TTP 248M

THERMAL TRANSFER / DIRECT THERMAL BAR CODE PRINTER

SERVICE MANUAL

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TABLE OF CONTENT

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1. FOUNDAMENTALS ABOUT THE SYSTEM

Printer Overview

Front View

Fig. 1.1 Printer Front View

Rear View

Fig. 1.2 Printer Rear View

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1.2 Pinter Specification

Item	Specification
Printing Mode	Thermal transfer and direct thermal
Resolution	203 DPI
Max. Print Length	999 mm
Max. Print Width	104 mm
Print Speed	Selectable speed of 4,6,8 inch per second
Environment	
Temperature	5 ~40 ^{O}C
Humidity	30 ~ 85 %
Temperature	-10 ~ 60 ^{O}C
Humidity	20 ~ 95 %
Ventilation	Free air environment
Sensors	Label gap (256-level), ribbon end (16-level), black mark (256-level), carriage open, ribbon near end
Memory	Flash Memory 2MB, DRAM 4MB and optional Flash Memory 8MB
Interface	RS-232C 56000bps (Max.), Centronics
Cutter	116 mm width (Paper thickness up to 0.28 mm)
Power	100 VAC to 120 VAC, 200 VAC to 240 VAC Switching mode power supply. Input Frequency : 50Hz to 60Hz Input Current : 4.0 Amps at max. Inrush Current : 40 Amps max. (cold start) at 115 VAC input line voltage. 80 Amps max. (cold start) at 230 VAC input line voltage.
Electrical	
CPU	HITACH SH 7709A

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TPH	ROHM KF2004-GL41D 550Ω
Stepping Motor	Mitsumi 24V 7.5 Degrees 4Ω Japan Servo KH56KM 2u023 1.80,24V,0.36Ω
Memory	SDRAM, 1M×16Brt×2 7ns Flash Memory: (512K×16Bit) ×2 70ns
Compliance	CE, UL/CUL, BSMI, FCC Class A, TÜV-GS
Communication Interface	
Communication	RS-232C (DB-9) at 2400, 4800, 9600 or 19200 38400, 56000, 57600, 115200, 128000, 50000 baud rate
Word Length	7 or 8 data bits, 1 or 2 stop bits, selectable parity
Communication Protocol	XON/XOFF and DSR/DTR
Parallel Port	Standard parallel interface
Input Buffer	10KB

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- RS-232 Interface Pin Configuration:

Host Function	9 Pin	25 Pin		9 Pin	Printer Function
				1	+5V
RxD	2	3	←	2	TxD
TxD	3	2	→	3	RxD
DTR	4	20	→	4	DSR
GND	5	7		5	GND
DSR	6	6	→	6	RDY
RTS	7	4	←	7	N/C
CTS	8	5	←	8	RDY
				9	+5V

1.3 Available Bar Codes

- Code 39
- Code 39C
- Code 93
- Code128UCC
- Code128 subsets A.B.C
- Code 11
- Codabar
- Interleave 2 of 5
- EAN-8
- EAN-13
- EAN-128
- UPC-A
- UPC-E
- EAN and UPC 2(5) digits add-on
- CPOST
- MSI
- PLESSEY
- POSTNET

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- EAN-14
- ITF14
- PDF-417
- Maxicode
- DataMatrix

1.4 Text Specification

Font	Width x Length
Font 1	8x12
Font 2	12x20
Font 3	16x24
Font 4	24x32
Font 5	32x48
Font 6	14x19 OCRB
Font 7	21x27 OCRB
Font 8	14x25 OCRA

Font	Width x Length
EAN 1	7x10
EAN 2	14x22
EAN 3	21x33
EAN 4	28x43
EAN 5	35x52
EAN 6	42x64
EAN 7	49x74
EAN 8	56x85
EAN 9	63x97
EAN 10	70x107

Font 1 to Font 8 are all build-in fonts and BF1 fonts.
EAN 1 to EAN 10 are the fonts used on Barcode UPC and EAN series (they content numbers only).
The above are the fonts we approve on our printers.

Specification of Fonts

	Fixed Pixel	Variable Pixel	Singed byte	Double byte	Decode by Table
BF1	X		X		

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BF2	X			X	
BF3	X		X		X
BF4	X			X	X
VF1		X	X		
VF2		X		X	
VF3		X	X		X
VF4		X		X	X

File Head of Font (Fixed 32bytes)

Offset 0	B->Bitmap font
Offset 1	0->Fixed pixel 1->Variable Pixel
Offset 2	0->Singed Byte Decode 1->Double Byte Decode
Offset 3	Decode by table
Offset 4	0-> None 1->Italic
Offset 5-6	Font Height
Offset 7-8	Font Width
Offset 9-10	Font decode start
Offset 11-12	Font decode end
Offset 13	Font decode type
Offset 14	Reserved
Offset 15-16	Font character total
Offset 17-18	Italic Width Variable
Offset 19-31	Reserved

If (BF1 BF2 VF1 VF2)

Offset 32-xx : Font Data

Else if(BF3 BF4 VF3 VF4)

Offset 32-xx : Decoded Table

Offset xx-xx : Font Data

VF1~4

Font data of variable pixel

(width low byte)(width high byte) Font Data

Font of variable printing spacing is two-bite-width of word in front of the data of every word.

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BF3~4 VF3~4

Decode Table

(char low byte) (char high byte) (offset 4 bytes ==> file start to font data)

The font with decade table, the previous two bytes of every word is the code of the word, and the later four bytes is the displacement from the file head to the position of the data of the word.

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2. SUPPLY SPECIFICATIONS

2.1 Types of Paper

Two types of media are available for TTP-248M/2410M : label and ticket.
In TTP-248M/2410M, there are two types of sensors for paper : gap sensor and black mark sensor.
Label and ticket can be further classified into direct thermal type or thermal transfer type.

2.2 Specification

Item	Specification
Type	Label (Continuous, die-cut, fan-fold, ticket, Tag etc.)
Label Width	19～118 mm (0.7”～4.65”)
Label Length	10～999 mm (0.4”～39.33”)
Label Thickness	0.06～0.25 mm
Label Roll Diameter	203 mm
Paper Core ID	25.7± 0.3 mm
Paper Weight	Less than 280 g/m^2
Rewinder Roll diameter	138 mm (Max.) with 1" core
Label Roll Diameter without Rewinder	254 mm (Max.) with 3" core
Roll Core Diameter	25 ~ 77 mm
Black Mark Height	1.5 mm (Min.)
Black Mark Width	3 mm (Min.)

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2.3 Ribbon Specification

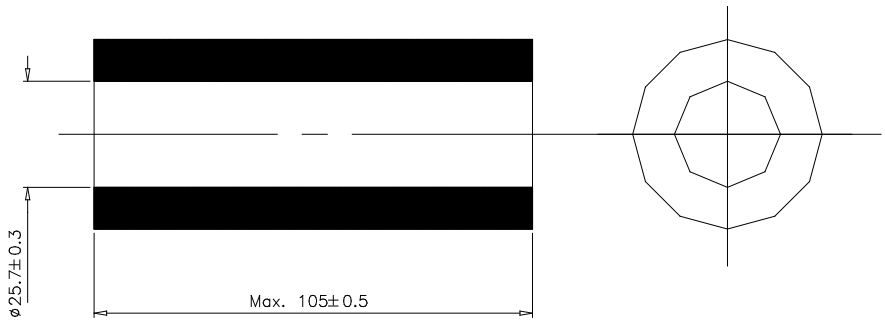
Item	Specification
Ribbon Shape	Spool type
Ribbon Width	25.4～114.3 mm
Ribbon Length	450 m
Diameter	Less than 3.5” (89 mm)
Roll Up Method	Print surface wound outside as standard.

Note: The maximum length of ribbon depends on its thickness and core outside diameter.

The formula below defines the correlation between ribbon roll length and ribbon core diameter.

$L = \frac{(D^2 - d^2) \times \pi}{4t}$ where ,

L = Ribbon length
D = Max. roll diameter
d = Ribbon core outside diameter
t = Ribbon thickness



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3. CIRCUIT DESCRIPTION

3.1 MCU

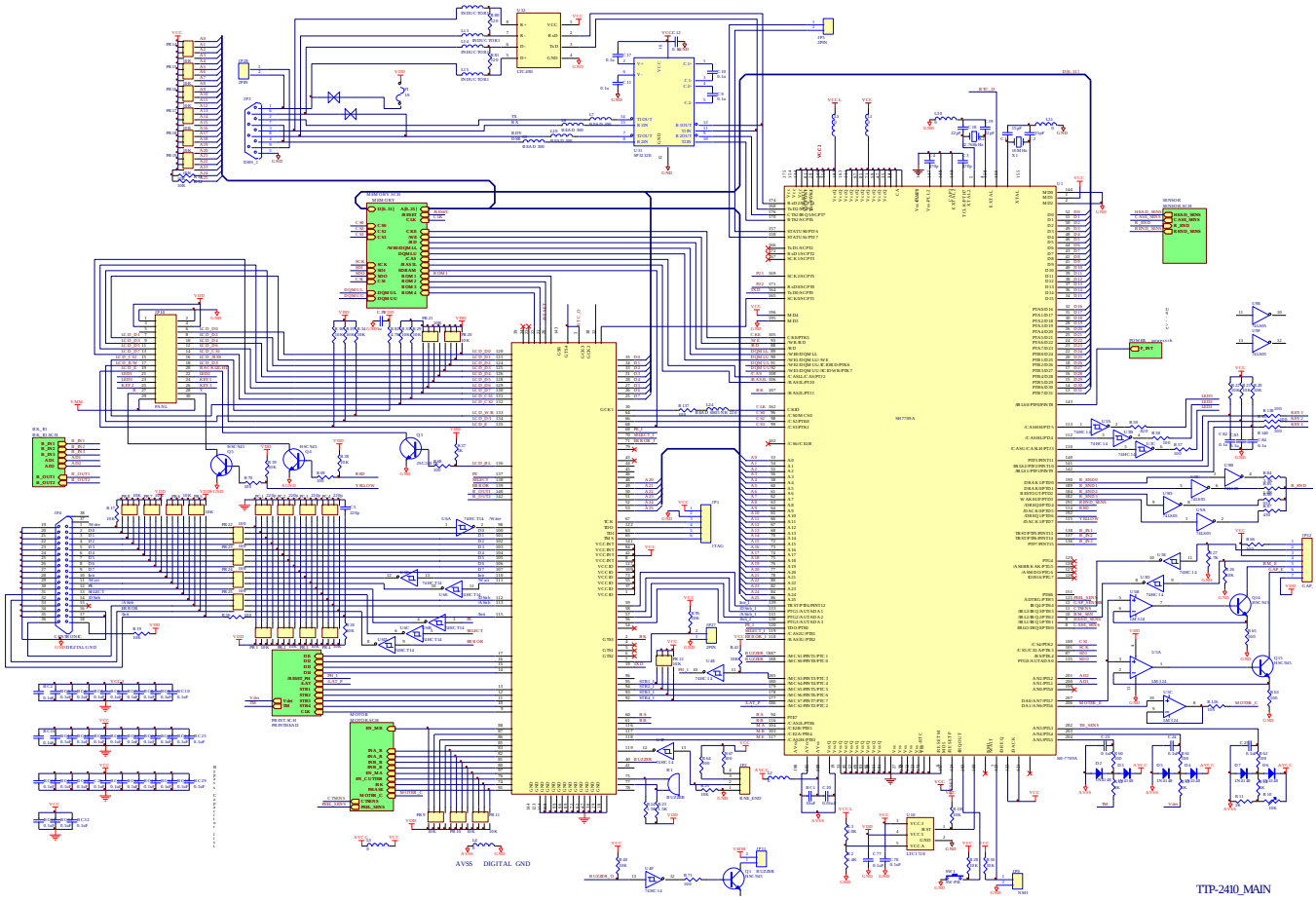

Fig. 3.1 MCU Circuit Diagram

The mainboard of TTP-248M/2410M includes seven system blocks:

A. Memory System (decoder & memory block)
B. Motor System (stepping motor, DC motor and cutter block)
C. Print Head System
D. Communication System (serial & parallel port block)
E. Power System
F. Sensor System
G. LCD Display System

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The figure below shows the PCB system area:

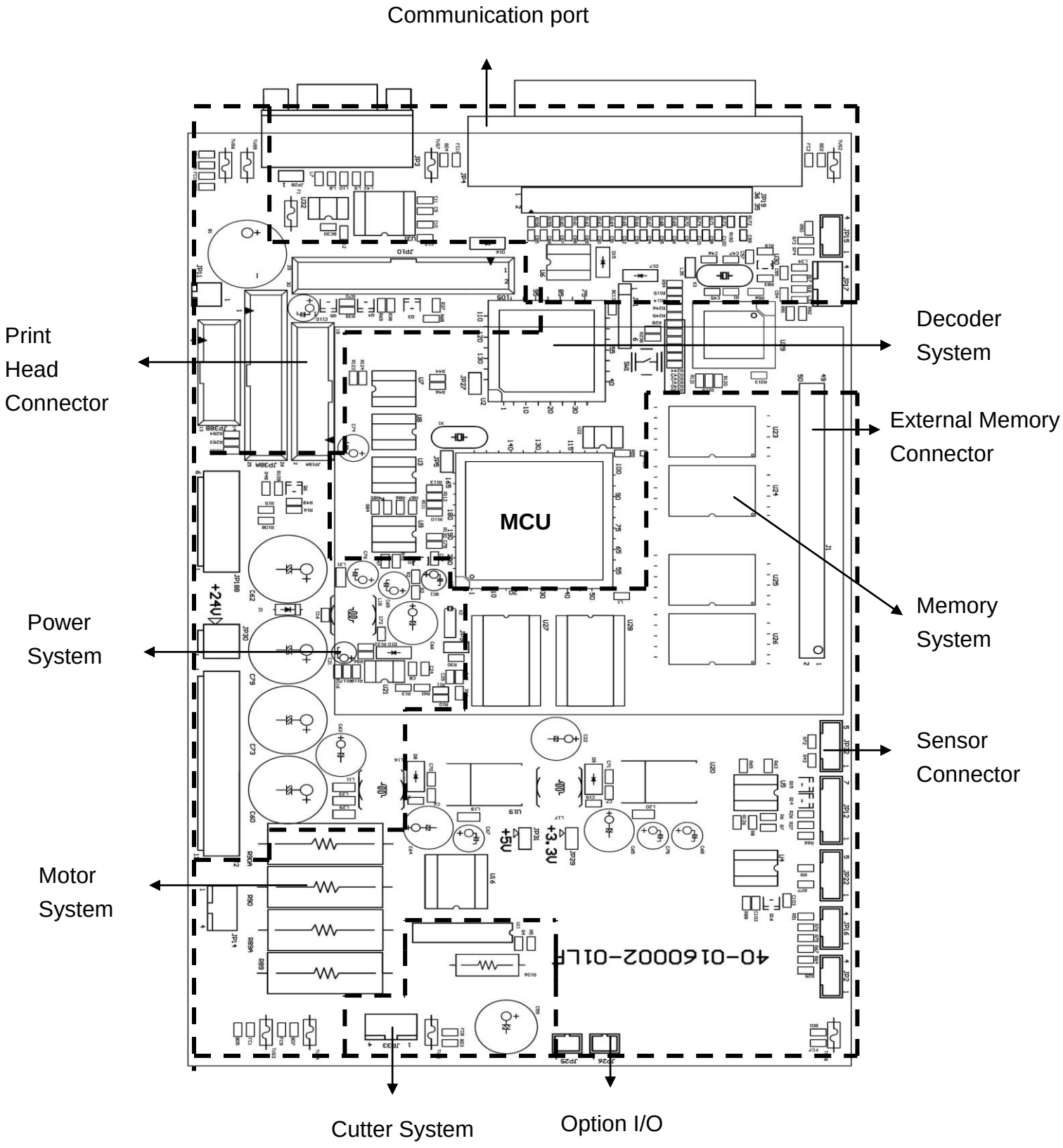

Fig. 3.2 System Block of PCB

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3.2 MCU PIN Description

SH7709A Pin Function

Number of Pins				
FP-208C	TBT-216B	Pin Name	I/O	Description
1	B02	MD1	I	Clock mode setting
2	A02	MD2	I	Clock mode setting
3	B03	Vcc-RTC*1	—	RTC power supply (1.9 V/1.8 V*5)
4	A03	XTAL2	O	On-chip RTC crystal oscillator pin
5	B04	EXTAL2	I	On-chip RTC crystal oscillator pin
6	A04	Vss-RTC*1	—	RTC power supply (0 V)
7	B05	NMI	I	Nonmaskable interrupt request
8	A05	IRQ0/$\overline{\text{IRL0}}$/PTH[0]	I	External interrupt request/input port H
9	B06	IRQ1/$\overline{\text{IRL1}}$/PTH[1]	I	External interrupt request/input port H
10	A06	IRQ2/$\overline{\text{IRL2}}$/PTH[2]	I	External interrupt request/input port H
11	B07	IRQ3/$\overline{\text{IRL3}}$/PTH[3]	I	External interrupt request/input port H
12	A07	IRQ4/PTH[4]	I	External interrupt request/input port H
13	B08	D31/PTB[7]	I/O	Data bus / input/output port B
14	A08	D30/PTB[6]	I/O	Data bus / input/output port B
15	B09	D29/PTB[5]	I/O	Data bus / input/output port B
16	A09	D28/PTB[4]	I/O	Data bus / input/output port B
17	B10	D27/PTB[3]	I/O	Data bus / input/output port B
18	A10	D26/PTB[2]	I/O	Data bus / input/output port B
19	B11	VssQ	—	Input/output power supply (0 V)
20	A11	D25/PTB[1]	I/O	Data bus / input/output port B
21	B12	VccQ	—	Input/output power supply (3.3 V)
22	A12	D24/PTB[0]	I/O	Data bus / input/output port B
23	B13	D23/PTA[7]	I/O	Data bus / input/output port A
24	A13	D22/PTA[6]	I/O	Data bus / input/output port A
25	B14	D21/PTA[5]	I/O	Data bus / input/output port A

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SH7709A Pin Function (cont)

Number of Pins				
FP-208C	TBT-216B	Pin Name	I/O	Description
26	A14	D20/PTA[4]	I/O	Data bus / input/output port A
27	B15	Vss	—	Power supply (0 V)
28	A15	D19/PTA[3]	I/O	Data bus / input/output port A
29	B16	Vcc	—	Power supply (1.9 V/1.8 V*5)
30	A16	D18/PTA[2]	I/O	Data bus / input/output port A
31	B17	D17/PTA[1]	I/O	Data bus / input/output port A
32	A17	D16/PTA[0]	I/O	Data bus / input/output port A
33	B18	VssQ	—	Input/output power supply (0 V)
34	A18	D15	I/O	Data bus
35	B19	VccQ	—	Input/output power supply (3.3 V)
36	A19	D14	I/O	Data bus
37	B20	D13	I/O	Data bus
38	A20	D12	I/O	Data bus
39	B21	D11	I/O	Data bus
40	A21	D10	I/O	Data bus
41	B22	D9	I/O	Data bus
42	A22	D8	I/O	Data bus
43	B23	D7	I/O	Data bus
44	A23	D6	I/O	Data bus
45	B24	VssQ	—	Input/output power supply (0 V)
46	A24	D5	I/O	Data bus
47	B25	VccQ	—	Input/output power supply (3.3 V)
48	A25	D4	I/O	Data bus
49	B26	D3	I/O	Data bus
50	A26	D2	I/O	Data bus
51	B27	D1	I/O	Data bus
52	A27	D0	I/O	Data bus
53	B28	A0	O	Address bus
54	B29	A1	O	Address bus
55	C28	A2	O	Address bus

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SH7709A Pin Function (cont)

