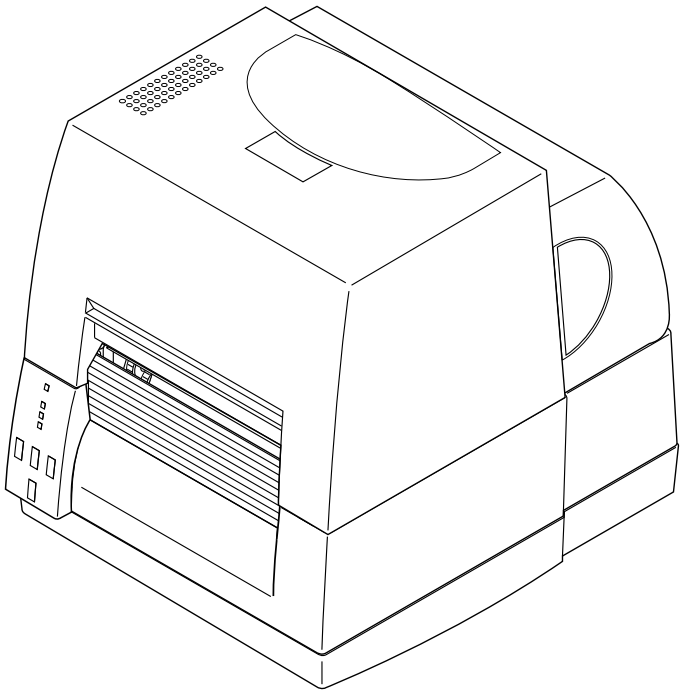
CITIZEN
Micro HumanTech

Technical Manual
CL-S621, CL-S621C & CL-S631

Thermal Transfer Barcode & Label Printer



CITIZEN SYSTEMS JAPAN CO., LTD.

JM74991-00F
1.00E-1011

Safety Precautions

To prevent personal injury or property damage, the following shall be strictly observed.
The degree of possible injury and damage due to incorrect use/maintenance or improperly following instructions is described below.

⚠ Warning	Indicates a situation which, if not observed and handled properly, could result in death or serious injury.
⚠ Caution	Indicates a situation which, if not observed and handled properly, could result in injury or property damage.

⚠ : This is a mark to call attention to the reader.

⚠ Warning

- **Before starting disassembly/reassembly or mechanical adjustment, be sure to disconnect the power cord from the power source.**
- **Do not replace a fuse with the power switch turned on.**
- **When replacing a fuse, use the same rating and type since it is provided to prevent fire and damage to the "Unit, Power Supply".**

⚠ Caution

- **Do not disassemble/reassemble or adjust the machine, if it functions properly. Particularly, do not loosen screws on any component, unless necessary.**
- **After completing an inspection and before turning on the power, be sure to check that there is no abnormality.**
- **Never try to print without media.**
- **Check that the media is properly set.**
- **Do not lay anything on the cover or lean against it during maintenance or while the printer is in operation.**
- **During maintenance, be careful not to leave parts or screws unattached or loose inside the printer.**
- **When handling a printed circuit board, do not use gloves, etc., which can easily cause static electricity. Since ICs, such as CPU, RAM and ROM, might be destroyed by static electricity, do not touch lead wires or windows unnecessarily.**
- **Do not put the printed circuit boards directly on the printer or on the floor.**
- **When disassembling or reassembling, check wires for any damage and do not pinch or damage them. Also, run wires as they were.**

CHAPTER 1
SPECIFICATIONS

CHAPTER 1 SPECIFICATIONS

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1-1. General Specifications

Printing		
Printing method	Thermal transfer/Direct thermal	
Resolution	Main scanning line density: 203 dots/inch (8 dots/mm) (CL-S621/S621C) 300 dots/inch (11.8 dots/mm) (CL-S631)	
	Sub-scanning line density: 203 dots/inch (8 dots/mm) (CL-S621/S621C) 300 dots/inch (11.8 dots/mm) (CL-S631)	
	Head 864 dots (effective dots: 832 dots) (CL-S621/S621C) Head 1275 dots (effective dots: 1240 dots) (CL-S631)	
Max. print width	104 mm (CL-S621/S621C) 105 mm (CL-S631)	4.1 inch
Max. print length	812.8 mm	32 inch
Print density	Print density is adjustable with software	
Printing speed setting	[For CL-S621/S621C] 6, 5, 4, 3 or 2 inches per second (Direct thermal) 4, 3 or 2 inches per second (Thermal transfer) • 4, 3 or 2 inches per second when the optional peeler is used. [For CL-S631] 4, 3 or 2 inches per second	
Print mode		
Batch mode	Normal printing (single or multiple sheets)	
Tear off mode	Feeds back media to the tear-off position after printing is completed.	
Cut mode *1	Prints while cutting at designated sheet units. The following two kinds of cut mode operations are available. • Back feed • Cut through (Cut through refers to stopping present printing to cut the previous label when it reaches the cut position. After cutting, printing restarts but a gap may be created at the seam of the printing at this time.)	
Peel mode*1	Peels labels from the liners after printing them.	
Media		
Types of media	Roll, fanfold (continuous media, die-cuts, continuous tags, paper or tickets)	
Recommended media	Thermal transfer: label media (RPR-W Ricoh) Direct thermal media: label media (150LA-1 Ricoh), tag media (TB2E0V, Mitsubishi Paper)	
Max. media width	118.0 mm	4.65"
Min. media width	19.5 mm	0.77"
Min. label width	19.5 mm	0.77"

*1: Options can be separately purchased.

Media (continued)		
Min. label pitch*2	6.35 mm	0.25"
Max. media thickness	0.254 mm	0.01"
Max. media length	812.8 mm	32"
Min. media length	6.35 mm	0.25"
Min. media thickness	0.0635 mm	0.0025"
On-board roll media diameter	Max. external diameter: 127mm	5"
	Media core: 25.4 to 76mm	1 to 3"
Ribbon		
Recommended ribbon	B110A Ricoh	
Max. ribbon width	114.0 mm	4.50"
Min. ribbon width	25.4 mm	1.00"
Max. ribbon length	360.0 m	1,181 ft
Max. roll diameter	74.0 mm	2.90"
Inner diameter of the paper tube	25.4 ± 0.25 mm	1.00 ± 0.01"
Ribbon end detection	Ribbon out detection by a tension sensor	
Bar code		
For Datamax® emulation*3		
One-dimension	• Code 3 of 9 • UPC-A • UPC-E • EAN-13 (JAN-13) • EAN-8 (JAN-8) • Interleaved 2 of 5 • Code 128 • HIBC (Modulus 43-used code 3 of 9) • Codabar (NW-7) • Int 2 of 5 (Modulus 10-used Interleaved 2 of 5) • Plessey • Case Code • UPC 2DIG ADD • UPC 5DIG ADD • Code 93 • Telepen • ZIP • UCC/EAN 128 • UCC/EAN128 (for K-MART) • UCC/EAN128 Random Weight • FIM	
Two-dimension	• UPS Maxi Code • PDF-417 • Data Matrix • QR Code • Aztec • RSS	
For Zebra® emulation*4		
One-dimension	• Code 11 • Interleaved 2 of 5 • Code 39 • EAN-8 • UPC-E • Code 93 • Code 128 • EAN-13 • Industrial 2 of 5 • Standard 2 of 5 • ANSI CODABAR • LOGMARS • MSI • Plessey • UPC/EAN Extensions • UPC-A • POSTNET • Planet	
Two-dimension	• Code 49 • PDF-417 • CODA BLOCK • UPS Maxi Code • Micro PDF-417 • Data Matrix • QR Code • RSS • TLC39	

*2: When a media pitch of less than 1" is used, set the "Small Media Adjustment" setting in the "Page Setup" menu to "ON".

*3: Datamax® is a registered trademark of Datamax Bar Code Products Corporation.

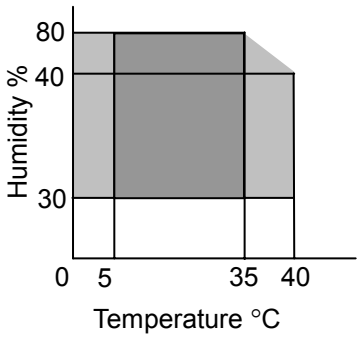
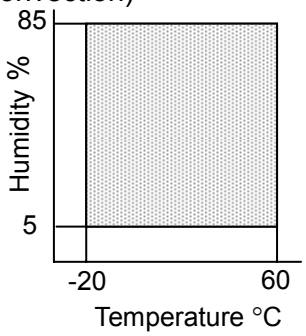
*4: Zebra® is a registered trade mark of Zebra Technologies Corporation.

Font		
	For Datamax® emulation*3	
		1. Seven kinds of fixed pitch font Overseas, English fonts and European fonts 2. OCR fonts OCR-A*5, OCR-B*5 3. Proportional fonts CG Triumvirate smooth font CG Triumvirate Bold smooth font (6, 8, 10, 12, 14, 18, 24, 30, 36, 48 points: CL-S621/S621C) (4, 5, 6, 8, 10, 12, 14, 18, 24, 30, 36, 48 points: CL-S631) • Character set: Conforms with code page 850 standards 4. TrueType™ rasterizer *6 5. Chinese fonts (For CL-S621C) GB18030-2000, 15x16 dots, 24x24 dots
	For Zebra® emulation*4	
		1. Five kinds of fixed pitch font Overseas, English fonts and European fonts 2. OCR fonts OCR-A*5, OCR-B*5 3. Proportional font CG Triumvirate Condensed Bold 4. True type™ rasterizer*6
Symbol set		
		PC866U Ukraina, PC Cyrillic, ISO 60 Danish/Norwegian, DeskTop, ISO 8859/1 Latin 1, ISO 8859/2 Latin 2, ISO 8859/9 Latin 5, ISO 8859/10 Latin 6, ISO 8859/7 Latin/Greek, ISO 8859/15 Latin 9, ISO 8859/5 Latin/Cyrillic, ISO 69: French, ISO 21: German, ISO 15: Italian, Legal, Math-8, Macintosh, Math, PC-858 Multilingual, Microsoft Publishing, PC-8, Code Page 437, PC-8 D/N, Code Page 437N, PC-852 Latin 2, PC-851 Latin/Greek, PC-862 Latin/Hebrew, Pi Font, PC-850 Multilingual, PC-864 Latin/Arabic, PC-8 TK, Code Page 437T, PC-1004, PC-775 Baltic, Non-UGL, Generic Pi Font, Roman-8, Roman-9, ISO 17: Spanish, ISO 11: Swedish, Symbol, PS Text, ISO 4: United Kingdom, ISO 6: ASCII, Ventura International, Ventura Math, Ventura US, Windows 3.1 Latin 1, Wingdings, Windows 3.1 Latin 2, Windows 3.1 Baltic (Latv, Lith), Windows 3.0 Latin 1, Windows Latin/Cyrillic, Windows 3.1 Latin 5

*5: The OCR font may have a low recognition rate according to the reader.

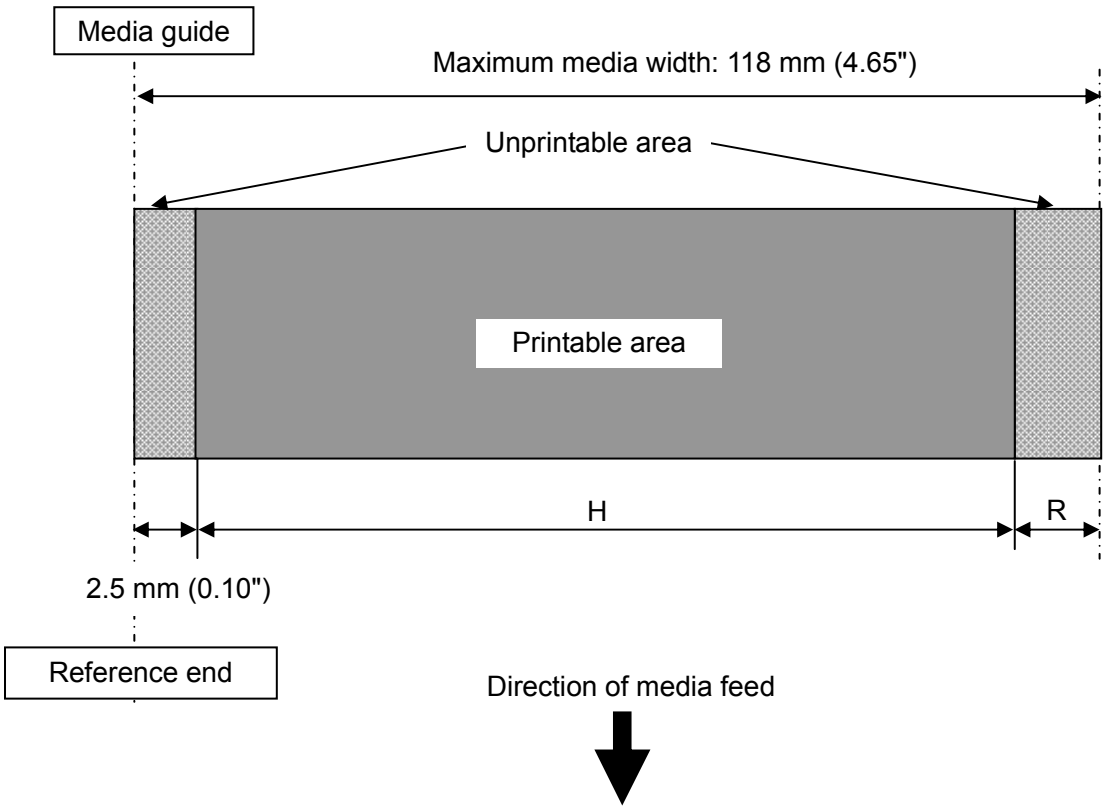
*6: It is equipped with UFST™ and TrueType™ rasterizer that are licensed from Agfa Corporation.
TrueType™ is a trademark of Apple Computer.
UFST™ is a trademark of Agfa Corporation.

Control language	
	Conforms to Datamax® programming language*3 and Zebra® programming language*4
Outline of electronic devices	
CPU	32-bit RISC CPU
ROM	Standard equipment: FLASH ROM 4MByte (User area: 1MByte) For CL-S621C and CL-S621 (Korea version): FLASH ROM 12MByte (User area: 4MByte)
RAM	[For Datamax® emulation] Standard equipment: SDRAM 16MByte (User area: 1MByte) For CL-S621C and CL-S621 (Korea version): SDRAM 16MByte (User area: 4MByte) [For Zebra® emulation] Standard equipment: SDRAM 16MByte (User area: 4MByte)
Media detection sensors	
Transparent sensor	Detects media gap between labels, notches on tags, and media out
Reflective sensor	Detects reflective mark on back of media and media out
Label peeling sensor *1	
Communication interfaces	
Serial	2400 4800 9600 19200 38400 57600 115200 bps
USB	FULL Speed USB1.1
Communication interface options	
Parallel	IEEE1284 (Compatible, Nibble, ECP mode)
Network	Ethernet interface
Indications and switches	
LED	POWER, PRINT, CONDITION, ERROR
Buzzer	Alarms, errors, etc.
Operating panel keys	PAUSE, FEED, STOP, MODE/REPEAT
Head-up detection sensor	Detects head open.
Power switch	Turns power on and off.
Power supply	
120V version	120V (-10%+6%), 2.5A, 60Hz (U.S.A., Canada)
	UL60950-1, CSA No. 950, FCC Part 15 Subpart B (Class A)
220V version	220V-240V (-10%+6%), 1.2A, 50/60Hz (Europe)
	EN60950-1, EN55022 (Class A), EN55024, EN61000-3-2, EN61000-3-3
Power consumption (max. value)	
120V version	64W (operating at 12.5% printing duty), 10W (standby) (CL-S621) 66W (operating at 12.5% printing duty), 10W (standby) (CL-S631)
220V version	64W (operating at 12.5% printing duty), 10W (standby) (CL-S621/S621C) 67W (operating at 12.5% printing duty), 10W (standby) (CL-S631)

Others	
Environment	Operating temperature conditions: Operating temp. 0 to 40°C, humidity 30 to 80%, condensation free (Conditions: ventilation, and natural convection) Storage temperature conditions Temp. -20 to 60°C, humidity 5 to 85% (Conditions: ventilation, and natural convection)  [Operating and printing assurance condition]  [Storage assurance condition]
External dimensions	Approx. 231 (W) X 289 (D) X 263 (H) mm 9.1 (W) X 11.4 (D) X 10.3 (H)"
Weight	Approx. 4.9 kg (10.8 lb.)
Accessories	Test label media, Test ribbon, CD-ROM (User's Manual), Quick start guide, Head cleaner, Power cord, Media holder bar and Media holder guide, Ribbon holder, Paper core
Option	Auto-cutter unit, Peeler unit, Parallel I/F board, Ethernet I/F board

1-2. Printable Area

The printable area of the printer is as follows:
When media is set to the printer, it must be aligned with the media guide at the left of the printing mechanism. Though the available maximum media width is 118 mm (4.65"), there are unprintable areas on both sides: 2.5 mm (0.10") width is on the left side and 11.5 mm (0.45") (for CL-S621/S621C)/ 10.5 mm (0.41”) (for CL-S631) width on the right side.
The left side unprintable area applies for any size media.

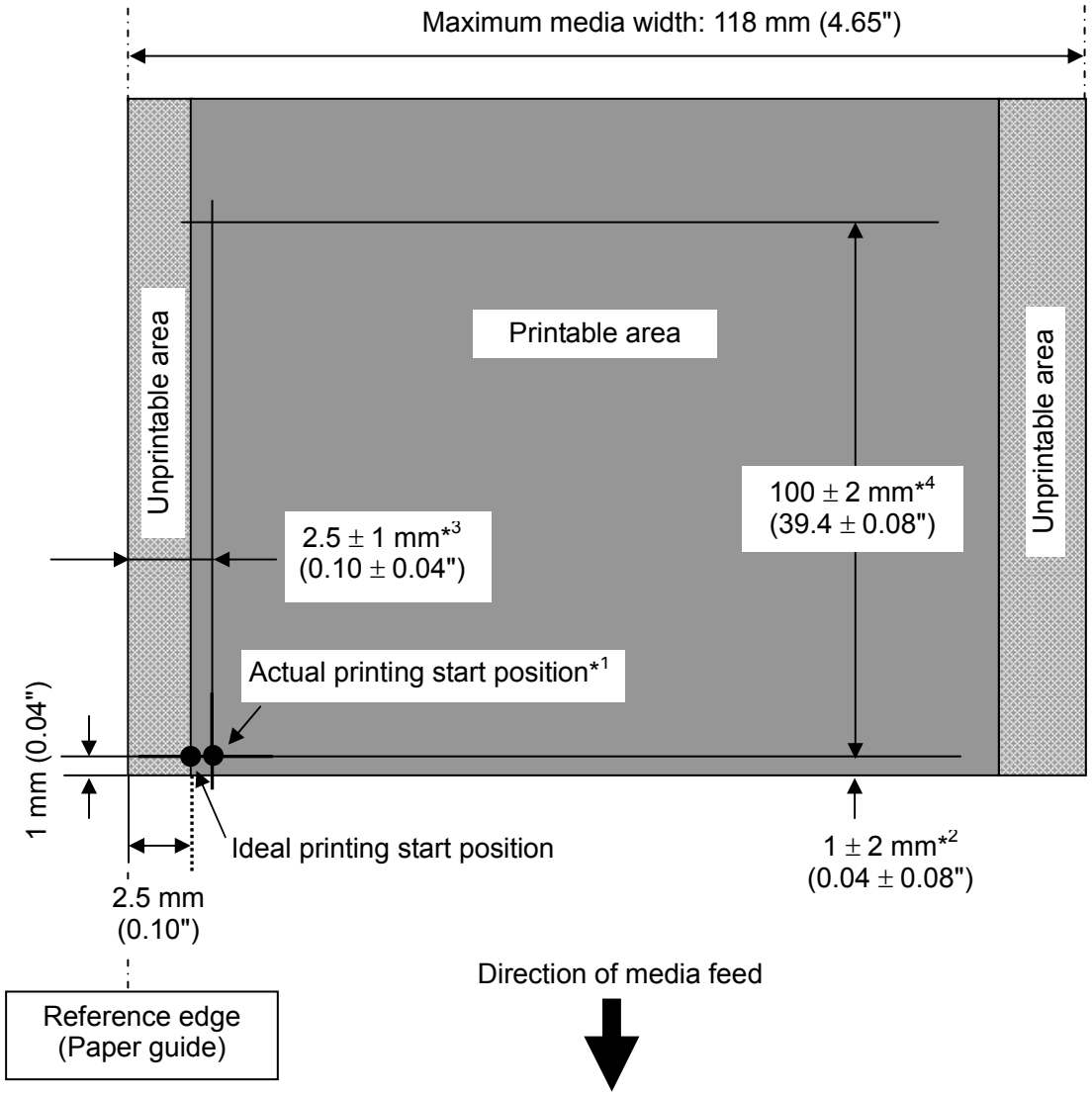


MODEL	H	R
CL-S621/S621C	104.0 mm (4.09”)	11.5 mm (0.45”)
CL-S631	105.0 mm (4.13”)	10.5 mm (0.41”)

1-3. Printing Position Accuracy

By default, the printing start position is 2.5 mm (0.10") from the left end of the media and 1 mm (0.04") backward the leading edge of the label, U-shaped notch, or black mark.
2.5 mm (0.10") is the necessary value to avoid printing in the unprintable area as mentioned in 1-2 "Printable Area".

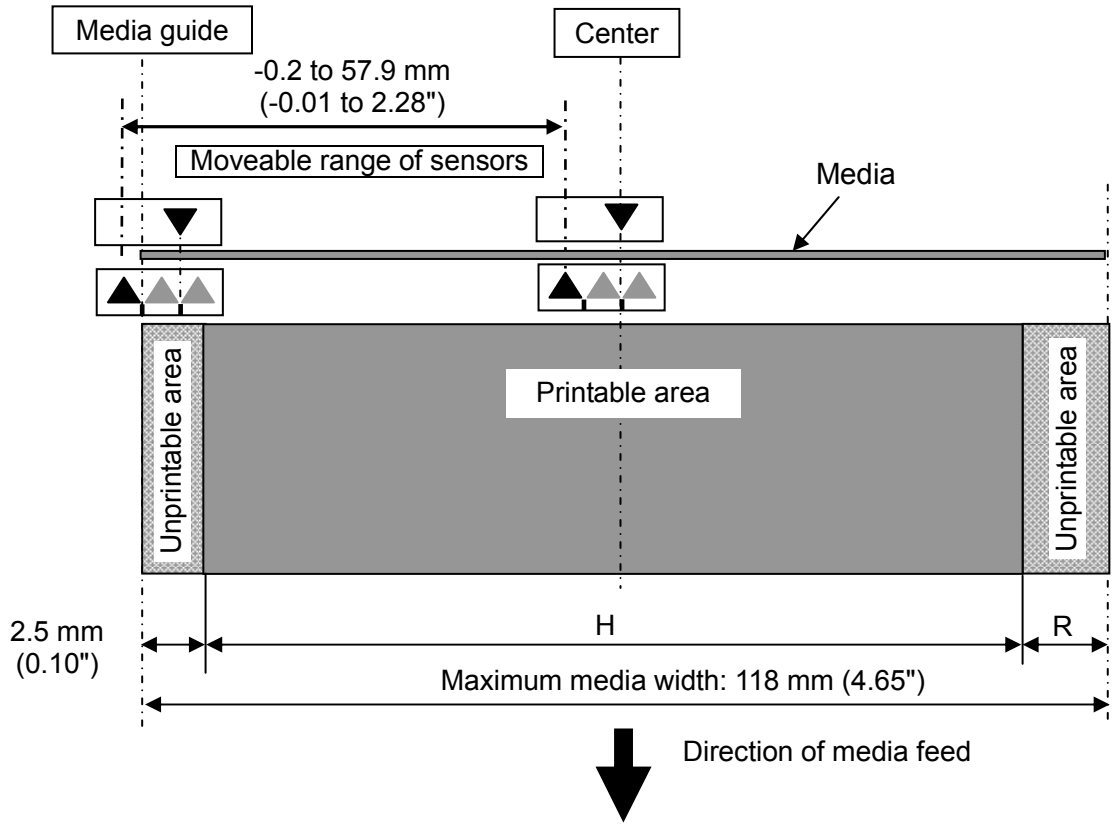
The printing start position will deviate from the ideal position as follows:



*1: Actual printing start position. May deviates from the ideal one in the indicated range.
*2: Deviation of vertical positioning when printing position is set to 0.
*3: Deviation of horizontal positioning when printing position is set to 0.
*4: Deviation of vertical printing position when 100 mm is specified from the printing start position.

1-4. Adjustable Sensors

There are two media sensors; the upper sensor (transparent sensor) and the bottom sensor (reflective sensor). The upper sensor is used to detect the labels on the liner or the U-shaped notches of tag. The bottom sensor is used to detect the black marks on tag. Also, both sensors are used to detect media end.
The mechanical adjustable range of both sensors is equal and they are adjustable independently. When both sensors are moved to the left end or the right end (center of the printing mechanism), both sensors coincide for detecting notch or label.
For details about the media sensors, refer to “2-1-3 Label/Tag Detection Mechanism".



MODEL	H	R
CL-S621/S621C	104.0 mm (4.09”)	11.5 mm (0.45”)
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CHAPTER 2
OPERATING PRINCIPLES

CHAPTER 2 OPERATING PRINCIPLES

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2-1. Operation of Each Mechanism

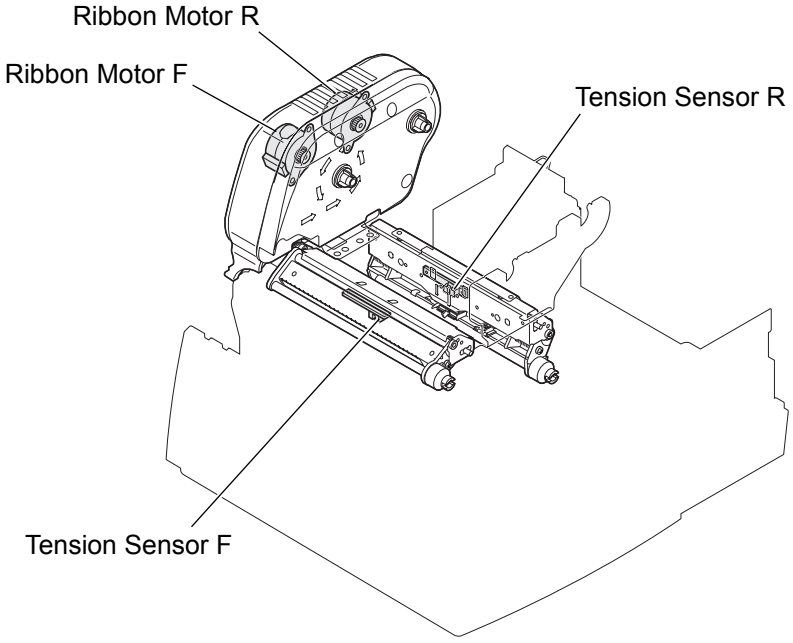
This printer is a thermal transfer barcode & printer comprised of the following mechanisms: media feed, ribbon feed, label/tag detection, print head up/down detection, head balance adjustment and media thickness adjustment.
This section describes the operation of each of these mechanisms.

2-1-1. Locations and Functions of Motors, Sensors and Thermal Head

This printer has the following motors, sensors and thermal head.

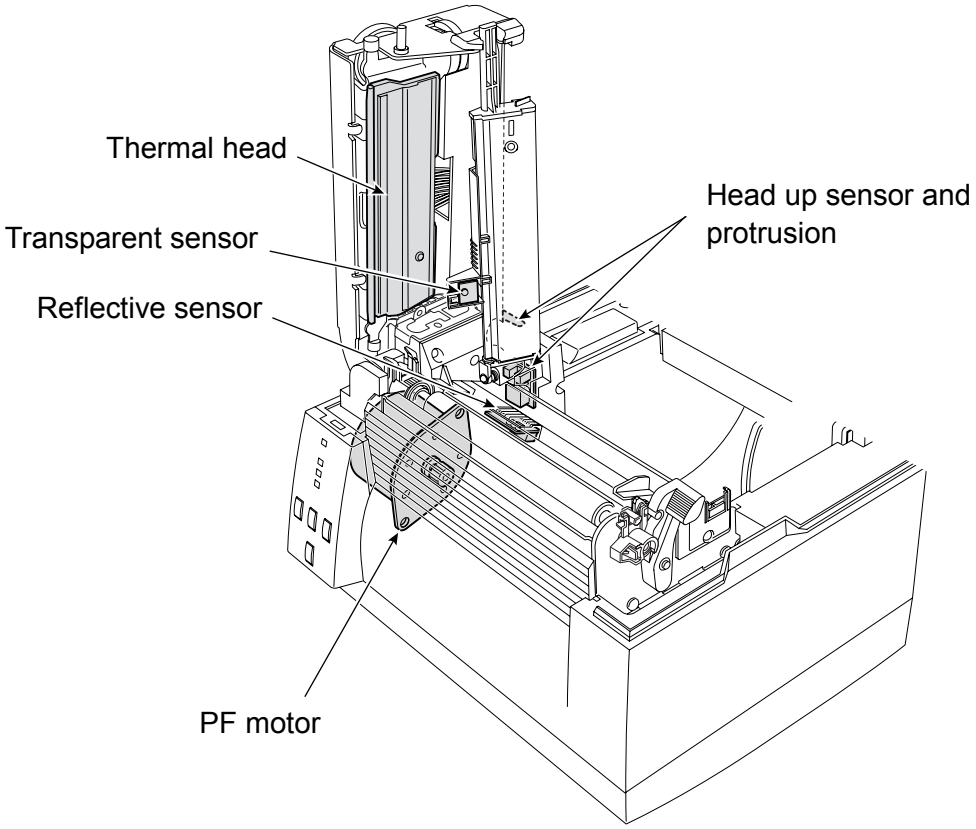
(1) "Unit, Ribbon" section

Part name	Description
Ribbon Motor F (Front side)	This motor takes up ribbon. A thermistor is attached to the side surface of this motor to detect the motor temperature.
Ribbon Motor R (Rear side)	This motor gives back tension to ribbon.
Tension Sensor F (Front side)	This sensor is a photointerrupter which detects if appropriate tension is given to the take-up side ribbon or not. It also detects a ribbon-running error.
Tension Sensor R (Rear side)	This sensor is a photointerrupter which detects if appropriate tension is given to the supply side ribbon or not. It also detects the ribbon end status.



(2) Printing section

Part name	Description
PF Motor	This motor feeds media. A thermistor is attached to the side surface of this motor to detect the motor temperature.
Head Up Sensor	This sensor is a photointerrupter to detect the print head position; up or down.
Transparent Sensor (Upper sensor)	This sensor is a photo sensor to detect the labels stuck on liner or U-shaped notches on tag. It also detects the media end.
Reflective Sensor (Bottom sensor)	This sensor is a photo sensor to detect the black marks on tag. It also detects the media end.
Thermal Head	It consists of a head driver and thermal elements. Thermal elements are heated to make printing on media. The thermal head incorporates a thermistor to detect the thermal head temperature.

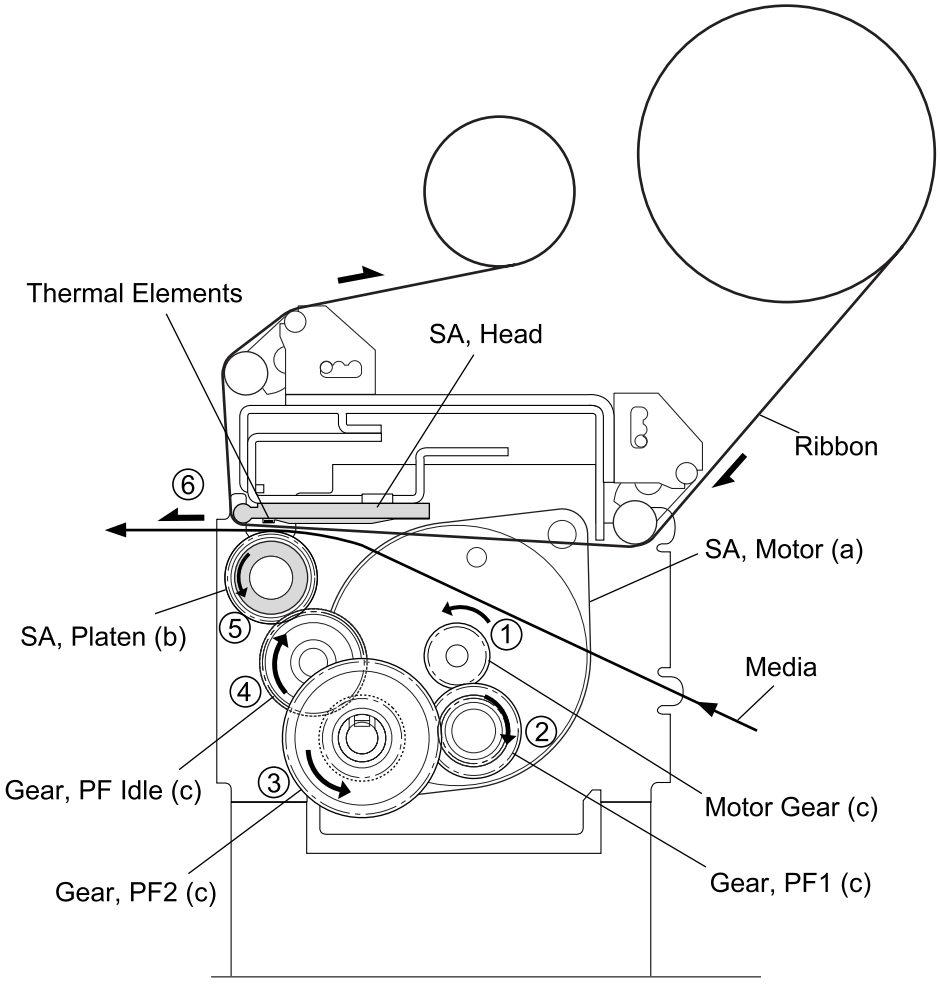


2-1-2. Media Feed Mechanism

The major components of the media feed mechanism are:
(a) SA, Motor
(b) SA, Platen
(c) Gear train

By setting the head block to the down position, media is pushed against the “SA, Platen” by the “SA, Head”.
As the “SA, Motor” (stepping motor) turns counterclockwise viewing from the right side of the printer, the “SA, Platen” turns counterclockwise via the gear train (“Gear PF1”, “Gear PF2” and “Gear, PF Idle”) and media is fed forward by the friction force produced between the “SA, Platen” and the “SA, Head”.

When the “SA, Motor” turns clockwise, media is fed backwards.
One step of the “SA, Motor” feeds media by 1/16 mm (0.0025").



[Right side view]

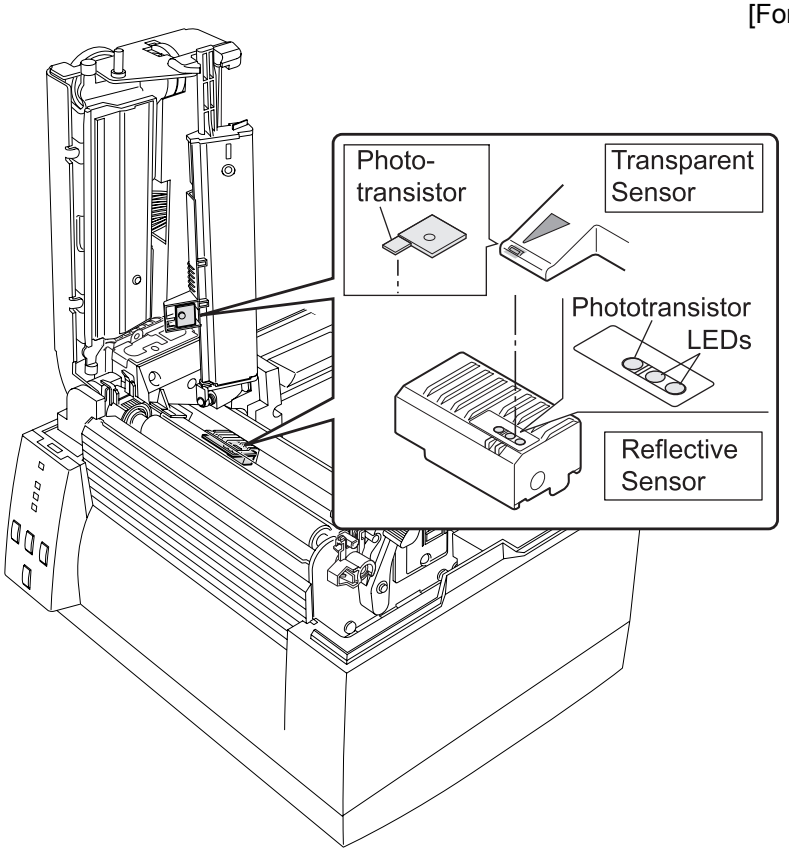
2-1-3. Label/Tag Detection Mechanism

The major components of the label/tag detection mechanism are:
(a) Movable reflective sensor (Bottom sensor)
(b) Movable transparent sensor (Upper sensor)

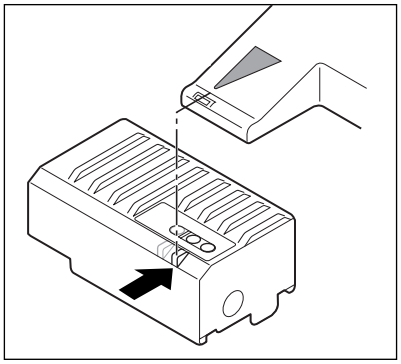
There are two movable sensors, the reflective sensor (bottom sensor) and the transparent sensor (upper sensor). As shown in the figure blow, the reflective sensor has two LEDs and one phototransistor. The reflective sensor is used to detect black marks at the back of tag. On the other hand, the transparent sensor is a phototransistor that will receive the transparent light from the LEDs through the media. The transparent sensor is used to detect labels on liner or U-shaped notches of tag. Both reflective and transparent sensors are used to detect the media end.

Aligning the sensors for label paper or tag with U-shaped notches:
For label paper, both reflective and transparent sensors should be manually set at the center of label. For tags with U-shaped notches, both sensors should be manually aligned with the U-shaped notch. In both cases, the arrow mark of the transparent sensor should be aligned with the right side mark of the reflective sensor.

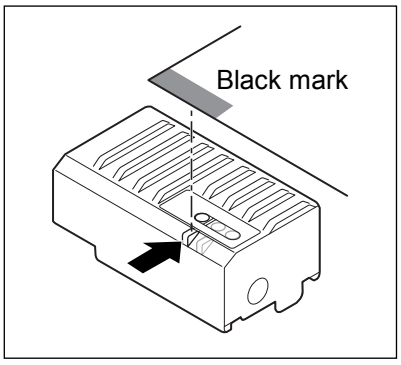
Aligning the reflective sensor for tag with black marks:
For tag with black marks, the reflective sensor alone should be aligned with the black mark. In this case, the left side mark should be aligned with the black mark.



[For label paper/tag with U-shaped notches]



[For tag with black marks]



Detecting labels: (Media Sensor menu: “See Through”)

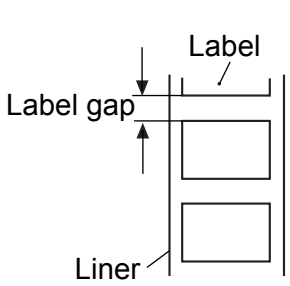
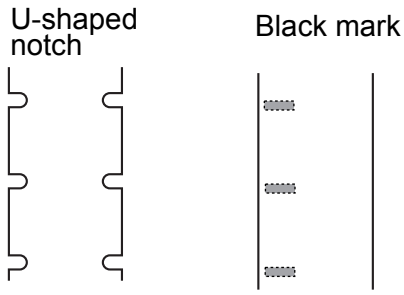
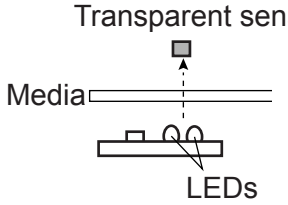
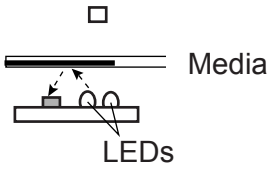
For detecting label, both reflective sensor and transparent sensor are used. Label paper passes between both sensors. The light emitted from the LEDs of the reflective sensor passes through the liner (base part of label paper) where no label is stuck on it, and the light reaches the transparent sensor. Accordingly, the phototransistor of the transparent sensor turns ON. Meanwhile, in the label part, the light is blocked by label and does not reach the phototransistor. So, the phototransistor turns OFF. By sensing the output of the transparent sensor, the CPU on the Main PCB can detect the label leading edge for printing.

Detecting U-shaped notches of tag: (Media Sensor menu: “See Through”)

For detecting U-shaped notches of tag, both reflective sensor and transparent sensor are used. The U-shaped notches are detected in the same way as the label mentioned above, except that the light is directly falls on the transparent sensor through the notch.

Detecting black marks on tag: (Media Sensor menu: “Reflect”)

For detecting black marks on tag, only the reflective sensor is used. Light emitted from the LEDs is reflected by the tag (at other than the black mark) and reaches the phototransistor of the reflective sensor. At the black mark, the light is not reflected. The CPU on the Main PCB detects the black mark by sensing the output of the reflective sensor.

<table>
<tr><td rowspan="2">Media</td><td>Label</td><td colspan="2">Tag</td></tr>
<tr><td> 
</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="2">Sensor to be used</td><td colspan="2">Transparent and Reflective sensors</td><td>Reflective sensor</td></tr>
<tr><td colspan="2"> 
</td><td> 
</td></tr>
<tr><td>Media Sensor menu</td><td colspan="2">See Trough</td><td>Reflect</td></tr>
</table>

Detecting continuous media: (Media Sensor menu: “None”)

For detecting continuous media, only the reflective sensor is used. In this case, only media end is detected by the reflective sensor.

LED light amount control:

According to the media selected by the Media Sensor menu (“See Through”, “Reflect”, or “None”), the amount of light is well controlled to detect the label/U-shaped notch, black mark, or continuous media. The amount of light is as follows (the largest amount is for “See Through):

• Continuous media (None) < Black mark (Reflect) < Label/U-shaped notch (See Through)

2-1-4. Printing and Ribbon Feed Mechanism

The major components of the printing and ribbon feed mechanism are:

(a) SA, Head
(b) SA, Ribbon Motor F/R
(c) Ribbon gear train
(d) SA, Ribbon Tension Shaft F/R
(e) SA, Tension Sensor (Front/Rear)

Ink ribbon is set to the printer using the ribbon holders. Ribbon is supplied from the supply reel and is taken up by the take-up reel with adequate ribbon tension, via the “SA, Ribbon Tension Shaft F/R”. The “SA, Ribbon Tension Shaft F/R” is always pushed outward by the internal springs, and, when ribbon slacks, it moves outward. When ribbon tightens, it moves inward. (Refer to the figures on the later pages.)
The same tension sensor is installed on the take-up and supply sides. The tension sensor on the take-up side is used to detect the position of the “SA, Ribbon Tension Shaft F”, i.e. the ribbon tension on the take-up side. While, the tension sensor on the supply side is used to detect the position of the “SA, Ribbon Tension Shaft R”, i.e. the ribbon tension on the supply side.
The tension sensor on the take-up side is also used to detect a ribbon running condition, and that on the supply side is used to detect the ribbon end.

On the take-up side, the Ribbon Motor F turns to take up ribbon. On the supply side, the Ribbon Motor R turns to supply ribbon, while applying adequate back tension to ribbon to eliminate ribbon slack.

Printing:
When printing with ink ribbon, ink on the ribbon is melted by the heated thermal element of the “SA, Head” and is transferred on the media surface.

Taking up Ribbon:
Ribbon will be taken up on the take-up side as follows:
(1) As media is fed, ribbon is also fed by the friction force produced between media and the “SA, Head”.
(2) Ribbon slacks and the tension sensor on the take-up side turns OFF as the “SA, Ribbon Tension Shaft F” is pushed outward.
(3) The Ribbon Motor F starts to turn and ribbon is taken up.
(4) Ribbon tightens and the tension sensor on the take-up side turns ON. Then, the Ribbon Motor F stops.

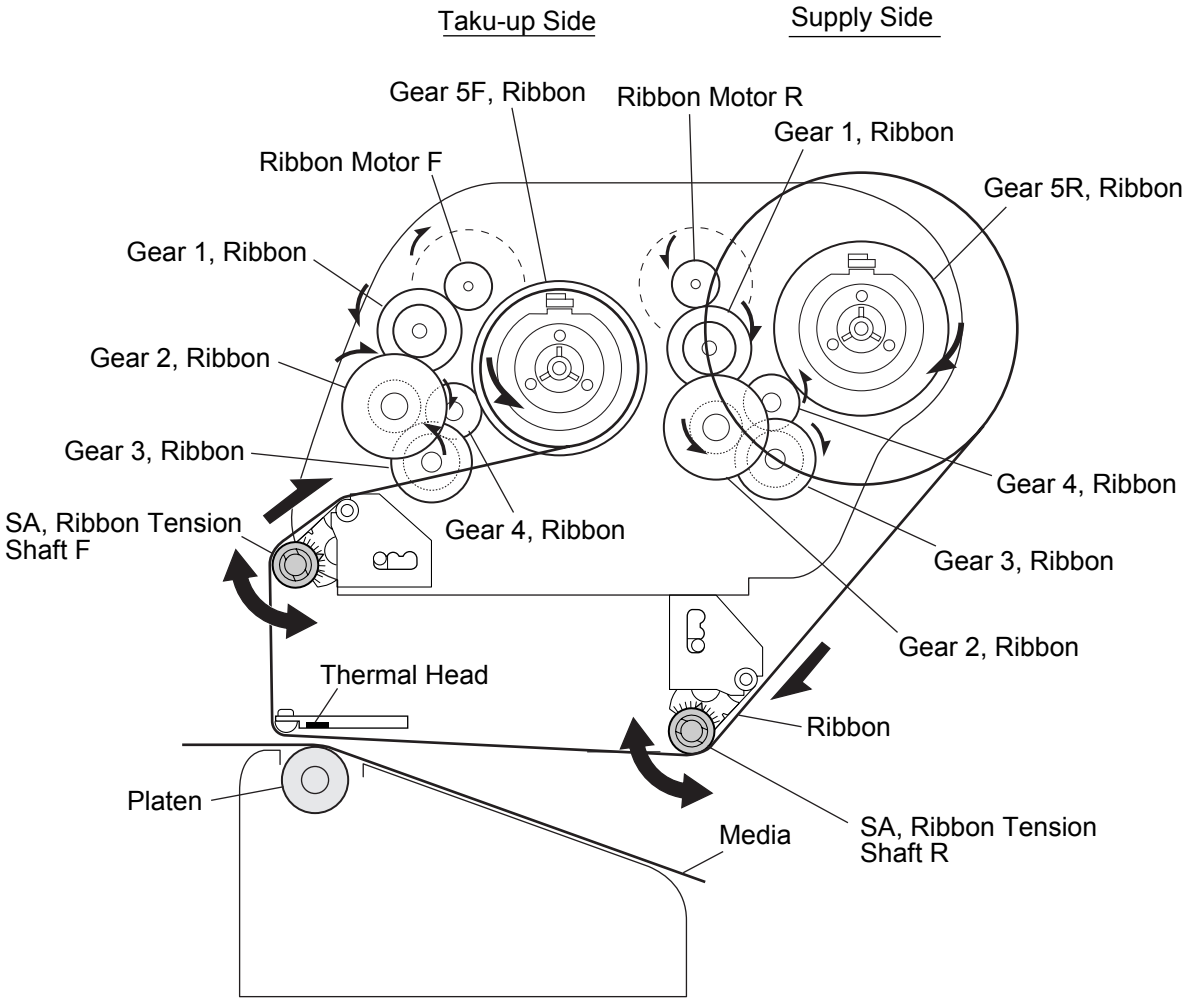
Supplying Ribbon:
On the supply side, the Ribbon Motor R turns to supply ribbon, while applying adequate back tension. In the same way as on the take-up side, the tension sensor on the supply side detects the ribbon tension to keep the ribbon tension constant. However, when printing is made and ribbon is fed, the tension sensor on the supply side turns ON since ribbon is tightened at this time.

Reel Drive Mechanism:

Though the ribbon holders are directly installed in the reels, ribbon is connected to the reels via the spring mechanism of the ribbon holders. This means that ribbon is taken up via the spring mechanism when the Ribbon Motor F/R turns.

On the take-up side, the Ribbon Motor F turns in the clockwise direction viewing from the right side of the printer, the “Gear 5F, Ribbon” (take-up reel) turns in the counterclockwise direction via the Ribbon Gears 1, 2, 3 and 4, and ribbon is taken up.

On the supply side, the rotational direction of the Ribbon Motor R differs depending on the ribbon winding type to be used. In the case of the outside-wound ribbon as shown in the following figure, the Ribbon Motor R turns in the counterclockwise direction, the “Gear 5R, Ribbon” (supply reel) turns in the clockwise direction via the “Gear 1, Ribbon”, “Gear 2, Ribbon”, “Gear 3, Ribbon” and “Gear 4, Ribbon”, and ribbon is supplied.



Detecting Ribbon Tension (Tension Sensors):

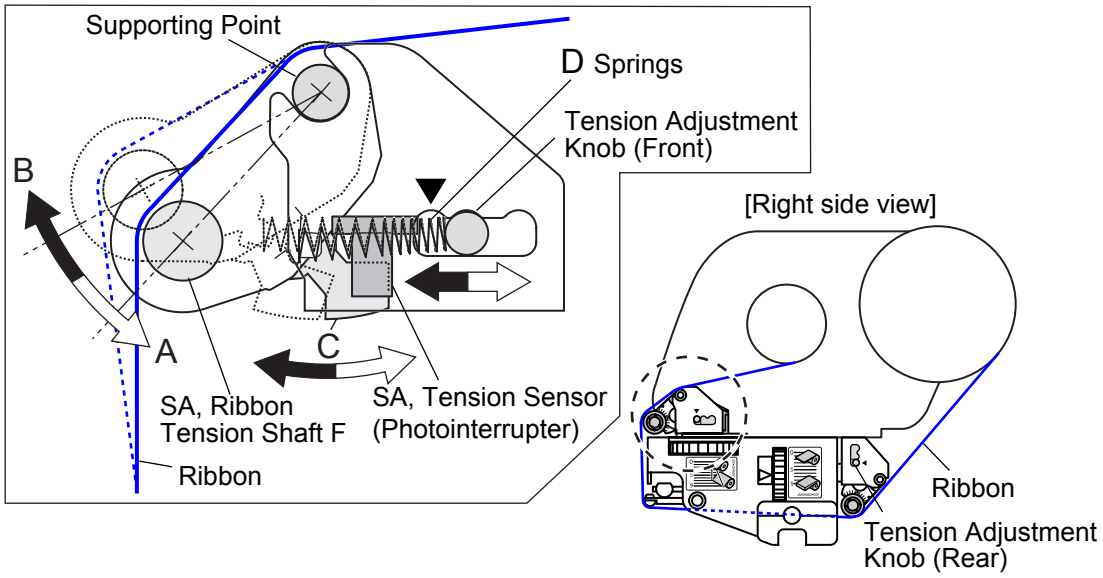
The same tension sensor is installed on the take-up and supply sides. Since the operation is the same on both sides, the take-up side operation is explained here:

When ribbon is taken up, it tightens and the “SA, Ribbon Tension Shaft F” is pushed inward (in the direction of “**A**”). At this time, the claw “**C**” of the “SA, Ribbon Tension Shaft F” is inserted into the photointerrupter of the “SA, Tension Sensor”, and the photointerrupter turns OFF.

When printing starts, ribbon is fed forward together with media and it slacks. At this time, the “SA, Ribbon Tension Shaft F” is moved outward (in the direction of “**B**”) by the spring (“**D**”) force, and the claw “**C**” comes off the photointerrupter. So, the photointerrupter turns ON and the Ribbon Motor F starts to turn to take up ribbon. Then, the claw “**C**” is inserted into the photointerrupter again, and the Ribbon Motor F stops.

This cycle is repeated and constant tension is applied to ribbon.

On the supply side, when printing starts, ribbon is tightened contrary to the take-up side, and the tension sensor turns ON. Then, the Ribbon Motor R turns to supply ribbon.



Tension Adjustment Mechanism:

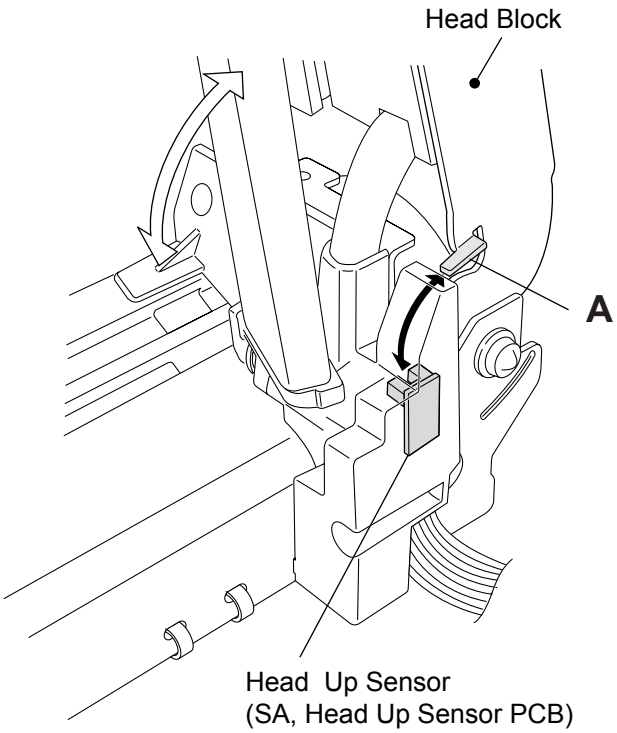
To apply adequate ribbon tension, you can change the spring (“**D**”) force as follows:

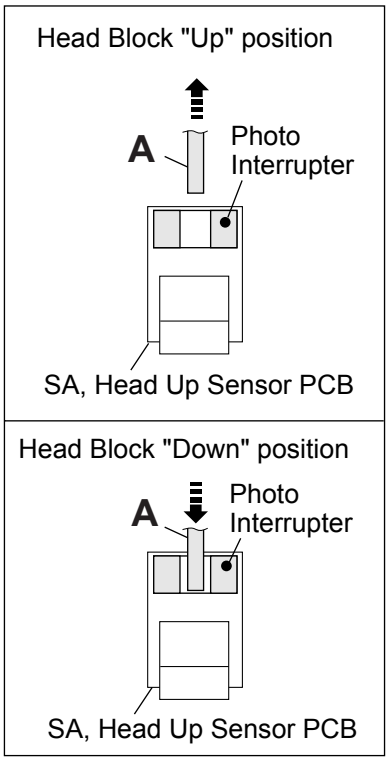
- Ribbon Tension Adjustment Knob F/R (for users)
  Changes the spring force. The spring force is adjustable in 3 steps. As you move the knob toward the ▼ mark, the spring force becomes stronger .
- Tension Adjustment Screw (for service personnel)
  Can finely adjust the spring position. For details, refer to “3-6-3 Ribbon Tension Adjustment”.

2-1-5. Print Head Up/Down Detection Mechanism

The component of the print head up/down detection mechanism is as follows:
(a) Head up sensor
(b) Protrusion that engages in the sensor

The print head up/down detection mechanism detects the up (open)/down (close) status of the head block.
When the head block is in the up position, the protrusion "**A**" is disengaged from the head up sensor. At this time, the head up sensor turns ON and "Low" level is output from the head up sensor.
While, the head block is in the down position, the protrusion "**A**" is engaged in the head up sensor. At this time, the head up sensor turns OFF and "High" level is output from the head up sensor.
The CPU on the Main PCB detects up or down position of the head block by sensing the output of the head up sensor.





2-1-6. Head Balance Adjustment Mechanism

The major components of the head balance adjustment mechanism are:

(a) Lever, Head Balance
(b) Cam, Head Balance
(c) Spring, Head L/R

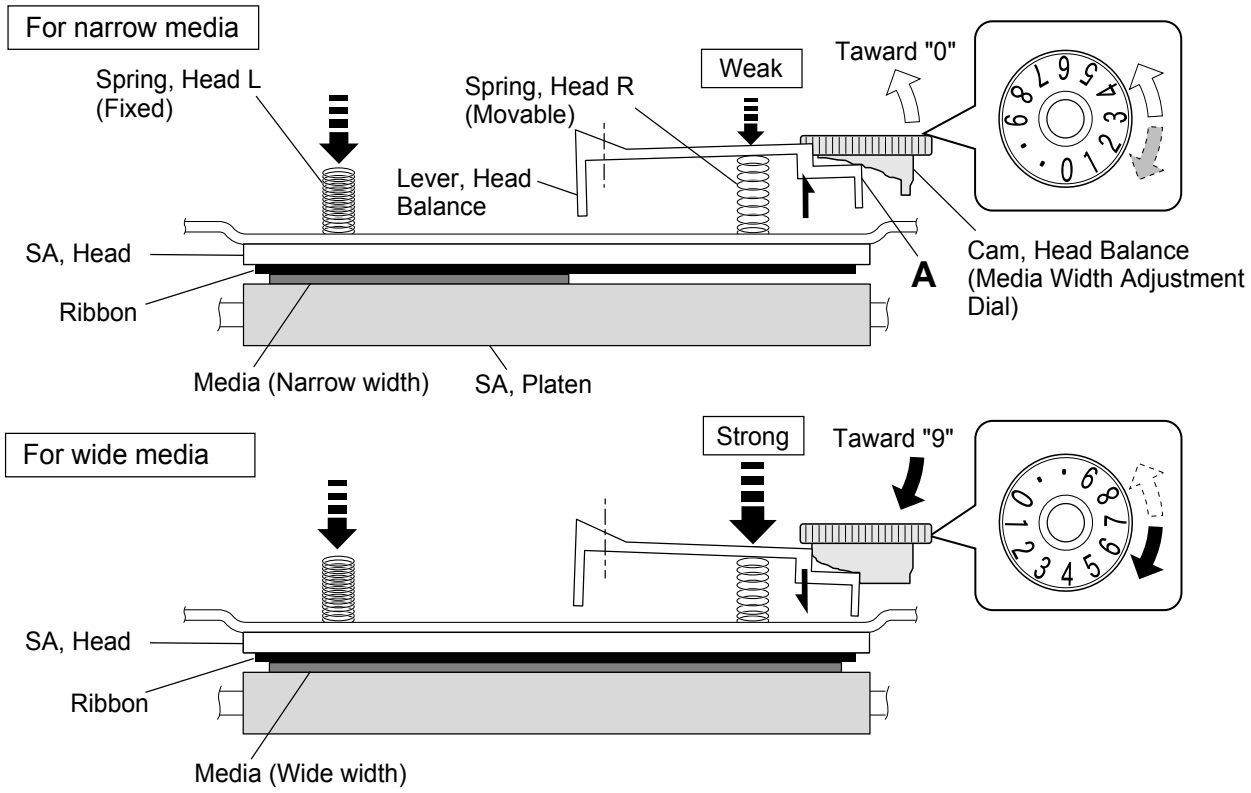
The head balance adjustment mechanism is used to eliminate uneven printing density on media. The head balance adjustment is accomplished by changing the right side head pressure according to media width to be used. To adjust, the blue Media width adjustment dial (“Cam, Head Balance”) is used. When narrow width media is used, the dial should be set toward “0” to give weaker pressure. When wide width media is used, it should be set toward “9” to give stronger pressure.

When narrow media is used (need to give weak pressure):

The “Spring, Head L” and “Spring, Head R” act to press the “SA, Head” against the “SA, Platen”. If the same pressure is given by both springs, since no media exists on the right side of the “SA, Head”, the “SA, Head” will slant to the right, resulting in uneven printing density. The part “**A**” of the “Lever, Head Balance” is pushed against the cam part by the “Spring, Head R” and it moves up step by step as the Media width adjustment dial is turned toward “0”. As it moves up, the “Spring, Head R” is pressed with weaker force by the “Lever, Head Balance”, and the right side pressure against the “SA, Head” is decreased, resulting in even printing density. You need to align the dial number according to the media width to be used. (Smaller number for narrower media)

When wide media is used (need to give strong pressure):

The same principle applies to wide media. However, in this case, the Media width adjustment dial should be turned toward “9”. Then the part “**A**” of the “Lever, Head Balance” moves down to apply stronger pressure to the “SA, Head”. (Larger number for wider media)



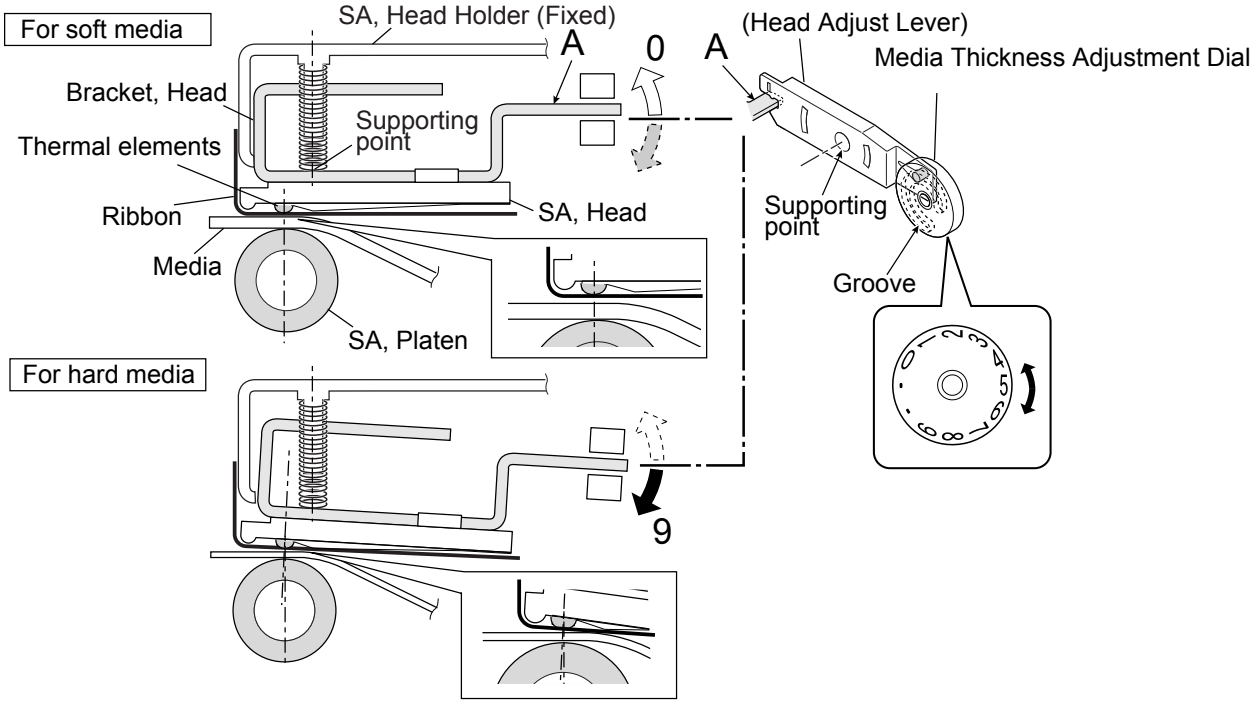
2-1-7. Media Offset Adjustment Mechanism

The major components of the media thickness adjustment mechanism are:
(a) Bracket, Head
(b) SA, Head Adjust (Includes Head adjust lever and Media thickness adjustment dial.)

According to the softness of media, the thermal element position is displaced from the optimum position. The head offset adjustment mechanism is used to correct this by moving the “SA, Head” back and forth a little. By performing the head adjustment properly, optimum printing quality is available. (When shipping, the Media thickness adjustment dial is set to “1”.)

When soft media is used (thin thermal paper, label paper, etc.):
When soft media is used, the optimum position of the thermal elements will be nearly right above the center of the “SA, Platen”. This position will be set when the Media thickness adjustment dial is set to “1”.

