Service Manual

EC-PM-80320

Thermal Printer

Warnings, Cautions, and Notes

Pay attention to the following promises when using this manual:

Warning:

Warnings must be followed carefully to avoid bodily injury.

Caution:

Cautions must be observed to avoid damage to your equipment.

Note:

Notes contain important information and useful tips on the operation of your printer.

This Manual is to help qualified service engineers repair or adjust your EC-PM-80320.

Please read the manual carefully before repairing and adjusting your EC-PM-80320.

The warranty will not cover any trouble with or damage to the printer resulting from repair or modification by unqualified persons.

Warning: Be sure to turn off the printer and disconnect the power cord from the AC outlet before removing the upper housing. Failure to disconnect the power could result in an electric shock.

Note: 1. It is strictly prohibit anybody or any group from copying or reprinting the content of this manual in any means.

2. This manual is subject to change without notice.

3. We have tried our best to write this service manual. This manual was prepared with the greatest care. If you should find any unclear points, mistakes, or omission, please contact your local dealer.

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Chapter 1 Printer Introduction

1.1 Explanation and application

EC-PM-80320 printer is a kind of high-speed mini thermal printer with high quality, high reliability and low noise. It does not need ribbon cartridge and can be operated easily. EC-PM-80320 printer can be widely used in ECR, PC-POS and BANK POS for printing various kinds of receipts.

1.2 Product type

In order to fulfill different requirements and operating circumstance, manufacturer develops EC-PM-80320 series products which are high-speed thermal mini-printers.

According to different data ports (interfaces), EC-PM-80320 series can be classified into different models: EC-PM-80320, EC-PM-80320U, EC-PM-80320US, EC-PM-80320UE, EC-PM-80320UB and EC-PM-80320UW.

EC-PM-80320 series printer is equipped with an auto cutter which has two options for the consumer to select: partial cutter can only cut the paper with one point left while full cutter cuts the paper fully.

Interface:

EC-PM-80320 series products are configured with a cash drawer interface, you can choose one of the following data interfaces when purchasing this product:

Model	Interface
EC-PM-80320	Parallel interface
EC-PM-80320U	USB interface
EC-PM-80320US	USB interface + Serial interface
EC-PM-80320UE	USB interface + Ethernet interface
EC-PM-80320UB	USB interface + Bluetooth
EC-PM-80320UW	USB interface + Wi-Fi

1.3 Characteristic

(a) Super high-speed printing

The maximal speed can reach to 220 mm/s.

(b) Installing paper easily

The platen roller part which can be opened make you install paper easily.

(c) High Resolution

Thermal print head with high density (8 dots/mm) can provide clear printing result.

(d) Long life-span

Be able to print paper with the length of 100km.

(e) Low noise

Thermal printing mode ensures low noise.

(f) Cleaning thermal print head easily

The platen roller part which can be removed make you clean the thermal print head easily.

(g) Preventing static

The frame ground connecting to the outside metal parts can reduce the faradic current radiation to the minimum.

1.4 Parts Identification

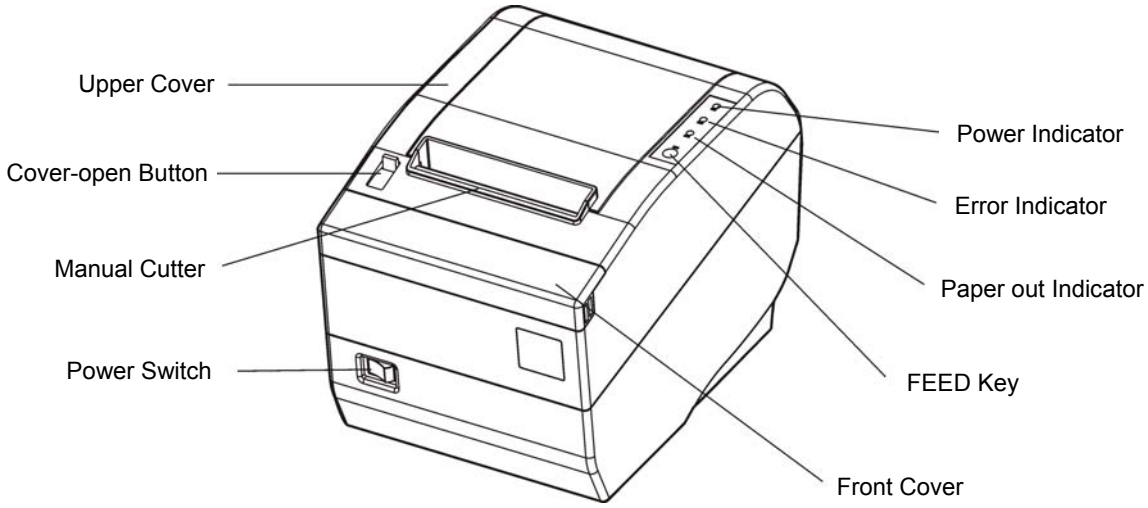


Figure 1-1 Main parts of the printer

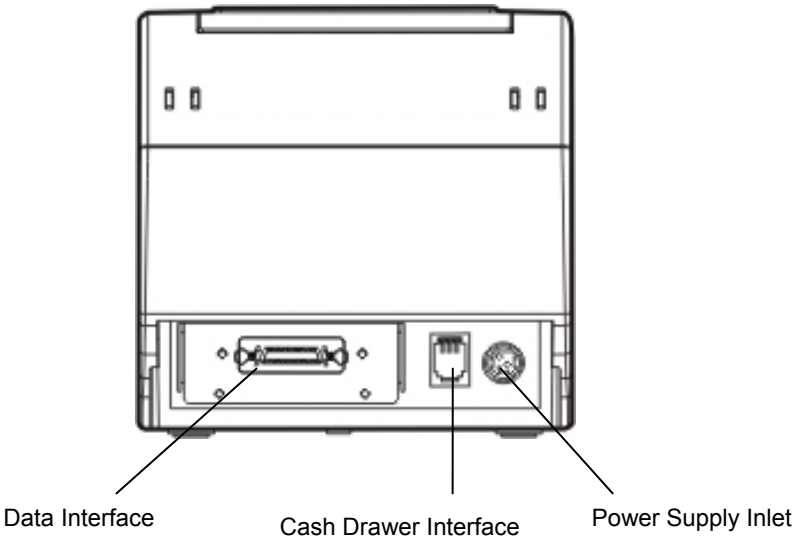


Figure 1-2 Back interfaces of the printer

Note: Please take the specific interface as standard.

Chapter 2 Control Panel Operation

2.1 Control Panel

There are three LEDs and one key on the control panel shown as Figure 2-1.

Figure 2-1 Control panel

2.1.1 Indicator LED

Indicator LED	Description
POWER (Green)	Denotes whether the printer's power supply is connected or not. The indicator LED is on when the power is connected.
ERROR (Red)	Denotes printer's status. The indicator LED is on when the malfunction appears.
PAPER OUT (Red)	Denotes printer's paper status. The indicator LED is on when paper end or is about to end.

Note: Refer to "Error message on the control panel" for detailed information about LED malfunctions in this service manual.

2.1.2 KEY

Key	Function
【FEED】	**【FEED】**controls paper feeding, you can enable or disable the key function with a command. When enable, the paper will be fed continuously if you press and hold on it, or stop if you loosen it.

2.2 Self-Testing

Self-testing lets you know if the printer is working properly. If the printer printouts the self-test content normally, it denotes that there is nothing wrong with the printer except for the interface which connecting to the computer. Otherwise, the printer should be repaired.

Hold down the **FEED** key and turn on the power switch while the printer cover is closed, the **ERROR** LED blinks once with two beeps (if beeper is installed in the printer), loosen the key, then the printer will print out self-test information such as the software version, update date and interface etc.

2.3 Hex Dump Printing

This function allows you to check whether the connection between the printer and the computer or

terminal device works properly or not.

The method is that holding down **FEED** key while turning on the printer, the **ERROR** LED blinks once with two beeps. Go on holding the key for about one second, and then loosen it after the **ERROR** LED blinks once again with a beep. Turn off the printer when you want to exit this print mode.

2.4 Restoring Factory Printer Settings

The function is to clear the settings stored in the printer and to restore the factory settings for correlative parameters.

The method is that holding down **FEED** key while turning on the printer, the **ERROR** LED blinks once with beeping twice at the same time. Do not loosen the key until the **ERROR** LED blinks once with beeping once in about one second. Keep on pressing until **ERROR** LED blinks one more time with a beep in about one second. At this time, turn off the printer and the function takes effect.

2.5 Setting Slip Stitch

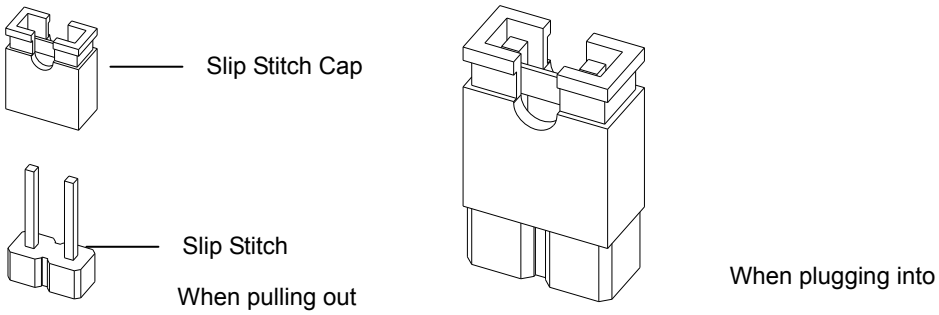


Figure 2-2 Setting slip stitch

If needed, Slip Stitch is used to upgrade printer firmware or it should be closed in normal working condition. When to upgrade, pull out the Slip Stitch Cap after the printer is turned off, and then holding down **FEED** key while turning on the printer again, the **ERROR** and **PAPER OUT** LEDs blinking once at the same time, which denotes that the printer enters into the online-upgrade mode. Loosen the key and then use the computer software equipped with the printer to upgrade. Turn off the printer after finishing upgrading, plug Slip Stitch Cap and then the printer can be working normally.

Note: Do not change the Slip Stitch without any permission of the factory, or the printer can not work.

Chapter 3 Specification

3.1 General Specification

Item	Description	
Printing method	Direct thermal printing	
Dot density	576 dots/line (203×203 DPI)	
Effective printing width	72 mm	
Max paper feed speed	220 mm/s	
Paper specification	Thermal roll paper model	TF50KS-E (Japan paper co.ltd)
		AF50KS-E (JUJO THERMAL)
	Width: 79.5 ± 0.5 mm	
	Weight: 53 ~ 80 g/m^2	
	Maximum diameter: Φ80 mm	
	Paper thickness: 0.065 ~ 0.15 mm	
	Note: The inner diameter of paper shaft is Φ12 mm and the outer diameter of paper shaft is Φ18 mm	
Character set	ASCII: 13 international character sets	
Line spacing	1/6 inch, or programmable in 1/203 inch increments	
Interface	This printer can be equipped with the following interfaces: Parallel interface (Centronics) USB interface (2.0 Full-Speed) USB interface (2.0 Full-Speed) + Serial interface (RS-232C, DB9) USB interface (2.0 Full-Speed) + Ethernet interface (10/100Base-T) USB interface (2.0 Full-Speed) + Bluetooth (2.0/2.1+EDR) USB interface (2.0 Full-Speed) + Wi-Fi (802.11b/g/n) **Note: 1. Only one of the data interfaces is supplied when leaving the factory.** **2. Please take the specific interface as standard.**	
Cash drawer interface	RJ-11, 24V(DC)/1A	
Special function	Automatic cutter, Online parameter settings, Online software upgrade	
Input buffer	4 MB	
Control command	ESC/POS Emulation	
	Character printing command: Support ANK characters, user-define characters and enlarge Chinese characters 1~8 times printing, adjust character line spacing	
	Dot image printing command: Support different densities dot images and downloading image printing, save NV bitmap without electricity (Can save LOGO for long)	
	Bar code	Linear bar code: UPC-A, UPC-E, EAN-13, EAN-8, CODE39, CODE128, ITF-25, CODABAR
		Two-dimension code: PDF417, QR CODE
Power Supply (AC adapter)	IN	Input voltage: 100 ~ 240 V(AC)
		Frequency: 50Hz/60Hz

	OUT	Output voltage: 24 V(DC)
		Current: 2.5 A
Environmental conditions	Operating environment	Temperature: 5 ~ 35℃
		Humidity: 25 ~ 80%RH (No condensation)
	Storage environment	Temperature: -40 ~ 55℃
		Humidity: ≤93%RH (40℃, No condensation)
Weight	Approx. 2 Kg	
Noise	＜38 dB (A) (ISO7779 standard)	
Physical dimensions	145 mm (Width) × 200 mm (Depth) × 145 mm (Height)	
Control panel	One key and three LEDs	
Paper type	Thermal roll paper	
Power consumption	① Operating: 40 W; ② Standby: Approximately 3.2 W **Note: Only when the product is unconnected with outer power supply, it can achieve zero energy consumption state.**	
Code page	76 kinds	
Certificate	CE/FCC	

Note: All the technical instructions in this service manual are the laboratorial measurements which are achieved under national standard store and work environment (room temperature), the measuring paper accords with the specification in this service manual.

3.2 Interface Specification

The printer is configured with one cash drawer interface and one data interface (Parallel interface, USB interface, USB interface + serial interface, USB interface + Ethernet interface, USB interface + Bluetooth or USB interface + Wi-Fi). Please connect the printing and the computer with correct cables.

3.2.1 Cash Drawer Interface

The cash drawer interface of the printer uses the RJ-11 connector, which is shown below.