Number of Pins				
FP-208C	TBT-216B	Pin Name	I/O	Description
56	C29	A3	O	Address bus
57	D28	VssQ	—	Input/output power supply (0 V)
58	D29	A4	O	Address bus
59	E28	VccQ	—	Input/output power supply (3.3 V)
60	E29	A5	O	Address bus
61	F28	A6	O	Address bus
62	F29	A7	O	Address bus
63	G28	A8	O	Address bus
64	G29	A9	O	Address bus
65	H28	A10	O	Address bus
66	H29	A11	O	Address bus
67	J28	A12	O	Address bus
68	J29	A13	O	Address bus
69	K28	VssQ	—	Input/output power supply (0 V)
70	K29	A14	O	Address bus
71	L28	VccQ	—	Input/output power supply (3.3 V)
72	L29	A15	O	Address bus
73	M28	A16	O	Address bus
74	M29	A17	O	Address bus
75	N28	A18	O	Address bus
76	N29	A19	O	Address bus
77	P28	A20	O	Address bus
78	P29	A21	O	Address bus
79	R28	Vss	—	Power supply (0 V)
80	R29	A22	O	Address bus
81	T28	Vcc	—	Power supply (1.9 V/1.8 V*[5])
82	T29	A23	O	Address bus
83	U28	VssQ	—	Input/output power supply (0 V)
84	U29	A24	O	Address bus
85	V28	VccQ	—	Input/output power supply (3.3 V)

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SH7709A Pin Function (cont)

Number of Pins				
FP-208C	TBT-216B	Pin Name	I/O	Description
86	V29	A25	O	Address bus
87	W28	$\overline{BS}$/PTK[4]	O / I/O	Bus cycle start signal / input/output port K
88	W29	$\overline{RD}$	O	Read strobe
89	Y28	$\overline{WE0}$/DQMLL	O	D7–D0 select signal / DQM (SDRAM)
90	Y29	$\overline{WE1}$/DQMLU/$\overline{WE}$	O	D15–D8 select signal / DQM (SDRAM) / write strobe (PCMCIA)
91	AA28	$\overline{WE2}$/DQMUL/$\overline{ICIORD}$/ PTK[6]	O / I/O	D23–D16 select signal / DQM (SDRAM) / PCMCIA / input/output port read / input/output port K
92	AA29	$\overline{WE3}$/DQMUU/$\overline{ICIOWR}$/ PTK[7]	O / I/O	D31–D24 select signal / DQM (SDRAM) / PCMCIA / input/output port read / / input/output port K
93	AB28	RD/$\overline{WR}$	O	Read/write
94	AB29	$\overline{AUDSYNC}$/PTE[7]	O / I/O	AUD synchronous / input/output port E
95	AC28	VssQ	—	Input/output power supply (0 V)
96	AC29	$\overline{CS0}$/$\overline{MCS[0]}$	O	Chip select 0/mask ROM chip select 0
97	AD28	VccQ	—	Input/output power supply (3.3 V)
98	AD29	$\overline{CS2}$/PTK[0]	O / I/O	Chip select 2 / input/output port K
99	AE28	$\overline{CS3}$/PTK[1]	O / I/O	Chip select 3 / input/output port K
100	AE29	$\overline{CS4}$/PTK[2]	O / I/O	Chip select 4 / input/output port K
101	AF28	$\overline{CS5}$/$\overline{CE1A}$/PTK[3]	O / I/O	Chip select 5/CE1 (area 5 PCMCIA) / input/output port K
102	AF29	$\overline{CS6}$/$\overline{CE1B}$	O	Chip select 6/CE1 (area 6 PCMCIA) / input/output port K
103	AG28	$\overline{CE2A}$/PTE[4]	O / I/O	Area 5 PCMCIA card enable / input/output port E
104	AG29	$\overline{CE2B}$/PTE[5]	O / I/O	Area 6 PCMCIA card enable / input/output port E
105	AH28	CKE/PTK[5]	O / I/O	CK enable (SDRAM) / input/output port K

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SH7709A Pin Function (cont)

Number of Pins				
FP-208C	TBT-216B	Pin Name	I/O	Description
106	AJ28	$\overline{\text{RAS3L}}$/PTJ[0]	O / I/O	Lower 32 Mbytes address (area 3 DRAM, SDRAM) RAS / input/output port J
107	AH27	$\overline{\text{RAS2L}}$/ PTJ[1]	O / I/O	Lower 32 Mbytes address (area 2 DRAM, SDRAM) RAS / input/output port J
108	AJ27	$\overline{\text{CASLL}}$/CASL/PTJ[2]	O / I/O	D7–D0 (DRAM) CAS / Lower 32 Mbytes address (SDRAM) CAS / input/output port J
109	AH26	VssQ	—	Input/output power supply (0 V)
110	AJ26	$\overline{\text{CASLH}}$/CASU/PTJ[3]	O / I/O	D15–D8 (DRAM) CAS / Lower 32 Mbytes address (SDRAM) CAS / input/output port J
111	AH25	VccQ	—	Input/output power supply (3.3 V)
112	AJ25	$\overline{\text{CASHL}}$/PTJ[4]	O / I/O	D23–D16 (DRAM) CAS / input/output port J
113	AH24	$\overline{\text{CASHH}}$/PTJ[5]	O / I/O	D31–D24 (DRAM) CAS / input/output port J
114	AJ24	DACK0/PTD[5]	O / I/O	DMA acknowledge 0 / input/output port D
115	AH23	DACK1/PTD[7]	O / I/O	DMA acknowledge 1 / input/output port D
116	AJ23	$\overline{\text{CAS2L}}$/PTE[6]	O / I/O	D7–D0 (area 2 DRAM) CAS / input/output port E
117	AH22	$\overline{\text{CAS2H}}$/PTE[3]	O / I/O	D15–D8 (area 2 DRAM) CAS / input/output port E
118	AJ22	$\overline{\text{RAS3U}}$/PTE[2]	O / I/O	Upper 32 Mbytes address (area 3 DRAM, SDRAM) RAS / input/output port E
119	AH21	$\overline{\text{RAS2U}}$/PTE[1]	O / I/O	Upper 32 Mbytes address (area 2 DRAM) RAS / input/output port E
120	AJ21	TDO/PTE[0]	I/O	Test data output / input/output port E
121	AH20	$\overline{\text{BACK}}$	O	Bus acknowledge
122	AJ20	$\overline{\text{BREQ}}$	I	Bus request
123	AH19	$\overline{\text{WAIT}}$	I	Hardware wait request
124	AJ19	$\overline{\text{RESETM}}$	I	Manual reset request

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SH7709A Pin Function (cont)

Number of Pins				
FP-208C	TBT-216B	Pin Name	I/O	Description
125	AH18	$\overline{\text{ADTRG}}$/PTH[5]	I	Analog trigger / input port H
126	AJ18	$\overline{\text{IOIS16}}$/PTG[7]	I	area 6 16-bit input/output / input port G
127	AH17	$\overline{\text{ASEMD0}}$/PTG[6]*6	I	ASE mode / input port G
128	AJ17	$\overline{\text{ASEBRKAK}}$/PTG[5]	O/I	ASE break acknowledge / input port G
129	AH16	PTG[4]	I	Input port G
130	AJ16	AUDATA[3]/PTG[3]	I/O / I	AUD data / input port G
131	AH15	AUDATA[2]/PTG[2]	I/O / I	AUD data / input port G
132	AJ15	Vss	—	Power supply (0 V)
133	AH14	AUDATA[1]/PTG[1]	I/O / I	AUD data / input port G
134	AJ14	Vcc	—	Power supply (1.9V/1.8 V*5)
135	AH13	AUDATA[0]/PTG[0]	I/O / I	AUD data / input port G
136	AJ13	$\overline{\text{TRST}}$/PTF[7]/PINT[15]	I	Test reset / input port F / port interrupt
137	AH12	TMS/PTF[6]/PINT[14]	I	Test mode switch / input port F / port interrupt
138	AJ12	TDI/PTF[5]/PINT[13]	I	Test data input / input port F / port interrupt
139	AH11	TCK/PTF[4]/PNT[12]	I	Test clock / input port F / port interrupt
140	AJ11	$\overline{\text{IRLS}}$[3]/PTF[3]/ PINT[11]	I	External interrupt request / input port F / port interrupt
141	AH10	$\overline{\text{IRLS}}$[2]/PTF[2]/ PINT[10]	I	External interrupt request / input port F / port interrupt
142	AJ10	$\overline{\text{IRLS}}$[1]/PTF[1]/PINT[9]	I	External interrupt request / input port F / port interrupt
143	AH09	$\overline{\text{IRLS}}$[0]/PTF[0]/PINT[8]	I	External interrupt request / input port F / port interrupt
144	AJ09	MD0	I	Clock mode setting
145	AH08	Vcc-PLL1*2	—	PLL1 power supply (1.9V/1.8 V*5)
146	AJ08	CAP1	—	PLL1 external capacitance pin
147	AH07	Vss-PLL1*2	—	PLL1 power supply (0 V)
148	AJ07	Vss-PLL2*2	—	PLL2 power supply (0 V)

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SH7709A Pin Function (cont)

Number of Pins				
FP-208C	TBT-216B	Pin Name	I/O	Description
149	AH06	CAP2	—	PLL2 external capacitance pin
150	AJ06	Vcc-PLL2*2	—	PLL2 power supply (1.9V/1.8 V*5)
151	AH05	AUDCK/PTH[6]	I	AUD clock / input port H
152	AJ05	Vss	—	Power supply (0 V)
153	AH04	Vss	—	Power supply (0 V)
154	AJ04	Vcc	—	Power supply (1.9V/1.8 V*5)
155	AH03	XTAL	O	Clock oscillator pin
156	AJ03	EXTAL	I	External clock / crystal oscillator pin
157	AH02	STATUS0/PTJ[6]	O / I/O	Processor status / input/output port J
158	AH01	STATUS1/PTJ[7]	O / I/O	Processor status / input/output port J
159	AG02	TCLK/PTH[7]	I/O	TMU or RTC clock input/output / input/output port H
160	AG01	$\overline{\text{IRQOUT}}$	O	Interrupt request notification
161	AF02	VssQ	—	Power supply (0 V)
162	AF01	CKIO	I/O	System clock input/output
163	AE02	VccQ	—	Power supply (3.3 V)
164	AE01	TxD0/SCPT[0]	O	Transmit data 0 / SCI output port
165	AD02	SCK0/SCPT[1]	I/O	Serial clock 0 / SCI input/output port
166	AD01	TxD1/SCPT[2]	O	Transmit data 1 / SCI output port
167	AC02	SCK1/SCPT[3]	I/O	Serial clock 1 / SCI input/output port
168	AC01	TxD2/SCPT[4]	O	Transmit data 2 / SCI output port
169	AB02	SCK2/SCPT[5]	I/O	Serial clock 2 / SCI input/output port
170	AB01	$\overline{\text{RTS2}}$/SCPT[6]	O / I/O	Transmit request 2 / SCI input/output port
171	AA02	RxD0/SCPT[0]	I	Receive data 0 / SCI output port
172	AA01	RxD1/SCPT[2]	I	Receive data 1 / SCI output port
173	Y02	Vss	—	Power supply (0 V)
174	Y01	RxD2/SCPT[4]	I	Receive data 2 / SCI output port

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SH7709A Pin Function (cont)

Number of Pins				
FP-208C	TBT-216B	Pin Name	I/O	Description
175	W02	Vcc	—	Power supply (1.9V/1.8 V*[5])
176	W01	$\overline{\text{CTS2}}$/IRQ5/SCPT[7]	I	Transmit clear 2 / external interrupt request / SCI input port
177	V02	$\overline{\text{MCS[7]}}$/PTC[7]/PINT[7]	O / I/O / I	Mask ROM chip select / input/output port C / port interrupt
178	V01	$\overline{\text{MCS[6]}}$/PTC[6]/PINT[6]	O / I/O / I	Mask ROM chip select / input/output port C / port interrupt
179	U02	$\overline{\text{MCS[5]}}$/PTC[5]/PINT[5]	O / I/O / I	Mask ROM chip select / input/output port C / port interrupt
180	U01	$\overline{\text{MCS[4]}}$/PTC[4]/PINT[4]	O / I/O / I	Mask ROM chip select / input/output port C / port interrupt
181	T02	VssQ	—	Input/output power supply (0 V)
182	T01	$\overline{\text{WAKEUP}}$/PTD[3]	O / I/O	Standby mode interrupt request notification / input/output port D
183	R02	VccQ	—	Input/output power supply (3.3 V)
184	R01	$\overline{\text{RESETOUT}}$/PTD[2]	O / I/O	Reset output / input/output port D
185	P02	$\overline{\text{MCS[3]}}$/PTC[3]/PINT[3]	O / I/O / I	Mask ROM chip select / input/output port C / port interrupt
186	P01	$\overline{\text{MCS[2]}}$/PTC[2]/PINT[2]	O / I/O / I	Mask ROM chip select / input/output port C / port interrupt
187	N02	$\overline{\text{MCS[1]}}$/PTC[1]/PINT[1]	O / I/O / I	Mask ROM chip select / input/output port C / port interrupt
188	N01	$\overline{\text{MCS[0]}}$/PTC[0]/PINT[0]	O / I/O / I	Mask ROM chip select / input/output port C / port interrupt
189	M02	DRAK0/PTD[1]	O / I/O	DMA request acknowledge / input/output port D
190	M01	DRAK1/PTD[0]	O / I/O	DMA request acknowledge / input/output port D
191	L02	$\overline{\text{DREQ0}}$/PTD[4]	I	DMA request / input port D
192	L01	$\overline{\text{DREQ1}}$/PTD[6]	I	DMA request / input port D
193	K02	$\overline{\text{RESETP}}$	I	Power-on reset request
194	K01	CA	I	Chip activate / hardware standby request
195	J02	MD3	I	Area 0 bus width setting
196	J01	MD4	I	Area 0 bus width setting

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SH7709A Pin Function (cont)

Number of Pins				
FP-208C	TBT-216B	Pin Name	I/O	Description
197	H02	MD5	I	Endian setting
198	H01	AVss	—	Analog power supply (0 V)
199	G02	AN[0]/PTL[0]	I	A/D converter input / input port L
200	G01	AN[1]/PTL[1]	I	A/D converter input / input port L
201	F02	AN[2]/PTL[2]	I	A/D converter input / input port L
202	F01	AN[3]/PTL[3]	I	A/D converter input / input port L
203	E02	AN[4]/PTL[4]	I	A/D converter input / input port L
204	E01	AN[5]/PTL[5]	I	A/D converter input / input port L
205	D02	AVcc (3.3V)	—	Analog power supply (3.3 V)
206	D01	AN[6]/DA[1]/PTL[6]	I	A/D converter input / D/A converter output / input port L
207	C02	AN[7]/DA[0]/PTL[7]	I	A/D converter input / D/A converter output / input port L
208	C01	AVss	—	Analog power supply (0 V)

Notes: 1. Must be connected to the power supply even when the RTC is not used.
2. Must be connected to the power supply even when the on-chip PLL circuits are not used (except in hardware standby mode).
3. Except in hardware standby mode, all V_{CC}/V_{SS} pins must be connected to the system power supply. (Supply power constantly.) In hardware standby mode, power must be supplied at least to V_{CC} –RTC and V_{SS} –RTC. If power is not supplied to V_{CC} and V_{SS} pins other than V_{CC} –RTC and V_{SS} –RTC, hold the CA pin low.
4. A01, A28, A29, AH29, AJ29, AJ02, AJ01, and B01 are NC pins. Do not make any connection to these pins.
5. 1.9 V for the 133 MHz model, 1.8 V for the 100 MHz model
6. Drive high when using the user system alone, and not using an emulator or the H-UDI.

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3.3 Reset Circuit

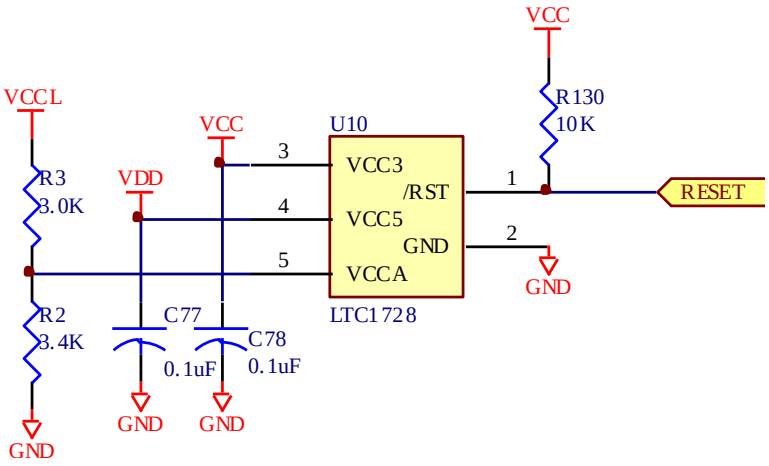

Fig. 3.3 Reset Circuit

This is the reset circuit. The LTC1728IC detects three kinds of DC Voltage (5V, 3V and 1.9V).
VCC3 (VCC, DC3V) input threshold is 3.086
VCC5 (VDD, DC5V) threshold is 4.675.

$$VCCA\left(\frac{R2}{R1+R3}\times VCCL, DC1V\right) \text{ is } 1.000$$

RST is reasserted whenever any one of the Vcc inputs drops below its predetermined threshold and remains asserted until 200ms after all of the Vcc inputs are above their thresholds.

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3.4 Memory System

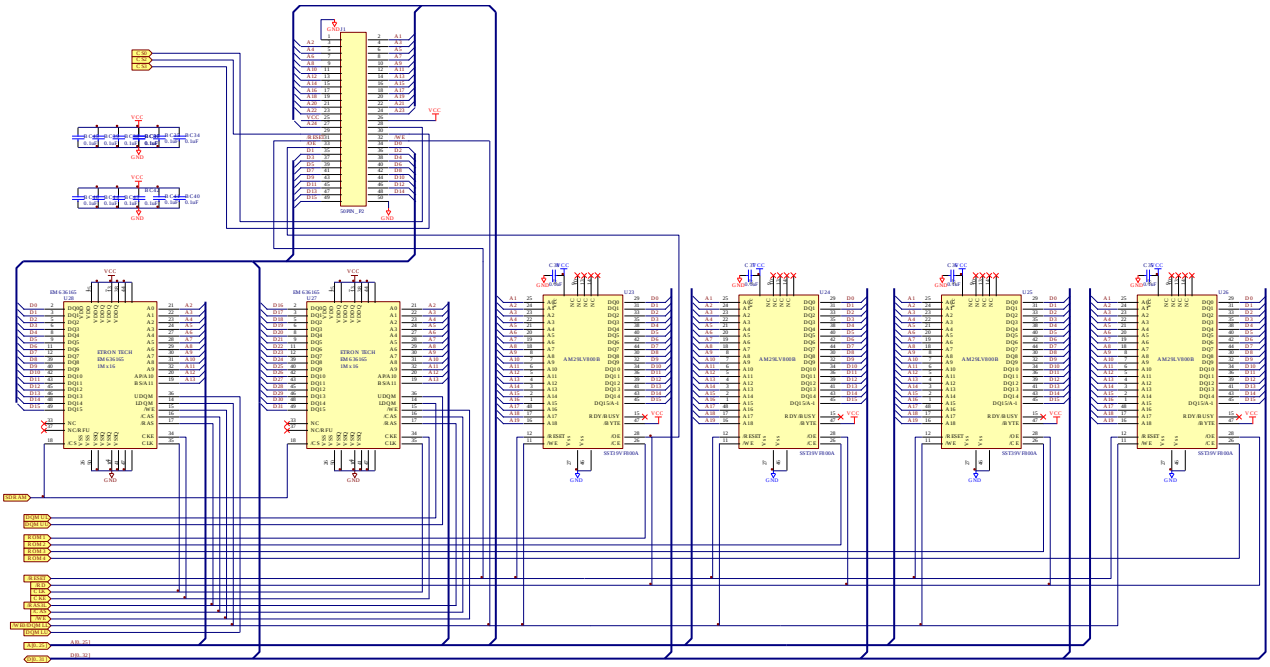

Fig. 3.4 Memory System

This is memory circuit. The 23U,24U, 25U, 26U which type 1M Bytes Flash memory and U27, U28 which type 2M Bytes SDRAM are used. The MCU WR/RD pin becomes to “H” while Reading flash memory or SDRAM; similarly, become to “L” while Writing.

