Table 3-7 TPH Specification

Item	Maximum	Unit	Conditions
Print Cycle (S.L.T.)	0.71	ml/Line	Tsub=25℃
Supply Energy	0.44	mJ/Dot	
Supply Voltage	26.4	V	Vp < 28.0V (Vp : Peak of VH)
Substrate Temperature	70	℃	Thermister Temperature
Number of heating dots at same time	256	Dots	
Logic Supply Voltage (Vdd)	5.25	V	Include Peak Voltage of Vdd
Logic input Voltage (Vin)	-0.5 ~ Vdd+0.5	V	

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

2) 203dpi

Item	Description	Remark
Heat Element Structure	2 Heaters / Dot	
Number of Heat Element	576 Dots	
Heat Element Pitch	0.125mm/dot, 8Dot/mm (203DPI)	
Print Width	72±0.2mm	
Average Resistance	800Ω ± 3%	
Thermister	1) Resistance R25 : 30kΩ ± 5% (At 25℃) 2) B Value : 3950K ± 2% 3) Temperature : - 40℃ ~ +125℃	

Table 3-9 TPH Specification

Item	Maximum	Unit	Conditions
Print Cycle (S.L.T.)	0.63	ml/Line	Tsub=25℃
Supply Energy	0.34	mJ/Dot	
Supply Voltage	26.4	V	Vp < 28.0V (Vp : Peak of VH)
Substrate Temperature	70	℃	Thermister Temperature
Number of heating dots at same time	320	Dots	
Logic Supply Voltage (Vdd)	5.25	V	Include Peak Voltage of Vdd
Logic input Voltage (Vin)	-0.5 ~ Vdd+0.5	V	

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

3-3-7 Other Component Specification

Item	Description	Remark
Auto Cutter	• Model : ORC-RUY80 (OHYANE RIKI MFG, Co., Ltd) • Type : Guillotine Type • Motor : DC Brush Motor FK-180SH-12280 (Mabuchi Motor) • Voltage : 24V DC ± 7 % • Current : 800mA (Average), 1.6A(Peak)	
Paper Feed Motor	• Model : 14PU-M046-G1VM (Minebea) • Type : 2-Phase, Bi-Polar chopper dual,3.75 Step angle • Voltage : 24V ± 10% DC • Drive Current : 0.7A [PHASE] • Resistance : 4.2±0.42 (Ω/Phase) • Inductance : 3.0 REF. (mH/Phase)	
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), 0.75A (When 230V)	
In rush Current	• Max : 40A (Peak to Peak)	
Line Regulation	• +24V 1%	
Load Regulation	• +24V 5%	
Ripple Noise	• Peak 300mV	
O.C.P (Over Current Protect)	• 3.0A ~ 8.0A	
S.C.P (Shot Current Protect)	• Fold-Back Method	

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
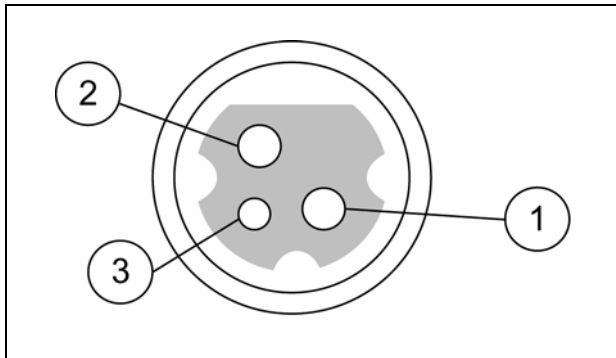
Figure 3-5 Power Connector

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 bit	
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

Printer Side: D-SUB25P-Male
Ferrite Core : 1 Turn (OP-118E : 18.2 x 12.5 x 25.5)
CONN : User Spec
In Case PC : D-SUB25P-Female or
D-SUB9P-Female
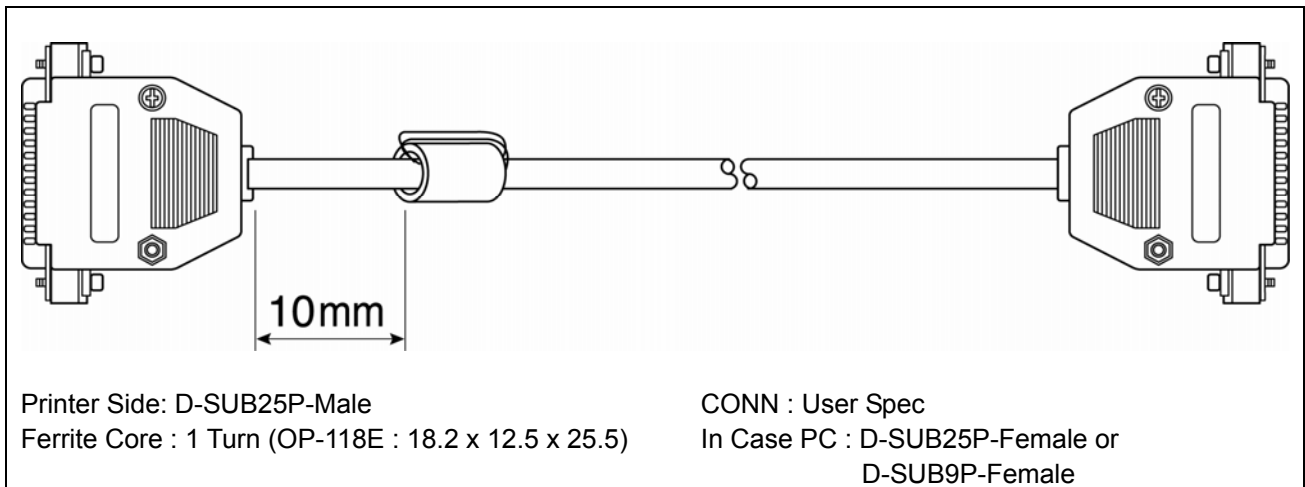
Figure 3-6 RS-232C Cable

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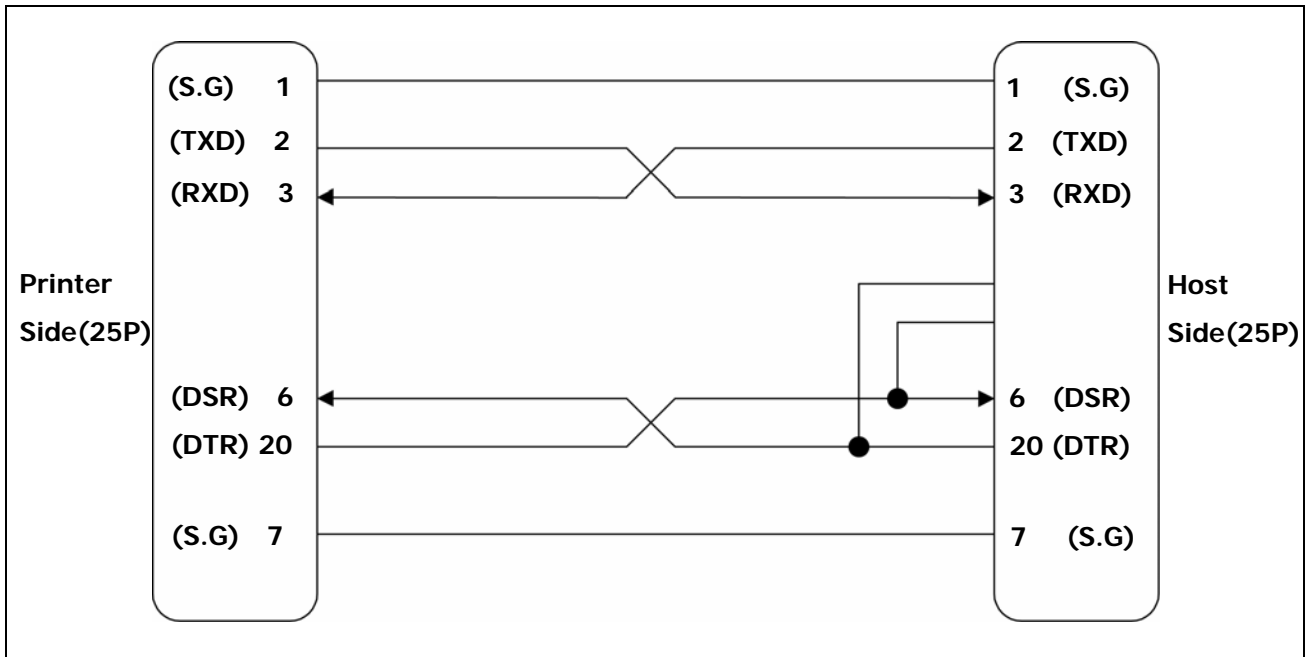
Figure 3-7 RS-232C Cable Connection

3-5-1(d) Signal Description

Pin No.	Signal Name	Signal Direction	Function
BODY	Frame GND	-	Frame Ground
2	TXD	Output	Transmit Data
3	RXD	Input	Receive Data
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	Signal GND	-	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

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.

2-5-2(a) Forward Mode Specification (Compatibility mode)
Data transmission from host computer to printer : Centronics compatible

Item	Description	Remark
Data Transmission	• 8-bit 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.

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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

Printer
Side

Centronics
36P
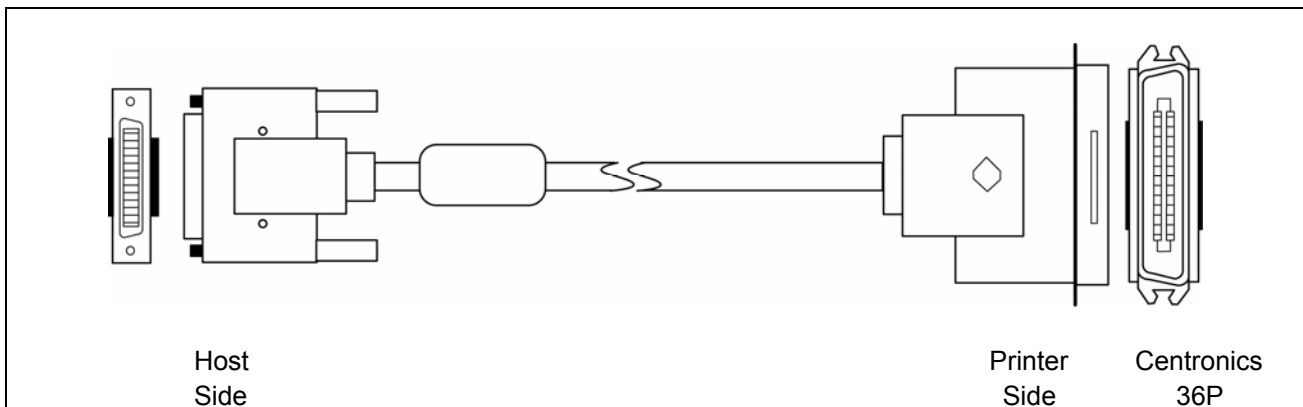
Figure 3-8 IEEE1284 Cable

3-5-3 USB2.0 Interface

SRP-350plus 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	
Transceiver	• Differential Receive Sensitivity : 200[mV] • Differential common Mode Range : 0.8 ~ 2.5[V] • Single-End Receiver Threshold : 0.8 ~ 2.0[V]	
Speed	• 12 Mbps	
Power	• Self-Powered	
Cable & Connector	• Cable : 5m / 2m • Connector : B Type	
Other	• Support USB SPEC V1.1	

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.
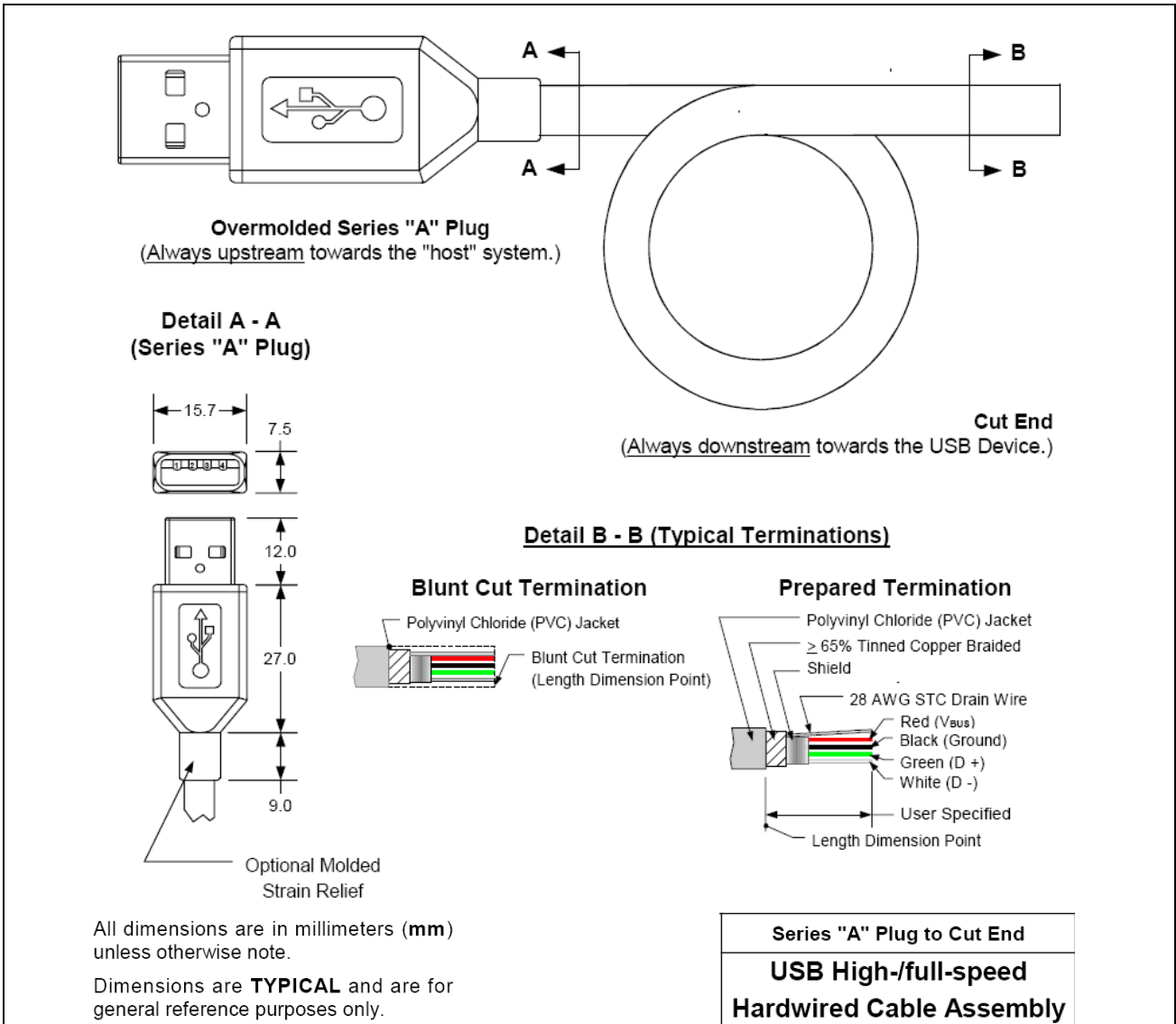
Figure 3-9 USB Cable