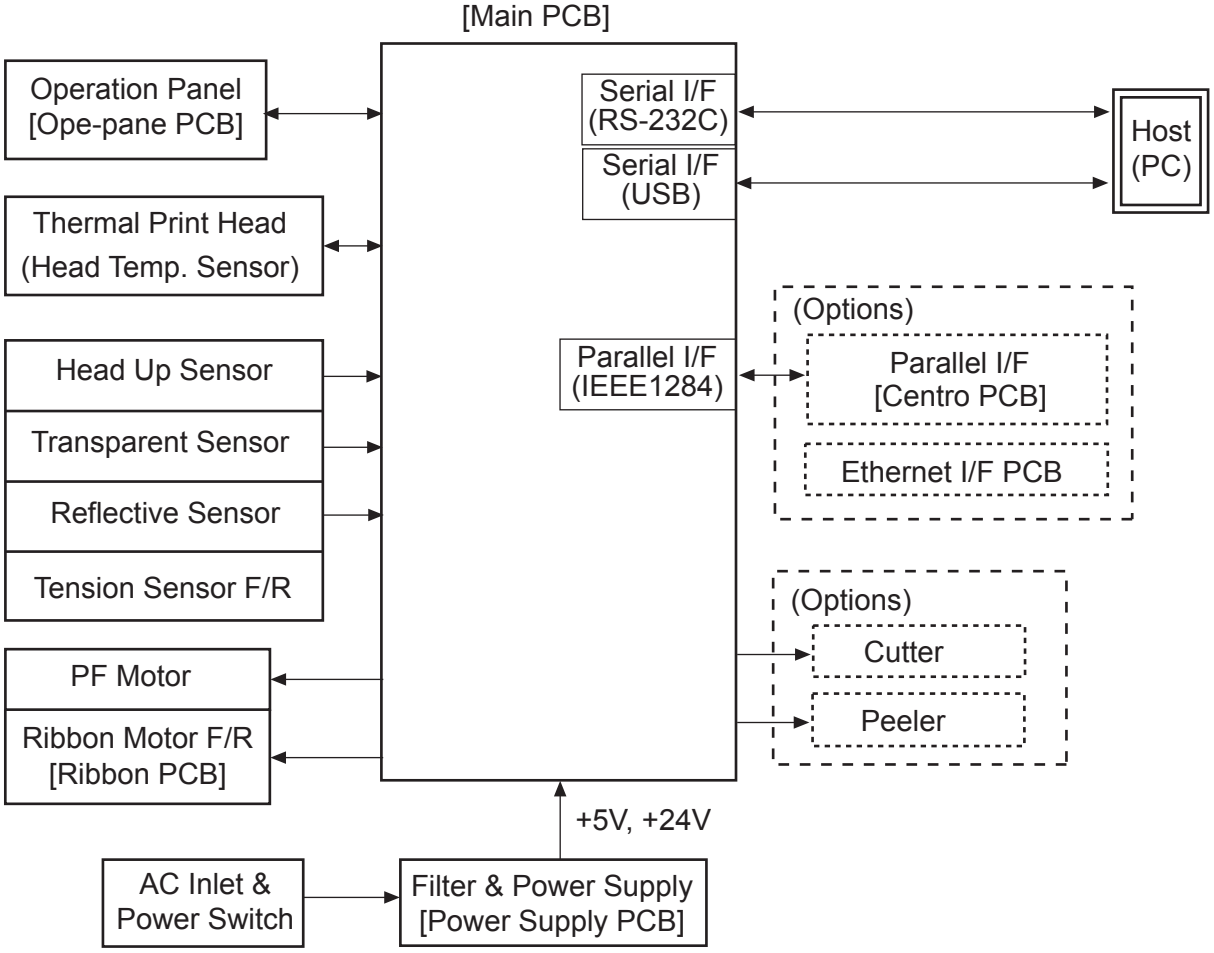
When hard media is used (tag paper):
When hard media is used, the optimum position of the thermal elements will shift toward the left a little from the center of the “SA, Platen”, viewing from the right side of the “SA, Platen”. As the optimum position varies according to the hardness of media, it is necessary to adjust the Media thickness adjustment dial from "1" to the greater number for the optimum position.
As the Media thickness adjustment dial turns, the Head adjust lever also turns around the supporting point. At this time, as the end "**A**" of the “Bracket, Head” is inserted into the Head adjust lever, the “Bracket, Head” moves up and down. Note that the “Bracket, Head” turns around both “Bushing, Head” on both sides. When the Media thickness adjustment dial is set to the larger number, the end "**A**" of the Head Bracket lowers more. At this time, the thermal element position shifts to the left from the center of the “SA, Platen”, viewing from the right side of the “SA, Platen”.



2-2. Operation of Control Parts

2-2-1. Configuration of Printer

The following shows major configuration blocks.



Major functions of individual components are described below:

(1) Filter & power supply section

Consists of a fuse, a filter circuit to eliminate external electric noise, and a switching type regulator to transform an AC input to +5V DC and +24V DC outputs required to drive the printer.

(2) Main PCB

Controls the entire operations of the printer. It consists of CPU, ROM, RAM, Custom IC, driver circuits, etc.

(3) Operation panel

A panel used to indicate the operating status of the printer and to set specifications. It consists of 4 keys and 4 LEDs.

(4) Thermal print head

The thermal print head has the following thermal elements. It also has the print head driver circuit.

- 864 dots for CL-S621/S621C
- 1275 dots for CL-S631

(5) Sensors

The following 7 sensors are used:

Sensor name	Description
Head Up Sensor	Photointerrupter.
Transparent Sensor	Photo sensor using the phototransistor.
Reflective Sensor	Photo sensor consisting of 2 LEDs and 1 phototransistor.
Tension Sensor (Front/Rear)	Photo sensor using the photointerrupter. Located on the front and rear of the “Unit, Ribbon”.
Head Temperature Sensor	Thermistor incorporated in the print head.
PF Motor Temperature Sensor	Thermistor attached to the PF Motor.
Ribbon Motor Temperature Sensor	Thermistor attached to the Ribbon Motor F.

(6) Motor

Three motors are used. The PF Motor is a stepping motor to feed media. The Ribbon Motor F and Ribbon Motor R are stepping motors to take up and supply ribbon, respectively.

(7) Serial I/F (RS-232C)

This is a circuit to transmit and receive serial data between the printer and the host.
Serial I/F, USB I/F or Parallel I/F (Option) is automatically selected when data is received.

(8) USB (Universal Serial Bus) I/F

This is a circuit to transmit and receive serial data between the printer and the host using the USB.
Serial I/F, USB I/F or Parallel I/F (Option) is automatically selected when data is received.

(9) Parallel I/F (IEEE1284) (Option)

This is the parallel I/F to transmit and receive parallel data between the printer and the host. It supports Centronics Compatible mode, NIBBLE mode and ECP mode.
Parallel I/F, serial I/F, or USB I/F is automatically selected when data is received.

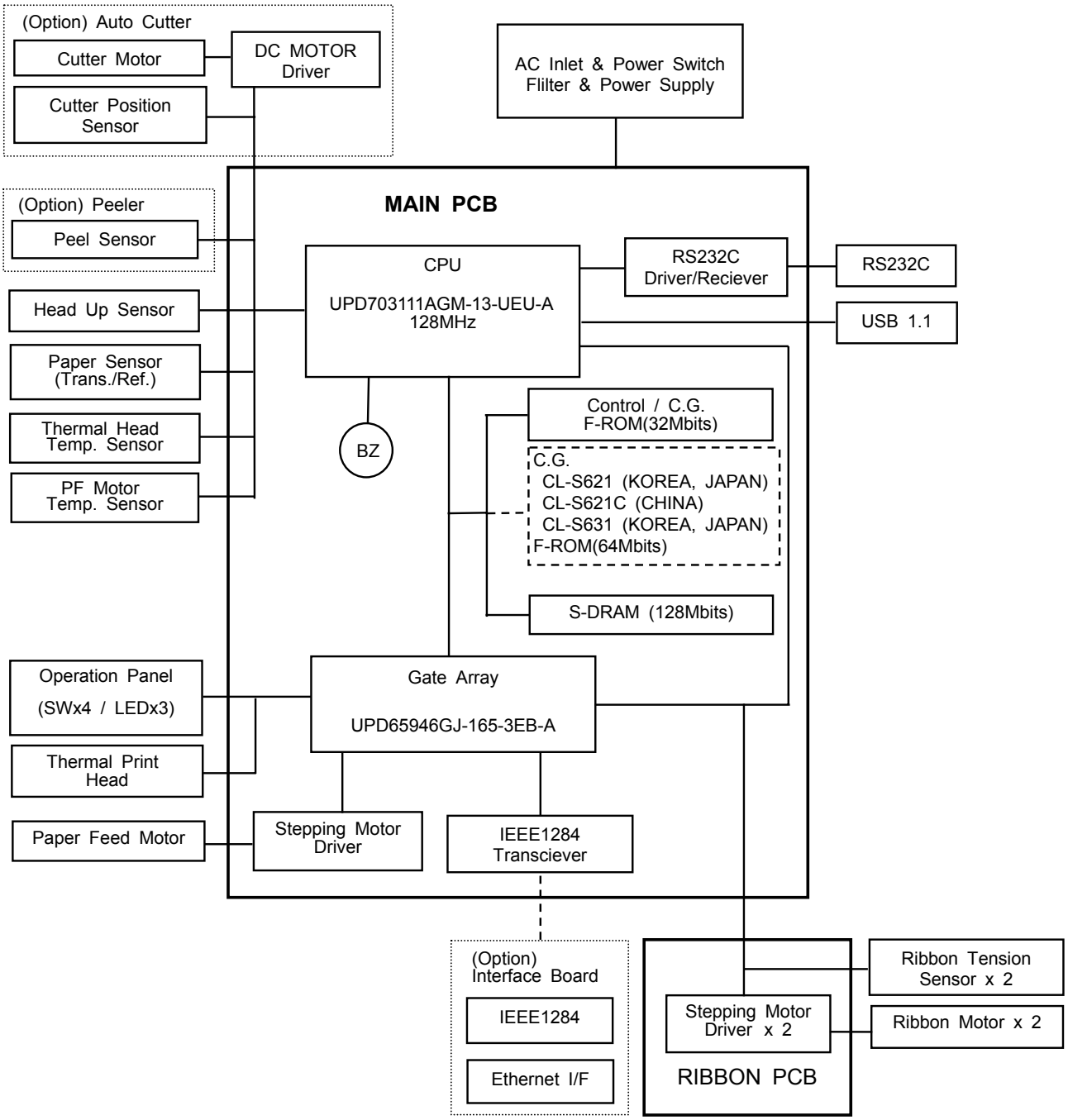
(10) Ethernet I/F (Option)

This is a circuit which supports Ethernet protocol. LAN connection is possible.

2-2-2. Operation of Control Unit

(1) Block diagram

The following descriptions are for major functions of the components.



(a) CPU

The CPU is a microprocessor with 32-bit architecture. The clock fed to the CPU is 16 MHz. The CPU internally multiplies this 16 MHz by 8 times and uses 128 MHz clock. The CPU includes cache memory, RAMs, DMA controller, serial I/F, USB function controller, A/D converter, etc.

(b) Flash ROM

A flash ROM of 32M bits (4M bytes) that stores the firmware and CG (character generator)

(c) SDRAM (Synchronous dynamic RAM)

A SDRAM of 128M bits (16M bytes) that is used as working area, input buffer and download buffer

(d) Custom IC

The custom IC incorporates a control circuit for the interface I/O port, motors, print head, etc.

(e) Head control

This is a circuit to control the thermal head driver incorporated in the thermal head. It also checks if a thermal element of the thermal head is faulty.

(f) PF motor driver

This is a circuit to drive the PF Motor. The PF Motor is a stepping motor.

(g) Ribbon motor driver

This is a circuit to drive the Ribbon Motor F and Ribbon Motor R. These motors are stepping motors.

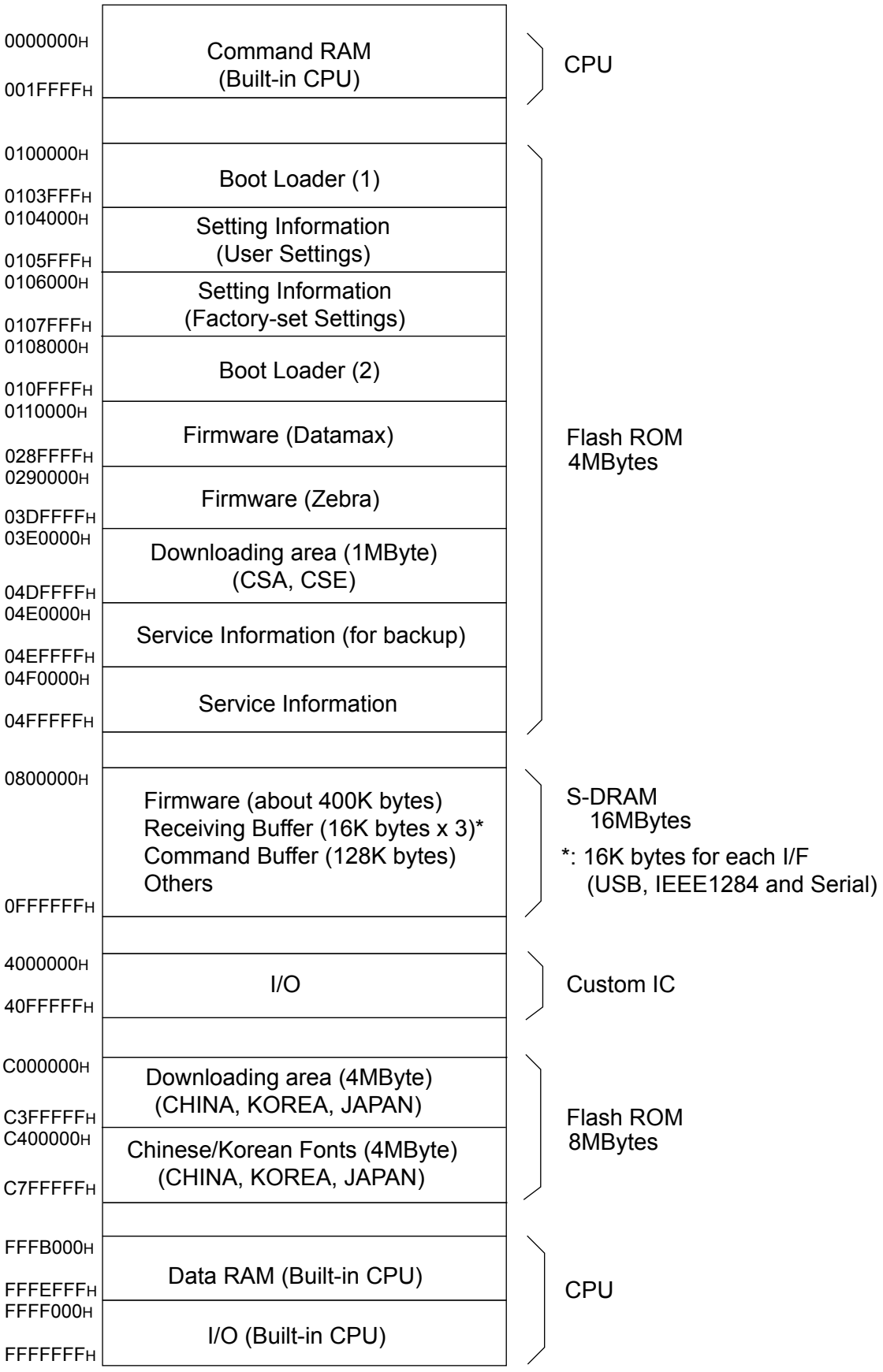
(h) Buzzer

The buzzer is driven when an alarm, etc. occurs.

(i) Fan

Cooling fan for the ribbon motor. When the temperature of the Ribbon Motor F (take-up side motor) exceeds a certain value, this fan starts to work.

(2) Memory map

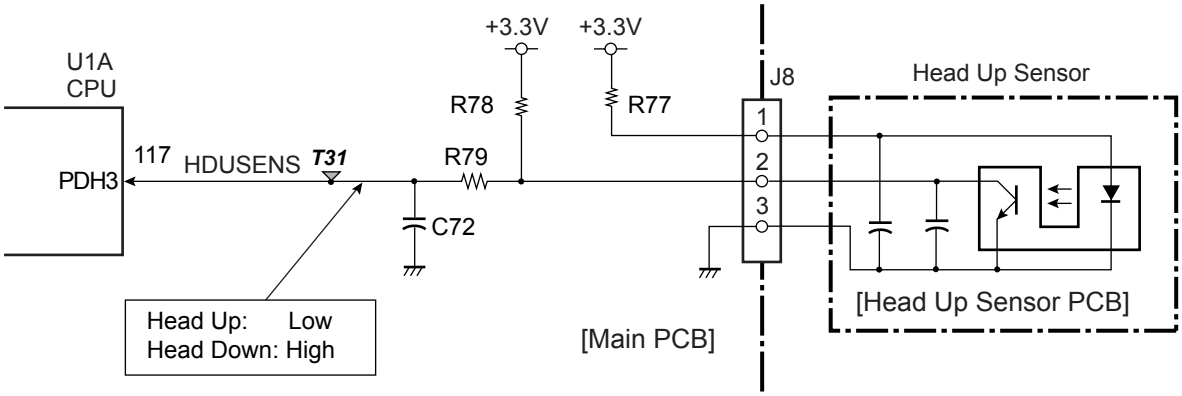

0000000H
Command RAM
(Built-in CPU)
001FFFFH
CPU
0100000H
Boot Loader (1)
0103FFFH
0104000H
Setting Information
(User Settings)
0105FFFH
0106000H
Setting Information
(Factory-set Settings)
0107FFFH
0108000H
Boot Loader (2)
010FFFFH
0110000H
Firmware (Datamax)
028FFFFH
0290000H
Firmware (Zebra)
03DFFFFH
03E0000H
Downloading area (1MByte)
(CSA, CSE)
04DFFFFH
04E0000H
Service Information (for backup)
04EFFFFH
04F0000H
Service Information
04FFFFFH
Flash ROM
4MBytes
0800000H
Firmware (about 400K bytes)
Receiving Buffer (16K bytes x 3)*
Command Buffer (128K bytes)
Others
0FFFFFFH
S-DRAM
16MBytes
*: 16K bytes for each I/F
(USB, IEEE1284 and Serial)
4000000H
I/O
40FFFFFH
Custom IC
C000000H
Downloading area (4MByte)
(CHINA, KOREA, JAPAN)
C3FFFFFH
C400000H
Chinese/Korean Fonts (4MByte)
(CHINA, KOREA, JAPAN)
C7FFFFFH
Flash ROM
8MBytes
FFFB000H
Data RAM (Built-in CPU)
FFFEFFFH
FFFF000H
I/O (Built-in CPU)
FFFFFFFH
CPU

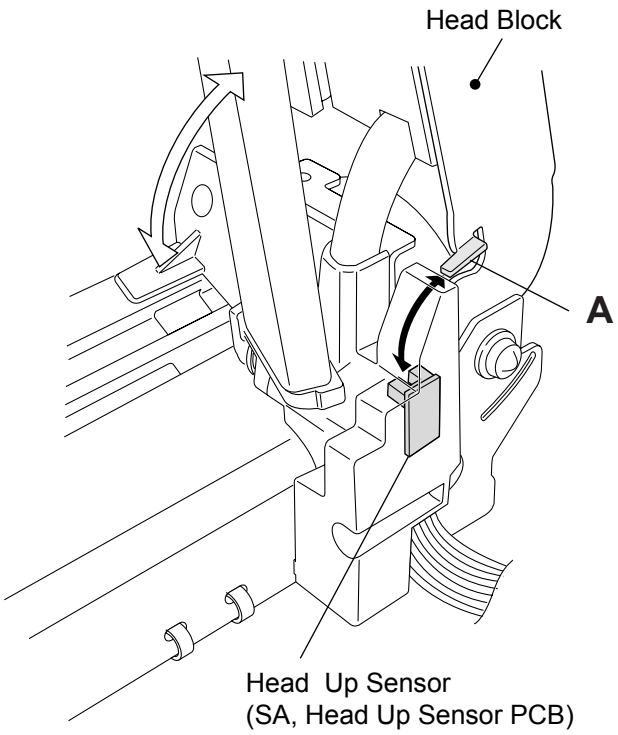
(3) Sensors

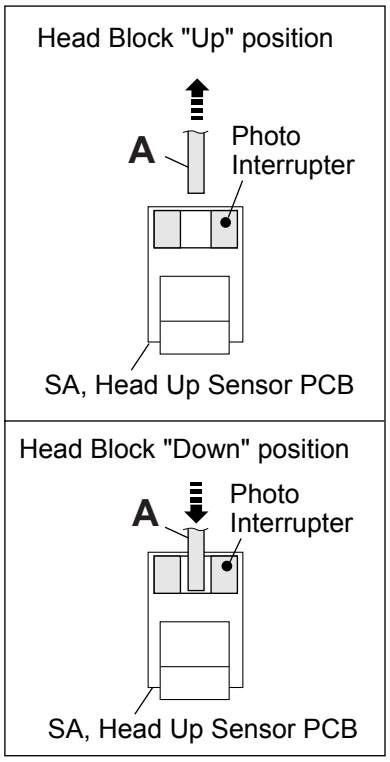
(3-1) Head up sensor

The head up sensor is used to detect the head position (up or down). This sensor uses a photointerrupter.)

When the head block is closed (in the down position), the protrusion "**A**" of the head block is engaged in the head up sensor, and the light emitted from the LED of the photointerrupter is blocked by the protrusion "**A**". Thus, the phototransistor turns OFF, and pin 117 (HDUSENS) of U1A (CPU) goes to "High" level.
When the head block is opened (in the up position), the protrusion "**A**" is disengaged from the head up sensor, and the light emitted from the LED reaches the phototransistor. Thus, the phototransistor turns ON and pin 117 (HDUSENS) of U1A (CPU) goes to "Low" level.







(3-2) Transparent sensor and reflective sensor

The transparent sensor is used to detect the label stuck on liner and the U-shaped notch on tag. On the other hand, the reflective sensor is used to detect the black mark printed on the bottom surface of tag. Both sensors are also used to detect the media end.
The upper side transparent sensor is the phototransistor, and the lower side reflective sensor consists of 2 LEDs and 1 phototransistor. Media passes between these sensors.

Transparent sensor (used for detecting the label or U-shaped notch):
When the liner without label stuck on it passes between both sensors, the light emitted from the LEDs reaches the transparent sensor, passing through the liner. Thus, the transparent sensor (phototransistor) conducts and the voltage corresponding to the amount of light is applied to pin 5 (TRAMON) of U1A (CPU).
Meanwhile, when the liner with the label stuck on it passes between both sensors, the light is blocked by the label and the transparent sensor (phototransistor) turns OFF. Thus, pin 5 (TRAMON) of U1A (CPU) goes "Low" level. From these levels, U1A (CPU) can detect the leading edge (arrival) of the label on liner.
When media runs out, the light directly falls on the transparent sensor and media end is detected. In this case, pin 5 of U1A (CPU) will go "High" level.

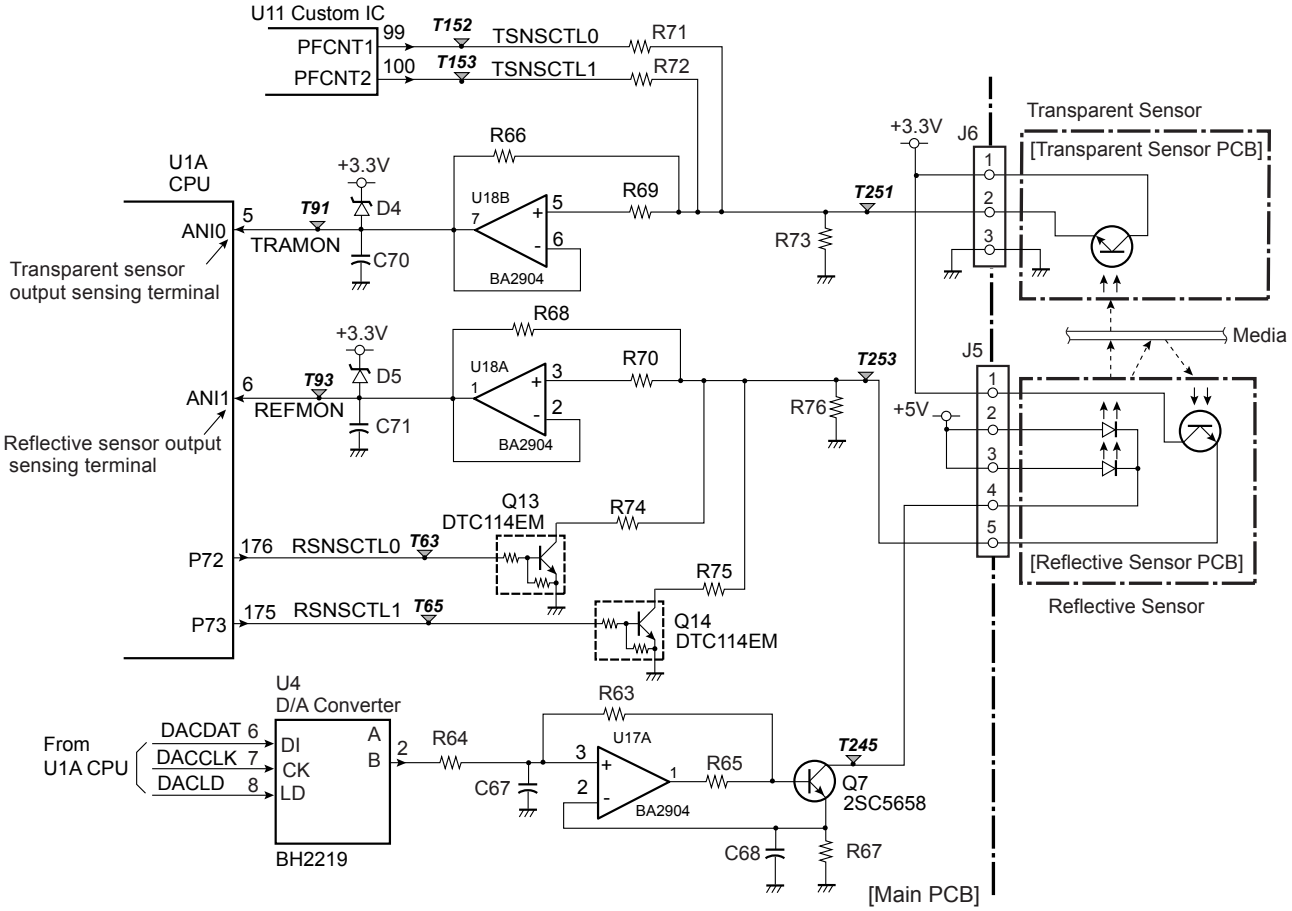
When the transparent sensor is conducted, the voltage at pin 5 (TRAMON) varies depending on the characteristics of the light receiving element (phototransistor) of the transparent sensor and other factors. To solve this problem, U11 (Custom IC) outputs TSNSCTL0 (pin 99) and TSNSCTL1 (pin 100) signals to turn ON/OFF (connect/disconnect) R71 and R72 (voltage dividing resistors) to minimize the difference in level at pin5 (TRAMON).

The current flowing into the LEDs is determined by the data sent from the CPU to the digital-to-analog converter (U4). The digital-to-analog converter converts the data received from the CPU and outputs resoultant level at pin 2. The base current of the transistor Q7 is determined by this level. This means that the current flowing into the LEDs is also determined by this level. In the actual control, the CPU changes data (LED current) to keep the level at pin 5 of CPU constant.

Reflective sensor (used for detecting the black mark on tag):
When tag with black marks is used, light is reflected by the tag. In the place where no black mark is there, the phototransistor of the reflective sensor conducts and the voltage corresponding to the amount of light is applied to pin 6 (REFMON) of U1A (CPU).
When the light falls on the black mark, no light is reflected. In this case, the lower phototransistor turns OFF and pin 6 of U1A (CPU) will go “Low” level.
When media runs out, the light is not reflected and no light falls on the reflective sensor. In this case, pin 6 of CPU will go “Low” level and media end is detected.

When the reflective sensor is conducted, the voltage at pin 6 (REFMON) varies depending on the characteristics of the light receiving element (phototransistor) of the reflective sensor and other factors. To solve this problem, U1A (CPU) outputs RSNSCTL0 (pin 176) and RSNSCTL1 (pin 175) signals to turn ON/OFF (connect/disconnect) R74 and R75 (voltage dividing resistors) to minimize the difference in level at pin6 (REFMON).

As to the current control of the LEDs, the operation is the same as for the transparent sensor mentioned above.



(3-3) Tension Sensor F/R

The Tension Sensor F is used to detect the ribbon tension on the take-up side (front side) as well as ribbon running. While, the Tension Sensor R is used to detect the ribbon tension on the supply side (rear side) as well as the ribbon end. These sensors are photointerrupters.

Tension Sensor F:

The Tension Sensor F is used to keep the ribbon tension on the take-up side constant. When printing starts, ribbon is fed and take-up side ribbon slacks. Then, the claw of the “SA, Ribbon Tension Shaft F” comes off the photointerrupter on the Tension Sensor PCB and the photointerrupter turns ON. Thus, pin 97 (SENS_A) of U11 (Custom IC) goes "High" level. Then, U1A (CPU) drives the Ribbon Motor F to take up ribbon. As a result, ribbon tightens and the claw is inserted into the photointerrupter. Thus, pin 97 (SENS_A) of U11 (Custom IC) goes "Low" level. Then, U1A (CPU) stops the Ribbon Motor F. During printing, this cycle is repeated and constant ribbon tension is maintained.

The LED (D901) on the tension sensor lights when ribbon slacks (the claw of the “SA, Ribbon Tension Shaft F” comes off the photointerrupter and the photointerrupter turns ON). The LED goes out when ribbon tightens.

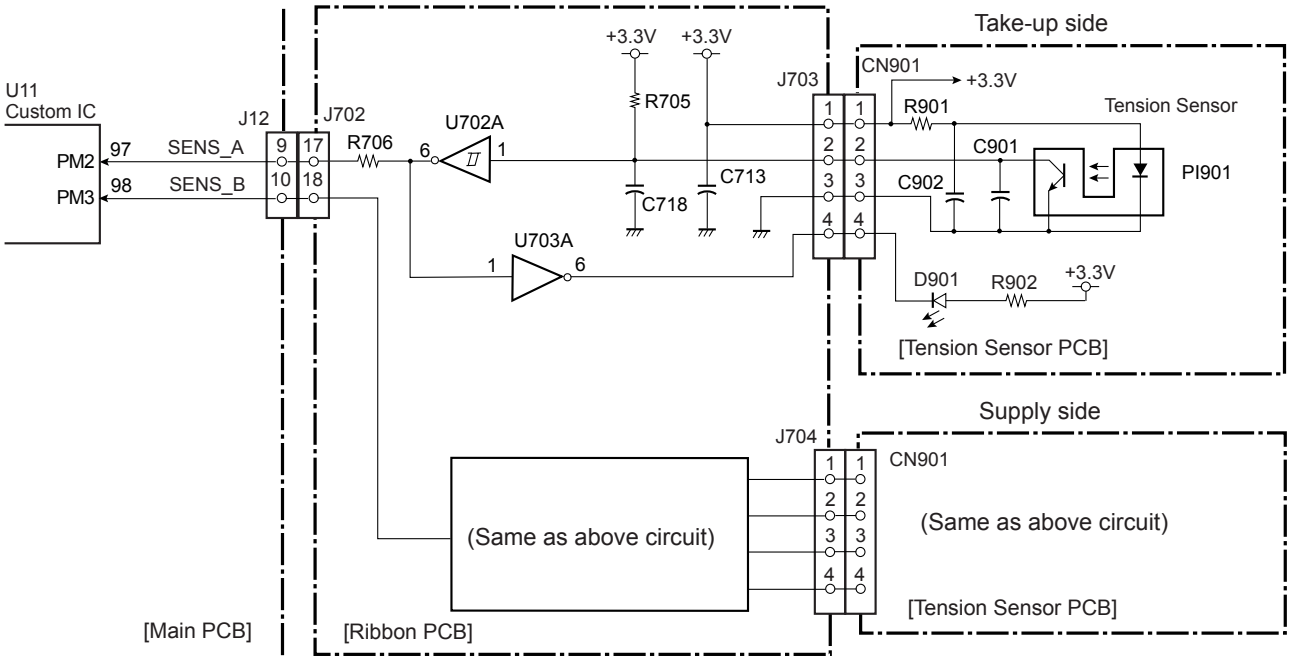
If ribbon is not correctly fed during printing, the ON/OFF state of the photointerrupter on the Tension Sensor F becomes improper. Thus, the CPU can detect a ribbon running error.

Tension Sensor R:

The Tension Sensor R is used to keep the ribbon tension on the supply side constant. When printing starts, ribbon is fed and supply side ribbon tightens. Then, the claw of the “SA, Ribbon Tension Shaft R” is inserted into the photointerrupter on the Tension Sensor PCB and the photointerrupter turns OFF. Thus, pin 98 (SENS_B) of U11 (Custom IC) goes "Low" level. Then, U1A (CPU) drives the Ribbon Motor R to supply ribbon. As a result, ribbon slacks and the claw comes off the photointerrupter. Thus, pin 98 (SENS_B) of U11 (Custom IC) goes "High" level. Then, U1A (CPU) stops the Ribbon Motor R. During printing, this cycle is repeated and constant ribbon tension is maintained.

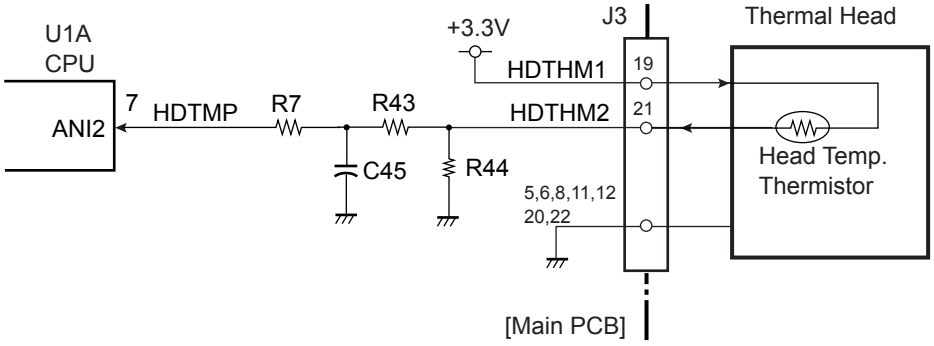
In the same way as for Tension Sensor F, the LED (D901) on the tension sensor lights when ribbon slacks and goes out when ribbon tightens.

When ribbon runs out, the ON/OFF state of the photointerrupter on the Tension Sensor R becomes unchangeable. Thus, the CPU can detect the ribbon end.



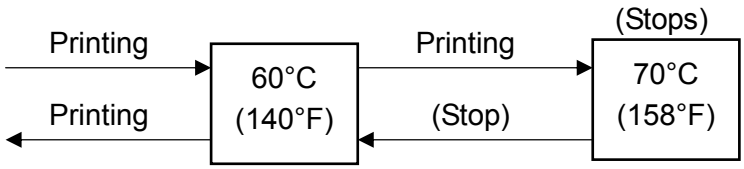
(3-4) Head temperature sensor

The head temperature sensor is used to detect the temperature of the thermal head. This sensor is a thermistor incorporated in the “SA, Head”. Since the resistance of the thermistor changes according to the temperature change, the voltage at pin 7 of U1A (CPU) changes accordingly. The CPU senses the voltage at pin 7 to detect the head temperature. According to the temperature of the print head, the CPU controls the printing pulse width applied to the thermal elements to keep the printing density constant.



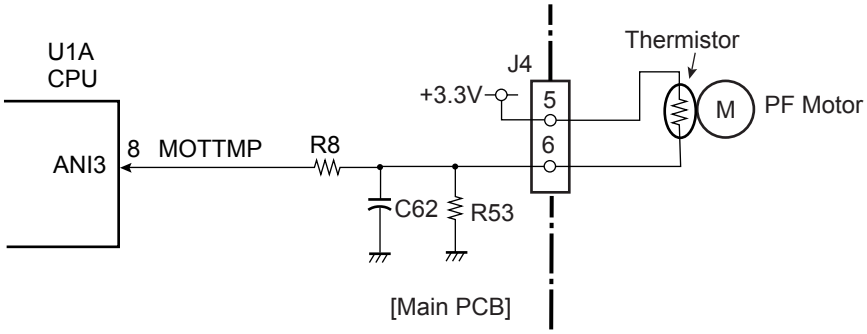
Printing operation when the head temperature rises:

If the head temperature reaches 70°C (158°F), printing stops after printing the current label. In this case, PRINT LED and CONDITION LED simultaneously blink on the operation panel. When the temperature of the “SA, Head” falls below 60°C (140°F), LEDs stop blinking and printing will be resumed.



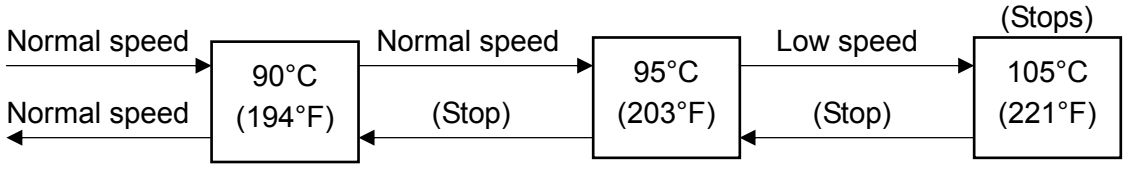
(3-5) PF motor temperature sensor

The motor temperature sensor is used to detect the temperature of the PF motor. This sensor is a thermistor bonded to the PF motor. Since the resistance of the thermistor changes according to the temperature change, the voltage at pin 8 of U1A (CPU) changes accordingly. The CPU senses the voltage at pin 8 to detect the motor temperature.



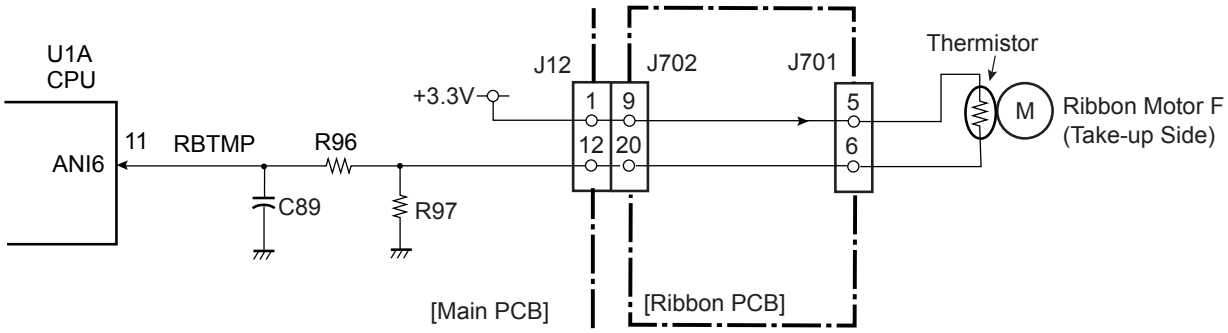
Printing operation when motor temperature rises:

When the temperature of the motor rises above 95°C (203°F), printing speed is reduced to avoid overheating. If it reaches 105°C (221°F), the motor stops after printing the current label. In this case, PRINT LED and CONDITION LED alternately blink on the operation panel. When the temperature of the motor falls below 90°C (194°F), LEDs stop blink and printing will be resumed.



(3-6) Ribbon motor temperature sensor

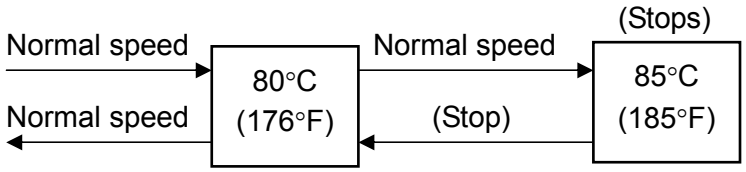
The ribbon motor temperature sensor is used to detect the temperature of the Ribbon Motor F on the take-up side. This sensor is a thermistor bonded to the Ribbon Motor F. Since the resistance of the thermistor changes according to the temperature change, the voltage at pin 11 (RBTMP) of U1A (CPU) changes accordingly. The CPU senses the voltage at pin 11 to detect the ribbon motor temperature.



Printing operation at ribbon motor temperature rise:

When the temperature of the Ribbon Motor F reaches 85°C (185°F), the ribbon motor stops after printing the current label. In this case, PRINT LED and CONDITION LED alternately blink on the operation panel.

When the temperature of the Ribbon Motor F falls below 80°C (176°F), LEDs stop blink and printing resumes.

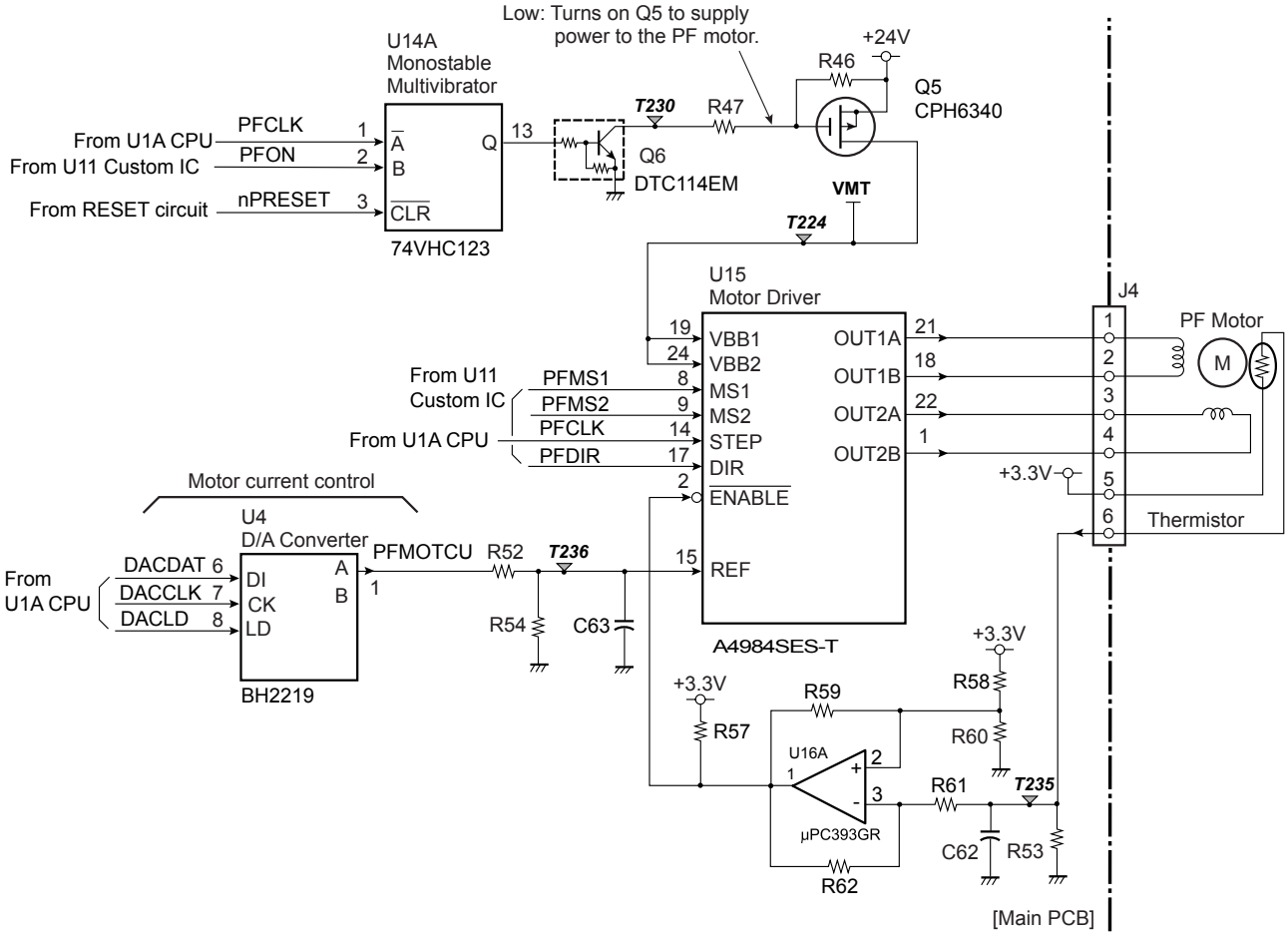


(4) Drivers

(4-1) PF motor driver

This is a driving circuit to drive the PF motor (stepping motor).
The following illustration shows a simplified circuit.
The PF motor is driven by the bipolar constant current chopper method.
The exciting method for the motor is the 1st-2nd phase method.
The power to the PF motor is supplied by turning ON the FET Q5. This is accomplished by activating the monostable multivibrator U14A. When U14A is triggered, Q6 turns ON and Q5 turns ON.
The exciting method is determined by PFMS1 and PFMS2 signals sent from U11 (Custom IC).
The rotational direction of the PF motor is determined by PFDIR signal and the PF motor rotates when a pulse (PFCLK) is input to STEP (pin 14 of U15).
The digital-to-analog converter (U4) is used to control the PF motor current. Its output is controlled by the data sent from the CPU (U1A).

PF motor forcible stop function by circuitry:
The CPU monitors the temperature of the PF motor and stops the PF motor if its temperature reaches 105°C (221°F), as mentioned in "(3-4) Motor temperature sensor". In addition to this function, for further safety measures, a circuitry is provided to forcibly stop the PF motor if its temperature exceeds over 105°C (221°F). When the temperature reaches to a predetermined level, $\overline{\text{ENABLE}}$ (pin 2) of U15 becomes "Low" level and the outputs from U15 are disabled.

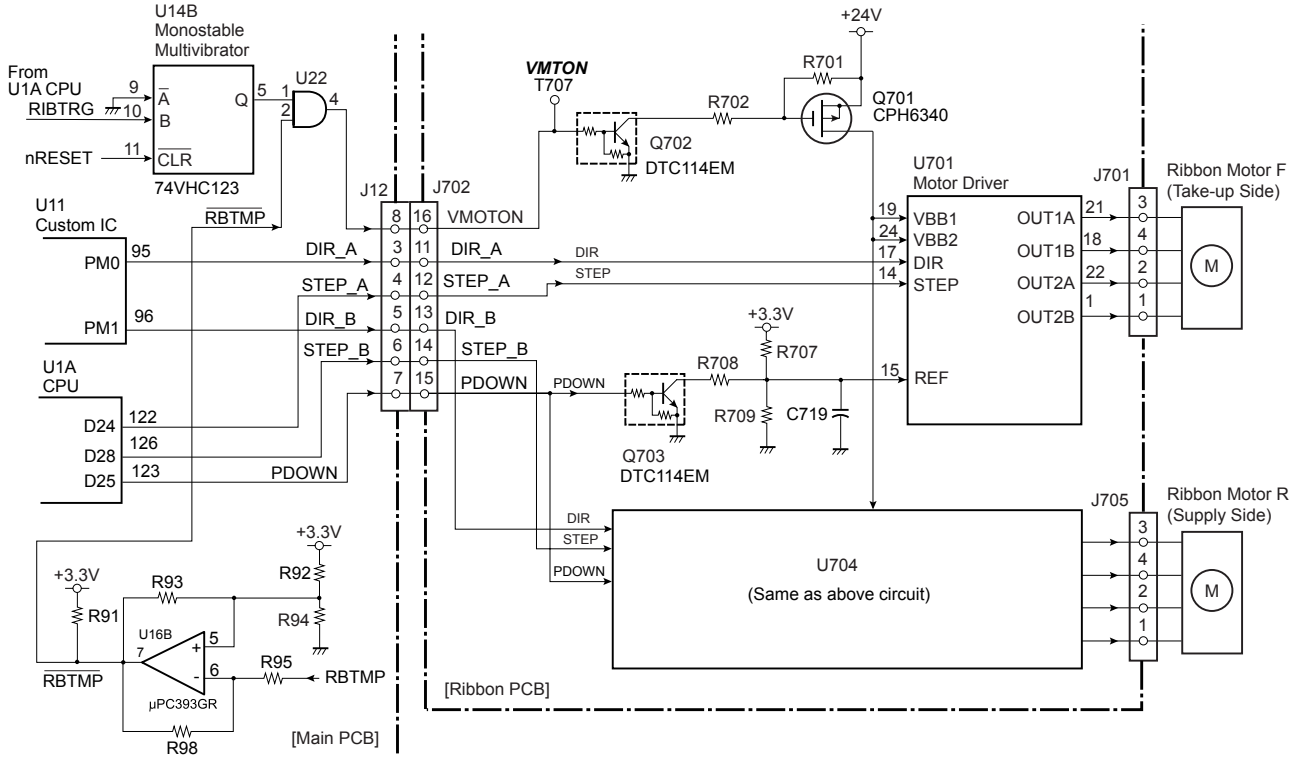


(4-2) Ribbon motor driver

This is a driving circuit to drive the Ribbon Motor F and Ribbon Motor R (stepping motors). The Ribbon Motor F is used to take up ribbon and the Ribbon Motor R is used to supply ribbon.

The Ribbon Motor F/R is driven by the STEP_A/B signal sent from the CPU (U1A). The rotational direction of the motor is determined by the DIR_A/B signal sent from the custom IC (U11). The strength of PF motor excitation (strong and weak) is switched by the PDOWN signal sent from the CPU (U1A).
The motor drive circuits for the Ribbon Motor F and Ribbon Motor R are the same.

Ribbon motor forcible stop function by circuitry:
The CPU monitors the temperature of the Ribbon Motor F and stops it if its temperature reaches a certain level, as mentioned in “(3-6) Ribbon motor temperature sensor”. In addition to this function, for further safety measures, a circuitry is provided to forcibly stop the ribbon motors if the temperature exceeds over 105°C (221°F). When the temperature reaches to a predetermined level, $\overline{\text{RBTMP}}$ (pin 7) of U16B becomes “Low” level and the supply power to the ribbon motors is shut down.



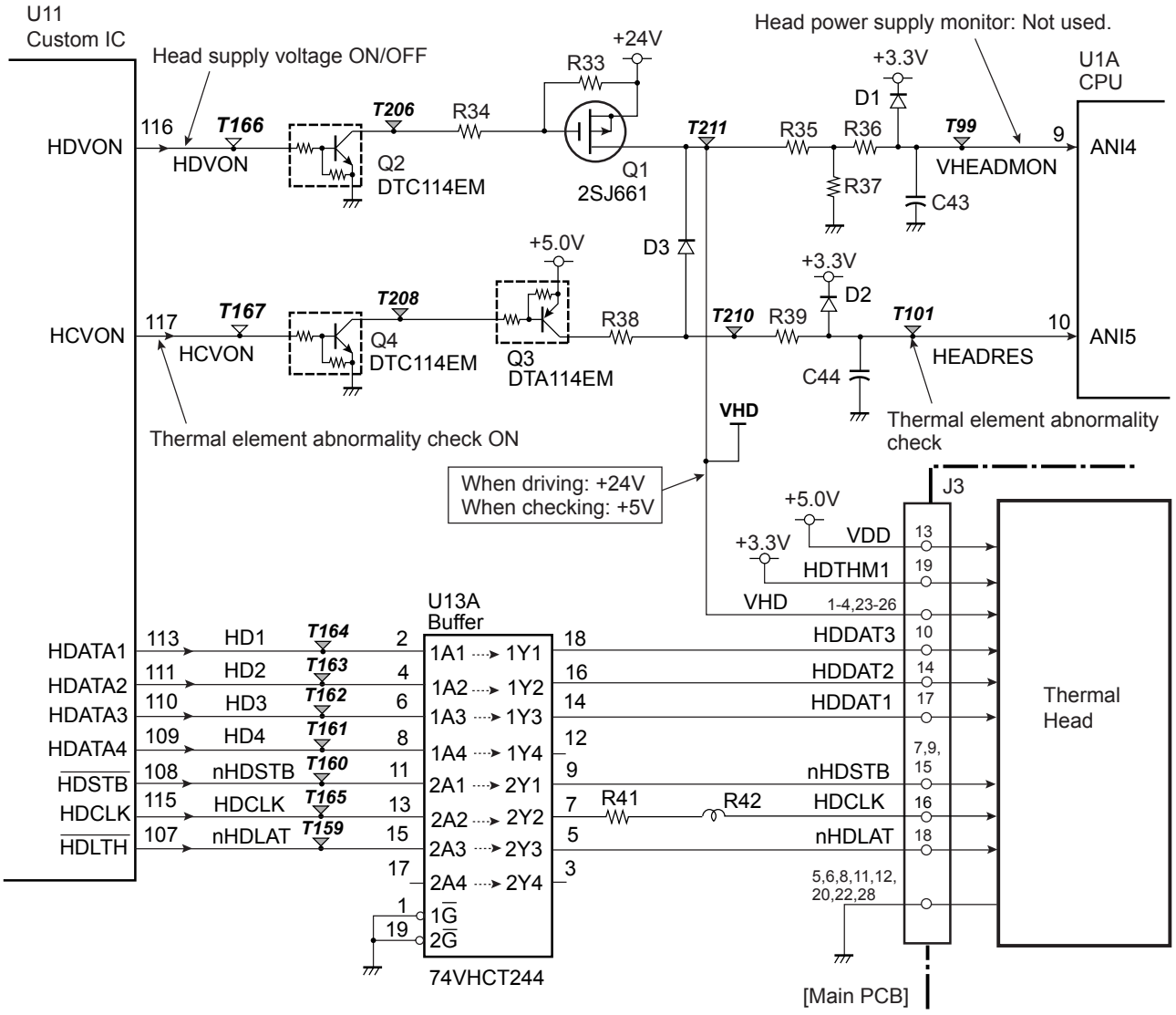
(4-3) Head driver

The head driver is incorporated in the “SA, Head”.

During printing, pin 116 (HDVON) of U11 (Custom IC) goes to "High" level, and Q2 and Q1 turn ON. Thus +24V is supplied to the thermal head (“SA, Head”).

The print data is sent from the Custom IC (U11) to the head driver to select the thermal elements to be heated. The data is sent via HDATA1-HDATA3, $\overline{\text{HDSTB}}$, HDCLK and $\overline{\text{HDLTH}}$ lines (pins 113, 111, 110, 108, 115 and 107 of U11).

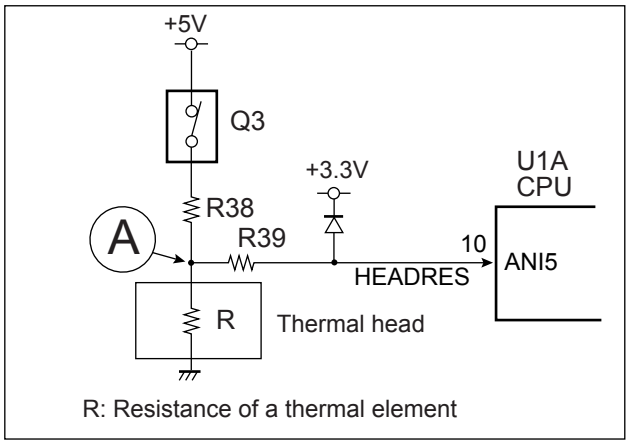
According to the print data received, the thermal head heats the thermal elements to print dots on thermal transfer paper. The width of heating pulse will be changed according to the head temperature to keep the printing density constant.



Thermal resistance check:

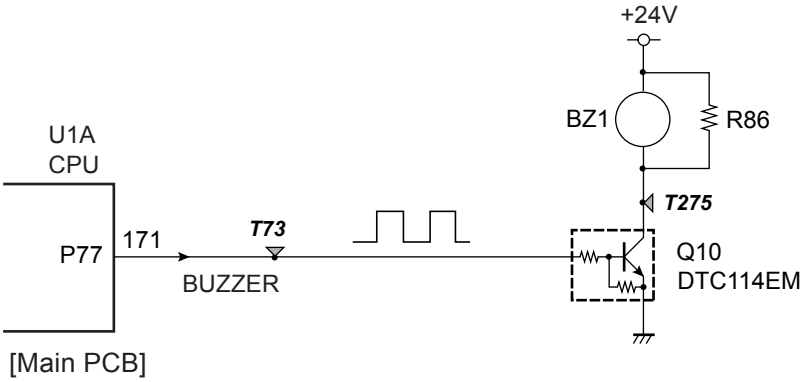
When the printer is turned ON, the thermal resistance check is conducted. If any fault is found, it is memorized and, when the printer is turned ON next time, the CONDITION LED and ERROR LED alternately blink on the operation panel.

During the thermal resistance check, pin 117 (HCVON) of U11 (Custom IC) goes to "High" level, and Q4 and Q3 turn ON. Thus, +5V is supplied to the thermal head, instead of +24V.
The following is a simplified circuitry under checking, where Q3 turns ON and a thermal element "R" is selected. At the point "A", the voltage divided by R38 and R is developed. The CPU monitors this voltage at pin 10 (HEADRES), and check if the voltage is out of the allowable range or not. (For example, if R is open, the voltage at point “A” will be about +3.3V.) Each thermal element is successively checked in this way.



(4-4) Buzzer driver

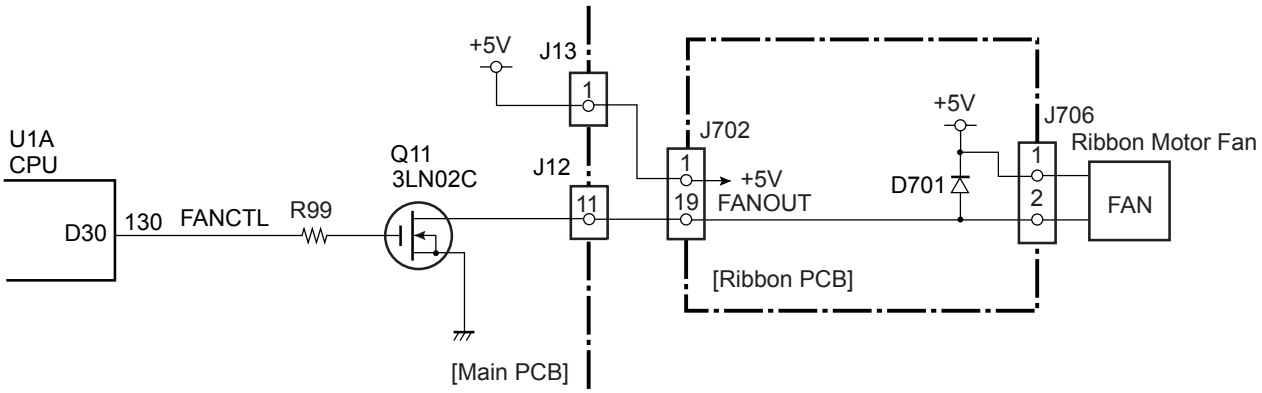
This circuit drives the buzzer.
To sound the buzzer, the CPU outputs a pulse from pin 171 (BUZZER). The transistor Q10 turns ON and OFF, and the buzzer sounds.



(4-5) Fan driver

This circuit drives the ribbon motor cooling fan.

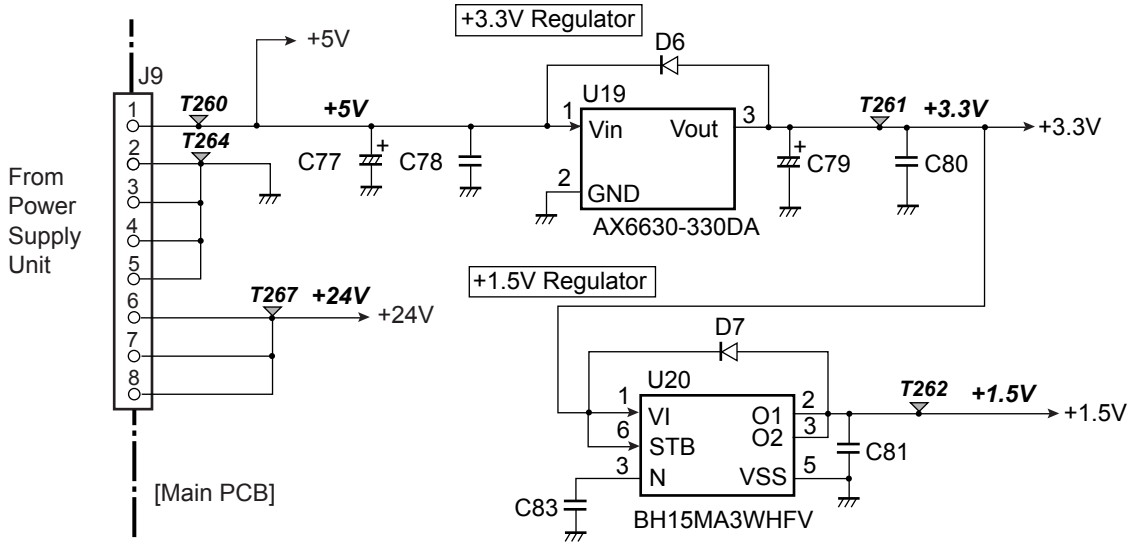
When pin 130 (FANCTL) is set to “Low” level, Q11 turns ON and the fan is driven.
The fan is driven according to the Ribbon Motor F temperature detected by the ribbon motor temperature sensor.
When the temperature is under 45°C (113°F), the fan is not driven.
When the temperature exceeds 45°C (113°F) during ribbon motor running, the fan starts to turn.
If the temperature is 70°C (158°F) or more after the ribbon motor is stopped, the fan is kept turned until the temperature falls below 70°C (158°F).



(5) Other circuits

(5-1) +3.3V/+1.5V circuit

The Main PCB receives +5V and +24V from the “Unit, Power Supply”. +5V and +24V are used for control circuits and driver circuits, respectively.
U19 and U20 are the regulator ICs to produce +3.3V and +1.5V from +5V.
+3.3V is used for various logic circuits, while +1.5V is supplied to the CPU (U1A) only.



(5-2) Reset circuit

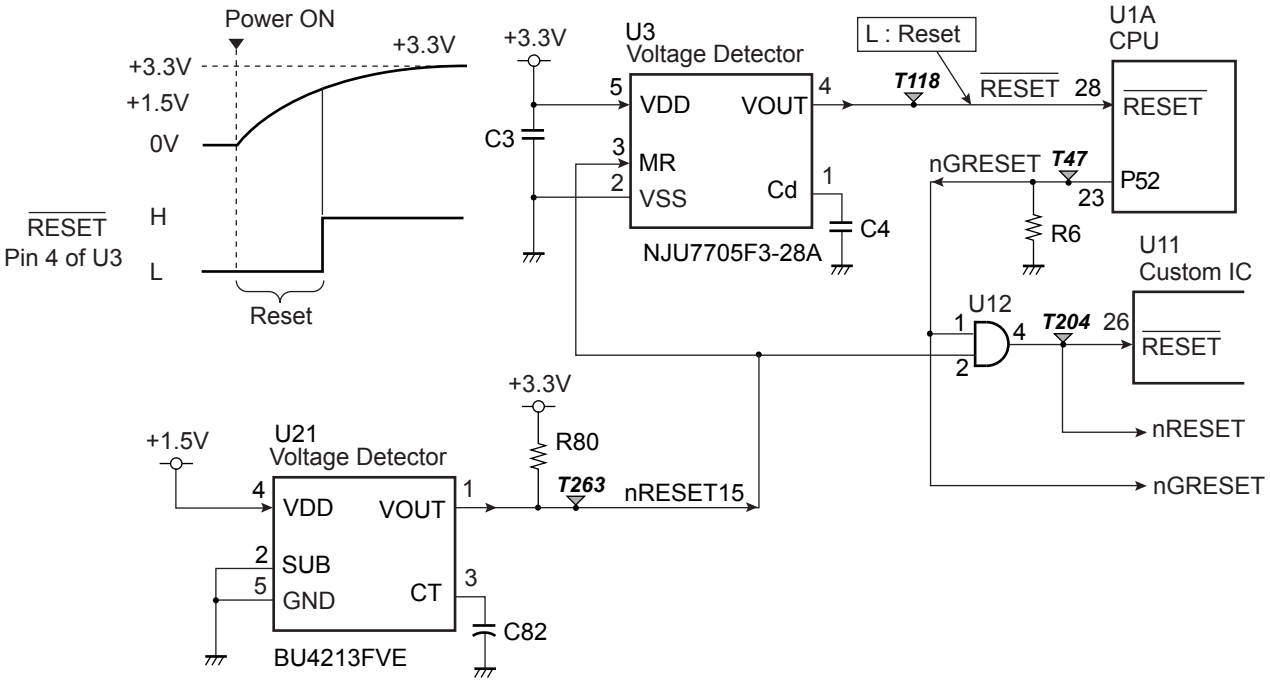
This circuit performs the system reset.