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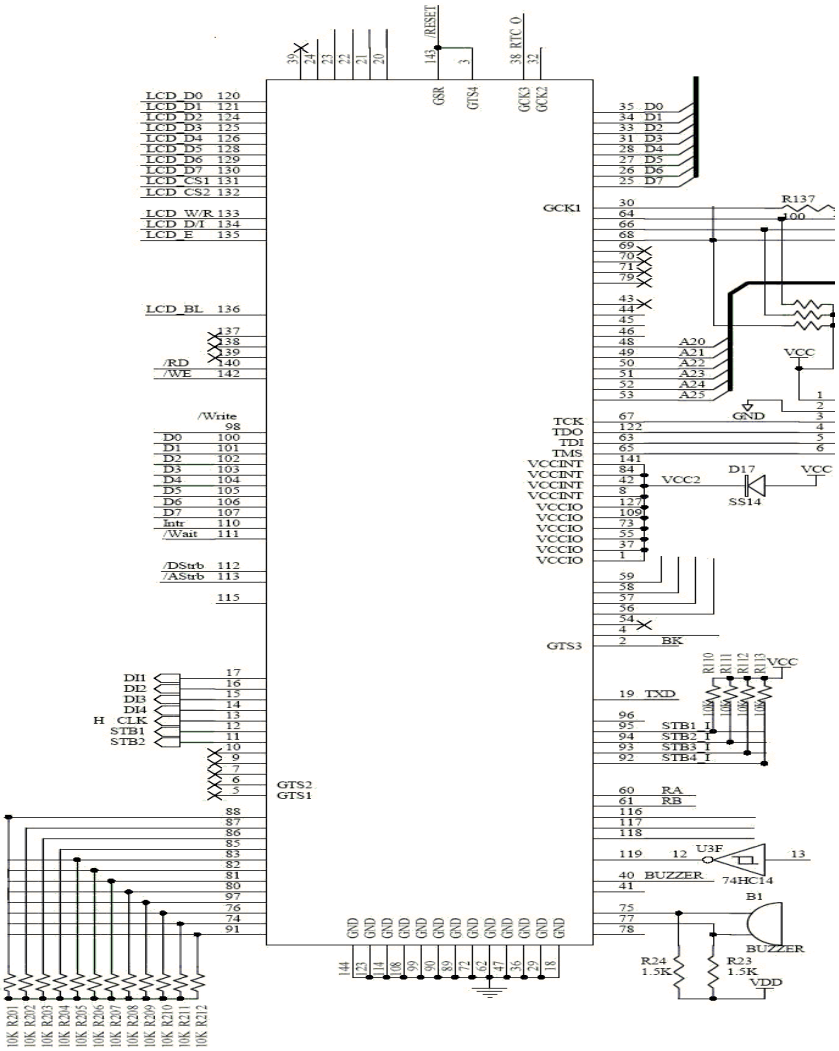
3.5 Decoder Circuits



USE CPLD to decode.

3.6 Memory Address Map

(Privileged mode)

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0x00000000	2-Gbytes virtual space, cacheable (write-back/write-through)	Area P0
0x80000000	0.5-Gbytes fixed physical space, cacheable (write-back / write-through)	Area P1
0xA0000000	0.5-Gbytes fixed physical space, non-cacheable	Area P2
0xC0000000	0.5-Gbytes virtual space, cacheable (write-back / write-through)	Area P3
0xE0000000	0.5-Gbytes control space, non-cacheable	Area P4

Table 1.

Cacheable address use Area P1 (0x80000000 ~ 0x9FFFFFFF)

Non-cacheable address use Area P2 (0xA0000000 ~ 0xBFFFFFFF)

Program Area use Area P1.

Hardware Area use Area P2.

P1 and P2 is same area, just P1 is cacheable and P2 is non-cacheable.

Area P2

0xA0000000	Flash 1 (Main board U25), Size 1M bytes (Firmware Program)	Area 0(/CS0)
0xA0100000	Flash 2 (Main board U26), Size 1M bytes	
0xA0200000	Flash 3 (Main board U23), Size 1M bytes	
0xA0300000	Flash 4 (Main board U24), Size 1M bytes	
0xA0400000	Flash 5 (Memory Card U1), Size 1M bytes	
0xA0500000	Flash 6 (Memory Card U2), Size 1M bytes	
0xA0600000	Flash 7 (Memory Card U3), Size 1M bytes	
0xA0700000	Flash 8 (Memory Card U4), Size 1M bytes	
0xA0800000	Flash 9 (Memory Card U5), Size 1M bytes	
0xA0900000	Flash 10 (Memory Card U6), Size 1M bytes	
0xA0A00000	Flash 11(Memory Card U7), Size 1M bytes	
0xA0B00000	Flash 12 (Memory Card U8), Size 1M bytes	
0xA0C00000 | 0xA3FFFFFF	N/C	
0xA0C00000 | 0xA3FFFFFF	Use by CPU	Area 1 (Internal I/O)
0xA8000000	N/C	Area 2 (External I/O)

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0xA8100000	Ribbon Near End Data Register (1 byte)	
0xA8200000	Centronics Data Register (1 byte)	
0xA8300000	TPH Data Area 1 Register (1 byte)	
0xA8400000	TPH Data Area 2 Register (1 byte)	
0xA8500000	TPH Data Area 3 Register (1 byte)	
0xA8600000	TPH Data Area 4 Register (1 byte)	
0xA8700000	Cutter Control Register (1 byte)	Bit 0: Power Bit 1: Direction 0:Backward 1:Forward
0xA8800000 | 0xA88FFFFF	N/C	
0xA8900000	LCD Control Register (1 byte)	Bit 0: LCD CS1 Bit 1: LCD CS2 Bit 2: LCD OP Bit 3: LCD Power Bit 4: LCD R/W Bit 5: LCD Enable
0xA8A00000	LCD Data (1 byte)	
0xAC000000 | 0xAC3FFFFF	SDRAM	Area 3(/CS3)
0xB0000000 | 0xB3FFFFF	N/C	Area 4(/CS4)
0xB4000000 | 0xB7FFFFF	N/C	Area 5(/CS5)
0xB8000000 | 0xBBFFFFF	N/C	Area 6(/CS6)
0xBC000000 | 0xBFFFFFF	N/C	Reserved Area

Table 2.

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3.7 Firmware Address Map

(Cacheable Address Flash 1)

0x80000000 | 0x80001FFF	Boot Interrupt Vector Initial Program	This program run in 0x8C3F0000	Boot Area (32 Kbytes) (Boot Project)
0x80002000 | 0x80002FFF	Update Firmware Program (Run in SDRAM)		(Boot Project)
0x80003000 | 0x80007FFF	Boot Area Main Program		
0x80008000 | 0x800BFFFF	Main Program Area	This program run in 0x8C000000	Main Program Area
0x800C0000 | 0x800CFFFF	LCD Font Area		
0x800D0000 | 0x800EFFFF	Fixed Pitch Bitmap Font		
0x800F0000 | 0x800FFFFF	Variable Pitch Bitmap Font		

Table 3.

SDRAM Address Map

(Cacheable Address SDRAM)

0x8C000000 | 0x8C0F7FFF	Main Program Area	Include build Font	Main Program Area Total 480K
0x8C0F8000 | 0x8C3EFFFF	Program Ram Area	Include Image Area and File Area	
0x8C3FBFF0 | 0x8C3FFFFF	Stack Area		Total 16K

Table 4.

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3.8 Power Down Sensor

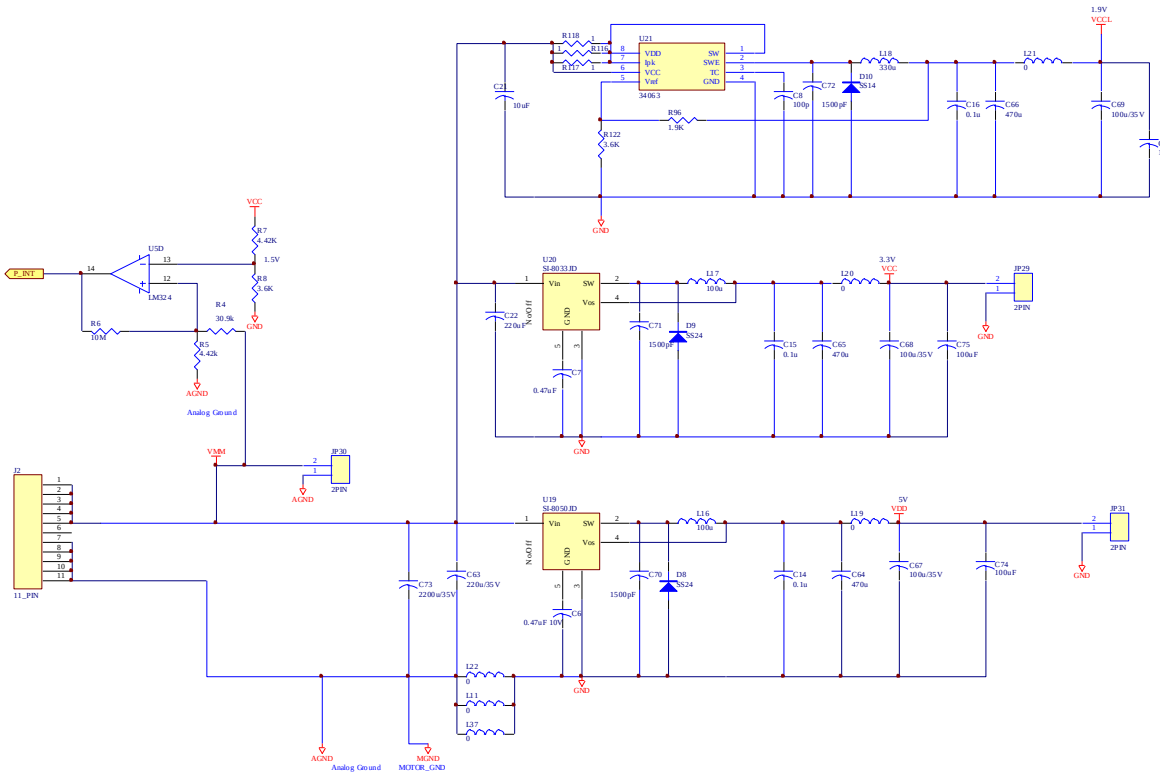

Fig. 3.6 Power Down Sensor Circuit

PIN U19 ----SJ8050JD is used to provide 5V to CTHP, LCD, motor, connector.

PIN U20 ---- SJ8033JD is used to provide 3.3V to CPLD, memory.

PIN U21 ---- 34063 is used to provide 1.9V to CPU。

｜Vout｜=1.25(1+R96/R122)

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3.9 Print Head

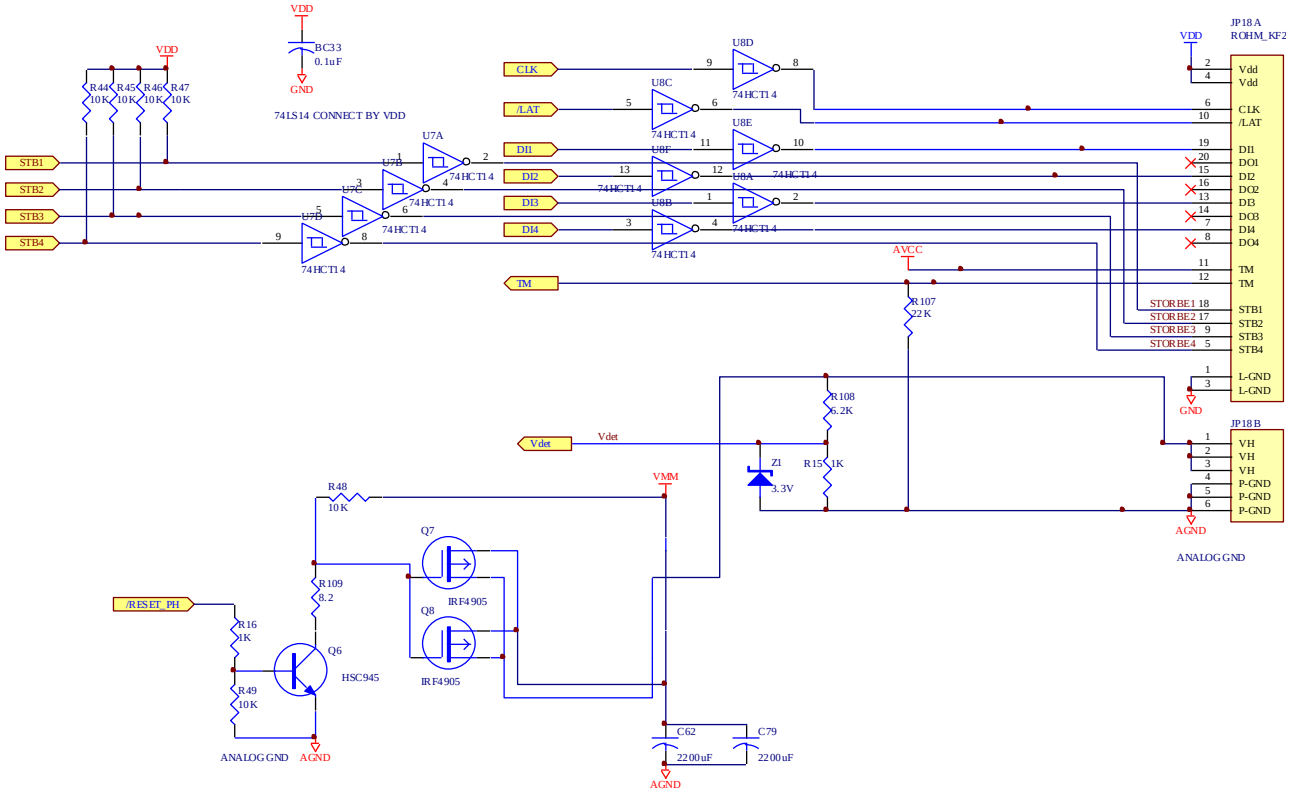

Fig. 3.7 Print Head (ROHM KF2004-GL41B)

Print Head Sensor

The voltage of sender is about 1.18V (1.17V~1.19V)

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3.10 Motor System Circuit

PHASE \ STEP	1	2	3	4
INA_R	ON	ON		
/INA_R			ON	ON
INB_R		ON	ON	
/INB_R	ON			ON

Table 5. Stepping Motor Pattern

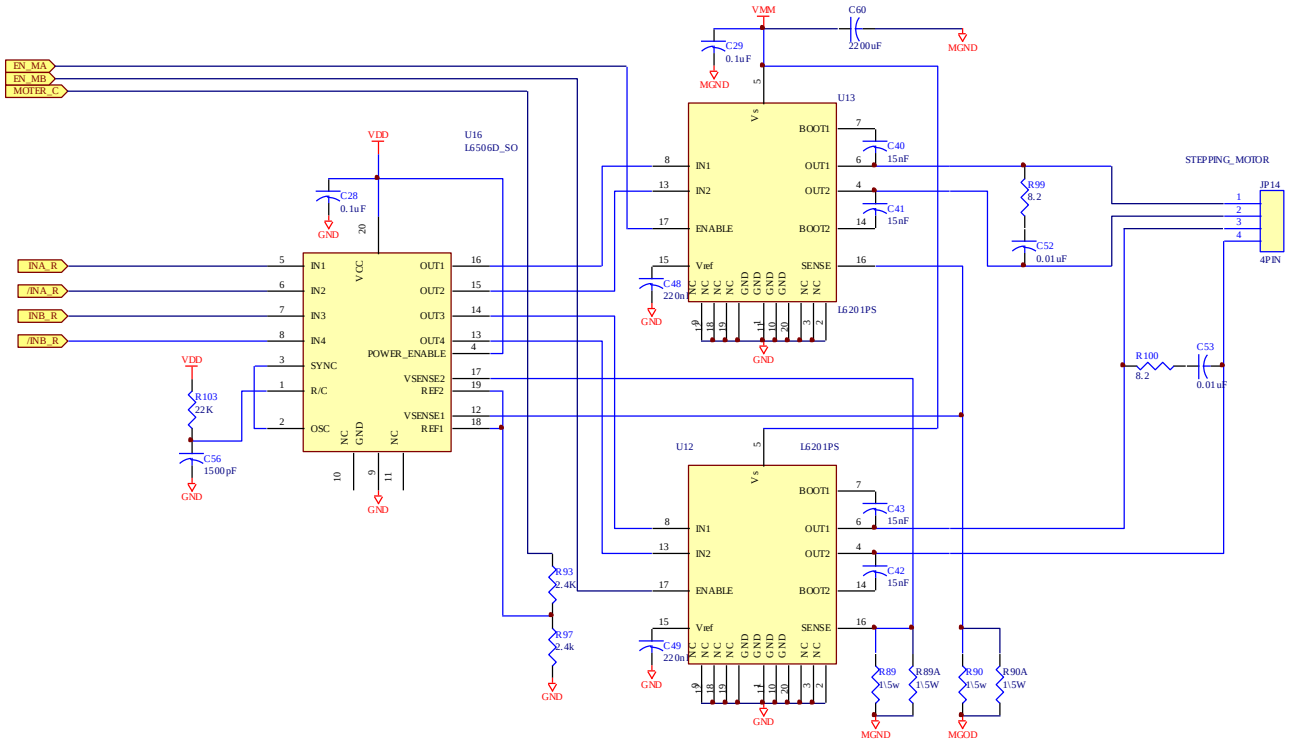

Fig. 3.8 Stepping Motor Circuit

MOTER_C pin is adjusted by CPU D/A (pin 206) to pass the current of motor.

Pin EN_MA is used to enable U13 Driver.

Pin EN_MB is used to enable U12 Driver.

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3.11 Sensor Circuits

Ribbon Near End Sensor

The voltage of sender (PIN 3) is about 1.18V (1.17V~1.19V).

When the sensor detects the black area, the voltage of receiver (PIN 2) is≧ 2.10V.

When the sensor detects the white area, the voltage of the receiver (PIN 2) is≦ 1.26V.

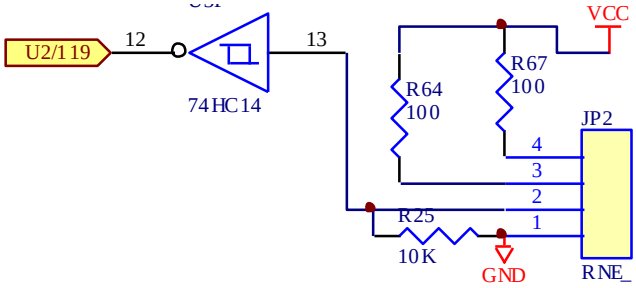

Fig. 3.9 Ribbon Near End Sensor Circuit

GAP Sensor

1. Selecting MANUAL GAP and adjust the tension.
   When the tension increases, the voltage of the sender (PIN 5) will decrease; when the tension decreases, it will increase.
   If adjust the voltage of PIN 5 between tension 000~255, it will alter between 4.4V~3.7V.
2. Selecting AUTO GAP to detect label will get a value of tension, and then selecting the MANUAL GAP.
   When sensor detects the paper:
   LCD displays Not Through→ the voltage of receiver (PIN 2)≦2.10V
   When sensor detects the gap or does not detect paper:
   LCD displays Through → the voltage of receiver (PIN 2)≧1.26V

Black Mark Sensor

Selecting MANUAL Bline, and adjust the tension.