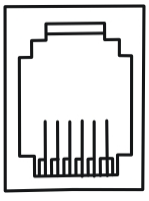


Figure 3-1 Cash drawer interface

Table 3-1: Cash drawer connector Pin assignments

Pin number	Signal	Direction
1	Frame GND	---
2	Cash Drawer drive signal	OUT
3	Cash Drawer Open/closed signal	IN
4	24VDC	OUT
5	Cash Drawer drive signal	OUT

6	Cash Drawer Open/closed signal ground	---
Drive current≤24V/1A		

Table 3-1 Cash drawer connector Pin assignments

Note: Please use the cash drawer that meets the specification mentioned above. Manufacturer will not honor warranty when using unauthorized cash drawer.

3.2.2 Parallel Interface

EC-PM-80320 printer's parallel interface is compatible with CENIRONICS protocol, supporting BUSY/ACK handshaking protocol.

The connector is a 36-PIN connector, whose pins are indicated as below.

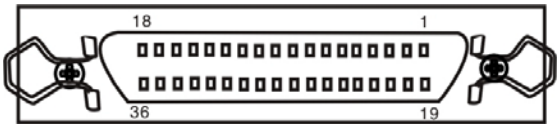


Figure 3-2 Parallel interface

Table 3-2: Connector Pin Assignments

Pin number	Signal	Direction	Description
1	/STB	IN	Trigger in low level, read the data in rising edge
2 3 4 5 6 7 8 9	DATA1 DATA2 DATA3 DATA4 DATA5 DATA6 DATA7 DATA8	IN IN IN IN IN IN IN IN	These signals are respective represent the parallel data from the first bit to the eight. "1" means high level, while "0" means low level.
10	/ACK	OUT	Acknowledge signal, Low level means that printer is ready for receiving data.
11	BUSY	OUT	High level means printer is too busy to receive data
12	PE	OUT	High level means that paper is out.
13	SEL	OUT	High level with the pull-up resistor.
32	/ERR	OUT	Low level means the printer is in error state
14, 15, 17, 18, 34, 36	NC	---	NC
16, 19~30, 33	GND	---	GND, "0" level in logic

Note: ① "IN" means input to the printer, "OUT" means output from printer.
② The signal logical level is TTL level.

Relative signal is shown as Figure 3-3.

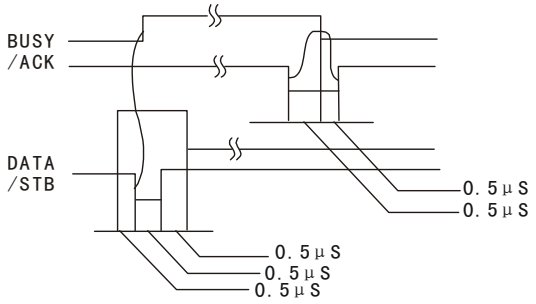


Figure 3-3 Timing signal in parallel interface

3.2.3 USB Interface

USB interface is 2.0 Full-Speed version.

Contact Number	Signal Name	Typical Wiring Assignment
1	VBUS	Red
2	D-	White
3	D+	Green
4	GND	Black

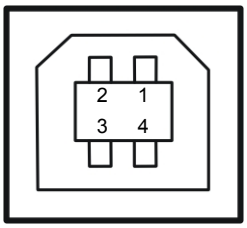


Figure 3-4 USB interface

3.2.4 Serial Interface

EC-PM-80320 printer's serial interface is compatible with RS-232C protocol, supporting RTS/CTS and XON/XOFF handshaking protocol. Its connector is a DB-9 type connector and each pin's definitions are shown as figure 3-5.

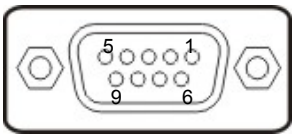


Figure 3-5 Sequence numbers of Serial connector

Table 3-3 Pin assignments of the serial interface

Pin Number	Signal	From	Description
2	RXD	Host	Receive data from Host
3	TXD	Printer	Sent control code X-ON/X-OFF and data to the Host
8	CTS	Printer	"MARK" state means printer is too busy to receive data; "SPACE" means printer is ready for receiving data.
5	GND	—	Signal GND

4	DTR	Printer	Signal terminal is ready

Note: ① "From" means the source where signal comes out.
② Signal level is EIA level.

The default settings in serial connecting way are 9600bps, 8 data bits, parity check disabled and 1 stop bit.

EC-PM-80320 printer's serial interface can be connected with the standard RS-232C connector. When connecting with a PC, the connecting picture is shown as Figure 3-6. While connecting with an IBM PC or a compatible PC, you can connect the cable as shown in Figure 3-7.

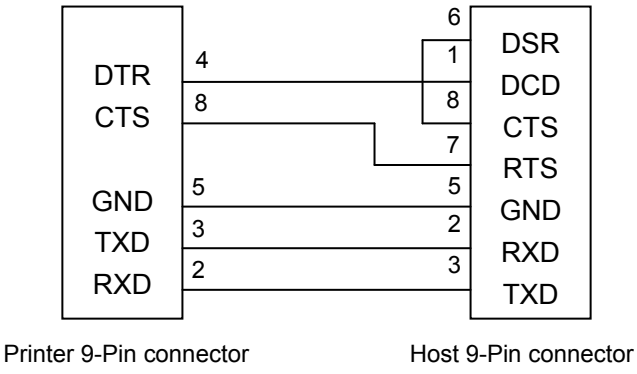


Figure 3-6 Connecting with 9-Pin PC

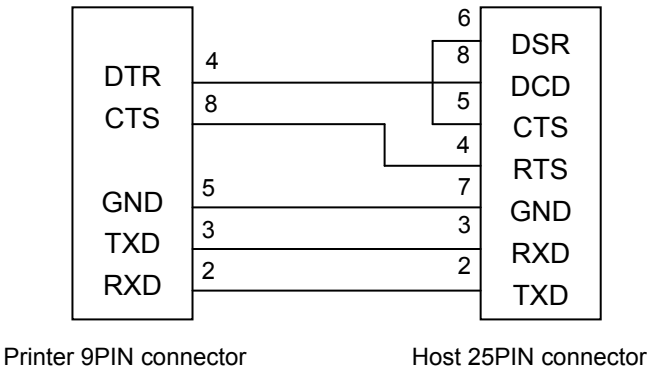


Figure 3-7 Connecting with 25-Pin PC

3.2.5 Ethernet Interface

Ethernet interface of 10/100 Base-T can be connected to 10/100M.

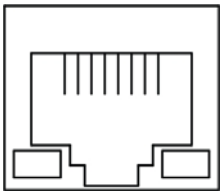


Figure 3-8 Ethernet interface

3.2.6 Power Supply Inlet

The EC-PM-80320 printer connects with a 24V±10% and 2.5A AC adapter. The power supply inlet is

shown as Figure 3-9.

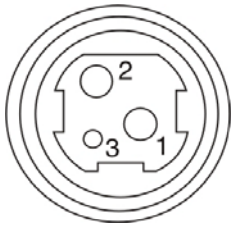


Figure 3-9 Power supply inlet

Chapter 4 Printer Working Principle

4.1 Working Principle of Thermal Print Head

EC-PM-80320 has one thermal print head which is made up of 640 fever dot-size components. The print result is formed through thermal print head dot-matrix heating the thermal paper which is to be black and matching the paper feed. The printable width of thermal print head is 576 dots. 32-dot null data are input both in the left-side and right-side when printable data are transmitted.

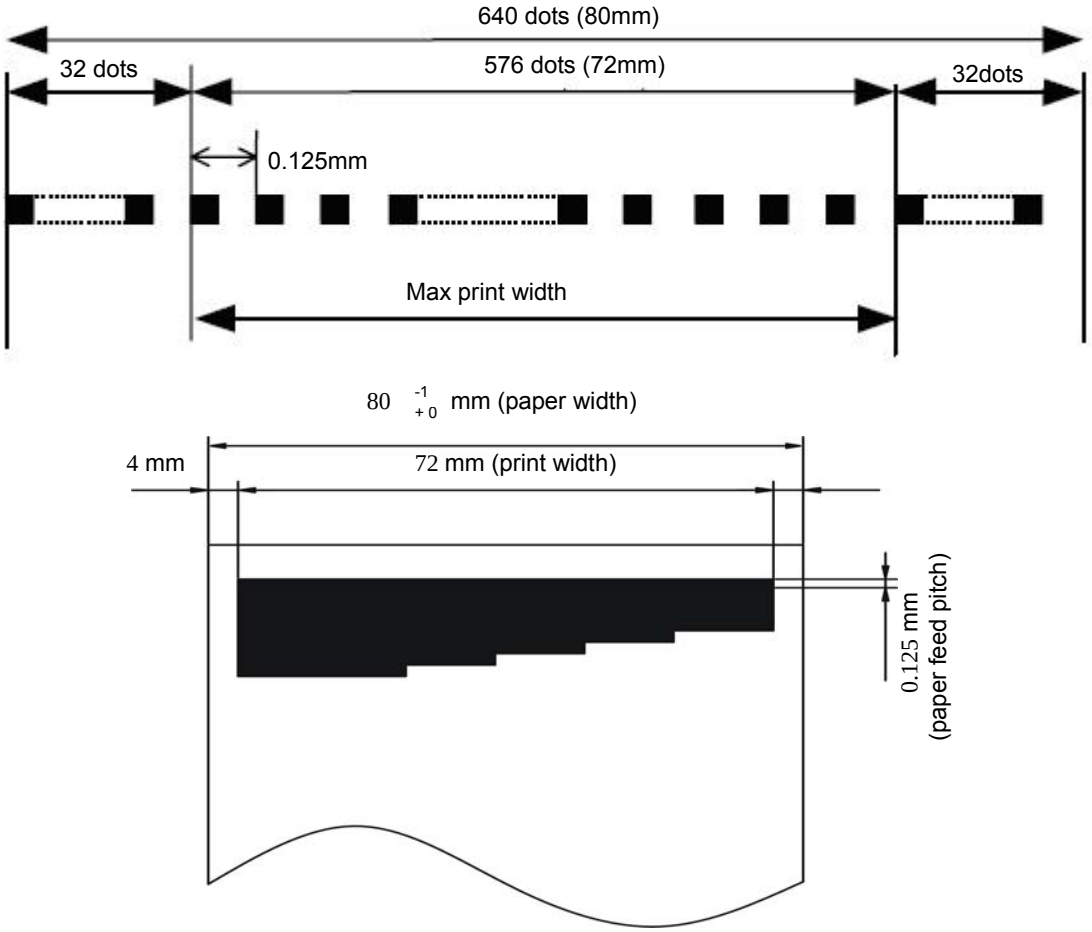


Figure 4-1 Printable width and printable area

4.1.1 Matching with thermal head and paper

The transverse section figure of thermal head matching with paper is shown as Figure 4-2.

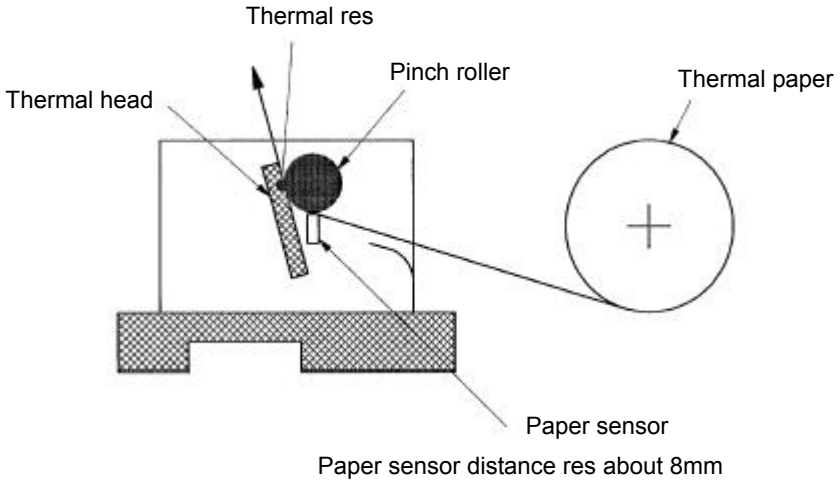


Figure 4-2 Thermal head matching with thermal paper

4.1.2 The structure of thermal head

Figure 4-3 shows electric theory of EC-PM-80320 thermal head.

Table 4-1 explains the relationship between DST module and the start-up fever component.

Thermal head contains several fever components a head-driver which is used to control and drive the fever components. Along with the CLK signal, Serial data is transmitted from DATAIN to shift-register synchronously, and to be saved in the latch-register with the LATCH signal cycle time. Later on, print start-up signal (DST1, 2) will heat the corresponding fever component according to the data latched in the latch-register. EC-PM-80320 thermal head prints 128 dots per section according to the print content.

Because print separately can cut down the peak value of electricity caused by reducing the average of print speed, which is useful to high-frequency print. When the print section is lower than 128 dots, excrescent voice evokes or disruption can be produced and the print quality will also be dropped. So please check the dots in advance.

When the dots of high-frequency are lower than 176, the phenomenon of paper glued occurs for the reason of the surrounding temperature, drive voltage and paper used, which is also need to check the dots in advance.