When power is turned ON, +3.3V gradually increases from 0V. When the voltage at pin 5 (+3.3V) of U3 reaches approx. at 2.8 V, U3 is activated and then the RESET signal changes from "Low" to "High" level.

While the RESET signal is “Low”, the CPU (U1A) is reset.

The CPU outputs the nGRESET signal to reset the Custom IC (U11) and other ICs.

+1.5 V is supplied to the CPU. If +1.5 V is shut down, nRESET14 signal changes to “Low” level and all circuits including U1A (CPU) and U11 (Custom IC) are instantly reset.

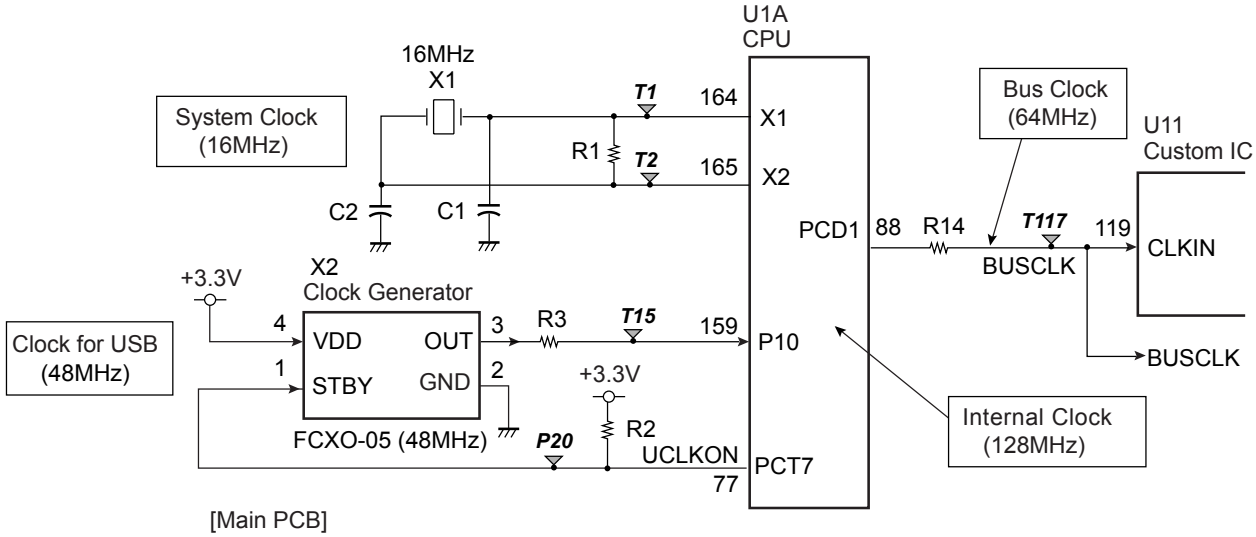


(5-3) Clock circuit

Crystal oscillator X1 oscillates a 16 MHz clock. This clock is send to the CPU (U1A) and the CPU generates a 128 MHz internal clock and 64 MHz clock.

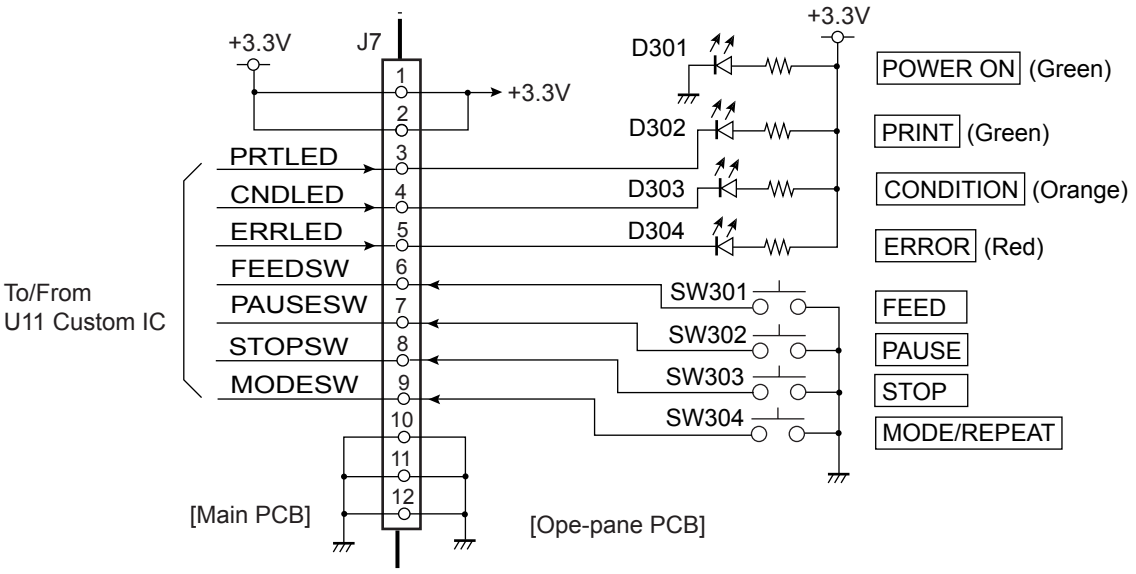
The 64MHz clock is fed to the Custom IC (U11).

Oscillator X2 oscillates a 48 MHz clock used for USB I/F control. It starts oscillation when UCLKON signal (pin 77) is output from the CPU to X2.



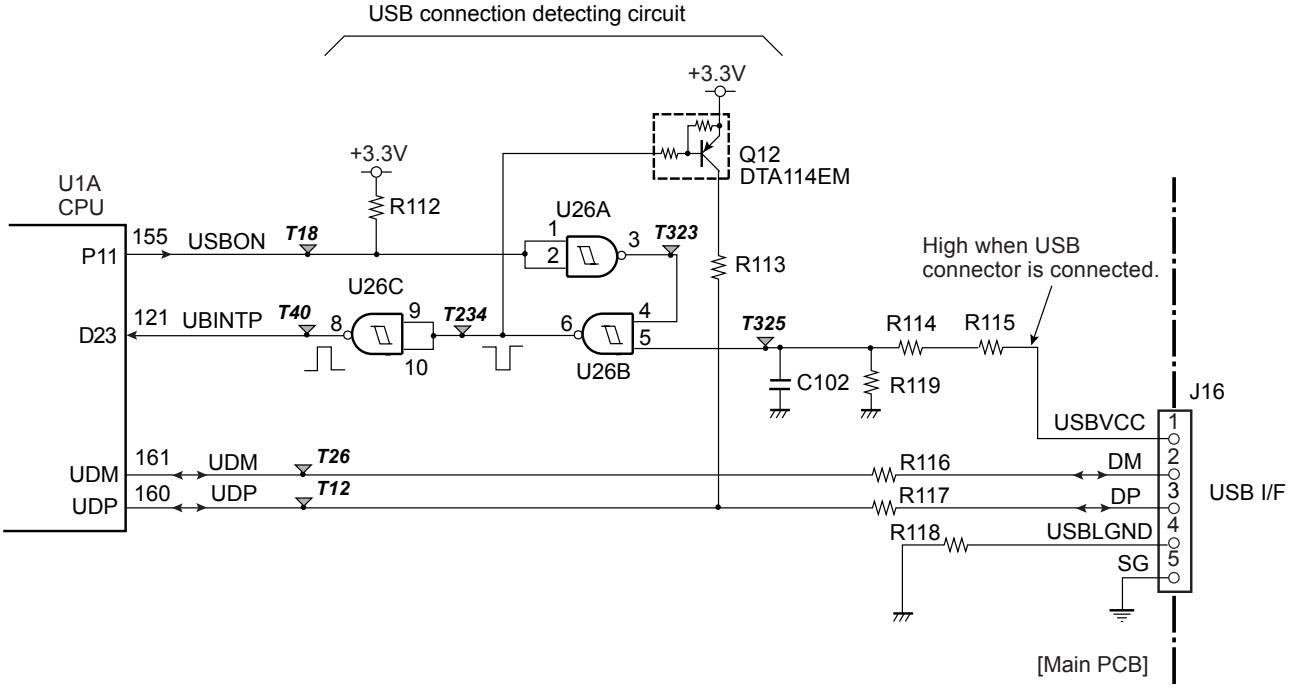
(5-4) Ope-pane circuit

The ope-pane circuit consists of 4 LEDs and 4 switches.
Each LED is directly driven by the Custom IC (U11) and each switch signal is input to the Custom IC (U11). (The following shows the simplified circuit diagram.)



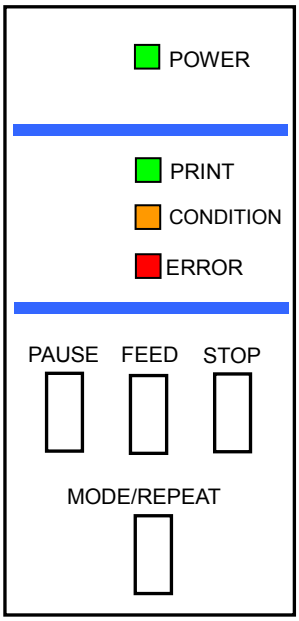
(5-5) USB I/F control circuit

The USB control circuit interfaces with the USB (Universal Serial Bus).
NAND gates (U26A, U26B and U26C) and transistor Q12 consist of a USB connection detecting circuit. When USB connector is connected to the printer, pin 1 of J16 (USBVCC) is set to “High” level. The detection circuit detects this level and output a UBINTP pulse to the CPU to inform of the USB connection.



2-3. Operation Panel

Operation panel is located on the left/front side of the printer.
Operation panel consists of 4 keys and 4 LEDs, which perform to set the condition of the printer and indicate the operating condition.



2-3-1. External view

(1) Keys

There are 4 keys, [MODE/REPEAT], [PAUSE], [FEED] and [STOP]. The function name on the key is selected when the key is pressed.

(2) LEDs

There are 4 LEDs, POWER, PRINT, CONDITION and ERROR. The LEDs light up or blink to indicate printer status, setting modes, or error conditions.
POWER LED lights up when power is turned on. (green)
PRINT LED lights up when the printer is ready to print (on-line state). (green) It is also used in Menu Setting mode and Sensor Adjustment mode.
CONDITION LED lights up in Menu Setting mode or Sensor Adjustment mode. (orange)
ERROR LED lights or blinks when error occurs. (red)
(To indicate an error, PRINT and CONDITION LEDs will be also used.)

2-3-2. Operation using the keys

The following explains the normal operation and test operation accessible by pressing and holding the keys while turning ON the power.
In this manual, pressing and holding the key while turning the power ON is described as follows:

[Key name] + [Key name] + [POWER]

Example: **[MODE] + [POWER]** (to enter menu setting mode)

(1) Normal operation

The following two operations are available.

Operation	Description	Remarks
[PAUSE] + [FEED] + [STOP] + [POWER]	Enters sensor adjustment mode.	See (1-1). For details, see the User's Manual.
[MODE] + [POWER]	Enters menu setting mode.	See (1-2). For details, see the User's Manual.

(1-1) Sensor adjustment mode

According to media to be used, you need to perform the sensor adjustment.
The following shows the rough description how to adjust the sensor. For details, refer to the User's manual.
Before performing the sensor adjustment, select the Media Sensor menu ("See Through", "Reflect", or "None") according to media to be used. See "(1-2) Menu setting mode" on the next page.

Media Sensor menu	Media
See Through	Label paper or tag with U-shaped notches
Reflect	Tag with black marks
None	Continuous media

All operations are made with the key.

1. Entering the sensor adjustment mode (**[PAUSE]** + **[FEED]** + **[STOP]** + **[POWER]**)

2. Selecting the sensor to be used (either the transparent sensor or reflective sensor)
   Transparent sensor: Label paper, Tag with U-shaped notches
   Reflective sensor: Tag with black marks

3. Positioning of the sensor(s) against media

4. Sensitivity adjustment using actual media to be used

(1-2) Menu setting mode

Set the menu according to your requirements. The following shows the menu settings print sample. To enter this mode, while pressing and holding the **[MODE]** key, turn ON the power. (**[MODE] + [POWER]**) For details, refer to the User's Manual.

Machine Information

Model Number	: CL-S631
Boot Version	: X.X
ROM Version	: DRXXXXXX
ROM Date(DD//MM//YY)	: XX/XX/XX
ROMCheck Sum	: XXXX
Head Check	: OK
Print Counter	: 0002.2km
Service Counter	: 0002.2km
Cut Counter	: 0
Sensor Monitor	: 2.78V
Option Interface	: None

Current Menu Settings

[Global Config Menu]

Config Set	: 1

[PageSetup Menu]

Print Speed	: 4 IPS
Print Darkness	: 10
Darkness Adjust	: 00
Print Method	: Thermal Transfer
Ribbon Winding	: Outside
Continuous Media Length	: 4.00 inch
Vertical Position	: 0.00 inch
Horizontal Shift	: 0.00 inch
Vertical Image Shift	: 0.00 inch
Media Sensor	: See Through
Small Media Adjustment	: Off
Small Media Length	: 1.00 inch
Symbol Set	: PM

[System Setup Menu]

Sensor Level	: 1.5 V
Paper End Level	: 2.80 V
Error Reporting	: On Printing
Buzzer Select	: On
Metric/Inch	: Inch
Max Media Length	: 10.00 inch
Settings Lock	: Off
Keyboard Lock	: Off
Control Code	: STD
Emulation Select	: DM4
Emulation Auto Detect	: On

[After Print Menu]

AutoConfigure	: On
Function Select	: Tear
Cutter Action	: Backfeed
Paper Position	: 0.00 inch
Mode/Repeat Key	: Disabled

[Interface Menu]

RS-232C Baud rate	: 9600
RS-232C Parity	: None
RS-232C Length	: 8 bit
RS-232C Stop bit	: 1 bit
RS-232C X-ON	: Yes
IEEE1284	: On
USB Device Class	: Printer
USB VCOM Protocol	: Auto

(2) Test mode

The following test modes are available.

Operation	Description	Remarks
[FEED] + [POWER]	Enters self print mode	See (2-1).
[STOP] + [POWER]	Enters hex dump mode	See (2-2).

(2-1) Self print mode

You can check the printing quality by printing the self print pattern.

For label (prints 2 labels):

1. While pressing and holding the **[FEED]** key, turn on the power.
2. When the PRINT LED blinks slowly (later, it will blink rapidly), release the **[FEED]** key.
   The printer enters self print mode. The label is fed, self test printing is made for two labels, and then printing stops.
3. To repeat printing, press the **[FEED]** key again.
   To exit self print mode, turn off the power.

For continuous media:

1. While pressing and holding the **[FEED]** key, turn on the power.
2. The PRINT LED will blink slowly. When it changes to rapid blink, release the **[FEED]** key.
   The printer enters self print mode and self test printing is made.
3. To repeat printing, press the **[FEED]** key again.
   To exit self print mode, turn off the power.

[Print pattern in self print mode]

Media feed direction

(2-2) Hex dump mode

You can print the data in the receive buffer in the hexadecimal form.

For label:

1. While pressing and holding the **[STOP]** key, turn on the power.
2. When the PRINT LED blinks slowly (later, it will blink rapidly), release the **[STOP]** key.
   The printer enters hex dump mode and hex dump printing starts.
   To exit hex dump mode, turn off the power.

For continuous media:

1. While pressing and holding the **[STOP]** key, turn on the power.
2. The PRINT LED will blink slowly. When it changes to rapid blink, release the **[STOP]** key.
   The printer enters hex dump mode and hex dump printing starts.
   To exit hex dump mode, turn off the power.

[Dump list example]

```
DUMP LIST

02 40 30 31 30 30 0D02 60 30 30 32 30 0D 02 4C    .M0100..c0020..L
44 31 31 0D31 30 30 30 30 30 30 30 30 31 30    D11.100000000010
30 30 31 30 31 32 33 34 35 36 37 38 39 3A 3B 3C   0010123456789:;<
```

(3) Factory/Service mode

Operation	Description	Remarks
All keys + [POWER]	Enters factory mode and service mode	

(3-1) General

Factory mode and Service mode are available for maintenance.

Factory mode:

You can change the factory-set items such as logical shift of the sensor or head, and double heat (printing the same dot twice).

Note:

- **In Factory mode, DO NOT change the factory-set values unless you need it, since there are essential items related to printing accuracy, etc.**

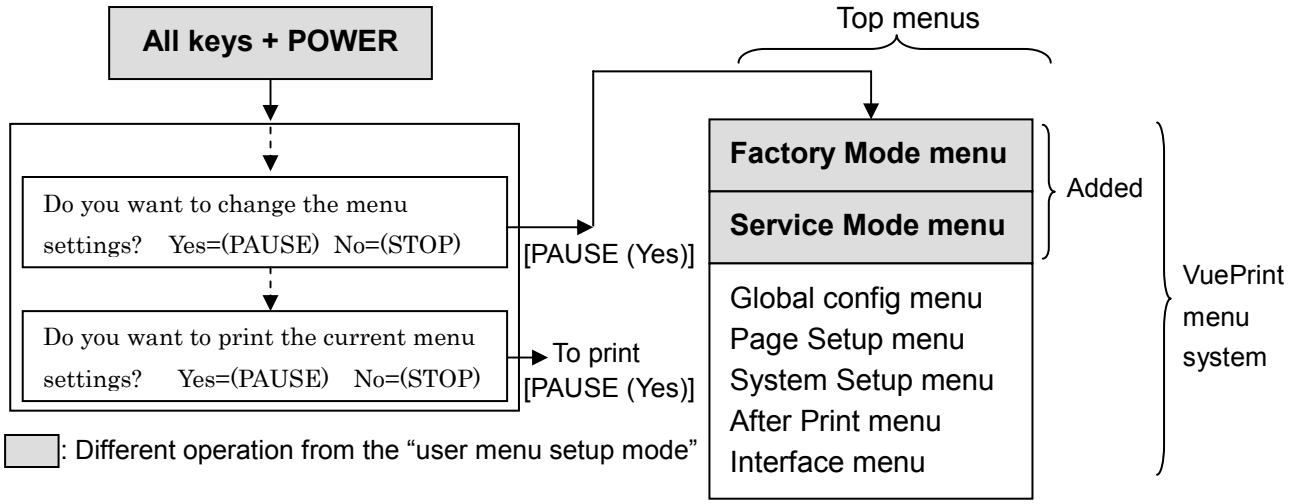
Service mode:

You can perform checks such as “head check “and “counter print” to print the total print length since the printer is firstly used.

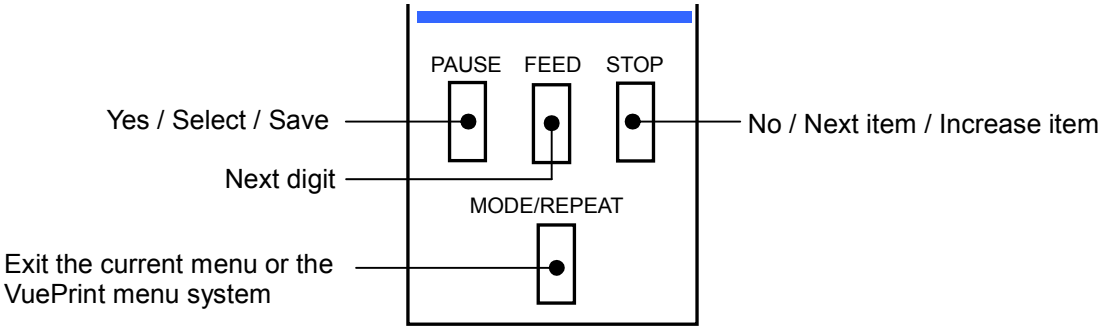
(3-2) How to enter the Factory/Service Mode

How to enter Factory/Service mode differs from the “user menu setup mode” operation. However, once you have entered Factory/Service mode, the basic operation is the same as that for the “user menu setup mode” explained in the User’s manual.

The Factory/Service mode menu appears at the top of the user menus as follows:



The menu operation principle is the same as for the “user menu setup mode” operation. The keys to be used and the functions are as follow:



[Menu settings print sample in Factory/Service mode]

Machine Information

Model Number	: CL-S631
Boot Version	: X.X
ROM Version	: DRXXXXXX
ROM Date(DD//MM//YY)	: XX/XX/XX
ROMCheck Sum	: XXXX
Head Check	: OK
Print Counter	: 0002.2km
Service Counter	: 0002.2km
Cut Counter	: 0
Sensor Monitor	: 2.78V
Option Interface	: None

Factory Mode Settings

Through Sensor Position	: 0 dot
Reflect Sensor Position	: 0 dot
Machine Tear Position	: 0 dot
Machine Cut Position	: 0 dot
Machine Peel Position	: 0 dot
Machine Horizontal Pos.	: 8 dots
AutoCal Mode	: On
See Through Sensor	: 0.0 V
Reflect Sensor	: 0.0 V
SeeThrough Sensitivity	: Low
Reflect Sensitivity	: Low
Through Cal Level	: 2.30 V
Reflect Cal Level	: 2.10 V
SensNone Cal Level	: 2.05 V
Darkness Rate	: High
Double Heat Menu	: Off
PowerOn Head Check	: On
Head Check Start Pos.	: Dot 1
Head Check Stop Pos.	: Dot 848
Head Error Print	: No
Max Page Length	: 32 inch
Ribbon Control	: Auto
Ribbon End Detection	: Quick
Void to TOF	: Off
Reverse Media Length	: 0.00 inch
Min Cut Length	: Default
Paper End Sensor	: On
Paper End Length	: Default
Parallel Error Output	: On
Auto Online	: Off
Auto Online Delay	: 2 sec
Top Form Sensing	: On
USB Serial Number	: Off
Auto Exec Print	: On
Config Print Layout	: Standard
Head Clean Message	: Off
Print Preference	: Darkness
CLPID Mode	: Off

Submenus for maintenance only

Current Menu Setting

[Global Config Menu]
Config Set : 1

[PageSetup Menu]
Print Speed : 4 IPS

(to be continued)

Print Darkness	: 10
Darkness Adjust	: 00
Print Method	: Thermal Transfer
Ribbon Winding	: Outside
Continuous Media Length	: 4.00 inch
Vertical Position	: 0.00 inch
Horizontal Shift	: 0.00 inch
Vertical Image Shift	: 0.00 inch
Media Sensor	: See Through
Small Media Adjustment	: Off
Small Media Length	: 1.00 inch
Symbol Set	: PM
[System Setup Menu]	
Sensor Level	: 1.5 V
Paper End Level	: 2.80 V
Error Reporting	: On Printing
Buzzer Select	: On
Metric/Inch	: Inch
Max Media Length	: 10.00 inch
Settings Lock	: Off
Keyboard Lock	: Off
Control Code	: STD
Emulation Select	: DM4
Emulation Auto Detect	: On
[After Print Menu]	
AutoConfigure	: On
Function Select	: Tear
Cutter Action	: Backfeed
Paper Position	: 0.00 inch
Mode/Repeat Key	: Disabled
[Interface Menu]	
RS-232C Baud rate	: 9600
RS-232C Parity	: None
RS-232C Length	: 8 bit
RS-232C Stop bit	: 1 bit
RS-232C X-ON	: Yes
IEEE1284	: On
USB Device Class	: Printer
USB VCOM Protocol	: Auto

[Procedure to enter Factory/Service Mode]

1. Set media.
2. While pressing and holding **all keys**, turn on the power. (**ALL keys + [POWER]**)
   The printer enters Factory/Service mode. The PRINT LED and CONDITION LED light up and the following message is printed on media.

```
Citizen CL-S631 VuePrint Menu System

The four control panel buttons are used to select different options.  Generally:
Yes / Select / Save              = PAUSE (P) key
No / Next Item / Increase Item   = STOP (S) key
Next Digit                       = FEED (F) key
Exit to previous menu            = MODE (M) key

Do you want to reset this printer to factory settings?  Yes=(PAUSE)  No=(STOP)
```

3. Press the **[STOP]** key to skip to the next message.
   Then, the following message is printed.

```
Do you want to print the current menu settings?  Yes=(PAUSE)  No=(STOP)
```

4. Press the **[STOP]** key to skip to the next message.
   Then, the following message is printed.

```
Do you want to change the menu settings?  Yes=(PAUSE)  No=(STOP)
```

5. Press the **[PAUSE]** key to enter the menu settings mode.
   Then, the following top menu is printed.

```
Do you want to change "Factory Mode Menu" items?
    Yes=(PAUSE)  No=(STOP)  Exit=(MODE)
```

   • To enter the Factory Mode menu, proceed to the next step 6.
   • To skip to the next top menu (Service Mode menu), press the **[STOP]** key. See step 7.
   • To return to the previous one, press the **[MODE]** key.

6. Press the **[PAUSE]** key to enter the submenus.
   * The following submenus under the Factory Mode menu will be printed as you press the [PAUSE] key repeatedly.
   * For setting each item, see "(3-3)-(a) Factory Mode menu table", and setting example "How to change the value in the Factory Mode menu" on page 2-48.

```
Through Sensor Position      +000
Save=(PAUSE)  Next Digit=(FEED)  Change value=(STOP)  Exit=(MODE)
Reflect Sensor Position      +000
Save=(PAUSE)  Next Digit=(FEED)  Change value=(STOP)  Exit=(MODE)
Mach Tear Pos                +000
Save=(PAUSE)  Next Digit=(FEED)  Change value=(STOP)  Exit=(MODE)
(to be continued)
```

Mach Cut Pos **+000**
Save=(PAUSE) Next Digit=(FEED) Change value=(STOP) Exit=(MODE)

Mach Peel Pos **+000**
Save=(PAUSE) Next Digit=(FEED) Change value=(STOP) Exit=(MODE)

Mach Hor Pos **+08**
Save=(PAUSE) Next Digit=(FEED) Change value=(STOP) Exit=(MODE)

AutoCal Mode **ON**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

SeeThrough Sensor **0.0**
Save=(PAUSE) Next Digit=(FEED) Change value=(STOP) Exit=(MODE)

Reflect Sensor **0.0**
Save=(PAUSE) Next Digit=(FEED) Change value=(STOP) Exit=(MODE)

SeeThrough Sensitivity **Low**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

Reflect Sensitivity **Low**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

Darkness Rate **High**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

Double Heat Menu **OFF**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

PowerOn Head Check **ON**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

Ribbon End Detection **Quick**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

Parallel Error Out **ON**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

USB Serial Number **OFF**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

Auto Exec Print **ON**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

Config Print Layout **Standard**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

Print Preference **Darkness**
Save=(PAUSE) Change value=(STOP) Exit=(MODE)

Note: In the actual printing, the cursor "^" will be printed instead of "_(underline)".

7. When the Service Mode Menu message is printed as shown below, press the [PAUSE] key to enter its submenus.
   * The following submenus will be printed successively as you press the [PAUSE] key repeatedly.
   * When you press the [PAUSE] key, check is done and the check result will be printed. For performing each item, see "(3-3)-(b) Service Mode menu table" and setting example "How to perform the check in the Service Mode menu" on page 2-50.

```
Do you want to change "Service Mode Menu" items?
 Yes=(PAUSE)   No=(STOP)   Exit=(MODE)
   Head Check          Exec
   Yes=(PAUSE)   No=(STOP)   Exit=(MODE)
   ROM Check           Exec
   Yes=(PAUSE)   No=(STOP)   Exit=(MODE)
   RAM Check           Exec
   Yes=(PAUSE)   No=(STOP)   Exit=(MODE)
   Print Counter       Exec
   Yes=(PAUSE)   No=(STOP)   Exit=(MODE)
   Service Counter     Exec
   Yes=(PAUSE)   No=(STOP)   Exit=(MODE)
   Cutter Counter      Exec
   Yes=(PAUSE)   No=(STOP)   Exit=(MODE)
Do you want to change "Page Setup Menu" items?
 Yes=(PAUSE)   No=(STOP)   Exit=(MODE)
```

8. To exit the Factory/Service mode, press the **[MODE]** key.

(3-3) Factory/Service Mode menu table

The following table shows the value and description of each submenu under Factory Mode menu and Service Mode menu.

(a) Factory Mode menu table

*: "+" shows that the object logically moves forward/rightward. "-" shows that the object logically moves backward/leftward.

**: For both CL-S621/S621C and CL-S631, 8 dots correspond to 1 mm for each adjustment value. (Namely, 203 dots correspond to 1".)

Submenu Name	Adjustable Value (Default Value)	Description
Through Sensor Position (See **Note**.)	-256 to +256 [dots] (+000 [dots])	Logically shifts the transparent sensor position back and forth. (-32 to +32 mm, -1.26 to +1.26")
Reflect Sensor Position (See **Note**.)	-256 to +256 [dots] (+000 [dots])	Logically shifts the reflective sensor position back and forth. (-32 to +32 mm, -1.26 to +1.26")
Mach Tear Pos	-256 to +256 [dots] (+000 [dots])	Logically shifts the tear off position back and forth. (-32 to +32 mm, -1.26 to +1.26")
Mach Cut Pos	-256 to +256 [dots] (+000 [dots])	Logically shifts the cutting position back and forth. (-32 to +32 mm, -1.26 to +1.26") (Optional)
Mach Peel Pos	-256 to +256 [dots] (+000 [dots])	Logically shifts the peel position back and forth. (-32 to +32 mm, -1.26 to +1.26") (Optional)
Mach Hor Pos	-16 to +16 [dots] (+08 [dots])	Logically shifts the head position back and forth. (-3 to +1 mm, -0.12 to +0.04")
AutoCal Mode	ON, OFF (ON)	Automatically controls the light amount in each Media sensor menu (See Through, Reflect, None).
SeeThrough Sensor	0.0 to 3.3 [V] (0.0 [V])	This menu is effective when "AutoCal Mode" is set to OFF. The light amount in Media sensor menu "See Through" can be changed manually. Larger value emits larger amount of light.
Reflect Sensor	0.0 to 3.3 [V] (0.0 [V])	This menu is effective when "AutoCal Mode" is set to OFF. The light amount in Media Sensor menu "Reflect" can be changed manually. Larger value emits larger amount of light.
SeeThrough Sensitivity	Low, Medium, High (Low)	This menu is effective when "AutoCal Mode" is set to OFF. The sensitivity of the transparent sensor can be changed in 3 levels.
Reflect Sensitivity	Low, Medium, High (Low)	This menu is effective when "AutoCal Mode" is set to OFF. The sensitivity of the reflective sensor can be changed in 3 levels.
Darkness Rate	High, Low (High)	The rate for darkness increase/decrease can be set.
Double Heat Menu	ON, OFF (OFF)	To display the item "Double Heat Menu" in the "PageSetup Menu" or not is selectable.

Submenu Name	Adjustable Value (Default Value)	Description
PowerOn Head Check	ON, OFF (ON)	To perform the head check at power ON or not is selectable.
Ribbon End Detection	Quick, Normal, Slow (Quick)	Sets the ribbon end detection time.
Parallel Error Out	ON, OFF (ON)	To set the Fault signal to ON or not at the time of error occurrence in parallel interface is selectable.
USB Serial Number	ON, OFF (OFF)	To send the serial number to the host when the USB interface is connected to the printer or not is selectable.
Auto Exec Print	ON, OFF (ON)	To execute the Auto Exec file stored in the printer at power ON or not is selectable.
Config Print Layout	Standard, Reversed (Standard)	Print layout type can be selected. Standard: Prints setting items on the left and set values on the right. Reversed: Prints set values on the left and setting items on the right.
Print Preference	Darkness, Speed (Darkness)	To put the priority on printing density or printing speed is selectable.

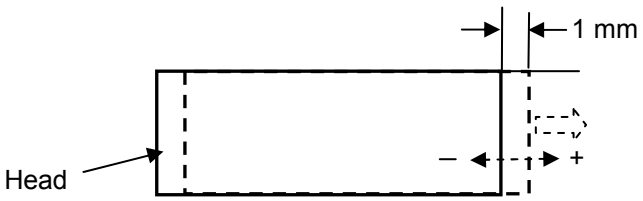
Note: "Through Sensor Position" adjustment and "Reflect Sensor Position" adjustment must be done after one of the following parts is replaced.

- SA, Main PCB
- SA, Transparent Sensor PCB
- SA, Reflective Sensor PCB

How to change the value in the Factory Mode menu

For example, the following shows how to logically move the thermal head position 1 mm (0.04") toward the right side. In this case, you should add 8 (dots) to the current value (e.g. +08).

• Variable range: -16 to +32 dots (default +08 dots) (-2 to +4 mm, -0.08 to +0.16")
• 8 dots correspond to 1 mm. (203 dots correspond to 1".)



[Front]

1. Perform steps 1-6 on page 2-43 to enter the Factory Mode menu. See "(b) How to enter the Factory/Service Mode".
2. Press the **[PAUSE]** key until "Mach Hor Pos" submenu is printed.

```
Do you want to change "Factory Mode Menu" items?
     Y es=(PAUSE) No=(STOP) Exit=(MODE)
     Through Sensor Position        +000
     S ave=(PAUSE)   Next Digit=(FEED)   Change value=(STOP)   Exit=(MODE)
                  :
                  :
     Mach Hor Pos                   +08
     Save=(PAUSE)   Next Digit=(FEED)   Change value=(STOP)   Exit=(MODE)
```

Note: In the actual printing, the cursor "^" will be printed instead of "_(underline)".

3. To set the value to 16 (8 plus 8), press the **[FEED]** key to move the cursor to the next digit (+08), and then press the **[STOP]** key once to specify "1".
   Each time you press the key, the value of the current digit with the cursor will scroll (0, 1, 2, 3, 4, ..., 9, 0).
4. Next, press the **[FEED]** key to move the cursor to the next digit (+18).
   The changed value is printed.

```
     Mach Hor Pos                   +18
     Save=(PAUSE)   Next Digit=(FEED)   Change value=(STOP)   Exit=(MODE)
```

5. Press the **[STOP]** key 8 times to specify "6".
   Each time you press the key, the value will scroll (8, 9, 0, 1, ..., 6).
6. To save the set value, press the **[PAUSE]** key.
   The set value will be printed. Be sure that the new value is "16", and then press the **[MODE]** key to exit the item.
   * If the value is not the one you expected, repeat above operation.

```
     Mach Hor Pos                   +16
     Save=(PAUSE)   Next Digit=(FEED)   Change value=(STOP)   Exit=(MODE)
```

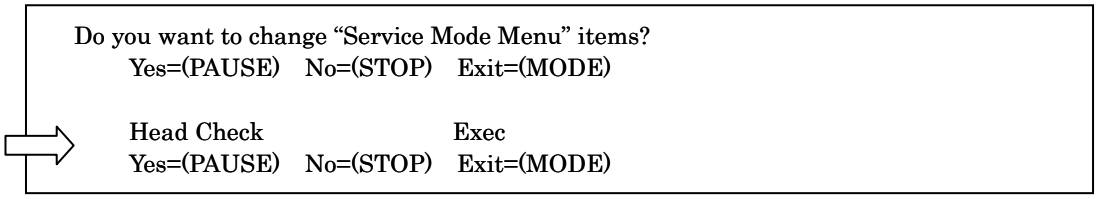
(b) Service Mode menu table

Submenu Name	Value	Description
Head Check	None	**[PAUSE]**: Checks the number of defective thermal elements and prints it. If no defective thermal element is found, "0" will be printed. Example: Bad head element: 0 dot(s) **[STOP]:** Nothing is printed.
ROM Check	None	**[PAUSE]**: Performs ROM checksum test, and prints the check result (OK or NG) and the checksum value. Example: PROGRM ROM OK 4F4E **[STOP]:** Nothing is printed.
RAM Check	None	**[PAUSE]**: Performs RAM capacity check and prints the check result. Example: RAM OK 16384K **[STOP]:** Nothing is printed.
Print Counter	None	**[PAUSE]**: Prints the total printed length accumulated from when the printer is firstly used. Example: Length 1234.5Km **[STOP]:** Nothing is printed.
Service Counter	None	**[PAUSE]**: Prints the service counter length in Km accumulated from when it was reset last time. Example: Length 0123.4Km Clear Service Counter ? Yes=(PAUSE) No=(STOP) To clear the service counter, press the **[PAUSE]** key again. To quit, press the **[STOP]** key. **[STOP]:** Nothing is printed.
Cut Counter	None	**[PAUSE]**: Prints the cut counter value accumulated from when it was reset last time. Example: Count 10 Clear Cut Counter ? Yes=(PAUSE) No=(STOP) To clear the cut counter, press the **[PAUSE]** key again. To quit, press the **[STOP]** key. **[STOP]:** Nothing is printed.

How to perform the check in the Service Mode menu

For example, the following shows how to perform the head check.

1. Perform steps 1-7 on pages 2-43 to 2-45 to enter the Service Mode menu. See "(b) How to enter the Factory/Service Mode".
2. Press the **[PAUSE]** key until "Head Check" submenu is printed.



3. Press the **[PAUSE]** key to check for head abnormality.
   The number of faulty thermal elements is printed.
   Example: Bad head element: 0 dot(s)
   After printing the check result, the next submenu is automatically printed.

   If you press the [**STOP**] key, nothing is printed.

2-4. Interface

2-4-1. Serial Interface

(1) Specifications

System	Start/stop asynchronous full duplex communication
Signal level	RS-232C
Baud rate	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Data length	7 bits, 8 bits
Stop bit	1 bit, 2 bits
Parity	Odd, even, none
Connector	D-SUB JHBY-25S-1A3G 25PIN (JST)

(2) Signal line and pin assignment

Pin No.	Signal Abbr.	Signal name	Function
1	FG	Frame ground	Protective grounding
2	TXD	Transmit Data	Signal line that transmits data from the printer to the host
3	RXD	Receive data	Signal line that transmits data from the host to the printer
4	RTS	Request To Send	Pulled up to +12V through 3.3 kΩ
5	NC	------	Not used
6	DSR	Data Set Ready	Signal line that is active when the host can interface with the printer
7	SGND	Signal ground	Signal grounding line
8-17, 19	NC	------	Not used
18	VCC	+5V	(Factory use only)
20	DTR	Data Terminal Ready	Signal line that is active when the printer can interface with the host
21-25	NC	------	Not used

(3) Protocol

XON/XOFF system:

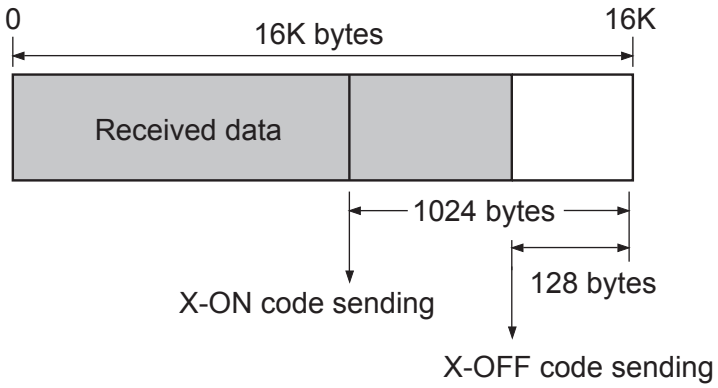
Controlled with the data transmission request signal X-ON (11H) code and the data transmission stop request signal X-OFF (13H) code.

The conditions for the X-ON code output are as follows:

- When the printer is turned from off-line to on-line.
- When the remaining of receive buffer is 1024 bytes or more after sending X-OFF code.

The conditions for the X-OFF code output are as follows:

- When the remainder of receive buffer is 128 bytes or less.
- When the printer is turned from on-line to off-line.
  When the media end is detected.
  When a printer error occurs.



READY/BUSY System:

DTR signal is controlled with READY ("High")/BUSY ("Low") level.

DTR turns to "High (Ready)" in the following conditions:

- When the printer is in on-line mode, and
- When the remaining buffer is 128 bytes or more.
  (After DTR becomes "High", DTR retains "High" until the remaining buffer becomes 1024 bytes or less.)

DTR turns to "Low (Busy)" in the following conditions:

- When the printer is in off-line mode.
- When the remaining buffer is less than 128 bytes.
  (After DTR becomes "Low", DTR retains "Low" until the remaining buffer becomes 1024 bytes or more.)

2-4-2. USB Interface

(1) Specifications

Standards	Complies with Universal Serial Bus Specification
Transmission speed	Compatible with 12Mbps (full speed) transmission
Receive buffer	16K bytes
Connector	DUSB DUSB-BRA42-T11 (DDK)

(2) Signal line and pin arrangement

Pin No.	Signal code	Signal	Function
1	VBUS	USB power	USB power (+5V)
2	D+	Signal line +	+ signal line
3	D-	Signal line -	- signal line
4	GND	GND	GND

2-4-3. Parallel Interface (Option)

(1) Specifications

Transmission system	8-bit parallel data
Receive buffer size	16K bytes
Transmission modes	**Compatible mode** It is an asynchronous forward channel mode to send the byte width data from the host to the printer. The interface line of the data is operated in accordance with signal line definitions of Centronics. **NIBBLE mode** It is an asynchronous reverse channel mode to send the data from the printer to the host. In Nibble mode, 4-bit data (half byte) is sent at a time using the 4 status lines (FAULT, SELECT, PE, and BUSY). To send one complete byte data, the printer sends 2 nibbles (8 bits in total) to the host. Nibble mode is usually combined with Compatible mode to create a complete bi-directional channel. **ECP mode** ECP mode permits bi-directional asynchronous data transmission, and by means of interlock handshake, it does not require the timing necessary with Compatible mode.
Signal level	IEEE1284 compatible

(2) Signal line and pin assignment

Pin No.	Signal name	I/O	Function in Compatible Mode
1	$\overline{\text{STROBE}}$	Input	Strobe signal to read in 8-bit data
2-9	DATA0-7	Input	8-bit parallel signal
10	$\overline{\text{ACKNLG}}$	Output	8-bit data request signal
11	BUSY	Output	Signal specifying printer busy
12	PERROR	Output	Signal specifying media end
13	SELECT	Output	Signal specifying if the printer is on-line (printing enabled) or off-line
14	AUTOFD	Input	Invalid (ignored)
15	NC	---	Not used
16	SGND	---	Signal ground
17	FGND	---	Frame ground
18	P.L.H	Output	Peripheral logic high (pulled up to +5V at 1KΩ)
19-30	GND	---	Ground for twisted pair return
31	$\overline{\text{PRIME}}$	Input	Printer reset
32	$\overline{\text{FAULT}}$	Output	Signal specifying printer error
33	GND	---	Signal ground
34	NC	---	Not used
35	FUSE	---	Not used
36	SELECTIN	Input	Invalid (ignored)

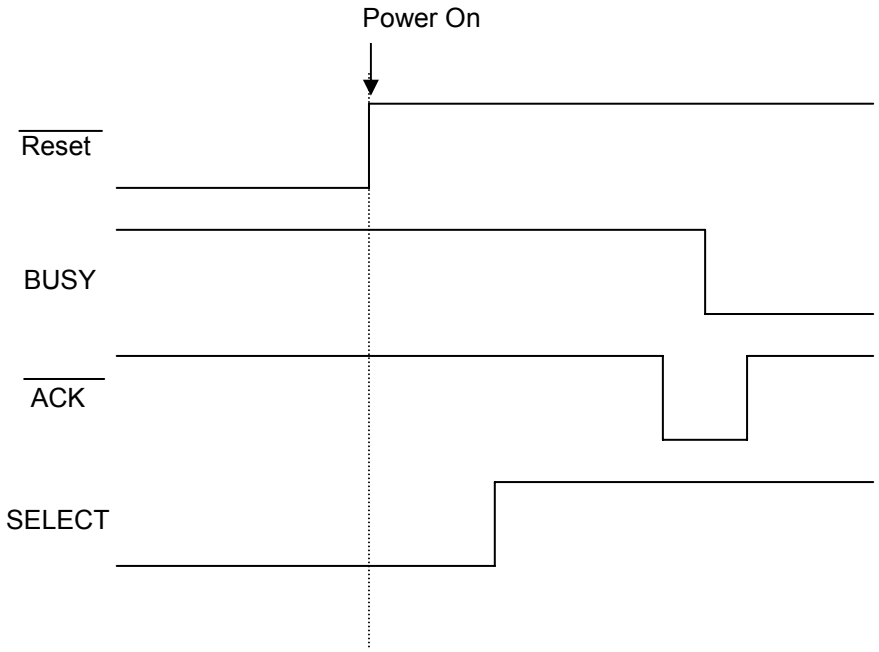
(3) Parallel port status signals when an error occurs

The following table shows the status signal change when an error occurs.
Under the specifications for this bi-directional parallel interface, the parallel port status signals when an error occurs are, as shown below, partially processed differently than with Compatible mode used up till now. When bi-directional parallel interface is on in the setting menu, even if a printer error has occurred, the BUSY signal line is not active ("H").

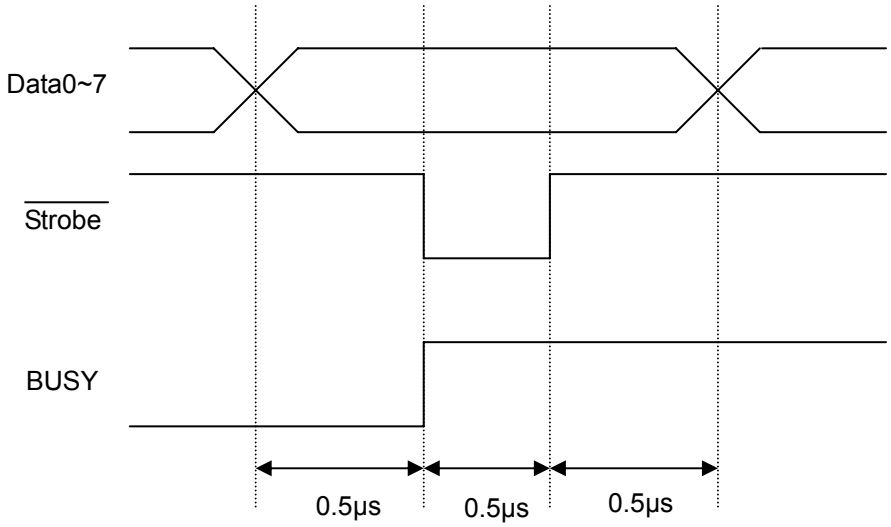
Error	Compatible mode
Paper end	Busy: L → H PError: L → H Select: H → L $\overline{\text{Fault}}$: H → L
Error other than paper end • Head open • Other	Busy: L → H PError: L→ unchanged Select: H → L $\overline{\text{Fault}}$: H → L
Conditions for Busy	• Receive buffer full • Data being read • Error

(4) Compatible timing specification

[When power is on] (Timing to go on-line)

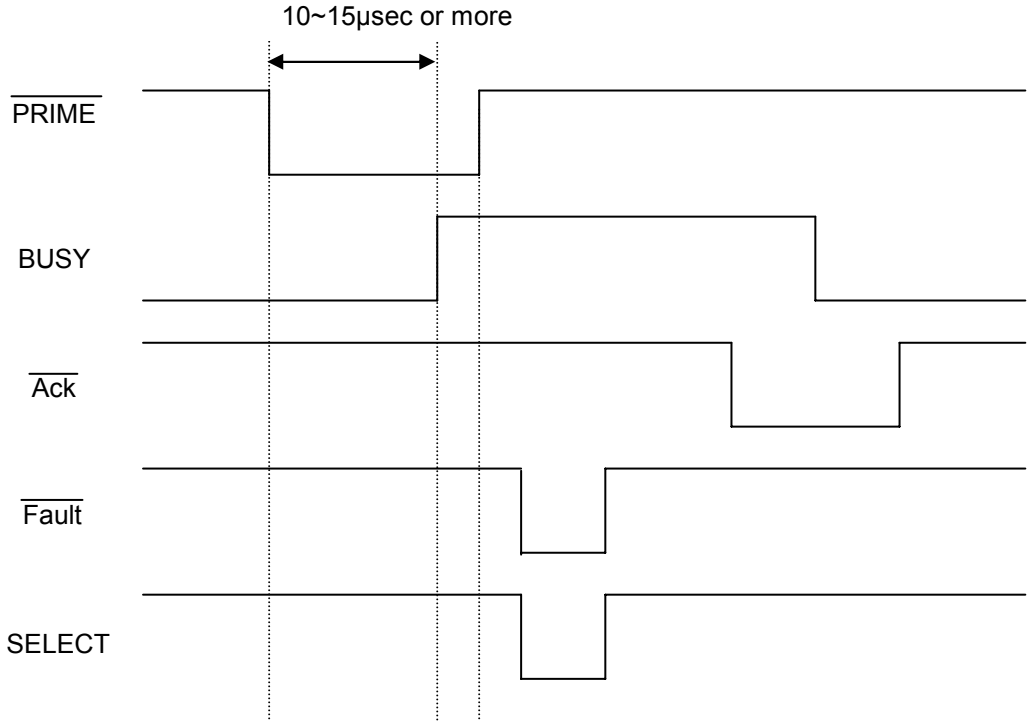


[While receiving data]



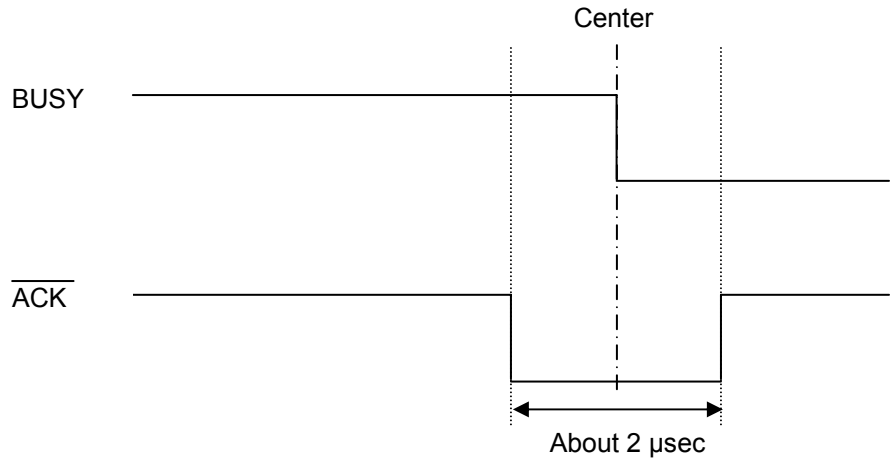
Note: BUSY goes “High” at the falling edge of $\overline{\text{Strobe}}$, and data is latched at the leading edge of $\overline{\text{Strobe}}$.

[While receiving PRIME signal]



Note: If the $\overline{\text{PRIME}}$ signal width is 10 µsec or less, it is not accepted.
BUSY goes to "High" when the $\overline{\text{PRIME}}$ signal is accepted by the printer.

[Timing relationship between BUSY and $\overline{\text{ACK}}$]

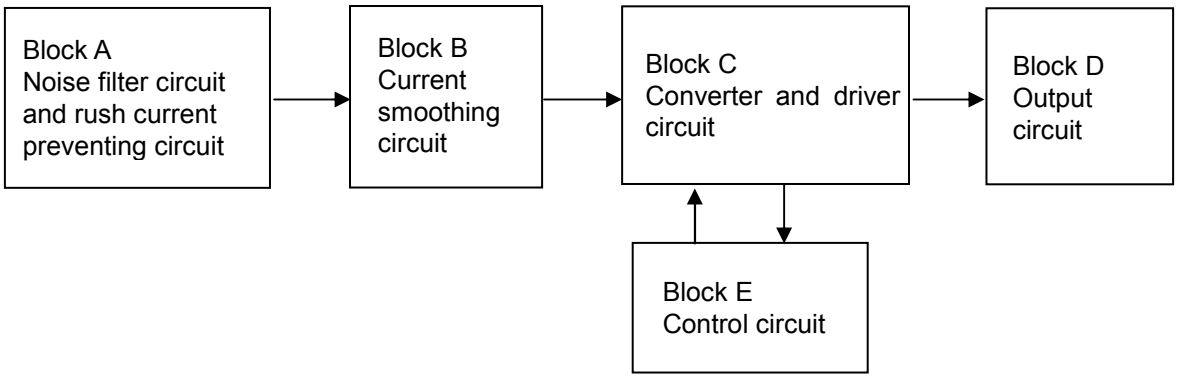


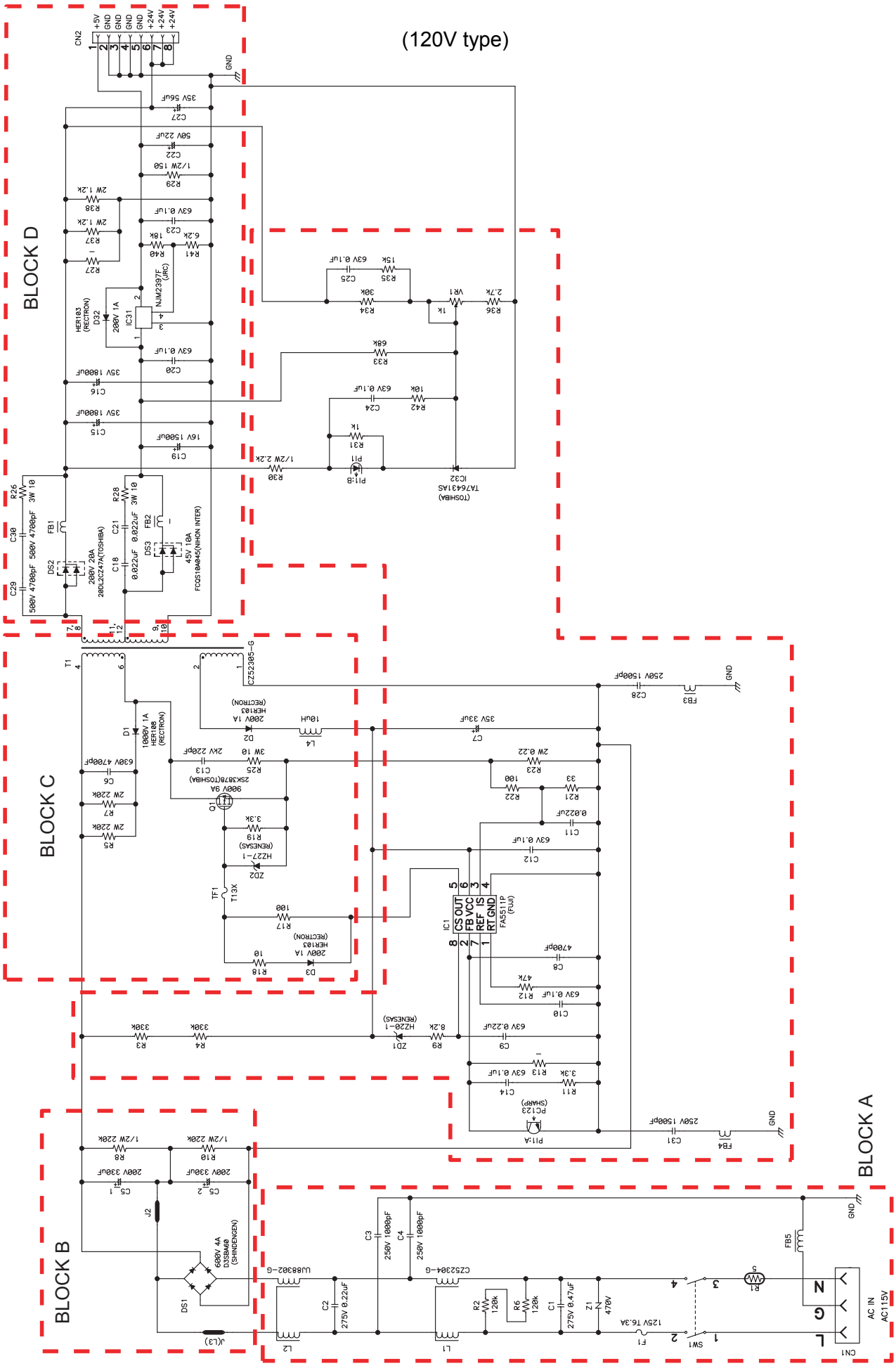
2-5. Power Supply

The power supply is a frequency-fixed reverse type switching regulator which outputs +5V and +24V DC. Power supply will be 120V AC type or 220-240V AC type.

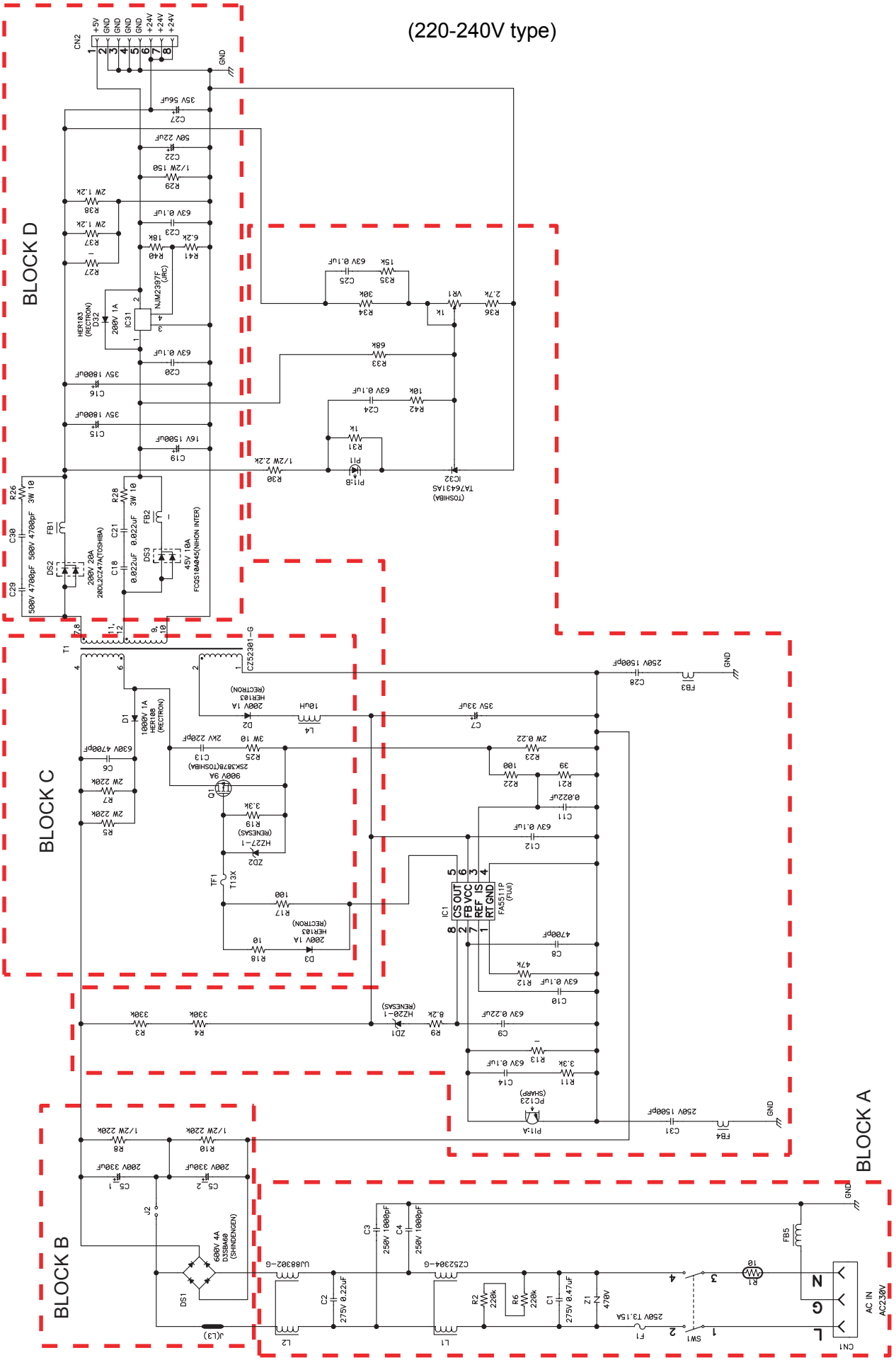
2-5-1. Block diagram

The following shows a block diagram for this power supply. For the circuit corresponding blocks A to E, refer to the circuit diagram on the following pages:




(120V type)
BLOCK A
BLOCK B
BLOCK C
BLOCK D
AC IN
AC115V

(220-240V type)



2-5-2. Block A (Noise filter circuit and rush current preventing circuit)

The filter circuit consists of the power switch (SW1) the fuse (F1), the X capacitors (C1, C2), the Y capacitors (C3, C4), the common mode choke coils (L1 and L2), the varistor (Z1), and the thermistor (R1).
This circuit eliminates switching noise from the power supply to the main power line. Also, it eliminates noise from the main power line to the power supply to protect the power supply circuit.
The thermistor R1 suppresses the rush current to the power supply circuit at power on. In continuous operation, the resistance of R1 is reduced as it is heated, reducing the power loss by R1.

2-5-3. Block B (Current smoothing circuit)

This block consists of the bridge rectifier DS1, the smoothing capacitors C5-1 and C5-2, and resistors R8 and R10.

<For 120V type>
Half-wave rectification is performed by the bridge rectifier DS1 and the capacitor C5-1 and also by the bridge rectifier DS1 and the capacitor C5-2. Thus, the DC voltage across R8 and R10 (output of this circuit) becomes approx. 2.8-time of the AC input voltage. (It will be approx. 320V DC if the input voltage is 115V AC.) This DC voltage is supplied to the next converter and driver circuit.
The choke coil L3 suppresses high frequency waves to meet the regulations against high frequency waves.

<For 200-240V type>
Full-wave rectification is performed by the bridge rectifier DS1 and the capacitors C5-1 and C5-2. The DC output of this circuit will be approx. 1.4-time of the AC input voltage. (It will be approx. 320V DC if the input voltage is 230V AC.) This DC voltage is supplied to the next converter and driver circuit.
The choke coil L3 suppresses high frequency waves to meet the regulations against high frequency waves.

2-5-4. Block C (Converter and driver circuit)

(1) Converter circuit

The converter circuit operates with conducting-angle-controlled reverse method with frequency fixed. The rectified and smoothed voltage (e.g. 320V DC) is converted by the switching transformer T1 and then supplied to the secondary circuit.

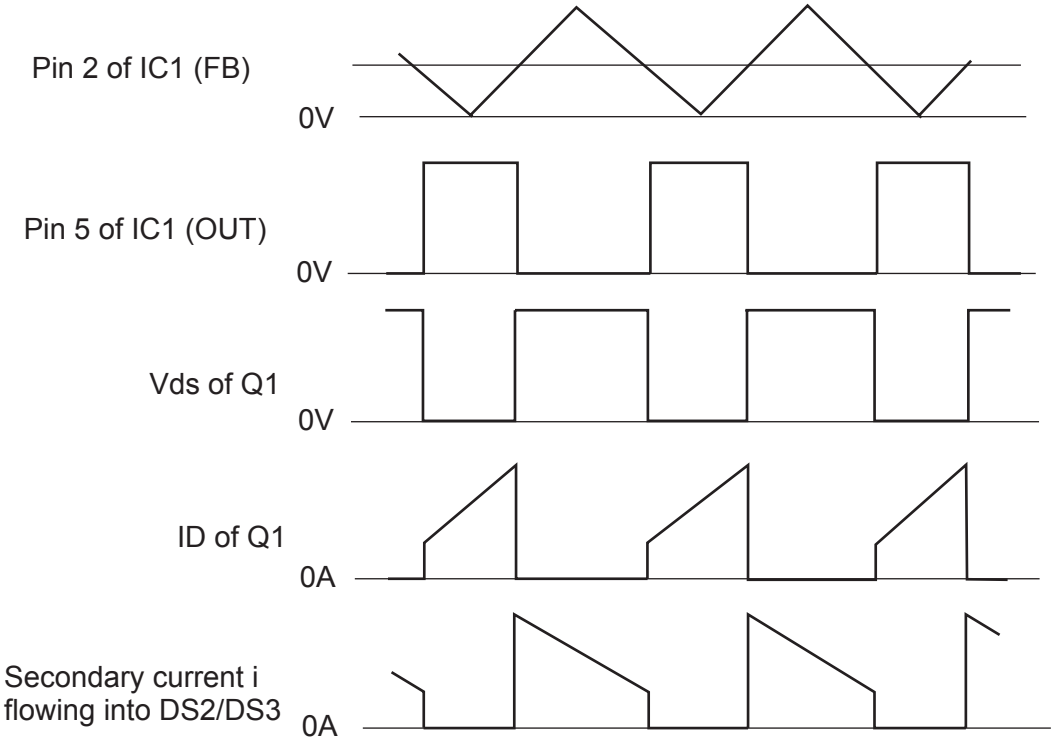
When Q1 is turned ON, 320V DC is applied to the primary winding N1 of T1. At this time, the voltage is induced in the secondary windings N3 and N4 and energy is charged in T1 since the energy flow to the secondary output circuit is blocked by the diodes DS2 and DS3.
When Q1 is turned OFF, the energy polarity is reversed and the energy charged in the secondary windings N3 and N4 is discharged to the secondary output circuit through DS2 and DS3. Above operation is repeated and the energy is continuously fed to the secondary output circuit.