When the tension increases, the voltage of the sender (PIN 6) will decrease; when the tension decreases, it will increase.

If adjusting the voltage of PIN 6 between tension 000~255, it will alter

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between 4.4V~3.7V.

2. Selecting AUTO GAP to detect label will get a value of tension, and then selecting the MANUAL GAP.

   When sensor detects white paper:

   LCD displays Reflect → the voltage of receiver (PIN 3)≦2.10V

   When sensor detects the Black mark or does not detect paper:

   LCD displays Not Reflected → the voltage of receiver (PIN 3)≧1.26V

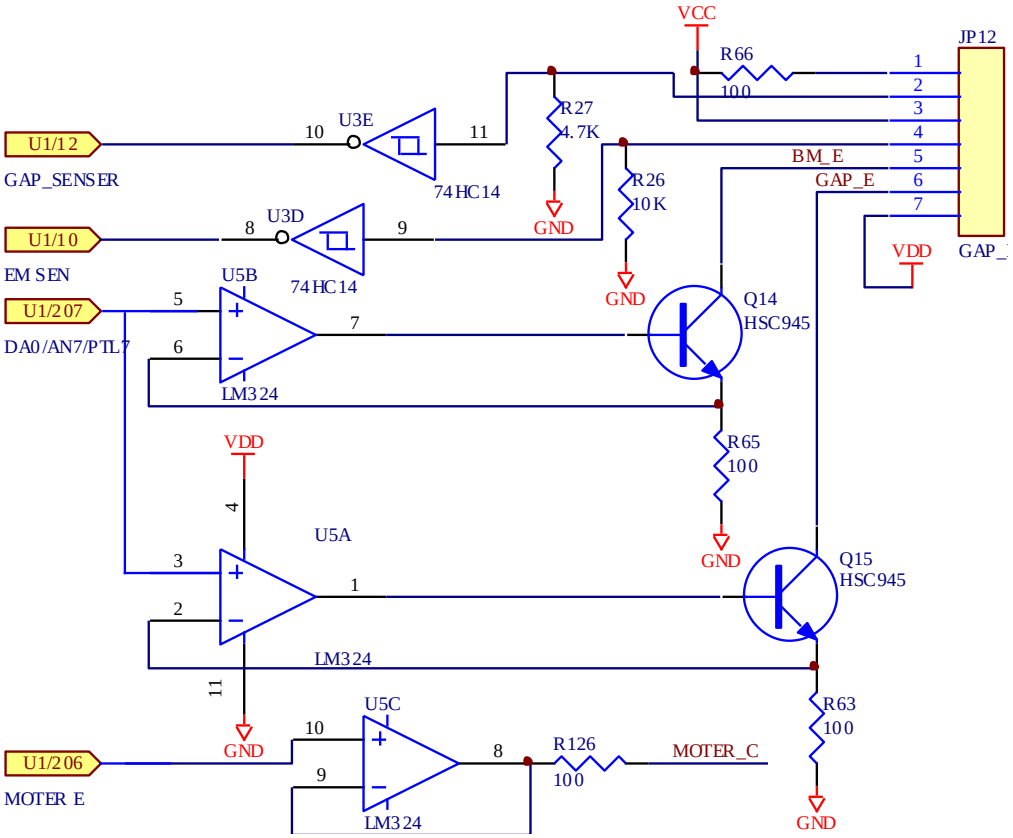

Fig. 3.10 Black mark/ Gap Sensor Circuit

Peel-off Sensor

The voltage of the sender is about 1.18V (1.17V~1.19V)

When sensor does not detect paper, the voltage of receiver (PIN 2) is≧2.10V

When sensor detects the paper, the voltage of receiver (PIN 2) is≦1.26V

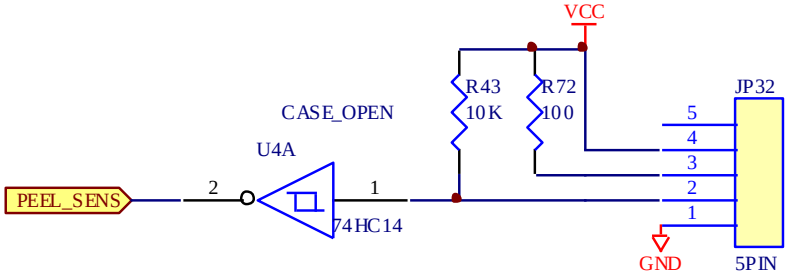

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Fig. 3.11 Peel-off Sensor Circuit

Case Sensor

The voltage of sender is about 1.18V (1.17V~1.19V)

When sensor detects upper cover, the voltage of receiver (PIN 2) is≧2.10V

When sensor does not detect upper cover, the voltage of receiver is ≦1.26V

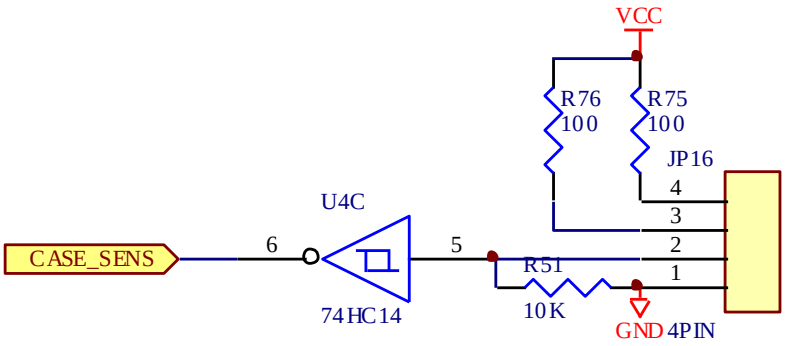

Fig. 3.12 Case sensor

Print Head Lift Lever Open Sensor

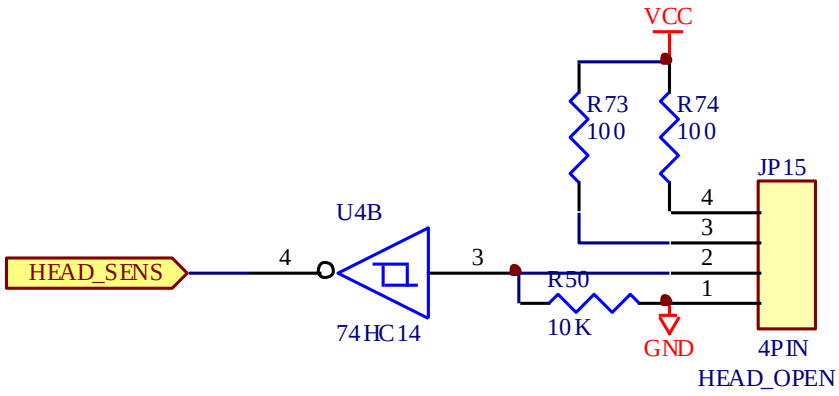

Fig. 3.13 Print Head Lift Lever Open Sensor Circuit

Ribbon End Sensor

1. Selecting MANUAL RIBBON and adjust the tension.
   When the tension increases, the voltage of the sender (PIN 5) will decrease; when the tension decreases, it will increase.
   If adjust the voltage of PIN 5 between tension 000~015, it will alter between 1.57V~2.70V.

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2. Selecting AUTO RIBBON to detect ribbon will get a value of tension, and then selecting the MANUAL Ribbon.
   When sensor detects ribbon:
   LCD displays Not Through → the voltage of receiver (PIN 4)≦1.26V
   When sensor detects no ribbon:
   LCD displays Through → the voltage of receiver (PIN 4)≧2.10V.

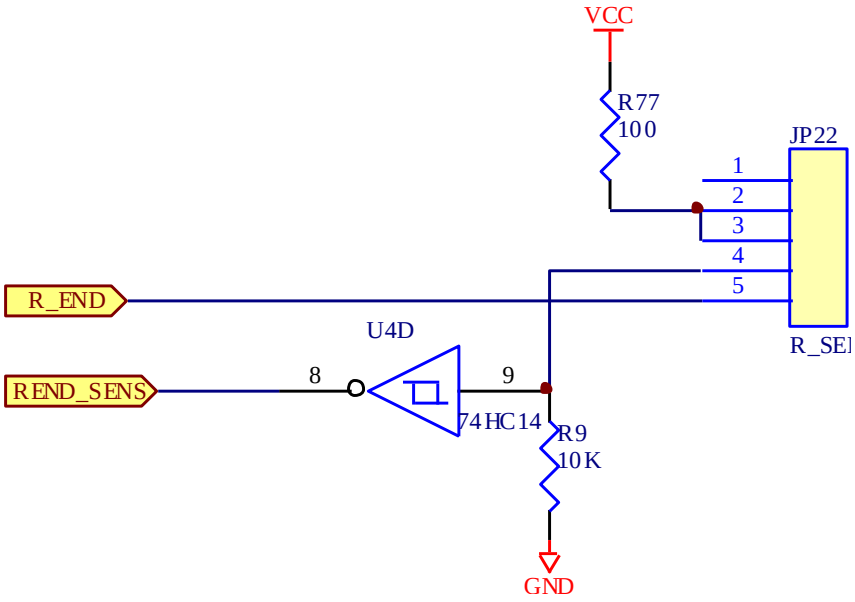

Fig. 3.14 Ribbon End Sensor Circuit

3.12 Serial Port Circuit

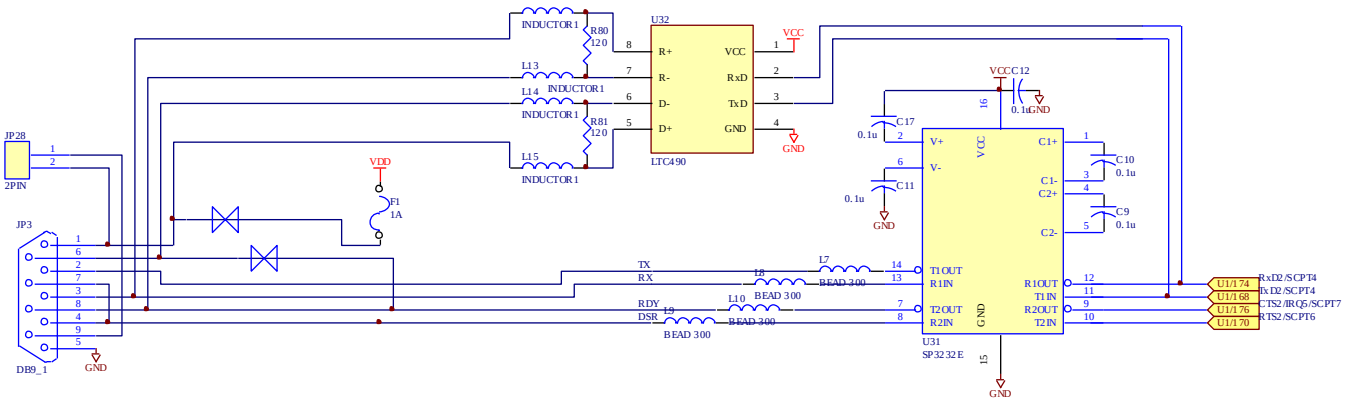

Fig. 3.15 Serial Port Circuit

U18 (SP3232E) is RS232 asynchronous communication driver IC.

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U19 is used for industrial long-distance asynchronous communication;U19 is optional.

3.13 Parallel Port Circuit

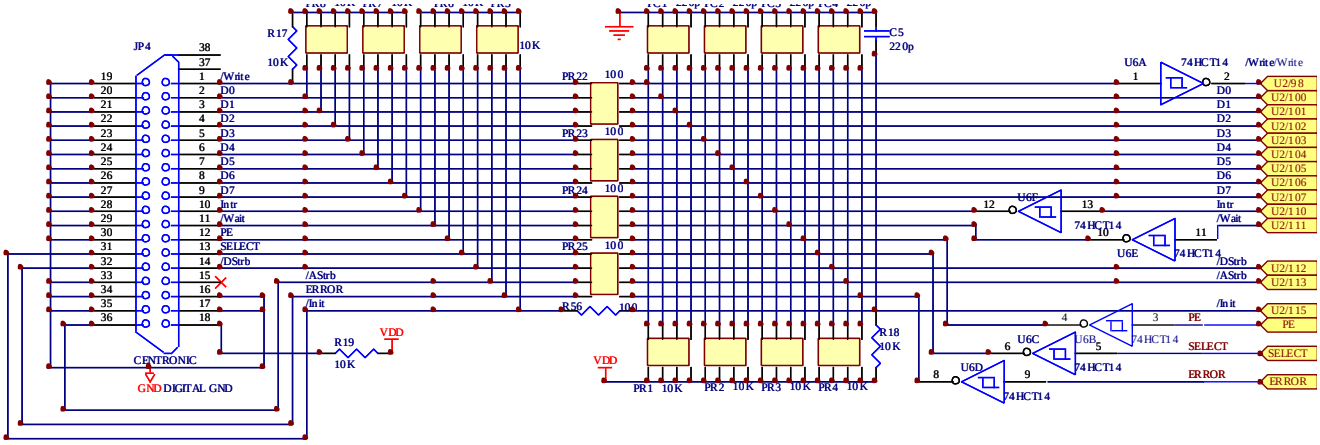

Fig. 3.16 Parallel Port Circuit

Censorings port is SPP mode and one-way communication.

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3.14 Cutter Drive System

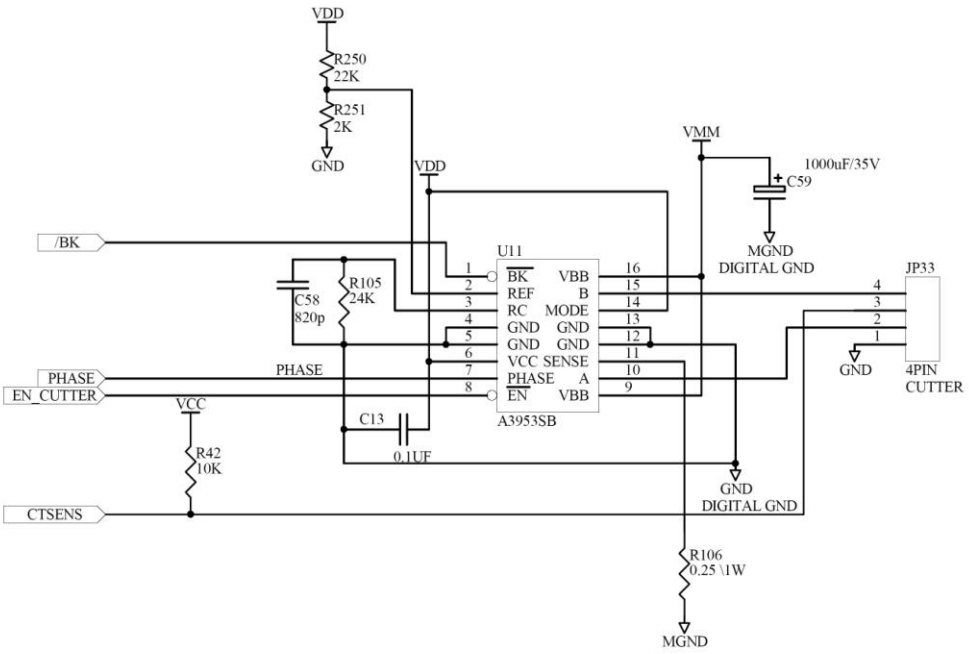

Fig. 3.17 Cutter Drive Circuit

JP33Pin 2 and 4 connect DC motor; pin 3 connects sensor.

Pin /BK Cutter is used to stop DC motor.

PHASE is used to control obversion and reverse.

Pin EN_CUTTER is used to enable Cutter.

Pin CTSENS is the sensor of cutter tab.

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3.15 PIN Switch Circuits

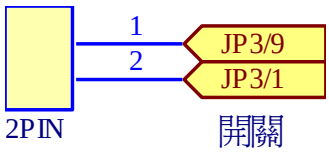

Fig. 3.18 LTC490 and RS232 pin switch

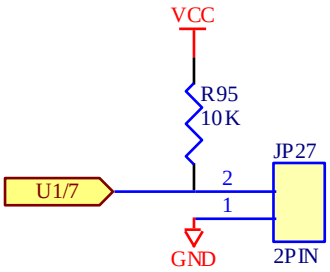

Fig. 3.19 Download boot program to on-board Flash memory pin switch

3.16 Connector Circuits

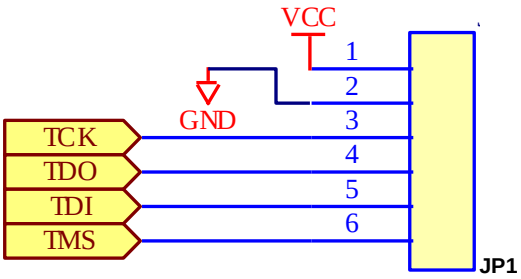

Fig. 3.20 JTAG Circuit

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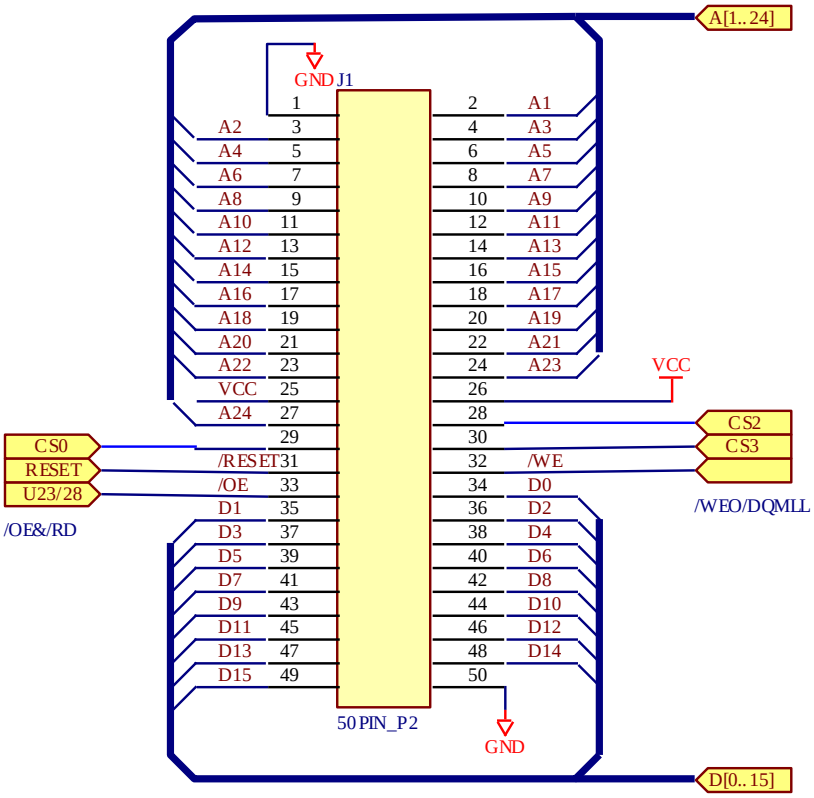

Fig. 3.21 Memory Card Connector

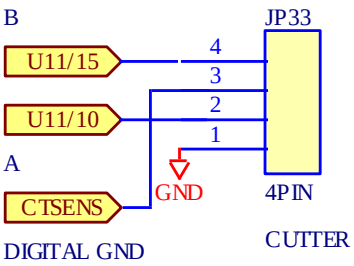

Fig. 3.22 Cutter Connector Circuit

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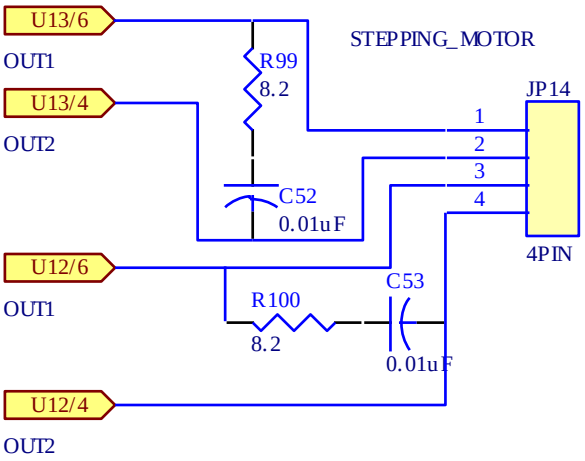

Fig. 3.23 Stepping Motor Connector

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3.17 Optional Items Circuits

The following circuits provide optional detecting message or input/output control.