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)	7 x 36
	0.406 mm (0.016)	19 x 40
26	0.483 mm (0.019)	7 x 34
	0.508 mm (0.020)	19 x 38
24	0.610 mm (0.024)	7 x 32
	0.610 mm (0.024)	19 x 36
22	0.762 mm (0.030)	7 x 30
	0.787 mm (0.031)	19 x 34
20	0.890 mm (0.035)	7 x 28
	0.931 mm (0.037)	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*
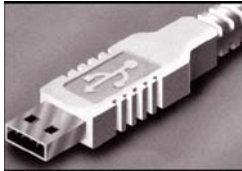
A Plugs
(*From the USB Device*)

A Receptacles
(*Downstream Output from the USB Host orHub*)

Series B Connectors

◆Series B plugs are always oriented downstream towards the *U*SB *Device*
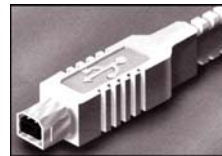
B Plugs
(*From the Host System*)

B Receptacles
(*Upstream Input to the USB Device or Hub*)
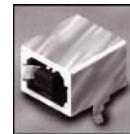
Figure 3-10 Keyed Connector Protocol

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
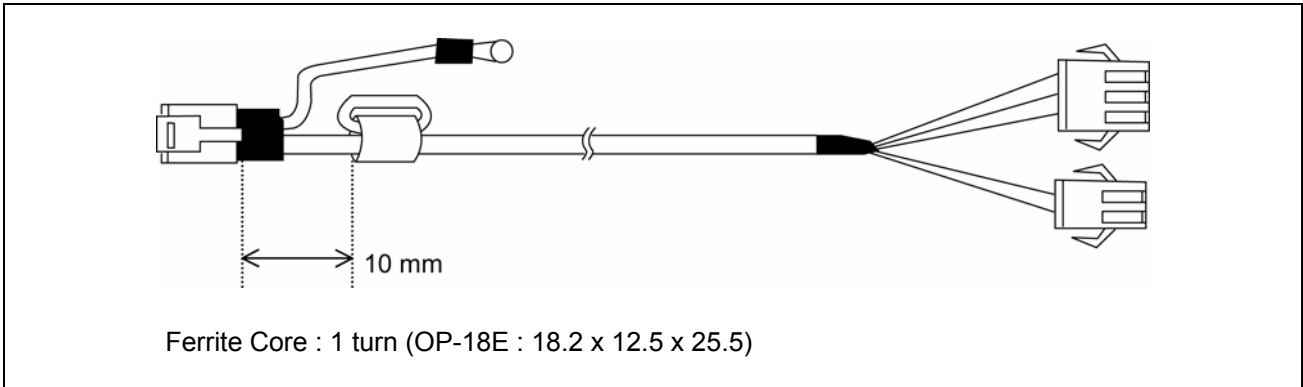
Figure 3-11 Drawer Cable

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.**

4. Hardware

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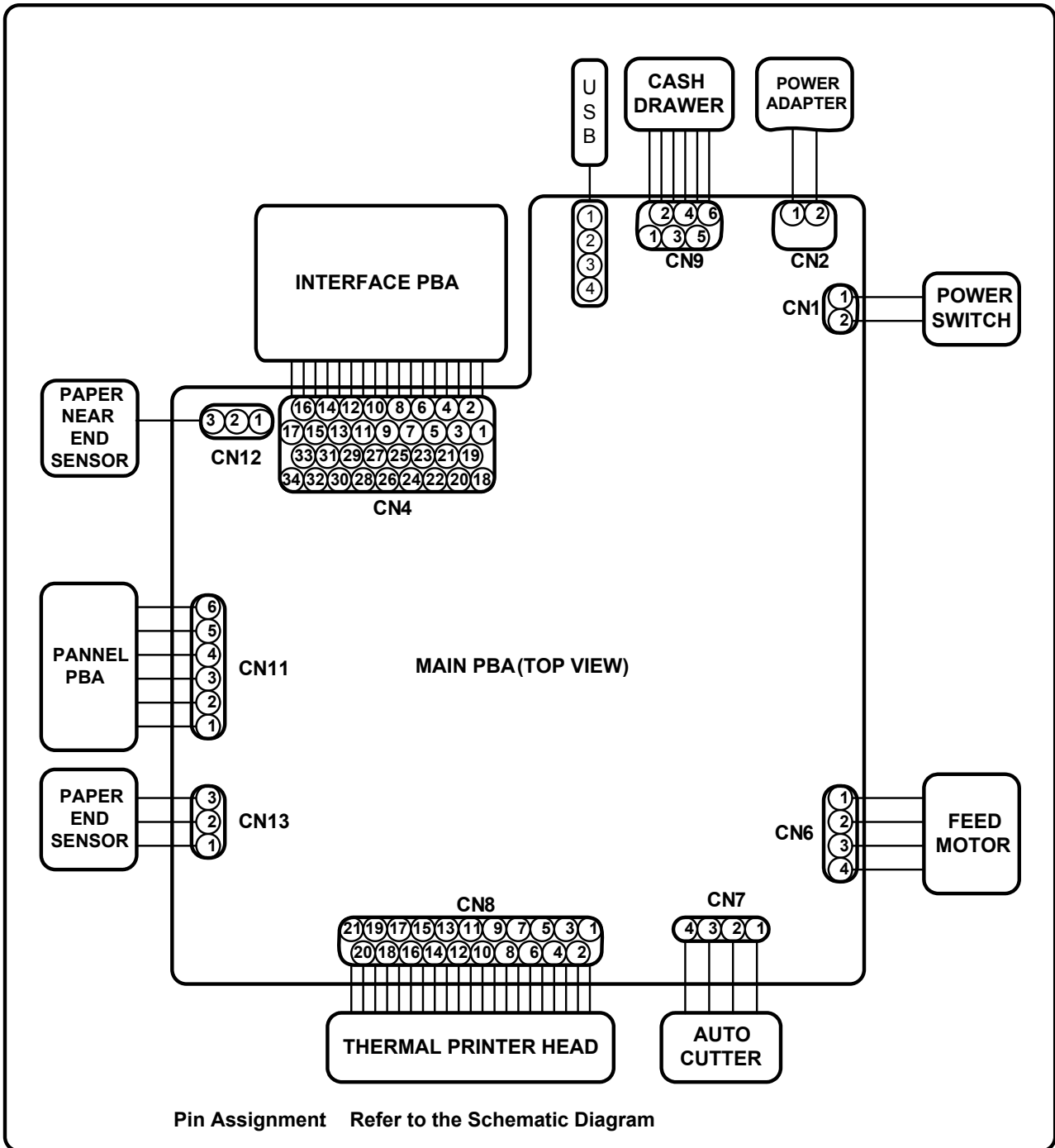
[Figure 4-1 Board Wiring Diagram]

4-2 Block Diagram
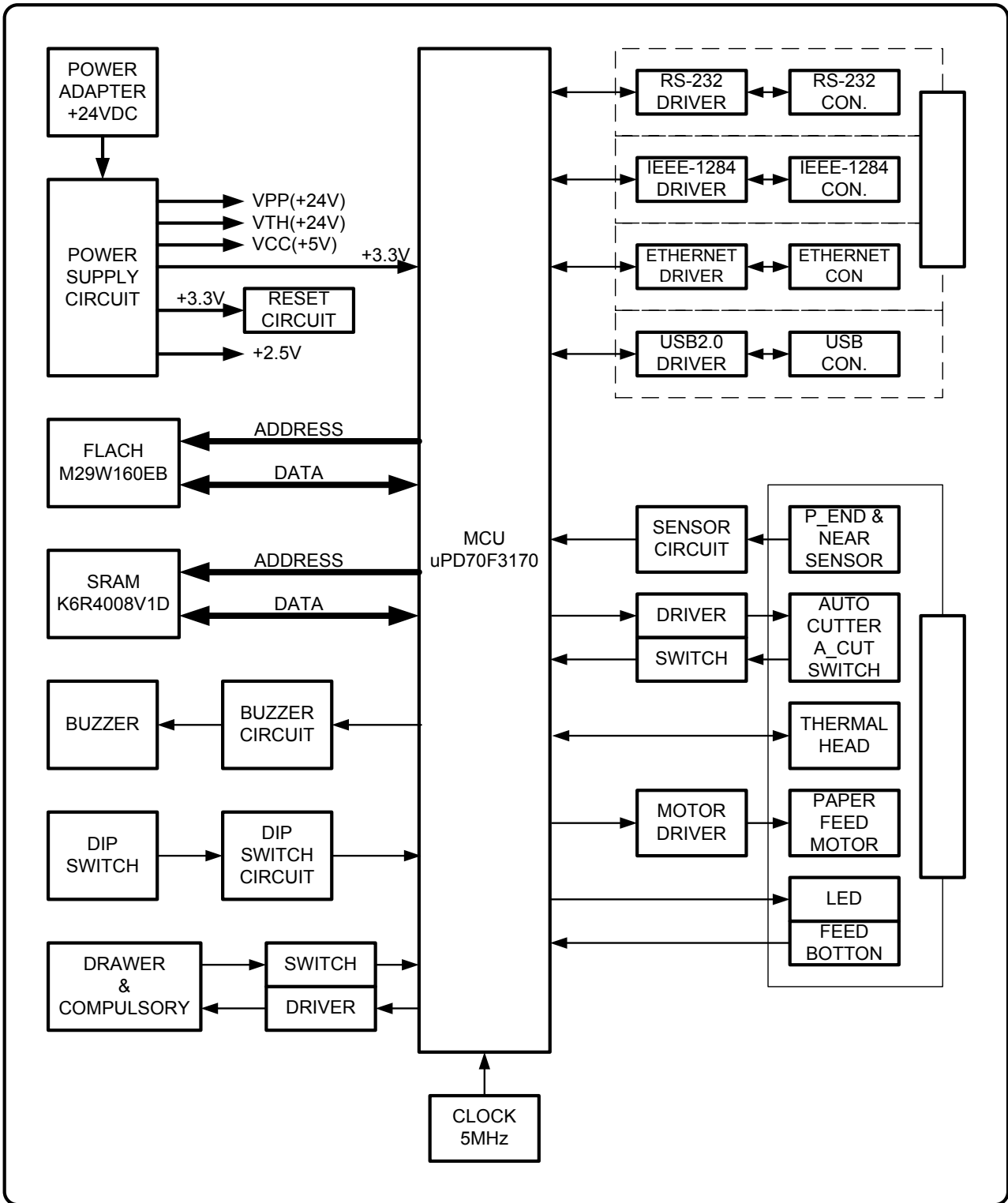
[Figure 4-2 Block Diagram]