The following circuit reduces the switching noise. So the output noise and the EMI (electromagnetic interference) noise are suppressed, and the reversal voltage applied to Q1, DS2 and DS3 is also reduced.

• C13 and R25 connected between drain and source of Q1 / D1, C6, R7 and R5 connected to the primary winding N1 / C18, C21, R28, FB2 connected to DS3 / C29, C30, R26, FB1 connected to DS2

(2) Driver circuit

The switching FET (Q1) is driven by the control IC (IC1). When power is turned ON, power is applied to pin 6 (VCC) of IC1 through R3 and R4. Then, the current starts to flow into the primary winding N2 and voltage is produced there. When the voltage at pin 6 (VCC) reaches approx. 16V DC, IC1 is activated and a pulse is output from pin 5 (OUT) of IC1 to drive Q1. When Q1 starts switching, approx. 20-25V DC is supplied from N2 to pin 6 (VCC) of IC1 to stably activate IC1. During stable oscillation, the switching pulse is continuously output from pin 5 (OUT) of IC1 to Q1 through R17, R18 and D3. The oscillation frequency is determined by R12 connected to pin 1 (RT), and the conduction-angle control is made by the control voltage fed from the secondary circuit to pin 2 (FB) of IC1. The following timing chart shows the control waveforms at various points.



Vds: Voltage between the drain and source of Q1
Id: Current flowing in the drain of Q1

2-5-5. Block D (Output circuit)

DS2, C15 and C16 perform half-wave rectification to produce +24V.
DS3 and C19 perform half-wave rectification to produce DC voltage to supply to the +5V regulator IC (IC31). IC31 produces a stabilized +5V voltage.

2-5-6. Block E (Control circuit)

The shunt regulator (IC32) and photo coupler (PI1) detect the output voltages (+24V and +5V) and feed the signal back to the primary side. R33, R34, R36 and VR1 are used to detect +24V and +5V outputs. The voltage produced by these resistors is compared with the reference voltage of IC32 (2.5V). If there is a difference between both voltages, the current flowing into the photo coupler PI1 is changed. So, the signal fed back to pin 2 (FB) of IC1 in the primary side is also changed. Then, the conduction-angle for Q1 is changed to stabilize +24V and +5V constant.

<Over current protection circuit>
The over current protection circuit detects the drain current of Q1 to check if power supply circuit is overloaded or its output is short-circuited. If over current is detected, IC1 cuts off the output signal from pin 5 (OUT) for protecting power supply circuit.
The drain current (Id) of Q1 is detected by R23, R22, R21 and C11, and input to pin 3 (IS) of IC1. If the voltage at pin 3 (IS) exceeds the internal reference voltage (0.24V) of IC1, the switching pulse sent from pin 5 (OUT) is cut off, resulting in lower output voltage.
If over current condition due to overloading or output short-circuit continuous, the voltage at pin 8 (CS) of IC1 increases, and after a certain period of time, the voltage will exceed the internal reference voltage (8.5V) of IC1. In this case, IC1 is latched to off mode and the output at pin 5 (OUT) is set to “Low” level (off condition). Then, the output voltages (+24V and +5V) is shut off.
To recover the latched state, turn OFF the power and, after a while, turn it ON again.

<Protection circuits in case of abnormality>
In case of abnormality, the power supply circuit automatically stops its operation to avoid smoking or fire.
When temperature of the power supply raises abnormally, the thermal fuse TF1 opens and the drive signal to Q1 is cut off. When the output voltage rises, the voltage across the primary winding N2 also proportionally raises. In this case, the Zener diode ZD1 is turned ON and the voltage higher than 8.5V is applied to pin 8 (CS) of IC1. Then, IC1 enters latch mode and stops its operation.
To recover the latched state, turn OFF the power and, after a while, turn it ON again.
If large current flows, the fuse (F1) in the noise filter circuit will be blown out.

CHAPTER 3
DISASSEMBLY AND MAINTENANCE

CHAPTER 3 DISASSEMBLY AND MAINTENANCE

TABLE OF CONTENTS

3-1. Maintenance Precautions

WARNINGS

(1) Before starting disassembly/reassembly or mechanical adjustment, be sure to disconnect the power cord from the power source.
(2) Do not replace a fuse with the power switch turned on.
(3) The fuse is provided to prevent fire, and damage to the “Unit, Power Supply”. When replacing it, use the same rating and type.
(4) The main plug on this equipment must be used to disconnect main power. Please ensure that the socket outlet is installed near the equipment and is easily accessible.

Observe the following in maintenance work:

CAUTIONS

(1) Do not disassemble/reassemble or adjust the machine, if it functions properly. Particularly, do not loosen screws on any component, unless necessary.
(2) After completing an inspection and before turning on the power, be sure to check that there is no abnormality.
(3) Never try to print without media.
(4) Check that the media is properly set.
(5) Do not lay anything on the cover or lean against it during maintenance or while the printer is in operation.
(6) During maintenance, be careful not to leave parts or screws unattached or loose inside the printer.
(7) When handling a printed circuit board, do not use gloves, etc., which can easily cause static electricity. Since ICs, such as CPU, RAM and ROM, might be destroyed by static electricity, do not touch lead wires or windows unnecessarily.
(8) Do not put the printed circuit boards directly on the printer or on the floor.
(9) When disassembling or reassembling, check wires for any damage and do not pinch or damage them. Also, run wires as they were.

3-2. Cleaning

Cleaning spots are listed below.

Cleaning Position	Description
Cabinet	Wipe soiled parts of the printer with a clean dry cloth. Remove bits of media, etc., using tweezers. **Note:** When cleaning, be careful not to scratch the equipment or to bend parts, etc.
Thermal head	Clean the thermal head with the head cleaner only.
Platen	Clean the platen with a soft cloth.
Media running surface ("SA, Platen")	Wipe off media refuse, etc., on and around the media running surface.

Clean inside the printer in accordance with the following:

- Cleaning frequency: Every 6 months or 300 hours of operation. (Whichever comes first)
- Materials: Dry cloth (gauze or soft cloth) and thermal head cleaner

3-3. Lubrication

3-3-1 Lubrication frequency

This is a maintenance-free machine and requires no lubrication under normal use. However, the machine should be lubricated whenever it is disassembled and reassembled, or when lubricated parts are cleaned.

The parts to be lubricated are indicated in the disassemble procedure with the mark ★.

3-3-2 Types of lubricant

- Floil G-311S (by Kanto Chemical Co., Ltd.)
- Floil G-474C (by Kanto Chemical Co., Ltd.)

3-3-3 Quantity of lubricant

Small quantity.....	★	About 1 drop.
Ordinary quantity	★★	About 3 to 4 drops. About 0.2 mm thick for grease.
Large quantity.....	★★★	Apply sufficiently.

3-3-4 Bond

Threebond1401B

3-4. Maintenance Tools List

Maintenance tools shown below are needed when replacing the maintenance parts such as the “SA, Main PCB”, “SA, Motor”, etc.

Maintenance Tools List

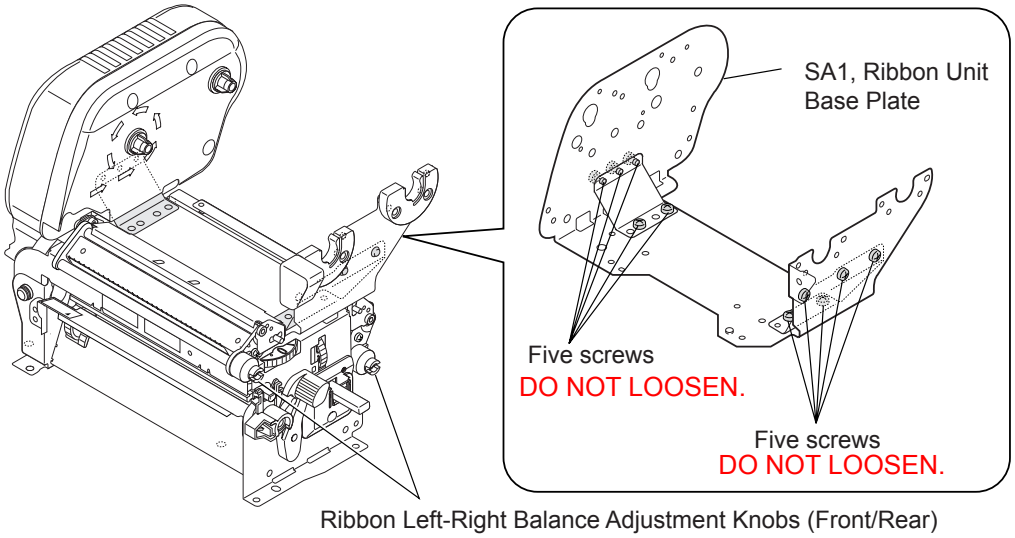
No.	Name	Q'ty	Description	Remarks
1	Phillips Screwdriver (Length 200 mm)	1	For 3~4 mm screws	
2	Phillips Screwdriver (Length 100 mm)	1	For 2~3 mm screws	
3	Flat-blade Screwdriver (Length 100 mm)	1	4.3 mm width	
4	Box wrench	1	Box size: 5 mm	
5	Tweezers	1		
6	Round Nose Pliers	1		
7	Cutting Nippers	1		
8	Soldering Iron (30W)	1		
9	Volt-ohm Meter	1		
10	Spring Gauge	1	500g	

3-5. Disassembly, Reassembly and Lubrication

Caution: Forbidden screws on the "Unit, Ribbon"

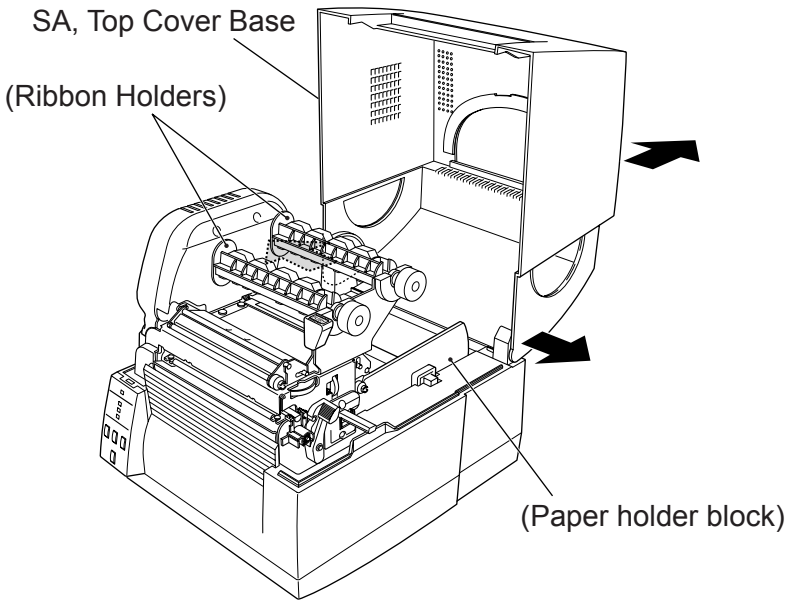
DO NOT loosen or remove the following 10 screws.

The "SA1, Ribbon Unit Base Plate" consists of three parts, and is assembled with 10 screws. If the "SA1, Ribbon Unit Base Plate" is disassembled, correct ribbon running cannot be assured. Namely, ribbon slant correction may become impossible within the adjustable range of the Ribbon Left-Right Balance Adjustment Knobs (Front/Rear).



3-5-1. "SA, Top Cover Base"

1. Open the "SA, Top Cover Base" and remove it while opening its rear ends as shown in the figure.
2. Remove the two Ribbon Holders and the Paper Holder block from the printer



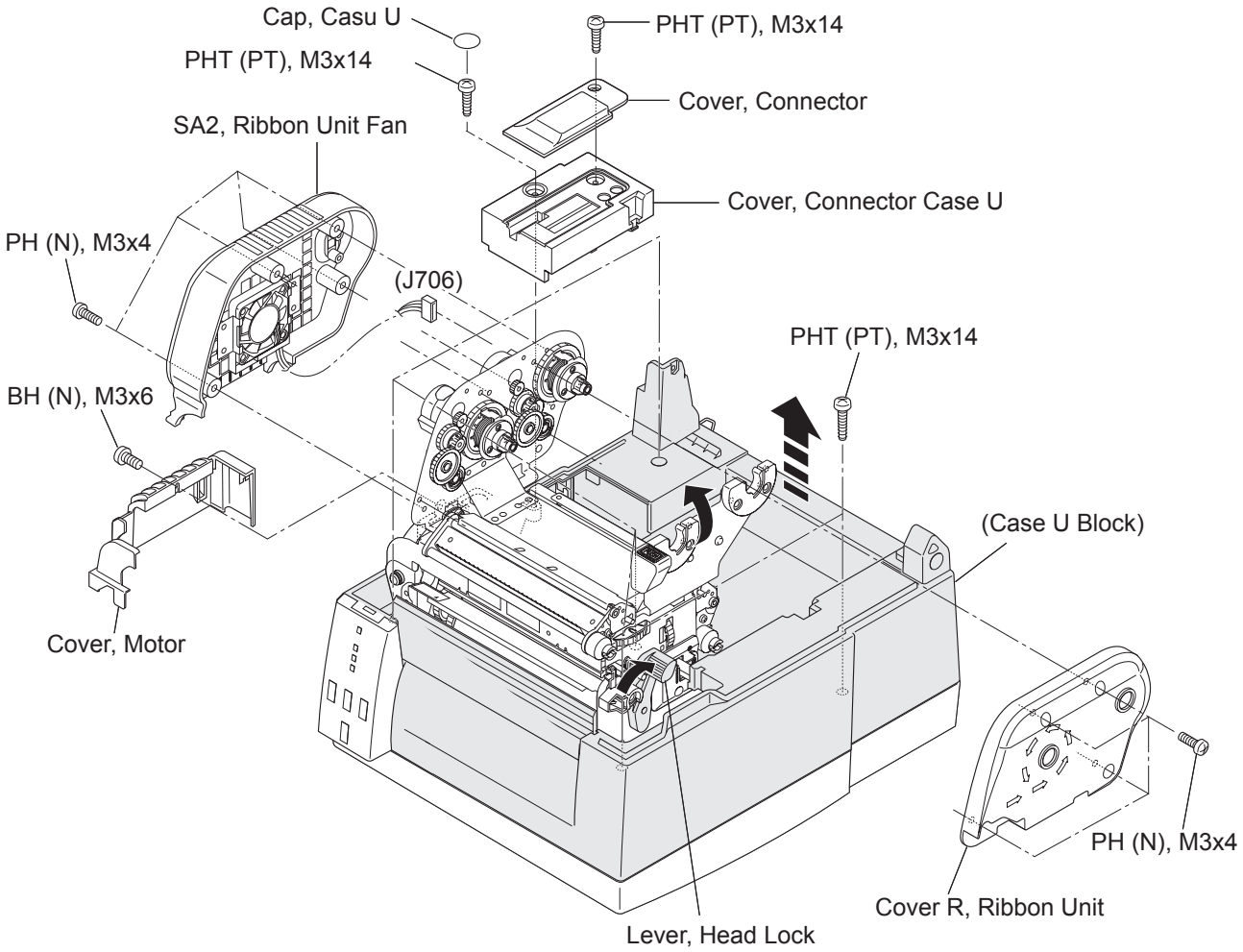
3-5-2. Case U

There are two ways to remove the Case U.

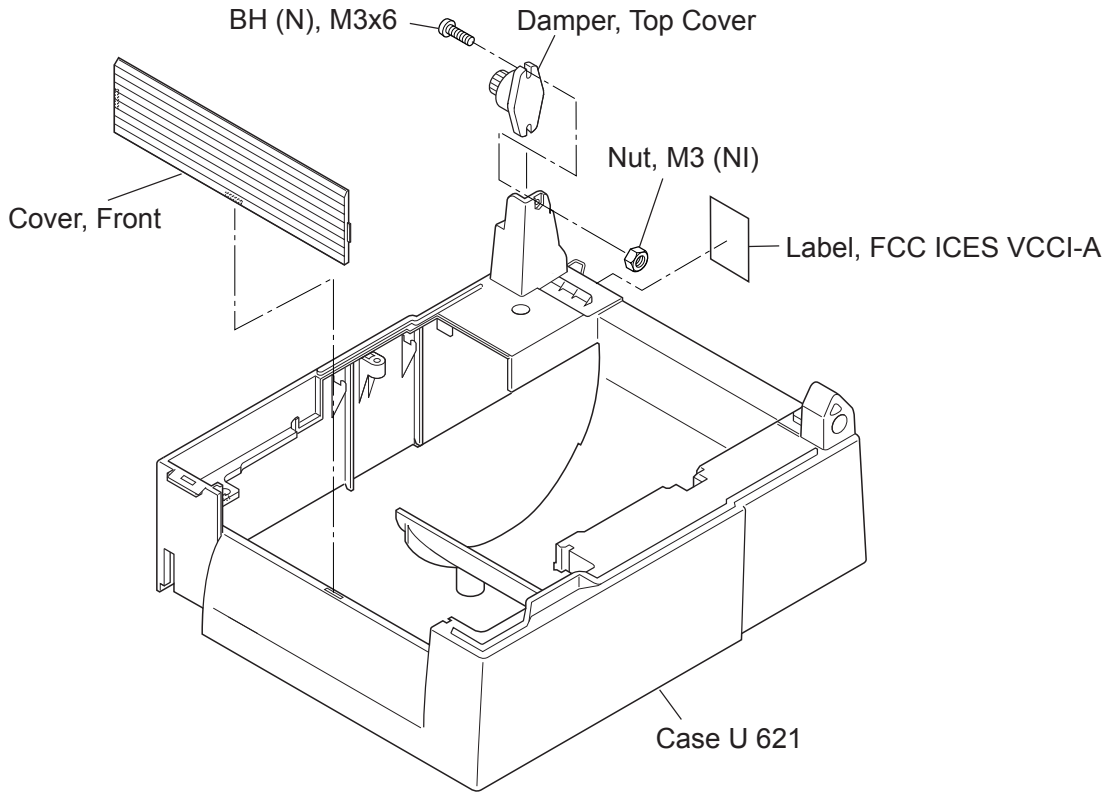
1) Removing the Case U without detaching the “Unit, Ribbon” (Normal way)
   Procedure is long, but no adjustment is necessary when reassembling.
2) Removing the Case U after detaching the “Unit, Ribbon”. (Readjustment is necessary.)
   You can remove the Case U easily. However, once the “Unit, Ribbon” is detached, you need to perform ribbon slant elimination adjustment.

(1) Removing the Case U without detaching the “Unit, Ribbon” (Normal way)

1. Remove the “SA, Top Cover Base”. Refer to “3-5-1 “SA, Top Cover Base””.
2. Remove 4 screws (PH (N), M3x4) and detach the “SA2, Ribbon Unit Fan”, and then disconnect 1 connector (J706) from the “SA, Ribbon PCB”.
3. Remove 4 screws (PH (N), M3x4) and detach the “Cover R, Ribbon Unit”.
4. Remove 1 screw (BH (N), M3x6) and detach the “Cover, Motor”.
5. Peel off the “Cap, Case U”. It is not reusable.
6. Remove 1 screw (PHT (PT), M3x14) and detach the “Cover, Connector Case U” Block.
7. Remove 1 screw (PHT (PT), M3x14) and detach the “Cover, Connector” from the “Cover, Connector Case U”.
8. Remove 5 screws (PHT (PT), M3x14).
9. Release the “Lever, Head Lock” (blue color) to open the “Unit, Head-TT”, and then carefully detach the Case U Block by lifting it upward.



10. Remove the “Cover, Front” from the Case U Block.
11. Remove 1 screw (BH (N), M3x6) and 1 nut (M3), and detach the “Damper, Top Cover” from the Case U upwardly.



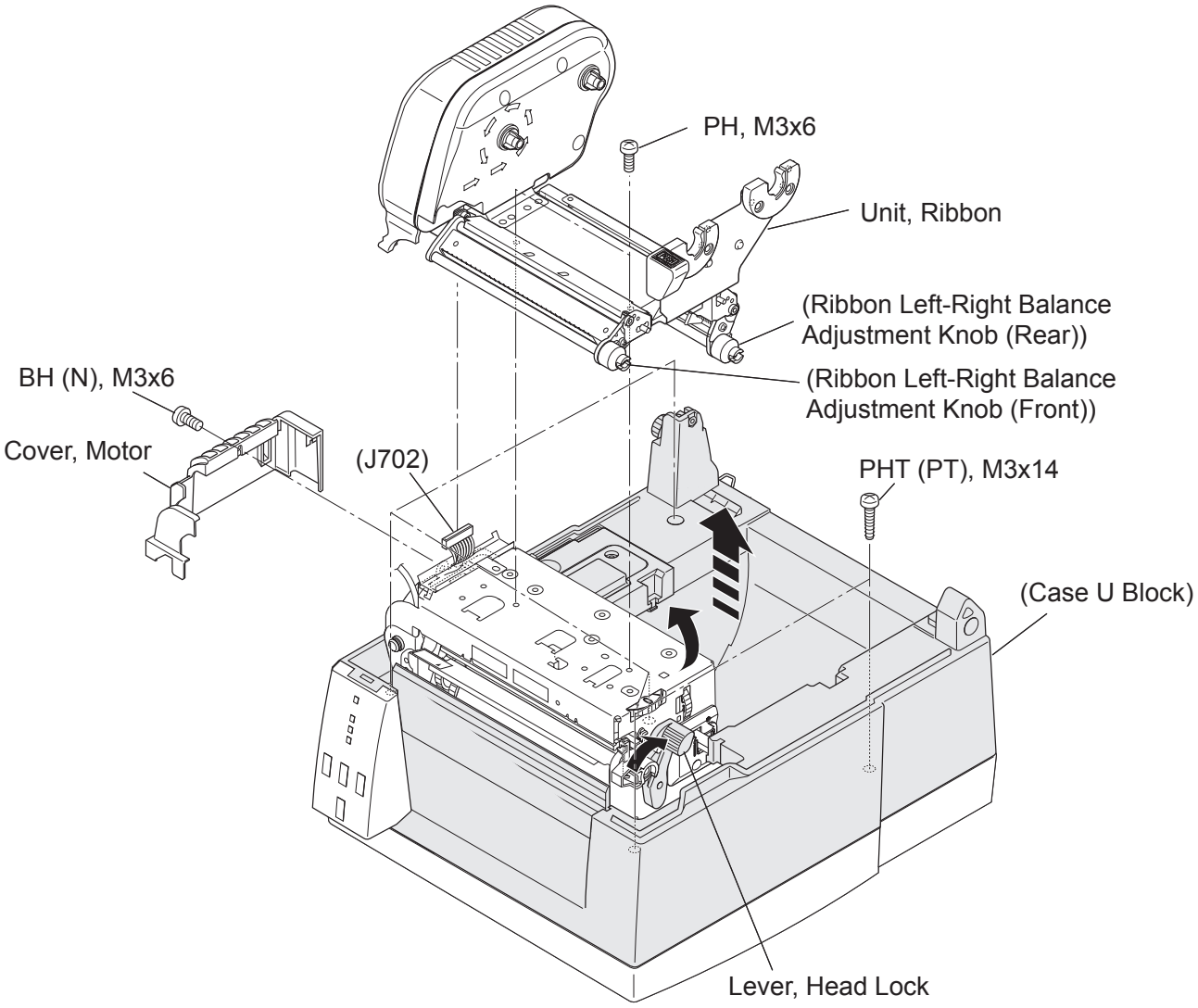
Notes on reassembling:

- The “Cap, Case U” cannot be reused once it has been peeled off.
- When assembling the “Damper, Top Cover”, tighten the screw while pushing down the “Damper, Top Cover”.

(2) Removing the Case U after detaching the "Unit, Ribbon"

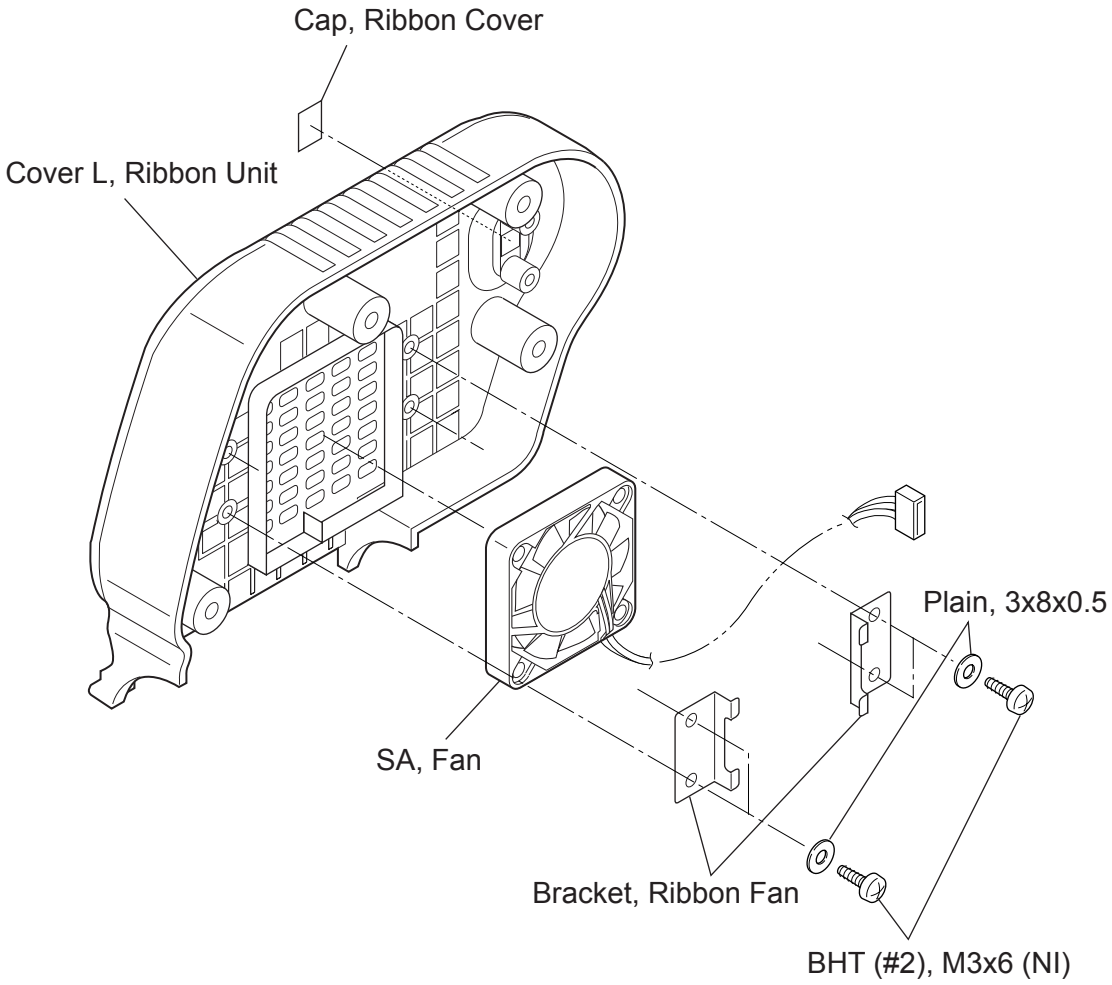
Caution: When the "Unit, Ribbon" is removed, you need to recheck if ribbon wrinkles appear or not. If ribbon wrinkles are found, correct them referring to "Removing Ribbon Wrinkle" on page 3-51. Normally, adjustment with the Ribbon Left-Right Balance Adjustment Knobs (Front/Rear) will remove ribbon wrinkle.

1. Remove the "SA, Top Cover Base". Refer to "3-5-1 "SA, Top Cover Base"".
2. Remove 2 screws (PH, M3x6) and detach the "Unit, Ribbon" by lifting it upward. At this time, disconnect 1 connector (J702) from the "SA, Ribbon PCB".
3. Remove 1 screw (BH (N), M3x6) and detach the "Cover, Motor".
4. Remove 5 screws (PHT (PT), M3x14).
5. Release the "Lever, Head Lock" (blue color) to open the "Unit, Head-TT", and then carefully detach the Case U Block by lifting it upward.



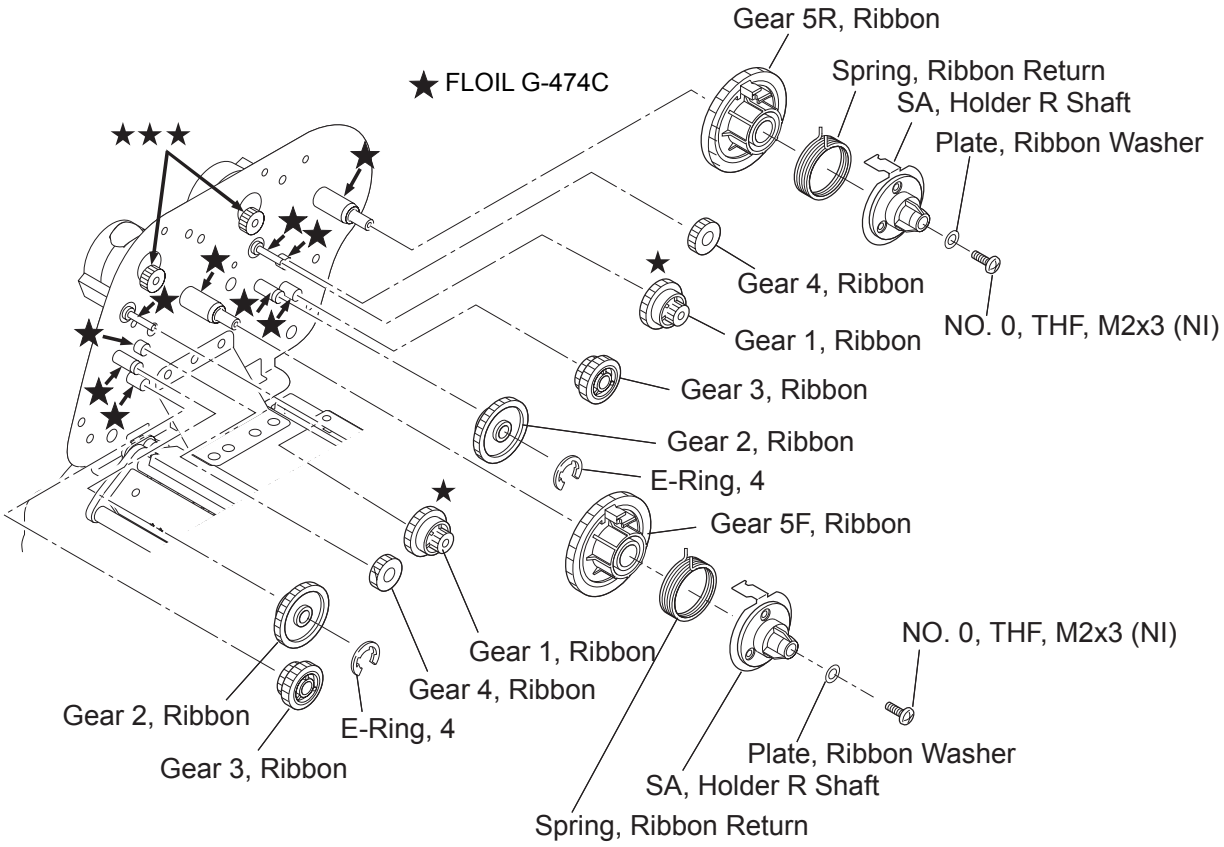
3-5-3. “SA, Fan”

1. Remove the “SA, Top Cover Base” and the “SA2, Ribbon Unit Fan”. Refer to Steps 1 and 2 in “3-5-2-(1) Removing the Case U without detaching the “Unit, Ribbon” (Normal way)”.
2. Remove 4 screws (BHT (#2), M3x6 (NI)) and 4 washers (3x8x0.5), and detach the two “Bracket, Ribbon Fan”.
3. Remove the “SA, Fan” and the “Cap, Ribbon Cover” from the “Cover L, Ribbon Unit”.



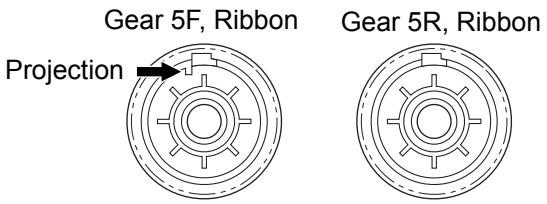
3-5-4. Ribbon Gears

1. Remove the “SA, Top Cover Base” and the “SA2, Ribbon Unit Fan”. Refer to Steps 1 and 2 in “3-5-2-(1) Removing the Case U without detaching the “Unit, Ribbon” (Normal way)”.
2. On the front (ribbon take-up) side, remove 1 screw (NO. 0, THF, M2x3 (NI)) and 1 “Plate, Ribbon Washer”. Then, remove the “SA, Holder R Shaft”, “Spring, Ribbon Return”, and “Gear 5F, Ribbon” in that order.
3. Also on the front side, disengage 1 E-ring and remove the “Gear 2, Ribbon”, “Gear 1, Ribbon”, “Gear 3, Ribbon”, and “Gear 4, Ribbon” in that order.
4. On the rear (ribbon supply) side, remove 1 screw (No. 0, THF, M2x3 (NI)) and 1 “Plate, Ribbon Washer”. Then, remove the “SA, Holder R Shaft”, “Spring, Ribbon Return”, and “Gear 5R, Ribbon” in that order.
5. Also on the rear side, disengage 1 E-ring and remove the “Gear 2, Ribbon”, “Gear 1, Ribbon”, “Gear 3, Ribbon”, and “Gear 4, Ribbon” in that order.

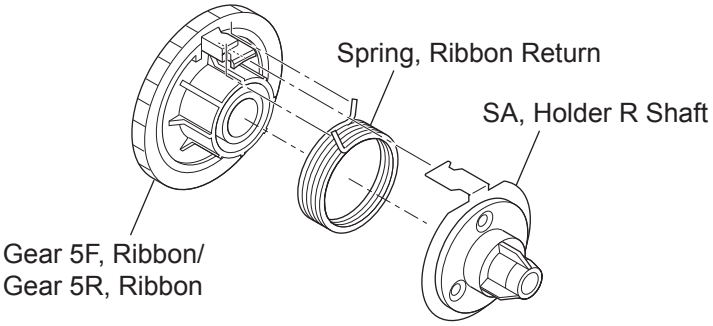


Notes on reassembling:

- Distinguish the “Gear 5F, Ribbon” from the “Gear 5R, Ribbon”, referring to the following figure.



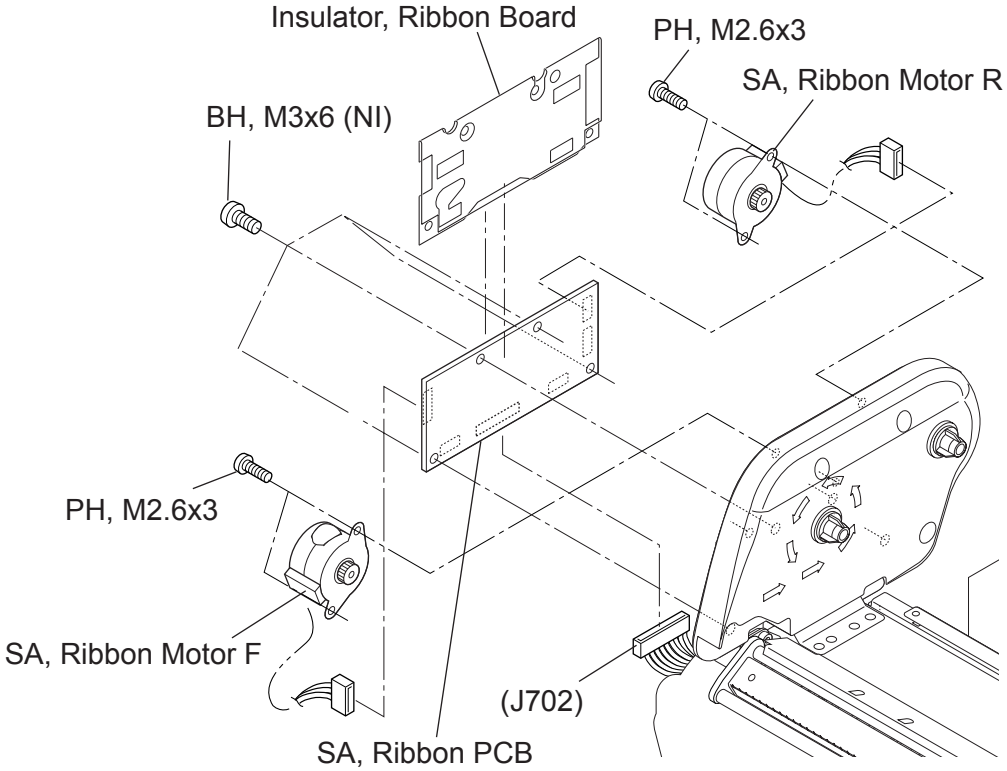
- Assemble the “SA, Holder R Shaft”, the “Spring, Ribbon Return”, and “Gear 5F, Ribbon”/5R as follows:



- Apply FLOIL G-474C to the parts (gears and shafts) shown by the ★ marks.

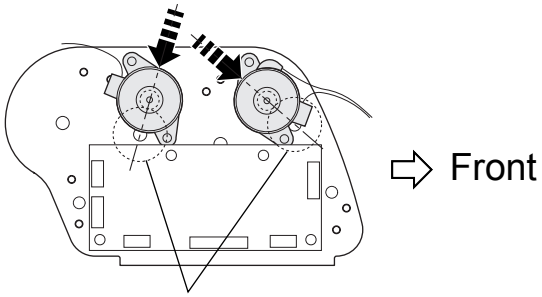
3-5-5. “SA, Ribbon Motor F/R” and “SA, Ribbon PCB”

1. Remove the “SA, Top Cover Base” and the “SA2, Ribbon Unit Fan”. Refer to Steps 1 and 2 in “3-5-2-(1) Removing the Case U without detaching the “Unit, Ribbon” (Normal way)”.
2. Disconnect 1 connector (J702) from the “SA, Ribbon PCB”.
3. Remove 2 screws (PH, M2.6x3), disconnect 1 connector, and detach the “SA, Ribbon Motor F”.
4. Remove 2 screws (PH, M2.6x3), disconnect 1 connector, and detach the “SA, Ribbon Motor R”.
5. Remove 4 screws (BH, M3x6 (NI)), and detach the “SA, Ribbon PCB” and the Ribbon Board Insulator.



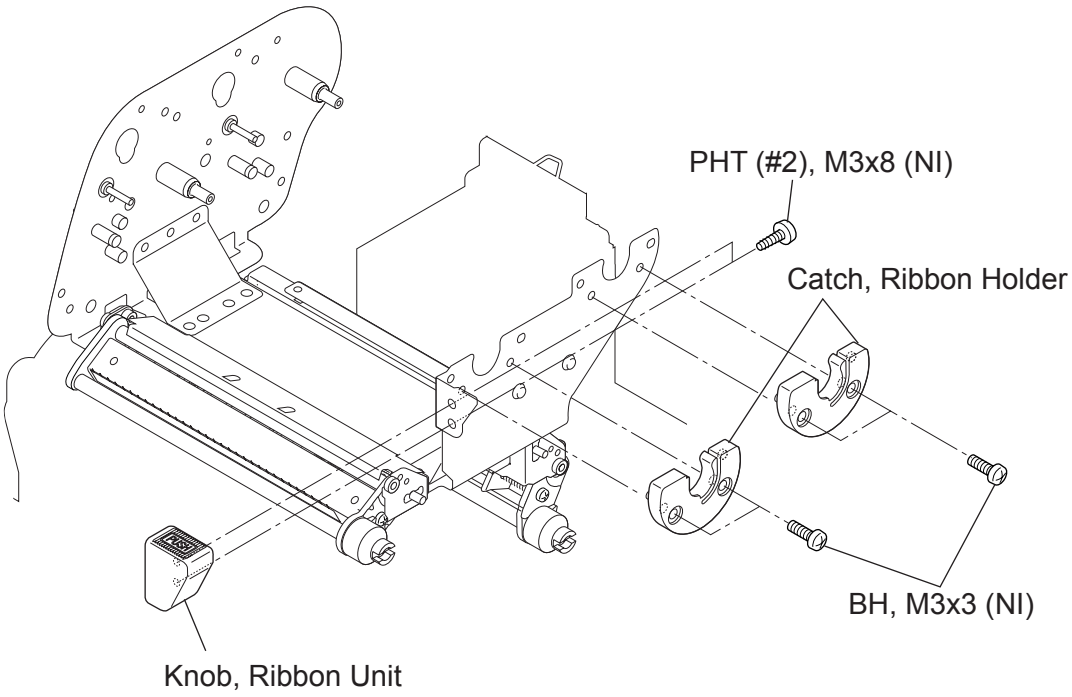
Note on reassembling:

- When assembling the “SA, Ribbon Motor F” and the “SA, Ribbon Motor R”, tighten screws while pushing the motor toward the “Gear 1, Ribbon”.



3-5-6. “Catch, Ribbon Holder” and “Knob, Ribbon Unit”

1. Open the “SA, Top Cover Base”. Refer to “3-5-1 “SA, Top Cover Base”“.
2. Remove 4 screws (BH, M3x3 (NI)) and detach the 2 “Catch, Ribbon Holder”.
3. Remove 2 screws (PHT (#2), M3x8 (NI)) and detach the “Knob, Ribbon Unit”.

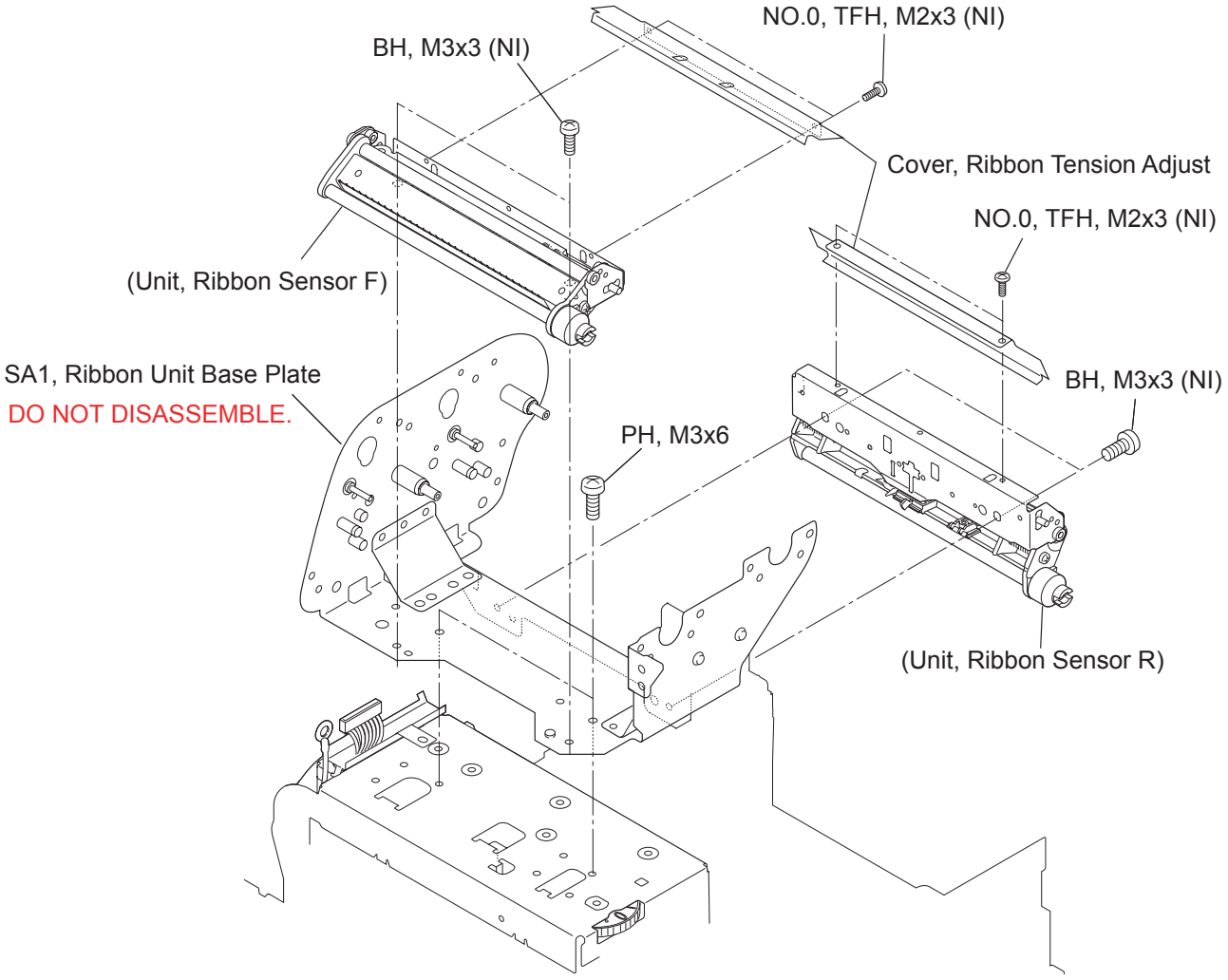


3-5-7. “Unit, Ribbon Sensor F/R” and “SA1, Ribbon Unit Base Plate”

Caution:

DO NOT disassemble the “SA1, Ribbon Unit Base Plate” that consists of three parts. If it is disassembled, correct ribbon running cannot be assured. Namely, ribbon slant correction may become impossible within the adjustable range of the Ribbon Left-Right Balance Adjustment Knobs (Front/Rear).

1. Open the “SA, Top Cover Base”. Refer to “3-5-1 “SA, Top Cover Base”“.
2. Remove 4 screws (NO.0, TFH, M2x3 (NI)) and detach the “Cover, Ribbon Tension Adjust” on the front and rear sides.
3. Remove 2 screws (BH, M3x3 (NI)) and detach the “Unit, Ribbon Sensor F”.
4. Remove 2 screws (BH, M3x3 (NI)) and detach the “Unit, Ribbon Sensor R”.
5. Remove 2 screws (PH, M3x6) and detach the “SA1, Ribbon Unit Base Plate” from the “Unit, Mechanism”.



Note on reassembling:

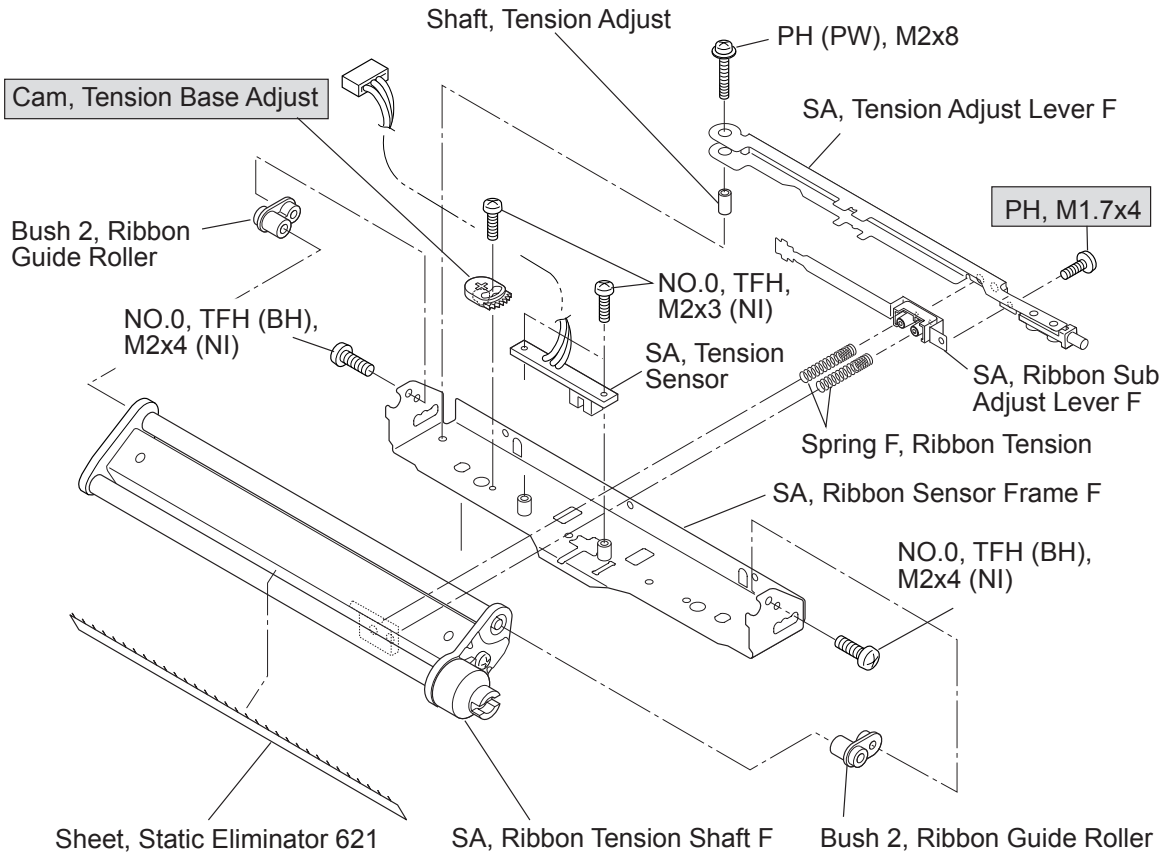
- When assembling the “Unit, Ribbon Sensor F/R”, perform “3-6-2 Ribbon Slant Elimination Adjustment” on page 3-46.

3-5-8. “SA, Ribbon Tension Shaft F” and “SA, Tension Sensor”

Caution:

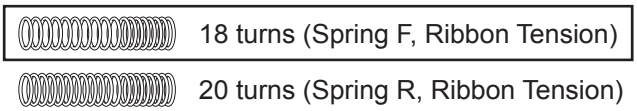
DO NOT disassemble the “Cam, Tension Base Adjust” and tension adjust screw (PH, M1.7x4) unless you need to replace them.

1. Open the “SA, Top Cover Base”. Refer to “3-5-1 “SA, Top Cover Base”“.
2. Remove the “Unit, Ribbon Sensor F”. Refer to “3-5-7 “Unit, Ribbon Sensor F/R”“.
3. Remove 2 screws (NO.0, TFH (BT), M2x4 (NI)) at both ends, and detach the “SA, Ribbon Tension Shaft F” and “Bush 2, Ribbon Guide Roller” (2 pcs.).
4. Peel off the “Sheet, Static Eliminator 621” from the “SA, Ribbon Tension Shaft F”.
5. Remove 1 screw (PH (PW), M2x8), and detach the Tension Adjust Lever F Block and “Shaft, Tension Adjust”.
6. Remove the “SA, Ribbon Sub Adjust Lever F” and “Spring F, Ribbon Tension” (2 pcs.) from the “SA, Tension Adjust Lever F”.
7. Remove the tension adjust screw (PH, M1.7x4) from the “SA, Tension Adjust Lever F”.
   Note: Do not remove this tension adjust screw unless you need to replace it.
8. Remove 2 screws (NO.0, TFH, M2x3 (NI)) and detach the “SA, Tension Sensor”.
9. Remove 1 screw (NO.0, TFH, M2x3 (NI)), and detach the “Cam, Tension Base Adjust” from the “SA, Ribbon Sensor Frame F”.
   Note: Do not remove the “Cam, Tension Base Adjust” unless you need to replace it.

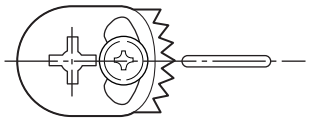


Notes on reassembling:

- Distinguish the “Spring F, Ribbon Tension” (used here) and the “Spring R, Ribbon Tension” (used in the next “3-5-9 “SA, Ribbon Tension Shaft R”“). They look like the same, but the number of turns differs.



- When assembling the “Cam, Tension Base Adjust”, adjust its position as shown in the figure to set it at the mechanical center. Then, perform adjustment according to “3-6-2-(2-1) Tension base adjust cam position adjustment (For service personnel)” on page 3-48.

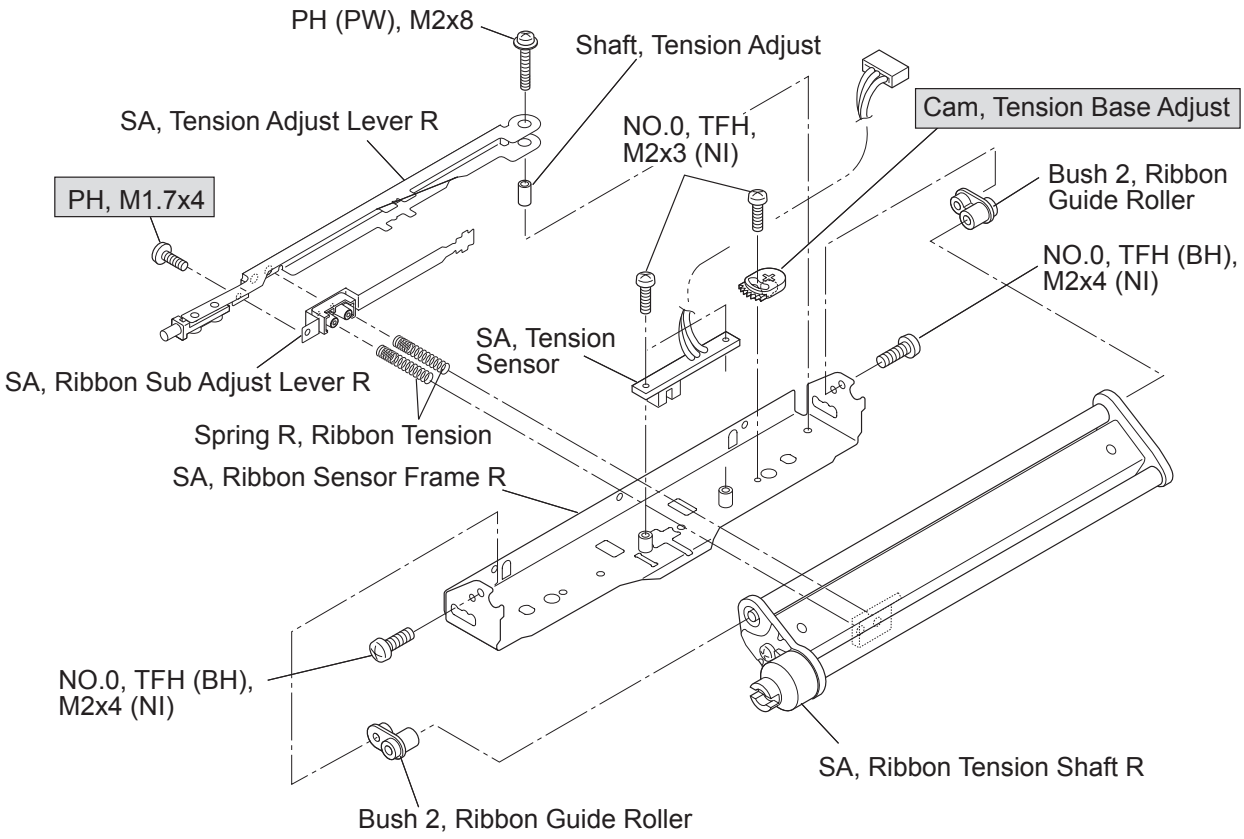


- When assembling the tension adjust screw (PH, M1.7x4), perform “3-6-3 Ribbon Tension Adjustment” on page 3-53.

3-5-9. “SA, Ribbon Tension Shaft R” and “SA, Tension Sensor”

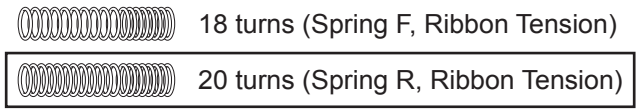
Caution:
DO NOT disassemble the “Cam, Tension Base Adjust” and tension adjust screw (PH, M1.7x4) unless you need to replace them.

1. Open the “SA, Top Cover Base”. Refer to “3-5-1 “SA, Top Cover Base”“.
2. Remove the “Unit, Ribbon Sensor R”. Refer to “3-5-7 “Unit, Ribbon Sensor F/R”“.
3. Remove 2 screws (NO.0, TFH (BT), M2x4 (NI)) at both ends, and detach the “SA, Ribbon Tension Shaft R” and “Bush 2, Ribbon Guide Roller” (2 pcs.).
4. Remove 1 screw (PH (PW), M2x8), and detach the Tension Adjust Lever R Block and “Shaft, Tension Adjust”.
5. Remove the “SA, Ribbon Sub Adjust Lever R” and “Spring R, Ribbon Tension” (2 pcs.) from the “SA, Tension Adjust Lever R”.
6. Remove the tension adjust screw (PH, M1.7x4) from the “SA, Tension Adjust Lever R”.
   Note: Do not remove this tension adjust screw unless you need to replace it.
7. Remove 2 screws (NO.0, TFH, M2x3 (NI)) and detach the “SA, Tension Sensor”.
8. Remove 1 screw (NO.0, TFH, M2x3 (NI)), and detach the “Cam, Tension Base Adjust” from the “SA, Ribbon Sensor Frame R”.
   Note: Do not remove the “Cam, Tension Base Adjust” unless you need to replace it.

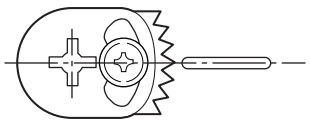


Notes on reassembling:

- Distinguish the “Spring R, Ribbon Tension” (used here) from the Ribbon Tension Spring F (used in “3-5-8 “SA, Ribbon Tension Shaft F”“). They look like the same, but the number of turns differs.



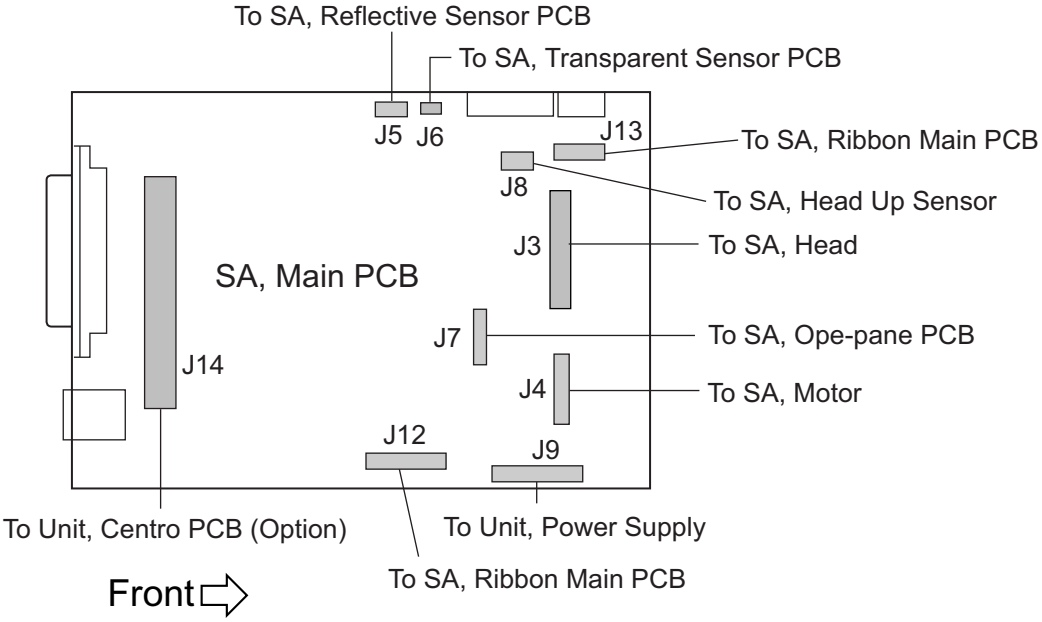
- When assembling the “Cam, Tension Base Adjust”, adjust its position as shown in the figure to set it at the mechanical center. Then, perform adjustment according to “3-6-2-(2-1) Tension base adjust cam position adjustment (For service personnel)” on page 3-48.



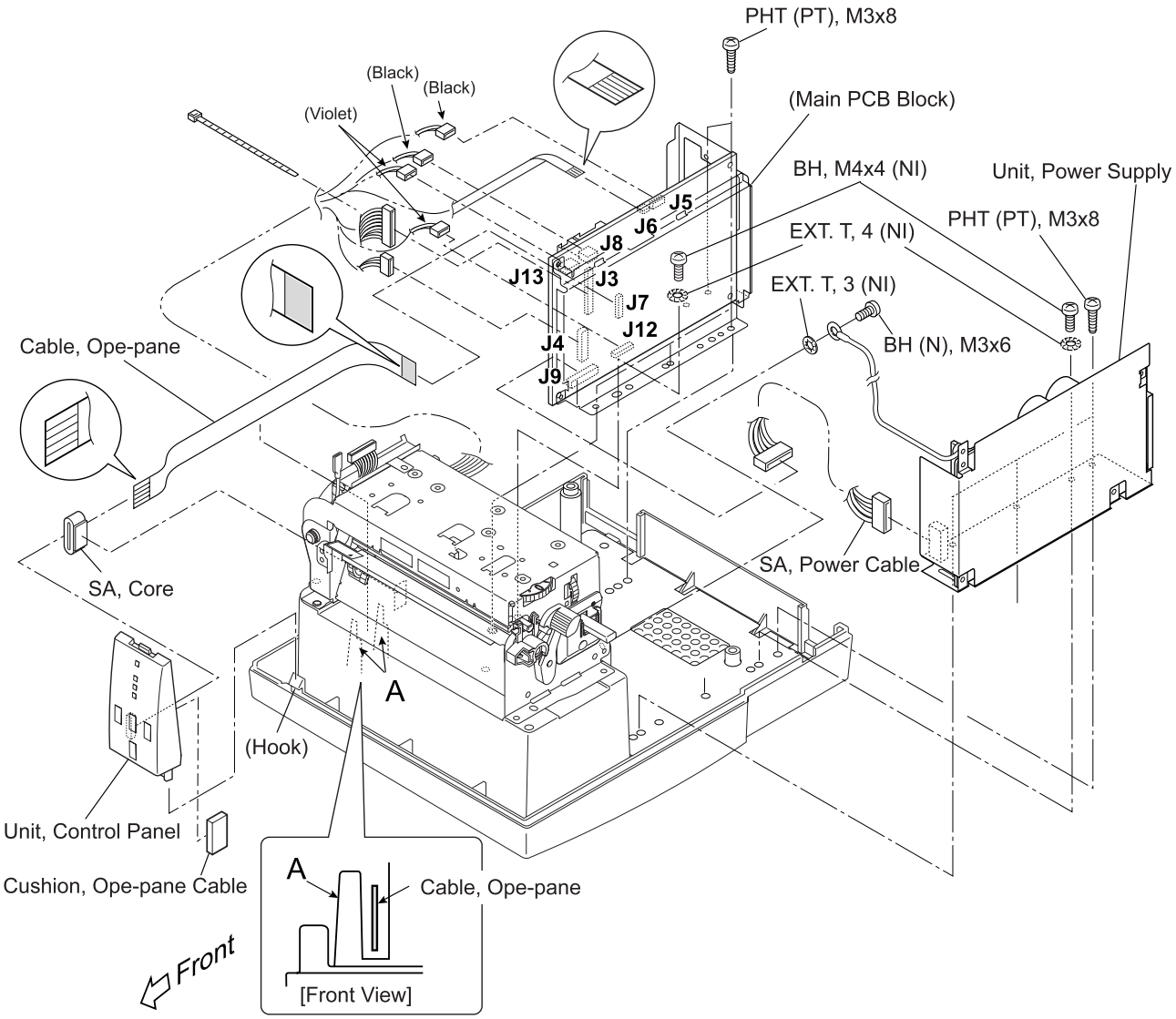
- When assembling the tension adjust screw (PH, M1.7x4), perform “3-6-3 Ribbon Tension Adjustment” on page 3-53.