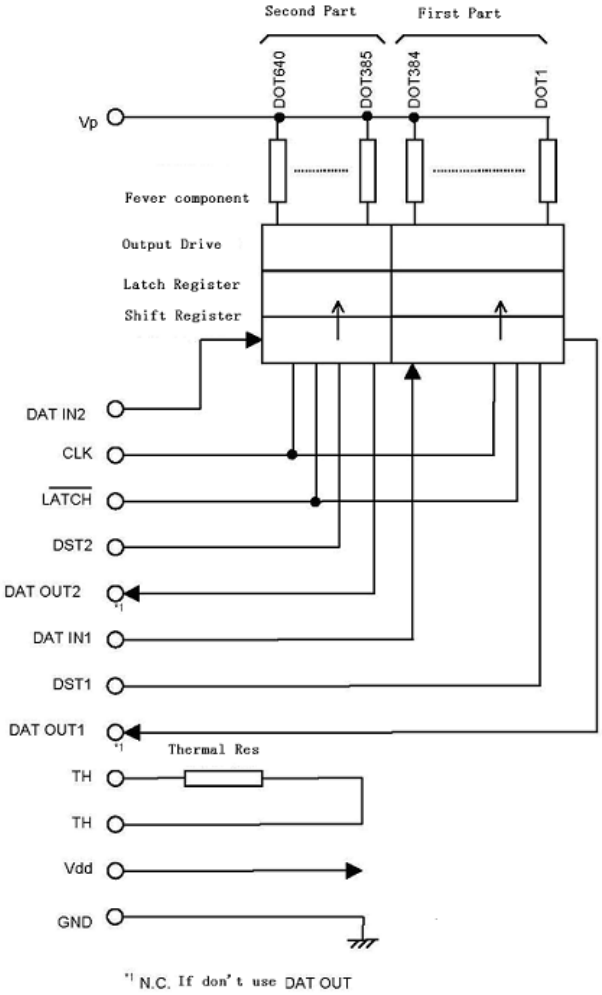


Figure 4-3 Electric structure features of thermal head

DST NO	Numbers of fever component	Dots/DST
DST1	1 to 384	384
DST2	385 to 640	256

Table 4-1 DST module and fever component

4.1.3 Print position of data

The 384 dots from 1 to 384 are transmitted through DATA IN1, and the 256 dots from385 to 640 are transmitted through DATA IN2.The print position of all data dots are shown as follows:

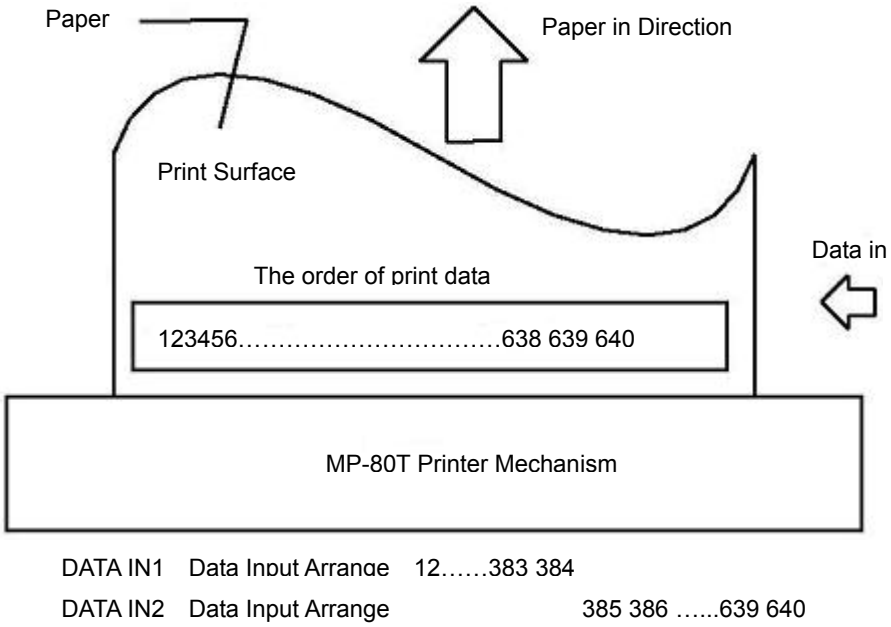


Figure 4-4 Print position of all data dots

4.1.4 Electric Character of Thermal Print Head

（Ta=25±10℃）

Items		Symbol	Condition	Rating			Unit
				Least	Standard	Most	
Resistance		RH		630.5	650	669.5	Ω
Drive Voltage		Vp		21.6	24.0	26.4	V
Drive Electricity		Ip	Most drive dots are 352dots at one time.	--	13.0	14.8	A
logical Voltage		Vdd		4.75	5.00	5.25	V
Logical Electricity		Idd	FCLK=8MHz, fDI=1/2fCLK	--	--	64	mA
Input Voltage	High	VIH	CLK, DAT, LATCH, DST	0.8*Vdd	--	Vdd	V
	low	VIL	CLK, DAT, LATCH, DST	0	--	02*Vdd	V
DAT Input Electricity	High	IIH DAT	VIH=5V	--	--	0.5	uA
	low	IIL DAT	VIL=0V	--	--	-0.5	uA
DST Input Electricity	High	IIH DST		--	--	120	uA
	low	IIL DST		--	--	-2.0	uA
CLK Input Electricity	High	IIH CLK		--	--	2.0	uA
	low	IIL CLK		--	--	-2.0	uA
LATCH Input Electricity	High	IIH LAT		--	--	2.0	uA
	low	IIL LAT		--	--	-2.0	uA
DAT Output Voltage	High	VDOH	Opening estate, Vdd=4.5V	4.45	--	--	V
	low	VDOL		--	--	0.05	uA

CLK Frequency	f CLK		--	--	8	MHz
CLK Pulse Width	tw CLK	Refer to Timing signal figure	35	--	--	ns
DAT Start-up Time	setup DI	Refer to Timing signal figure	30	--	--	ns
DAT Holding Time	thold DI	Refer to Timing signal figure	10	--	--	ns
DAT Output Delay	td DO	Refer to Timing signal figure	--	--	120	ns
LATCH Pulse Width	tw LAT	Refer to Timing signal figure	100	--	--	ns
LATCH Action Time	tsetup LAT	Refer to Timing signal figure	200	--	--	ns
LATC Holding Time	thold LAT	Refer to Timing signal figure	50	--	--	ns
DST Start-up Time	tsetup DST	Refer to Timing signal figure	300	--	--	ns
Output Delay Time	tDo	Refer to Timing signal figure	--	--	5	ns

Table4-2 Electric character of Thermal head

4.1.5 Timing Signal Figure

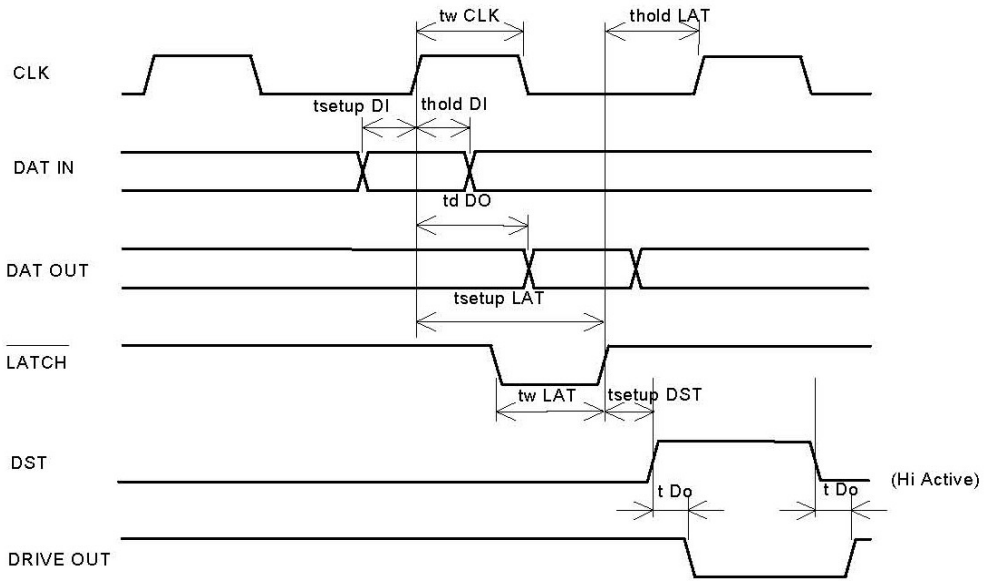


Figure 4-5 Timing Signal Figure

4.1.6 Thermal Head Resistance

The resistance of EC-PM-80320 thermal head is about 630.5 to 669.5Ω.

4.1.7 Thermal Head Voltage

There is a drive IC inside the printer, whose drive voltage is from 21.6 to 26.4V and logical voltage is from 4.75 to 5.25V.

4.2 Sensor

4.2.1 Thermal sensor

The thermal sensor whose function is to protect the print head and the user through checking the print head's temperature is set on the print head.

4.2.1.1 Checking the excrescent temperature of print head

EC-PM-80320 printer checks the excrescent temperature through soft and hardware. The print head will stop heating the fever component when the temperature is higher than 80℃ (thermal resistance is lower than 3.80 KΩ). The print head will reheat the fever component when the component's checked temperature is lower than 60℃ (thermal resistance is higher than 7.45 KΩ).The thermal head's life will be infected seriously when the fever component is heated and its temperature is continuously up to 80℃.

4.2.1.2 Thermal Resistance

The value of thermal resistance is determined by formula (1) at the temperature Tx (℃).

Formula (1):

Rx = R_{25}*EXP {B*（1/（273+Tx）-1/298）}

Rx: The value of thermal resistance at the temperature Tx（℃.

R_{25}: 30KΩ±5% (25℃)

B: 3950±2%

Tx: Working temperature of print head.（℃）

EXP（A）:Take natural logarithm e（2.71828）

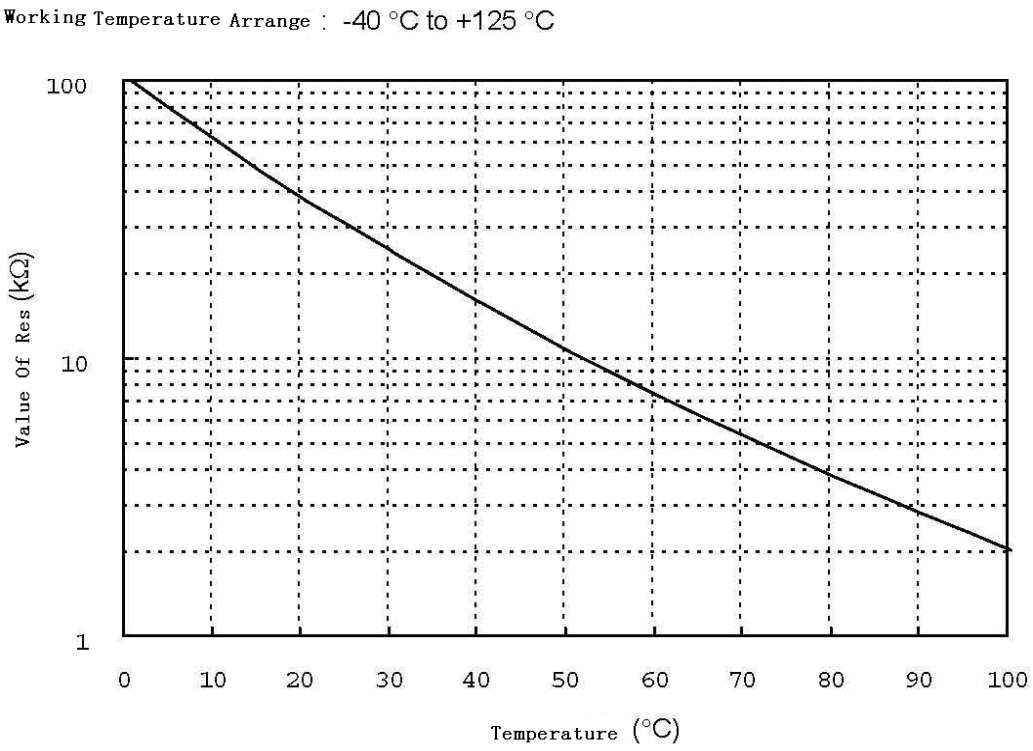


Figure 4-6 Relationship between value of thermal resistance and temperature

Temperature.（℃）	Value（KΩ）
0	100.99
5	77.85
10	60.57
15	47.53

20	37.61
25	30.00
30	24.11
35	19.51
40	15.89
45	13.03
50	10.75
55	8.92
60	7.45
65	6.25
70	5.27
75	4.47
80	3.80
85	3.25
90	2.79
95	2.41
100	2.09

Table4-3 Corresponding value of thermal resistance

4.2.2 Paper Sensor

EC-PM-80320 printer has two sensors (the light glint type) inside which are used to check whether there is paper, and also establishes an external electric circuit to check the output of sensor. One sensor is set under the print head, and the printer will stop printing when lack of paper is detected by this sensor, and it is valid by default. The other sensor is located at the side of paper holder, and the printer will stop printing when the print paper is about to use up detected by this sensor, and it is invalid by default. The function of stop printing by the two sensors is valid or not can be set by control program. The thermal head may be damaged and the life-span will be seriously infected due to printing on the condition of paper out.

Table4-4 and Table4-5 is paper sensor's parameters in common use.

Sort		**Sign**	**Maximum Rating**
LED（Input）	Positive Electricity	IF	50mA
	Reverse Electricity	VR	5V
	Allowed Power	P	75mW
Light Echo (output)	Voltage from collected port to Transmitted port	VCEO	20V
	Voltage from Transmitted port to collected port	VECO	5V
	Collected Electricity	IC	20mA
	Collected Waste	PC	70mW
Working Temperature		Topr	-20t o +80℃
Deposited Temperature		Tstg	-30 to 100℃

Table 4-4 The maximum Rating of paper sensor at 25℃.