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.
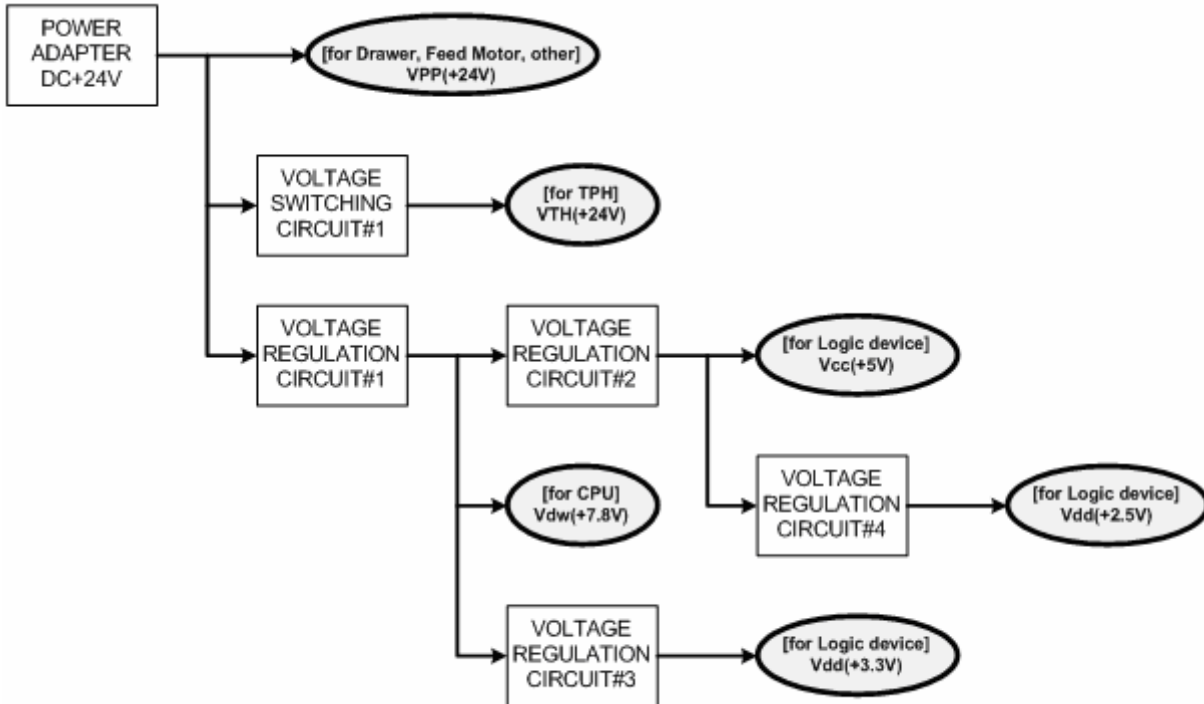
[Figure 4-3 Power Block Diagram]

No.	VOLTAGE	DESCRIPTION
1	VPP(+24VDC)	Cash Drawer Solenoid Driving / Step Motor Voltage
2	VTH(+24VDC)	Thermal Printer Head (TPH) Voltage
3	Vdw(+7.8VDC)	CPU Download Voltage
4	Vcc(+5VDC)	Logic, Sensor Voltage
5	Vdd(+3.3VDC)	CPU, Flesh, SRAM, Reset Voltage
6	Vdd(+2.5VDC)	USB core Voltage

1) Drawer Driving and Feed, Auto Cutter Motor Voltage, TPH Driving Voltage : +24VDC
+24VDC is supplied from SMPS. This Voltage is smoothed by capacitors (CL1).
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) Voltage : +7.8V (CPU Download Voltage)
Change the input 24V to 7.8V by a regulation. U1(LM2575S-ADJ)

3) Logic IC Driving Voltage: +5V
Change the input 7.8V to 5V by a regulation. U2(BA17805-E2)

4) CPU, Flesh, SRAM, Reset Voltage: +3.3V
Change the input 7.8V to 3.3V by a regulation. U3(BA033FP-E2)

5) USB core Voltage: +2.5V
Change the input 5V to 2.5V by a regulation. U202(BH25FB1WHFV)

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.
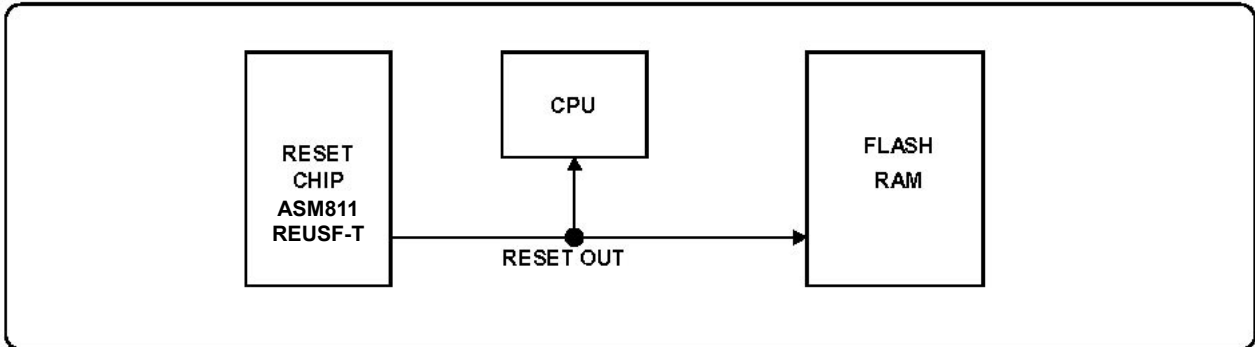
[Figure 4-4 Reset Block Diagram]
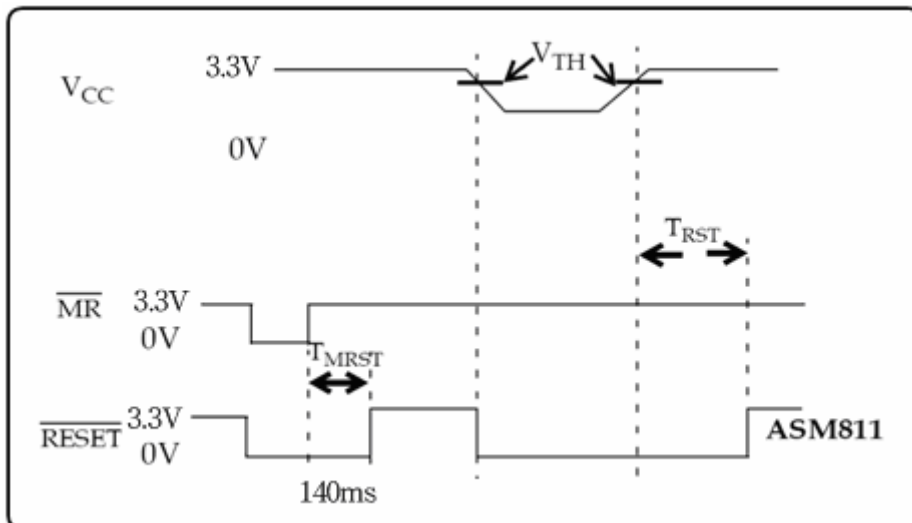
[Figure 4-5 Reset Waveform]

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 P86 of CPU (UPD70F3107)
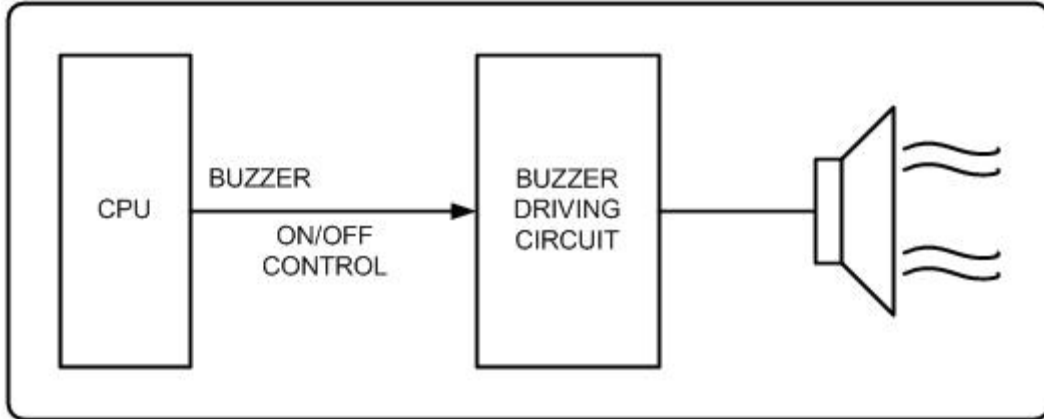
[Figure 4-6 Buzzer Block Diagram]

2) Cash Drawer Driving Circuit

The circuit is used for opening cash drawer and driven by the Q10, Q11(2SD2170). When its state is high level signal, Q10 or Q11 (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.**
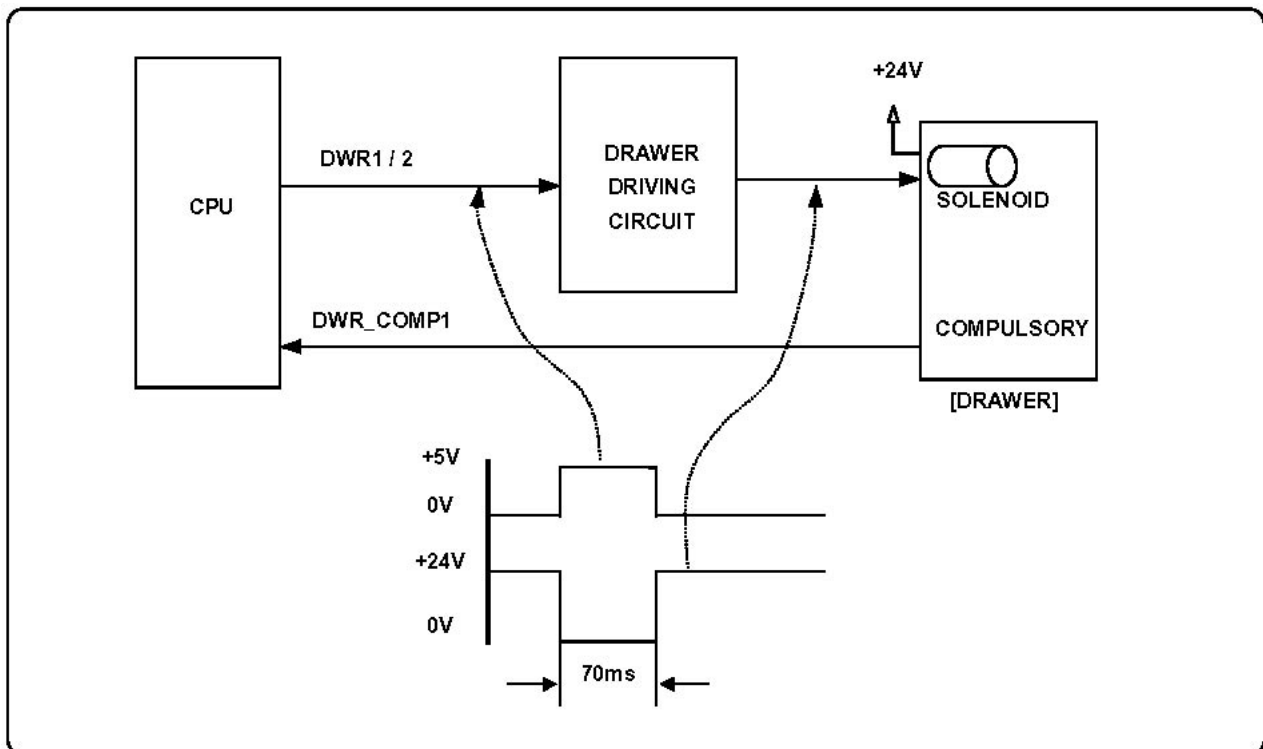
[Figure 4-7 Cash Drawer Block Diagram]

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	L	H
IEEE1284	H	H	H
USB2.0	H	L	H
ETHERNET	L	H	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.
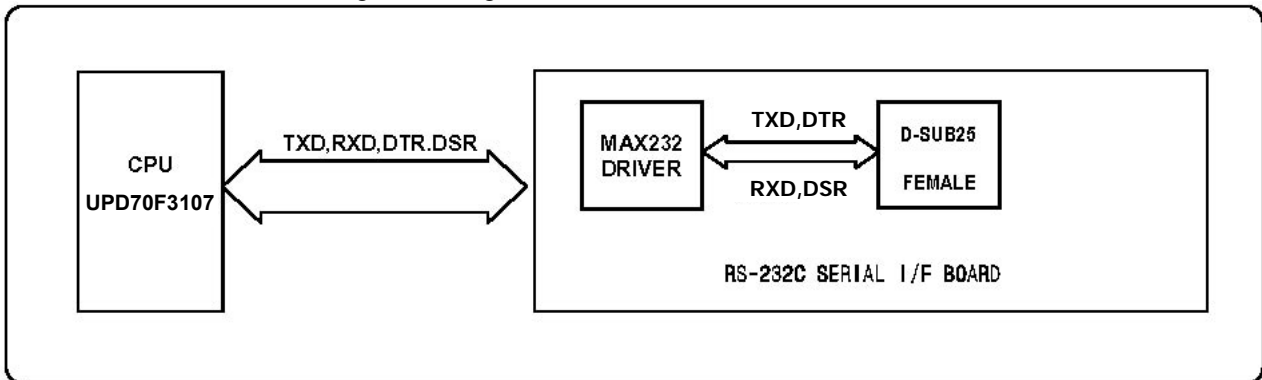
[Figure 4-8 RS-232C Communication Block Diagram]
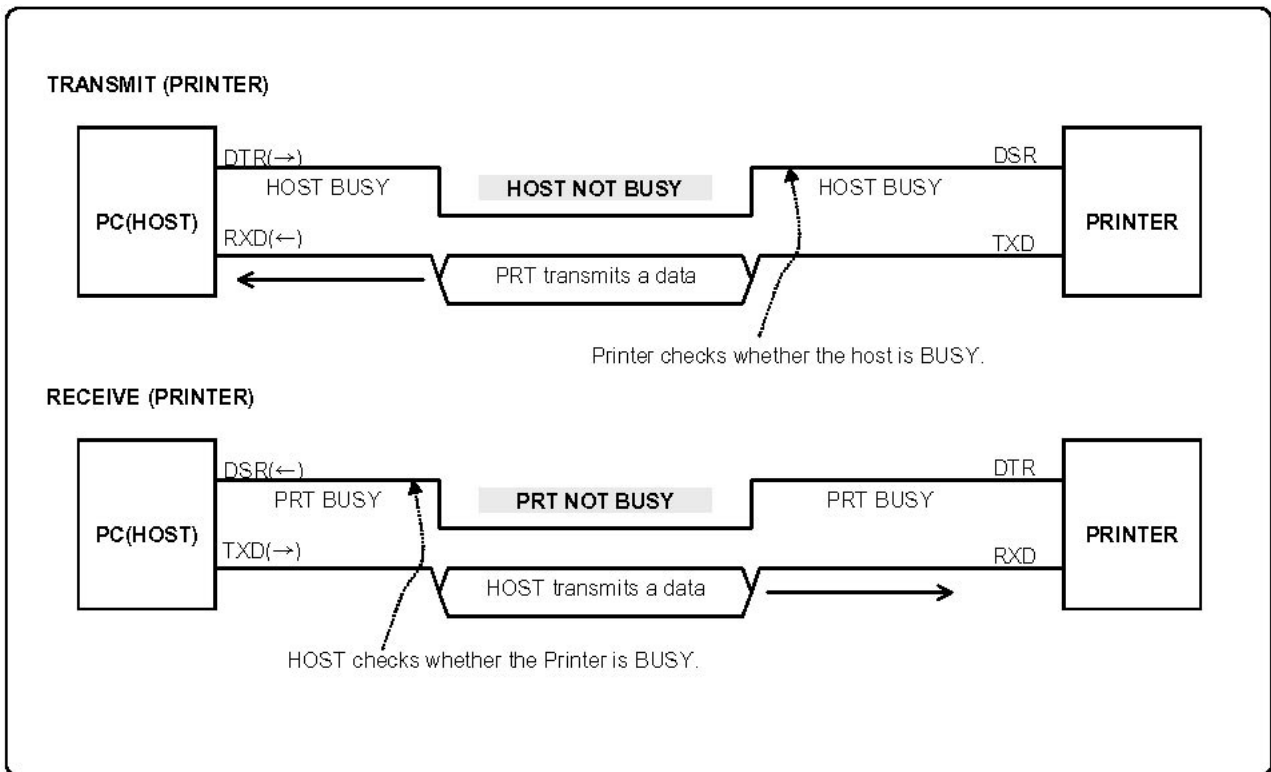
[Figure 4-9 RS-232C Communication Waveform]