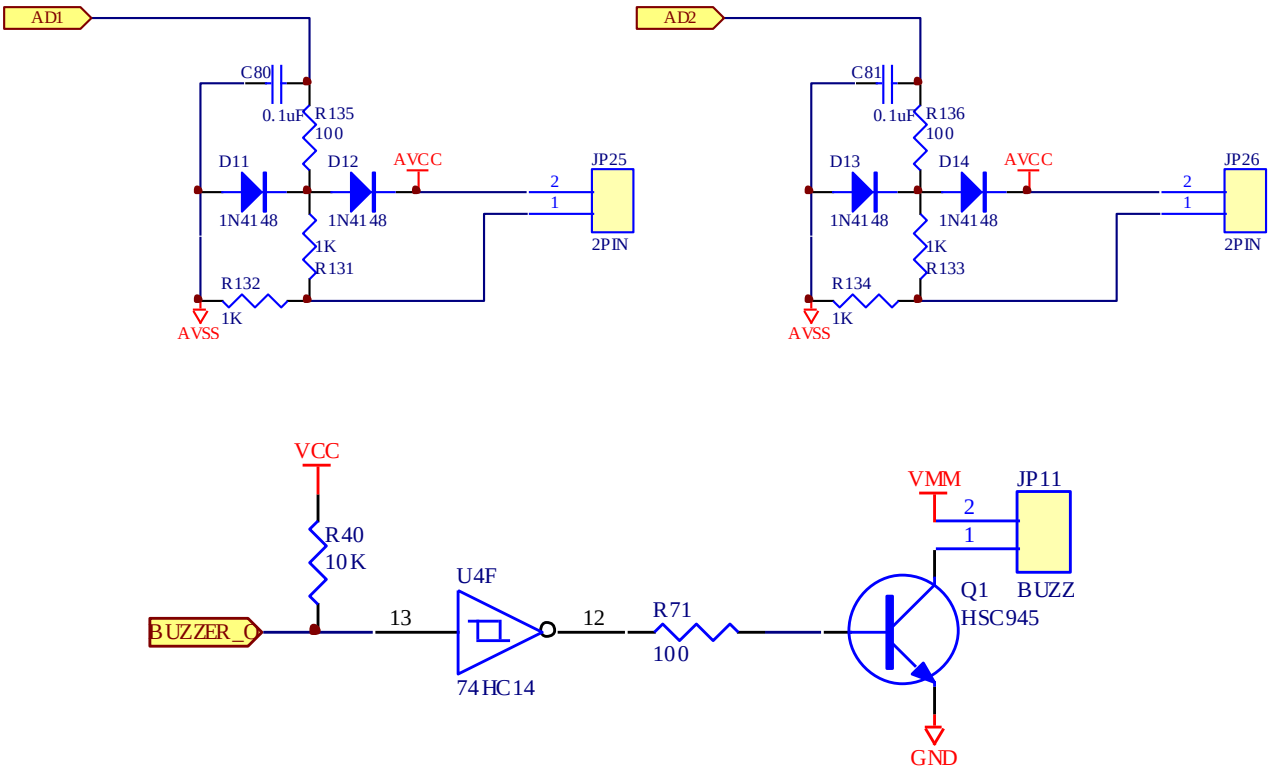

Fig. 3. Optional Item---Buzzer

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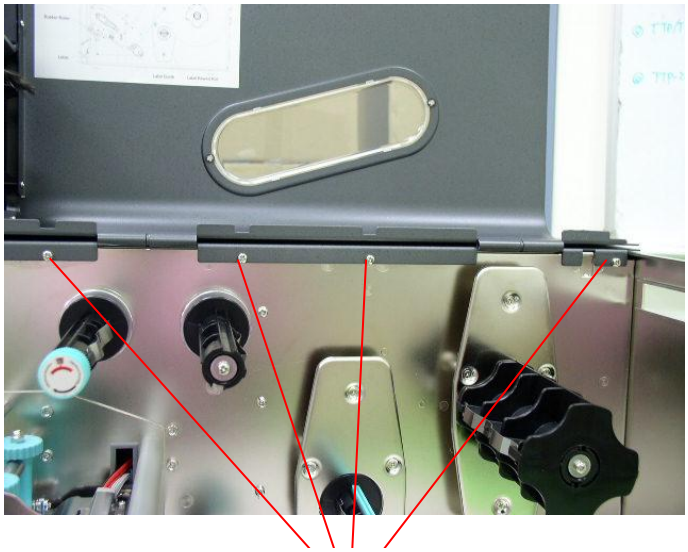
4. MACHANISM

4.1 Remove the Covers and LCD Panel

1. Open Top Right Side Cover.

2. Loosen the four screws used to fix Main Frame and Top Right Side Cover.



Screws

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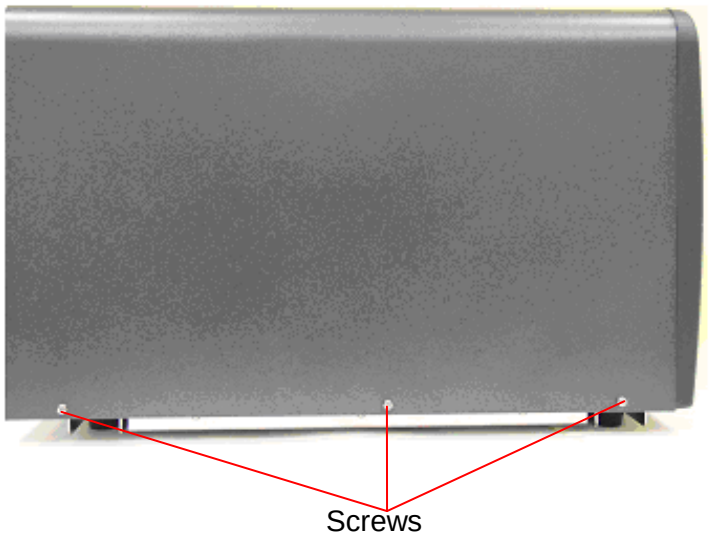
3. Loosen the three screws on Top Left Side Cover.



4. Remove Top Right Side Cover and Top Left Side Cover.

5. Remove the LCD Panel and remove the Lower Front Cover to the right side.

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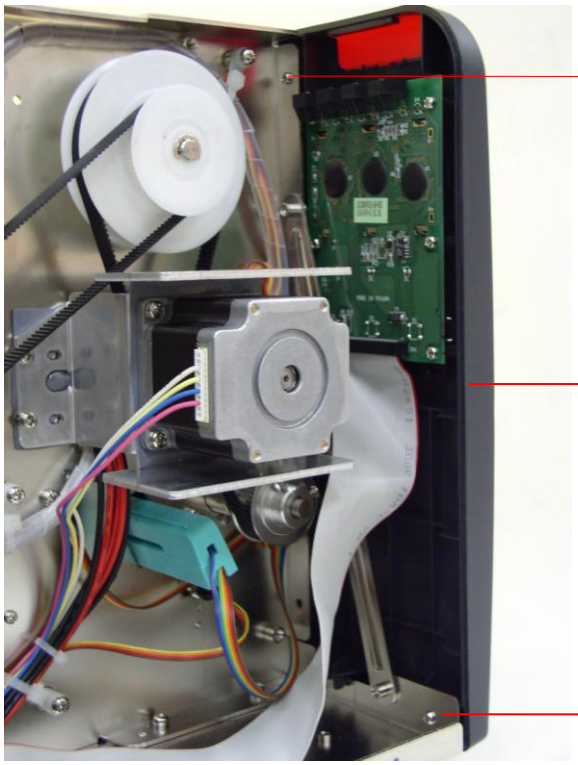

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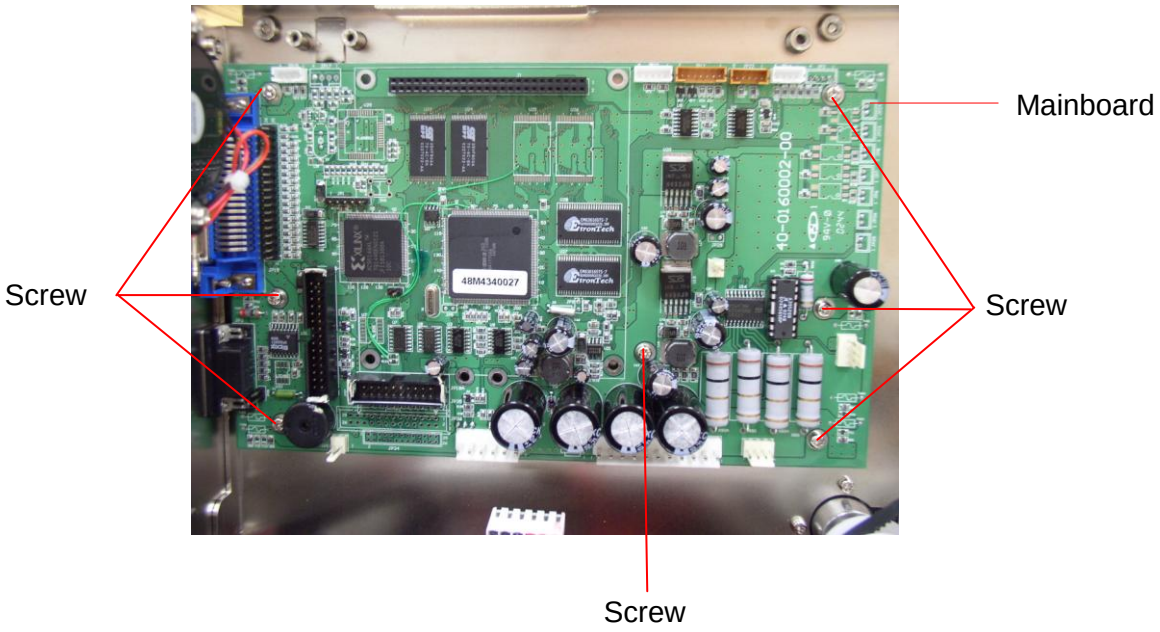
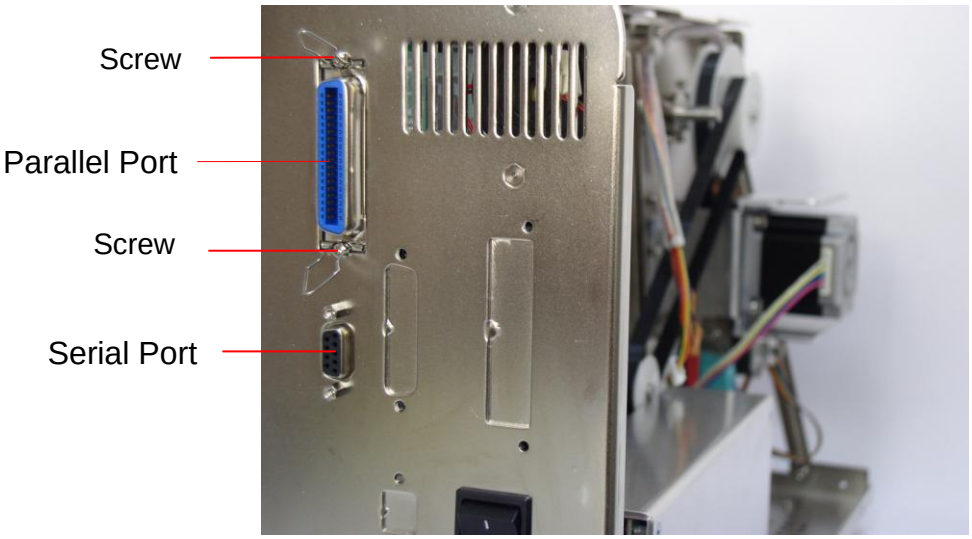
4.2 Replacing the Mainboard

1. Disconnect all harnesses.
2. Remove the seven screws on Mainboard, two hexagon screws of serial port and two screws of parallel port.





3. Replace the Mainboard.

4. Reassemble in the reverse procedures.

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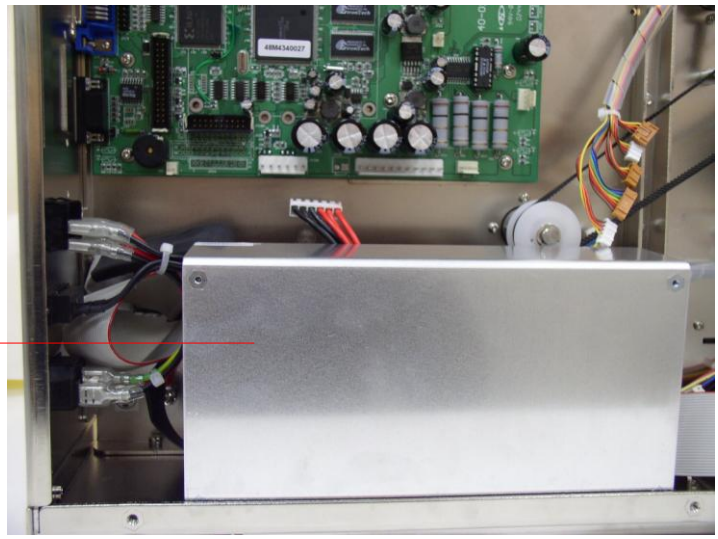
4.3 Replacing the Power Supply Unit

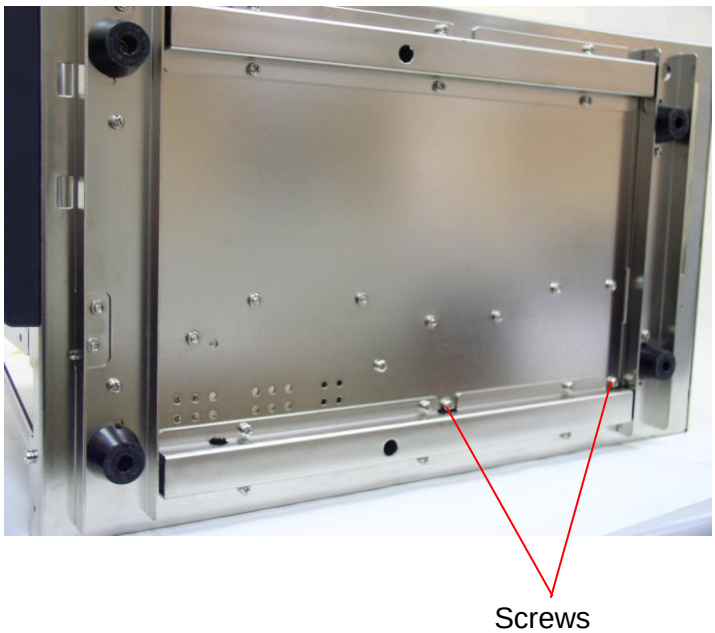
1. Disconnect all harnesses.

Power Supply Unit



2. Turn the printer upside down to loosen the two screws of the Power Supply Unit on the bottom of the printer.

Two screws



Screws

3. Replace the Power Supply Unit.
4. Reassemble in the reverse procedures.

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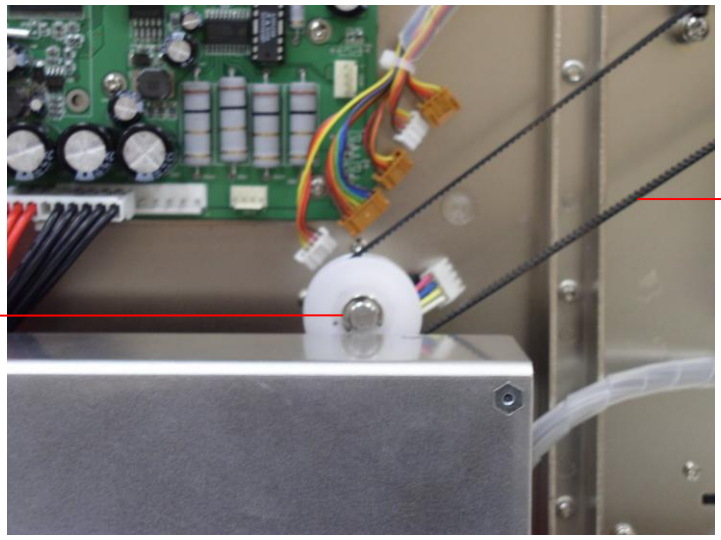
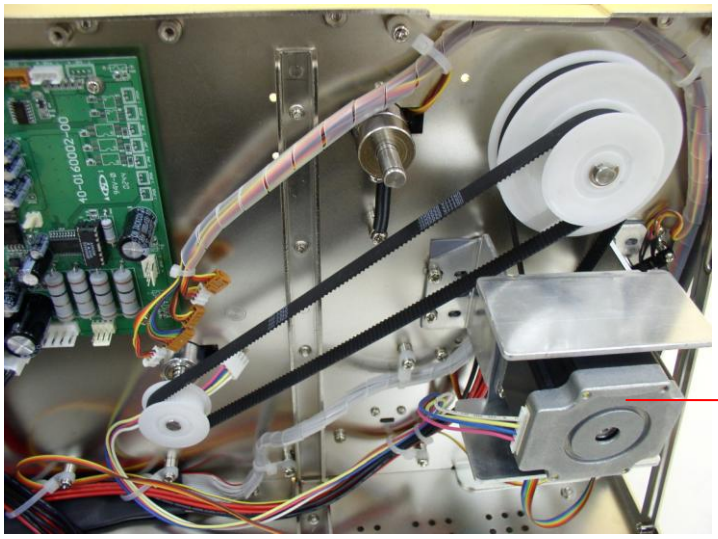
4.4 Replacing the Ribbon Rewind Spindle

1. Refer to 4.3 to remove the Power Supply Unit.
2. Remove the E-ring of the Label Rewind Spindle and the Label Rewind Spindle with belt.