Sort		**Sign**	**Condition**	**Min.**	**Standard**	**Max.**
LED（Input）	Positive Electricity	VF	IF=10mA	1.0V	1.2V	1.6V

	Reverse Electricity	IR	VR=5V	-------	-------	10uA
Light Echo(output)	Black Estate Electricity	ICEO	IF=0Ma,VCE=10v	-------	-------	200nA
Transmitted character	Photo electricity	IC	IF=0mA,VCE=5v	150uA	-------	600uA
	Peak Electricity	ILEAK	IF=0mA,VCE=5v	------	-------	1uA
	Collected Saturated Electricity	VCE（sat）	IF=0mA,IC=5uA	-------	-------	0.5V
	Responding Time(Rising edge)	tr	Ic=1mA,Vcc=5V RL=100Ω	--------	5us	------
	Responding Time(Descend edge)	tf		--------	5us	------

Table 4-5 Paper sensor Input/Output condition

4.2.3 Platen Position Sensor

Inside the printer, there is a platen position sensor (locates at the side of print head movement platen) which is used to check whether the state of platen is open or closed, and the state is displayed through a mechanical switch. When the platen is open, Please don't heat the thermal head, or the life of thermal head will be cut down obviously. The maximum rating of the sensor: 7VDC, 1mA; relative resistance: 70mΩ at most.

4.3 Working Principle of Control Unit

4.3.1 Structure module

Figure 4-7 is the main structure module of EC-PM-80320.

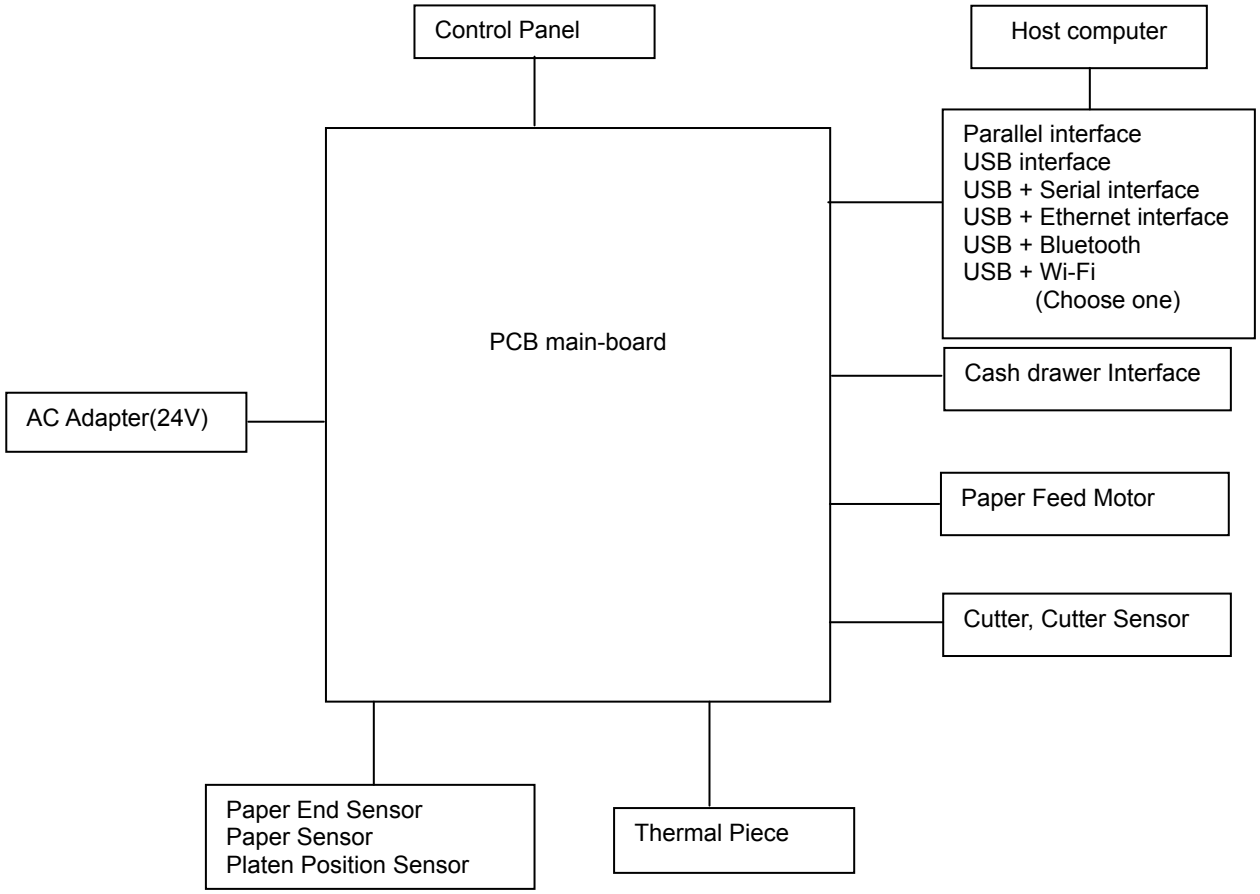


Figure 4-7 EC-80320's Structure Module

4.3.2 Part's Main Function

1. Power supply Adapter

Supply +24V DC

2. Main-Board

Take charge of the whole printer. If the main-board is electrified working properly, the power LED in control panel lights for a long time and other two LEDs blink once when the printer is turned on. The parts controlling the printer are made up of CPU, SDRAM, DATAFLASH and Drive electric circuit etc.

（1）CPU

AT91SAM7SE32 is a 32-bit microprocessor based on ARM7.

（2）DATAFLASH

The size of it is 4MB and it is used to store Chinese big word-database, ASCII characters and program.

（3）SDRAM

8MB, all the program runs in the SDRAM**.**

（4）Paper Feed Motor Driver

Control the paper-motor.

（5）Cutter Driver

Control the cutter motor.

（6）Power supply IC2360AD

Support ＋5V power supply. The system key parts are working at ＋5V except CPLD.

3. Control panel

The control panel is used to display printer's working condition and Paper feed function, which is made up of a switch and three LEDs.

4. Motor

The printer's motor contains Slice paper motor and Paper-feed motor, whose drive voltage is 24V.

5. Thermal Print Head

The thermal piece is made up of 640 fever components, 576 of which in the middle are available.

6. Cash Drawer Interface

Connect the printer to cashbox through this interface.

7. Sensor

There are altogether four sensors except the print head module. Paper sensor, paper end sensor are photo-electricity sensors, while paper-cutter sensor and print roller position sensor are mechanical sensors.

8. Standard interface

The EC-PM-80320 printer is configured with a cash drawer interface and a data interface (parallel interface, USB interface, USB interface + serial interface, USB interface + Ethernet interface, USB interface + Bluetooth, USB interface + Wi-Fi).

4.3.3 Function of Interface

CN1: Eight-thread socket, specified for CPLD downloading program.

CN2: Nine-thread socket, which connects to paper sensor, shaft-press sensor and paper-feed motor. (Shown as table 4-6)

CN3: Cash drawer interface.

CN4: Thread-socket of printer mechanism, connects thermal print head. (Shown as table 4-7)

CN5: Connect to cutter of printer mechanism. (Shown as table 4-8)

CN10: Connect to paper end sensor. (Shown as table 4-9)

CN12: Control panel connected socket. (Shown as table 4-10)

1～4	Drive signal thread of paper-feed motor
5	Power supply of paper sensor
6	Paper sensor signal is 5V high electricity lever when having no paper, while lower than 0.2V low electricity lever when having paper.
7、8	Ground line
9	Shaft-press sensor signal

Table4-6 CN2 The pin definition of CN2

1 ～ 4, 25 ～ 28	Vp, The thermal piece supply 24V.
6、24	Thermal piece data line
7 ～ 11, 19 ～ 22	Ground line
12、18	Thermal piece print ability
13	Clock
14	Thermal piece data-latch signal
15	5V Logic supply, 5V
16、17	Thermal piece over-hot protection

Table4-7 CN4 The pin definition of CN4

1, 2	Cutter Drive Signal
3	Ground Line
4	Cutter Sensor

Table4-8 CN5 The pin definition of CN5

1	5V Power supply of Paper End Sensor,5V
2	Paper End Sensor signal
3	Ground Line

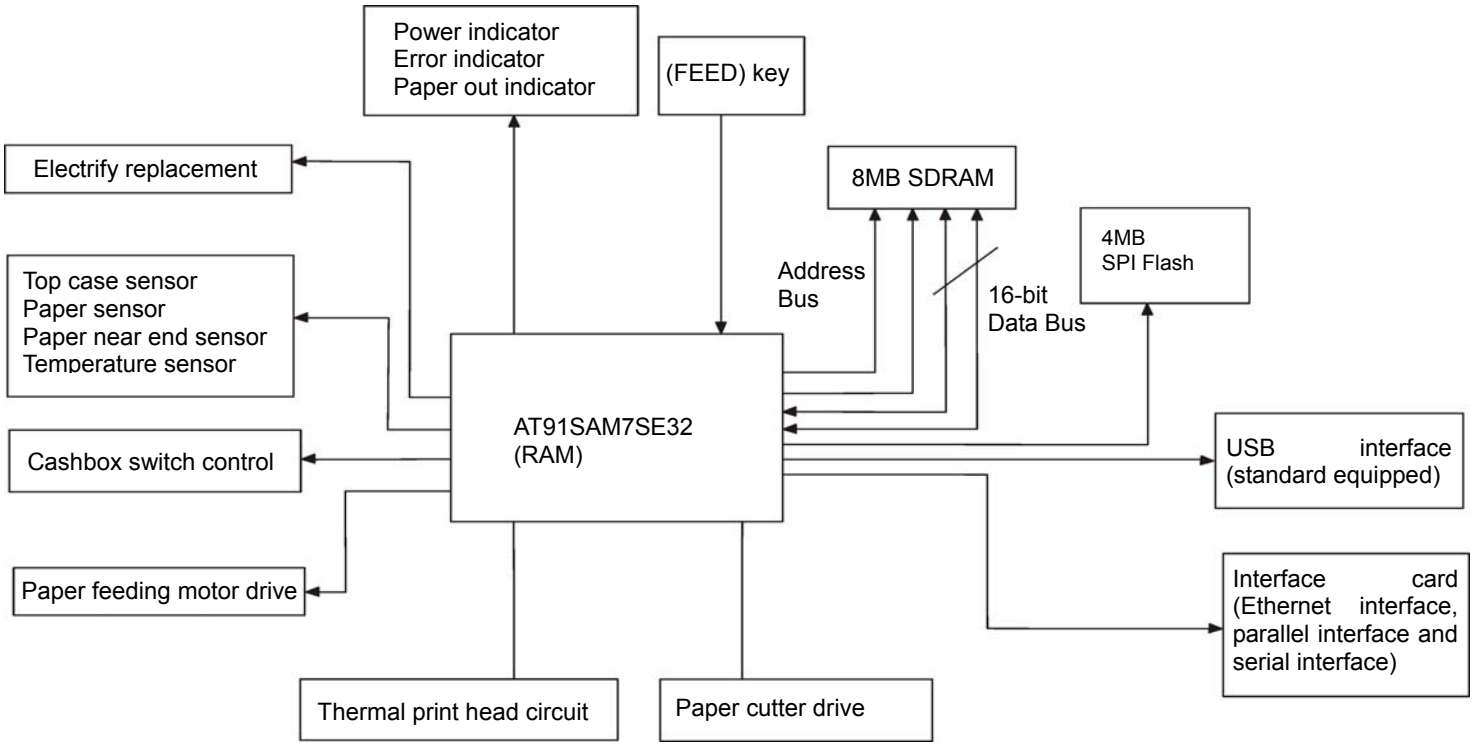
Table 4-9 CN10 The pin definition of CN10

1	5V Power Supply
2	Paper Out LED
3	Error LED
4	Paper-feed Signal
5	Ground Line

Table4-10 CN12 The pin definition of CN12

4.3.4 Control System's Principle Frame

Thermal motor control system's principle frame:



Note: working under +24v independent power, and key parts of system work under 3.3v.

Chapter 5 Printer Installation and Removing

Warning: 1. Before installing/removing or adjusting the printer, you should unplug the power cord from the electrical outlet.

2. Be careful of the cutter because of its sharpness.

3. Thermal head is a sensitive part, therefore, please don't touch the thermal head with your hand or other hard thing at any time.

4. Do not installing/removing or adjusting the printer if there is no functional error. Especially to keep in mind is that only when necessary could you loosen the screws in the relative parts.

5. During maintenance or printing, do not put any matter on the printer cover or place the printer slantingly.

6. In the period of installing and removing, you should be careful not to drop any screws or components in the printer or loosen any components.

7. Do not use gloves when removing PCB, because these things would produce static easily and static would damage IC (such as CPU, RAM and ROM). Therefore, do not touch lead-wires or pins.

8. Do not put the PCB directly on the printer or on the ground.

9. You should check whether the printer cable is damaged when installing or removing the printer. Do not press the printer cable too tightly, or else, it may be damaged.

5.1 Removing the Enclosure

5.1.1 Removing the Upper Cover

Step1. Pull the cover-open button, open the upper cover.

Step2. Loosen the four screws PM3*5*7 in the upper cover sideward.

Step3. Take down the upper cover.

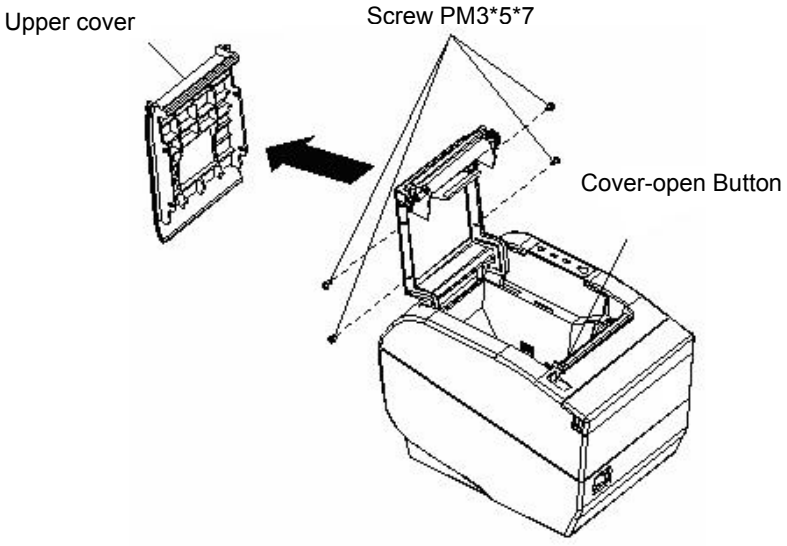


Figure 5-1

5.1.2 Removing the front cover

Pull the front cover frontward until it meets resistance and then pull it upwards.