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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.

Parallel Interface Board
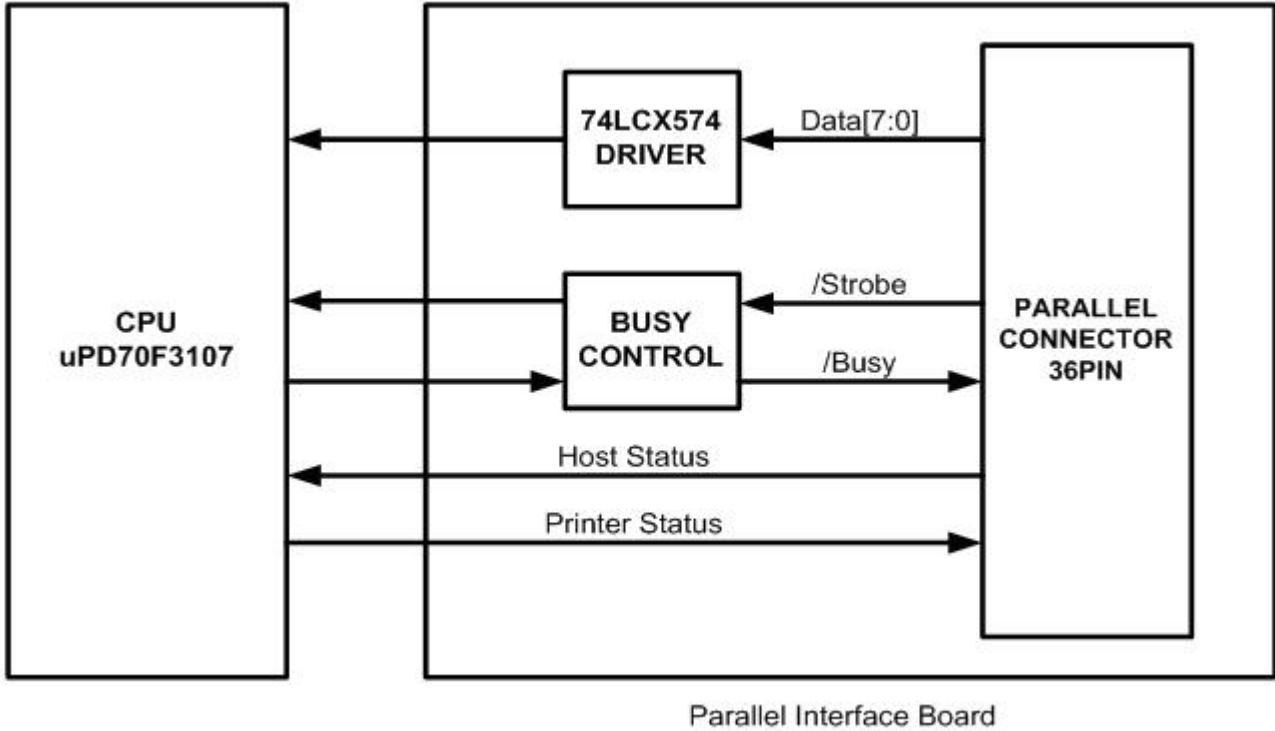
[Figure 4-10 IEEE1284 Communication Block Diagram]

4-3-7 USB Communication Block Diagram

The printer support the USB (Universal Serial Bus). The transfer type of the printer is the BULK.

USB2.0 Interface Block
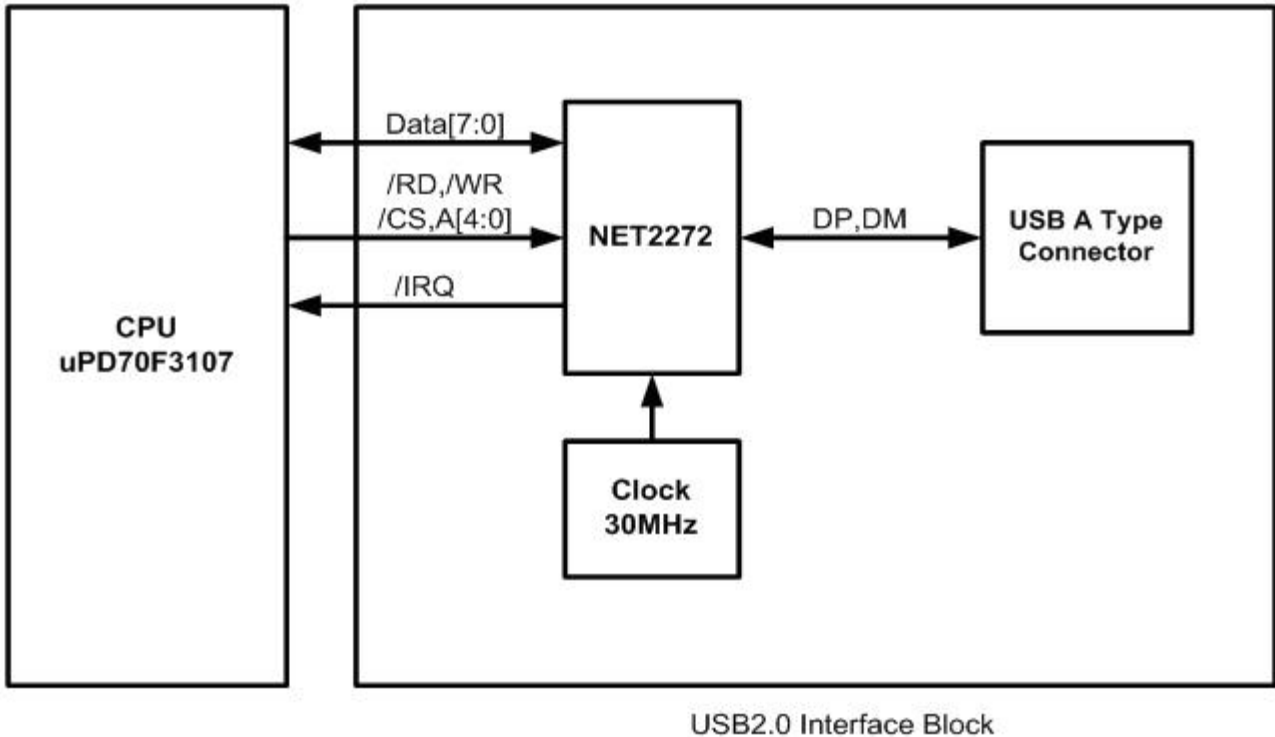
[Figure 4-11 USB2.0 Communication Block Diagram]

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.
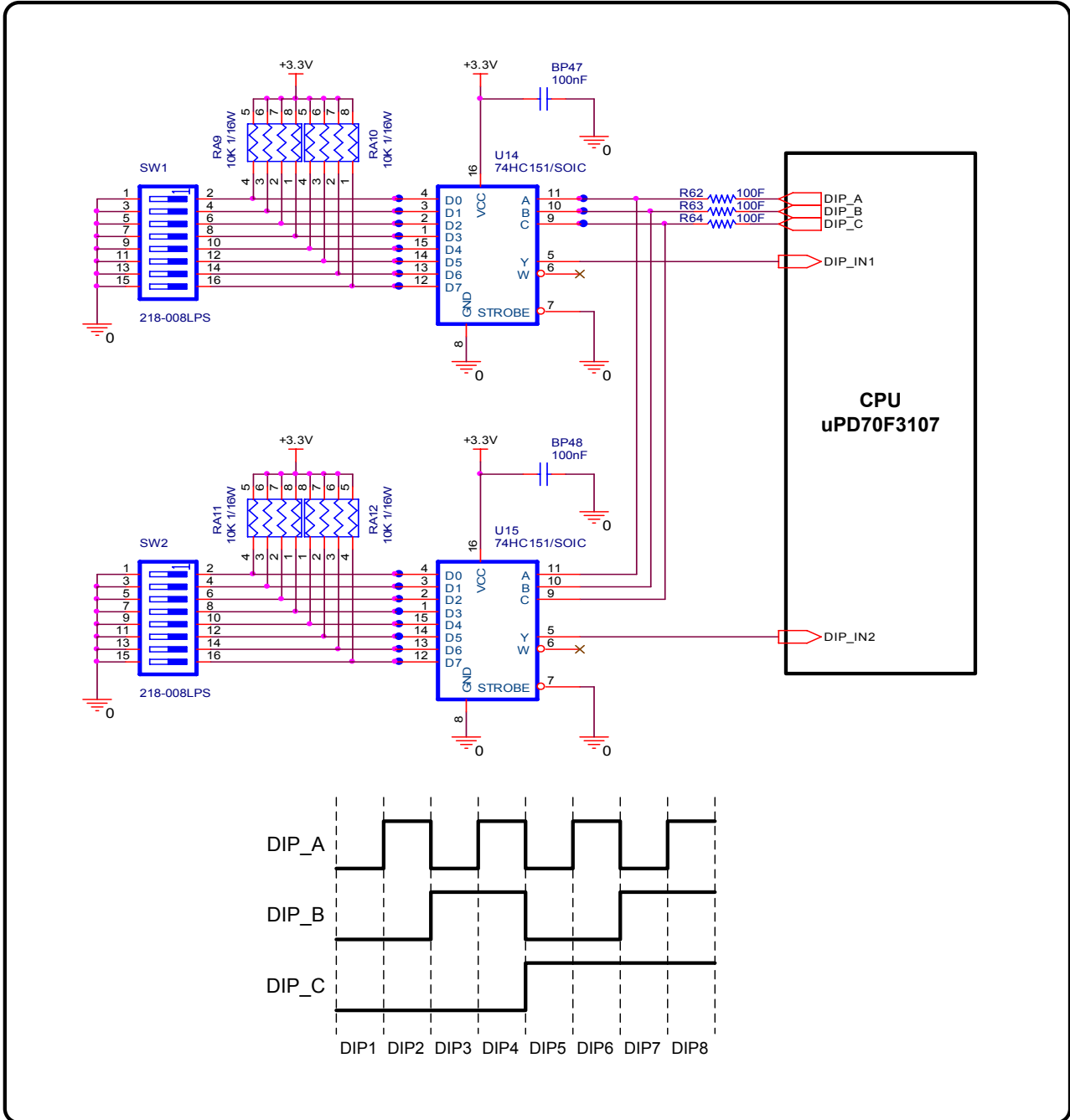
[Figure 4-12 USB Communication Block Diagram]