3. Loosen the four screws of the Stepping Motor Frame. Remove the stepping motor assembly and its belts.



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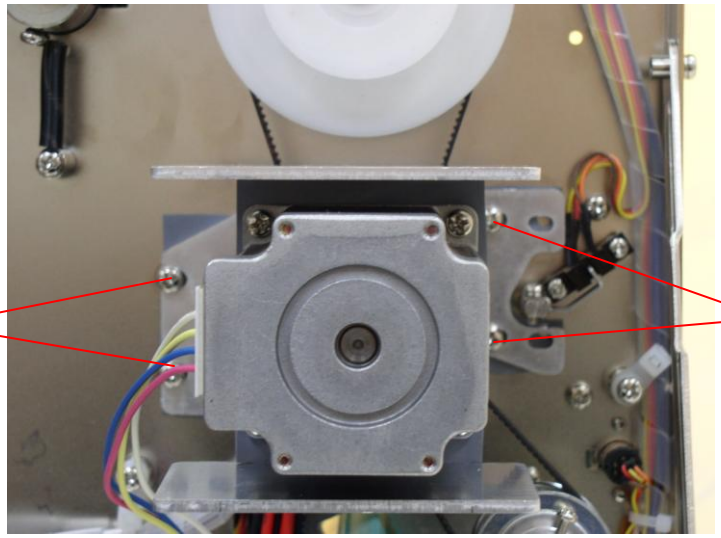
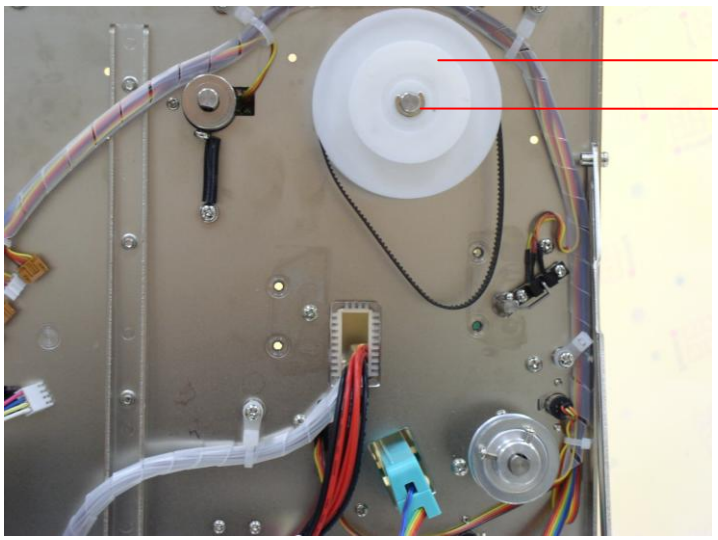


4. Remove the E-ring of pulley. And then, remove the pulley.



5. Loosen the three screws on the Cam Spindle Support Plate.

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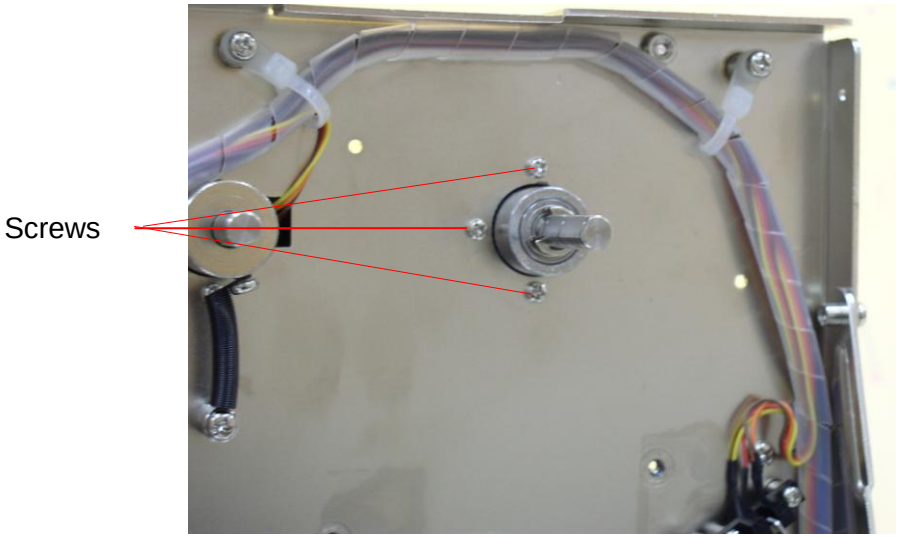
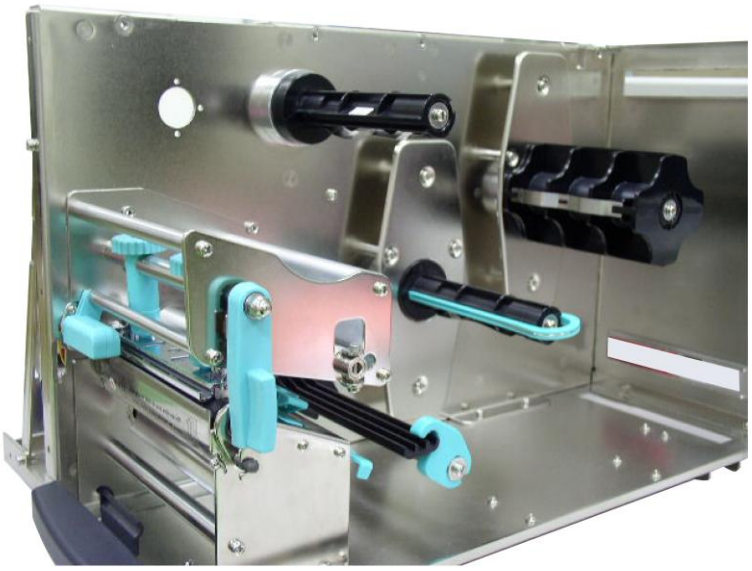


6. Replace the Ribbon Rewind Spindle.



7. Reassemble in the reverse procedures after replacing.

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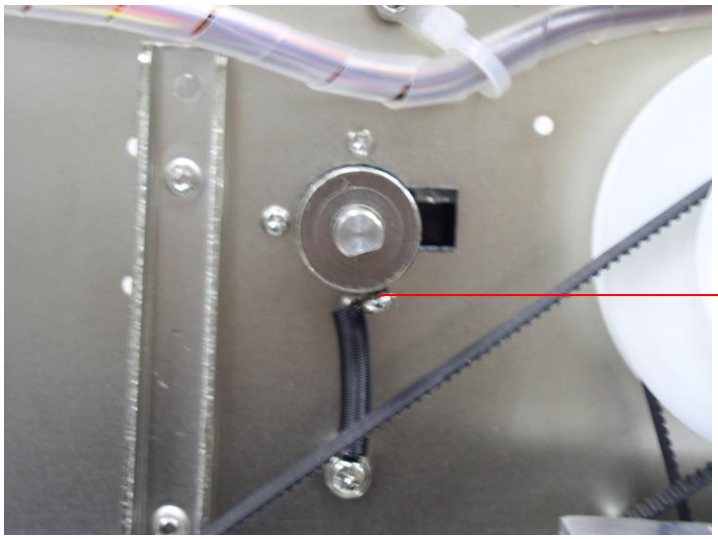
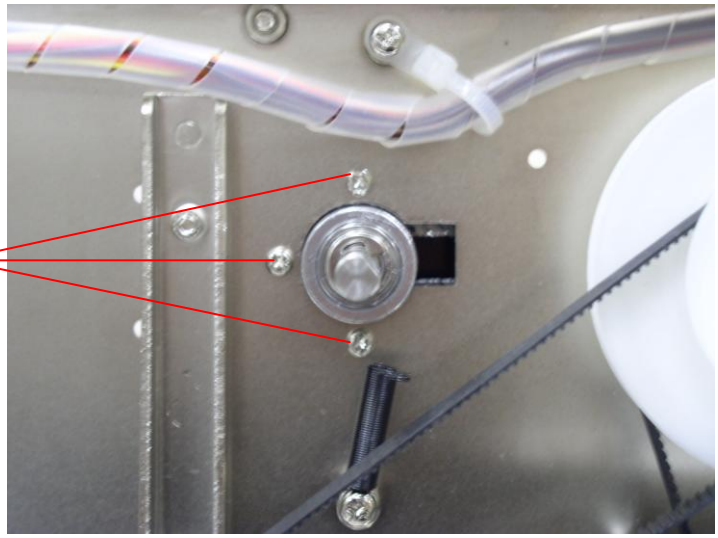
4.5 Replacing Ribbon Supply Spindle

1. Remove the four screws of the Ribbon Supply Spindle.





2. Remove the shaft bearing.
3. Replace the Ribbon Supply Spindle.

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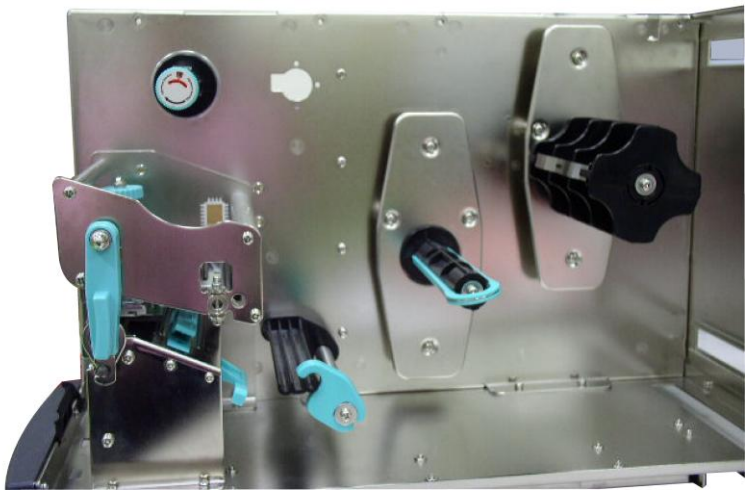

4. Reassemble in the reverse procedures after replacing.

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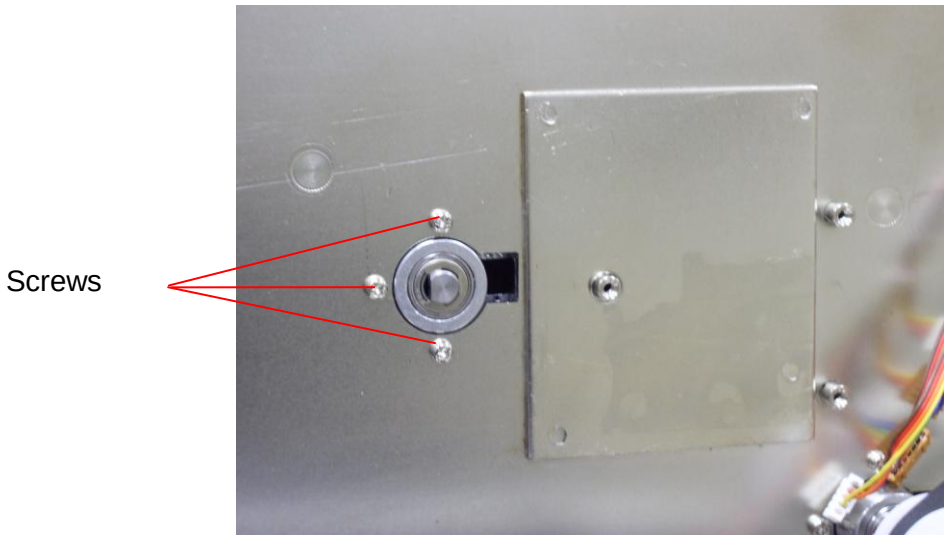
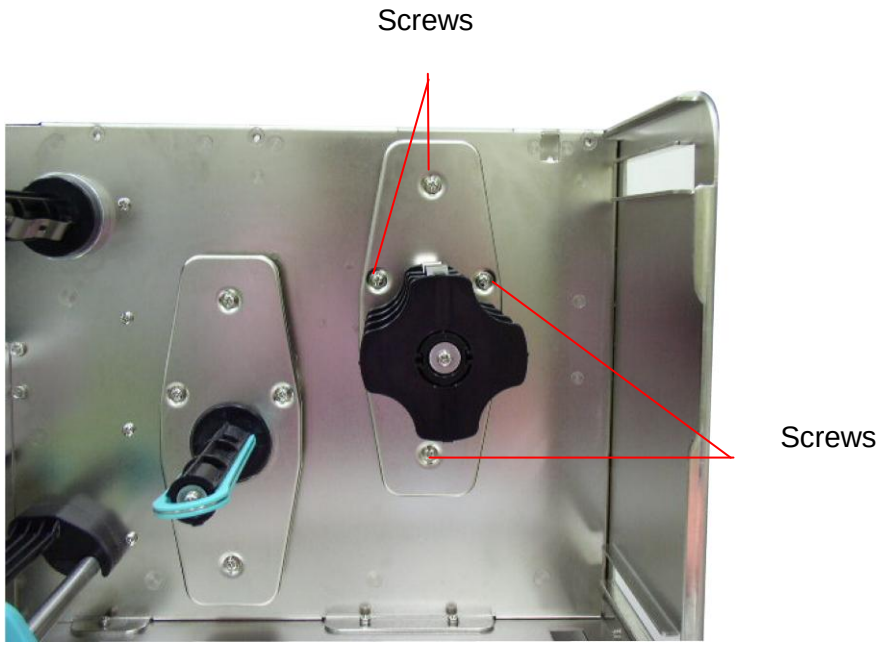
4.6 Replacing Label Supply Spindle

1. Refer to 4.2 to remove the Mainboard.
2. Remove the three screws of the Label Supply Spindle.



3. Remove the four screws of the fixing plate.



4. Replace the Label Supply Spindle.

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5. Reassemble in the reverse procedures after replacing.

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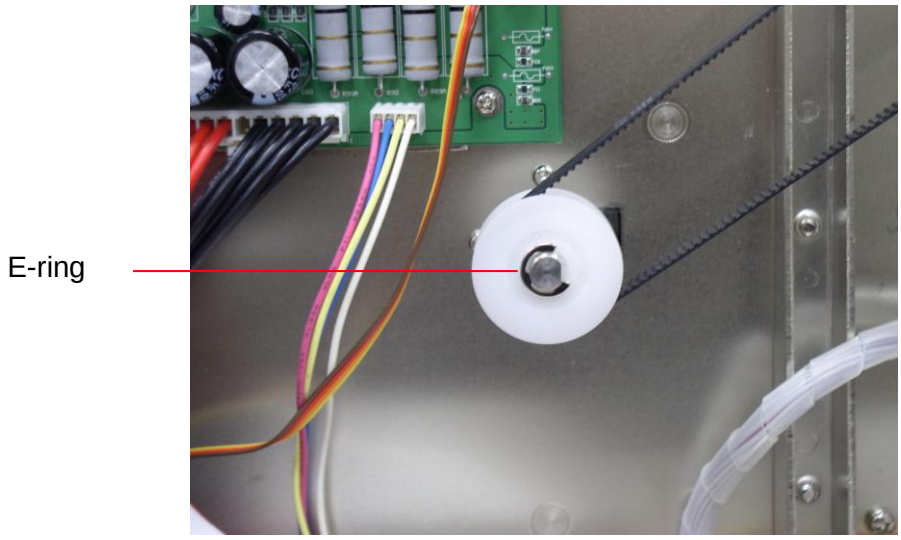
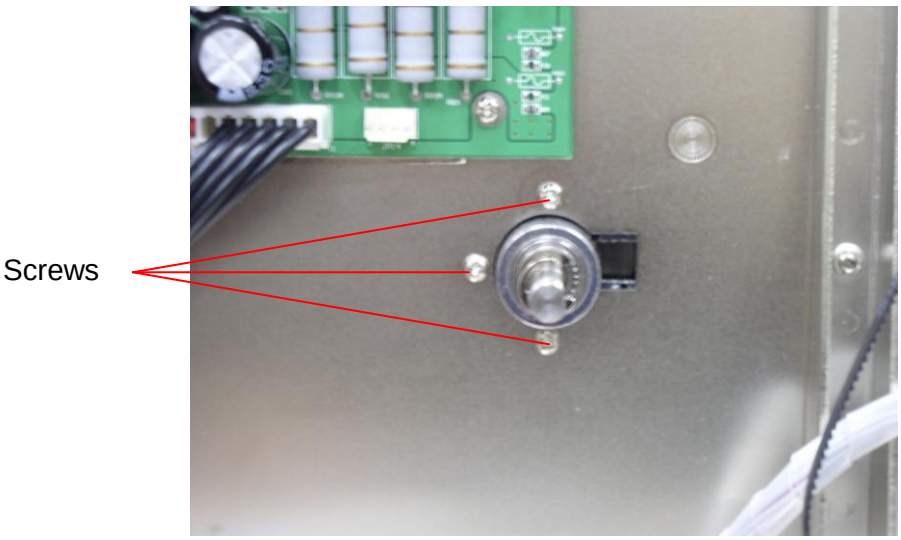
4.7 Replacing Label Rewind Spindle

1. Refer to 4.3 to remove the Power Supply Unit.
2. Remove the E-ring and the pulley of the Label Rewind Spindle.



3. Remove the three screws of the Label Rewind Spindle.



4. Remove the four screws of the fixing plate.

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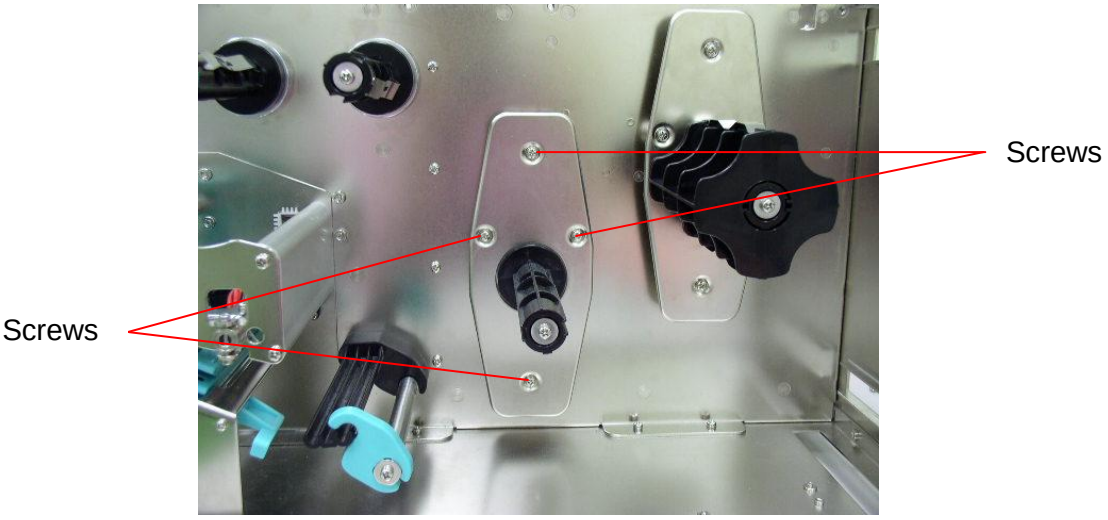
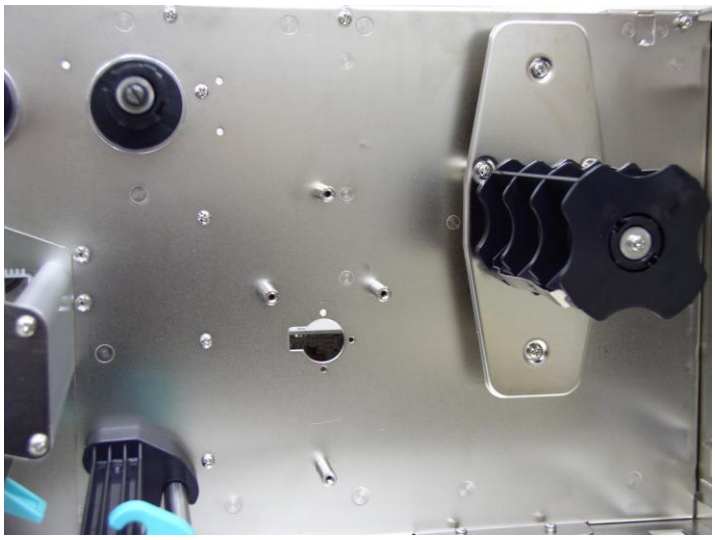


5. Replace the Label Rewind Spindle.



6. Reassemble in the reverse procedures after replacing.

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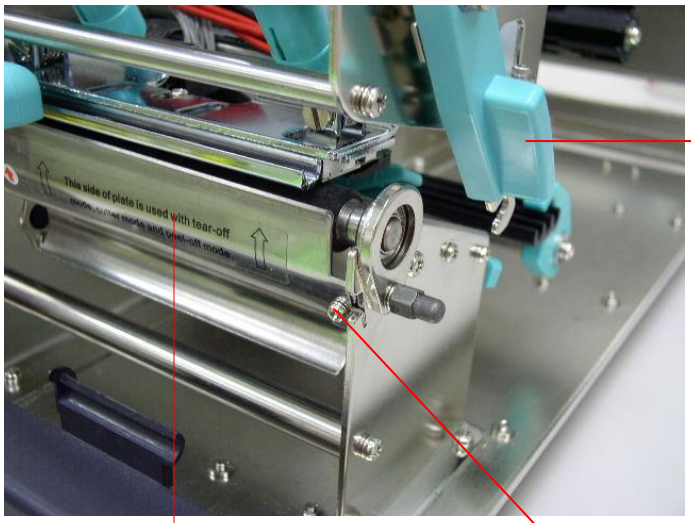
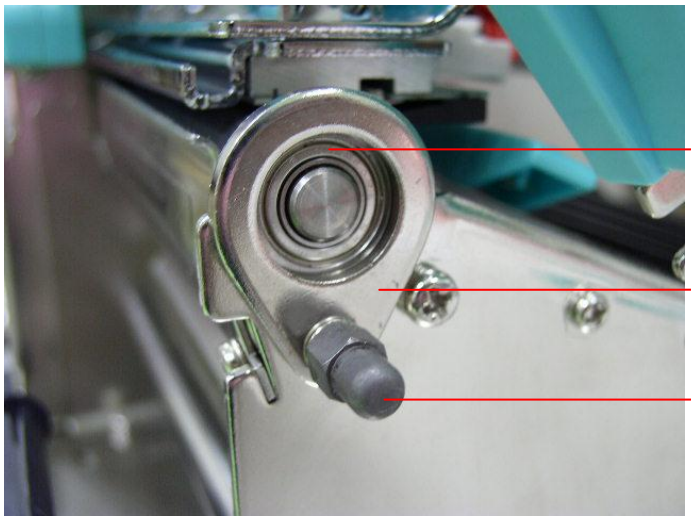
4.8 Replacing Platen

1. Refer to 4.1 to remove the Top Right and Left Side Covers.
2. Release the Print Head Lift Lever.
3. Remove the screw and the Stripper/Rewind Plate.