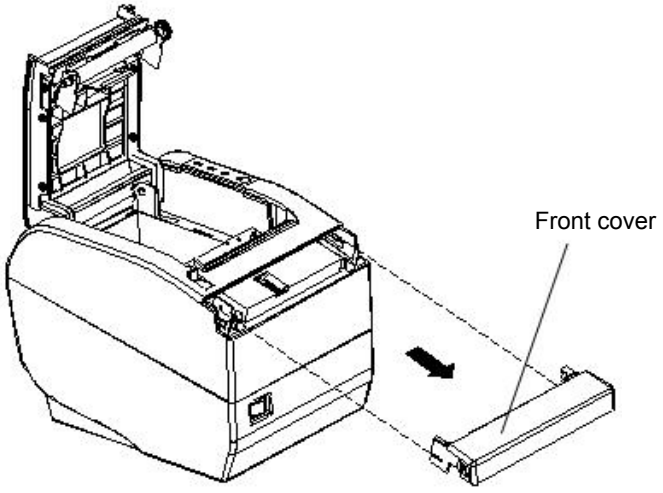


Figure 5-2

5.1.3 Removing the Upper Housing

Step1. Close the upper cover.

Step2. As Figure 5-3 shown, loosen the screws PWM3*5*7;

Step3. Pull out the upper housing upwards.

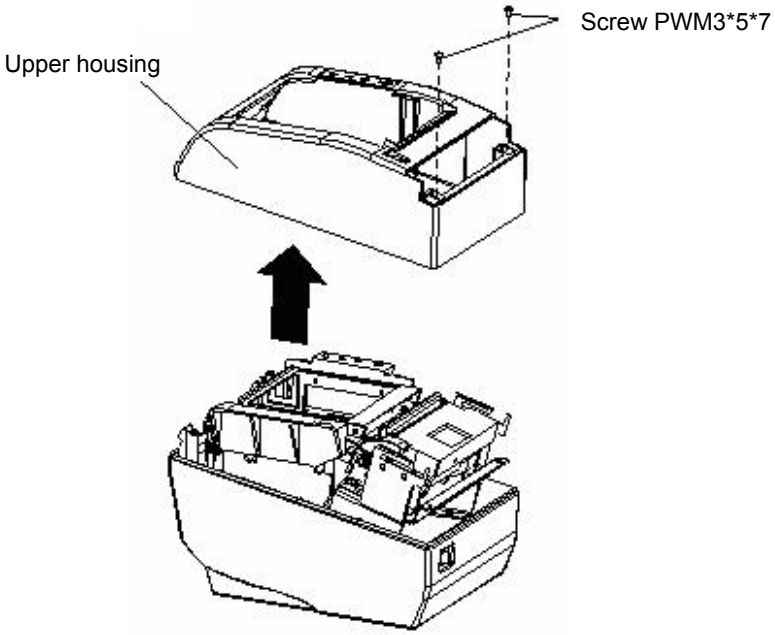


Figure 5-3

5.1.4 Removing the Bottom Housing

Step1. As Figure 5-4 shown，loosen the two screws PM2.5*3 in the interface PCB.

Step2. Pull out the interface PCB.

Step3. Use the nipper to take out four round rubber cushions from bottom housing, then you can see four screws PWM3*6.

Step4. Loosen four screws.

Step5. As Figure 5-5 shown, press the power switch to be symmetric, pull out the bottom housing, while which still blocks the switch, you can gently turn over the border of bottom housing outward.

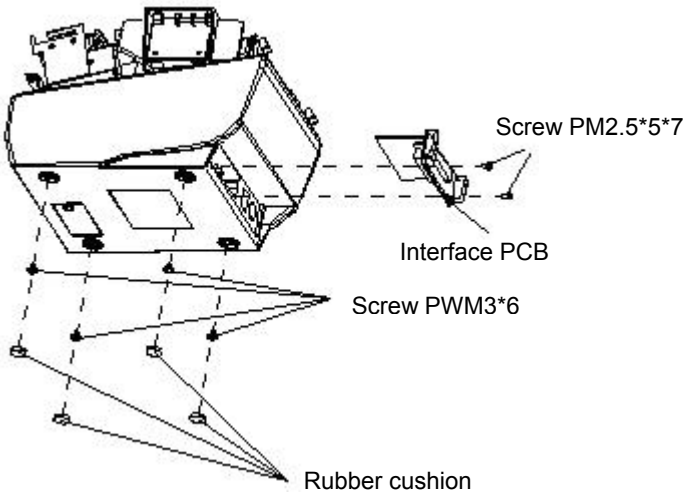


Figure 5-4

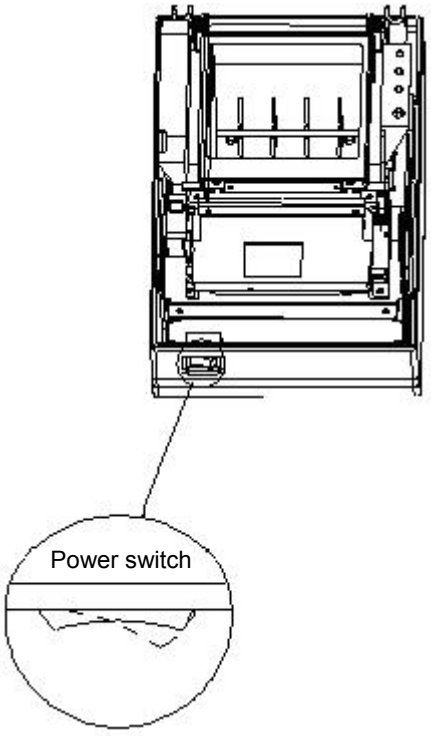


Figure 5-5

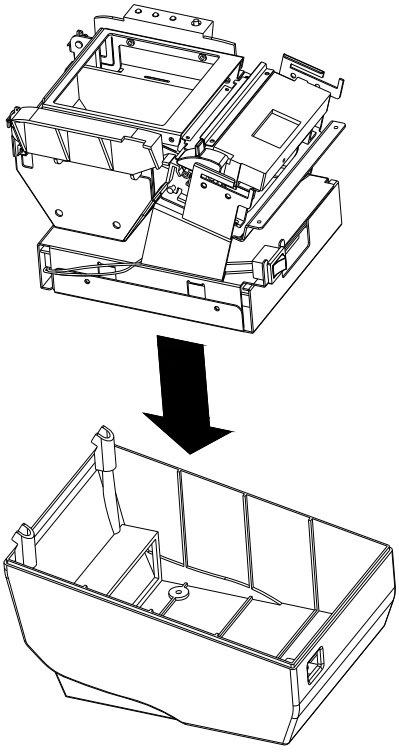


Figure 5-6

5.2 Disassemble MPM-80T Printer Assembly

5.2.1 Disassemble Bottom board cover

Step1. Loosen the screws PM3*4 around the baseplate cover.

Step2. Pull out the baseplate cover adown, overturn it, you can see the connected condition between main board and other parts shown in Figure 5-8.

Step3. Pull out the cable pin 3, 4, and 5.

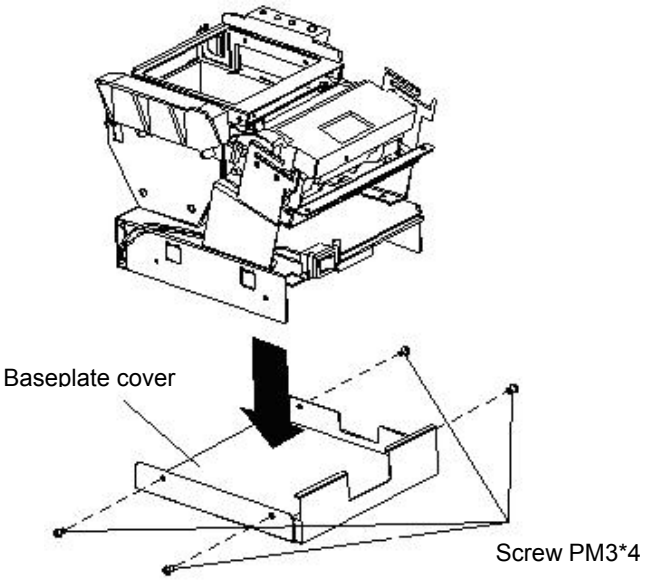


Figure 5-7

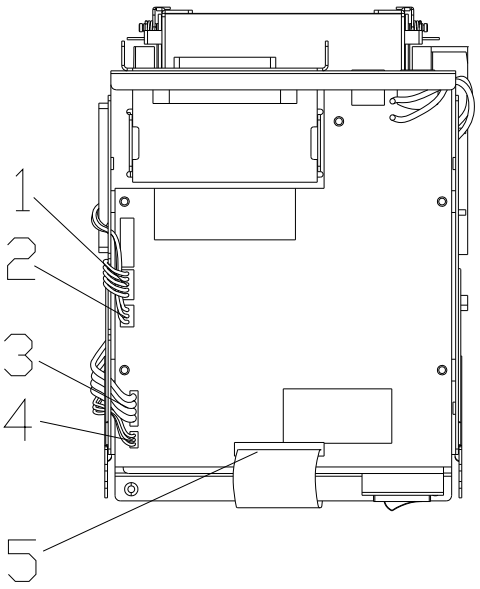


Figure 5-8

5.2.2 Disassemble MPM-80T Assembly

Step1. As Figure 5-9 shown, loosen the screws PM3*6.

Step2. Take down the MPM-80T assembly.

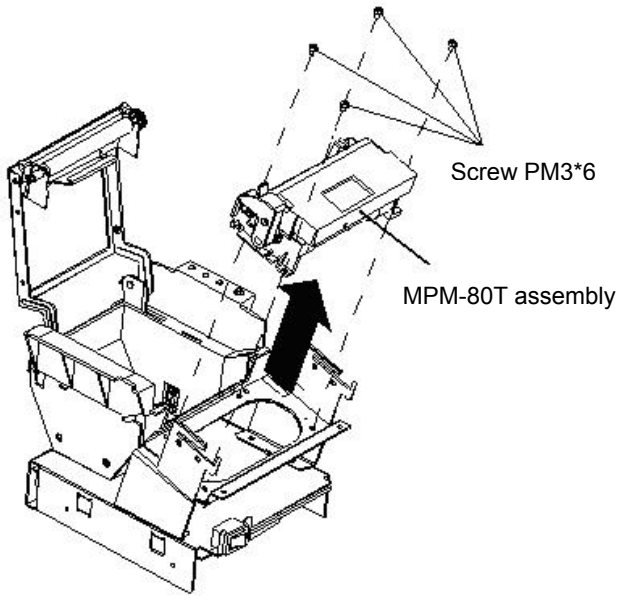


Figure 5-9

Note：MPM-80T assembly doesn't need maintenance, and it doesn't need any lubrication under the normal condition. Suggest that lubricate the surface of mechanism gear and shaft after disassembling or cleaning the lubricating parts.

5.3 Disassemble Paper Feed Mechanism

5.3.1 Removing the Platen Assembly

As Figure 5-10 shown, loosen the screws PM3*4.

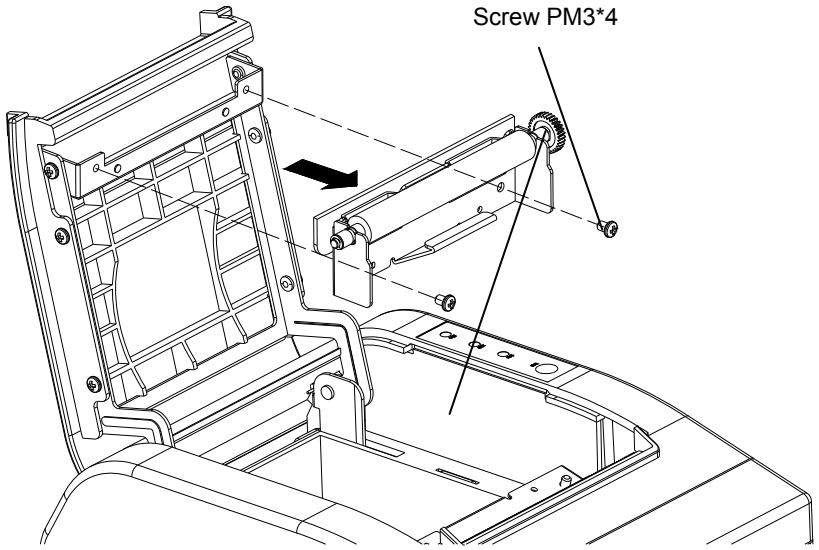


Figure 5-10

5.3.2 Loosen Rolling Ring

Step1. Pull out the feed paper gear.

Step2. Take off the E-ring Φ1.5, Then the rolling ring on both sides can be slid out.