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=512 Bits) 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-350plus Strobe Processing
STB1	1 ~ 256	256	The content of data is same.
STB2	257 ~ 512	256	
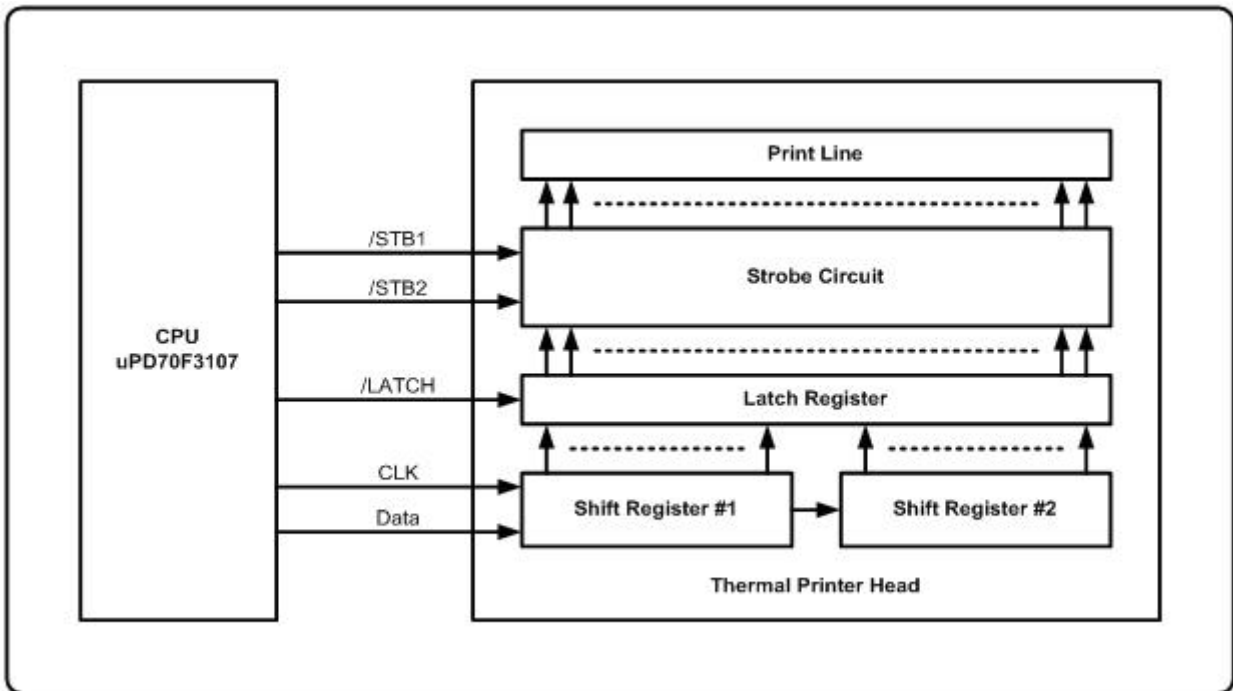
[Figure 4-13 Thermal Printer Block Diagram]
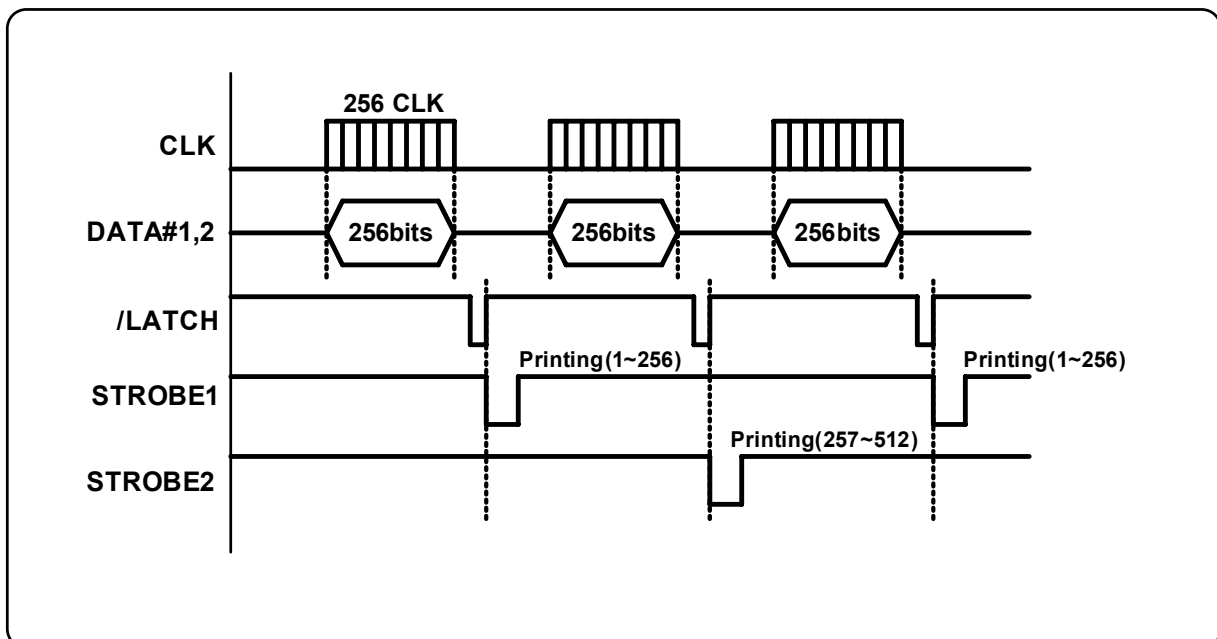
[Figure 4-14 Thermal Printer Timing Waveform]

5. Disassembly and Assembly

5-1 Case lower block
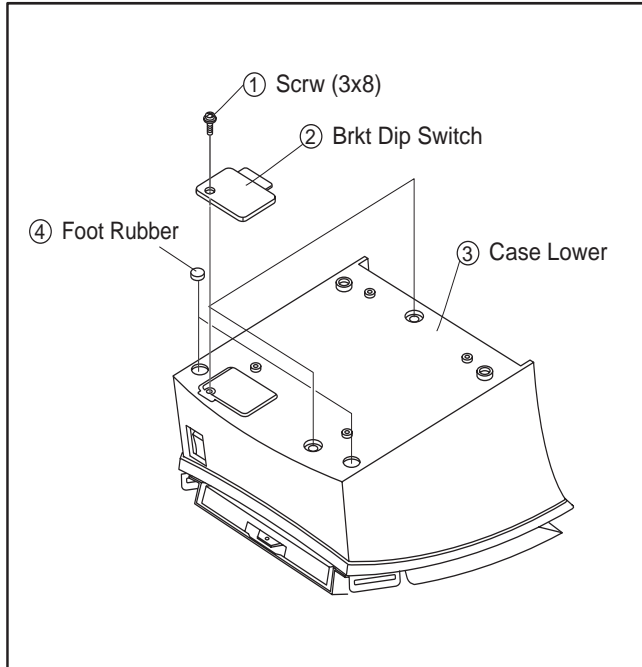
1. Remove the three screw.
2. Sparate the BRKT Dip switch,
   Case lower, Foot-Rubber from the Printer.
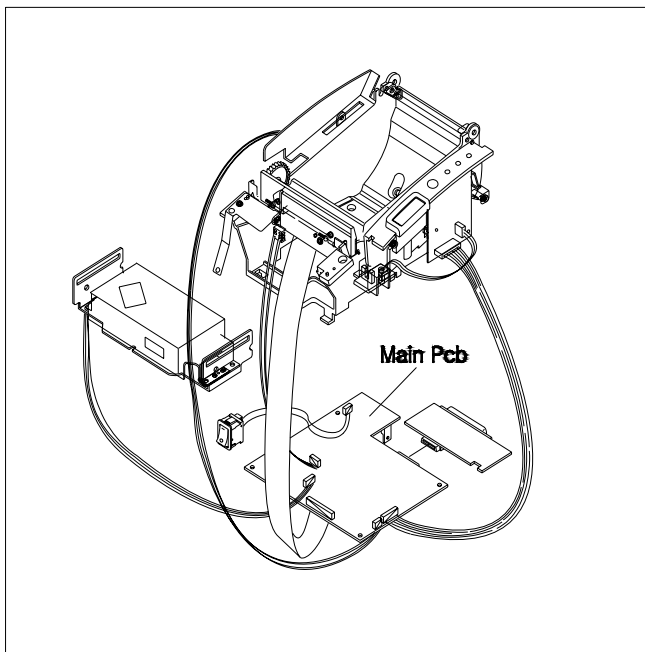
1. Remove the connector wires
   from main PBA and sub Assembly.

⑧ Screw

① Screw (3x6)

② Brkt PCB

Screw

⑧

⑥ Main PCB

④ Screw

③Brkt Serial
(Parallel, 485)

⑤PCB Serial
(Parallel, 485)

⑦ Screw (3x6)
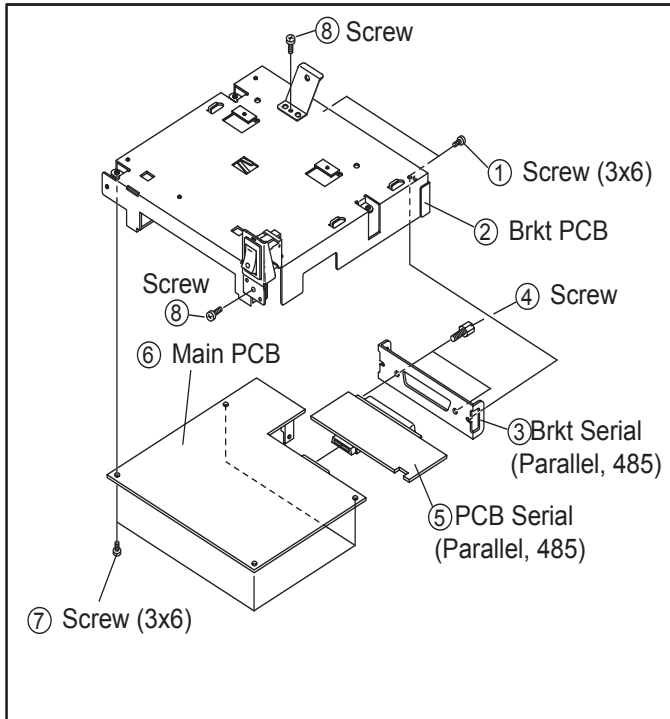
1. Remove the Screws form the BRKT PBA.
2. Separate the BRKT Interface.
3. Remove the two screws.
4. Separate the BRKT Interface from
   the I/F PBA Assembly.
5. Separate the I/F PBA from the Main PBA.
6. Remove the four screws.
7. Seperate the Main PBA form the
   BRKT PCB.