3-5-10. Main PCB Block, “Unit, Power Supply” and “Unit, Control Panel”

1. Remove the Case U Block. Refer to “3-5-2 Case U”.
2. Disconnect the following cables from the “SA, Main PCB”.
   • J3, J4, J5, J6, J7, J8, J9, J12, J13, J14

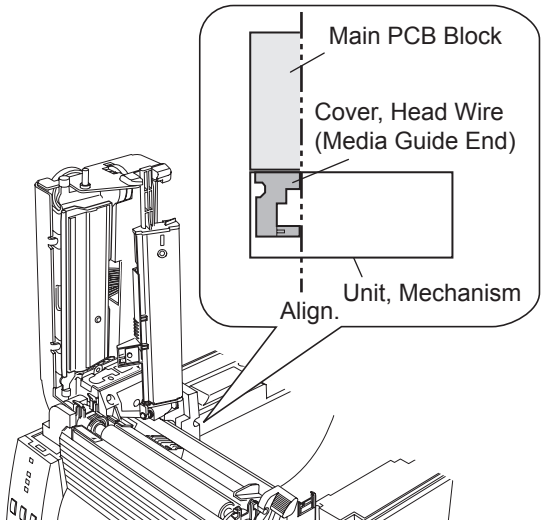


3. Remove 4 screws (PHT (PT), M3x8), 1 screw (BH, M4x4 (NI)) and 1 washer (EXT. T, 4 (NI)), and then detach the Main PCB Block upwardly.
4. Remove 3 screws (PHT (PT), M3x8), 1 screw (BH, M4x4 (NI)) and 1 washer (EXT. T, 4 (NI)), and 1 screw (BH (N), M3x6) and 1 washer (EXT. T, 3 (NI)), disconnect the “SA, Power Cable”, and detach the “Unit, Power Supply”.
5. Remove the “Unit, Control Panel” upwardly by releasing the hook part.
6. Remove the “Cushion, Ope-pane Cable” and the “Cable, Ope-pane” from the “Unit, Control Panel”.
7. Remove the “SA, Core” which is attached to the Case L.



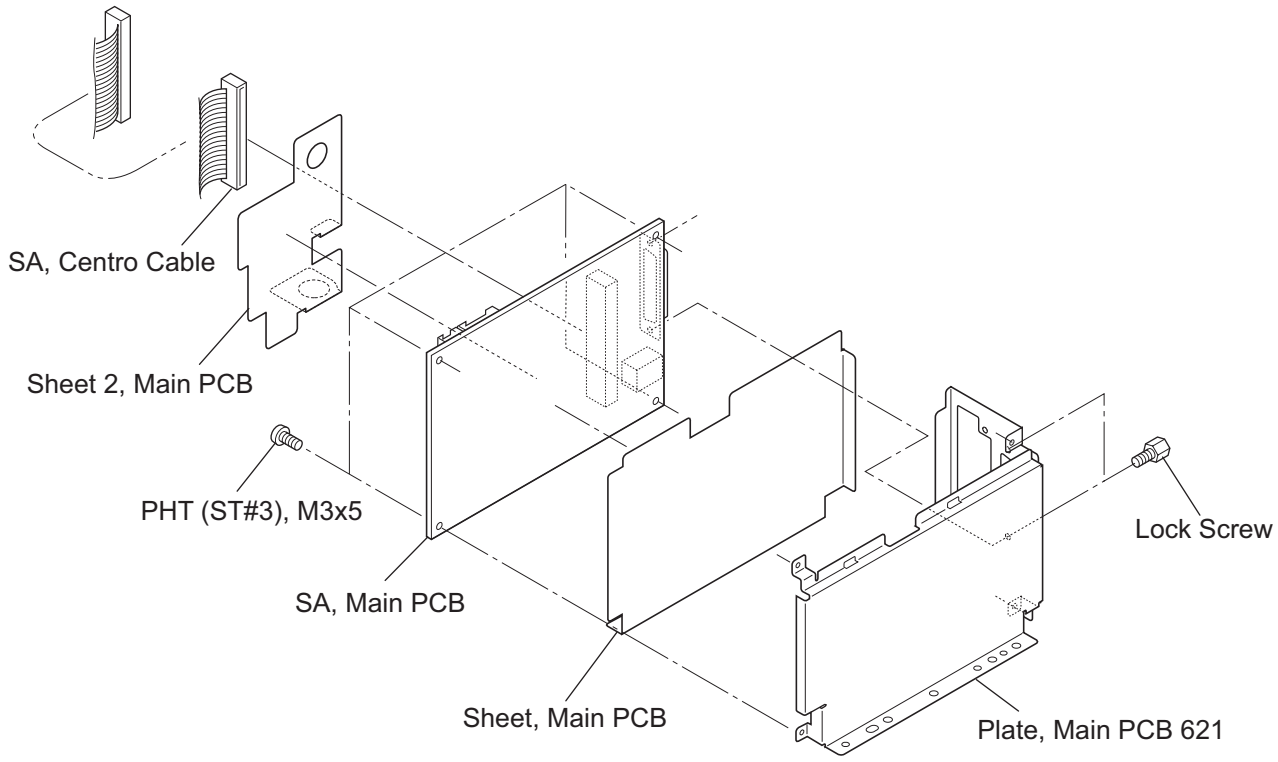
Notes on reassembling:

- When running the Ope-pane Cable, pass it inner side of the case arms "A".
- When connecting the flexible cables, be sure that the insertion direction is correct. If you insert it reversely, circuit is not electrically connected.
- When attaching the earth wire of the "Unit, Power Supply" to the "Unit, Mechanism", be sure that the earth lug is assembled in the horizontal direction as shown in the figure.
- Media-path left-edge alignment:
  Assemble the "Unit, Mechanism" so that the media guide end of the "Cover, Head Wire" is aligned with the chassis plate of the Main PCB Block as shown on the right.



3-5-11. “SA, Main PCB”

1. Remove the Case U Block. Refer to “3-5-2 Case U”.
2. Remove the Main PCB Block. Refer to “3-5-10 Main PCB Block, “Unit, Power Supply” and “Unit, Control Panel”“.
3. Disconnect the “SA, Centro Cable” from the “SA, Main PCB”.
4. Remove the “Sheet 2, Main PCB” from the “SA, Main PCB”.
5. Remove 2 lock screws and 4 screws (PHT (ST#3), M3x5), and detach the “SA, Main PCB” and the “Sheet, Main PCB” from the “Plate, Main PCB 621”.

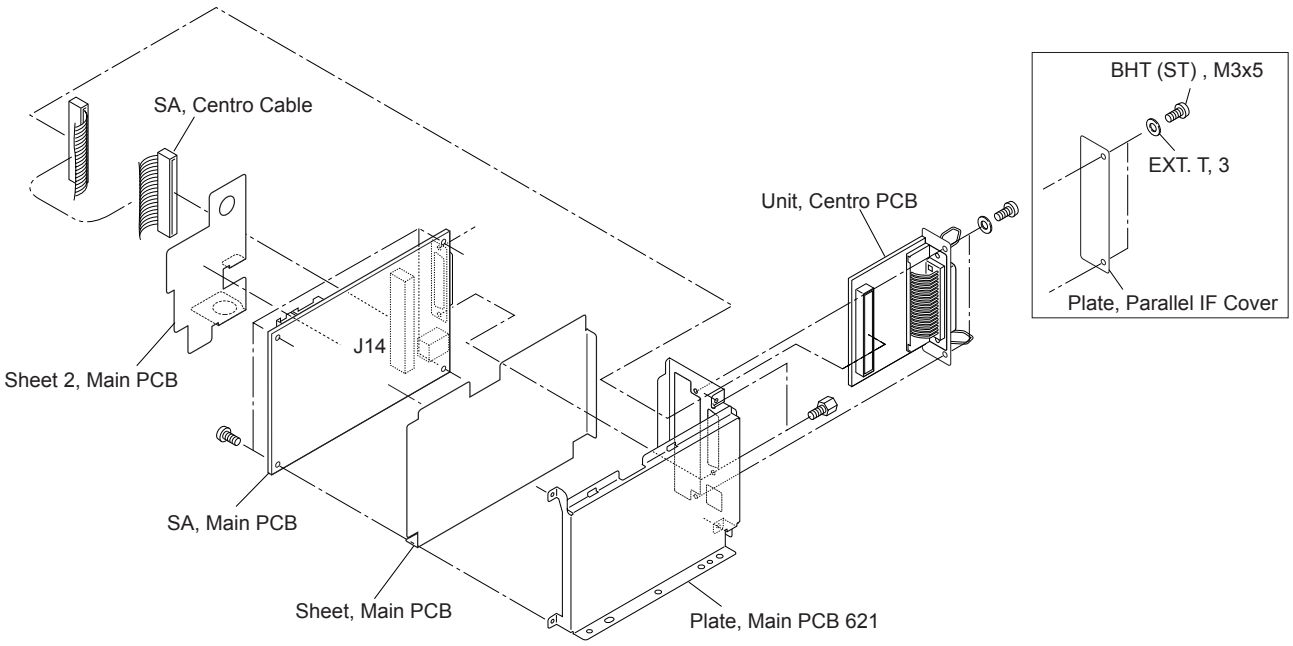


Note on reassembling:

- When the “SA, Main PCB” is replaced with new one, perform the sensor adjustment. Refer to “3-6-1 Transparent/Reflective Sensor Position Adjustment” on page 3-41.

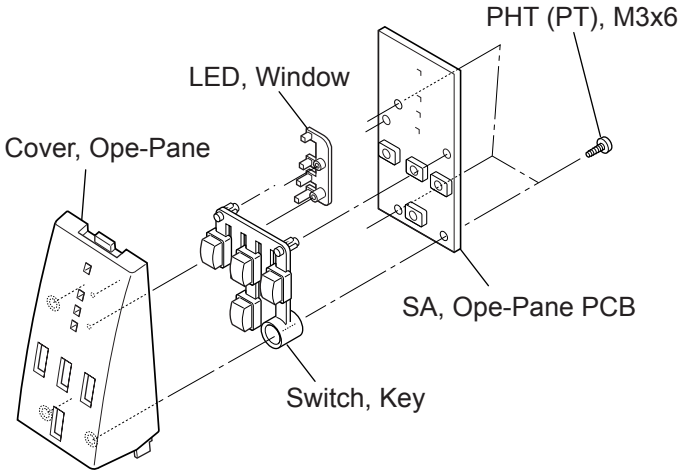
Note on installation of optional Parallel I/F board ("Unit, Centro PCB"):

1. Remove 2 screws (BHT (ST), M3x5) and 2 washers (EXT. T, 3), and detach the "Plate, Parallel IF Cover" from the back side of the printer.
2. Take out the free end of the "SA, Centro Cable" from the inside of the printer and connect it to the optional "Unit, Centro PCB".
3. Assemble the "Unit, Centro PCB" to the place where the "Plate, Parallel IF Cover" was attached, with the 2 screws and 2 washers removed in 1.



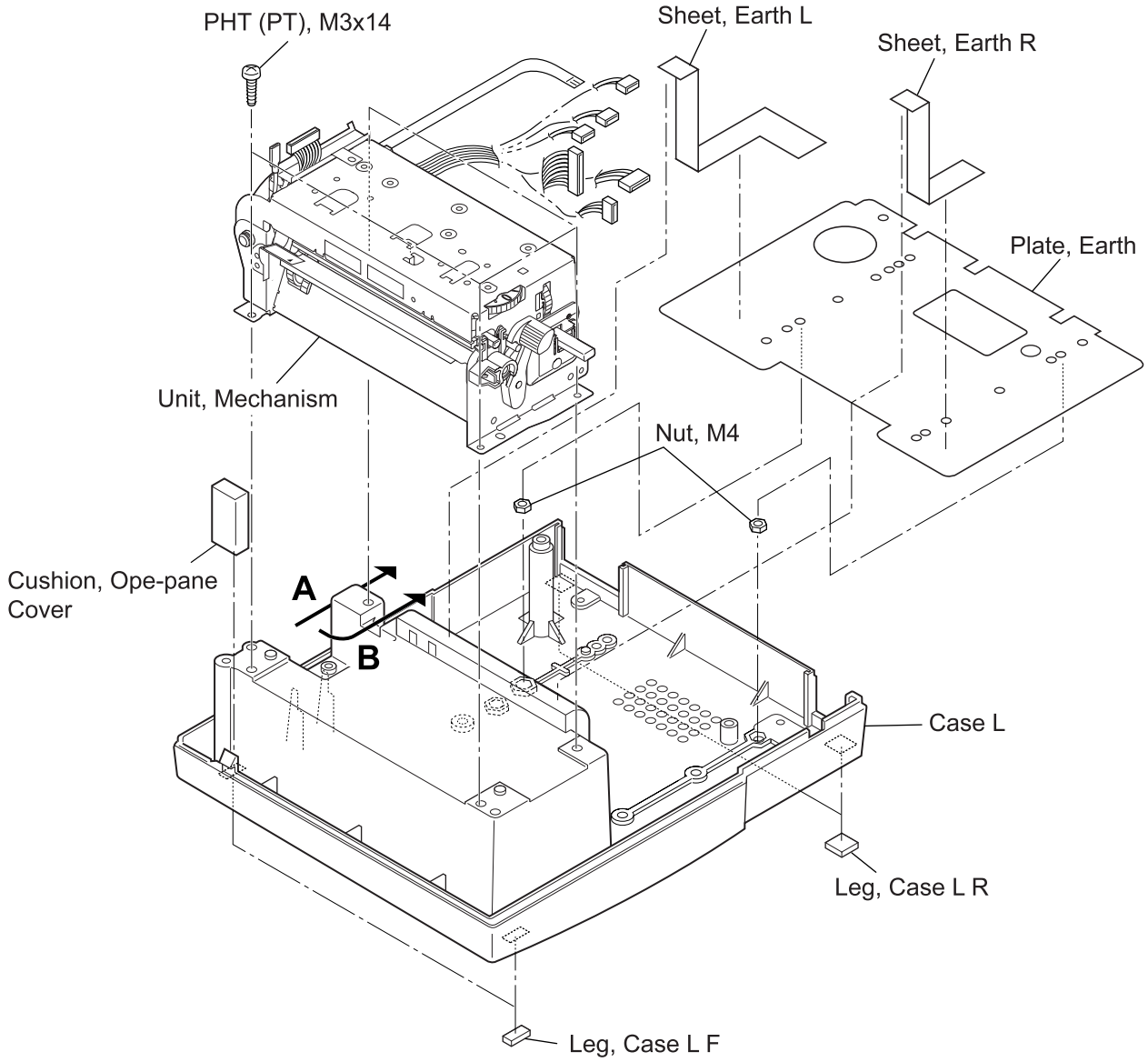
3-5-12. "SA, Ope-Pane PCB"

1. Remove the Case U Block. Refer to "3-5-2 Case U".
2. Remove the "Unit, Control Panel". Refer to "3-5-10 Main PCB Block, "Unit, Power Supply" and "Unit, Control Panel"".
3. Remove 3 screws (PHT (PT), M3x6) and detach the "Cover, Ope-pane".
4. Remove the "Switch, Key" and the "LED, Window" from the "SA, Ope-Pane PCB".



3-5-13. “Unit, Mechanism” and Case L

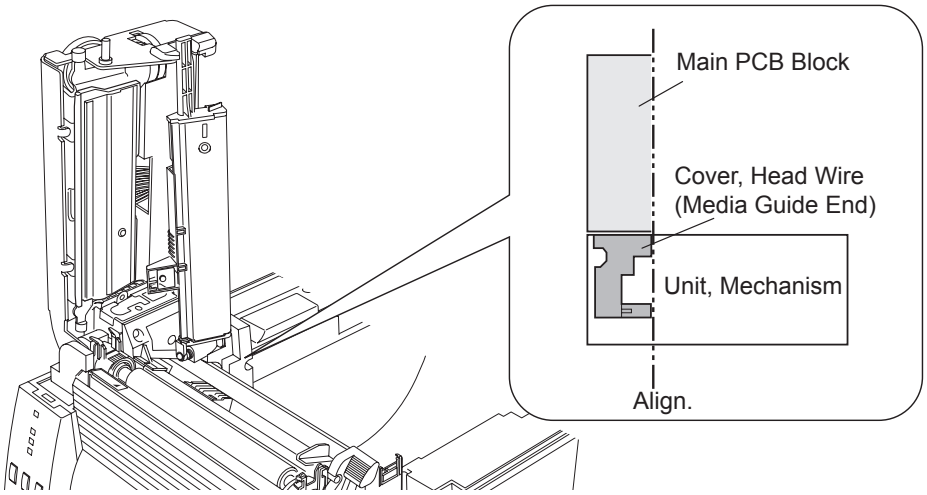
1. Remove the Case U Block. Refer to “3-5-2 Case U”.
2. Remove the Main PCB Block and “Unit, Power Supply”. Refer to “3-5-10 Main PCB Block, “Unit, Power Supply” and “Unit, Control Panel”“.
3. Remove 4 screws (PHT (PT), M3x14) and detach the “Unit, Mechanism”.
4. Remove the “Sheet, Earth L”, “Sheet, Earth R”, “Plate, Earth” and 2 nuts (M4).
5. Remove the “Cushion, Ope-pane Cover” from the Case L. (The Ope-pane Cover Cushion is not reusable.)
6. Remove the 2 “Leg, Case L F” and 2 “Leg, Case L R” from the Case L.



Notes on reassembling:

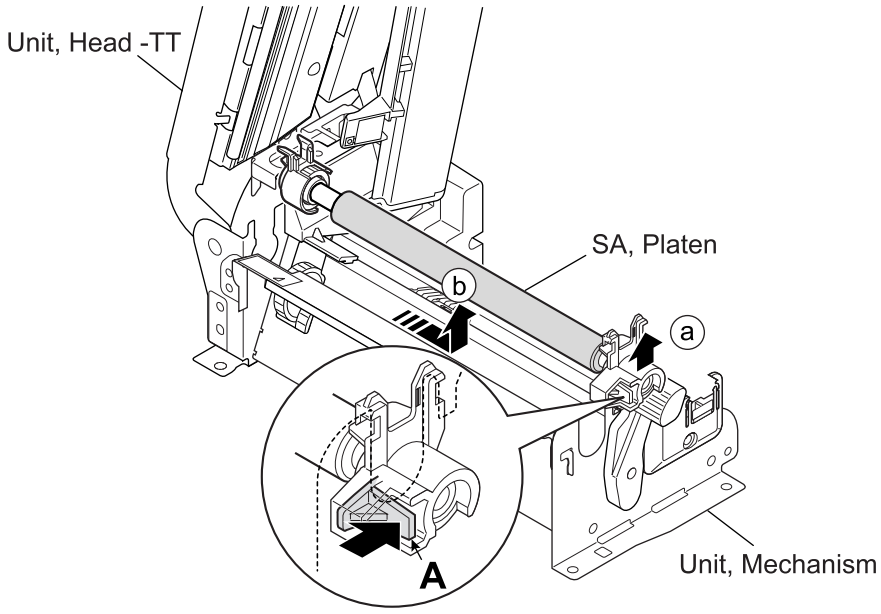
- The “Cushion, Ope-pane Cover” that was removed in Step 5 is not reusable.
- Run the cables as follows:
  Motor cable: Pass through left end (“**A**”).
  Other cables: Pass through the groove “**B**”.

- Media-path left-edge alignment:
  Align the “Unit, Mechanism” so that the media guide end of the “Cover, Head Wire” is aligned with the chassis plate of the Main PCB Block as shown below (refer to “3-5-10 Main PCB Block”).



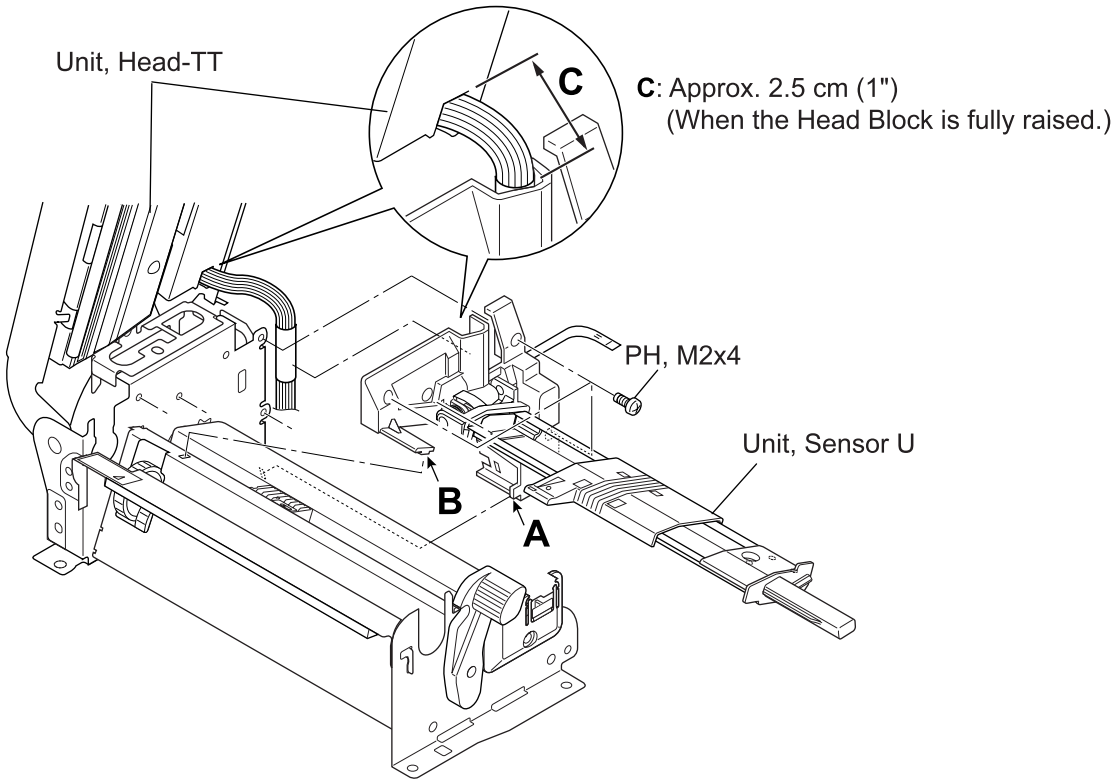
3-5-14. “SA, Platen”

1. Open the “SA, Top Cover Base” and then the “Unit, Head-TT”.
2. While pushing the part “**A**” of the “SA, Platen”, lift the right end a little. (See the arrow “**a**”.)
   Then, remove the “SA, Platen” from the “Unit, Mechanism” by moving it to the right and then lift it upwardly. (See the arrow “**b**”.)



3-5-15. “Unit, Sensor U”

1. Remove the “Unit, Mechanism”. Refer to “3-5-13 “Unit, Mechanism” and Case L”.
2. Open the “Unit, Head-TT” and detach the “Unit, Sensor U” to set it free.
3. Remove 4 screws (PH, M2x4), and detach the “Unit, Sensor U”.



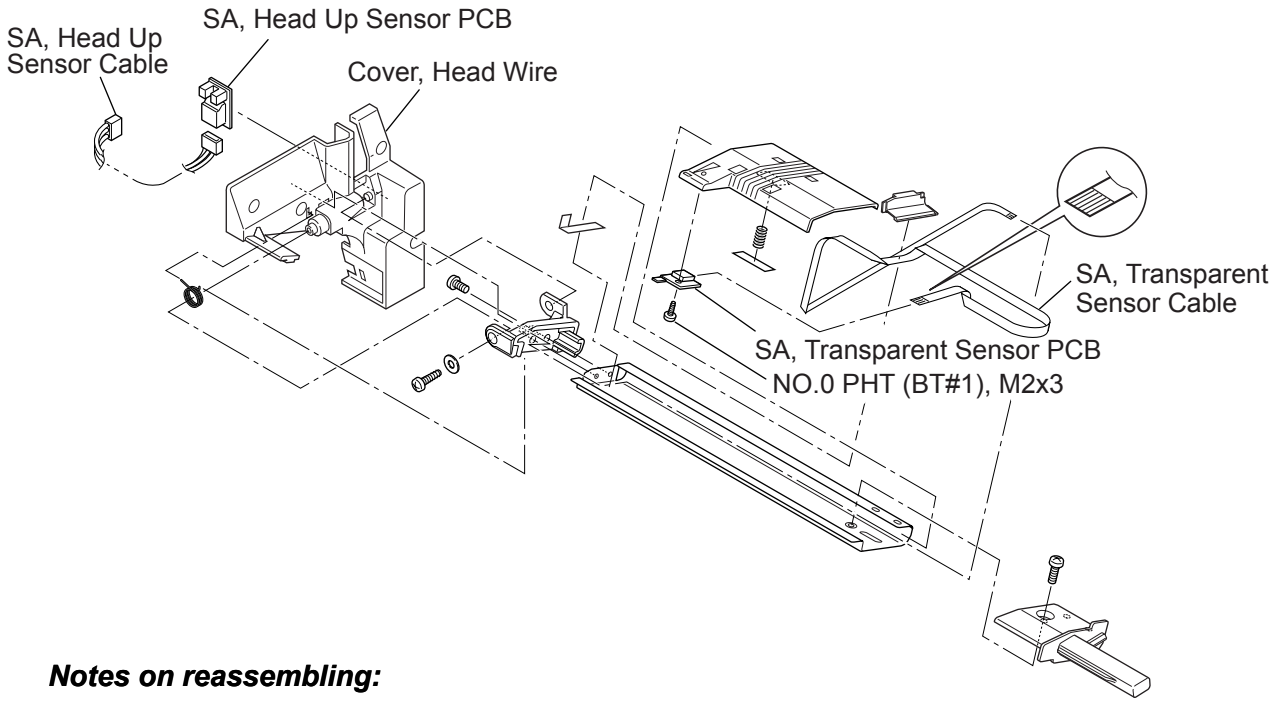
Notes on reassembling:

- When assembling the “Unit, Sensor U”, be sure that the protrusions “**A**” and “**B**” are securely engaged with the respective holes as shown in the figure.
- When assembling the “Unit, Sensor U”, be sure that the cable length “**C**” is approx. 2.5 cm (1”) with the “Unit, Head-TT” fully opened. If it is too long, the cable will be caught when the “Unit, Head-TT” is closed.

3-5-16. “SA, Head Up Sensor PCB”, “SA, Transparent Sensor PCB” and “SA, Transparent Sensor Cable”

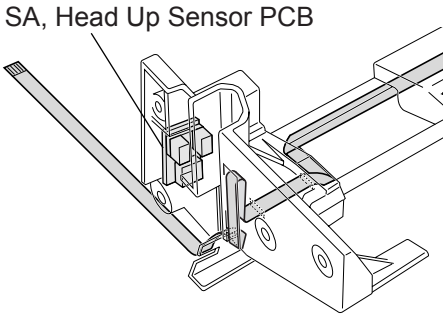
(1) “SA, Head Up Sensor PCB” and “SA, Transparent Sensor PCB”

1. Remove the “Unit, Sensor U”. Refer to “3-5-15 “Unit, Sensor U”“.
2. Remove the bonded “SA, Head Up Sensor PCB” from the “Cover, Head Wire” and disconnect the “SA, Head Up Sensor Cable”.
3. Remove 1 screw (NO.0 PHT (BT#1), M2x3) and detach the “SA, Transparent Sensor PCB” by disconnecting the “SA, Transparent Sensor Cable”.



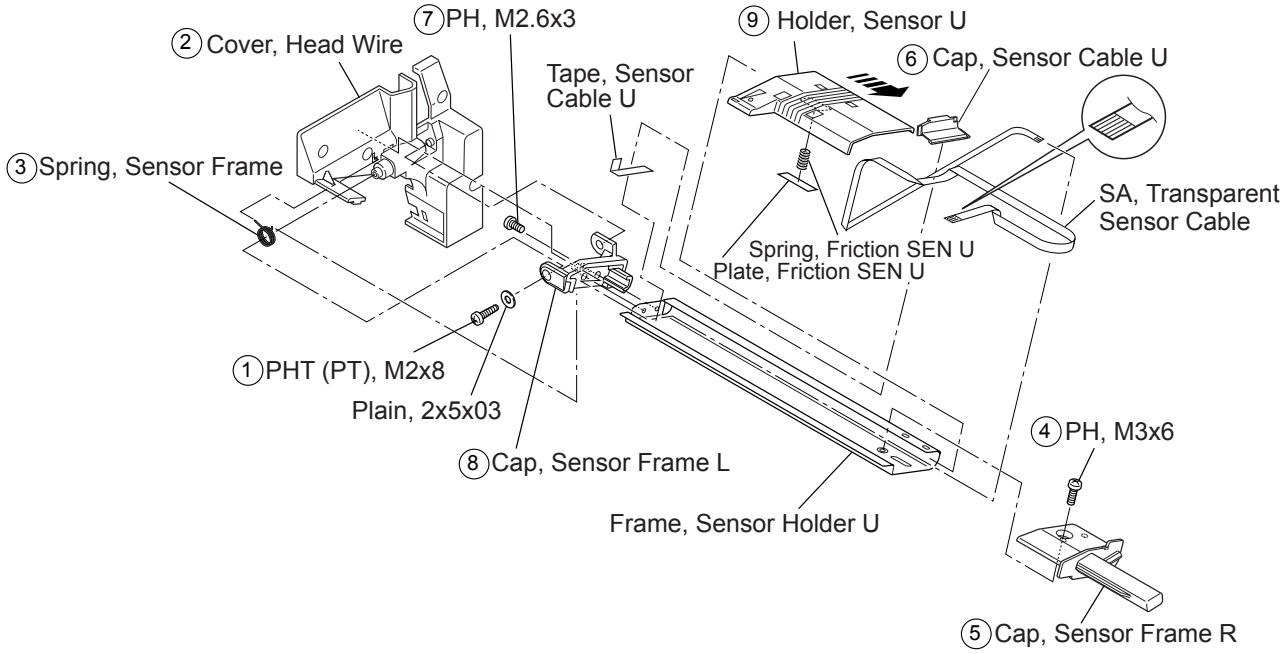
Notes on reassembling:

- When the “SA, Transparent Sensor PCB” is replaced with new one, perform the sensor adjustment. Refer to “3-6-1 Transparent/Reflective Sensor Position Adjustment” on page 3-41.
- When assembling the “SA, Head Up Sensor PCB”, bond it in place.



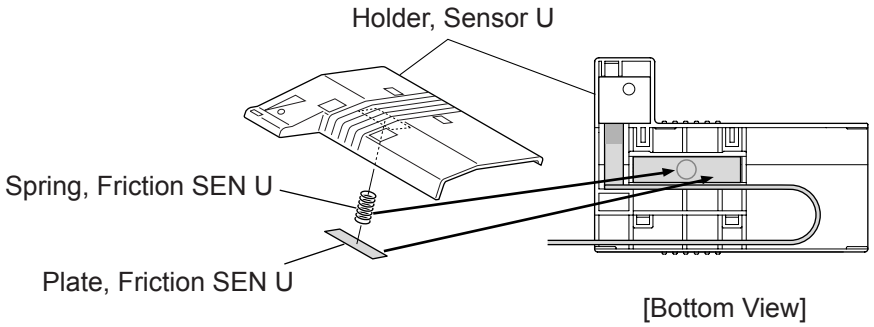
(2) "SA, Transparent Sensor Cable"

1. Remove the "Unit, Sensor U". Refer to "3-5-15 "Unit, Sensor U""".
2. Remove the "SA, Transparent Sensor PCB". Refer to (1) as above.
3. Remove 1 screw (PHT (PT), M2x8) (①) and 1 washer (Plain, 2x5x03), and disengage the "Unit, Sensor U" body from the "Cover, Head Wire" (②). Then, remove the "Spring, Sensor Frame" (③).
4. Remove 1 screw (PH, M3x6) (④) and detach the "Cap, Sensor Frame R" (⑤).
5. Remove the "Cap, Sensor Cable U" (⑥) to set the "SA, Transparent Sensor Cable" free.
6. Remove 2 screws (PH, M2.6x3) (⑦) and detach the "Cap, Sensor Frame L" (⑧).
7. Remove the "Holder, Sensor U" (⑨) by sliding it to the right and detach the "SA, Transparent Sensor Cable".
8. Remove the"Plate, Friction SEN U" and "Spring, Friction SEN U" from the "Holder, Sensor U".
9. Peel off the "Tape, Sensor Cable U" from the "Frame, Sensor Holder U".

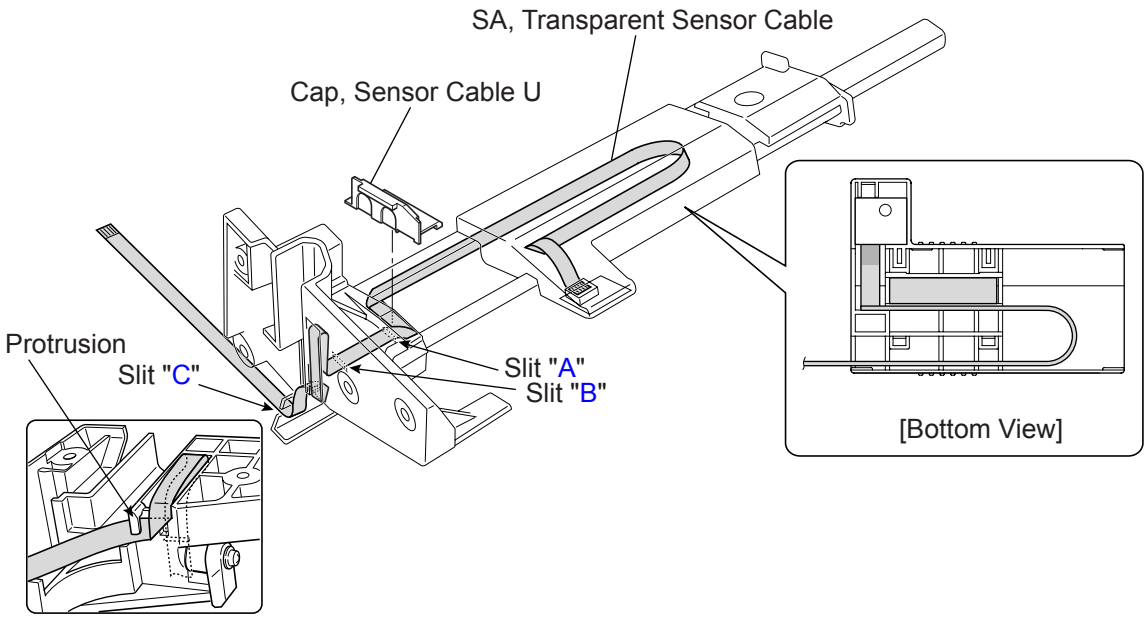


Notes on reassembling:

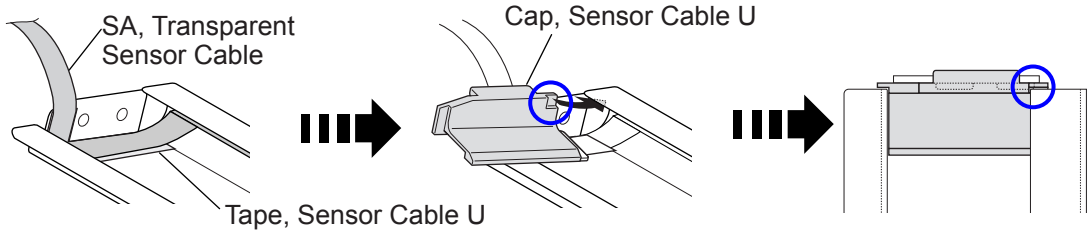
- When assembling the "Spring, Friction SEN U", securely engage it with the "Holder, Sensor U" and cover it with the"Plate, Friction SEN U".



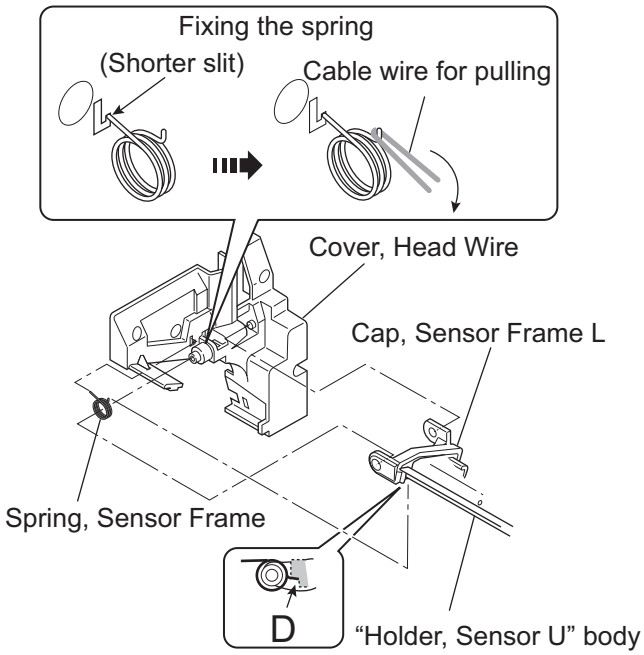
- When assembling the “SA, Transparent Sensor Cable”, run it as shown below. Be sure that it passes 2 slits (“**A**” and “**B**”), and the free end is hooked on the protrusion and passes the slit “**C**”.



- When assembling the “Cap, Sensor Cable U”, be sure that it is securely seated as shown below: The notched corner should be engaged with the chassis securely.

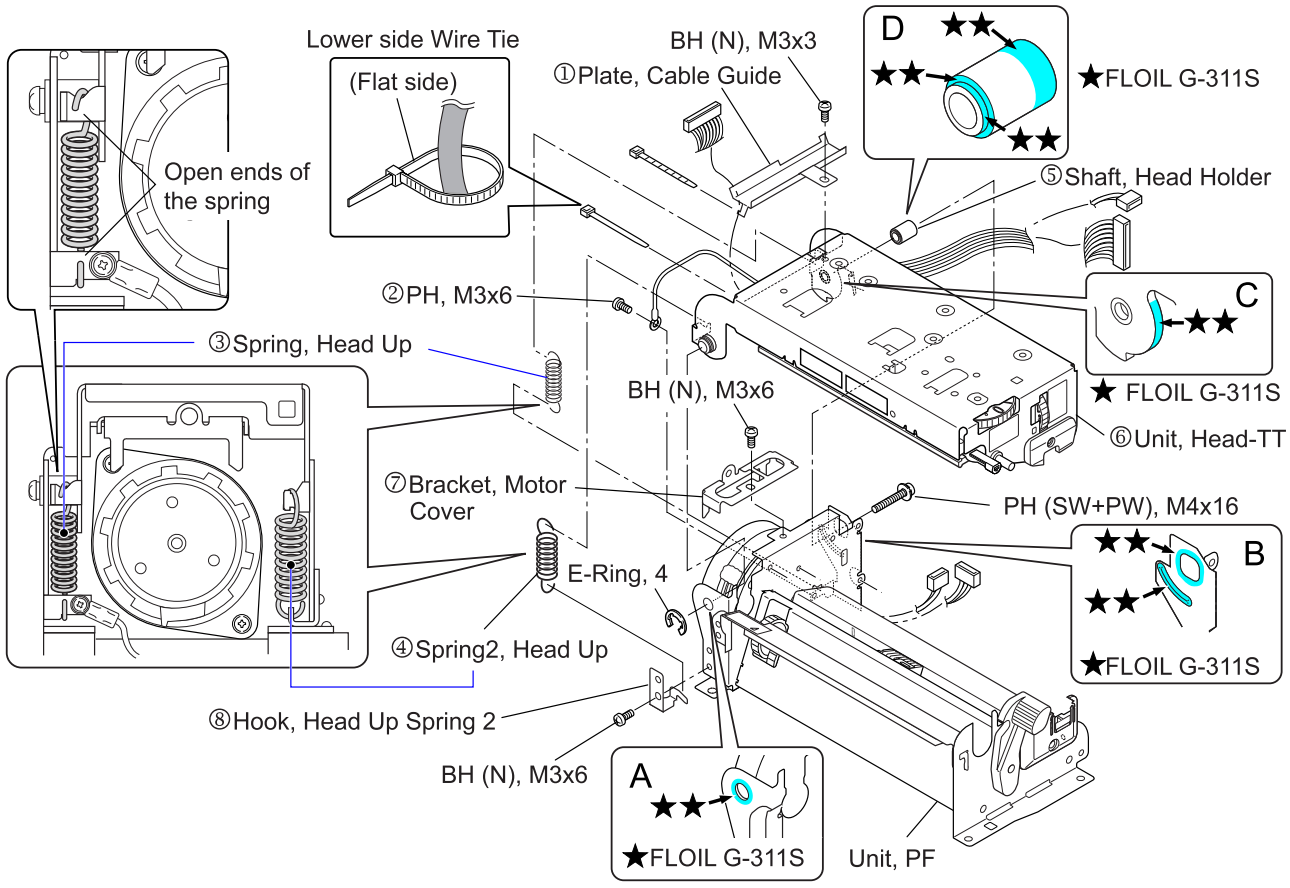


- When assembling the “Holder, Sensor U” body on the “Cover, Head Wire”, engage the “Spring, Sensor Frame” as follows.
  1) Insert the long end of the spring into the shorter slit of the “Cover, Head Wire”.
  2) Hook a cable wire or similar on the short end of the spring, and pull it to lower the short end of the spring.
  3) While pulling the cable wire, assemble the “Holder, Sensor U” body on the “Cover, Head Wire”, and then hook the short end of the spring on the part “D” of the “Cap, Sensor Frame L”.



3-5-17. “Unit, Head-TT” and “Unit, PF”

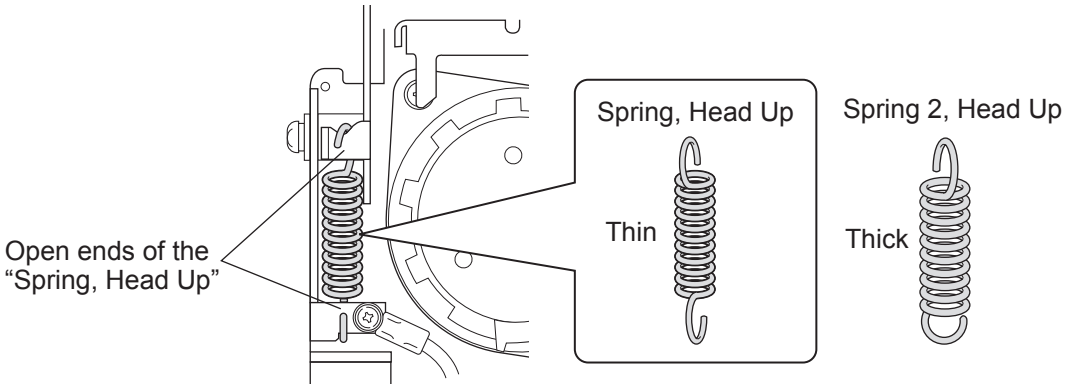
1. Remove the “Unit, Mechanism”. Refer to “3-5-13 “Unit, Mechanism” and Case L”.
2. Remove 1 screw (BH (N), M3x3) to detach the “Plate, Cable Guide” (①) from the “Unit, Head-TT”.
3. Remove 1 screw (PH, M3x6) (②) to detach the earth lug from the frame.
4. Open the “Unit, Head-TT” and disengage the “Spring, Head Up” (③) and the “Spring 2, Head Up” (④) from the “Unit, Mechanism”.
   Note: Hold the “Unit, Head-TT” as it can fall when the springs are removed.
5. Remove 1 screw (PH (SW+PW), M4x16) and the “Shaft, Head Holder” (⑤).
6. Disengage 1 E-ring (4) and detach the “Unit, Head-TT” (⑥) from the “Unit, PF” Block.
7. Remove 1 screw (BH (N), M3x6) and detach the “Bracket, Motor Cover” (⑦) from the “Unit, PF” Block.
8. Remove 1 screw (BH (N), M3x6) and detach the “Hook, Head Up Spring 2” (⑧) from the “Unit, PF”.



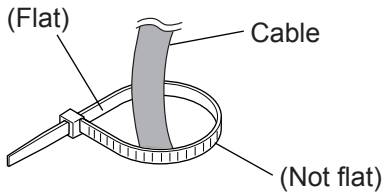
Notes on reassembling:

- When assembling, apply G-311S to the following places shown by the ★ mark.
  A: Hole (front left). Circumference surface of the hole (on both sides) and inside the hole
  B: Hole and protrusion (rear left). Circumference surface of the hole (on both sides) and along the protrusion surface.
  C: Along the contacting surface (rear left).
  D: 3 surfaces on the “Shaft, Head Holder”.
- When assembling the “Shaft, Head Holder”, be sure that its assembling direction is correct.

- When assembling the “Spring, Head Up” (thin) and the “Spring 2, Head Up” (thick), first, hook them on the upper arms (“Unit, Head-TT”), and then on the lower arms (“Unit, PF”).
  In this case, hook the “Spring, Head Up” so that its opening ends come outward as shown in the figure. (This can prevent unwanted noise generation produced when the “Unit, Head-TT” is opened or closed, though this phenomenon rarely happens.)



- When tying the Wire Tie on the lower side (not the Wire Tie on the upper side), wind it so that the flat surface is inside. (This prevents the cable from being rubbed by the uneven (not flat) surface when the “Unit, Head-TT” is opened or closed.)



3-5-18. “SA, Head”

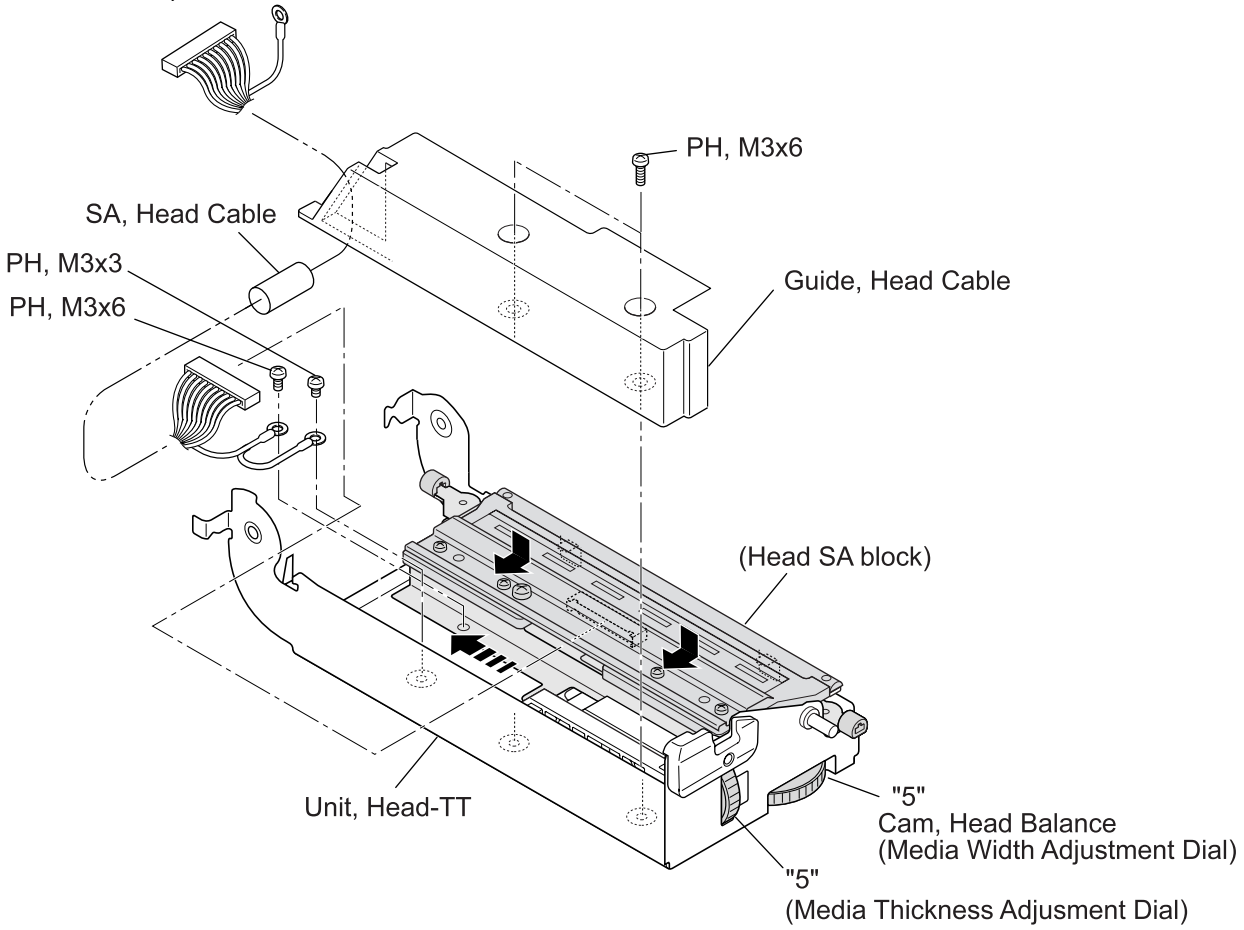
Caution:

- ***Carefully handle the “SA, Head” when disassembling and reassembling it so as not to damage the thermal elements of the “SA, Head”. Especially, avoid contacting the thermal elements with the metal part, etc.***

The following shows the normal disassembly procedure of the “SA, Head”. For easier way, refer to “Tip” on page 3-34.

(1) Head SA block

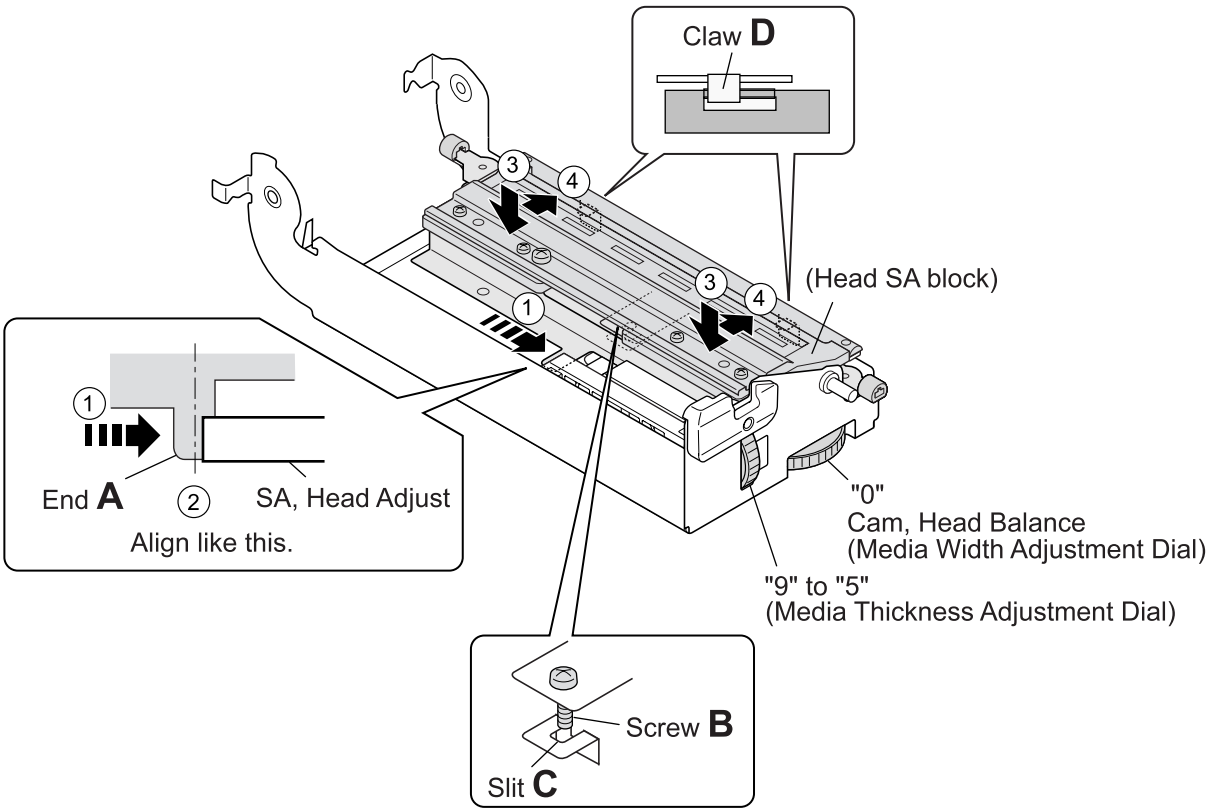
1. Remove the “Unit, Mechanism”. Refer to “3-5-13 “Unit, Mechanism” and Case L”.
2. Remove the “Unit, Head-TT”. Refer to “3-5-17 “Unit, Head-TT” and “Unit, PF””.
3. Place the “Unit, Head-TT” upside down as shown in the figure.
4. Remove 2 screws (PH, M3x6) and detach the “Guide, Head Cable”.
5. Set the media width adjustment dial and the media thickness adjustment dial to the location “5” for easier removal.
6. While pressing down the Head SA block, move it forward and then to the left as shown by the arrows.
7. Disconnect the connector from the Head SA block, remove 2 screws (PH, M3x3 and PH, M3x6), and detach the “SA, Head Cable”.



Notes on reassembling:

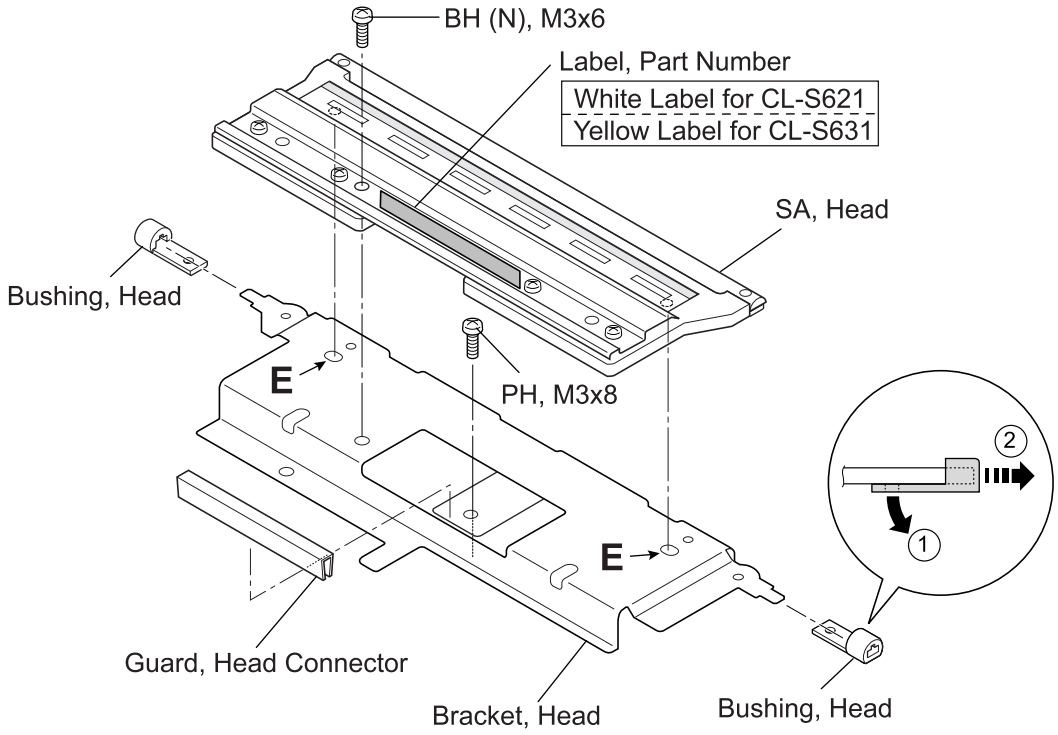
When assembling the Head SA block, follow the next steps:

1. Set the blue dials as follows:
   Media width adjustment dial: Location “0” (for easier assembling)
   Media thickness adjustment dial: Location “9”
2. Insert the end “**A**” of the Head SA block into the “SA, Head Adjust” (①) and align its position as shown in the figure (②). (In this position, the screw “**B**” of the Head SA block can be correctly inserted into the slit “**C**” of the frame. If the screw “**B**” is not inserted into the slit “**C**”, the Head SA block cannot be correctly seated.)
3. While lightly pressing down the Head SA block (③), move it toward the rear to hook its rear sides on the claws “**D**” of the frame (④).
4. Set the media width adjustment dial to the location “5” to give tension to the Head SA block.



(2) "SA, Head"

1. Remove the Head SA block. Refer to "(1) Head SA block" as above.
2. Remove 1 screw (BH (N), M3x6) and detach the "SA, Head".
3. Remove 2 "Bushing, Head", 1 screw (PH, M3x8) and "Guard, Head Connector" from the "Bracket, Head".
   (The screw (PH, M3x8) is used for alignment purpose and not for mounting.)



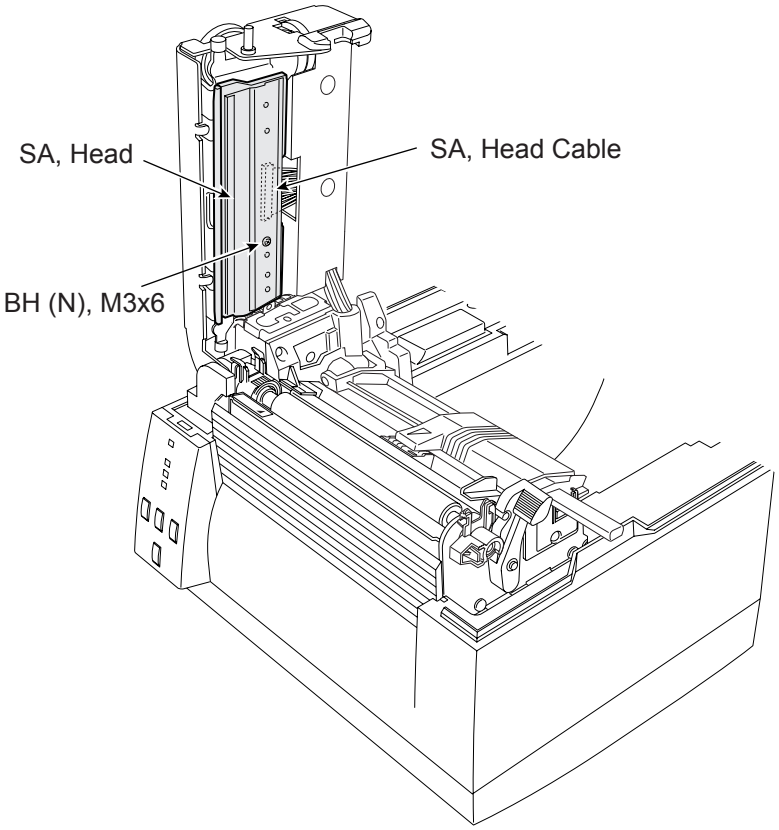
Notes on reassembling:

- When assembling the "SA, Head", insert its 2 protrusions into the guide holes "**E**" for aligning and then fix the "SA, Head" with 1 screw.
- After assembling the "SA, Head", clean the surface of the thermal elements with the head cleaner.
- After assembling the "SA, Head", perform test print in self print mode to check the print quality. (Refer to "2-3-2-(2-1) Self print mode".) If the print quality is not enough, ribbon slanting or ribbon wrinkle may occur. In this case, perform "3-6-2 Ribbon Slant Elimination Adjustment" on page 3-46.

Tip: To remove the "SA, Head" without disassembling the "Unit, Head-TT"

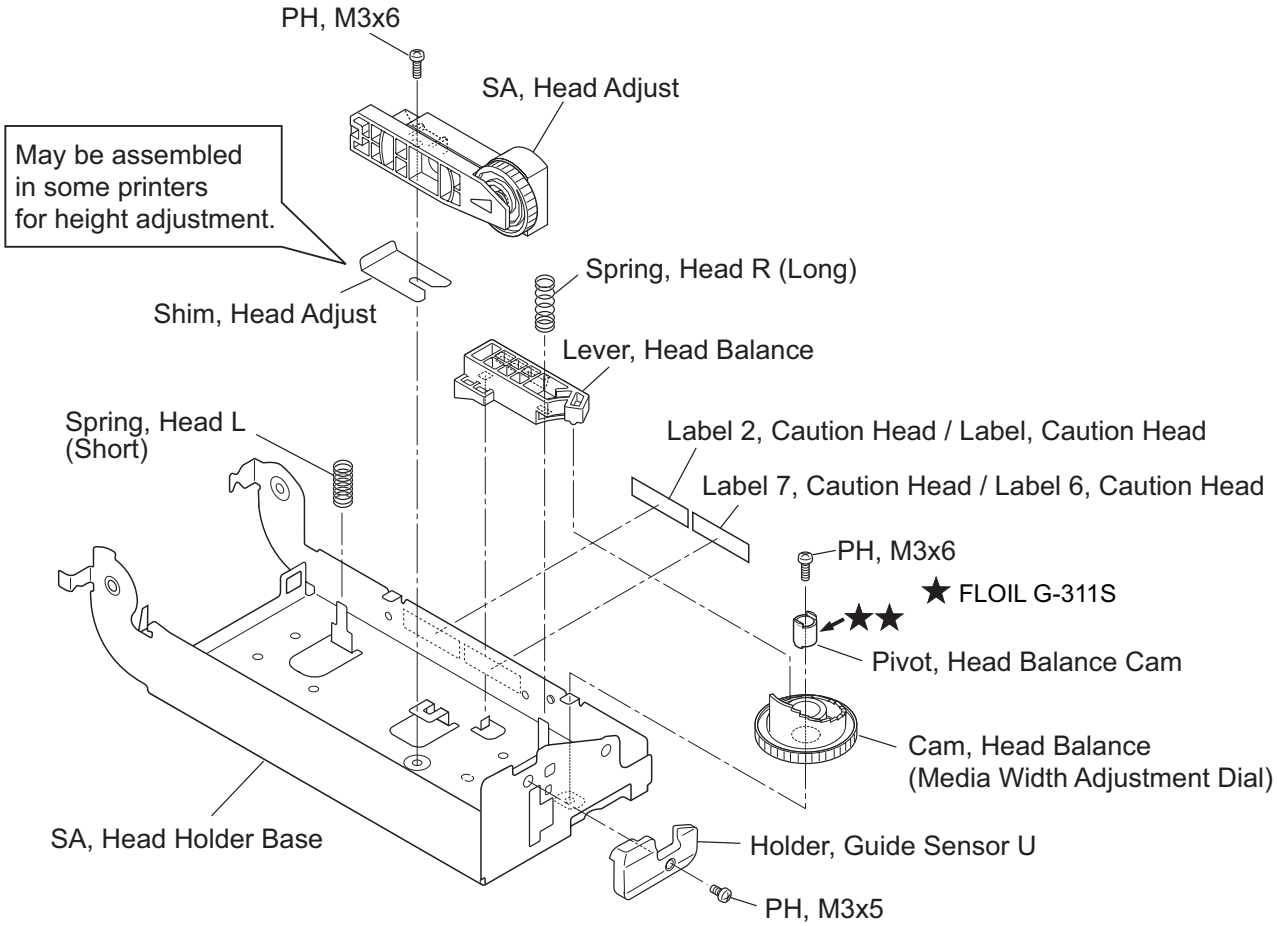
You can remove the "SA, Head" without disassembling the "Unit, Head-TT". Though, the normal disassembly procedure is described in (1) "Head SA block" on page 3-31.

1. Raise the "Unit, Head-TT". (The following figure omits the "Unit, Ribbon".)
2. Disconnect the connector of the "SA, Head Cable" from the "SA, Head".
3. Remove 1 screw (BH (N), M3x6) and detach the "SA, Head".



3-5-19. “SA, Head Adjust” and “Cam, Head Balance”

1. Remove the “Unit, Mechanism”. Refer to “3-5-13 “Unit, Mechanism” and Case L”.
2. Remove the “Unit, Head-TT”. Refer to “3-5-17 “Unit, Head-TT” and “Unit, PF””.
3. Remove the Head SA block. Refer to “3-5-18 (1) Head SA block”.
4. Remove the “Spring, Head L” (short one) and the “Spring, Head R” (long one).
5. Remove the “Cam, Head Balance” as follows:
   1) Set the “Cam, Head Balance” (media width adjustment dial) to the location “0” and remove the “Lever, Head Balance”.
   2) Remove 1 screw (PH, M3x6), and detach the “Cam, Head Balance” and the “Pivot, Head Balance Cam”.
6. Remove 1 screw (PH, M3x6), and detach the “SA, Head Adjust”.
   Note: The “Shim, Head Adjust” may be inserted for adjusting height, depending on the printer to be used. It may be inserted at the factory to obtain correct adjustable range of the Media Thickness Adjustment Dial. (Reference information is written in “3-6-4 Maintenance Information - Head Adjust Shim” on page 3-54.)
   If the shim(s) is(are) inserted, assemble it(them) as it was(were).
7. Remove 1 screw (PH, M3x5) and detach the “Holder, Guide Sensor U” from the “SA, Head Holder Base”.