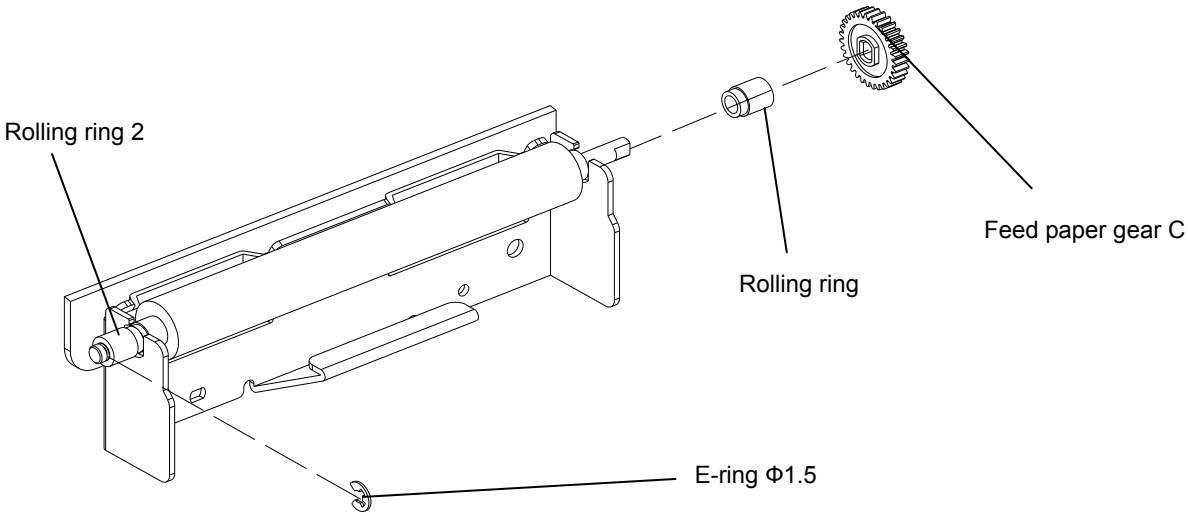


Figure 5-11

5.3.3 Take Down the Platen

Take out right-side of platen, and then slide the whole platen at the left side.

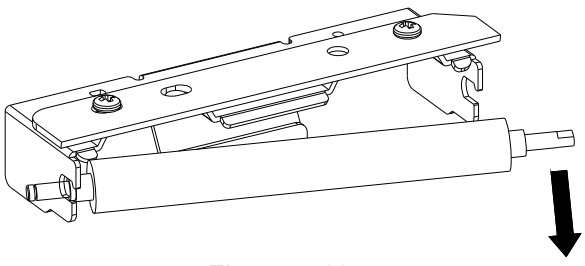


Figure 5-12

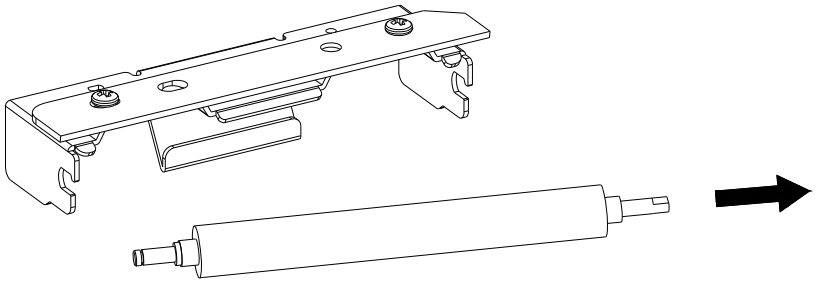


Figure 5-13

5.4 Installation of Printer

Installation of printer follows the reverse procedure of disassembly. When installing the printer, you must tighten the screws, and confirm that all the cables are connected correctly. Don't install incorrectly or miss some parts. If not need, please don't connect the power before installation is finished.

Chapter 6 Troubleshooting

6.1 Error Message on the Control Panel

When the malfunction is occurred, the printer will be off-line and give an alarm through LEDs. You can make out different malfunctions through the Table 6-1 shown below.

Tab 6-1 Error message on the control panel

Error LED	PAPER OUT LED	Malfunction	Solution
BLINK FAST	OFF	Auto cutter error	Reposit the auto cutter
ON	OFF	Upper cover is open	Close the cover tightly
OFF	BLINK	Paper is about to end	Load the paper again
ON	ON	Paper out	Load the paper again
BLINK	OFF	Print head overheated	Recover automatically after cooling down

6.2 Power Trouble

The electric voltage from power supply connecting to printer is single＋24VDC, which is connected to the fuse through printer power supply. The voltage becomes 5V through U12 supplying to parts of main board, and becomes 3.3V through U4 supplying to U1.The power LED in the control panel displays whether the power is on or off. If the switch is on and power LED is off, please check the fuse and check whether the second pin voltage of U12 is＋5V.

6.3 Print Badness

When warp appears in the heat printing, make sure the paper is in normal condition. If the print result is thin at one side, please check if the platen becomes flexible. CN4 takes charge of the connection of thermal head, Please check whether the FFC is damaged or connected well

6.4 Motor Abnormality

If paper feeds abnormally, check whether there is a 3.3V square wave output in the test point between the 29th pin of U1 and R2 when pressing the **FEED** key. If it does, check the 44th, the 47th, the 48th and the 49th pin of U3 in the same way (the corresponding test point in the C36 around).If it does not, U3 may be damaged. With U3 having no problems, go further examination for U8, which is the drive chip of paper feed motor. The output pins of U8 are the 16th, the 17th, the 26th and the 27th. Check whether there is a normal square wave output in the output pins which are specified for the 2nd, the 7th, the 8th and the 13th. Please check whether the drive chip of motor is damaged or not if there is no output. Check whether CN2 connector is connected well, the one which takes charge of paper feed motor and paper sensor.

6.5 Cutter Abnormality

Please check whether the upper cover is closed when the cutter can not work. Also check whether CN5 connector is connected well, the one which takes charge of cutter.

6.6 Cash Drawer Interface Abnormality

Please check whether U9 is damaged if cash drawer can not work. Check whether the corresponding pins of U9 are Anti- mutually, the one which is chip of 74HC04. Also check Q1 and D5.

6.7 Cutter Jammed or Error

When the auto-cutter is jammed by paper, please open the upper cover of the printer and take out the jammed paper. If the upper cover can not be opened, as well as the auto-cutter still can not

return to the normal position after the printer is restarted, please pull out the front cover which locates above the auto-cutter to expose the auto-cutter. Then turn the gear in the arrow direction. If the gear can't be moved in the arrow direction, don't force it, please turn it in the reverse direction until the auto-cutter returns to the normal position. As shown in Figure 6-1.

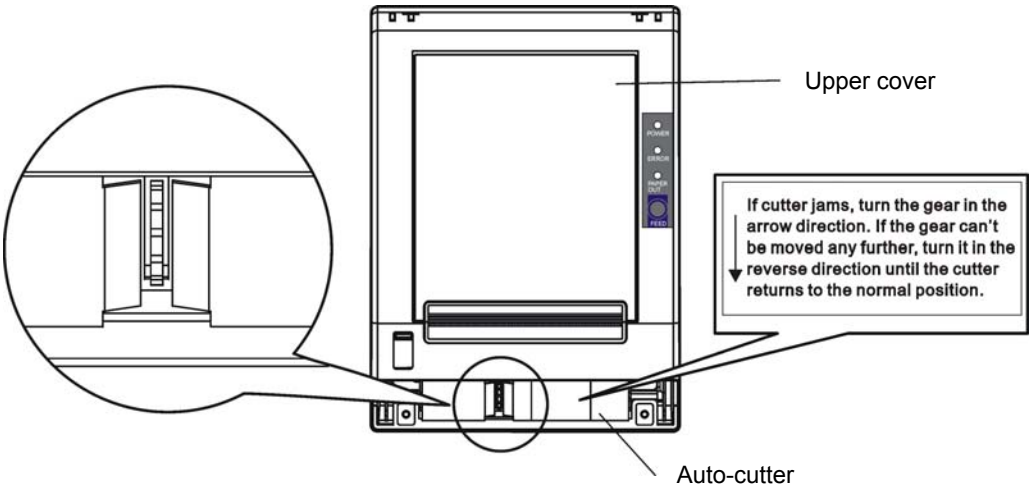


Figure 6-1 Adjust the auto-cutter by hand

Appendix A EC-PM-80320 Exploded View

A.1 Drawing for EC-PM-80320

(See Figure A-1)

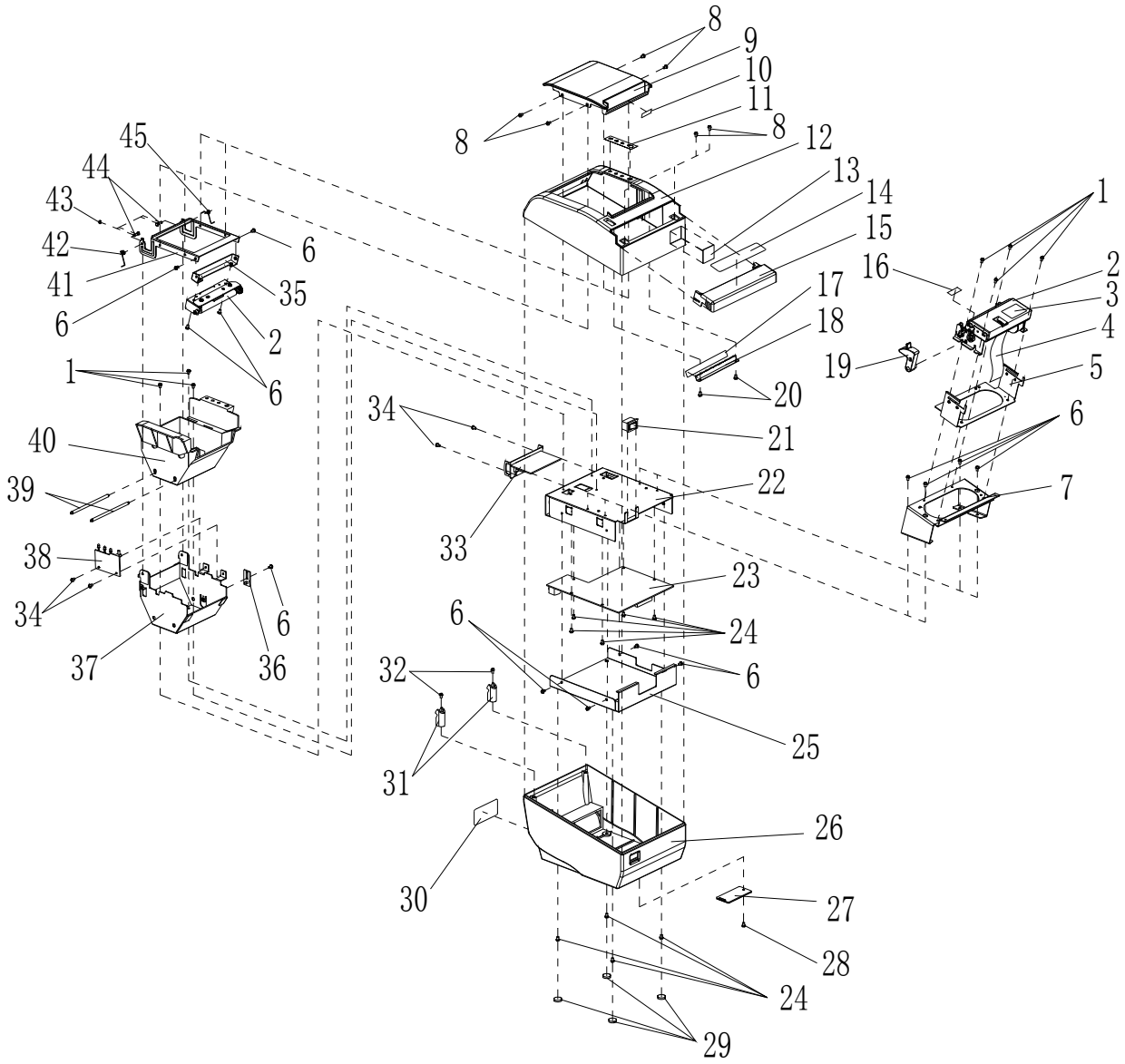


Figure A-1

A.2 Parts List for EC-PM-80320

NO.	Parts name	SAP	Qty	Note
1	Screw PM3X6	100000000770	7	
2	Mechanism assembly	200000000508	1	
3	Label 2	510000010892	1	
4	Printer connected flat cable	100000001782	1	
5	Mechanism frame	100000001009	1	
6	Screw PM3X4	100000000929	13	
7	Mechanism support	100000001008	1	
8	Screw M3X5X7	100000000966	6	
9	Top cover (black)	200000026046	1	
	Top cover (white)	200000025709	1	
10	Caution label	510000009652	1	
11	Control panel label	510000010091	1	White
		510000009660	1	Gray
12	Upper cover (black)	200000026048	1	
	Upper cover (white)	200000025716	1	
13	Trademark label	510000000081	1	
14	Label1	510000000094		
15	Front cover (black)	200000026047	1	
	Front cover (white)	200000025714	1	
16	High temperature caution label	510000000078	1	
17	Cutter slider	100000052129	1	
18	Manual cutter	100000001005	1	
19	Front knob（Black）	200000026044	1	
	Front knob（White）	200000025702	1	
20	Screw PA2.6X5	100000000946	2	
21	Power switch	100000000990	1	
22	Baseplate	100000001006	1	
23	Main PCBA	200000026549	1	
24	Screw PWM3X6	100000000310	9	
25	Baseplate cover	100000001007	1	
26	Bottom housing (Black)	200000026049	1	
	Bottom housing (White)	200000025718	1	
27	DIP switch cover (Black)	200000026045	1	
	DIP switch cover (White)	200000025703	1	
28	Screw HPB2.5X4	100000001042	1	
29	Round rubber cushion	100000000944	4	
30	Interface caution label	510000009657	1	
31	Joint pin (Black)	200000026043	1	
	Joint pin (White)	200000025701	1	
32	Screw HPB3*8	100000000546	2	
33	USB + Ethernet interface assembly	200000028151	1	