① Case Lower
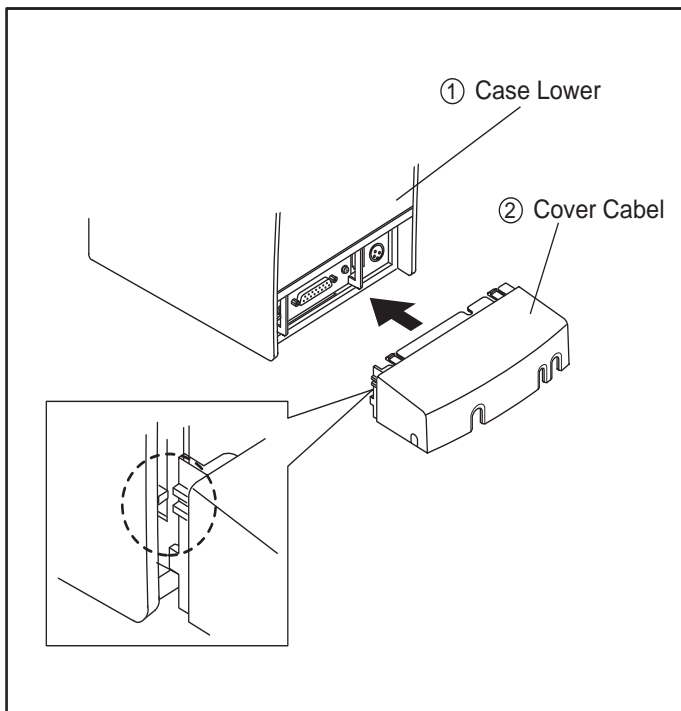
② Cover Cabel

1. Separate the Cover cable from
   Case lower.

5-2 Case Upper block
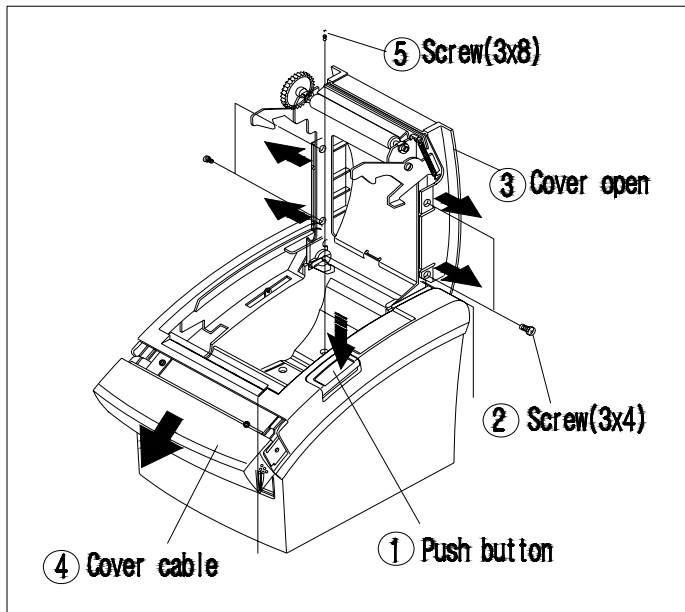
1. Push the button to open the Cove Open.
2. Remove the four screws.
3. Separate the Cover open.
4. Separate the Cover cutter.
5. Remove the screws.
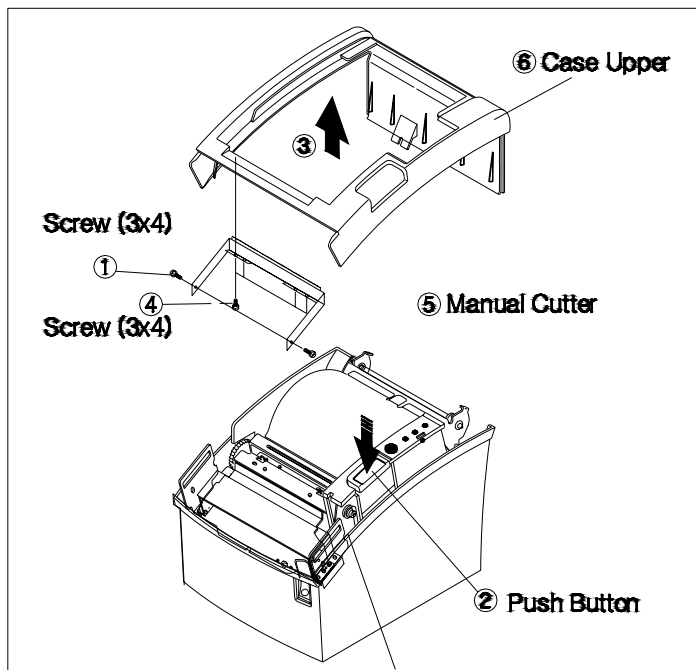
1. Remove the two screws.
2. Lift the Case upper in the direction of an arrow during pushing the Push button.
3. Remove the three screws.
4. Separate the Manual cutter from the Case upper.
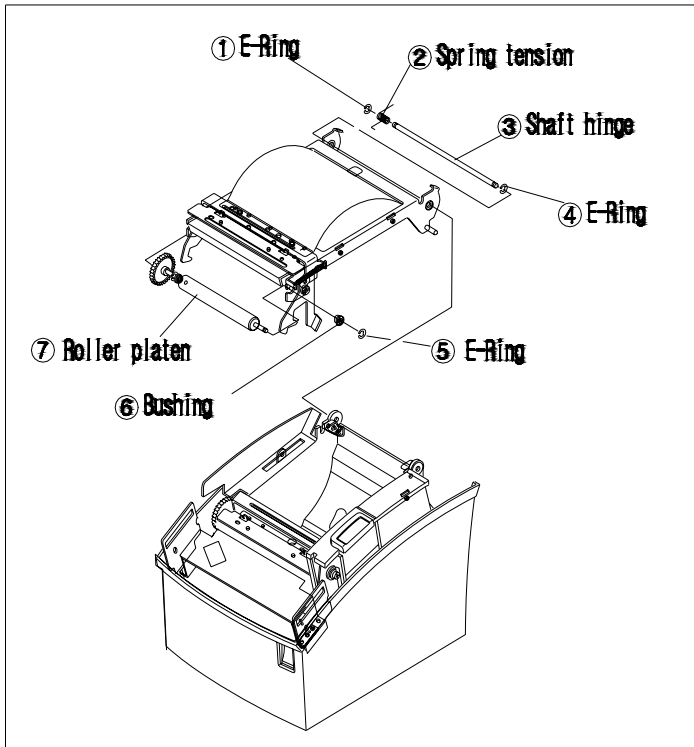
1. Remove the E-Ring.
2. Separate the Spring tension, the
   Shaft hinge and the E-Ring.
3. Remove the E-Ring.
4. Separate the Bushing and the
   Roller Platen Assembly.
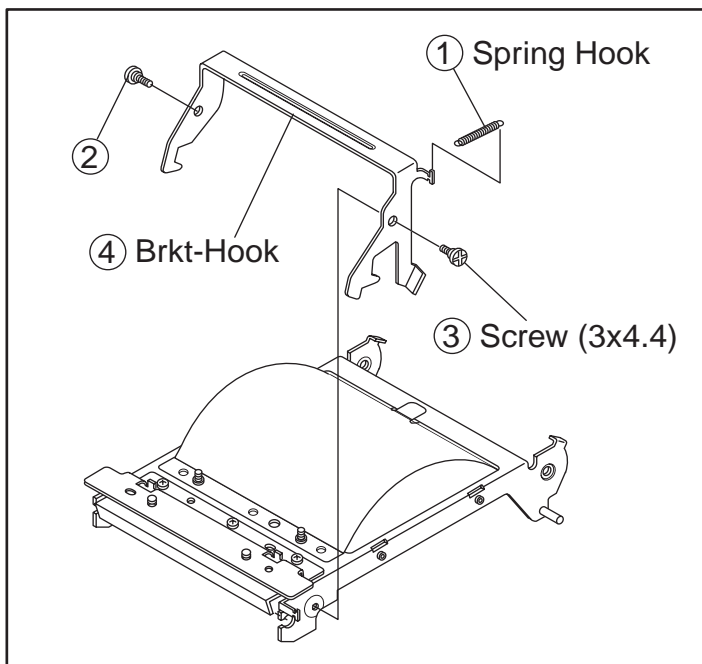
1. Remove the Spring Hook, two screws.
2. Separate the BRKT Hook.

① Screw (3x4)   ⑦ Cover Plate

② Fixed Cutter

⑤ Cutter Blade

③ Cover Housing

④ Screw (3x4)

⑥ Screw (3x6)
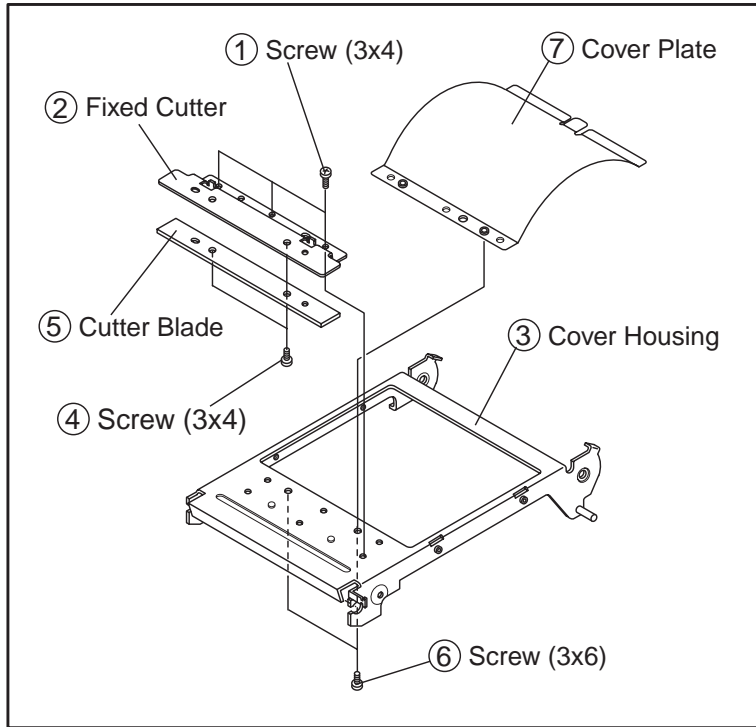
1. Remove the three screws.
2. Separate the Fixed-cutter from the Cover Housing.
3. Remove the two screws.
4. Separate the Cutter Blade from Fixed-cutter.
5. Remove the two screws.
6. Separate the Cover plate from the Cover housing.

5-3 Frame block

① Screw(3x10)

② Auto cutter

③ Bracket Cutter
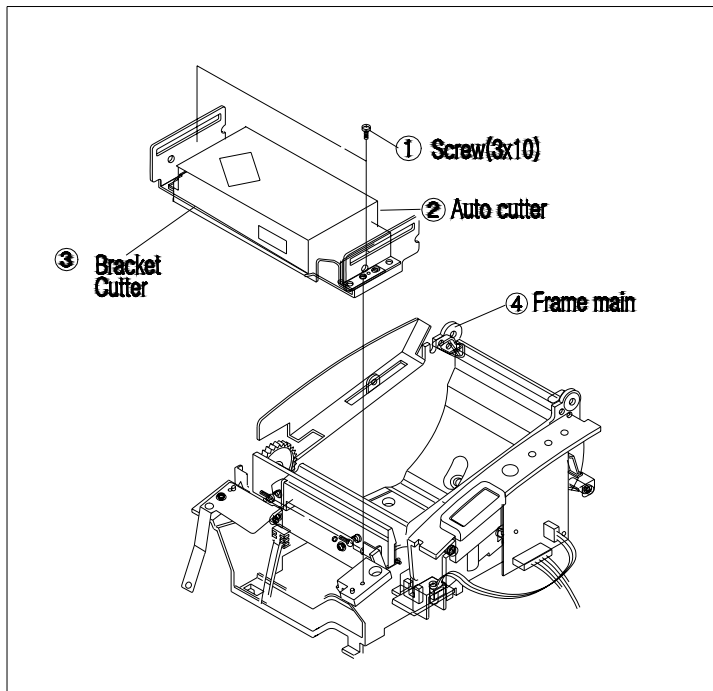
④ Frame main

1. Remove the two screws.
2. Separate the Black Auto cutter from the Frame main.
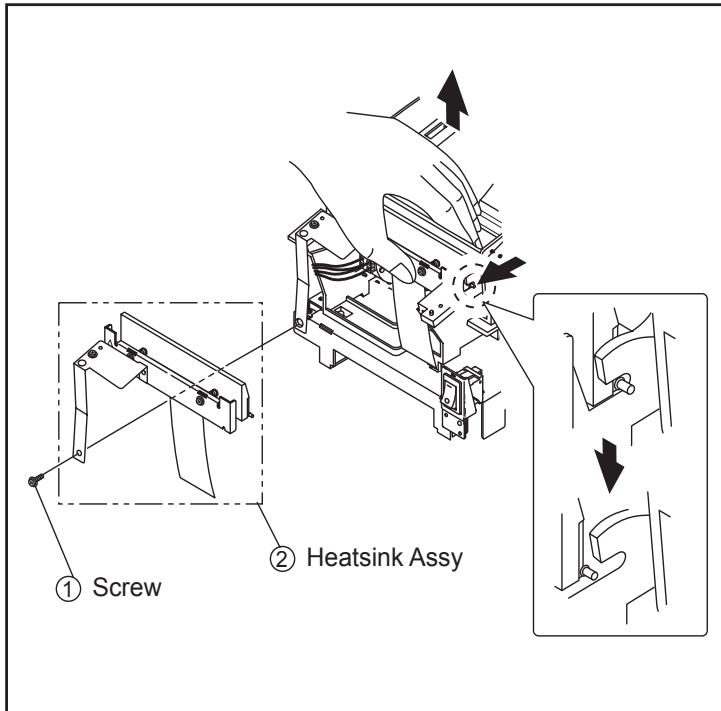
1. Remove the screw.
2. Push the Heat-sink Assembly in the direction of an arrow and Separate it.

② Heatsink Assy

① Screw

---
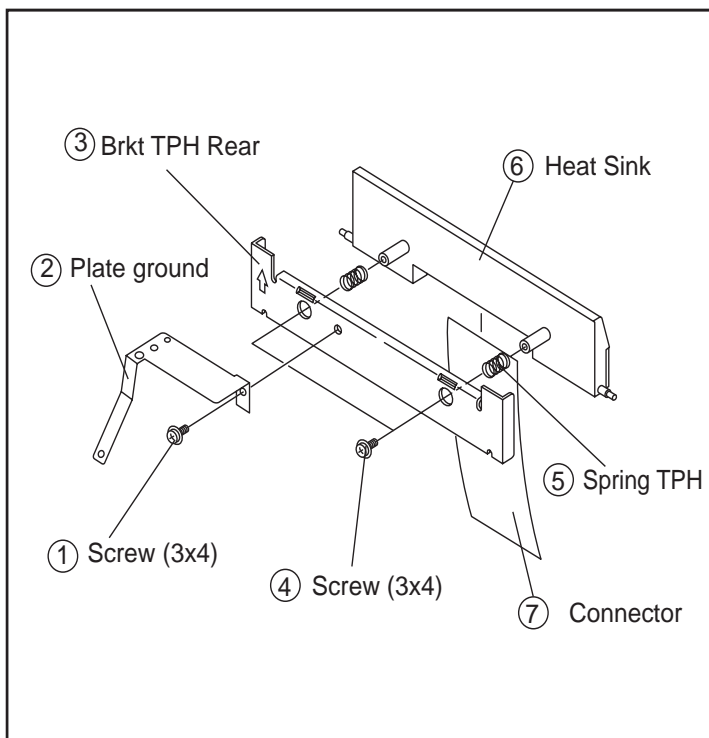
1. Remove the screw.
2. Separate the Plate-ground and BRKT TPH Rear.
3. Remover the two screws.
4. Separate the Heat-sink and the Spring TPH.
5. Separate the Connector from the Heat-sink.