4. Remove the Tab Core, Support Plate and Right Shaft Bearing.



5. Remove the two screws on the Gear.

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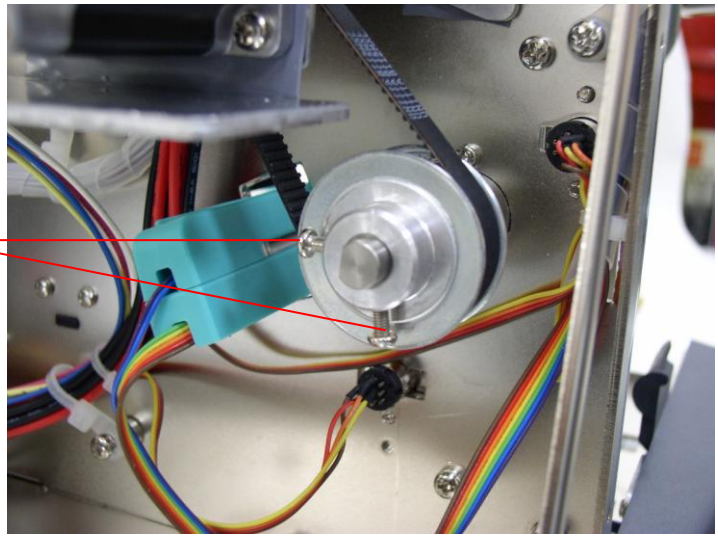
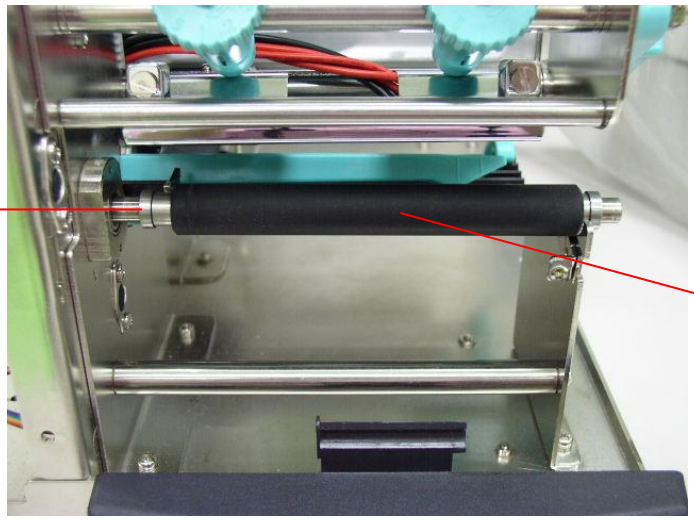


6. Remove the Platen and Left Shaft Bearing.



7. Reassemble in the reverse procedures after replacing.

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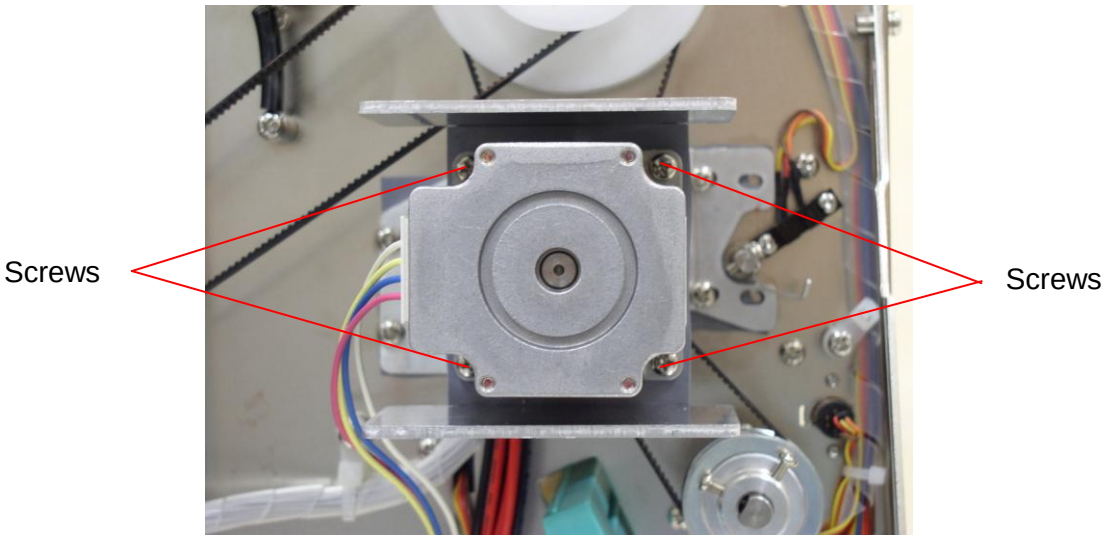
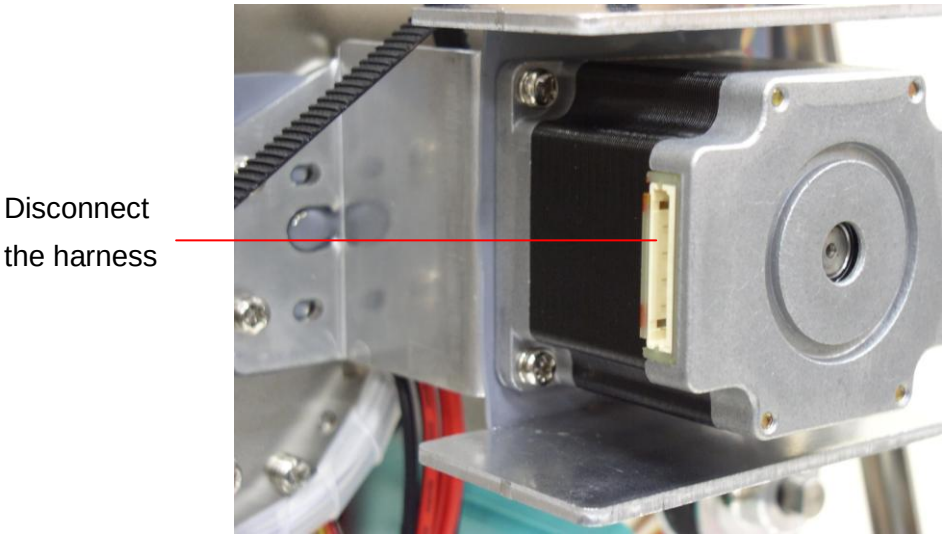
4.9 Replacing Motor

1. Loosen the four fixing screws on the Motor.



2. Disconnect the harness from the Motor



3. Replace the Motor.

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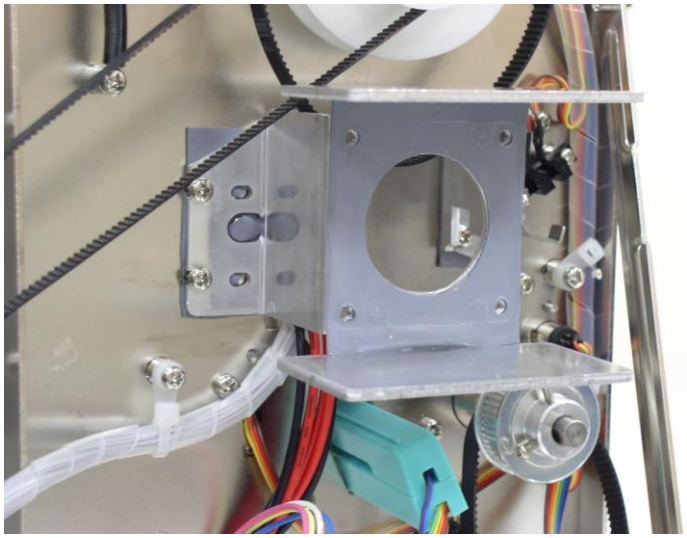

4. Reassemble in the reverse procedures after replacing.

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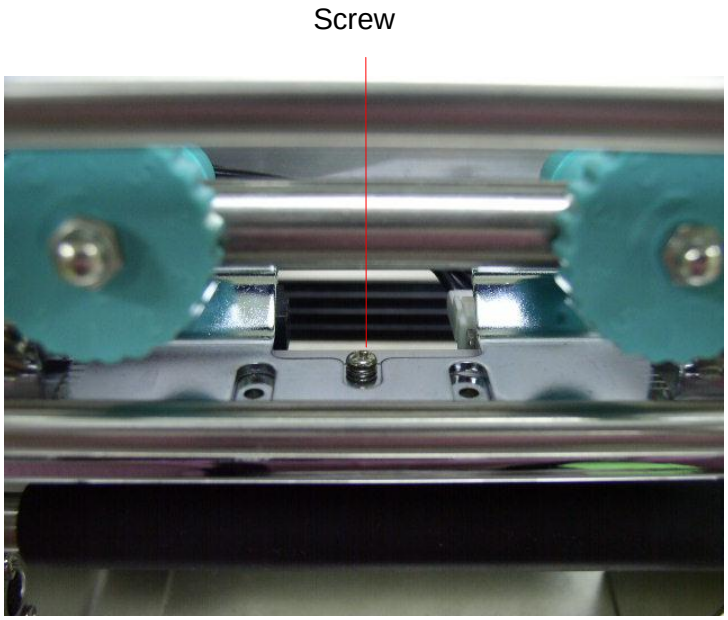
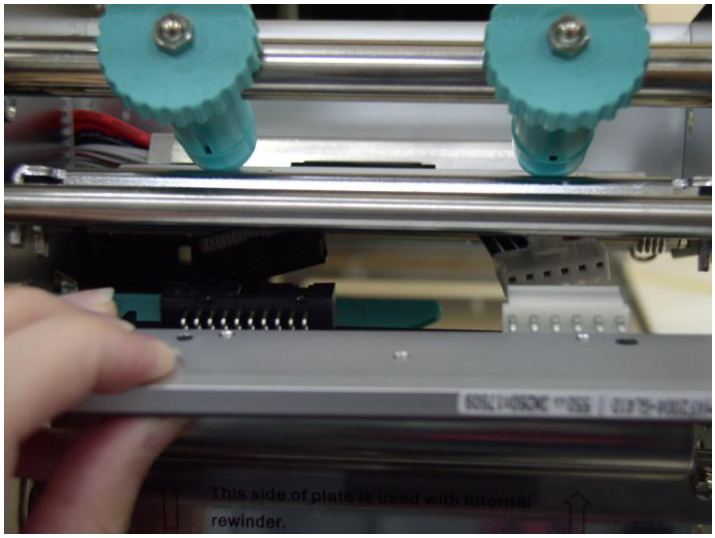
4.10 Replacing Print Head

1. Remove the screws on the Print Head.



2. Disconnect the two Printer Harnesses.



3. Replace the Print Head.
4. Reassemble in the reverse procedures after replacing.

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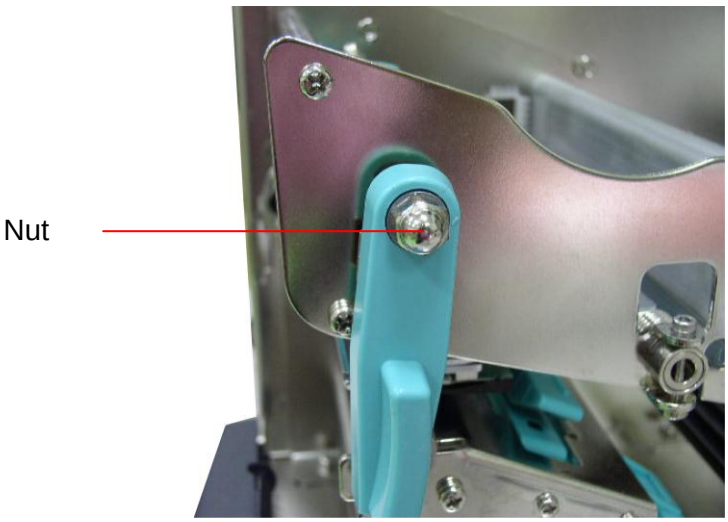
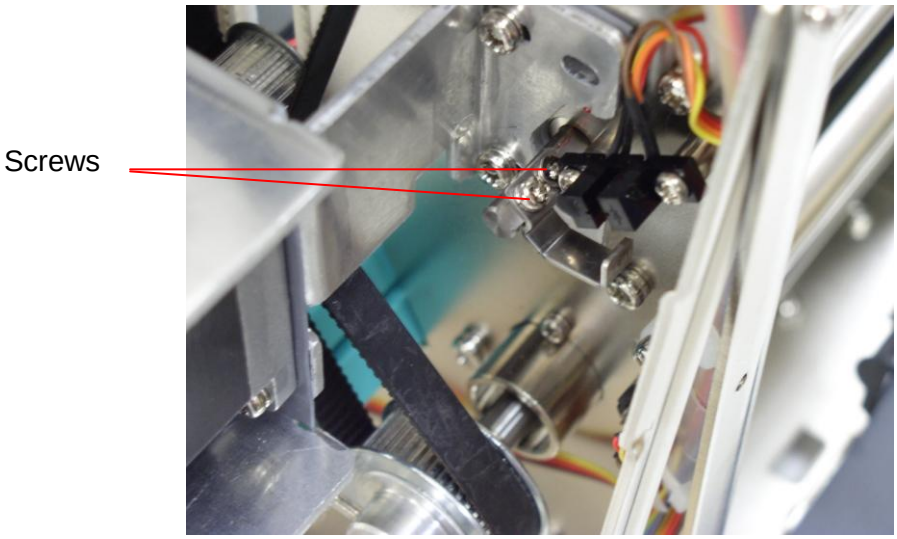
4.11 Replacing Print Head Pressure Adjustment Knob

1. Open the Right Side Cover and Right Side Plate.
2. Remove the Nut from the Print Head Lift Lever. Then remove the Print Head Lift Lever.



3. Remove the 2 screws these are on the TPH switch plate.



4. Remove the four screws these are on the Right Side Fixing Plate, Right Side Fixing Plate, and then, remove the Print Head Adjustment Knob assembly.

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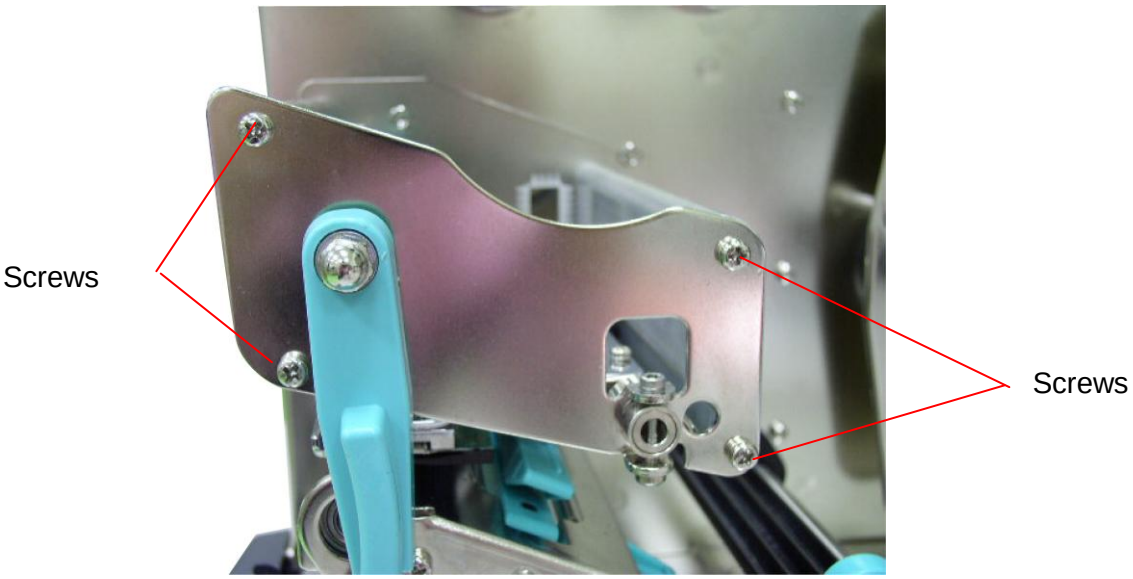
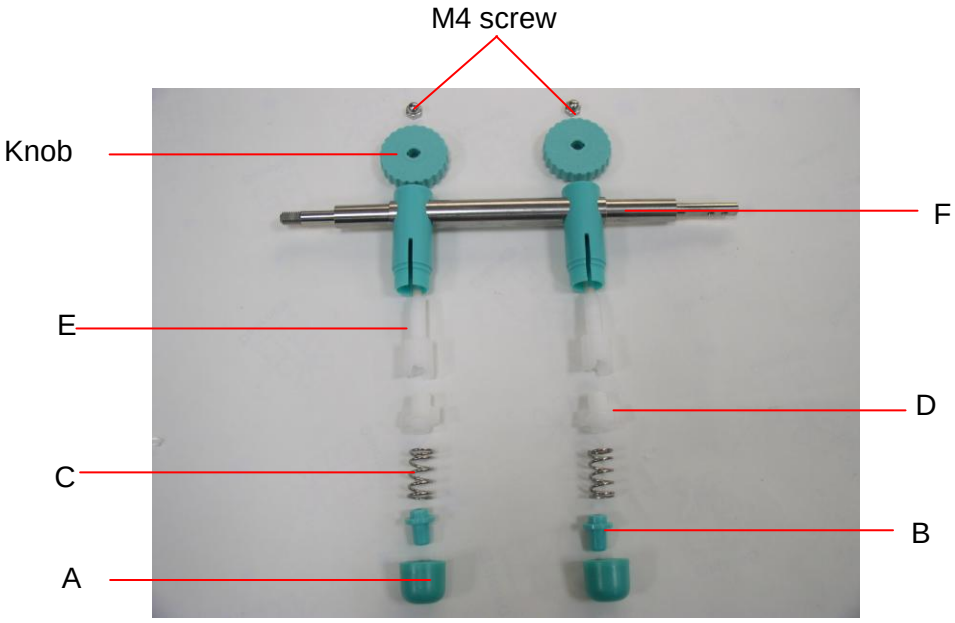