	USB interface assembly	200000028392	1	
	USB + Serial interface assembly	200000028150	1	
	Parallel interface assembly	200000028171	1	
34	Screw PM2.5X3	100000000954	4	
35	Platen frame	100000001010	1	
36	Paper end sensor assembly	200000000428	1	
37	Paper holder house	100000001012	1	
38	Control panel assembly	200000000381	1	
39	Slide shaft	100000001014	2	
40	Paper holder	200000025700	1	
41	Cover-opening plate	100000001011	1	
42	Torsional spring L	100000001015	1	
43	E-ring Φ2	100000000964	4	
44	Rotating pin	100000001013	2	
45	Torsional spring R	100000001016	1	

Appendix B Mechanism Exploded View

B.1 Drawing for MPM-80T

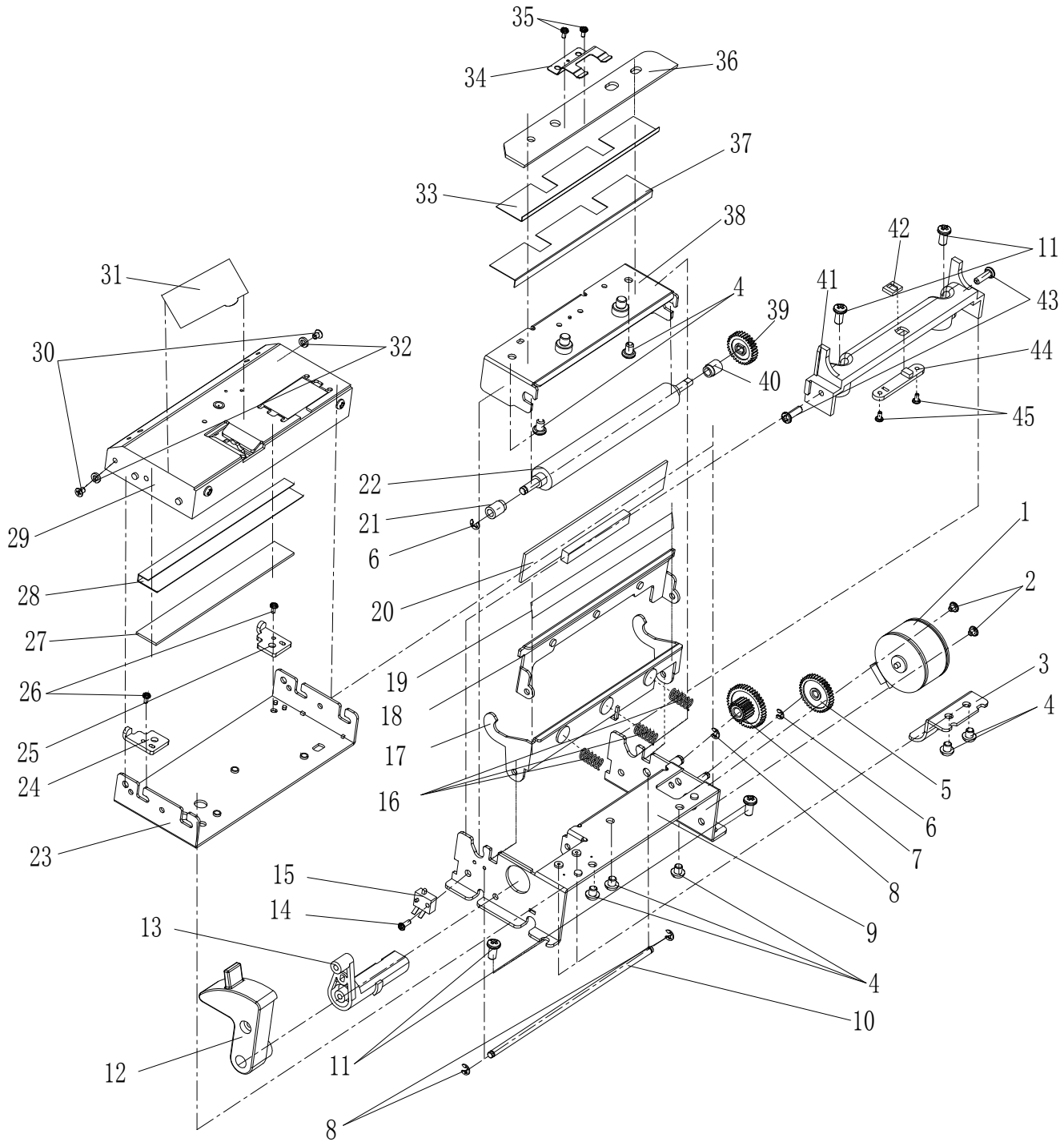


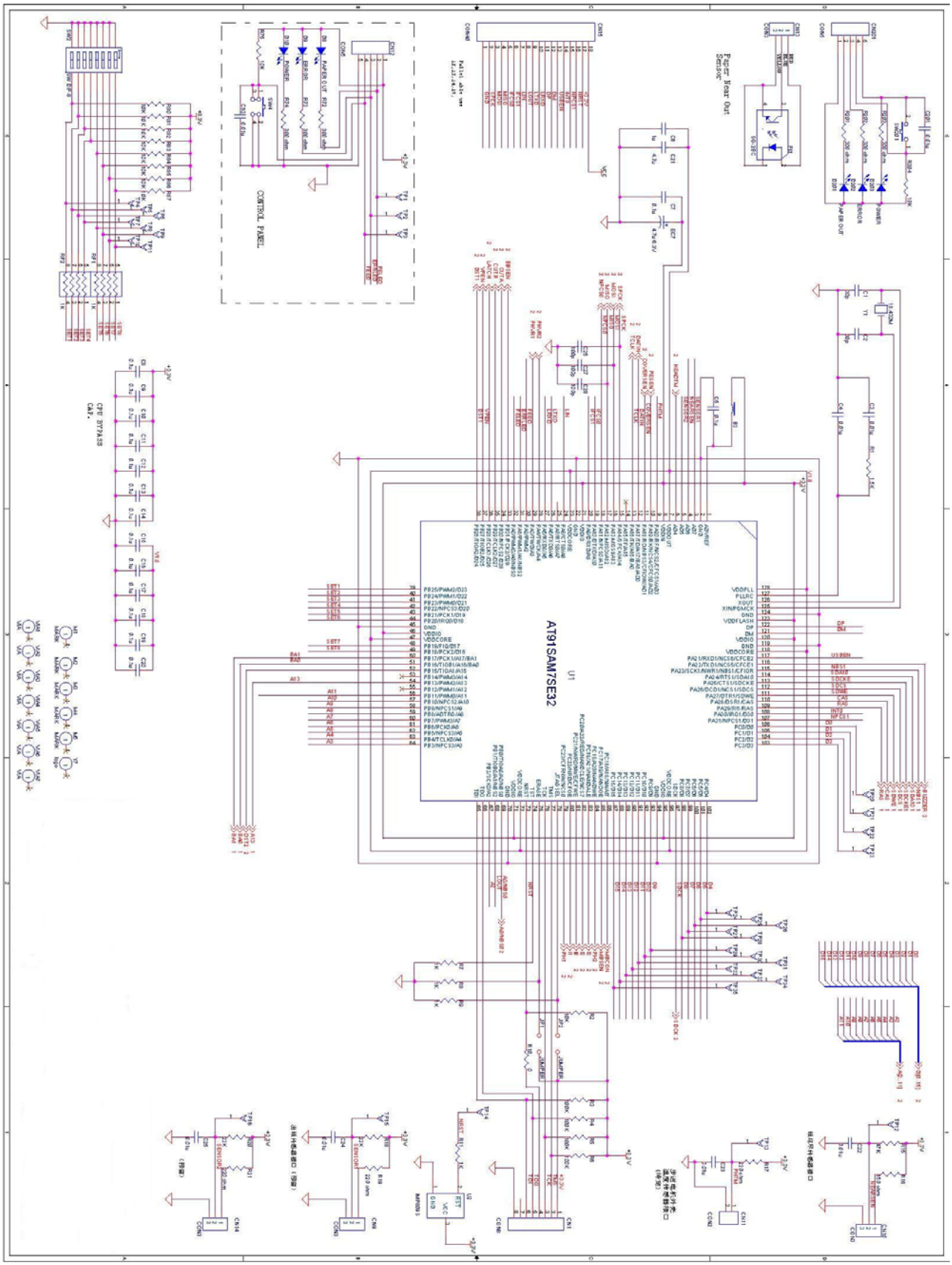
Figure A-2

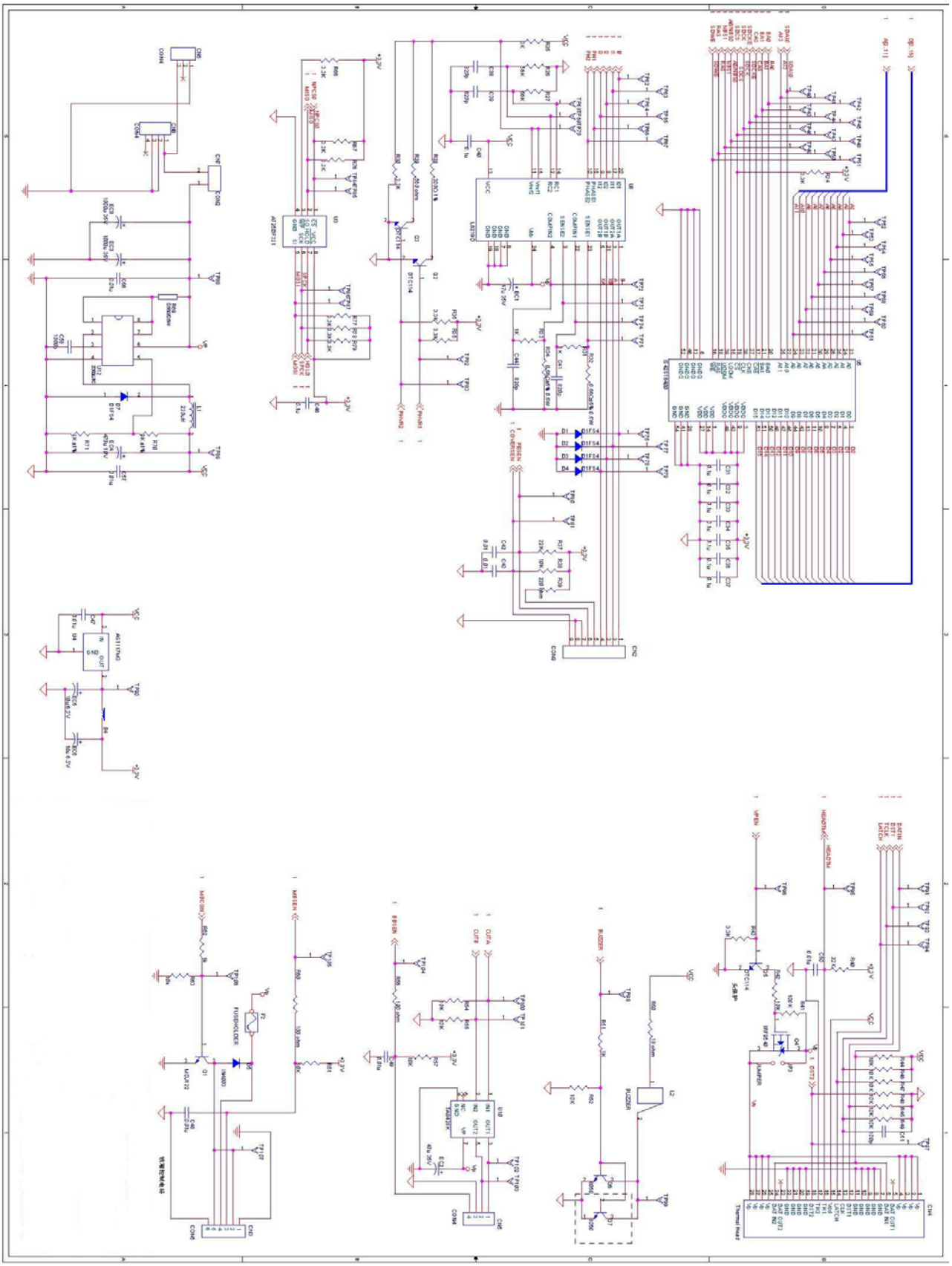
B.2 Parts List for MPM-80T Drawing

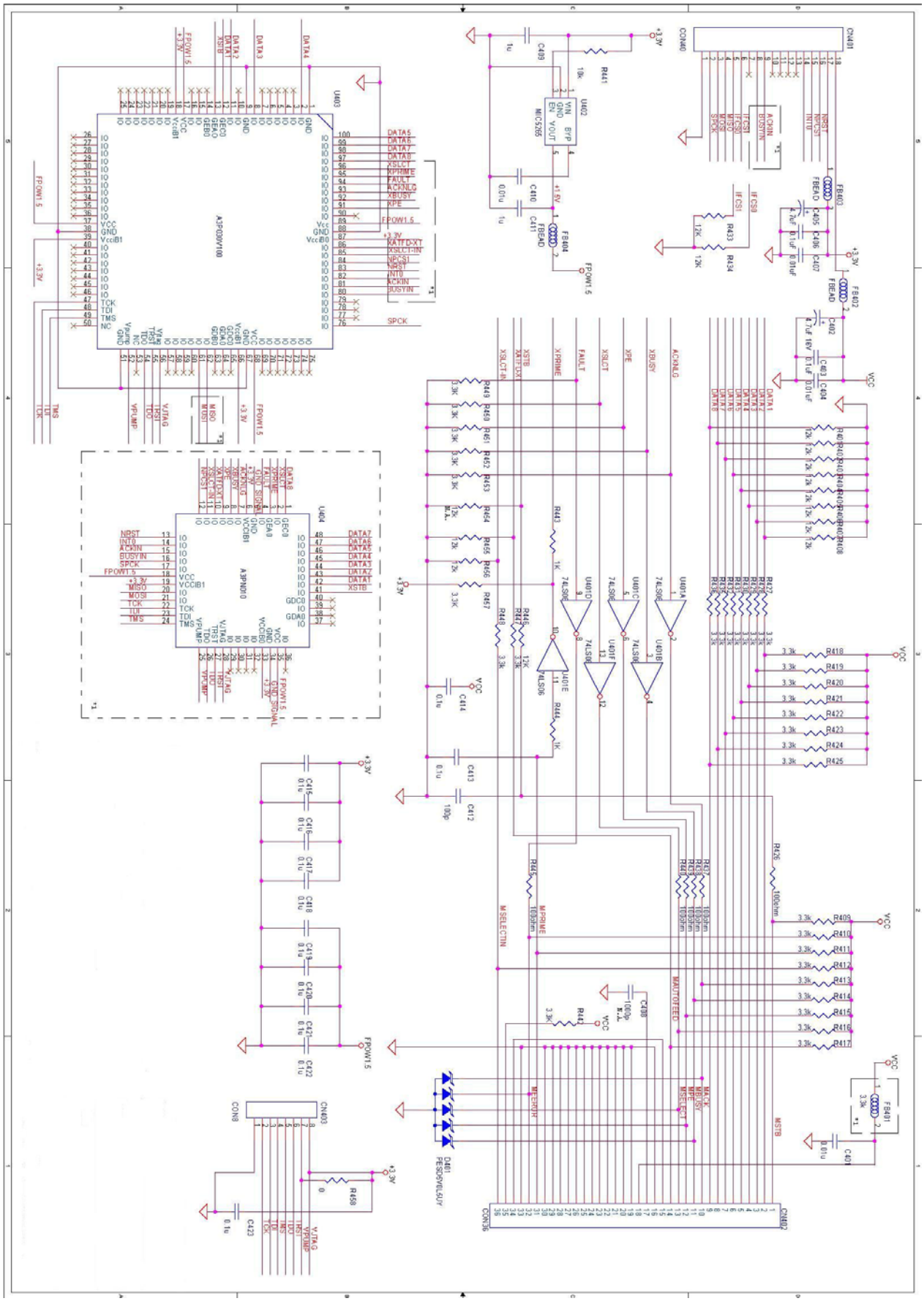
NO.	Parts name	SAP	Qty	Note
1	Paper feed motor	100000051980	1	
2	Screw BM2X2	100000001038	2	
3	Knob support plate	100000001021	1	
4	Screw PM3x4	100000000929	7	
5	Paper feed gear A	200000025707	1	
6	E-ring Φ1.5	100000000940	2	
7	Paper feed gear B	200000025706	1	
8	E-ring Φ2.0	100000000964	3	
9	Baseplate assembly	100000001018	1	
10	Support shaft	100000001030	1	
11	Screw PM3x6	100000000770	4	
12	Front knob	200000026044	1	
13	Knob	200000025711	1	
14	Screw HPM1.6x4.5	100000001039	1	
15	Microswitch	100000001036	1	
16	Support spring	100000001031	3	
17	PH plate	100000001020	1	
18	PH holding plate	100000001019	1	
19	3M Tape	100000001034	1	
20	Thermal print head	100000000981	1	
21	Rolling ring 2	100000052969	1	
22	Platen	100000052970	1	
23	Cutter bracket	100000001024	1	
24	Stationary blade shim L	100000054702	1	
25	Stationary blade shim R	100000054701	1	