③ Brkt TPH Rear

⑥ Heat Sink

② Plate ground

⑤ Spring TPH

① Screw (3x4)

④ Screw (3x4)

⑦ Connector
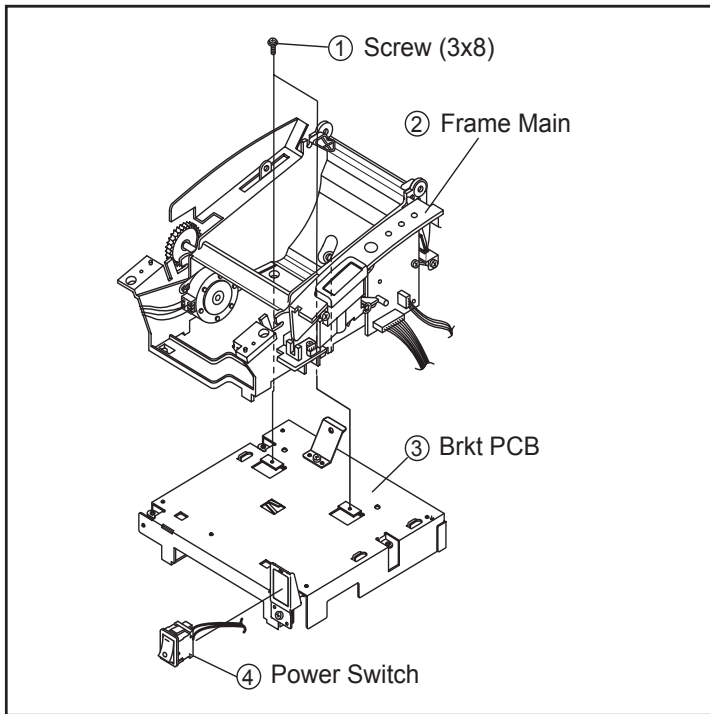
1. Remove the two screws.
2. Separate the Frame Main from the BRKT PCB.
3. Separate the Power Switch from the BRKT PCB.
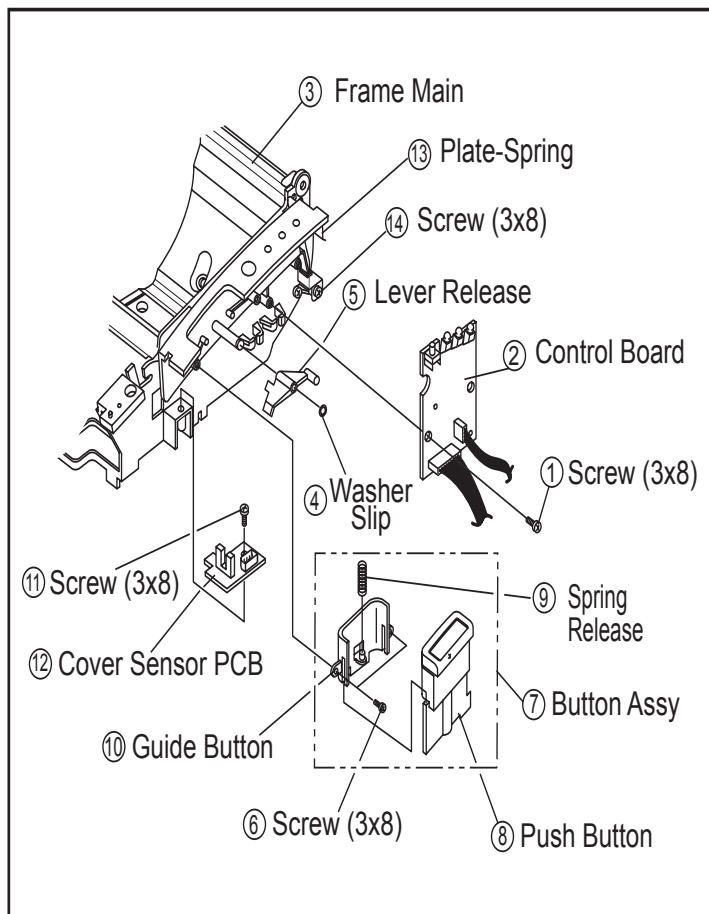
1. Remove the screw, And separate the Control board from the Frame Main.
2. Remover the Washer slip.
3. Separate the Lever Release from the Frame Main.
4. Remove the two screws.
5. Separate the Button Assembly from the Frame Main.
6. Push the Button. Then, the Button Assembly is separate.
   (Internal Spring Release, Guide Button)
7. Remover the screw. And separated the Cover Sensor PCB from the Frame Main.
8. Remover the screw. And separate the Plate-Spring from the Frame-Main.

6. Adjustments and Maintenance

6-1 Adjustment

6-1-1 Remaining Roll Paper Adjustment

This sensor is set to the step3 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 tab
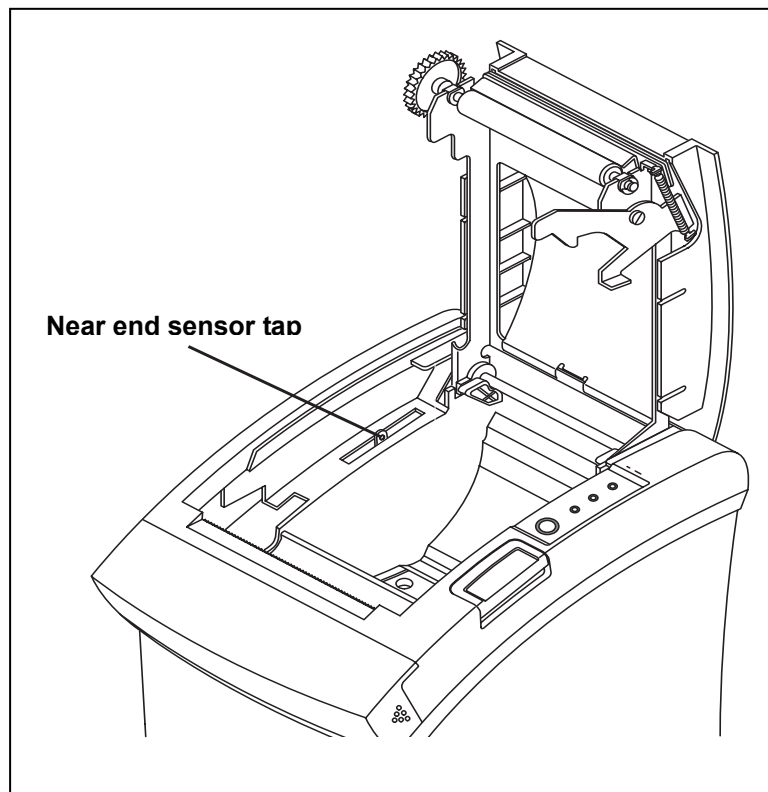
6-1-2 Paper Jam

If the paper jam occur, the Buzzer will beep. If the cover-open can be opened, open the
Cover-open and remove the paper.
If the Cover-open can not be opened, Follow the below.

1. Turn the printer on to make the cutter initialized, and then open the cover-open.

2. In case that the cutter is not initialized, remove the cover-cutter then remove the paper jam
with turning the knob to the arrow direction as shown below picture. You may use a cross
screwdriver to remove the paper jam.

3. After the cutter placed back, and then press the push button to open the cover.

4. Assemble the cover-cutter.
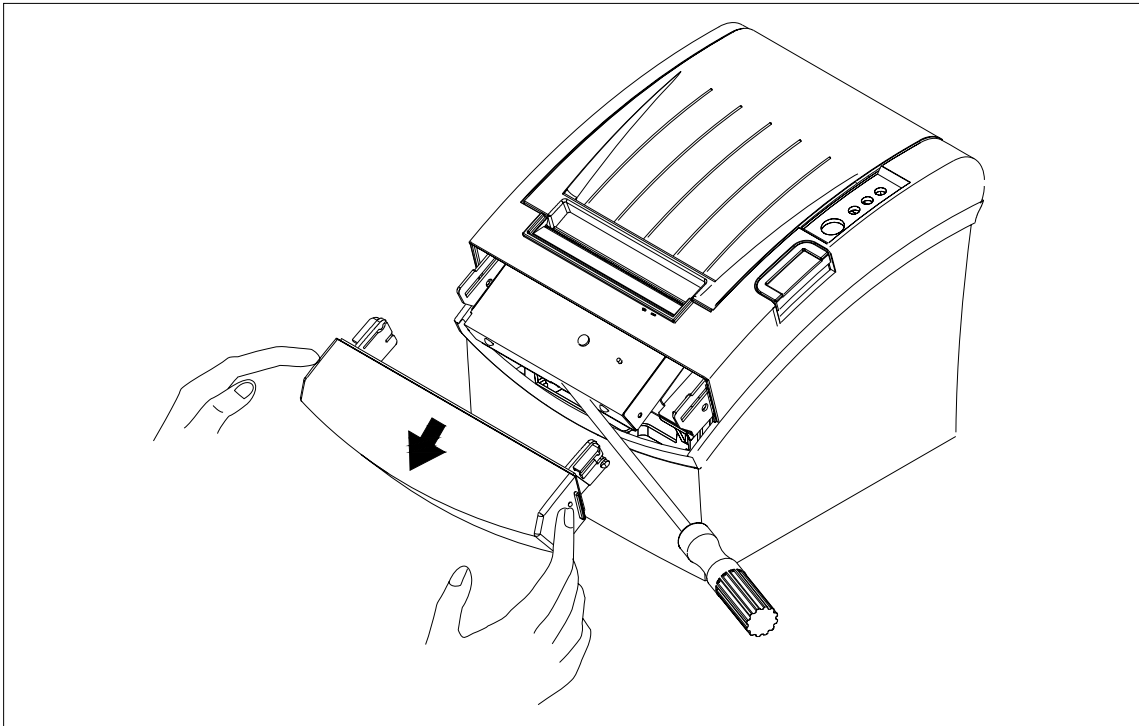
6-2 Maintenance

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.
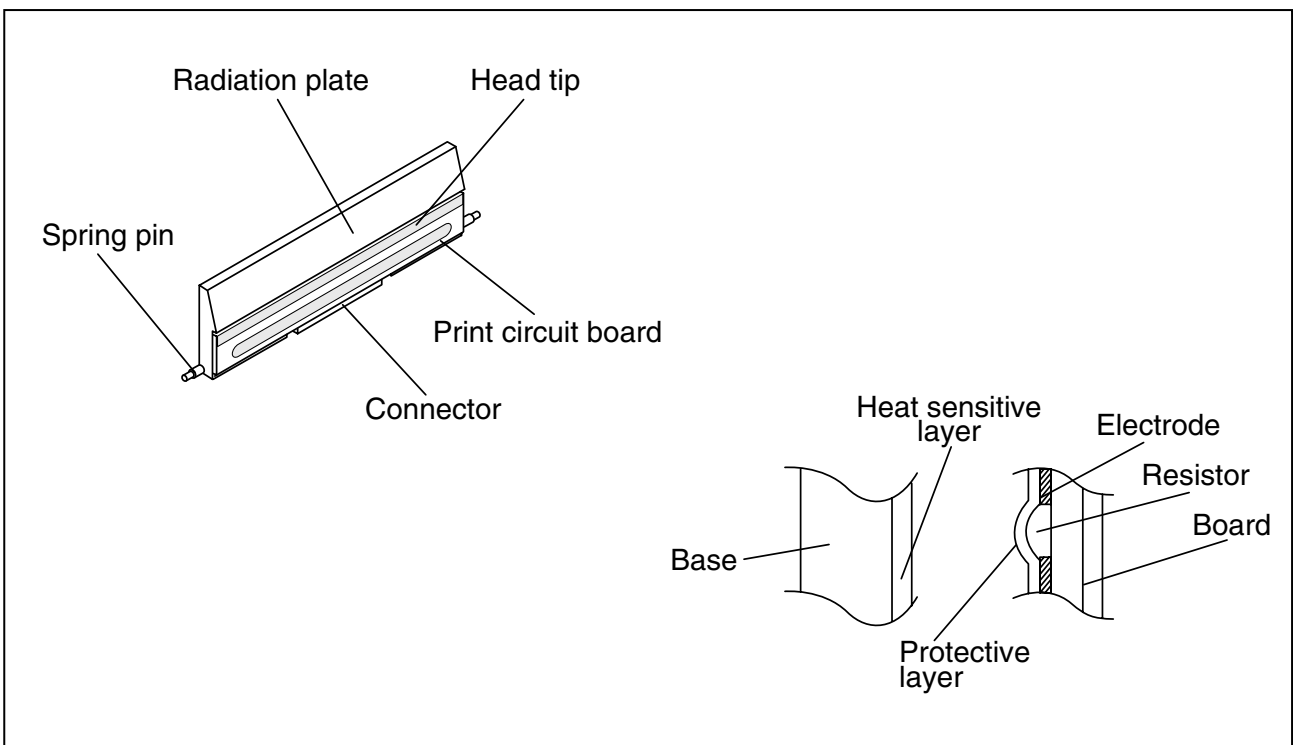
※ **Note: Never touch the thermal element with your hand.**
        Doing so can damage the thermal element.