5. Remove A.B.C.D in order.
6. Loosen M4 screw, knob E and F.



7. Reassemble in the reverse procedures after replacing.

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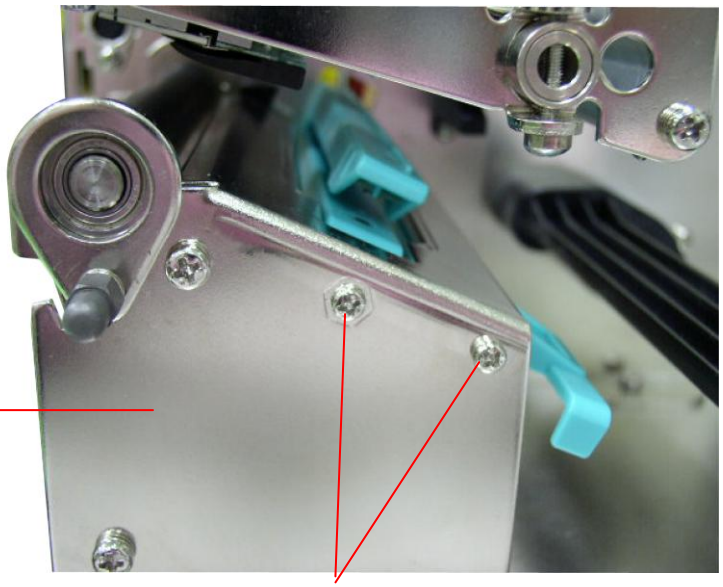
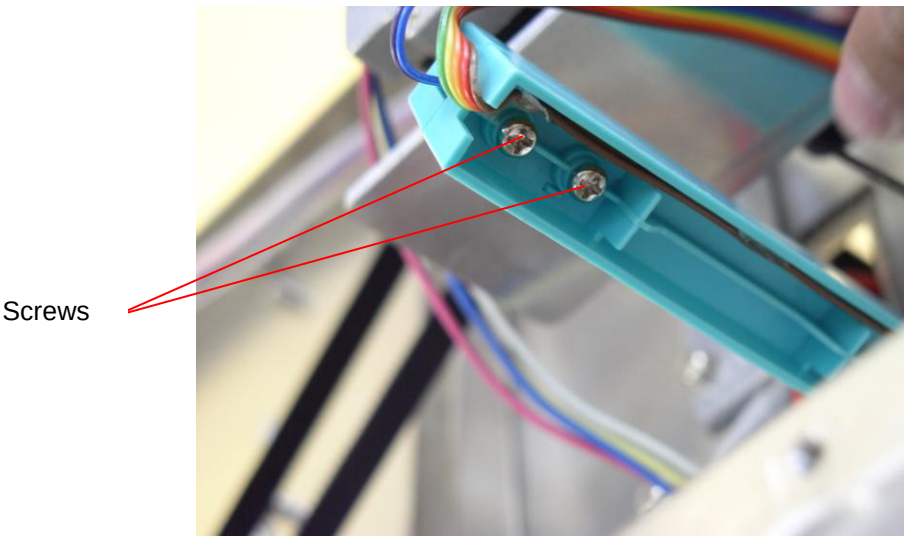
4.12 Replacing Gap/Black Mark Sensor

1. Disconnect the wires of Gap/Black Mark Sensor.
2. Refer to 4.8 to remove the Stripper/Rewind Plate.
3. Loosen two screws on Print Mechanism Lower Frame.



4. Loosen the two screws on the bottom of the Gap/Black Mark Sensor.



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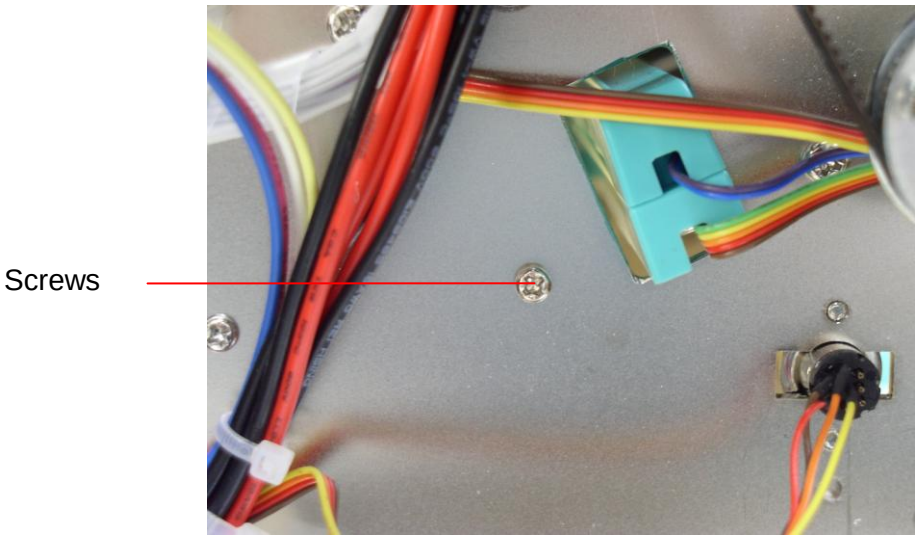
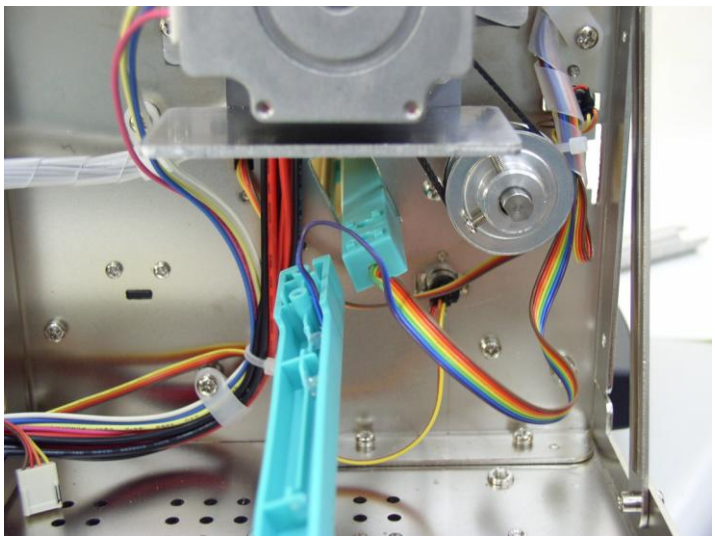
5. Remove the screw on the main frame. The Gap/Black Mark Sensor assembly is separated into upper part and lower part.





6. Push the upper part to the through the hole against to the Print Mechanism Lower Frame, place the upper part upside down, pull the lower part to the right side first, and then, pull out the upper part.

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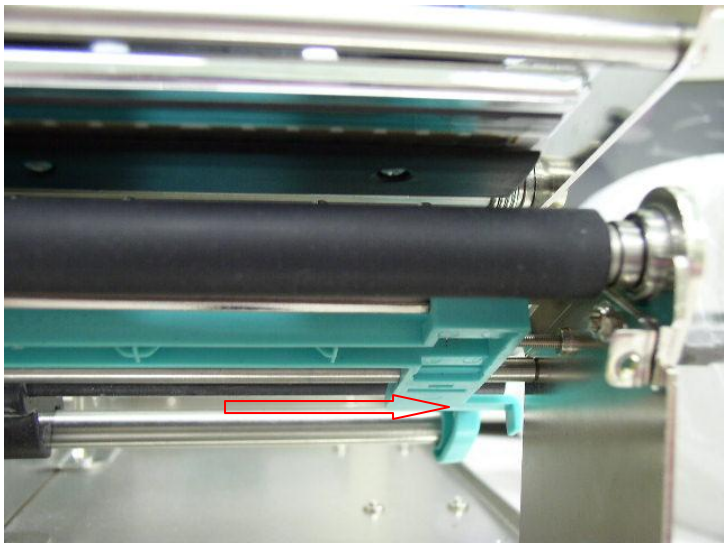

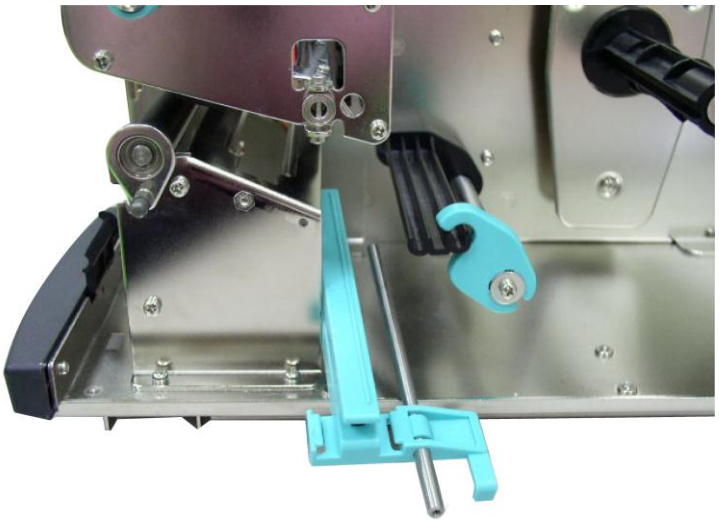

7. Reassemble in the reverse procedures after replacing.

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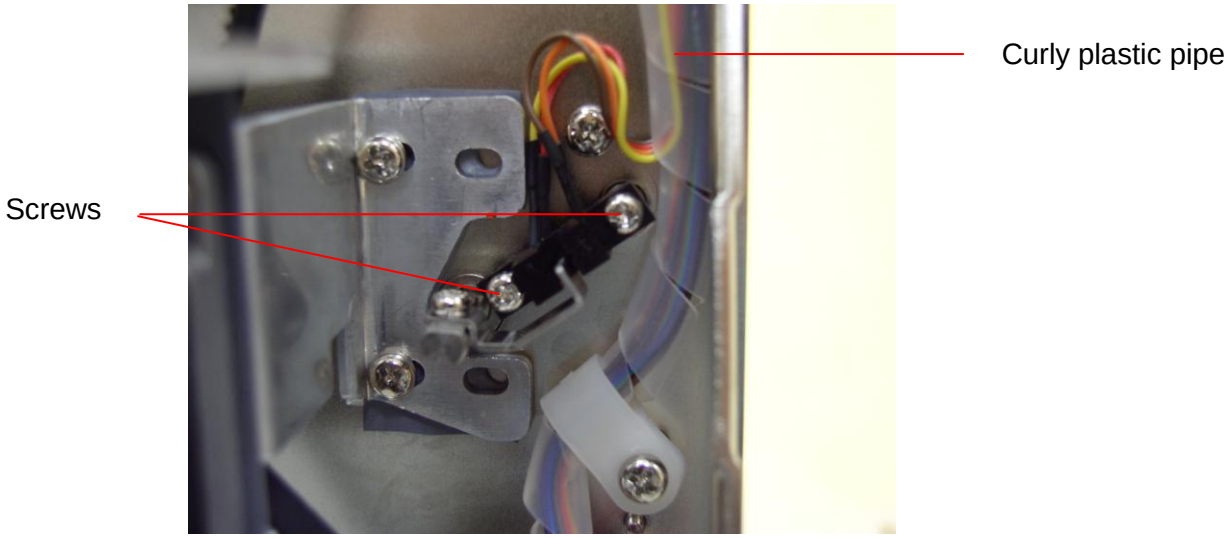
4.14 Replacing Print Head Lift Lever Sensor

1. Open the Top Left Side Cover.
2. Remove the Curly plastic pipe, and pull out the harness.
3. Disconnect all harness of Print Head Lift Lever Sensor. Remove the 2 screws of Print Head Lift Lever Sensor.



4. Remove Print Head Lift Lever Sensor.
5. Reassemble in the reverse procedures after replacing.

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5. TROUBLESHOOTING

5.1 Troubleshooting

The following guide lists the most common problems that may be encountered when operating this bar code printer. If the printer still does not function after all suggested solutions have been invoked, please contact the Customer Service Department of your purchased reseller or distributor for assistance.

Phenomenon	Cause of Errors	Recovery Procedure
No ribbon	1. Running out of ribbon 2. The ribbon is installed incorrectly. 3. The ribbon sensor is not been well calibrated.	1. Supply a new ribbon roll. 2. Please refer to the steps in user's manual to reinstall the ribbon. 3. Please calibrate the ribbon sensor
No paper	1. Running out of label 2. The label is installed incorrectly. 3. The moveable gap/black mark sensor is not placed in the proper location.	1. Supply a new label roll. 2. Please refer to the steps in user's manual to reinstall the label roll. 3. Please move the sensor to the proper location.
Poor printing quality	1. Dirt is accumulated on the print head. 2. The density setting is not set properly 3. Ribbon and media are incompatible. 4. The pressure of print head is not set properly	1. Please refer to the steps in user's manual to clear the print head. 2. Adjust the print density and speed. 3. Change proper ribbon or proper label roll. 4. Adjust the print head pressure adjustment knob.
Power indicator does not illuminate	1. The power cord is not properly connected. 2. The voltage setting of power supply in the rear of printer is set incorrectly.	1. Please check whether the power cord is well connected between printer and outlet. 2. Please set the voltage setting of power supply at the rear of printer to the proper voltage.
Paper jam	1. The label size is not set properly.	1. a. Reset the label size. b. Re-calibrate the

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	2. Labels may be stuck in side print mechanism.	gap/black mark sensor. 2. Remove the stuck label.
Carriage open	The printer carriage is open.	Please close the print carriage.
Memory full (FLASH / DRAM)	The space of FLASH/DRAM is full.	Delete unused files in the FLASH/DRAM.
No printout printing through serial port	1. The serial port setting is not consistent between host and printer. 2. The serial port cable pin configuration is not pin to pin assignment.	1. Please reset the serial port setting. 2. Please replace the cable with pin to pin assignment.
On-Line indicator is off, error indicator is on	1. Out of paper or out of ribbon. 2. The gap/black mark sensor or ribbon sensor are not calibrated. 3. The ribbon rewind spindle paper core is not been installed. 4. The diameter of rewind spindle paper core is less than 34 mm.	1. (1) Please check the feed path of label or ribbon. (2) Please supply a new label roll or ribbon roll. 2. (1) Calibrate gap/black mark sensor. (2) Calibrate ribbon sensor. 3. Install a paper core onto the ribbon rewind spindle. (The diameter of the paper core should be larger than 34 mm) 4. Please change the paper core which diameter is larger than 34 mm.

5.2 Calibrate Gap/Black Mark Sensor

1. **Gap/Black Mark Sensor Calibration**

   This utility is used to calibrate the sensitivity of the gap/black mark sensor. The gap/black mark sensor should be calibrated whenever **changing the label media** or **executing printer initialization**.

   Please follow the steps below to calibrate the gap sensor.

   a. Install the ribbon and label roll as the above-mentioned procedures, and engage the carriage release lever.
   b. Switch off printer power.
   c. Press PAUSE key and then switching on printer power. Release the PAUSE “GAP/BLINE sensor calibrating….” Message is shown on the LCD display. The printer will calibrate the gap/black mark sensor automatically.

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5.3 Self-test

To initiate the self-test mode, depress the MENU button. Press MENU button to scroll the cursor to Printer test. Press EXE button to enter the submenu and press MENU button to “Printer Config”. item. Press EXE button to print printer internal setting. In self-test, a check pattern is used to check the performance of the print head.
Following the check pattern, the printer prints internal settings as listed below:

1. Printer model and firmware version
2. Check sum
3. Serial port setting
4. Code page setting
5. Country code setting
6. Print speed setting
7. Print density setting
8. Label size setting
9. Gap (Bline) width and offset setting
10. Backing paper transparence
11. File list
12. Memory available

5.4 DRAM Clear

Switch off printer power. Press the PAUSE and FEED button simultaneously then switching on printer power. Release the button for more than 3 seconds. The printer will clear the memory and reset the printer.
Be sure to calibrate the gap register with blank label before printing.

5.5 Diagnosis Operation Procedure

When the power is turned on without any button pressed, self diagnosis is performed automatically to test the available memory. If any error occurs during this period, the ERR light will flash.
Do the self-test and inspect the test pattern to check if the Print head is available.

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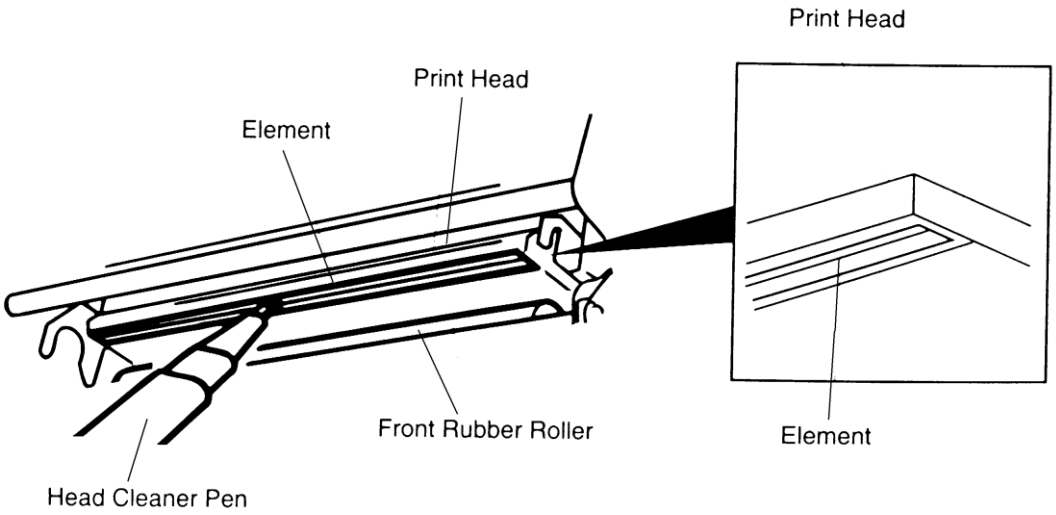
5.6 Cleaning Print Head

1. Switch off and unplug the power cord. Allow the printhead to cool for a minimum of one minute.
2. Open the printer cover.
3. Remove the screw by the side of the carriage release lever.
4. Open the printer carriage release lever.
5. Remove the media and ribbon (If loaded).
6. Clean the print head element with a head cleaner pen or use a cotton swab and 100% ethanol to clean the print head surface.
7. Do not close the print head until the alcohol volatilizing.
8. Close the printer cover.

Note:

*Do not touch printer head by hand. If you touch it careless, please use ethanol to clean it.

*It's industry alcohol. Please do not use regular alcohol, which may damage the printer head.



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UPDATE HISTORY

Date	Content	Editor
2007/1/17	1. Modify TPH part no. 2. Cancel guillotine cutter part no.	Camille
2007/1/24	1. Add cutter driver IC A3952SB (Non-RoHS) part no.	Camille
2007/1/25	1. Modify the cutter part no. 2. Modify the memory card part no. 3. Add the Internal print server (C) part no.	Camille
2007/3/9	1. Modify the External Ethernet print server (C) part no.	Camille
2007/4/14	1. Update TSC e-mail address 2. Update 6.6 section: cleaning print head	Camille
2007/8/1	1. Company information update	Camille
2008/1/23	1. Revoke part number for 98-0160053-00LF Internal print server (Z), 98-1000017-00LF External Ethernet print server (Z)/US and 98-1000018-00LF External Ethernet print server (Z)/EU 2. Modify description for 98-0220078-00LF Internal print server (C), 98-1000008-00LF External Ethernet print server (C)/US and 98-1000009-00LF External Ethernet print server (C)/EU	Camille
2008/7/11	Remove the parts list section	Camille
2011/1/25	Modify TSC address	Camille

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TSC Auto ID Technology Co., Ltd.

Corporate Headquarters
9F., No.95, Minquan Rd., Xindian Dist.,
New Taipei City 23141, Taiwan (R.O.C.)
TEL: +886-2-2218-6789
FAX: +886-2-2218-5678
Web site: www.tscprinters.com
E-mail: printer_sales@tscprinters.com
tech_support@tscprinters.com

Li Ze Plant
No.35, Sec. 2, Ligong 1st Rd., Wujie Township,
Yilan County 26841, Taiwan (R.O.C.)
TEL: +886-3-990-6677
FAX: +886-3-990-5577

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