26	Screw PM2.5x4	100000000925	2	
27	Patch	510000010391	1	
28	Paper guide film	510000010390	1	
29	Automatic cutter (Rotary)	100000047521	1	
30	Screw PM2x3	510000010319	2	
31	Worm protecting film	100000054810	1	
32	Elastic washer	100000049787	2	
33	Paper clog film_Upper	100000054805	1	
34	Spring	100000054436	1	
35	Screw BM2x2	100000001038	2	
36	Automatic cutter (stationary)	100000047521	1	
37	Paper clog film_Bottom	100000054806	1	
38	Cutter support	100000053274	1	
39	Paper feed gear C	200000025708	1	
40	Rolling ring	100000052571	1	
41	Paper guide	200000025710	1	

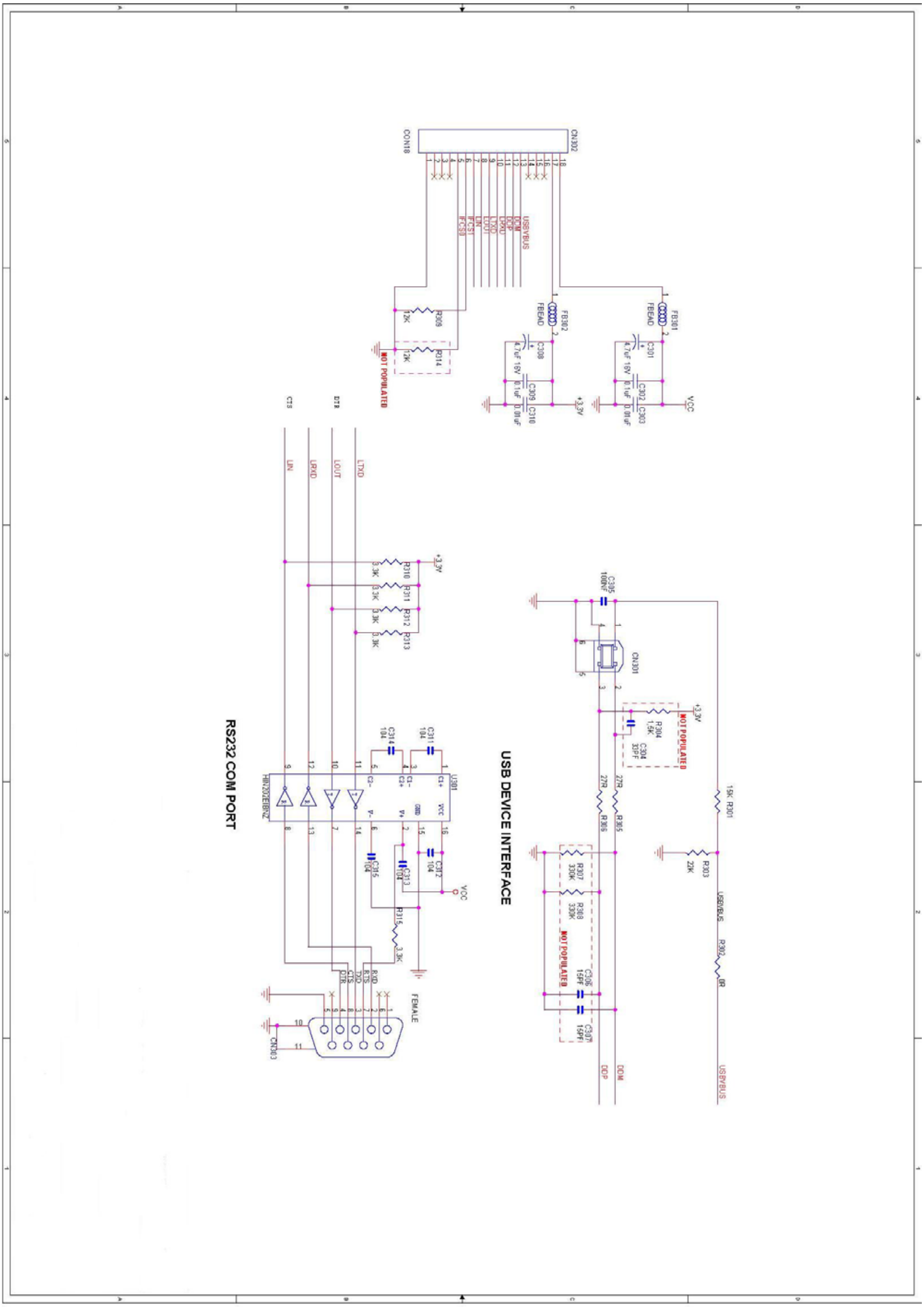
42	Sensor spacer	100000001037	1	
43	Screw PA2.5x8	100000000926	2	
44	Photoelectric sensor	100000000950	1	
45	Screw DB1.4x8	100000001040	2	

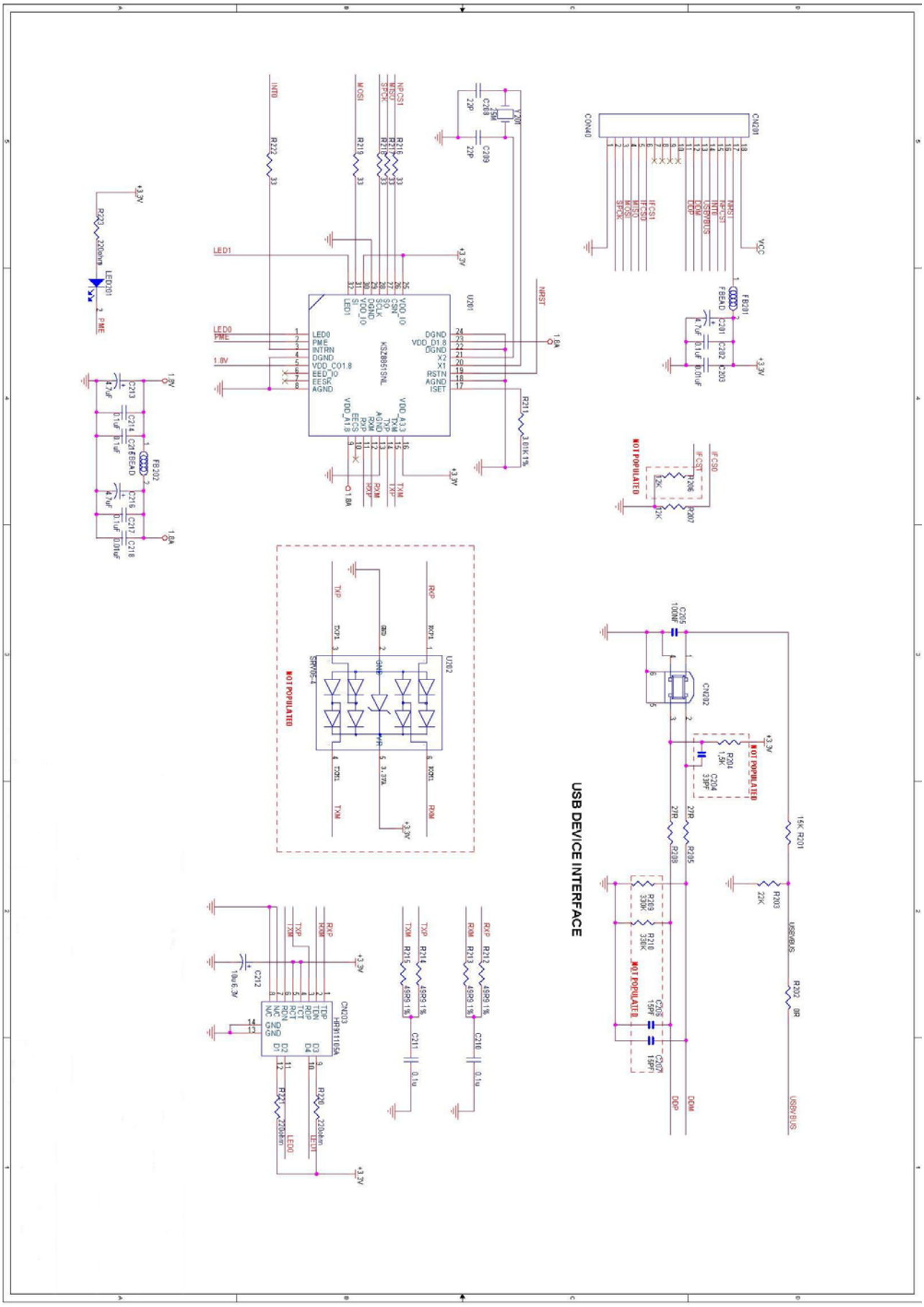
Appendix C Main control PCB circuit diagram








RS232 COM PORT
USB DEVICE INTERFACE
NOT POPULATED
CN302
CON18
CN301
CN303
FEMALE
U301
HIN202EIBNZ
FB301
FB302
FBEAD
USBVBUS
DCM
DCP
VCC
+3.3V


USB DEVICE INTERFACE
KSZ8851SNL
HR911105A
SRV05-4
NOT POPULATED
CON40
CN201
CN202
CN203
U201
U202
Y201
FB201
FB202
LED201
LED0
LED1
INT0
MCSI
MCSO
MSPCK
MCSCS1
IFCS1
IFCS0
IFCST
USBVBUS
DOM
DOP
VCC
1.8A
1.8V
3.3V
3.37A
R201 15K
R202 0R
R203 22K
R204 1.5K
R205 22R
R206 2.2K
R207 2.2K
R208 15PF
R209 22R
R210 330K
R211 3.01K 1%
R212 4999 1%
R213 4999 1%
R214 4999 1%
R215 4999 1%
R216 33
R217 33
R218 33
R219 33
R220 220ohm
R221 220ohm
R222 33
R223 220ohm
C201 4.7uF
C202 0.1uF
C203 0.01uF
C204 39PF
C205 100NF
C206 15PF
C207 15PF
C208 15PF
C209 22P
C210 0.1u
C211 0.1u
C212 10u 6.3V
C213 4.7uF
C214 0.1uF
C215 0.1uF
C216 4.7uF
C217 0.1uF
C218 0.01uF
C268 22P


ECLine
True value in POS