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

7. Troubleshooting

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

7-1 Power Problem

```
        ( Power Problem )
              │
        < Power Out Ok? On SMPS >──N──┐
              │Y                       ▼
              │    ┌──────────────────────────────────────┐
              │◄───│ 1. Check the Input/Output Power Cable │
              ▼    │ 2. Replace the Adapter(SMPS)          │
        < Power VDR (+24V) Ok? >──N──┐ └────────────────┘
              │Y                     ▼
              │    ┌──────────────────────────────────────┐
              │◄───│ 1. Check the Harness of Power S/W     │
              ▼    │ 2. Check the related Circuit & Pattern │
        < Power VTPH (+24V) Ok? >──N──┐ └────────────┘
              │Y                      ▼
              │    ┌──────────────────────────────────────┐
              │◄───│ 1. Check the TR (Q3,Q4)               │
              ▼    │ 2. Check the related Circuit & Pattern │
        < Power (+7.8V) Ok? >──N──┐
              │Y                  ▼
              │    ┌────────────────────────────────────────────┐
              │◄───│ 1. Check the Regulation U16 (LM2576S-ADJ)   │
              ▼    │ 2. Check the related Circuit & Pattern      │
        < Power VCC (+5V) Ok? >──N──┐
              │                     ▼
              │    ┌────────────────────────────────────────────┐
              │◄───│ 1. Check the Regulation U2 (BA17805FP-E2)   │
              ▼Y   │ 2. Check the related Circuit & Pattern      │
        < Power (+3.3V) Ok? >──N──┐
              │Y                   ▼
              │    ┌────────────────────────────────────────────┐
              │◄───│ 1. Check the Regulation U3 (BA033FP-E2)     │
              ▼    │ 2. Check the related Circuit & Pattern      │
           ( End )
```

7-2 System Problem

```
        ┌─────────────┐
        │   System    │
        │   Problem   │
        └─────────────┘
               │
        ◇ Reset Signal ◇──── N ──────┐
        ◇    Ok?       ◇              │
               │                      ▼
               Y          ┌──────────────────────────────────────────┐
               │          │ 1. Check the IC (U8,ASM811REUSF-T)        │
               ◄──────────┤ 2. Check the Reset Pin on Flash Memory and CPU │
               │          │ 3. Check the related Circuit & Pattern on PCB │
               │          └──────────────────────────────────────────┘
        ◇    Clock     ◇──── N ──────┐
        ◇ Signal Ok?   ◇              │
               │                      ▼
               Y          ┌──────────────────────────────────────────┐
               │          │ 1. Check the Frequency (5MHz)             │
               ◄──────────┤ 2. Check the related Circuit & Pattern on PCB │
               │          └──────────────────────────────────────────┘
               │
        ◇   Program    ◇──── N ──────┐
        ◇    Ok?       ◇              │
               │                      ▼
               Y          ┌──────────────────────────────────────────┐
               │          │ 1. Check the Address/Data Line Pattern    │
               ◄──────────┤ 2. Check the related Circuit & Pattern on PCB │
               │          │ 3. Program download again                 │
               │          └──────────────────────────────────────────┘
        ◇    SRAM      ◇──── N ──────┐
        ◇    Ok?       ◇              │
               │                      ▼
               Y          ┌──────────────────────────────────────────┐
               │          │ 1. Check the /CS Signal                   │
               ◄──────────┤ 2. Check the SRAM                         │
               │          │ 3. Check the Address/Data Pattern         │
               │          └──────────────────────────────────────────┘
        ◇    CPU       ◇──── N ──────┐
        ◇    Ok?       ◇              │
               │                      ▼
               Y          ┌──────────────────────────────────────────┐
               │          │ 1. Check the Main Clock (5MHz)            │
               ◄──────────┤ 2. Check the Address/Data Pattern         │
               │          │ 3. Check the Main PBA                     │
               │          └──────────────────────────────────────────┘
               │◄─────────────────────┘
               ▼
        ┌─────────────┐
        │     End     │
        └─────────────┘
```

7-3 Panel PBA and Sensor Problem

```
        ┌────────────────┐
        │   Panel PBA    │
        │    Problem     │
        └────────────────┘
                │
            ╱────────╲        N
           ╱   LED    ╲──────────────────┐
           ╲   Ok?    ╱                   │
            ╲────────╱                    ▼
                │ Y      ┌──────────────────────────────────────────────────┐
                │        │ 1. Check the LED Signal from CPU on Main PBA      │
                │◄───────│ 2. Check the Harness (Signal, VCC, GND)          │
                │        │ 3. Check the related Circuit, Pattern & Component │
                │        │ 4. Replace the Panel PBA                          │
                │        └──────────────────────────────────────────────────┘
            ╱────────╲        N
           ╱ Feed S/W ╲──────────────────┐
           ╲   Ok?    ╱                   │
            ╲────────╱                    ▼
                │ Y      ┌──────────────────────────────────────────────────┐
                │        │ 1. Check the Feed S/W Signal on Main PBA          │
                │◄───────│ 2. Check the Harness                             │
                │        │ 3. Check the related Circuit ,Pattern & Component │
                │        └──────────────────────────────────────────────────┘
            ╱────────╲        N
           ╱Cover Open╲──────────────────┐
           ╲ S/W Ok?  ╱                   │
            ╲────────╱                    ▼
                │ Y      ┌──────────────────────────────────────────────────┐
                │        │ 1. Check the Cover S/W Signal on Main PBA         │
                │◄───────│ 2. Check the Harness                             │
                │        │ 3. Check the related Circuit ,Pattern & Component │
                │        └──────────────────────────────────────────────────┘
        ┌────────────────┐
        │      End       │
        └────────────────┘


        ┌────────────────┐
        │    Sensor      │
        │    Problem     │
        └────────────────┘
                │
            ╱────────╲        N
           ╱Paper End ╲──────────────────┐
           ╲   Ok?    ╱                   │
            ╲────────╱                    ▼
                │ Y      ┌──────────────────────────────────────────────────┐
                │        │ 1. Check the Paper End Sensor Signal on Main PBA  │
                │◄───────│ 2. Check the related Circuit, Pattern & Component │
                │        │ 3. Check the Harness                             │
                │        │ 4. Check and Replace the P_End Sensor            │
                │        └──────────────────────────────────────────────────┘
            ╱────────╲        N
           ╱ Near End ╲──────────────────┐
           ╲   Ok?    ╱                   │
            ╲────────╱                    ▼
                │ Y      ┌──────────────────────────────────────────────────┐
                │        │ 1. Check the Near-End Sensor on Main PBA          │
                │◄───────│ 2. Check the Harness                             │
                │        │ 3. Check and Replace the Micro S/W              │
                │        └──────────────────────────────────────────────────┘
        ┌────────────────┐
        │      End       │
        └────────────────┘
```

7-4 Thermal Printer Head and Feed Motor Problem

Thermal Printer Head Problem

Control Signal Ok? **N**

1. Check the Control Signal on CPU
   (Data / CLK / Latch / Strobe 1, Strobe 2)
2. Check the Harness
3. Check the related Circuit & Pattern

Y

Power VCC VTPH Ok? **N**

1. Refer to the Power Problem
2. Check the Harness

Y

End

Feed Motor Problem

Feed Motor Ok? **N**

1. Check the Signal (MOT_PHA1,MOT_PHA2) on CPU
2. Check the Current Control Signals (MOT_I01,
   MOT_I11,MOT_I02,MOT_I12,/MOT_PS) on CPU
3. Check the Output Signal of U12 (BA6384EFV-E2)
4. Check the Auto Cutter Assembly (Motor, Cutter...)
5. Check the Harness
6. Check the Step Motor and the related
   Circuit & Pattern

Y

End

7-5 Auto Cutter and Drawer Problem

```
        ( Auto Cutter
           Problem )
              |
              v
          < Auto Cutter      N
             OK? > -------------------+
              |                        |
              | Y                      v
              |           +-------------------------------------------+
              +---------- | 1. Check the Signal on CPU                |
              |           | 2. Check the Output Signal of U13 (TA8428K)|
              |           | 3. Check the Harness                      |
              |           | 4. Check the Auto Cutter Assembly (Motor, Cutter...)|
              |           +-------------------------------------------+
              v
          < Auto Cutter     N
            S/W Ok? > -----------------+
              |                        |
              | Y                      v
              |           +-------------------------------------------+
              +---------- | 1. Check the Signal on CPU                |
              |           | 2. Check the Harness                      |
              |           | 3. Check the Micro S/W in the Auto Cutter Assembly|
              v           +-------------------------------------------+
           ( End )


        ( Drawer
          Problem )
              |
              v
          < Drawer Open     Y
            Failure? > ----------------+
              |                        |
              | N                      v
              |           +-------------------------------------------+
              +---------- | 1. Check the Drawer Connector & Harness   |
              |           | 2. Check the Drawer Signals on CPU (P33, P34)|
              |           | 3. Check the related circuit & Component 2SD2170|
              |           |    (Q10, Q11)                             |
              |           | 4. Check the Solenoid in the Drawer       |
              v           +-------------------------------------------+
          < Compulsory     Y
            Failure? > ----------------+
              |                        |
              | N                      v
              |           +-------------------------------------------+
              +---------- | 1. Check the Compulsory Harness & Connector|
              |           | 2. Check the Micro switch in the Drawer   |
              v           +-------------------------------------------+
           ( End )
```

7-6 Dip S/W and I/F PBA Select Problem

```
        ┌─────────────┐
        │  Dip Switch │
        │   Problem   │
        └─────────────┘
               │
          ╱─────────╲            N
         ╱  Dip S/W   ╲──────────────────────┐
         ╲  Input Ok? ╱                       │
          ╲─────────╱                         ▼
               │ Y          ┌──────────────────────────────────────────┐
               │            │ 1. Check the Output Signal (DIP_A~C)      │
               │ ◄──────────│ 2. Check the Input Signal (DIP_IN1~IN2)   │
               │            │ 3. Check the related Circuit & Pattern    │
               ▼            └──────────────────────────────────────────┘
        ┌─────────────┐
        │     End     │
        └─────────────┘
```

```
        ┌─────────────┐
        │ I/F PBA Select│
        │   Problem   │
        └─────────────┘
               │
          ╱─────────╲            N
         ╱  I/F PBA   ╲──────────────────────┐
         ╲ Select Ok? ╱                      │
          ╲─────────╱                         ▼
               │ Y          ┌──────────────────────────────────────────┐
               │            │ 1. Check the Diode on I/F PBA             │
               │ ◄──────────│ 2. Check the Input Signal (MD0*~MD2*)     │
               │            │ 3. Check the related Circuit & Pattern    │
               ▼            └──────────────────────────────────────────┘
        ┌─────────────┐
        │     End     │
        └─────────────┘
```

7-7 RS-232C Serial Communication Problem

```
          ┌──────────────┐
          │   RS-232C     │
          │   Problem     │
          └──────┬───────┘
                 │
                 ▼
          ╱─────────────╲          Y
         ╱ Communication  ╲──────────────┐
         ╲   Failure?     ╱              │
          ╲──────┬──────╱               │
                 │ N                      ▼
                 │          ┌─────────────────────────────────────┐
                 │          │ 1. Check the connection of the       │
                 │◄─────────│    RS-232C Connector and Other side  │
                 │          │ 2. Check the I/F Cable whether it is open or short │
                 │          │ 3. Check the Txd, Rxd Pin on CPU     │
                 │          │ 4. Check the MAX232 Driving Chip and │
                 │          │    related Circuit on I/F PBA        │
                 │          │ 5. Check whether Signal is affected by the │
                 │          │    Cable Noise                       │
                 │          └─────────────────────────────────────┘
                 ▼
          ╱─────────────╲          N
         ╱     H/W        ╲──────────────┐
         ╲  Handshake     ╱              │
          ╲──────┬──────╱               │
                 │ Y                      ▼
                 │          ┌─────────────────────────────────────┐
                 │          │ 1. Check the connection of the H/W handshaking │
                 │◄─────────│    Line and Other side (DTR/DSR)     │
                 │          │ 2. Check the I/F Cable whether it is open or short │
                 │          │ 3. Confirm the H/W handshaking Protocol │
                 │          └─────────────────────────────────────┘
                 ▼
          ┌──────────────┐
          │     End       │
          └──────────────┘
```

7-8 IEEE-1284 Parallel Communication Problem

```
        ╭──────────╮
        │ IEEE-1284 │
        │ Problem   │
        ╰──────────╯
             │
             ▼
         ╱────────╲
        ╱ Forward  ╲        Y
        ╲ Mode      ╱──────────────┐
         ╲ Failure? ╱               │
          ╲────────╱                ▼
             │ N        ┌─────────────────────────────────────────────┐
             │          │ 1. Check the Control Line (/CS_P)           │
             │◄─────────│ 2. Check the 1284 Control Line and Status Line│
             │          │ 3. Check the Signal of ICs (U1,U3,U4,U5)     │
             │          │ 4. Check the 1284 Cable whether it is open or shot │
             │          │ 5. Check the related Circuit & Pattern on I/F PBA │
             │          └─────────────────────────────────────────────┘
             ▼
         ╭────────╮
         │  End   │
         ╰────────╯
```

7-9 USB2.0 Communication Problem

```
                        ┌─────────────┐
                       (   USB        )
                       (   Problem    )
                        └──────┬──────┘
                               │
                               │
                        ◇─────────────◇         Y
                       ╱ Main PBA I/F  ╲──────────────┐
                       ╲   Failure?    ╱              │
                        ◇─────────────◇               │
                               │ N                    │
                               │         ┌────────────┴──────────────────────────────┐
                               │         │ 1. Check the Control Line & Signal         │
                               ◄─────────┤    (/CS_U,/RD,/LWR,USB_/IRQ)               │
                                         │ 2. Check the Data Line and Signal          │
                                         │ 3. Check the Connector (34P)               │
                                         │ 4. Check the Clock (30MHz)                 │
                                         │ 5. Check the related Circuit & Pattern on  │
                                         │    Main PBA                                │
                                         └────────────────────────────────────────────┘
                               │
                        ◇─────────────◇         Y
                       ╱ Reverse Mode  ╲──────────────┐
                       ╲   Failure?    ╱              │
                        ◇─────────────◇               │
                               │ N                    │
                               │         ┌────────────┴──────────────────────────────┐
                               │         │ 1. Check the Clock (30MHz)                 │
                               ◄─────────┤ 2. Check the Host whether it works correctly│
                                         │ 3. Check the USB Cable whether it is open  │
                                         │    or shot                                 │
                                         │ 4. Check the related Circuit & Pattern on  │
                                         │    Main PBA                                │
                                         └────────────────────────────────────────────┘
                               │
                        ┌──────┴──────┐
                       (    End       )
                        └─────────────┘
```

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