Note on reassembling:

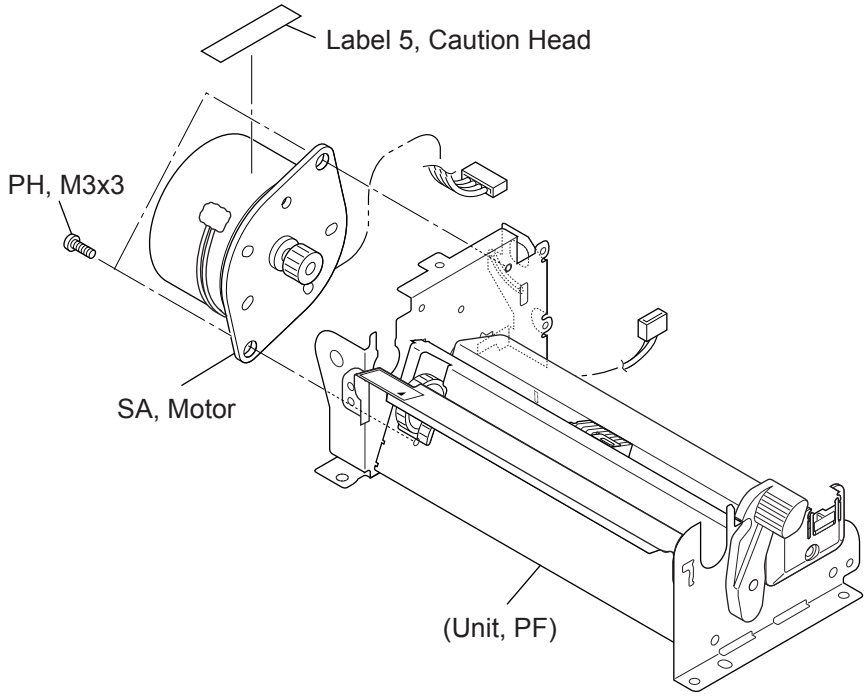
- When assembling, apply G-311S to the “Pivot, Head Balance Cam” surface.

3-5-20. “SA, Motor”

1. Remove the “Unit, Mechanism”. Refer to “3-5-13 “Unit, Mechanism” and Case L”.
2. Remove 2 screws (PH, M3x3), and detach the Motor Block. Then, peel off the “Label 5, Caution Head” from the “SA, Motor”.

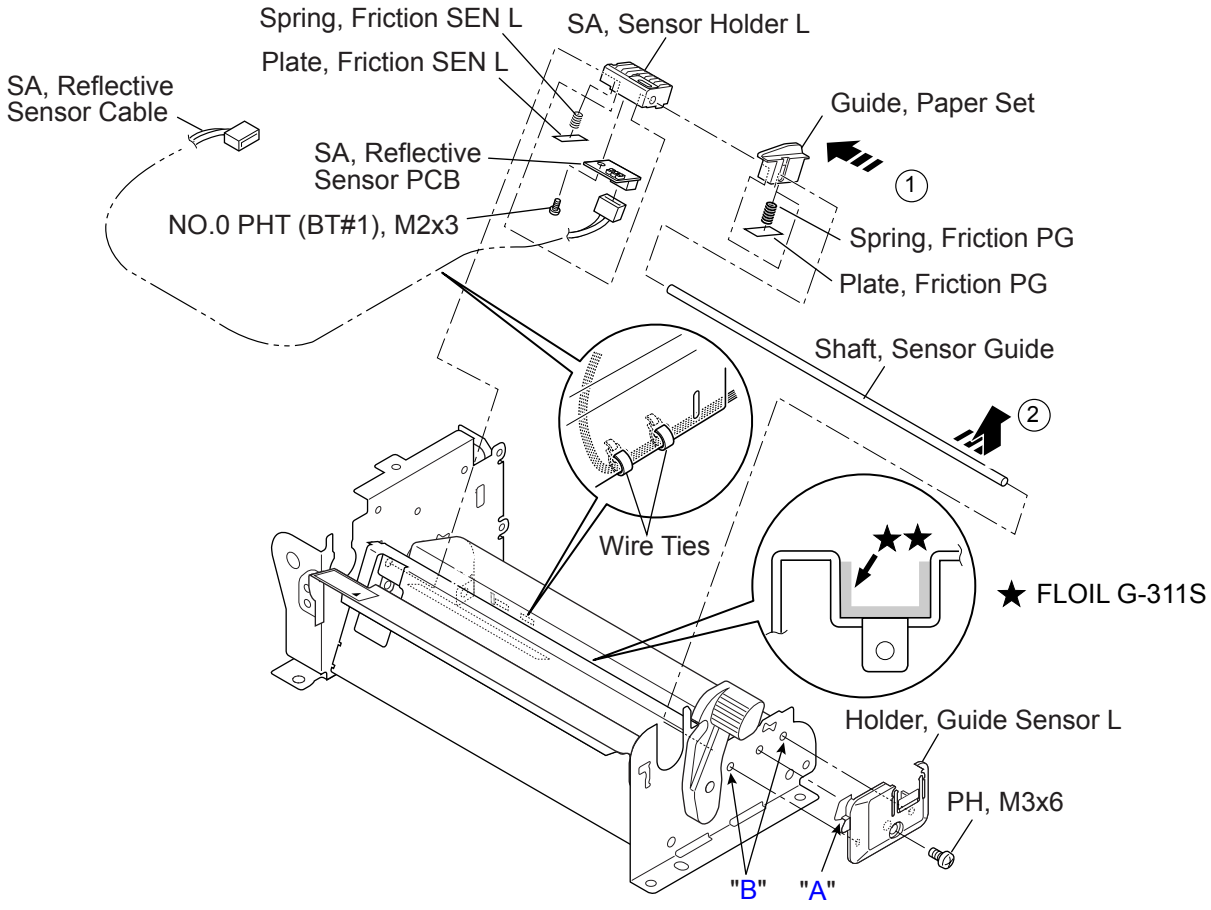
Note on reassembling:

- Once the “Label 5, Caution Head” has been removed, it cannot be reused.



3-5-21. “SA, Reflective Sensor PCB”

1. Remove the “Unit, Mechanism”. Refer to “3-5-13 “Unit, Mechanism” and Case L”.
2. By accessing to the connector of the “SA, Reflective Sensor Cable” from the bottom, disconnect it from the “SA, Reflective Sensor PCB”.
3. Open the “Unit, Head-TT”, remove 1 screw (PH, M3x6), and detach the “Holder, Guide Sensor L”.
4. Slide the “Guide, Paper Set” to the left (①) and remove the “Shaft, Sensor Guide” in the direction shown by the arrow (②), together with the “Guide, Paper Set” and “SA, Sensor Holder L”.
5. Pull out the “Guide, Paper Set” from the “Shaft, Sensor Guide” and remove the “Spring, Friction PG” and the “Plate, Friction PG”.
6. Pull out the “SA, Sensor Holder L” from the “Shaft, Sensor Guide” and remove the “Spring, Friction SEN L” and the “Plate, Friction SEN L”.
7. Remove 1 screw (NO.0 PHT (BT#1), M2x3) and detach the “SA, Reflective Sensor PCB” from the “SA, Sensor Holder L”.
8. Cut 2 Wire Ties and remove the “SA, Reflective Sensor Cable”.



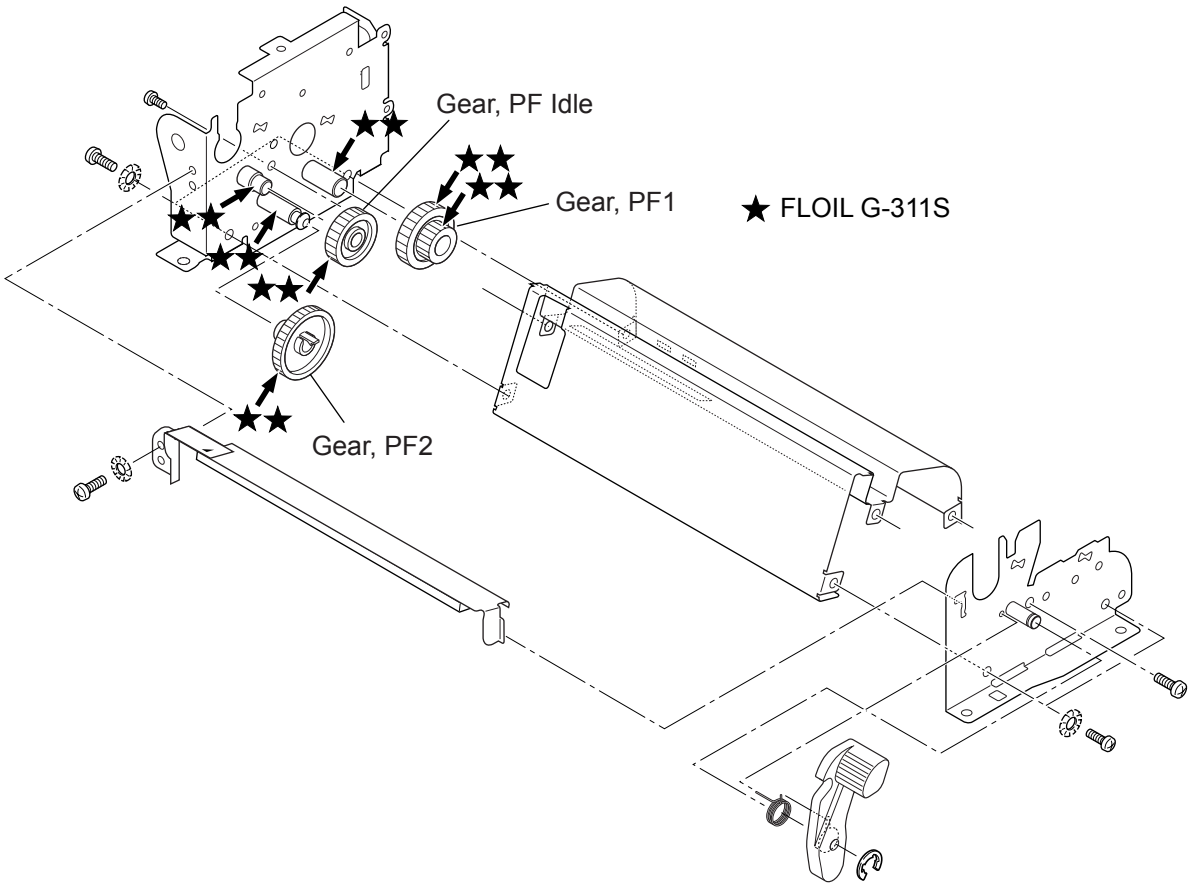
Notes on reassembling:

- When the “SA, Reflective Sensor PCB” is replaced with new one, perform the sensor adjustment. Refer to “3-6-1 Transparent/Reflective Sensor Position Adjustment” on page 3-41.
- Apply Floil G-311S along the groove of the frame as shown.

- Do not assemble the springs and plates wrongly.
  Spring, Friction PG: Large (approx. 7 mm in length)
  Spring, Friction SEN L: Small (approx. 5 mm in length)
  Plate, Friction PG: Wide
  Plate, Friction SEN L: Narrow
- Assemble the “Shaft, Sensor Guide” (with the “SA, Sensor Holder L” and the “Guide, Paper Set”), and align its ends in places. Next, securely assemble the “Holder, Guide Sensor L”. (The groove “**A**” of the “Holder, Guide Sensor L” should engage in the frame plate and also the protrusions should be inserted into the holes “**B**” on the frame.)
- When assembling the “SA, Reflective Sensor Cable”, bind it with 2 Wire Ties as shown in the figure.

3-5-22. Gears

1. Remove the “Unit, Mechanism”. Refer to “3-5-13 “Unit, Mechanism” and Case L”.
2. Remove the “Unit, PF”. Refer to “3-5-17 “Unit, Head-TT” and “Unit, PF””.
3. Remove the “SA, Motor”. Refer to “3-5-20 “SA, Motor””.
   Tip: You can remove the gears without removing the “Unit, PF” and the “SA, Motor”.
4. Pull out the “Gear, PF2” by releasing its lock, and then pull out the “Gear, PF1” and the “Gear, PF Idle”.

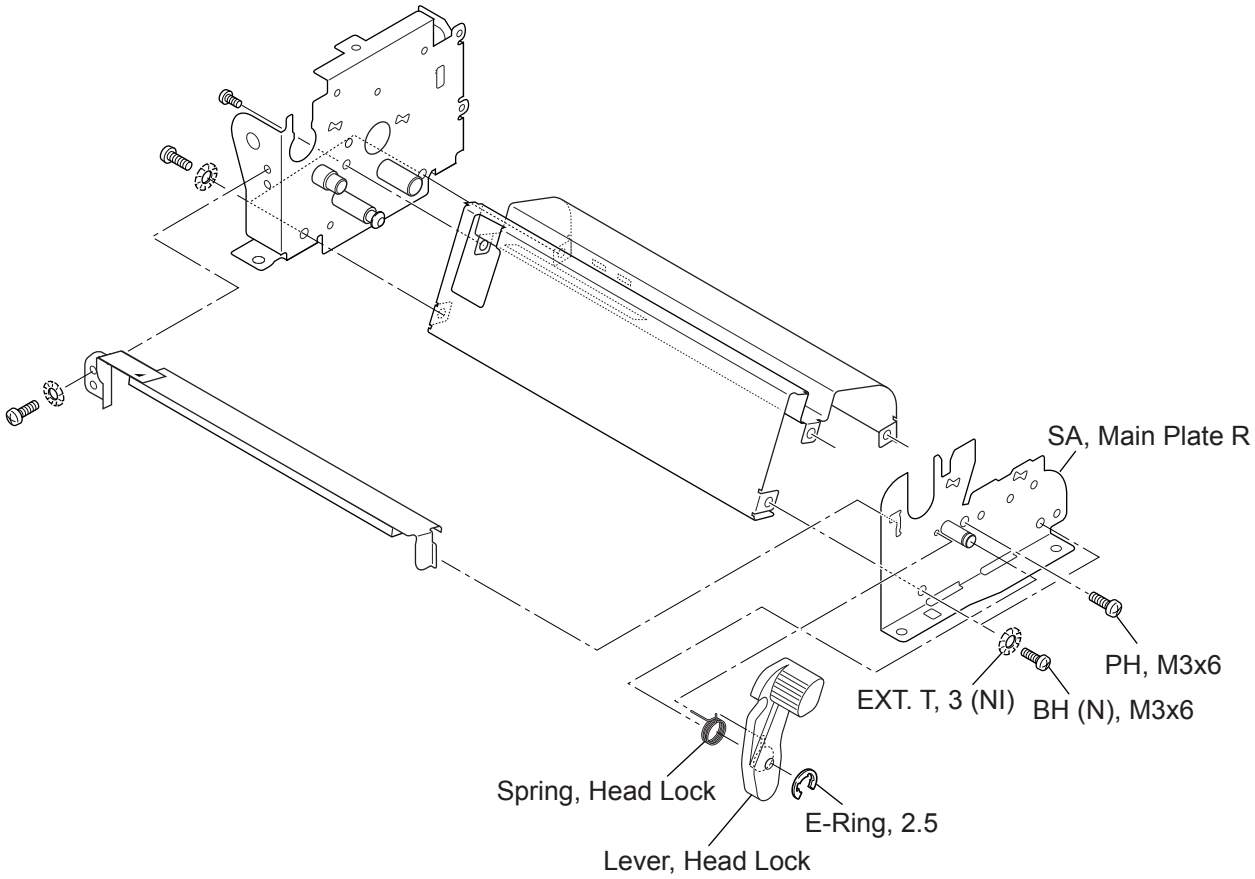


Notes on reassembling:

- Apply Floil G-311S to each gear shaft (3 shafts) and to each gear surfaces.
- The “Gear, PF Idle” has no directionality, but other gears have.

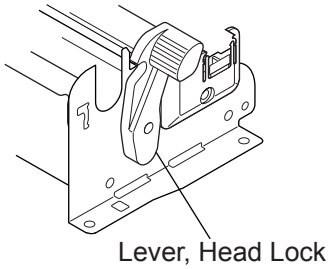
3-5-23. “Lever, Head Lock” and “SA, Main Plate R”

1. Remove the “Unit, Mechanism”. Refer to “3-5-13 “Unit, Mechanism” and Case L”.
2. Remove 2 screws (BH (N), M3x6), 2 washers (EXT. T, 3 (NI)) and 1 screw (PH, M3x6), and detach the Main Plate R Block.
3. Disengage 1 E-Ring and detach the “Lever, Head Lock” and the “Spring, Head Lock” from the “SA, Main Plate R”.



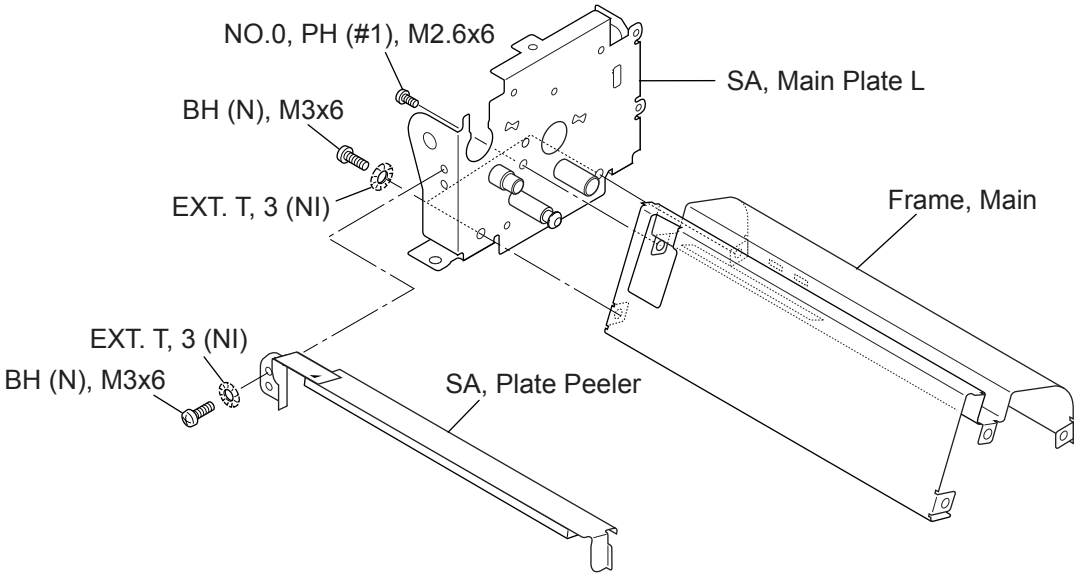
Note on reassembling:

- When assembling the “Lever, Head Lock”, hook the “Spring, Head Lock” as shown. (One end is inserted into the groove of the “Lever, Head Lock” and the other end into the hole.) Also, the “Lever, Head Lock” should be assembled on the “SA, Main Plate R” as shown in the figure.



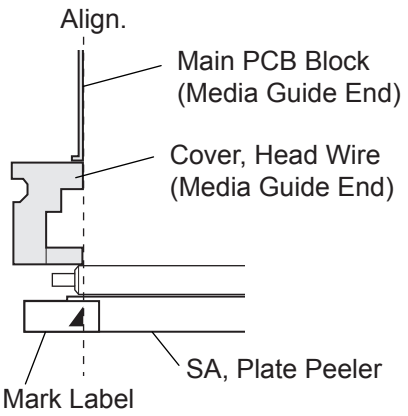
3-5-24. “Frame, Main”, “SA, Main Plate L” and “SA, Plate Peeler”

1. Remove the “Unit, Mechanism”. Refer to “3-5-13 “Unit, Mechanism” and Case L”.
2. Remove the “Unit, PF”. Refer to “3-5-17 “Unit, Head-TT” and “Unit, PF””.
3. Remove the “SA, Motor”. Refer to “3-5-20 “SA, Motor””.
4. Remove the “Shaft, Sensor Guide” (with the “SA, Sensor Holder L” and the “Guide, Paper Set”). Refer to steps 1 to 4 in “3-5-21 “SA, Reflective Sensor PCB””.
5. Remove 3 gears. Refer to “3-5-22 Gears”.
6. Remove the Main Plate R Block. Refer to steps 1 and 2 in “3-5-23 “Lever, Head Lock” and “SA, Main Plate R””.
7. Remove 2 screws (BH (N), M3x6), 2 washers (EXT. T, 3 (NI)) and 1 screw (NO.0, PH (#1), M2.6x6), and detach the “Frame, Main”.
8. Remove 1 screw (BH (N), M3x6) and 1 washer (EXT. T, 3 (NI)), and detach the “SA, Plate Peeler” from the “SA, Main Plate L”.



Note on reassembling:

- Media-path left-edge alignment when assembling the “SA, Plate Peeler”:
  When assembling the “SA, Plate Peeler”, align the arrow mark on the “SA, Plate Peeler” with the media contacting surface of the “Cover, Head Wire” as shown.
  Also, when you stick a new Mark Label, align its arrow mark with the media contacting surface of the “Cover, Head Wire”. (When assembling the “Unit, Mechanism”, the media guide end of the “Cover, Head Wire” should be aligned with the chassis plate of the Main PCB Block (as explained in “3-5-13 “Unit, Mechanism””). Then, the media-path left-edges are aligned on the basis of the Mark Label.



3-6. Adjustments

3-6-1. Transparent/Reflective Sensor Position Adjustment

When you replace one of the following parts, perform both sensor position adjustment and sensor sensitivity adjustment.

- SA, Main PCB
- SA, Transparent Sensor PCB
- SA, Reflective Sensor PCB

(1) Sensor position adjustment (factory mode)

After entering Factory mode, adjust the following submenu items:

- Through Sensor Position
- Reflect Sensor Position

For details, refer to “2-3-2-(3-3)-(a) Factory mode menu table”.

(2) Sensor sensitivity adjustment (maintenance mode)

In this adjustment, since the printer has not a display, PC is used instead.
All operations will be done with the keys on the printer’s control panel.
Communication between the printer and a PC is made through the serial port.

(2-1) Preparation

Before starting adjustment, prepare the following items:

- Media (both label paper and tag) (recommended media or media you use)
- RS-232C serial cable
- PC which is installed Terminal software such as HyperTerminal and TeraTerm. Windows normally comes with the HyperTerminal. If the software is not installed, you need to install it.

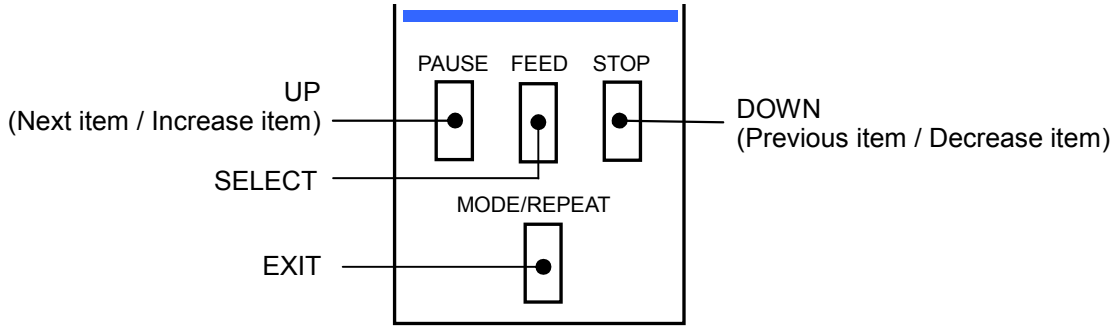
* Windows® is a registered trademark of Microsoft Corporation in the United States and/or other countries.

Setting on the PC side:

Make the following settings on the PC beforehand:

1. Connect the RS-232C serial cable between the printer and the PC.
2. On the PC, start the Terminal software.
3 Set the transmission conditions on the Terminal software so that they are identical to those on the printer side.
   Default values of the printer:
   - Transmission speed (baud rate): 9,600 bps
   - Data length: 8 bits
   - Stop bit: 1 bit
   - Protocol: XON/XOFF

Key operation on the printer:



(2-2) Adjustment procedures

Caution:
- ***DO NOT adjust other menus not explained here. They are for factory setup use and changing them will cause the printer to be defective.***

Notes:
- Do not turn OFF the power of the printer until you finish the adjustment. If it is turned OFF, you need to repeat the adjustment from the beginning.
- The value adjusted here is retained until you change it with the same procedure. Even if you perform initialization in the “user menu setup mode”, it is not initialized.

1. Turn on the PC and run the Terminal software.
2. While pressing and holding the **[MODE]**, **[FEED]** and **[STOP]** key, turn on the power. (**[MODE] + [FEED] + [STOP] + [POWER]**)
3. The following initial maintenance screen will appear on the PC.

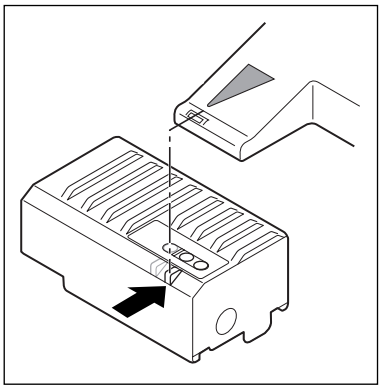
```
*Factory
   Setup

Up:PAUSE Select:FEED Down:STOP Exit:MODE
Settings Terminal mode to VT100
```

[Transparent sensor sensitivity adjustment, Media: Label paper]

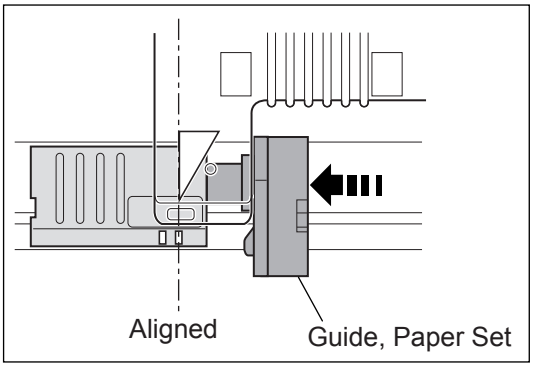
4. Press the **[FEED]** key to select the transparent sensor menu (“Ini Thru Sensor”).

```
Ini Thru
  Sensor

Up:PAUSE Select:FEED Down:STOP Exit:MODE
Settings Terminal mode to VT100
```

5. Peel off the label from liner (base) and set the liner part to the printer. Be sure that the normal adjustments for printing are correctly made.
   • Media sensor menu: “See Through”
   • Sensor positioning:
   The upper sensor marker should meet the bottom sensor marker on the right side.



Tip:
When you move the upper and bottom sensors to the right end (center of the printing mechanism), they match with each other for “See Through” position.
Also, when you push the “Guide, Paper Set” toward them in any poison, they match with each other as shown:



6. Press the **[FEED]** key to enter the transparent sensor adjustment mode.

```
Ini Thru
Exec./No

Up:PAUSE Select:FEED Down:STOP Exit:MODE
Settings Terminal mode to VT100
```

7. Press the **[PAUSE]** key to move the cursor to “Exec.”.

```
Ini Thru
Exec./No

Up:PAUSE Select:FEED Down:STOP Exit:MODE
Settings Terminal mode to VT100
```

8. Press the **[FEED]** key to perform adjustment.
   Liner is automatically fed little by little and adjustment is performed.
   During adjustment, the following screen appears.

```
Now !!
Excuting

Up:PAUSE Select:FEED Down:STOP Exit:MODE
Settings Terminal mode to VT100
```

When adjustment is successful, “Finished DAC XXX” is displayed.

```
Finished
DAC  143

Up:PAUSE Select:FEED Down:STOP Exit:MODE
Settings Terminal mode to VT100
```

*The value “143” is one of samples.

9. Press **any key** on the control panel to store the adjusted value.
   Proceed to step 10 to perform reflective sensor adjustment.

[When adjustment failed]

When adjustment failed, “Cannot Setup” is displayed.

1) Press any key on the control panel to return to the screen in step 4.
2) Check the mechanical sensor positions, current Media sensor menu setting, label paper, etc. and try again.

```
Cannot
Setup

Up:PAUSE Select:FEED Down:STOP Exit:MODE
Settings Terminal mode to VT100
```

[Reflective sensor sensitivity adjustment, Media: Tag]

10. Press the [PAUSE] key to select the reflective sensor menu.
    “Ini Refl Sensor” screen will appear.

```
Ini Thru
  Sensor

Up:PAUSE Select:FEED Down:STOP Exit:MODE
Settings Terminal mode to VT100
```

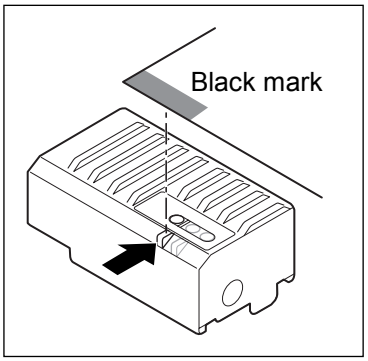
⇩ **[PAUSE]** key

```
Ini Refl
  Sensor

Up:PAUSE Select:FEED Down:STOP Exit:MODE
Settings Terminal mode to VT100
```

11. Press the [FEED] key to enter the reflective sensor menu.

```
Reflect
Exec./No

Up:PAUSE Select:FEED Down:STOP Exit:MODE
Settings Terminal mode to VT100
```

12. Set tag with black marks, but avoid placing the black mark part on the reflective sensor.
    If you use continuous tag, set it to the printer.
    Be sure that the normal adjustments for printing are correctly made.
    • Media sensor menu: “Reflect”/”None” (for continuous paper)
    • Sensor positioning:
    The bottom sensor should meet the black mark position. (However, avoid black mark.)



13. Press the **[PAUSE]** key to move the cursor to “Exec.”.
14. Press the **[FEED]** key to perform adjustment.
    Tag is automatically fed little by little and adjustment is performed.
    During adjustment, “Now!! Executing” appears.
    When adjustment is successful, “Finished DAC XXX” is displayed.

```
Finished
DAC  168

Up:PAUSE Select:FEED Down:STOP Exit:MODE
Settings Terminal mode to VT100
```

    *The value “168” is one of samples.
15. Press **any key** on the control panel to store the adjusted value.
    Then, the screen returns to the one in step 10 and “Ini Refl Sensor” is displayed.
16. Turn OFF the power to terminate the adjustment.

3-6-2. Ribbon Slant Elimination Adjustment

There are two kinds of ribbon slant elimination adjustments: for user and service personnel.

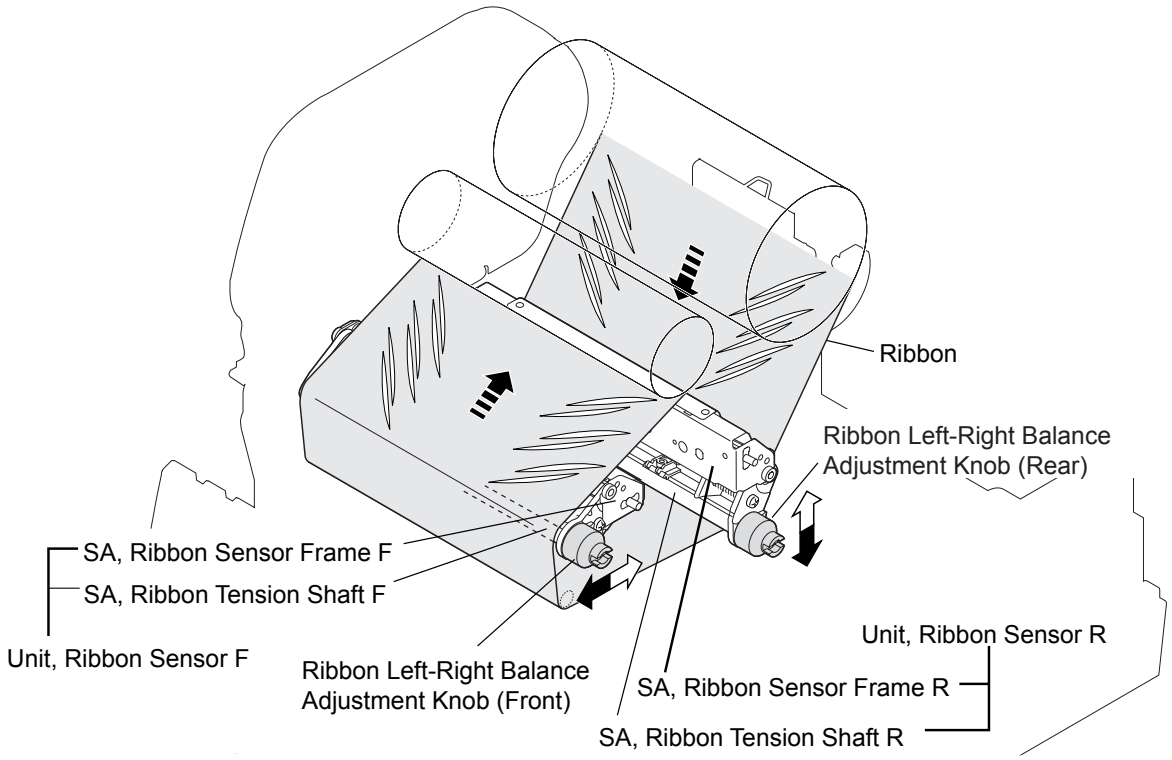
1) For User
   • Adjustment with the Ribbon Left-Right Balance Adjustment Knobs (Front/Rear)
2) For Service Personnel
   • “Cam, Tension Base Adjust” position adjustment:
   • Ribbon guide position adjustment (The ribbon guide is a part of “SA, Head”.)

Note: The general procedure how to remove ribbon wrinkles is explained on page 3-51. Refer to “Removing Ribbon Wrinkles” on that page.

(1) Ribbon slant elimination adjustment (For user)

As you turn the Ribbon Left-Right Balance Adjustment Knobs (Front/Rear), the knob side (right side) of the “SA, Ribbon Tension Shaft F” moves back and forth with the eccentric mechanism, and also, the knob side (right side) of the “SA, Ribbon Tension Shaft R” moves up and down. With this eccentric mechanism, ribbon running can be adjusted.

Tip: The adjustment on the front side is more effective than that on the rear side.

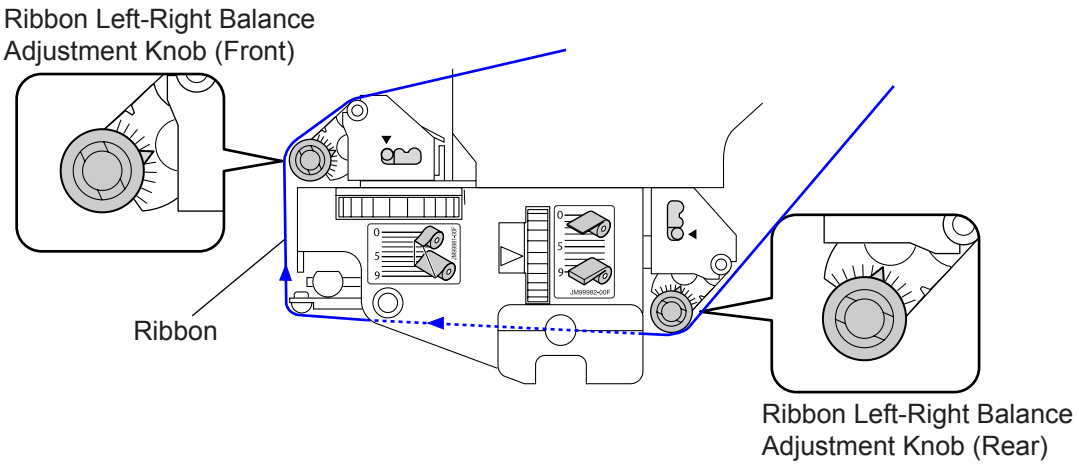


(1-1) Ribbon slant elimination adjustment for user (FRONT)

This front side adjustment is required in the following cases:

- Ribbon slant occurs, resulting in ribbon wrinkle.
- "Unit, Ribbon Sensor F" is replaced or reassembled.

1. Turn the Ribbon Left-Right Balance Adjustment Knobs (Front) to the center of the scale.
2. Turn the Ribbon Left-Right Balance Adjustment Knob (Rear) to the center of the scale.



3. Turn the Ribbon Left-Right Balance Adjustment Knob (Front) to remove ribbon wrinkle.
4. If ribbon slant is not removed yet, proceed to the next item, (1-2).

(1-2) Ribbon slant elimination adjustment for user (REAR)

This rear side adjustment is required in the following cases:

- Ribbon slant occurs, resulting in ribbon wrinkle.
- "Unit, Ribbon Sensor R" is replaced or reassembled.

1. Turn the Ribbon Left-Right Balance Adjustment Knob (Rear) and remove ribbon wrinkle.
2. If ribbon slant is not removed, repeat above item, (1-1).

(2) Ribbon slant elimination adjustment (For service personnel)

(2-1) Tension base adjust cam position adjustment (For service personnel)

This adjustment is required in the following cases:

- If the parallelism reference for the user adjustable range needs to be changed. (This adjustment will be required if ribbon wrinkle cannot be removed with the Ribbon Left-Right Balance Adjustment Knobs (Front/Rear).)
- "Cam, Tension Base Adjust" is replaced or reassembled.

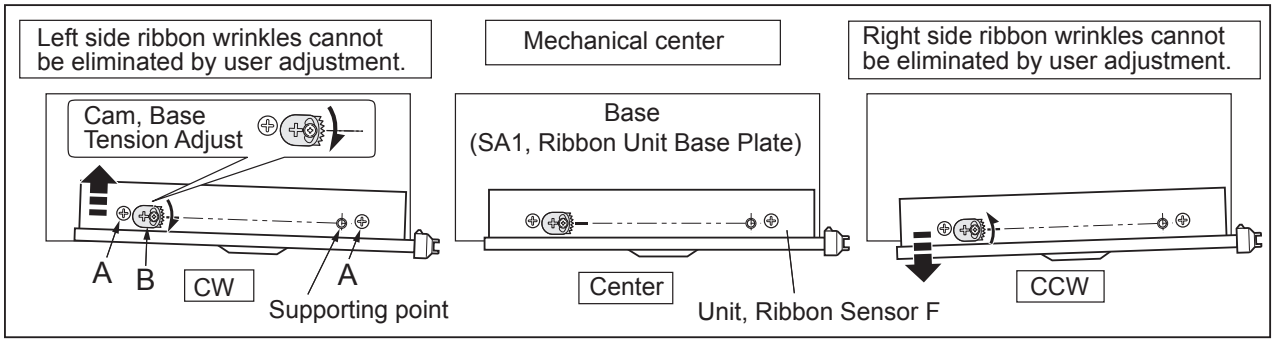
By adjusting the "Cam, Tension Base Adjust", the parallelism of the "Unit, Ribbon Sensor F/R" (movable part) against the Unit base (fixed part) is changed. The user adjustment using the Left-Right Balance Adjustment Knobs (Front/Rear) is done based on the new parallelism reference.

Note: The "Cam, Tension Base Adjust" is adjusted at the factory before shipping. Therefore, it may be off-center when shipped.

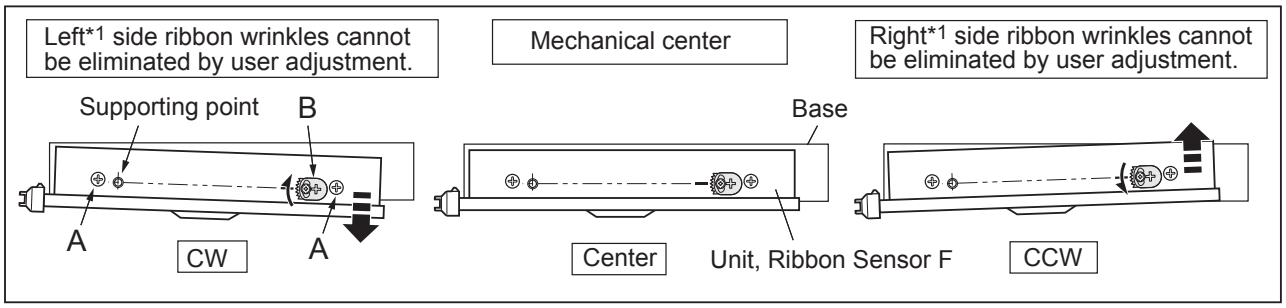
Adjustment procedure:

1. Remove the Ribbon Tension Adjustment Cover from the "Unit, Ribbon Sensor F/R".
2. Loosen 2 screws "**A**".
3. Loosen the screw "**B**", and turn the "Cam, Tension Base Adjust" clockwise or counterclockwise. The parallelism of the "Unit, Ribbon Sensor F/R" against the base is changed.
4. Tighten screws "**B**" and "**A**" (2 pcs.).

Shifting the "Unit, Ribbon Sensor F" (Viewing from the front side)



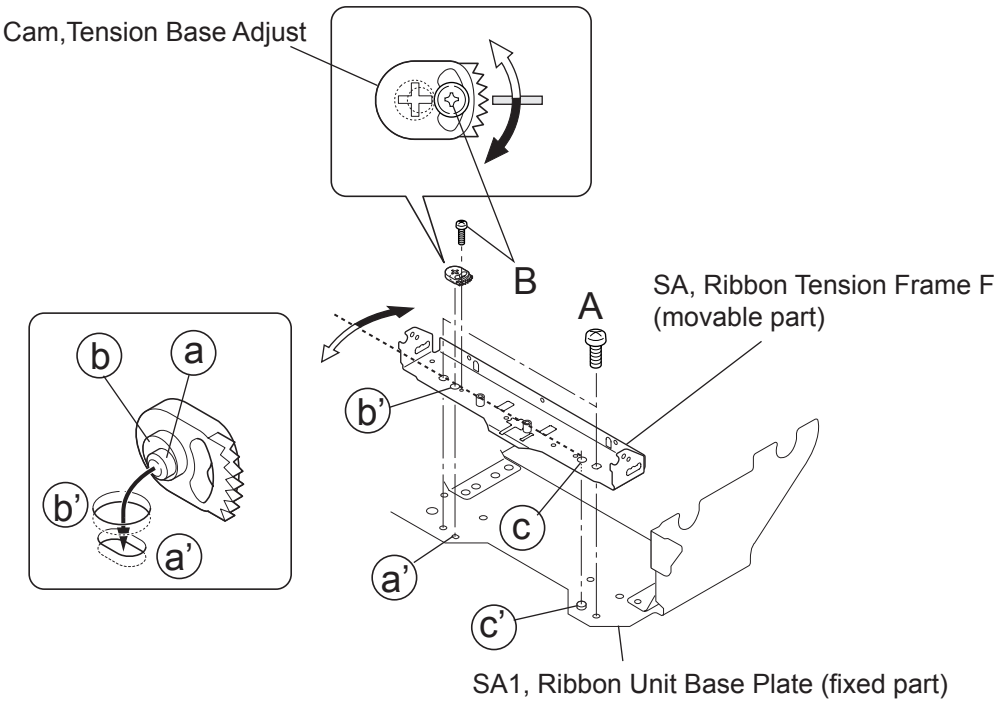
Shifting the "Unit, Ribbon Sensor R" (Viewing from the rear side)



*1: Shows the direction viewing from the rear side.
CW: Clockwise
CCW: Counterclockwise

Principle of operation of parallelism change with the "Cam, Tension Base Adjust":
The parallelism of the "Unit, Ribbon Sensor F/R" can be changed by means of the eccentric mechanism of the "Cam, Tension Base Adjust".
The "Cam, Tension Base Adjust" has projections "**a**" and "**b**". The projection "**a**" is inserted into the slotted hole "**a'** " on the base (fixed part), while the projection "**b**" is inserted into the hole "**b'** " on the "SA, Ribbon Tension Frame F/R" of the "Unit, Ribbon Sensor F/R" (movable part).
As you can see from the figure, the projection "**a**" is eccentric with respect to the projection "**b**". Accordingly, as your turn the "Cam, Tension Base Adjust" (after loosening screws "**A**" (2 pcs.) and "**B**"), the eccentric projection "**a**" pushes the slotted hole "**a'** " so that the "Unit, Ribbon Sensor F/R" itself turns around the supporting point "**c**". (The "Unit, Ribbon Sensor F/R" turns in the same direction as you turn the "Cam, Tension Base Adjust".)

[In the case of front side]

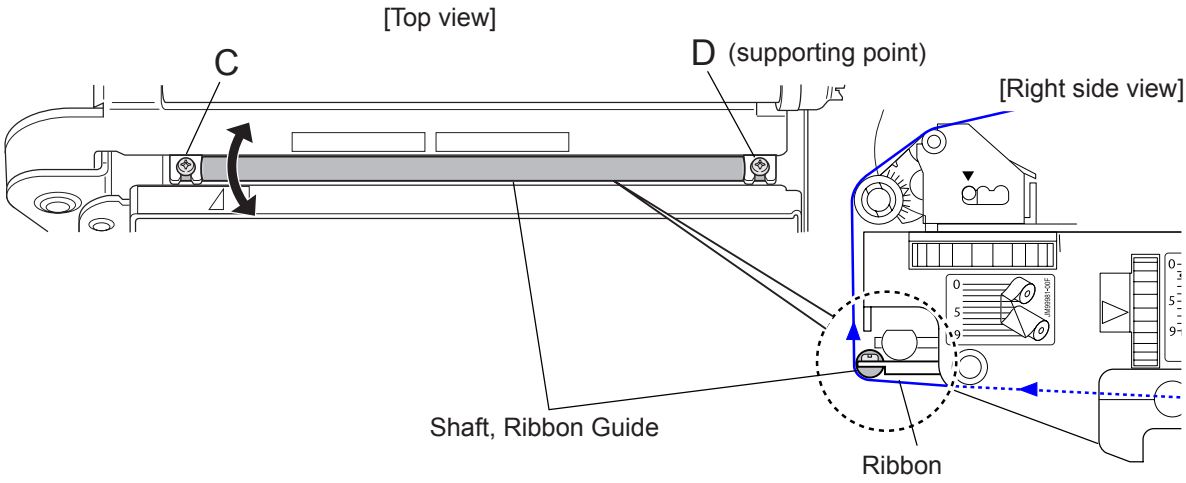


(2-2) Ribbon guide position adjustment in the “SA, Head” (For service personnel)

By shifting the ribbon guide shaft in the “SA, Head”, ribbon wrinkle on the front side can be corrected.

Adjustment procedure:

1. Loosen screws “**C**” and “**D**”.
2. Shift the left edge of the “Shaft, Ribbon Guide” back and forth to move the ribbon contacting surface.



Removing Ribbon Wrinkles

The following explains the general procedure for removing ribbon wrinkles.

Adjusting points:
• Ribbon tension
• Ribbon Left-Right Balance Adjustment Knob (Front) - Ribbon slant
• Ribbon Left-Right Balance Adjustment Knob (Rear) - Ribbon slant
• Ribbon Guide Shaft (a part of the “SA, Head”) - Ribbon slant

How to check ribbon wrinkles:
• Visual check

Adjustment procedure:
First, adjust the ribbon tension and then the ribbon paths (front/rear) to remove ribbon wrinkles.

(1) Ribbon Tension Adjustment

1. Adjust the ribbon tension on the front and rear sides to obtain the specified value. Refer to “3-6-3 Ribbon Tension Adjustment”.
2. Proceed to the next item, (2).

(2) Ribbon slant elimination adjustment

Ribbon is fed from the supply side and taken up on the take-up side via the “SA, Ribbon Tension Shaft R” of the “Unit, Ribbon Sensor R” and the “SA, Ribbon Tension Shaft F” of the “Unit, Ribbon Sensor F”. (See the figure on the next page.)

1. Adjust the Ribbon Left-Right Balance Adjustment Knob (Front) and then the Ribbon Left-Right Balance Adjustment Knob (Rear) to remove ribbon wrinkle.
   Refer to “3-6-2-(1) Ribbon slant elimination adjustment (For user)”.
2. If satisfactory results are not obtained, the following adjustments will be required.
   • “3-6-2-(2-1) Tension base adjust cam position adjustment (For service personnel)”.
   • “3-6-2-(2-2) Ribbon guide position adjustment in the “SA, Head” (For service personnel)”.

(2-1) Visual check and adjustment

Checking the ribbon surface visually is a good way to see whether the ribbon wrinkles or not. You can find wrinkles by the reflected light on the ribbon surface. Check both take-up side and supply sides of ribbon. (See the figure on the next page to find the places where wrinkles may appear.)

Note: For removing wrinkles, front side adjustment is more effective than the rear side one.

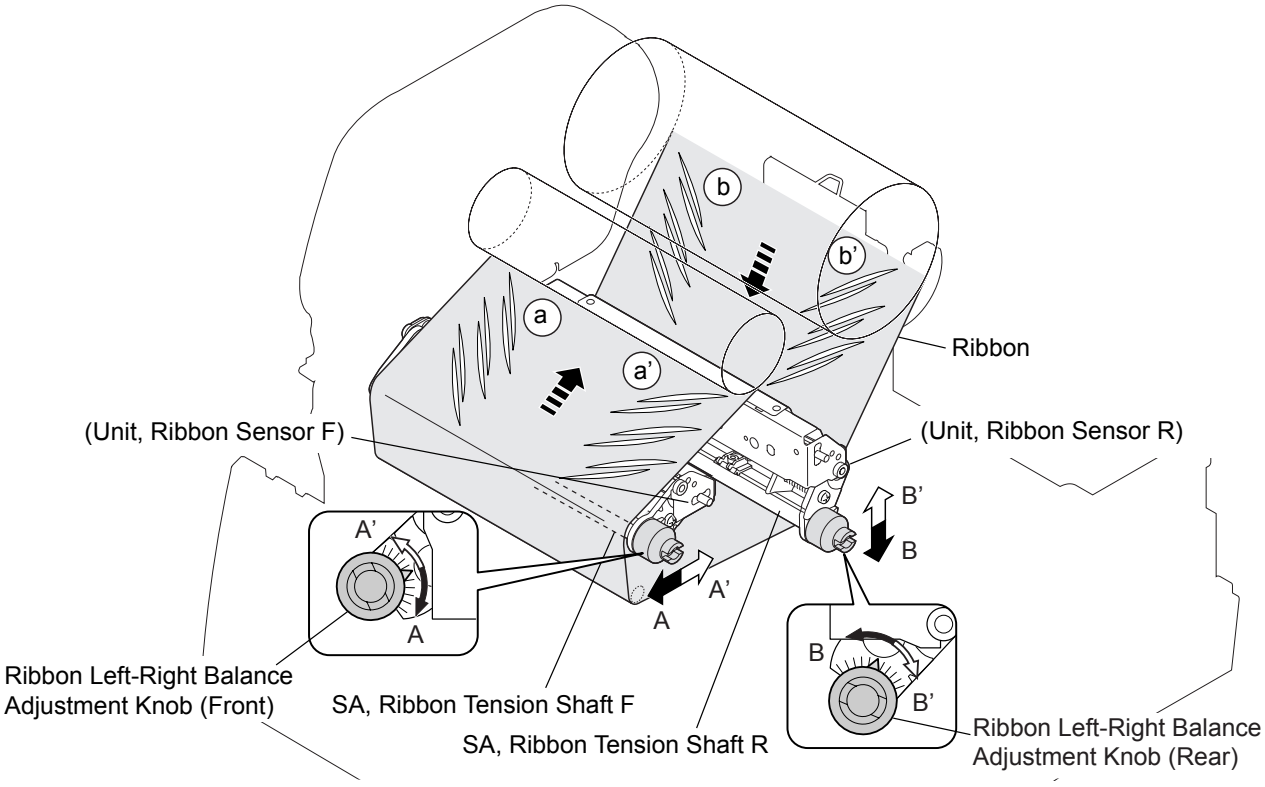
1. Perform test print in self print mode. (Refer to “2-3-2-(2-1) Self print mode”.)
2. Visually check the take-up side for ribbon wrinkles.
   Since ribbon is taken up stronger on the shorter ribbon path side, wrinkles appear on the longer path side. During printing the self print patterns, check wrinkles and correct the ribbon travel as follows:
   - If wrinkles are found on the left side (“**a**” in the figure), turn the Ribbon Left-Right Balance Adjustment Knob (Front) clockwise.
   - If wrinkles are found on the right side (“**a’** “ in the figure), turn the knob counterclockwise.

- If wrinkles are found at around center, find the side (either front or rear) and turn the knob accordingly.

3. Visually check on the supply side for ribbon wrinkles.
   Since ribbon is pulled stronger on the shorter ribbon path side, wrinkles appear on the longer path side.
   During printing the self print patterns, check wrinkles and correct ribbon travel as follow:
   - If wrinkles are found on the left side ("**b**" in the figure), turn the Ribbon Left-Right Balance Adjustment Knob (Rear) counterclockwise.
   - If wrinkles are found on the right side ("**b'** " in the figure), turn the knob clockwise.
   - If wrinkles are found at around center, find the side (either front or rear) and turn the knob accordingly.
4. Be sure that the adjusted positions in Steps 2 and 3 are at around the center of scales, respectively.

   Note 1: If they are off-center widely or wrinkles cannot be removed, the "Cam, Tension Base Adjust" position may be wrong. Perform "3-6-2-(2-1) Tension base adjust cam position adjustment (For service personnel)".

   Note 2: To remove ribbon wrinkles on the front side, the ribbon guide position is adjustable. Refer to "3-6-2-(2-2) Ribbon guide position adjustment in the "SA, Head" (For service personnel)".



(2-2) Readjustment of ribbon tension

If satisfactory results are not obtained yet, readjustment of ribbon tension is required. Repeat from "(1) Ribbon Tension Adjustment" on the previous page.

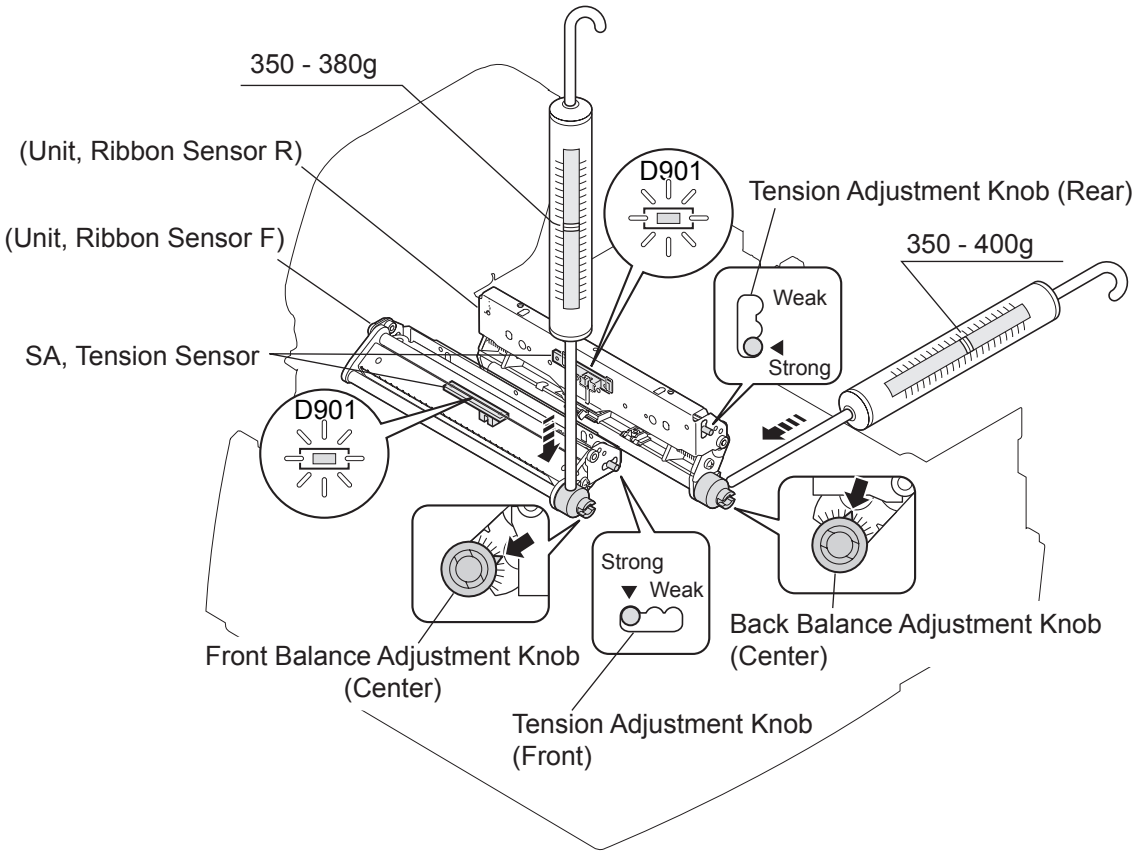
3-6-3. Ribbon Tension Adjustment

This adjustment should be done in the following cases:

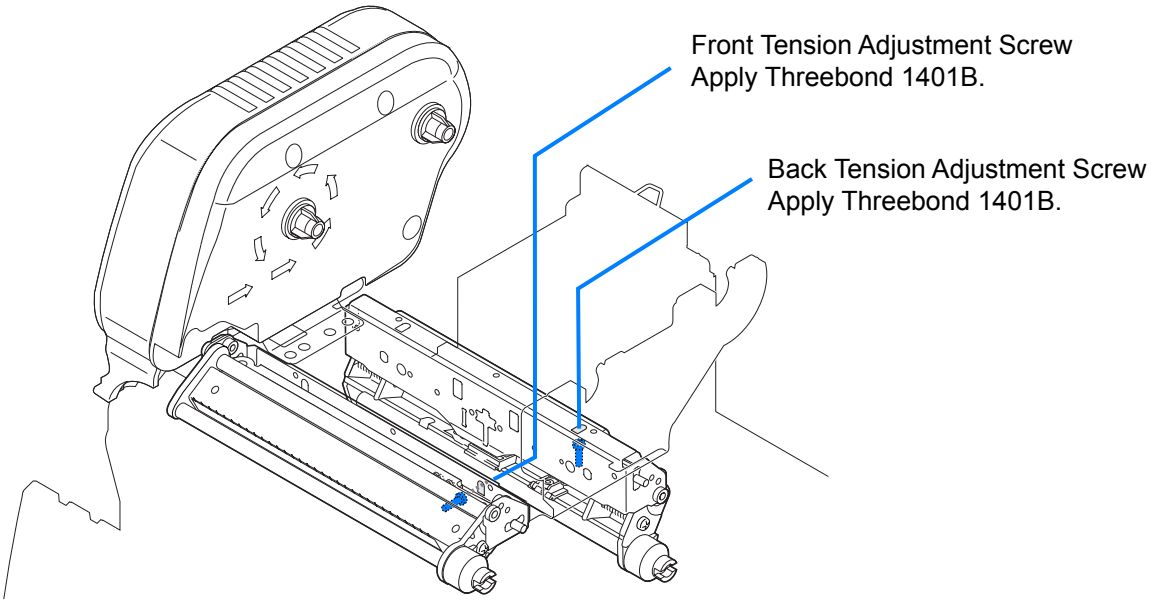
• When ribbon running is abnormal.

• When the “Unit, Ribbon Sensor F/R” or one of its parts is reassembled.

1. Turn the Ribbon Left-Right Balance Adjustment Knobs (Front) to the center of the scale.
2. Turn the Ribbon Left-Right Balance Adjustment Knob (Rear) to the center of the scale.
3. Set the Tension Adjustment Knobs (Front/Rear) to the positions marked with ▼ (Max. tension).
4. Remove the “Cover, Ribbon Tension Adjust” on the front and rear sides for checking the lighting status of LED (D901).
5. Turn ON the printer.
6. Place the spring gauge on the front side knob as shown in the figure and apply 350 to 380g force onto the knob. At this time, be sure that the LED changes from ON to OFF.
7. Place the spring gauge on the rear side knob as shown in the figure and apply 350 to 400g force onto the knob. At this time, be sure that the LED changes from ON to OFF.
8. If satisfactory results are obtained, turn OFF the printer.
   If not, proceed to Step 9.



9. While inserting a small screwdriver into the tension adjust screw through the hole, adjust the screw so that the LED changes from OFF to ON when the following tension is applied to the knob:
   Front (take-up) side: 350 to 380g
   Rear (supply) side: 350 to 400g
   Note: After adjustment, apply Threebond 1401B to the screw to fix it.



10. After completion of adjustment, turn OFF the printer.

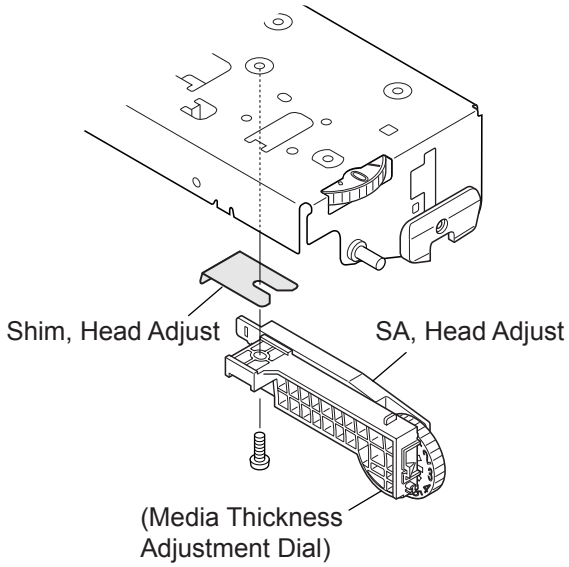
3-6-4. Maintenance Information - Head Adjust Shim

Depending on the printer, the “Shim, Head Adjust” may be added at the factory to obtain correct adjustable range of the Media Thickness Adjustment Dial. At the factory, the following adjustment is performed:
Note: This adjustment is not required for service work normally.

1. A line is printed with the Media Thickness Adjustment Dial set to “0”.
2. If the line is faint, one or more “Shim, Head Adjust” will be added.

[OK]

[NG]



CHAPTER 4
TROUBLESHOOTING

CHAPTER 4 TROUBLESHOOTING

TABLE OF CONTENTS

4-1. Error Message and Corrective Actions

When an error occurs, the error condition will be displayed on the operation panel. The LEDs on the control panel blink to tell you the error contents.

In case of error (except for abnormal head/motor temperature), the printer enters off line and the PRINT LED goes out.

Causes/Corrective Actions	PRINT LED	CONDITION LED	ERROR LED
Head open • Close the head.	OFF	OFF	
Media end • Add media.	OFF	OFF	
Media out (Media not detected) • Incorrect sensor positioning: Correct the sensor position to match the sensor position with the label/tag's black mark. • Incorrect Media mode menu: Match the Media mode menu (e.g. SeeThrough) and media to be used. • Incorrect sensor adjustment against media to be used: Enter sensor adjustment mode ([PAUSE]+[FEED]+[STOP]+[POWER]), and perform sensor adjustment.	OFF		
Abnormal ribbon feed	OFF		
Ribbon out (Ribbon end)	OFF		
Abnormal head temperature • Printing will temporarily stop. Wait until the thermal head gets cool.			OFF

Causes/Corrective Actions	PRINT LED	CONDITION LED	ERROR LED
Abnormal PF motor or Ribbon Motor F temperature • Printing will temporarily stop. Wait until the motor gets cool.			OFF
Abnormal auto cutter temperature (Optional) • Printing will temporarily stop. Wait until the auto cutter gets cool.			
Abnormal head resistance • Due to defective thermal element: Printing quality will degrade.	OFF		
Communication error • Reception buffer overrun • Parity or framing error • Transmission buffer overflow	OFF		OFF
Auto cutter abnormality (Optional) • Jamming, etc.	OFF	OFF	

4-2. Troubleshooting

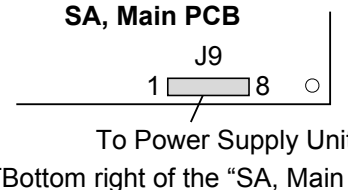
The following tables show possible remedies for various symptoms that might occur. Symptoms are given in the left column, and the corresponding remedies in the right column.

Notes: 1. When parts are replaced, refer to Chapter 3 "Disassembly and Maintenance".
2. Connectors (J . . .) given in the column of checks and remedies are connected with the “SA, Main PCB”. For the location of each connector, refer to “4-2-7 Connector Location".

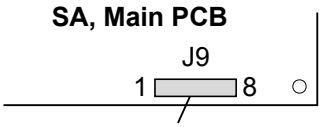
4-2-1. Problems in Powering Up the Printer

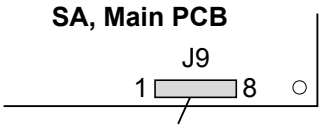
Symptoms	Checks	Remedies
No power to the printer	1. Check voltage on the input power line. Acceptable supply voltage: 120V (-10%+6%) for 120V version 220V-240V (-10%+6%) for 220V version	1. Supply correct voltage.
	2. Is the fuse F1 on the “Unit, Power Supply” blown?	2. Replace with new fuse. If new fuse is also blown when power is turned on with the connector J9 disconnected from the “SA, Main PCB”, the “Unit, Power Supply” is faulty and must be replaced. **Notes:** - Do not replace the fuse with the power switch turned on. - The fuse is provided to prevent fire, and damage to the “Unit, Power Supply”. When replacing it, use the same rating and type.
	3. Is the “SA, Power Cable” firmly connected between the “Unit, Power Supply” and the “SA, Main PCB” (J9)?	3. Connect it firmly.
	4. Is the Ope-pane Cable connected between the “SA, Main PCB” (J7) and the “SA, Ope-Pane PCB” firmly? If it is not connect or is inserted upside down, no LED lights even if you turned ON the power.	4. Connect it firmly.
	5. Failure in the power supply circuit.	5. Replace the “Unit, Power Supply”.

4-2-2. Media-feed Problems

Symptoms	Checks	Remedies
No media feed	1. Is the connector J4 for PF motor connected firmly?	1. Re-connect it firmly.
	2. Is the connector J9 for “Unit, Power Supply” connected firmly?	2. Re-connect it firmly.
	3. Is +24V supplied to the “SA, Main PCB” (at pins 6, 7 and 8 of J9)? 	3. Replace the “Unit, Power Supply”.
	4. Failure in the control circuit or in the paper feed motor driver.	4. Replace the “SA, Main PCB”.
	5. Does the PF motor work?	5. Replace the “SA, Motor”.
Irregular media feed pitch	1. Is the connector J4 for PF motor connected firmly?	1. Re-connect it firmly.
	2. Is dust or other foreign matter on the platen?	2. Remove dust or foreign matter.
	3. Does the media feed mechanism work smoothly?	3. Check, clean and lubricate mechanical parts. **Note:** Refer to Chap. 3 "Disassembly and Maintenance".
	4. Failure in the control circuit or in the paper feed motor driver.	4. Replace the “SA, Main PCB”.
Media jamming	1. Is media set correctly?	1. Set media correctly.
	2. Is the media being used within manufacturer's specifications?	2. Use media within manufacturer's specifications.
	3. Check the media feed mechanism and media path for dust or other foreign matter.	3. Remove dust or foreign matter.

4-2-3. Problems in Printing

Symptoms	Checks	Remedies
No print	1. Is the head block securely closed?	1. Close the head block correctly.
	2. Is the thermal head over heated?	2. Wait until the thermal head gets cool. Printing resumes automatically.
	3. Is the PF motor over heated?	3. Wait until the PF motor gets cool. Printing resumes automatically.
	4. Is the take-up side ribbon motor ("SA, Ribbon Motor F") over heated?	4. Wait until the "SA, Ribbon Motor F" gets cool. Printing resumes automatically.
	5. Is the interface cable firmly connected between the printer and the host?	5. Connect it firmly.
	6. Is the print head cable firmly connected between the "SA, Head" and the "SA, Main PCB" (J3)?	6. Connect it firmly.
	7. Does the transparent/reflective sensor detect presence of media?	7. To check, see "4-2-5 Sensor Problems".
	8. Is +24V supplied to the "SA, Main PCB" (at pins 6, 7 and 8 of J9)?  To Power Supply Unit [Bottom right of the "SA, Main PCB"]	8. Replace the "Unit, Power Supply".
	9. "SA, Head" is broken.	9. Replace the "SA, Head".
	10. Failure in the head driver circuit.	10. Replace the "SA, Head".
	11. Failure in the control circuit.	11. Replace the "SA, Main PCB".

Symptoms	Checks	Remedies
Poor printing	1. Thickness adjustment is improper.	1. Adjust the media thickness adjustment dial to suit to the media thickness being used.
	2. Is +24V supplied to the “SA, Main PCB” (at pins 6, 7 and 8 of J9)?  To Power Supply Unit [Bottom right of the “SA, Main PCB”]	2. Replace the “Unit, Power Supply”.
Uneven print density	1. Head balance is improper. Uneven print density may appear either on the right side or the left side.	1. Adjust the media width adjustment dial to suit to the media width being used.

4-2-4. Ribbon-feed Problem

Symptoms	Checks	Remedies
Ribbon is not fed at all, or is not fed correctly.	1. Is the ribbon correctly inserted into the ribbon holders?	1. Insert the ribbon correctly.
	2. Is the ribbon path correct?	2. Install the ribbon correctly.
	3. Is the cable connected between J12/J13 on the “SA, Main PCB” and J702 on the “SA, Ribbon PCB” firmly?	3. Connect it firmly.
	4. Is the cable connected between J701 on the “SA, Ribbon PCB” and the “SA, Ribbon Motor F” firmly?	4. Connect it firmly.
	5. Is the cable connected between J705 on the “SA, Ribbon PCB” and the “SA, Ribbon Motor R” firmly?	5. Connect it firmly.
	6. Does the ribbon cooling fan work correctly for cooling the ribbon motors? If not, check if the cable of the “SA, Fan” firmly connected to the “SA, Ribbon PCB” (J706).	6. Connect the cable firmly.
	7. Do the ribbon sensors on the take-up and supply sides work correctly? See “4-2-5 Sensor Problems”.	7. Replace the “SA, Tension Sensor”.

Symptoms	Checks	Remedies
Ribbon is not fed at all, or is not fed correctly.	8. Do the ribbon drive gears work correctly?	8. Replace the defective ribbon gear.
	9. Does the Ribbon Motor F/R work correctly?	9. Replace the “SA, Ribbon Motor F” or “SA, Ribbon Motor R”.
	10. Failure in the ribbon motor drive circuit.	10. Replace the “SA, Ribbon PCB”.
	11. Failure in the ribbon motor control circuit.	11. Replace the “SA, Main PCB”.
Ribbon slants.	1. Is the ribbon correctly inserted into the ribbon holders?	1. Insert the ribbon correctly.
	2. Is the ribbon path correct?	2. Install the ribbon correctly.
	3. Is the ribbon slant elimination adjustment made?	3. Adjust it according to 3-6-2 “Ribbon Slant Elimination Adjustment”.

4-2-5. Sensor Problems

Symptoms	Checks	Remedies
Head block is closed, but head open error is indicated by LEDs. (Head up sensor problem)	1. Is the “SA, Head Up Sensor Cable” firmly connected between the “SA, Head Up Sensor PCB” and the “SA, Main PCB” (J8)?	1. Connect it firmly.
	2. Is the protrusion (metal end) inserted into the photointerrupter of the “SA, Head Up Sensor PCB”?	2. Replace the “SA, Head Up Sensor PCB”.
	3. Failure in the control circuit.	3. Replace the “SA, Main PCB”.
Ribbon tension is not correctly controlled. (Tension sensor F/R problem)	1. Is the cable firmly connected between the “SA, Tension Sensor” on the take-up side and the “SA, Ribbon PCB” (J703)?	1. Connect it firmly.
	2. Is the cable firmly connected between the “SA, Tension Sensor” on the supply side and the “SA, Ribbon PCB” (J704)?	2. Connect it firmly.
	3. Is the tension value in the specified range?	3. Adjust tension according to 3-6-3 “Ribbon Tension Adjustment”.
	4. Does the ribbon sensor F/R work correctly? Remove the ribbon, and push and release the “Unit, Ribbon Senor F/R” with your finger tip to see if the LED of the “SA, Tension Sensor” turns ON and OFF. (Remove the Ribbon Tension Adjustment Cover to see LED.)	4. Replace the “SA, Tension Sensor” on the take-up/supply side. For the location of LED, see “3-6-3 Ribbon Tension Adjustment”.
	5. Failure in the control circuit.	5. Replace the “SA, Ribbon PCB” or the “SA, Main PCB”.

Symptoms	Checks	Remedies
Ribbon end is not correctly detected. (Tension sensor R problem)	1. Is the cable firmly connected between the “SA, Tension Sensor” on the supply side and the “SA, Ribbon PCB” (J704)?	1. Connect it firmly.
	2. Does the ribbon sensor R work correctly? Remove the ribbon, and push and release the “Unit, Ribbon Senor R” on the rear side with your finger tip to see if the LED of the “SA, Tension Sensor” turns ON and OFF. (Remove the Ribbon Tension Adjustment Cover to see LED.)	2. Replace the “SA, Tension Sensor” on the supply side. For the location of LED, see “3-6-3 Ribbon Tension Adjustment”.
	3. Failure in the control circuit.	3. Replace the “SA, Ribbon PCB” or the “SA, Main PCB”.
Label on liner or notch of tag is not detected. (Transparent sensor problem) Or Paper end is not detected.	1. Is the Media Sensor menu setting correct?	1. Set it to “See Through”.
	2. Does the Transparent Sensor marker match with the bottom sensor (Reflective Sensor) marker?	2. Move both sensors to align their positions for transparent use.
	3. Is the sensor adjustment is performed against media to be used?	3. Perform the sensor adjustment. See “2-3-2 (1-1) Sensor Adjustment mode”.
	4. Is the “SA, Transparent Sensor Cable” firmly connected between the “SA, Transparent Sensor PCB” and the “SA, Main PCB” (J6)?	4. Connect it firmly.
	5. Is the transparent sensor cable (flexible cable) inserted correctly (not upside down)?	5. Insert it in the correct direction.
	6. Is the “SA, Reflective Sensor Cable” firmly connected between the “SA, Reflective Sensor PCB” and the “SA, Main PCB” (J5)?	6. Connect it firmly.
	7. Is dust on the LEDs of the Reflective Sensor?	7. Clean the LEDs to remove dust.
	8. Failure in the Transparent Sensor or the Reflective Sensor.	8. Replace the “SA, Transparent Sensor PCB” or the “SA, Reflective Sensor PCB”.
	9. Failure in the control circuit.	9. Replace the “SA, Main PCB”.

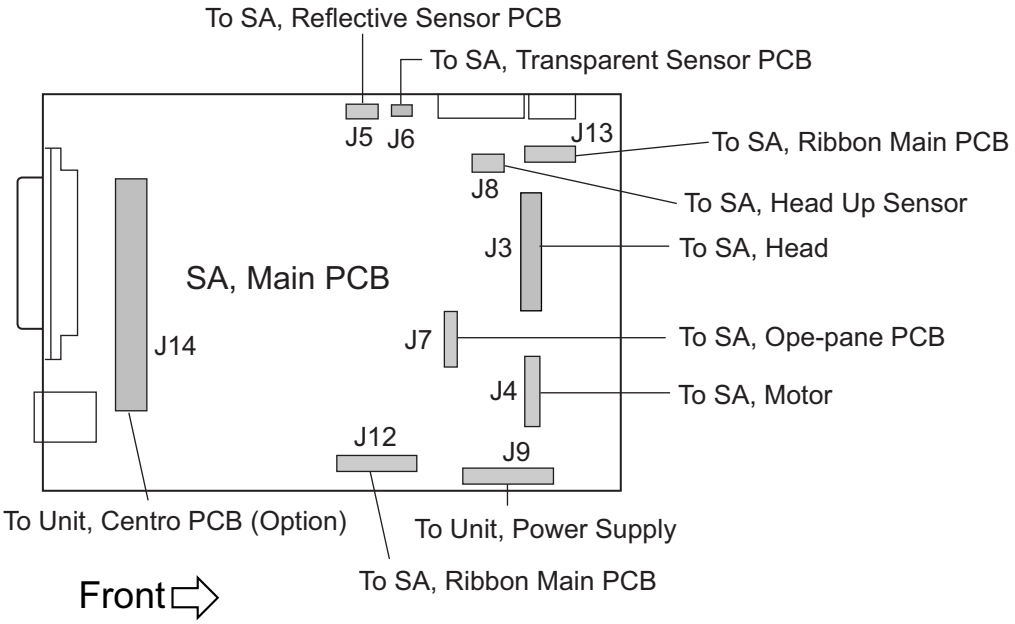
Symptoms	Checks	Remedies
Black mark on tag is not detected. (Reflective sensor problem) Or Paper end is not detected.	1. Is the Media Sensor menu correct? 2. Does the Reflective Sensor match with the black mark? 3. Is the sensor adjustment is performed against media to be used? 4. Is the “SA, Reflective Sensor Cable” firmly connected between the “SA, Reflective Sensor PCB” and the “SA, Main PCB” (J5)? 5. Is dust on the LEDs or photo transistor of the Reflective Sensor? 6. Failure in the Reflective Sensor. 7. Failure in the control circuit.	1. Set it to “Reflect”. 2. Move the sensor in the center of black mark. 3. Perform the sensor adjustment. See “2-3-2 (1-1) Sensor Adjustment mode”. 4. Connect it firmly. 5. Clean the LEDs to remove dust. 6. Replace the “SA, Reflective Sensor PCB”. 7. Replace the “SA, Main PCB”.

4-2-6. Operation Panel Problems

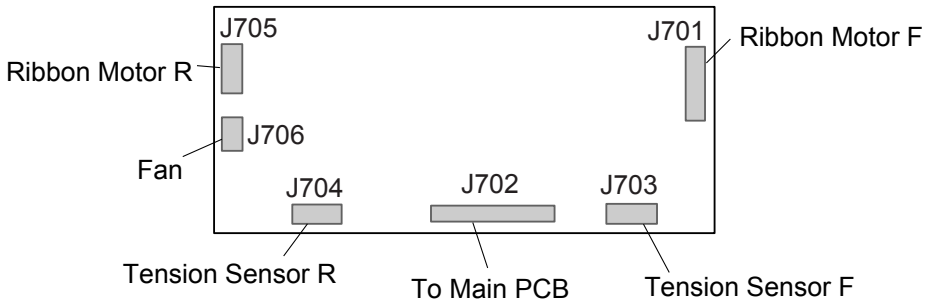
Symptoms	Checks	Remedies
Nothing is displayed on the LED.	1. Is the Ope-pane Cable connected between the “SA, Main PCB” (J7) and the “SA, Ope-Pane PCB” firmly? 2. Is the Ope-pane Cable inserted upside down? 3. Failure in the “SA, Ope-Pane PCB”. 4. Failure in the control circuit.	1. Connect it firmly. 2. Insert it in the correct direction. 3. Replace the “SA, Ope-Pane PCB”. 4. Replace the “SA, Main PCB”.
No key works.	1. Is the Ope-pane Cable connected between the “SA, Main PCB” (J7) and the “SA, Ope-Pane PCB” firmly? 2. Is the Ope-pane Cable inserted upside down? 3. Failure in the “SA, Ope-Pane PCB”. 4. Failure in the control circuit.	1. Connect it firmly. 2. Insert it in the correct direction. 3. Replace the “SA, Ope-Pane PCB”. 4. Replace the “SA, Main PCB”.

4-2-7. Connector Location

[SA, Main PCB]



[SA, Ribbon PCB]



CHAPTER 5
PARTS LISTS

CHAPTER 5 PARTS LIST

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CL-S621, CL-S621C & CL-S631

Recommended Spare Parts List

Revision Up List		
Sheet No.	Rev. No.	Date
1/1	0	Oct. 5, 2010

PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Recommended Spare Parts List Sheet No. 1/1

Rev. No. 0

Item No.	Location	Part No.	Part Name	Q'ty/ Unit	Maint. Class		Remarks	@
					Worn	Casual		
1	2-8-1	JM66707-0	SA, Main PCB	1		○	For CL-S621 (CSA, CSE)	
2	2-8-2	JM66721-0	SA, Main PCB	1		○	For CL-S631 (CSA, CSE, CHINA)	
3	2-8-3	JM66709-0	SA, Main PCB	1		○	For CL-S621C (CHINA)	
4	2-8-4	JM66719-0	SA, Main PCB	1		○	For CL-S621 (KOREA)	
5	2-8-5	JM66726-0	SA, Main PCB	1		○	For CL-S631 (KOREA)	
6	2-33-1	JM66850-0	Unit, Power Supply (100V)	1		○	For CSA	
7	2-33-2	JM66855-1	Unit, Power Supply (200V)	1		○	For CSE, CHINA, KOREA	
8	3-14	JM22701-0	SA, Platen	1	○			
9	3-18	JM66715-1	SA, Head Up Sensor PCB	1		○		
10	4-5-1	JM14705-0	SA, Head	1	○		For CL-S621/S621C	
11	4-5-2	JM14706-0	SA, Head	1	○		For CL-S631	
12	5-1	JM25704-0	SA, Motor	1	○			
13	5-14	JM66730-1	SA, Reflective Sensor PCB	1		○		
14	6-9	JM66725-0	SA, Transparent Sensor PCB	1		○		
15	8-5	JM66724-0	SA, Ribbon PCB	1		○		
16	8-8	JM35703-0	SA, Ribbon Motor R	1	○			
17	8-9	JM35702-0	SA, Ribbon Motor F	1	○			
18	8-20	JM68705-0	SA, Tension Sensor	2		○		
19								
20								

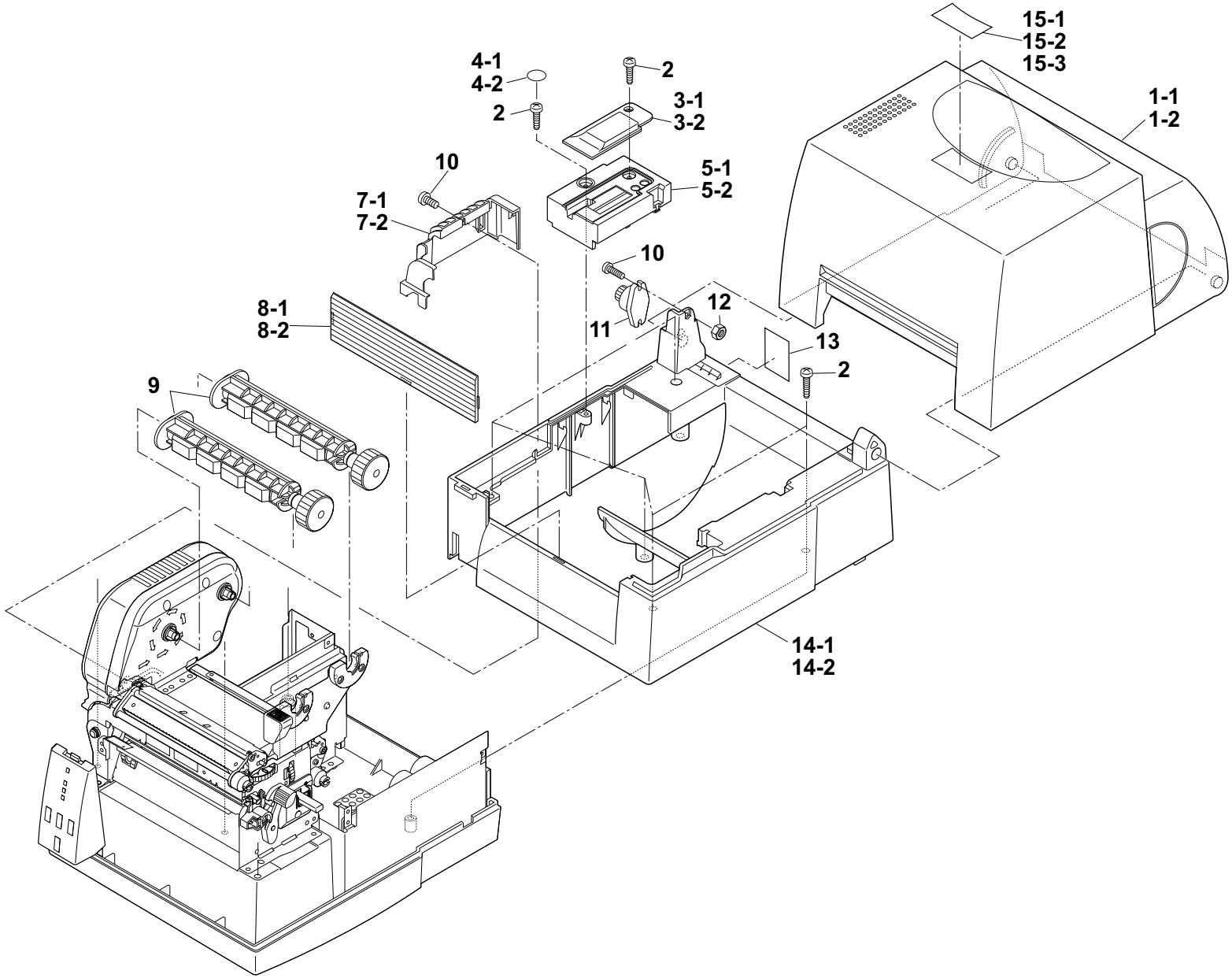
CL-S621, CL-S621C & CL-S631

Drawing No. 1

Parts List & Location for General Assembly

Revision Up List		
Sheet No.	Rev. No.	Date
1/2	0	Oct. 5, 2010
2/2	0	Oct. 5, 2010

DRAWING NO. 1 General Assembly (Rev. 0)



PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: General Assembly Sheet No. 1/2

Drawing No. 1 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
1-1-1	SA, Top Cover Base	JM56726-0	1	White	
1-1-2	SA, Top Cover Base	JM56741-0	1	Black	
1-2	Screw, PHT (BH), M3.0x14	E10130-140F	7		
1-3-1	Cover, Connector	JM56205-0	1	White	
1-3-2	Cover, Connector	JM56243-0	1	Black	
1-4-1	Cap, Case U	JM56102-0	1	White	
1-4-2	Cap, Case U	JM56114-0	1	Black	
1-5-1	Cover, Connector Case U	JM56226-0	1	White	
1-5-2	Cover, Connector Case U	JM56244-0	1	Black	
1-6	-	-	-		
1-7-1	Cover, Motor	JM56225-1	1	White	
1-7-2	Cover, Motor	JM56248-1	1	Black	
1-8-1	Cover, Front	JM56206-0	1	White	
1-8-2	Cover, Front	JM56245-0	1	Black	
1-9	SA, Ribbon Holder	JM34710-1	2		
1-10	Screw, BH (N), M3.0x6	E00530-060WF	2		
1-11	Damper, Top Cover	JM59906-0	1	FRT-C2-CTZ	
1-12	Nut, M3 (NI)	E40130-000WF	1		
1-13	Label, FCC ICES VCCI-A	TZ99901-0	1	For CSA	
1-14-1	Case U 621	JM56227-1	1	White	

PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: General Assembly Sheet No.2/2

Drawing No. 1 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
1-14-2	Case U 621	JM56241-0	1	Black	
1-15-1	Label, CL-S621	JM99958-0	1	For CL-S621 (CSA, CSE, KOREA)	
1-15-2	Label, CL-S631	JM99959-0	1	For CL-S631 (CSA, CSE, CHINA, KOREA)	
1-15-3	Label, CL-S621C	JM99973-0	1	For CL-S621C (CHINA)	

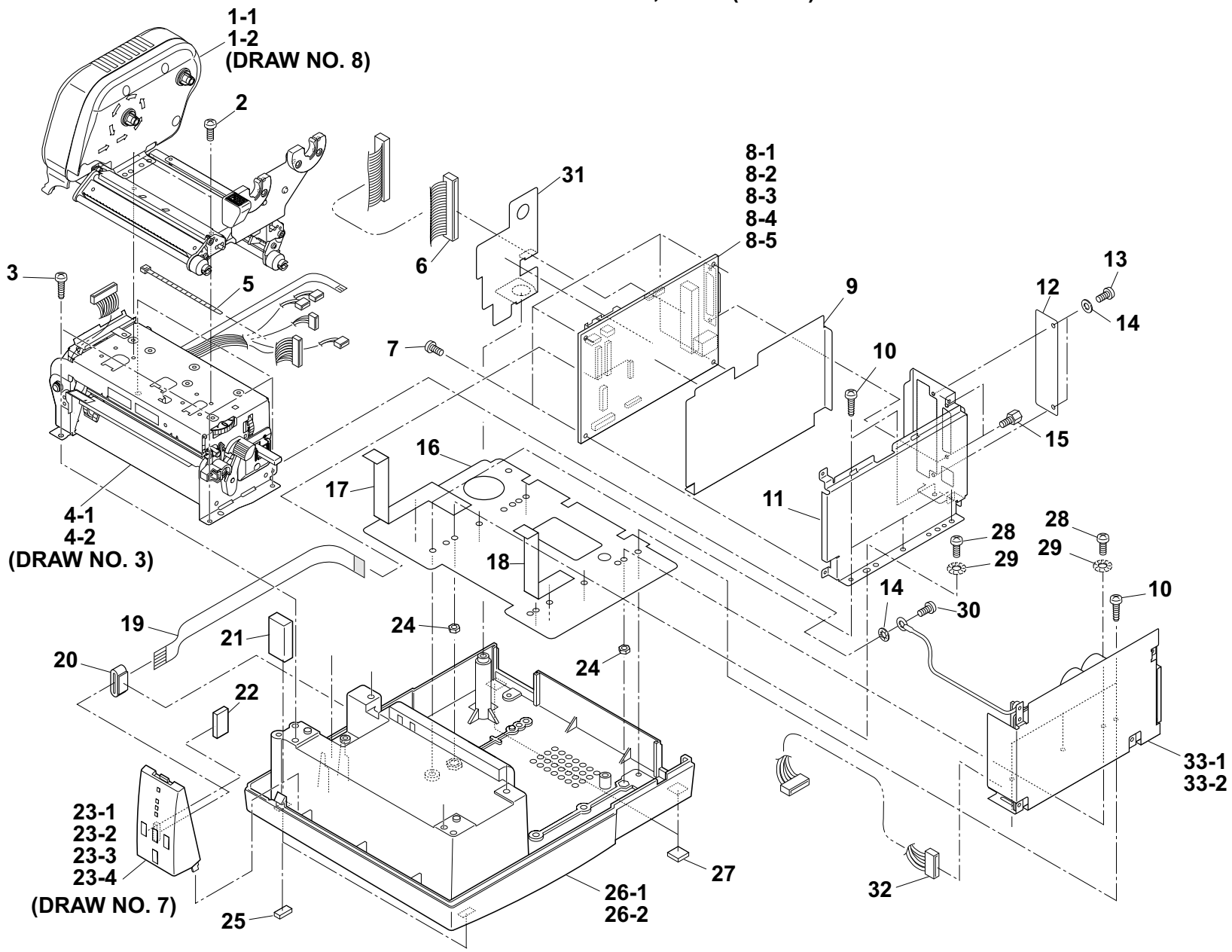
CL-S621, CL-S621C & CL-S631

Drawing No. 2

Parts List & Location for Unit, Base

Revision Up List		
Sheet No.	Rev. No.	Date
1/3	0	Oct. 5, 2010
2/3	0	Oct. 5, 2010
3/3	0	Oct. 5, 2010

DRAWING NO. 2 Unit, Base (Rev. 0)



PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Base Sheet No. 1/3

Drawing No. 2 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
2-1-1	Unit, Ribbon	JM34718-0	1	White (Ref. Drawing No. 8)	
2-1-2	Unit, Ribbon	JM34719-0	1	Black (Ref. Drawing No. 8)	
2-2	Screw, PH, M3.0x6	E00530-060WF	2		
2-3	Screw, PHT (BH), M3.0x14	E10130-140F	4		
2-4-1	Unit, Mechanism 621	JM49815-0	1	For CL-S621/S621C (Ref. Drawing No. 3)	
2-4-2	Unit, Mechanism 631	JM49816-0	1	For CL-S631 (Ref. Drawing No. 3)	
2-5	Wire Tie	C6701-202#	2	8432 L=100	
2-6	SA, Centro Cable	JM67725-0	1		
2-7	Screw, PHT (ST#3), M3.0x5	E11130-050F	4		
2-8-1	SA, Main PCB	JM66707-0	1	For CL-S621 (CSA, CSE)	
2-8-2	SA, Main PCB	JM66721-0	1	For CL-S631 (CSA, CSE, CHINA)	
2-8-3	SA, Main PCB	JM66709-0	1	For CL-S621C (CHINA)	
2-8-4	SA, Main PCB	JM66719-0	1	For CL-S621 (KOREA)	
2-8-5	SA, Main PCB	JM66726-0	1	For CL-S631 (KOREA)	
2-9	Sheet, Main PCB	JM44116-0	1		
2-10	Screw, PHT (BH), M3.0x8	E10130-080F	7		
2-11	Plate, Main PCB 621	JM44122-0	1		
2-12	Plate, Parallel IF Cover	JN54109-0	1		
2-13	Screw, BHT (ST), M3.0x5	E14030-050WF	2		
2-14	Washer, EXT.T, 3 (NI)	E50730-000WF	3		

PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Base Sheet No. 2/3

Drawing No. 2 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
2-15	Lock Screw (Inch)	C6390-049#	2	HFS-4S-B1W	
2-16	Plate, Earth	JM54101-0	1		
2-17	Sheet, Earth L	JM44115-0	1		
2-18	Sheet, Earth R	JM44114-0	1		
2-19	Cable, Ope-Pane	JM67900-1	1		
2-20	SA, Core	JM59701-0	1		
2-21	Cushion, Ope-Pane Cover	JM59904-0	1		
2-22	Cushion, Ope-Pane Cable	JM59903-0	1		
2-23-1	Unit, Control Panel	JM56805-0	1	For CSA, CSE/White (Ref. Drawing No. 7)	
2-23-2	Unit, Control Panel	JM56808-0	1	For CSA, CSE/Black (Ref. Drawing No. 7)	
2-23-3	Unit, Control Panel	JM56810-0	1	For CHINA/Black (Ref. Drawing No. 7)	
2-23-4	Unit, Control Panel	JM56812-0	1	For KOREA/Black (Ref. Drawing No. 7)	
2-24	Nut, M4	E40140-000F	2		
2-25	Leg, Case L F	JM59902-0	2		
2-26-1	Case L	JM56201-0	1	White	
2-26-2	Case L	JM56239-0	1	Black	
2-27	Leg, Case L R	JM59901-0	2		
2-28	Screw, BH, M4.0x4 (NI)	E00540-040WF	2		
2-29	Washer, EXT.T, 4 (NI)	E50740-000WF	2		
2-30	Screw, BH (N), M3.0x6	E00530-060WF	1		

PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Base Sheet No. 3/3

Drawing No. 2 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
2-31	Sheet 2, Main PCB	JM44123-0	1		
2-32	SA, Power Cable	JM67745-1	1		
2-33-1	Unit, Power Supply (100V)	JM66850-0	1	For CSA	
2-33-2	Unit, Power Supply (200V)	JM66855-1	1	For CSE, CHINA, KOREA	

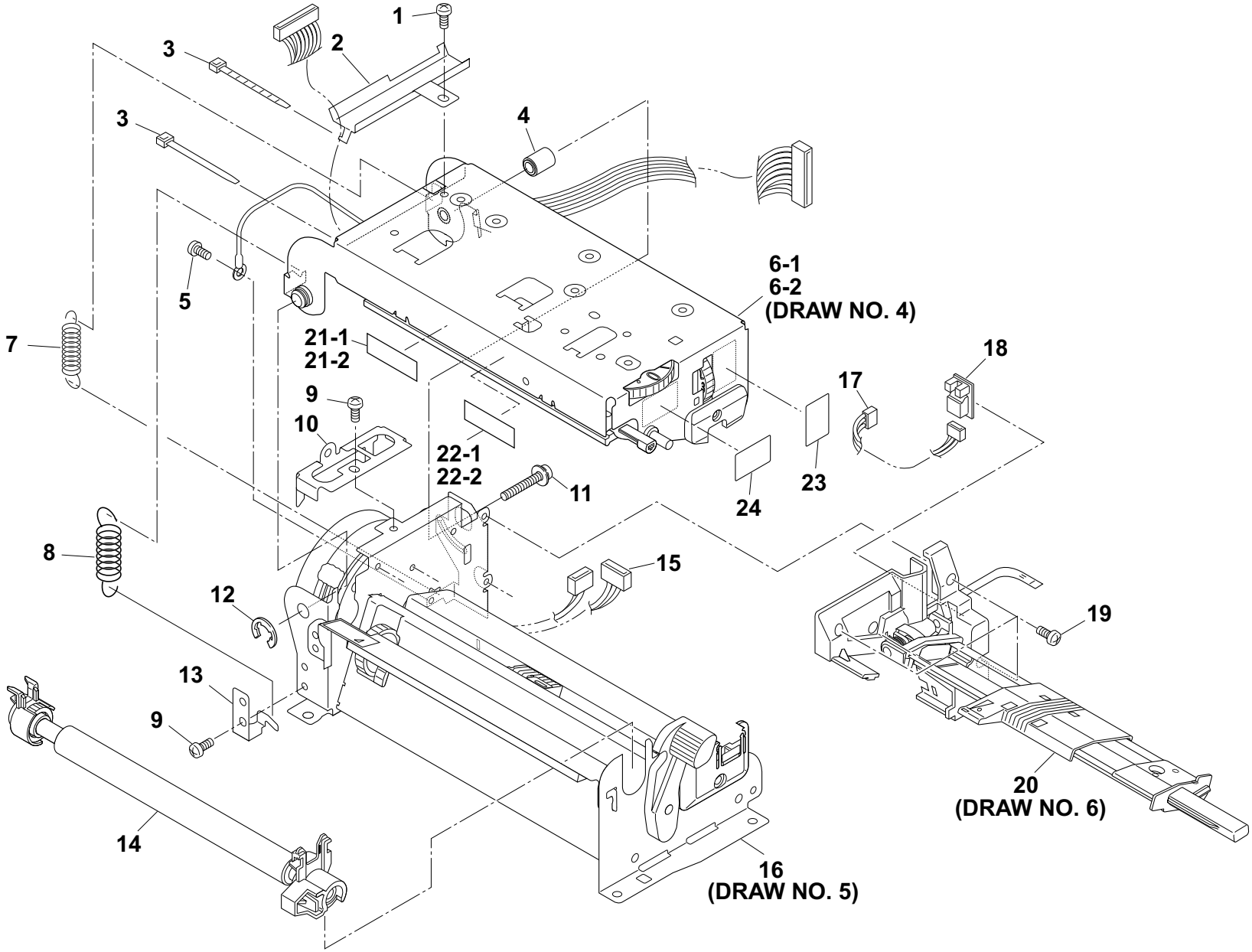
CL-S621, CL-S621C & CL-S631

Drawing No. 3

Parts List & Location for Unit, Mechanism

Revision Up List		
Sheet No.	Rev. No.	Date
1/2	0	Oct. 5, 2010
2/2	0	Oct. 5, 2010

DRAWING NO. 3 Unit, Mechanism (Rev. 0)



PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Mechanism Sheet No. 1/2

Drawing No. 3 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
3-1	Screw, BH (N), M3.0x3	E00530-030WF	1		
3-2	Plate, Cable Guide	JM34123-0	1		
3-3	Wire Tie	C6701-202#	2	8432 L=100	
3-4	Shaft, Head Holder	JM42007-0	1		
3-5	Screw, PH, M3.0x6	E00130-060F	1		
3-6-1	Unit, Head-TT 621	JM19802-0	1	For CL-S621/S621C (Ref. Drawing No. 4)	
3-6-2	Unit, Head-TT 631	JM19803-0	1	For CL-S631 (Ref. Drawing No. 4)	
3-7	Spring, Head Up	JM13601-0	1		
3-8	Spring2, Head Up	JM13605-0	1		
3-9	Screw, BH (N), M3.0x6	E00530-060WF	2		
3-10	Bracket, Motor Cover	JM44118-0	1		
3-11	Screw, PH (SW+PW), M4.0x16	E00940-160F	1		
3-12	E-Ring, 4	E60340-000F	1		
3-13	Hook, Head Up Spring 2	JM14112-0	1		
3-14	SA, Platen	JM22701-0	1		
3-15	SA, Ribbon Cable	JM67770-0	1		
3-16	Unit, PF	JM49814-0	1	(Ref. Drawing No. 5)	
3-17	SA, Head Up Sensor Cable	JM67715-1	1		
3-18	SA, Head Up Sensor PCB	JM66715-1	1		
3-19	Screw, PH, M2.0x4	E00120-040F	4		

PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Mechanism Sheet No. 2/2

Drawing No. 3 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
3-20	Unit, Sensor U	JM29701-1	1	(Ref. Drawing No. 6)	
3-21-1	Label 2, Caution Head	AH90935-0	1	For CSA, CSE, KOREA	
3-21-2	Label, Caution Head (CHINA)	AM90901-0	1	For CHINA	
3-22-1	Label 7, Caution Head	AR99902-0	1	For CSA	
3-22-2	Label 6, Caution Head	AR99901-0	1	For CSE, KOREA	
3-23	Label, Head Adjust	JM99982-0	1		
3-24	Label, Head Balance	JM99981-0	1		

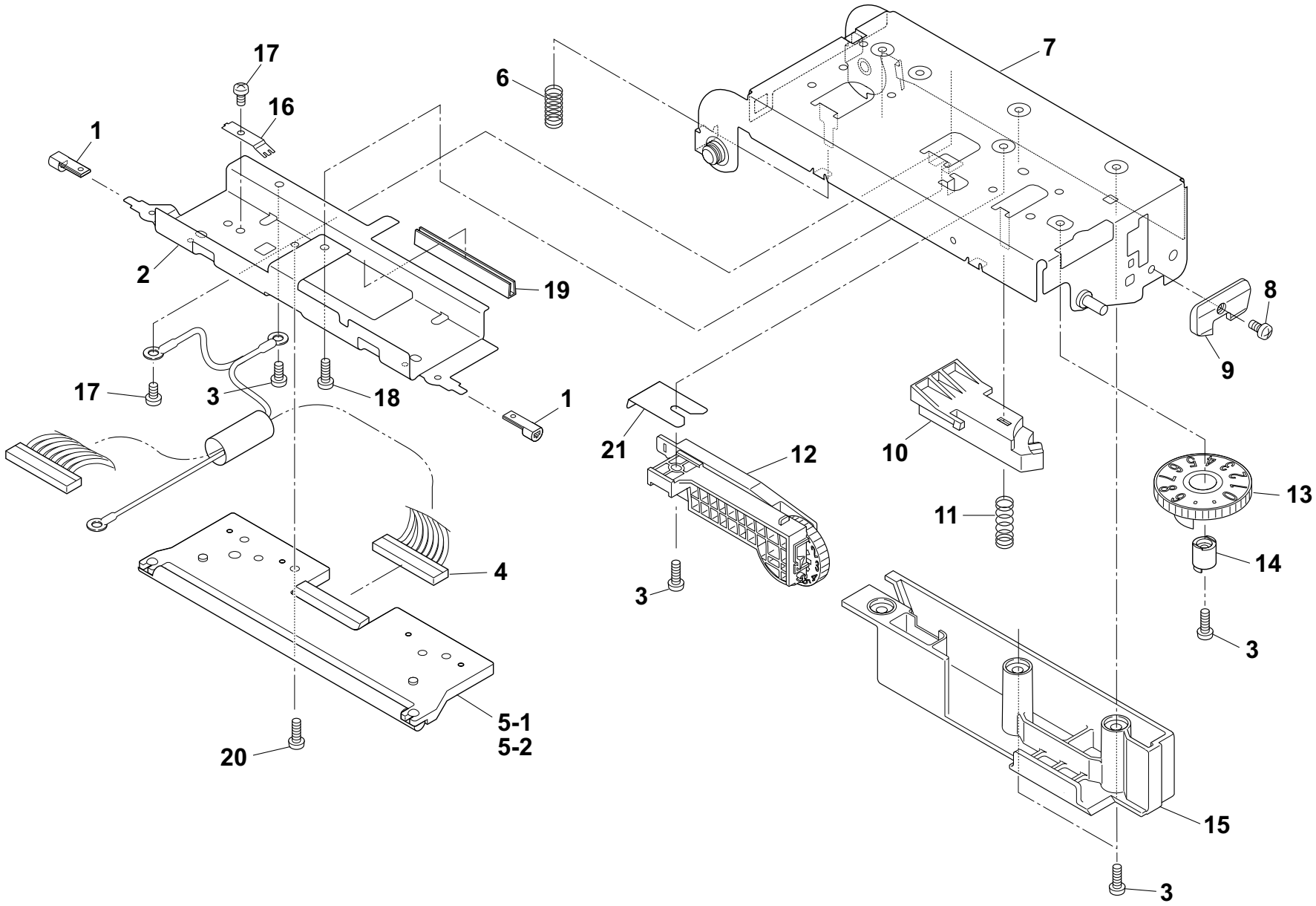
CL-S621, CL-S621C & CL-S631

Drawing No. 4

Parts List & Location for Unit, Head-TT

Revision Up List		
Sheet No.	Rev. No.	Date
1/2	0	Oct. 5, 2010
2/2	0	Oct. 5, 2010

DRAWING NO. 4 Unit, Head-TT (Rev. 0)



PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Head-TT Sheet No. 1/2

Drawing No. 4 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
4-1	Bushing, Head	JM11201-0	2		
4-2	Bracket, Head	JM14101-0	1		
4-3	Screw, PH, M3.0x6	E00130-060F	5		
4-4	SA, Head Cable (3-Input)	JM67711-1	1		
4-5-1	SA, Head	JM14705-0	1	For CL-S621/S621C	
4-5-2	SA, Head	JM14706-0	1	For CL-S631	
4-6	Spring, Head L	JM13603-0	1		
4-7	SA, Head Holder Base	JM14704-1	1		
4-8	Screw, PH, M3.0x5	E11130-050F	1		
4-9	Holder, Guide Sensor U	JM14211-0	1		
4-10	Lever, Head Balance	JM14203-0	1		
4-11	Spring, Head R	JM13602-0	1		
4-12	SA, Head Adjust	JM14720-0	1		
4-13	Cam, Head Balance	JM19203-0	1		
4-14	Pivot, Head Balance Cam	JM12201-0	1		
4-15	Guide, Head Cable	JM14212-1	1		
4-16	Plate, Head Earth	JM14105-0	1		
4-17	Screw, PH, M3.0x3	E00130-030F	2		
4-18	Screw, PH, M3.0x8	E00130-080F	1		
4-19	Guard, Head Connector	JM19902-0	1	CE-016	

PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Head-TT Sheet No. 2/2

Drawing No. 4 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
4-20	Screw, BH (N), M3.0x6	E00530-060WF	1		
4-21	Shim, Head Adjust	JM14106-0	-	May be installed at the factory.	

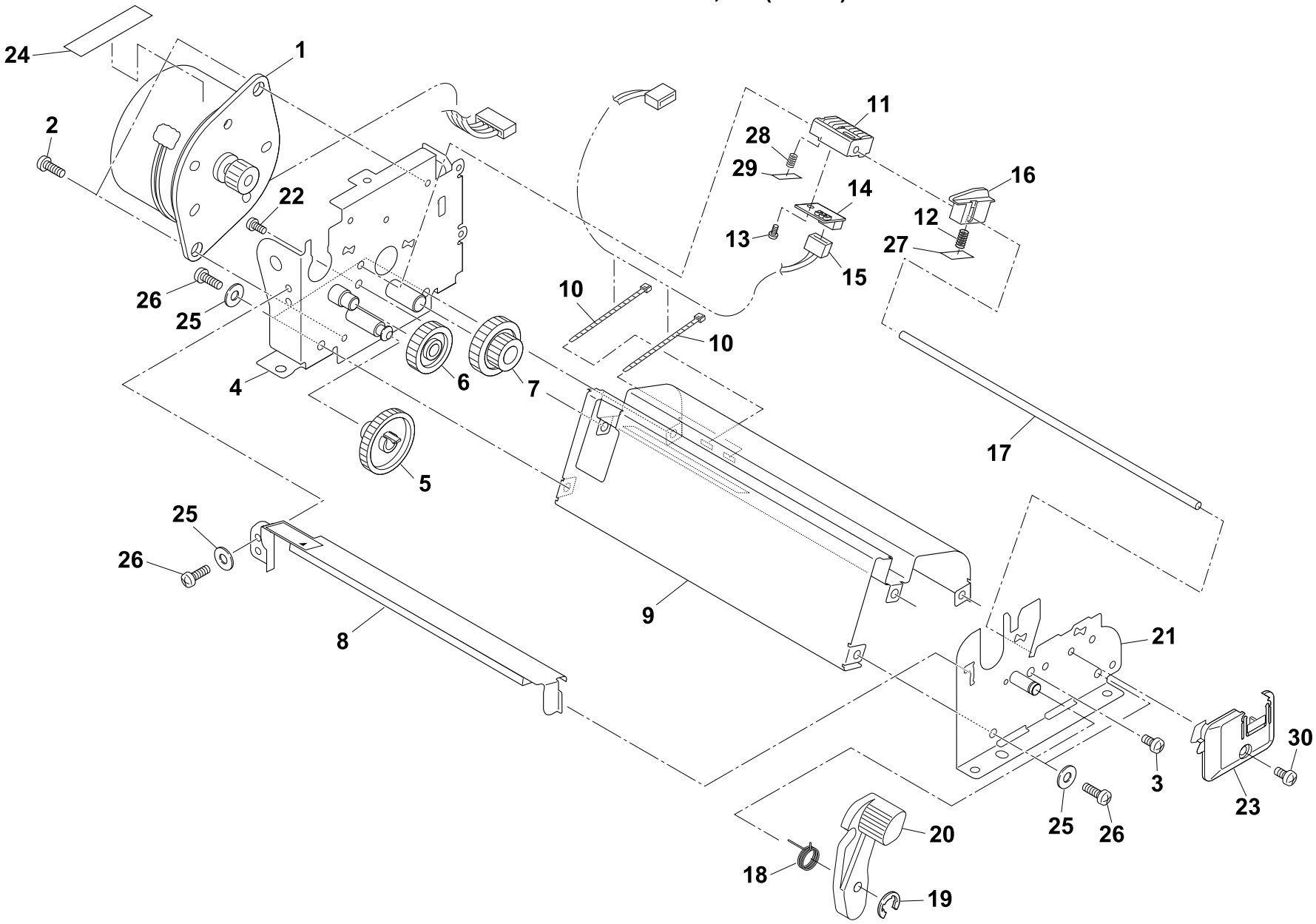
CL-S621, CL-S621C & CL-S631

Drawing No. 5

Parts List & Location for Unit, PF

Revision Up List		
Sheet No.	Rev. No.	Date
1/2	0	Oct. 5, 2010
2/2	0	Oct. 5, 2010

DRAWING NO. 5 Unit, PF (Rev. 0)



PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, PF Sheet No. 1/2

Drawing No. 5 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
5-1	SA, Motor	JM25704-0	1		
5-2	Screw, PH, M3.0x3	E00130-030F	2		
5-3	Screw, PH, M3.0x6	E00130-060F	1		
5-4	SA, Main Plate L	JM44711-0	1		
5-5	Gear, PF2	JM20202-0	1		
5-6	Gear, PF Idle	JM20203-0	1		
5-7	Gear, PF1	JM20201-0	1		
5-8	SA, Plate Peeler	JM44709-0	1		
5-9	Frame, Main	JM44101-0	1		
5-10	Wire Tie	C6701-202#	2	8432 L=100	
5-11	SA, Sensor Holder L	JM24701-0	1		
5-12	Spring, Friction PG	JM23604-0	1		
5-13	Screw, No.0, PHT (BT#1), M2.0x3	E11920-030F	1		
5-14	SA, Reflective Sensor PCB	JM66730-1	1		
5-15	SA, Reflective Sensor Cable	JM67720-1	1		
5-16	Guide, Paper Set	JM44202-2	1		
5-17	Shaft, Sensor Guide	JM42008-0	1		
5-18	Spring, Head Lock	JM43601-0	1		
5-19	E-Ring, 2.5	E60325-000F	1		
5-20	Lever, Head Lock	JM44203-0	1		

PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, PF Sheet No. 2/2

Drawing No. 5 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
5-21	SA, Main Plate R	JM44702-0	1		
5-22	Screw, No.0, PH (#1), M2.6x6	E01626-060F	1		
5-23	Holder, Guide Sensor L	JM44207-0	1		
5-24	Label 5, Caution Head	AK99925-0	1		
5-25	Washer, EXT.T, 3 (NI)	E50730-000WF	5		
5-26	Screw, BH (N), M3.0x6	E00530-060WF	5		
5-27	Plate, Friction PG	JM24117-0	1		
5-28	Spring, Friction SEN L	JM23603-0	1		
5-29	Plate, Friction SEN L	JM24116-0	1		
5-30	Screw, PH, M3.0x5	E11130-050F	1		

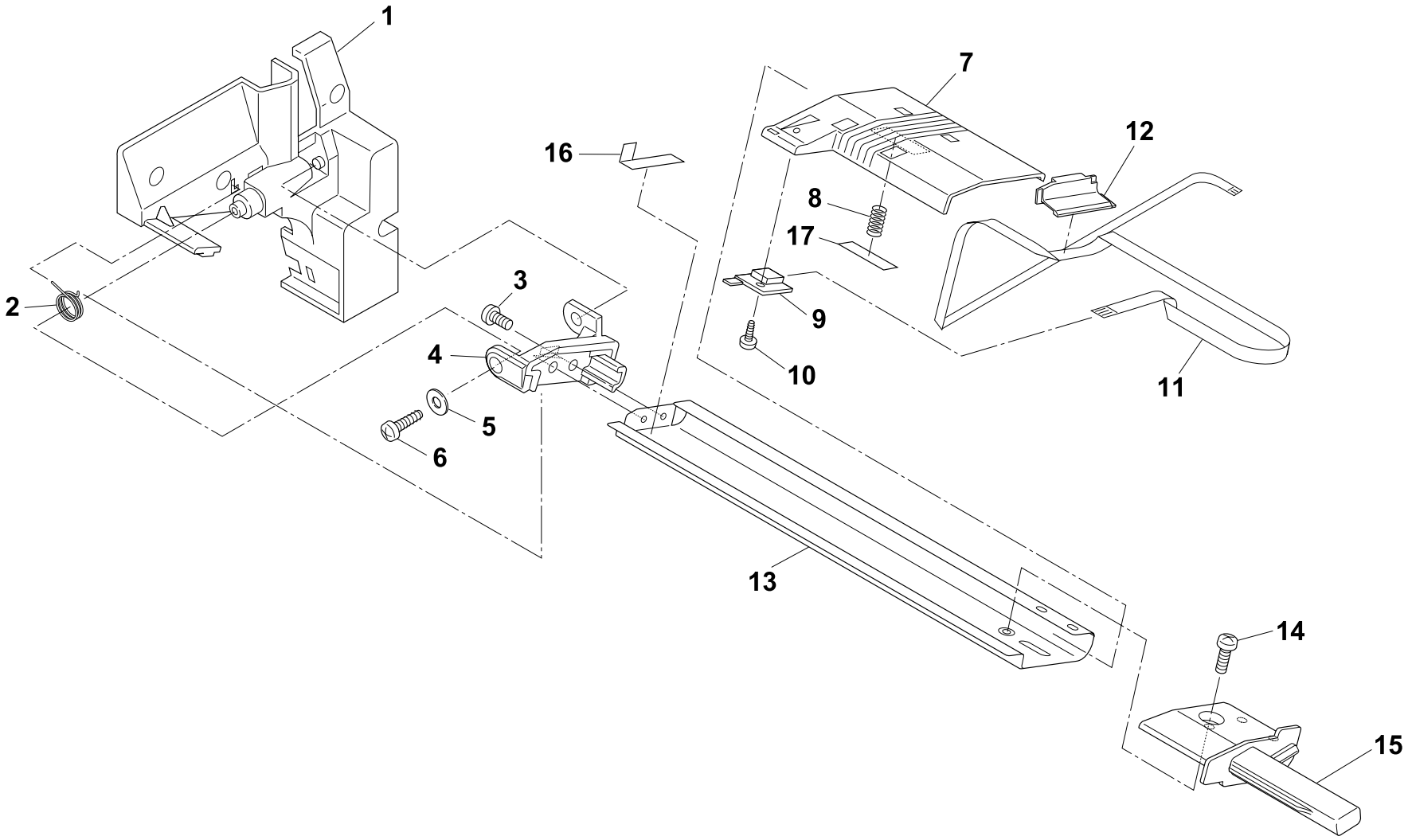
CL-S621, CL-S621C & CL-S631

Drawing No. 6

Parts List & Location for Unit, Sensor U

Revision Up List		
Sheet No.	Rev. No.	Date
1/1	0	Oct. 5, 2010

DRAWING NO. 6 Unit, Sensor U (Rev. 0)



PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Sensor U Sheet No. 1/1

Drawing No. 6 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
6-1	Cover, Head Wire	JM44201-2	1		
6-2	Spring, Sensor Frame	JM23602-0	1		
6-3	Screw, PH, M2.6x3	E00126-030F	2		
6-4	Cap, Sensor Frame L	JM24210-0	1		
6-5	Washer, Plain, 2x5x03	E50120-003F	1		
6-6	Screw, PHT (PT), M2.0x8	E10120-080F	1		
6-7	Holder, Sensor U	JM24205-3	1		
6-8	Spring, Friction SEN U	JM23605-0	1		
6-9	SA, Transparent Sensor PCB	JM66725-0	1		
6-10	Screw, No.0, PHT (BT#1), M2.0x3	E11920-030F	1		
6-11	SA, Transparent Sensor Cable	JM67705-2	1		
6-12	Cap, Sensor Cable U	JM24212-0	1		
6-13	Frame, Sensor Holder U	JM24150-0	1		
6-14	Screw, PH, M3.0x6	E00130-060F	1		
6-15	Cap, Sensor Frame R	JM24211-0	1		
6-16	Tape, Sensor Cable U	JM24105-0	1		
6-17	Plate, Friction SEN U	JM24118-0	1		

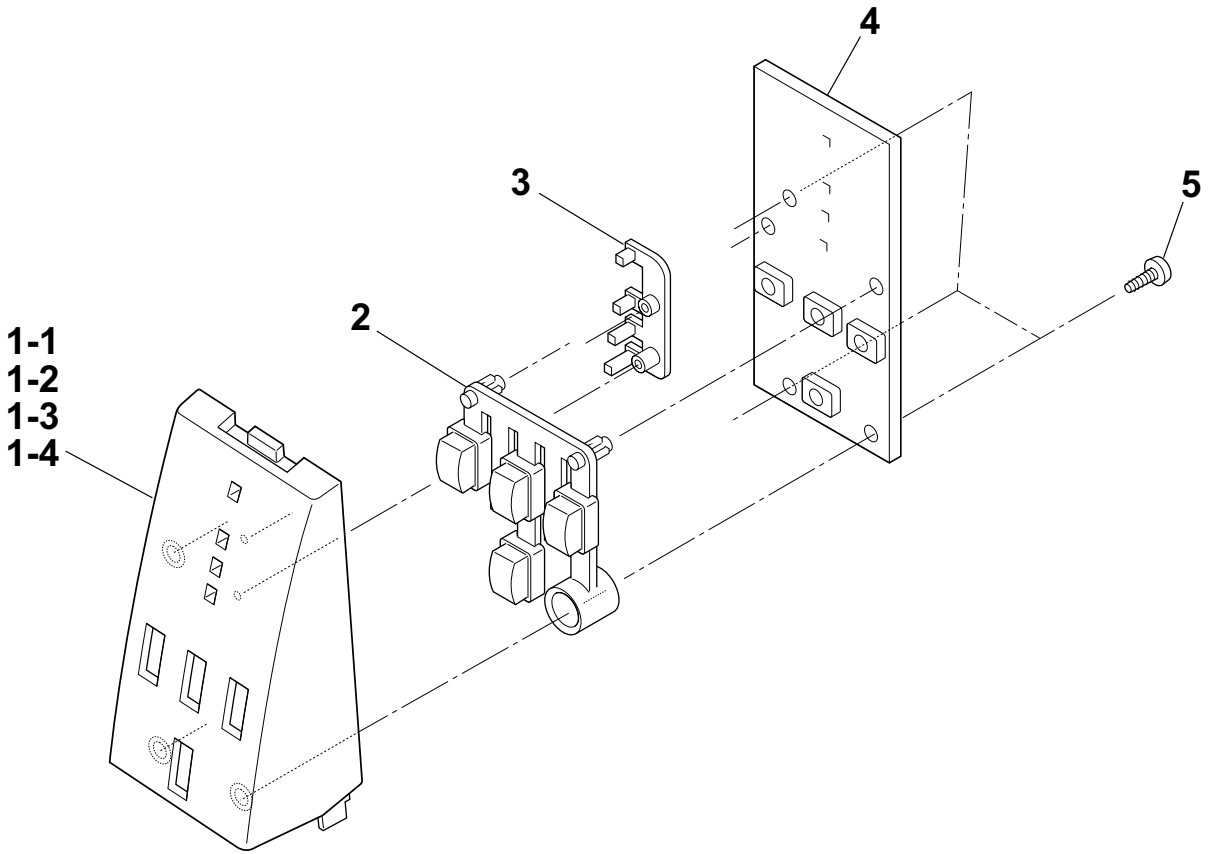
CL-S621, CL-S621C & CL-S631

Drawing No. 7

Parts List & Location for Unit, Control Panel

Revision Up List		
Sheet No.	Rev. No.	Date
1/1	0	Oct. 5, 2010

DRAWING NO. 7 Unit, Control Panel (Rev. 0)



PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Control Panel Sheet No. 1/1

Drawing No. 7 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
7-1-1	Cover, Ope-Pane	JM56204-0	1	For CSA, CSE/White	
7-1-2	Cover, Ope-Pane	JM56242-0	1	For CSA, CSE/Black	
7-1-3	Cover, Ope-Pane	JM56252-0	1	For CHINA/Black	
7-1-4	Cover, Ope-Pane	JM56258-0	1	For KOREA/Black	
7-2	Switch, Key	JM56253-0	1		
7-3	LED, Window	JM56208-0	1		
7-4	SA, Ope-Pane PCB	JM66720-1	1		
7-5	Screw, PHT (PT), M3.0x6	E10130-060F	3		

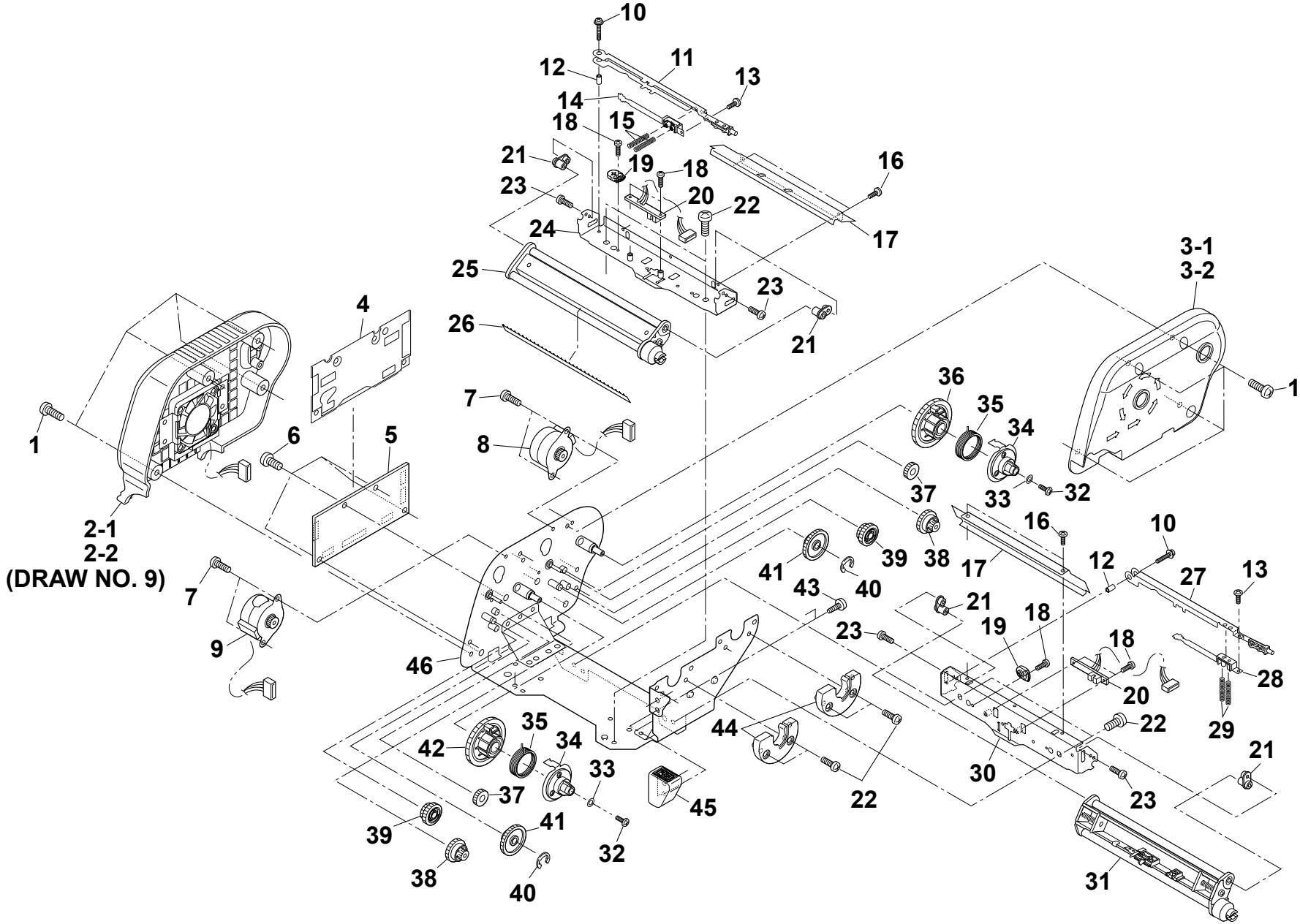
CL-S621, CL-S621C & CL-S631

Drawing No. 8

Parts List & Location for Unit, Ribbon

Revision Up List		
Sheet No.	Rev. No.	Date
1/3	0	Oct. 5, 2010
2/3	0	Oct. 5, 2010
3/3	0	Oct. 5, 2010

DRAWING NO. 8 Unit, Ribbon (Rev. 0)



PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Ribbon Sheet No. 1/3

Drawing No. 8 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
8-1	Screw, PH (N), M3.0x4	E00130-040WF	8		
8-2-1	SA2, Ribbon Unit Fan	-	1	White (Ref. Drawing No. 9)	
8-2-2	SA2, Ribbon Unit Fan	-	1	Black (Ref. Drawing No. 9)	
8-3-1	Cover R, Ribbon Unit	JM34201-0	1	White	
8-3-2	Cover R, Ribbon Unit	JM34221-0	1	Black	
8-4	Insulator, Ribbon Board	JM34120-1	1		
8-5	SA, Ribbon PCB	JM66724-0	1		
8-6	Screw, BH, M3.0x6 (NI)	E00530-060WF	4		
8-7	Screw, PH, M2.6x3	E00126-030F	4		
8-8	SA, Ribbon Motor R	JM35703-0	1		
8-9	SA, Ribbon Motor F	JM35702-0	1		
8-10	Screw, PH (PW), M2.0x8	E00620-080F	2		
8-11	SA, Tension Adjust Lever F	JM34711-0	1		
8-12	Shaft, Tension Adjust	JM32011-0	2		
8-13	Screw, PH, M1.7x4	E01617-040F	2		
8-14	SA, Ribbon Sub Adjust Lever F	JM34713-0	1		
8-15	Spring F, Ribbon Tension	JM33602-1	2		
8-16	Screw, No.0, TFH, M2x3 (NI)	E03920-030WF	4		
8-17	Cover, Ribbon Tension Adjust	JM34112-0	2		
8-18	Screw, No.0, TFH, M2x3 (NI)	E03920-030WF	6		

PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Ribbon Sheet No. 2/3

Drawing No. 8 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
8-19	Cam, Tension Base Adjust	JM39201-0	2		
8-20	SA, Tension Sensor	JM68705-0	2		
8-21	Bush 2, Ribbon Guide Roller	JM31202-0	4		
8-22	Screw, BH, M3.0x3 (NI)	E00530-030WF	8		
8-23	Screw, No.0, TFH (BH), M2x4 (NI)	E15920-040WF	4		
8-24	SA, Ribbon Sensor Frame F	JM34702-1	1		
8-25	SA, Ribbon Tension Shaft F	JM34715-0	1		
8-26	Sheet, Static Eliminator 621	JM29909-0	1		
8-27	SA, Tension Adjust Lever R	JM34712-0	1		
8-28	SA, Ribbon Sub Adjust Lever R	JM34714-0	1		
8-29	Spring R, Ribbon Tension	JM33605-0	2		
8-30	SA, Ribbon Sensor Frame R	JM34703-1	1		
8-31	SA, Ribbon Tension Shaft R	JM34716-0	1		
8-32	Screw, No.0, THF, M2x3 (NI)	E03920-030WF	2		
8-33	Plate, Ribbon Washer	JM34122-0	2	CC-0205-05B	
8-34	SA, Holder R Shaft	JM31701-0	2		
8-35	Spring, Ribbon Return	JM33601-0	2		
8-36	Gear 5R, Ribbon	JM30204-0	1		
8-37	Gear 4, Ribbon	JM30203-1	2		
8-38	Gear 1, Ribbon	JM30201-0	2		

PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Unit, Ribbon Sheet No. 3/3

Drawing No. 8 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
8-39	Gear 3, Ribbon	JM30205-0	2		
8-40	E-Ring, 4	E60340-000F	2		
8-41	Gear 2, Ribbon	JM30202-0	2		
8-42	Gear 5F, Ribbon	JM30206-0	1		
8-43	Screw, PHT (#2), M3.0x8 (NI)	E10130-080WF	2		
8-44	Catch, Ribbon Holder	JM34203-0	2		
8-45	Knob, Ribbon Unit	JM34204-0	1		
8-46	SA1, Ribbon Unit Base Plate	JM34707-0	1		

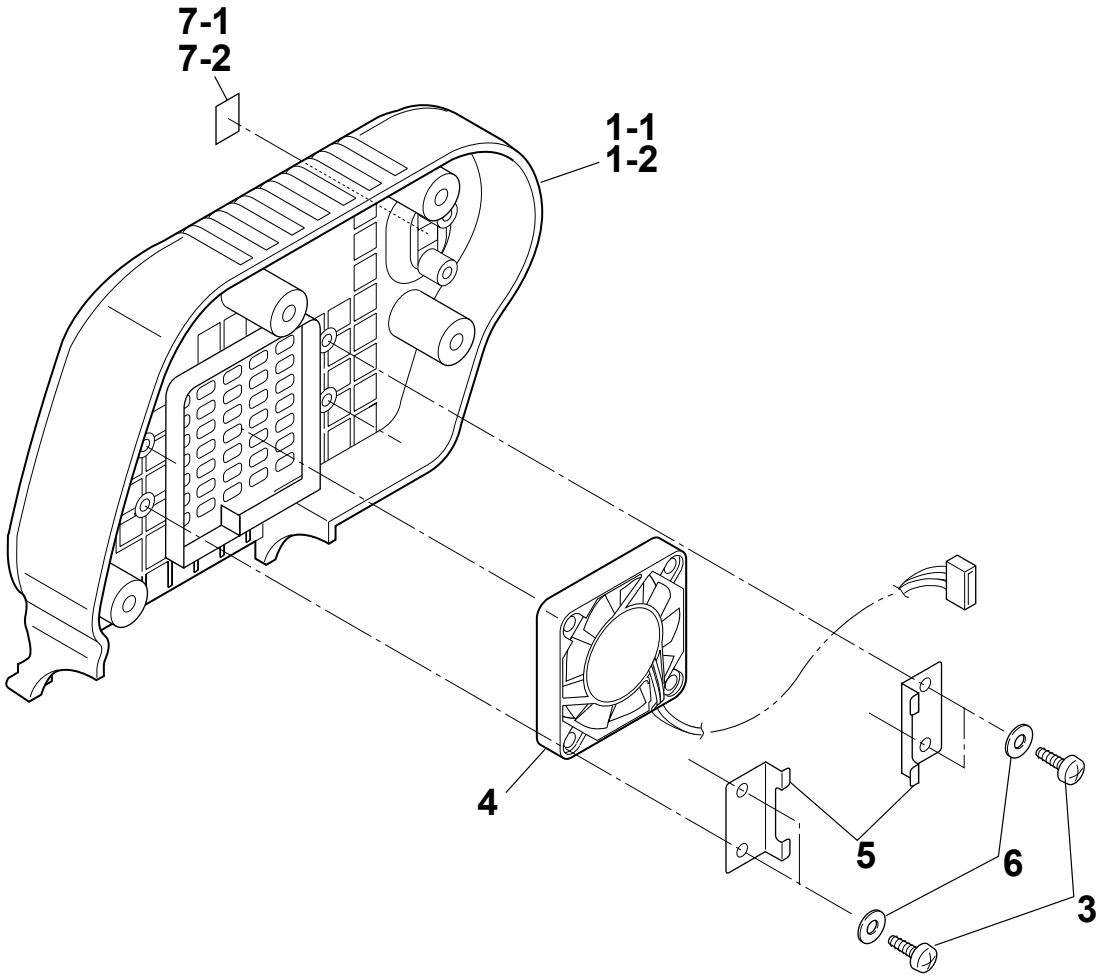
CL-S621, CL-S621C & CL-S631

Drawing No. 9

Parts List & Location for SA2, Ribbon Unit Fan

Revision Up List		
Sheet No.	Rev. No.	Date
1/1	0	Oct. 5, 2010

DRAWING NO. 9 SA2, Ribbon Unit Fan (Rev. 0)



PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: SA2, Ribbon Unit Fan Sheet No. 1/1

Drawing No. 9 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
9-1-1	Cover L, Ribbon Unit	JM34202-0	1	White	
9-1-2	Cover L, Ribbon Unit	JM34220-0	1	Black	
9-2	-	-	-		
9-3	Screw, BHT (#2), M3X6 (NI)	E10530-060WF	4		
9-4	SA, Fan	JM68702-0	1		
9-5	Bracket, Ribbon Fan	JM34116-0	2		
9-6	Washer, Plain, 3x8x05	E50130-005WF	4		
9-7-1	Cap. Ribbon Cover	JM56115-0	1	White	
9-7-2	Cap. Ribbon Cover	JM56116-0	1	Black	

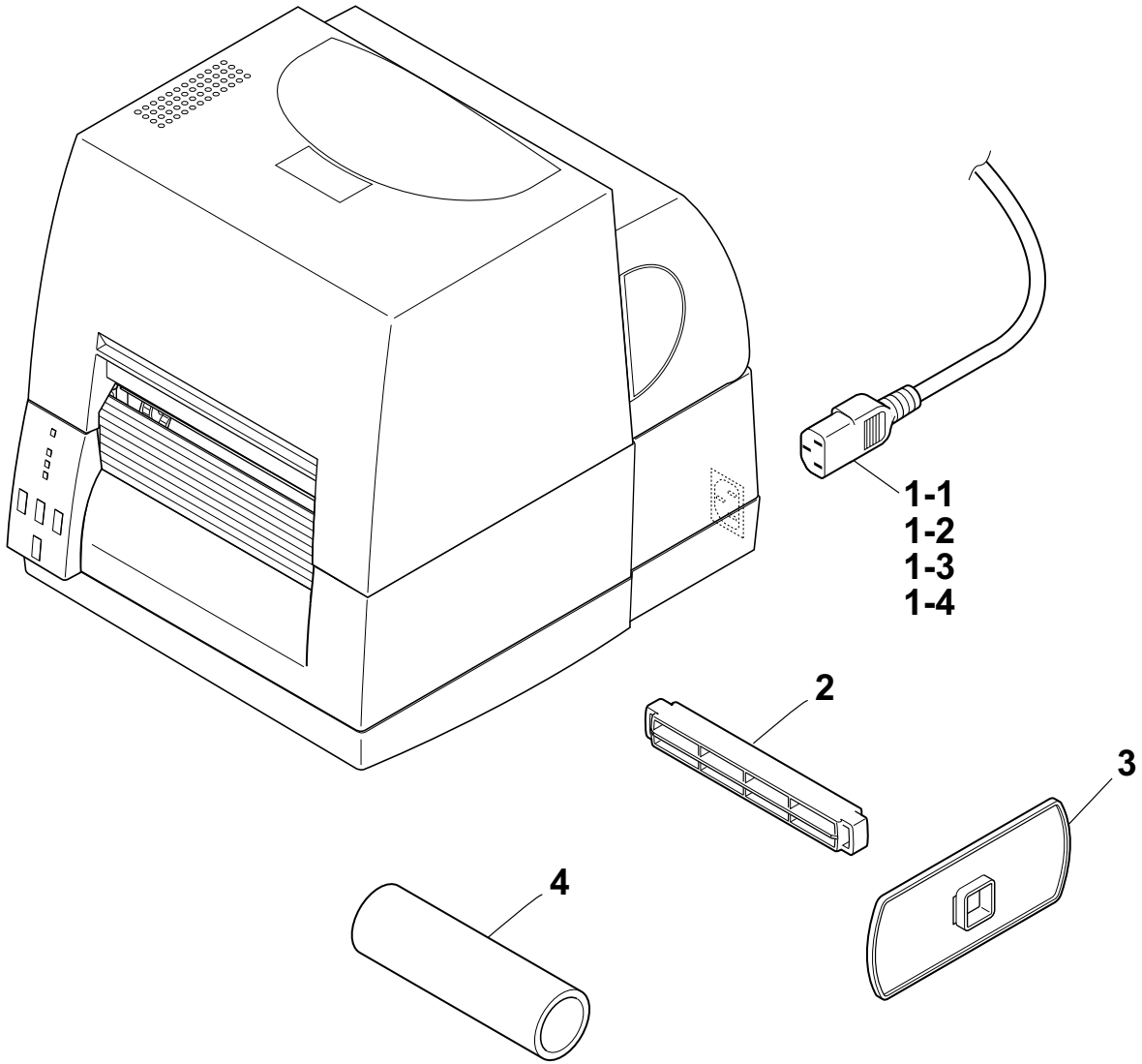
CL-S621, CL-S621C & CL-S631

Drawing No. 10

Parts List & Location for Accessories

Revision Up List		
Sheet No.	Rev. No.	Date
1/1	0	Oct. 5, 2010

DRAWING NO. 10 Accessories (Rev. 0)



PARTS LIST for CL-S621, CL-S621C & CL-S631 TITLE: Accessories Sheet No. 1/1

Drawing No. 10 Rev. No. 0

Location	Part Name	Part No.	Q'ty/ Unit	Remarks	@
10-1-1	Cord Set (UL/CSA)	C6009-000#	1	For CSA	
10-1-2	Cord Set (OE Straight)	C6009-200#	1	For CSE, KOREA	
10-1-3	Cord Set (UK)	C6009-300#	1	For CSE, KOREA	
10-1-4	Cord Set (CHINA)	C6009-800#	1	For CHINA	
10-2	Shaft, Paper	JM79202-0	1		
10-3	Flange, Paper Wide	JM79201-0	1		
10-4	Ribbon Core ϕ25x114	JM39902-0	1		
-	Cleaner, Head	JM79904-0	1		
-	Manual, User's (CD-R)	JN74924-2	1	For CSA, CSE	
-	Manual, User's (CD-R)	JN74939-1	1	For CHINA	
-	Manual, User's (CD-R)	JM74950-0	1	For KOREA	
-	Guide, Quick-Start	JM74981-0	1	English version	
-	Guide, Quick-Start	JM74953-0	1	For CHINA	
-	Guide, Quick-Start	JM74949-0	1	For KOREA	
-	Label, Paper (Accessory)	JN79902-0	1		
-	Ribbon	JM39901-0	1		

CHAPTER 6
CIRCUIT DIAGRAMS

CHAPTER 6 CIRCUIT DIAGRAMS

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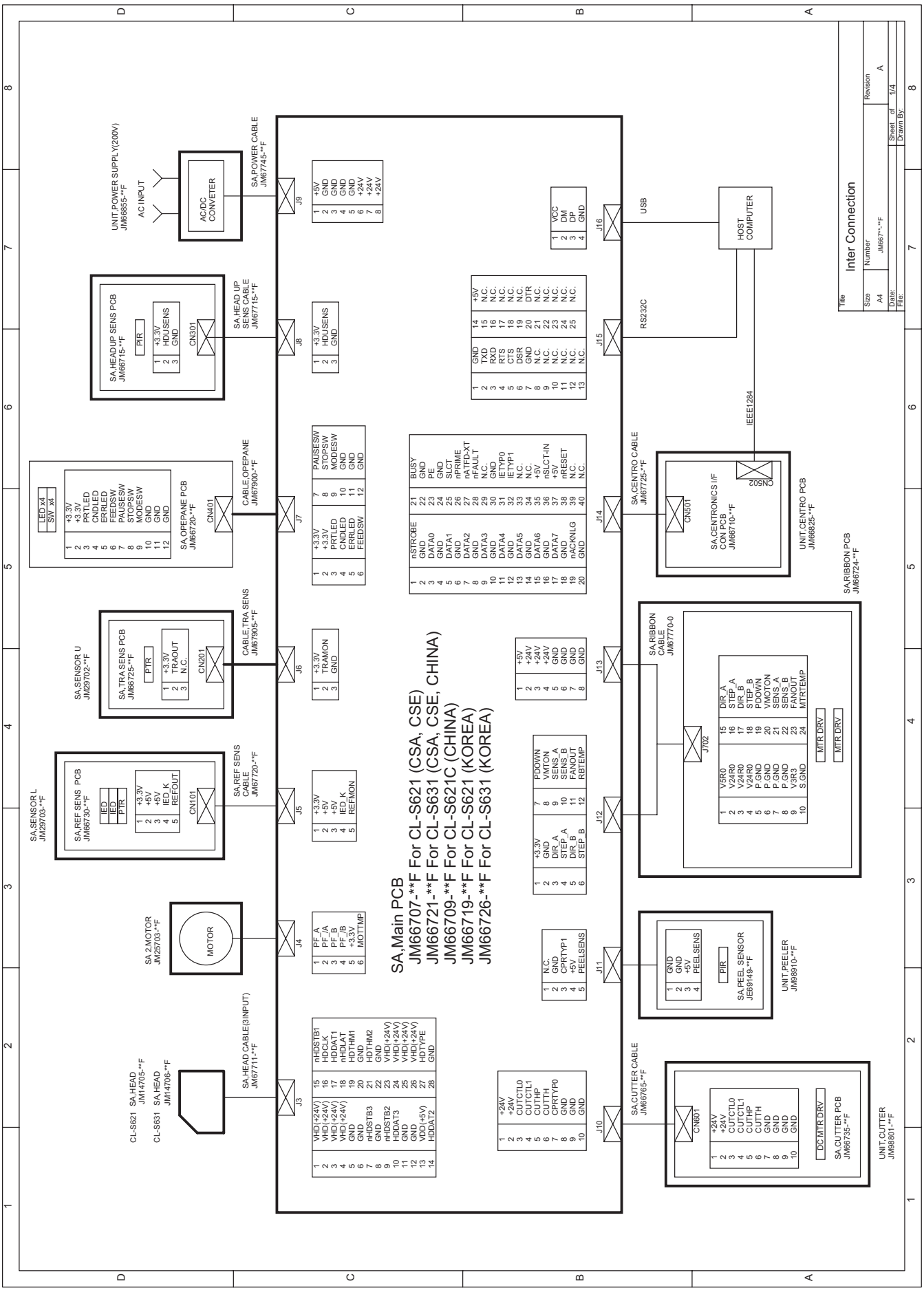
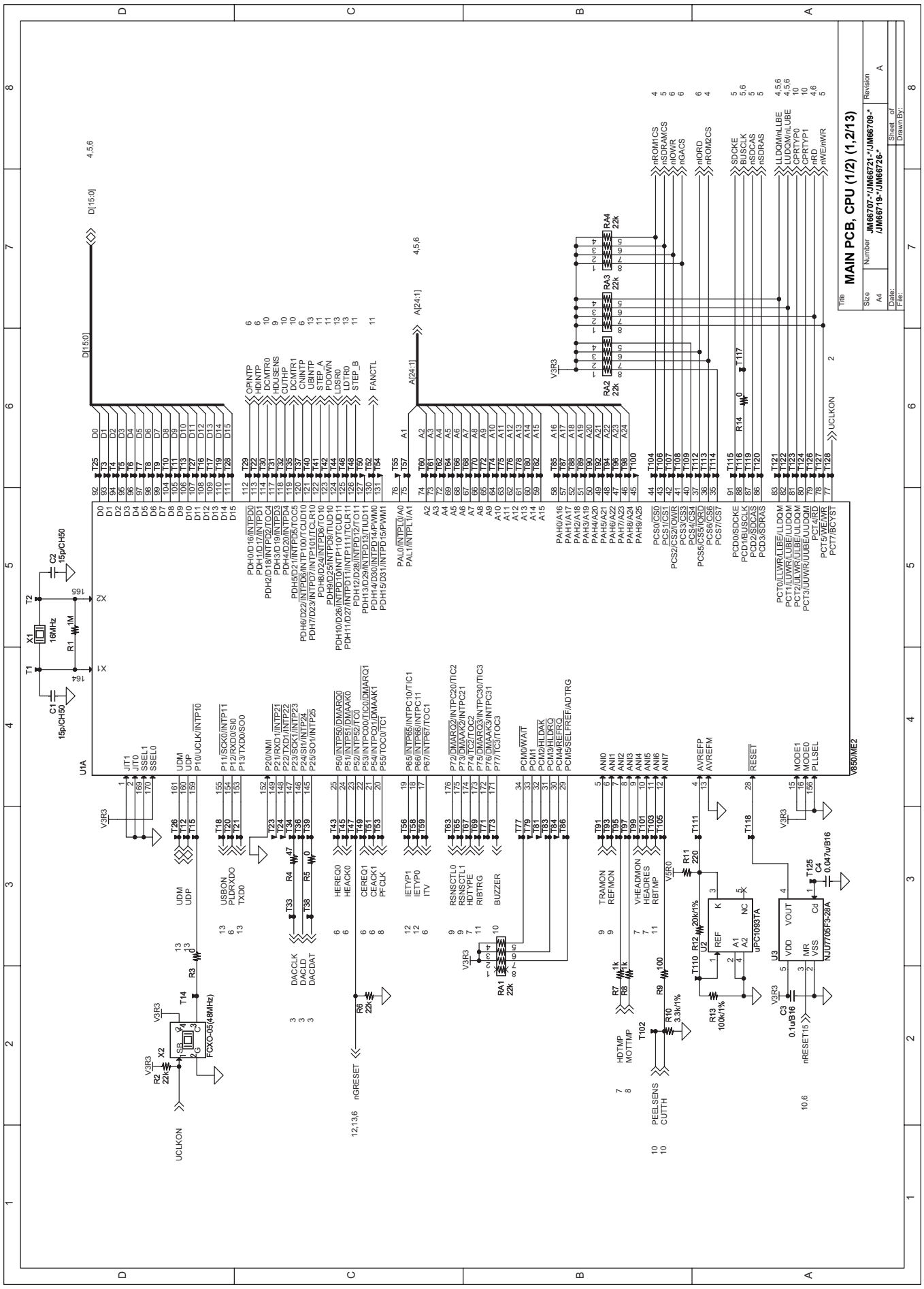
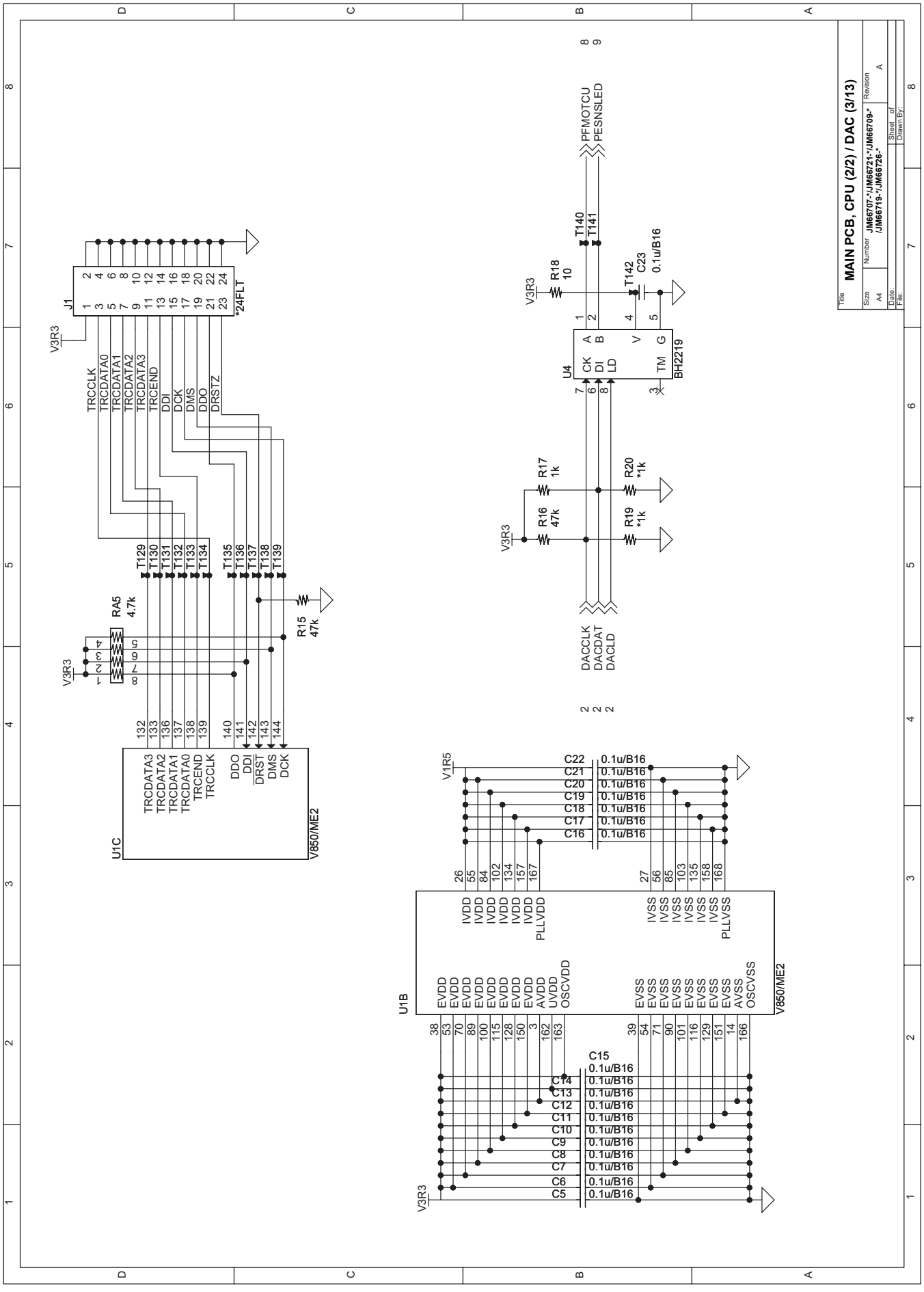
Inter Connection



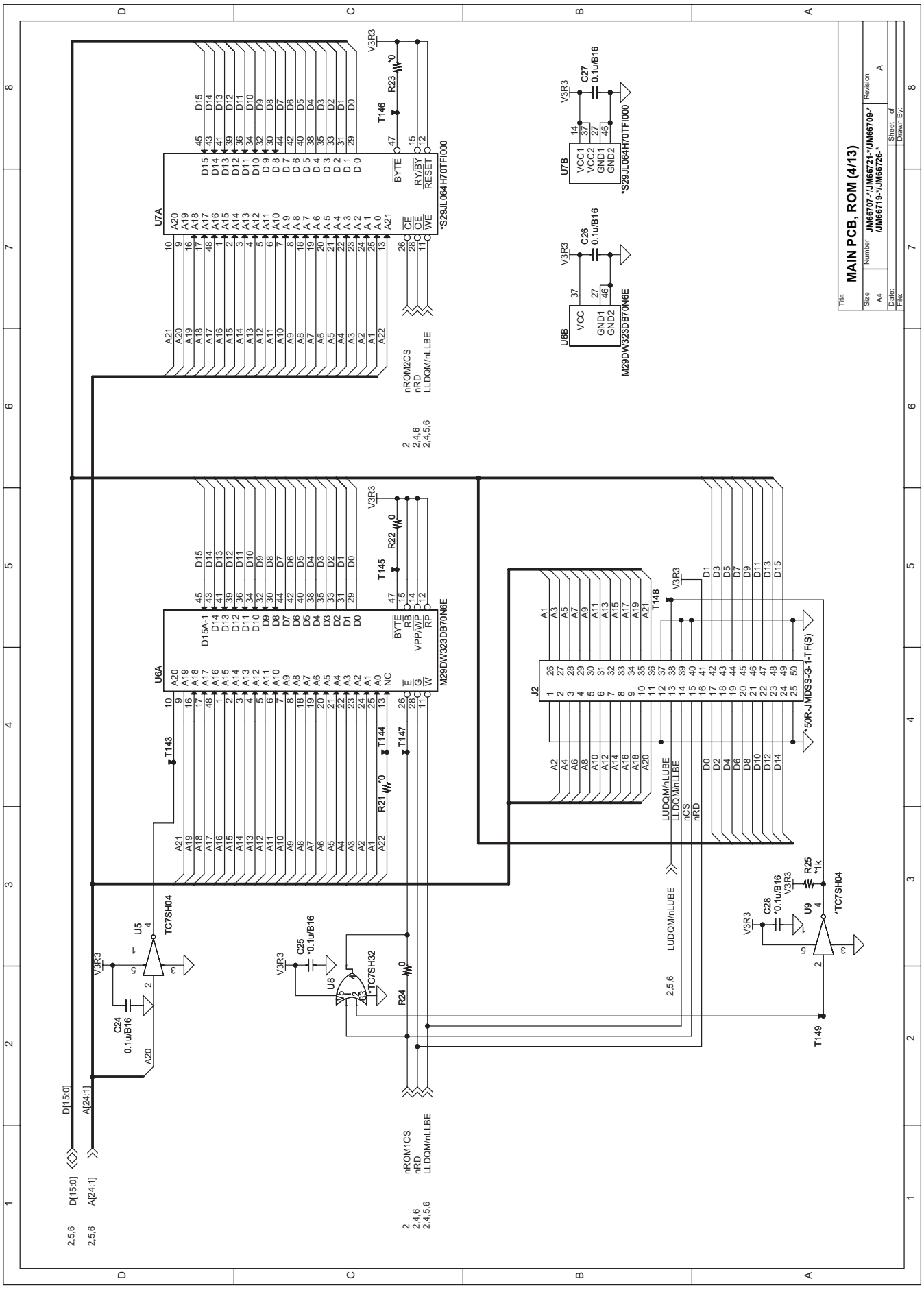
Circuit Diagram (Main PCB 1,2/13) [CPU (1/2)]



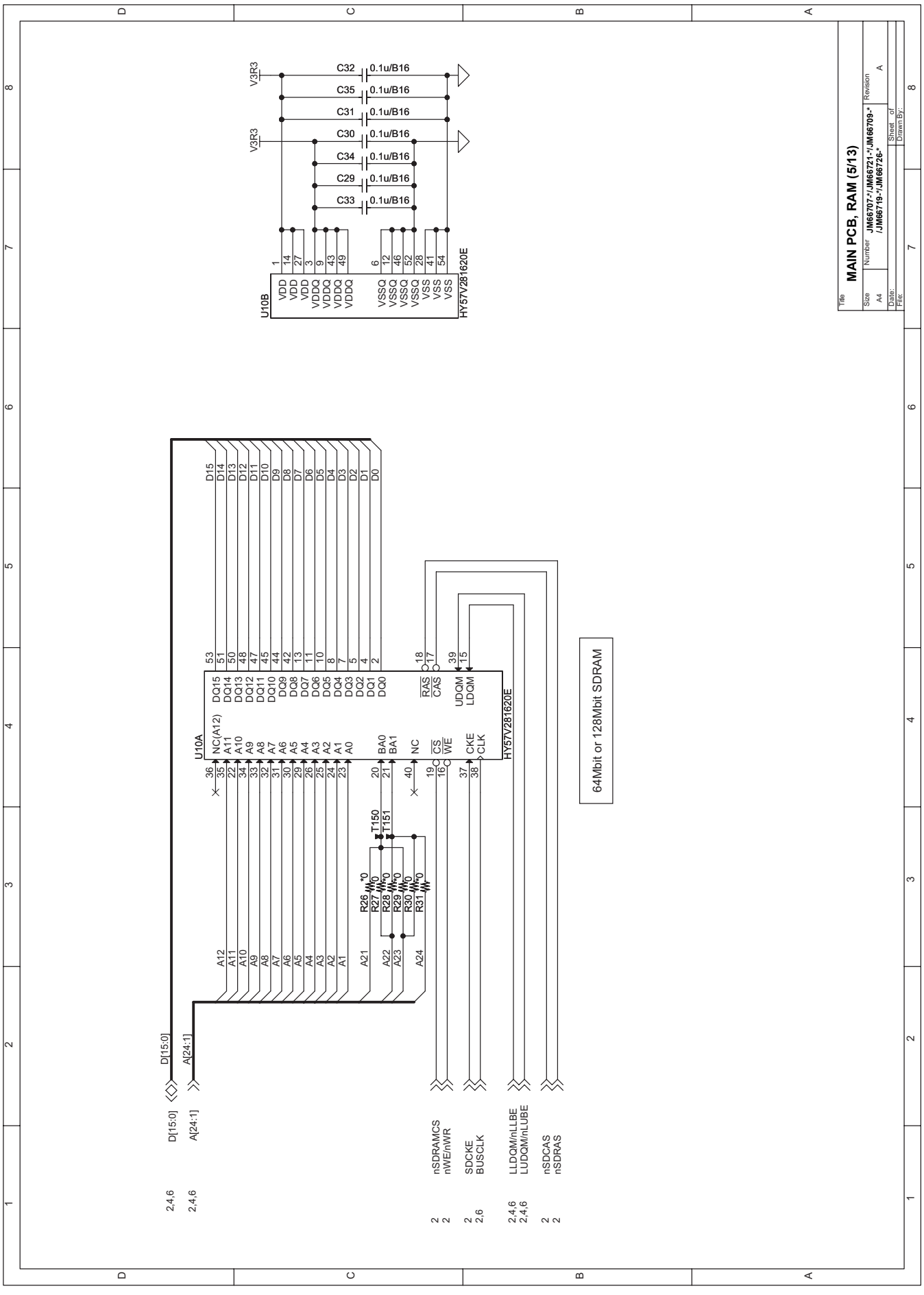
Circuit Diagram (Main PCB 3/13) [CPU (2/2)/DAC]



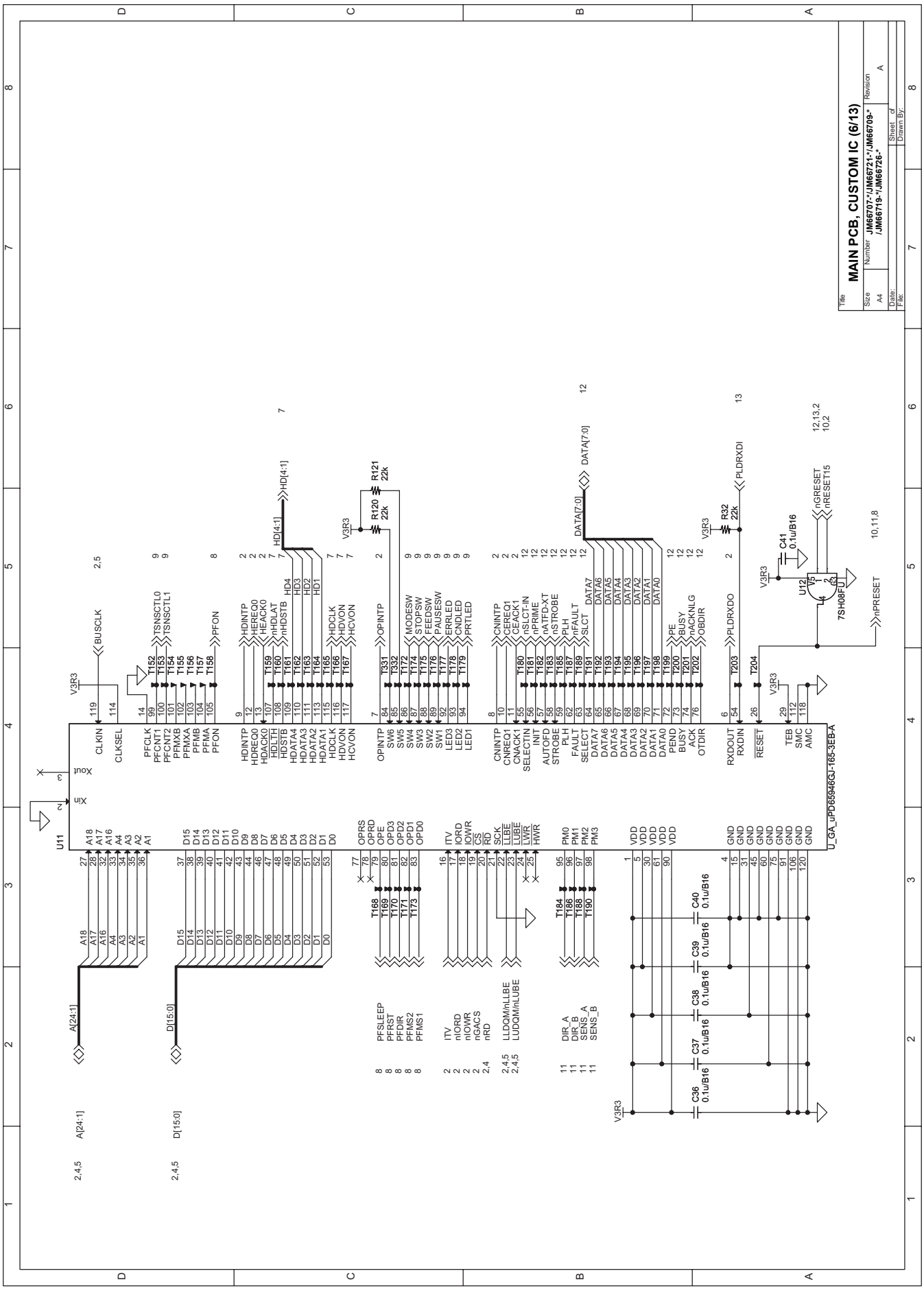
Circuit Diagram (Main PCB 4/13) [ROM]



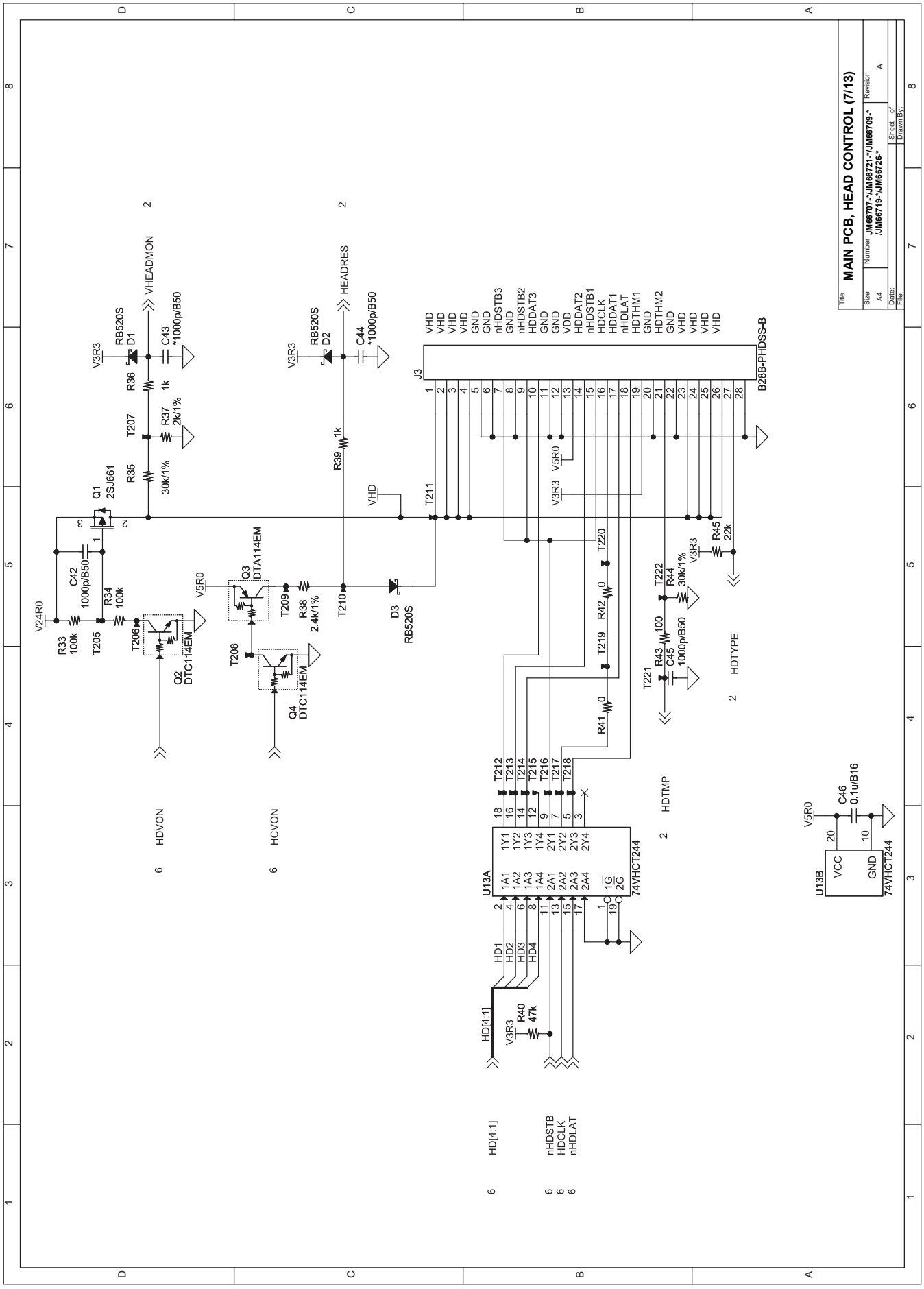
Circuit Diagram (Main PCB 5/13) [RAM]



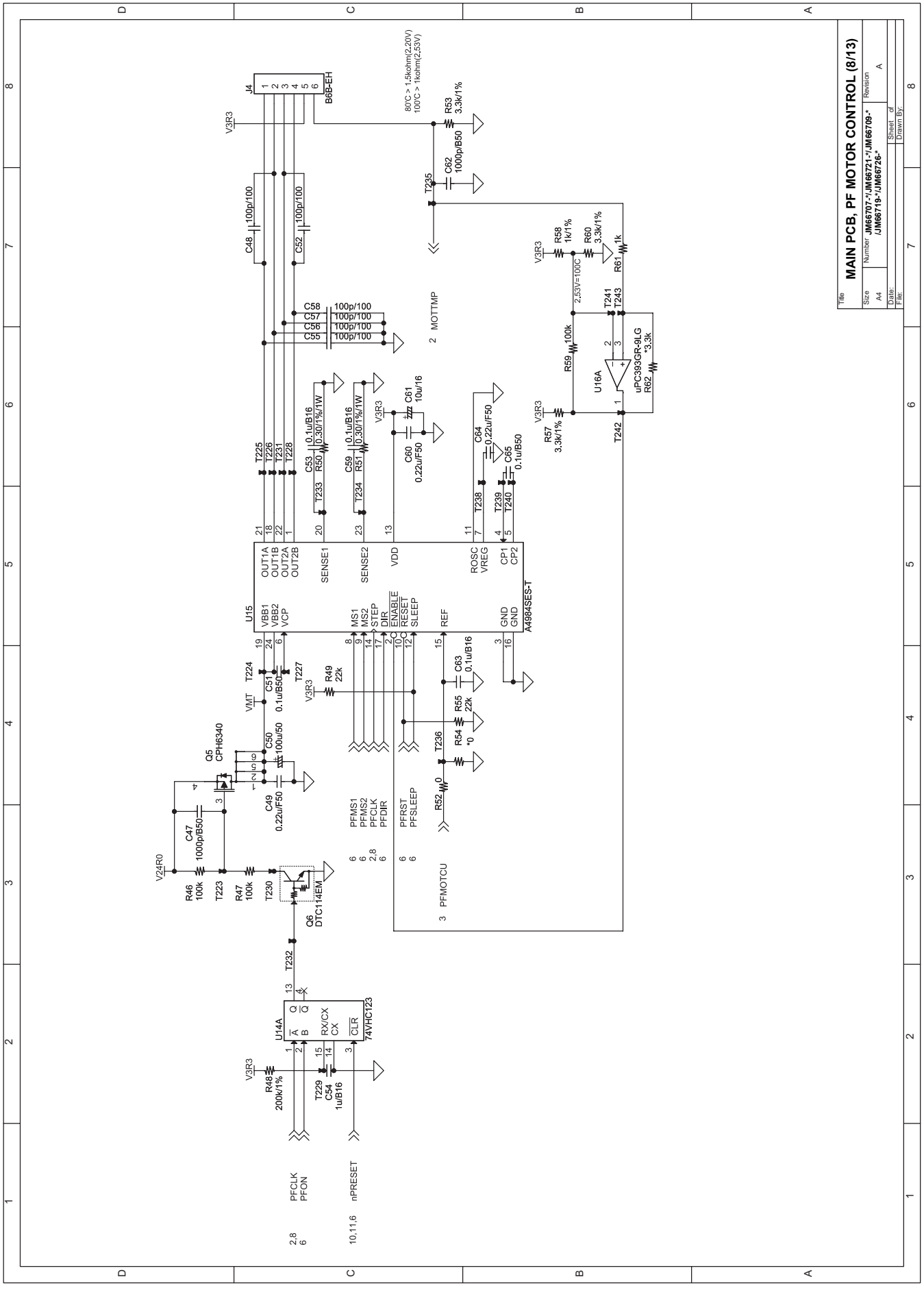
Circuit Diagram (Main PCB 6/13) [Custom IC]



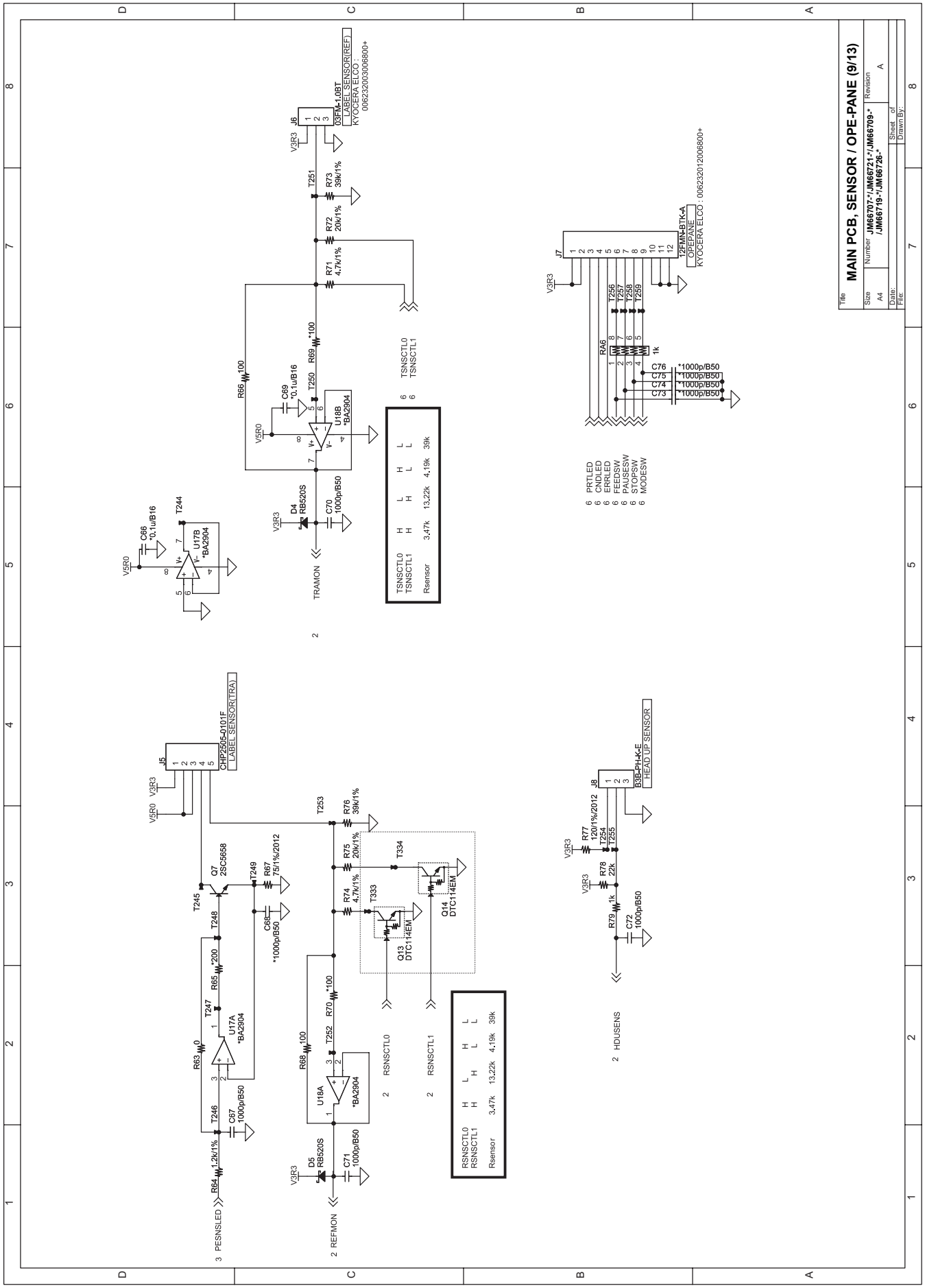
Circuit Diagram (Main PCB 7/13) [Head Control]



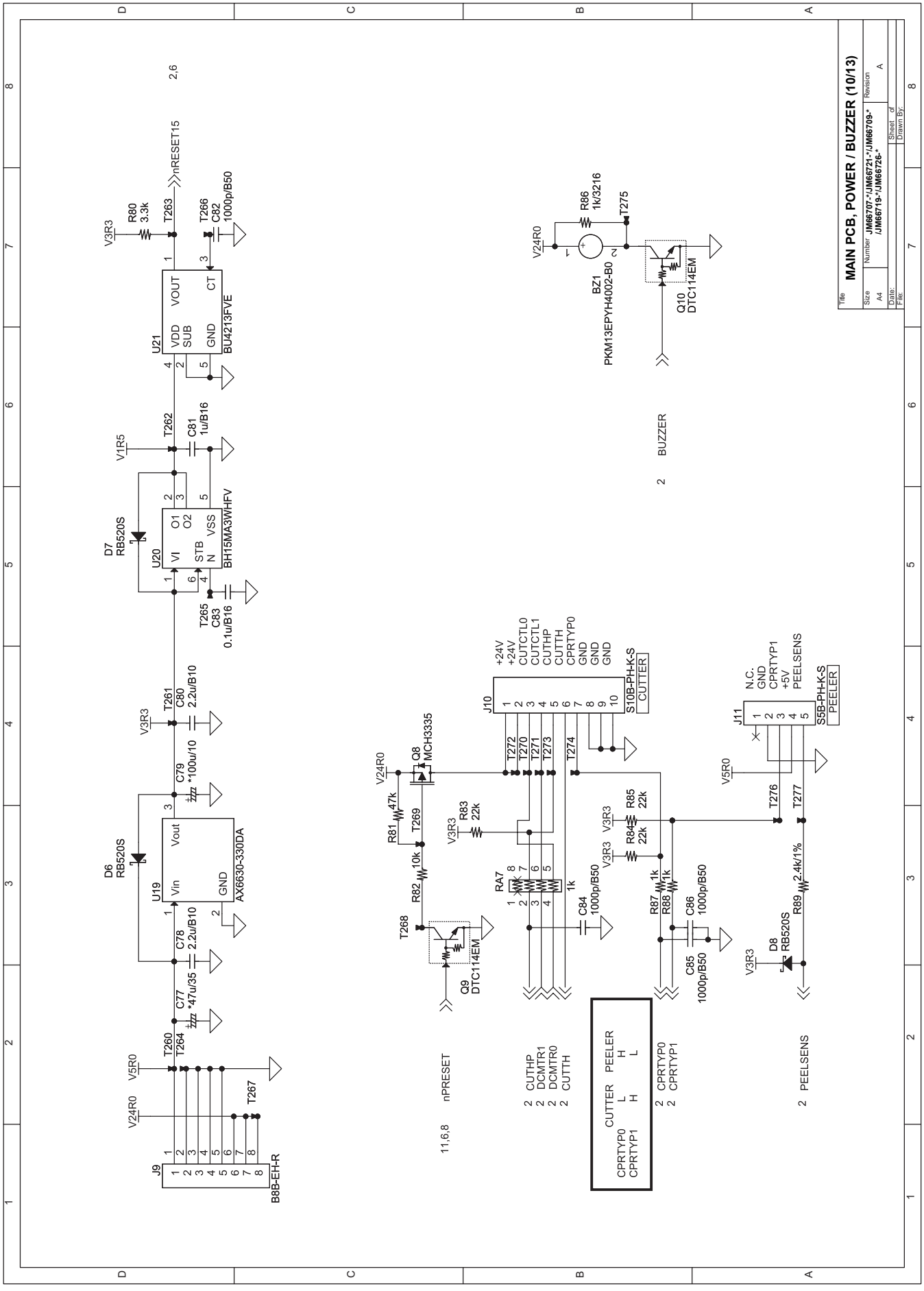
Circuit Diagram (Main PCB 8/13) [PF Motor Control]



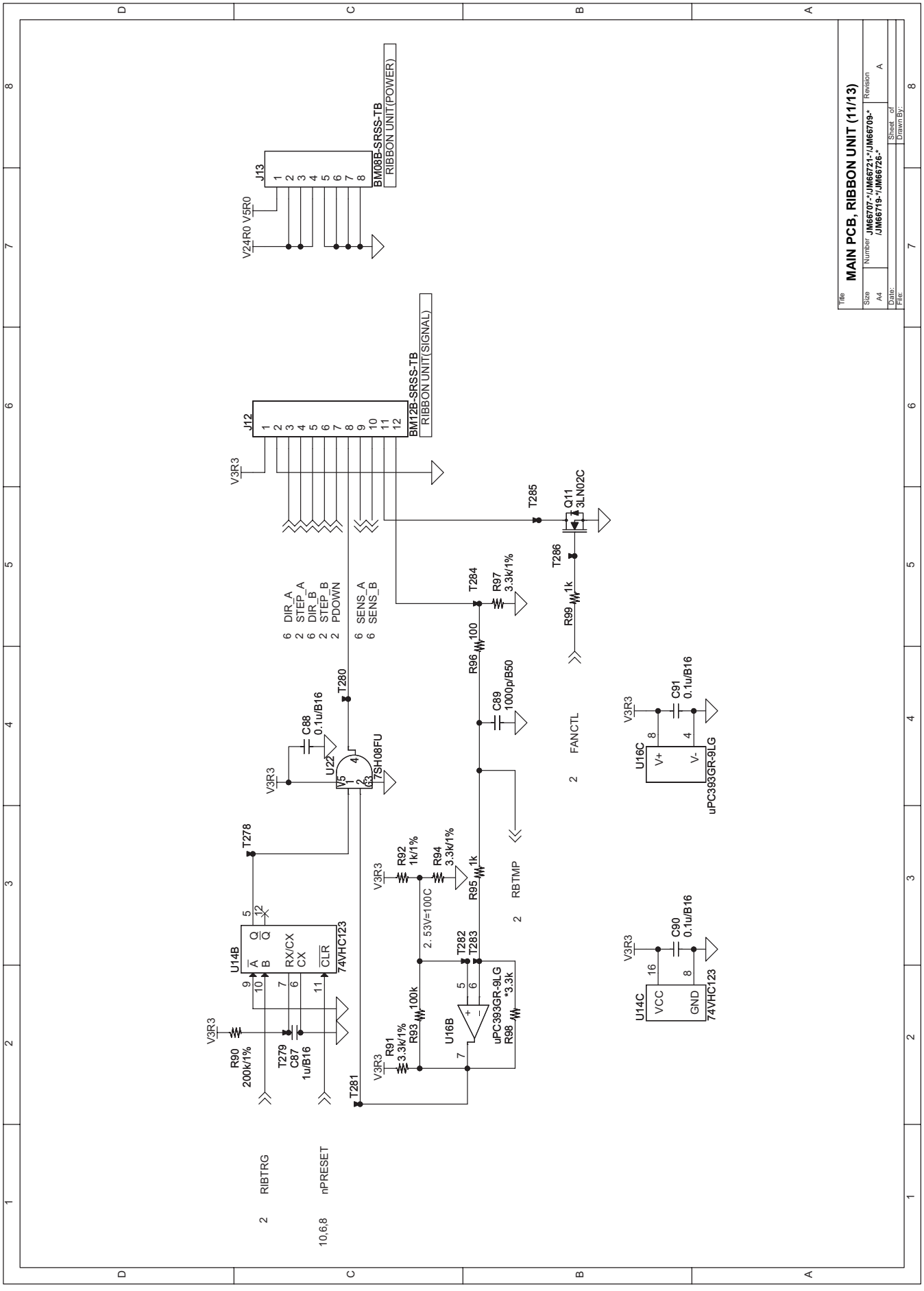
Circuit Diagram (Main PCB 9/13) [Sensor/Ope-pane]



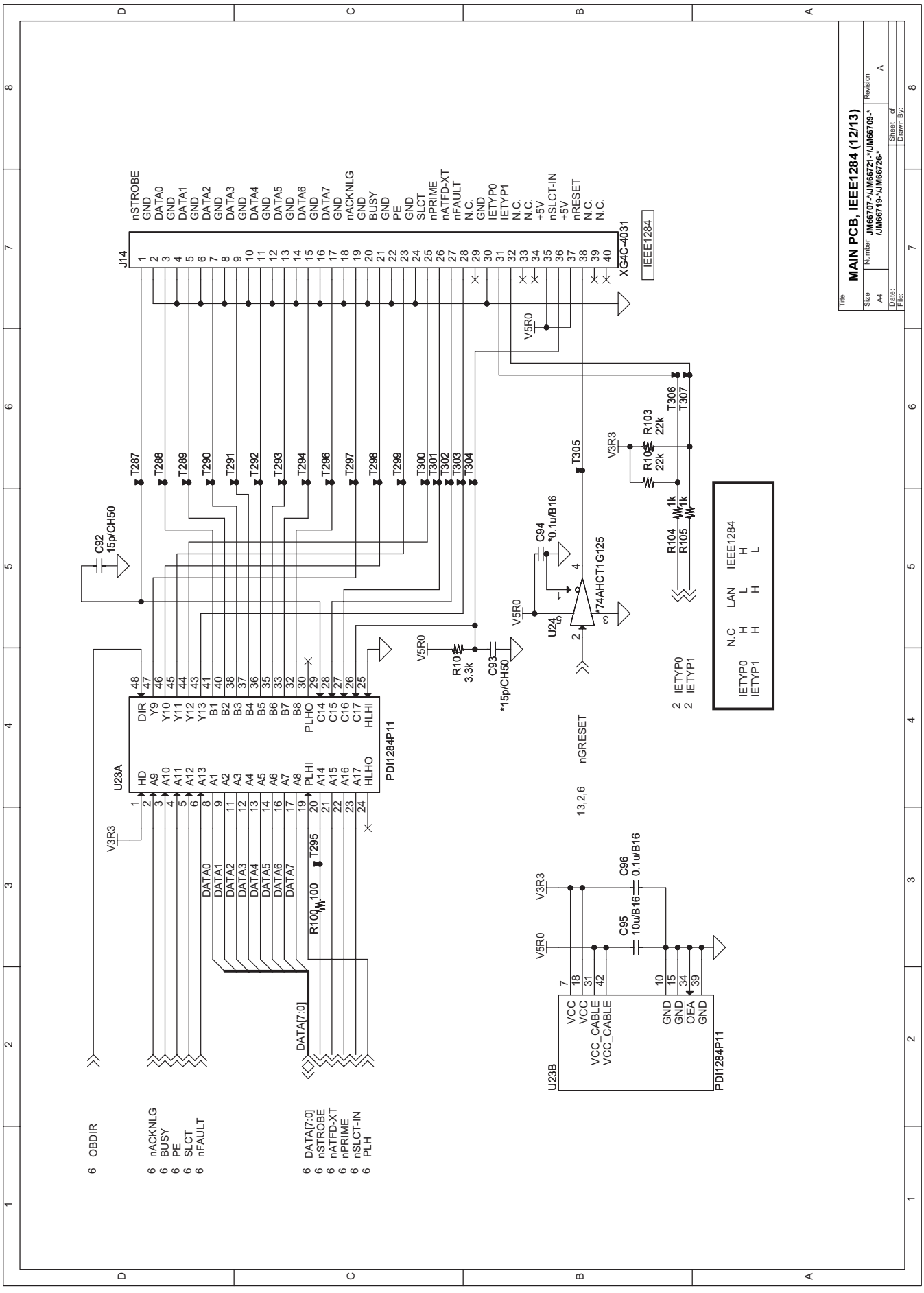
Circuit Diagram (Main PCB 10/13) [Power/Buzzer]



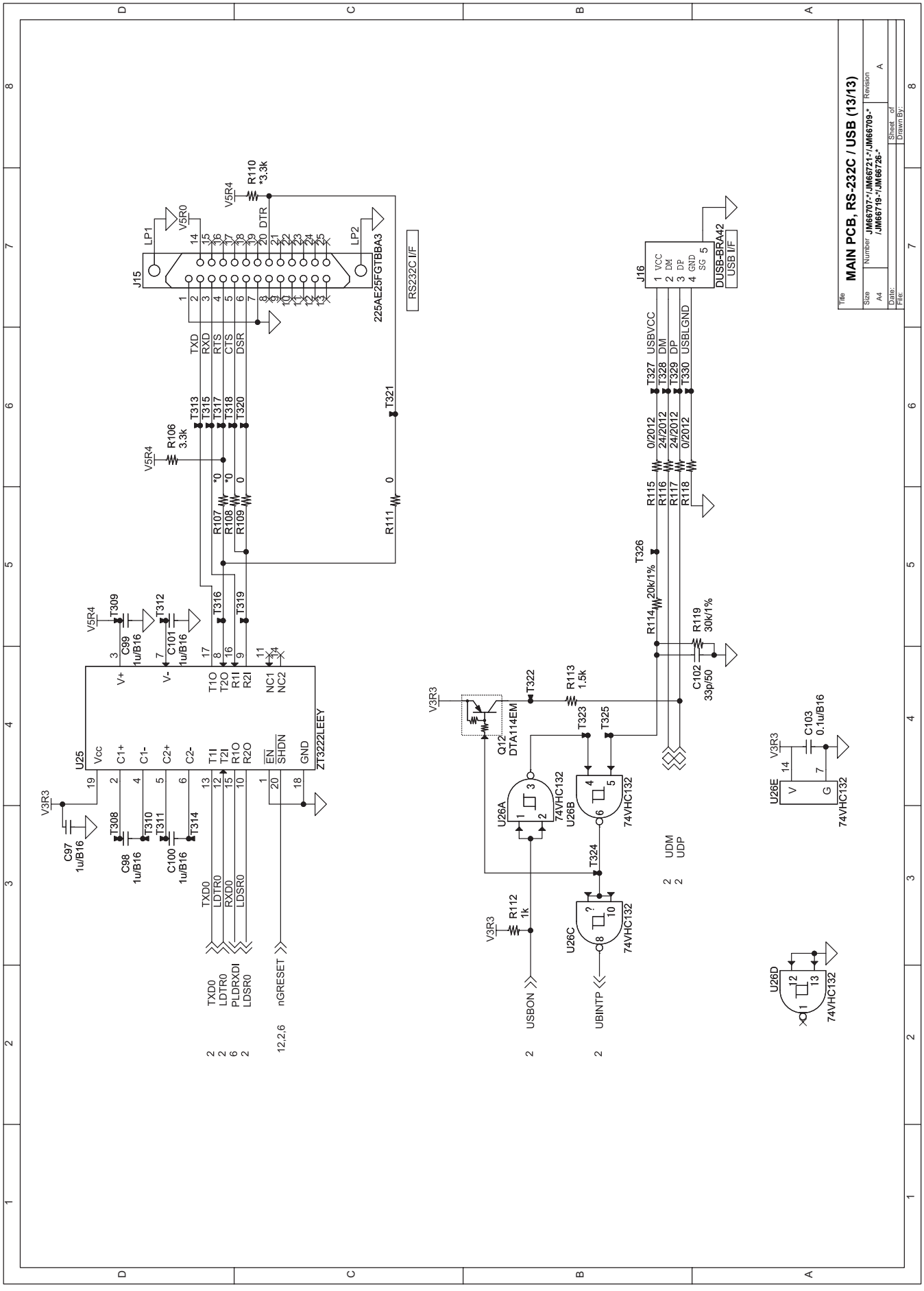
Circuit Diagram (Main PCB 11/13) [Unit, Ribbon]



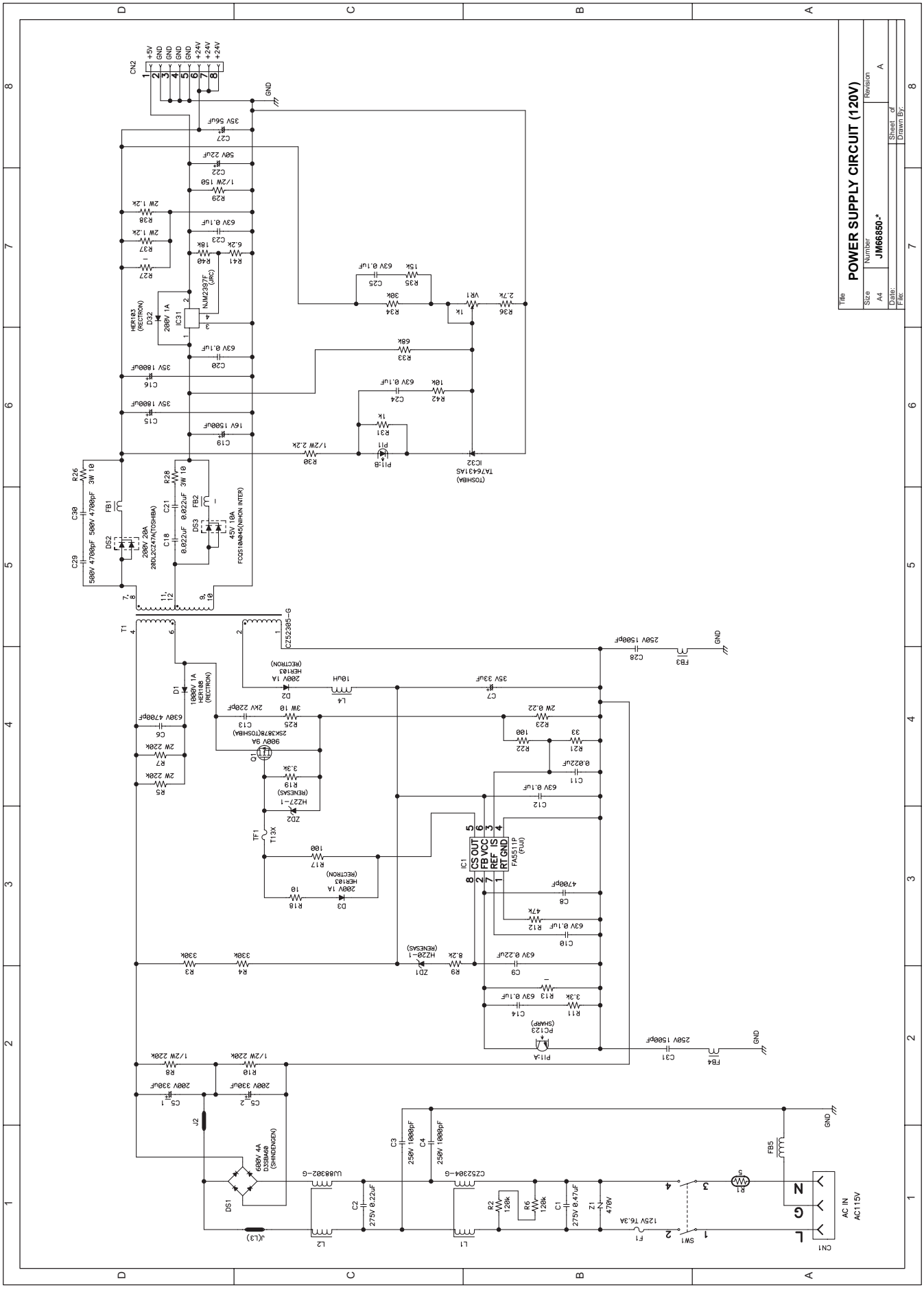
Circuit Diagram (Main PCB 12/13) [IEEE1284]



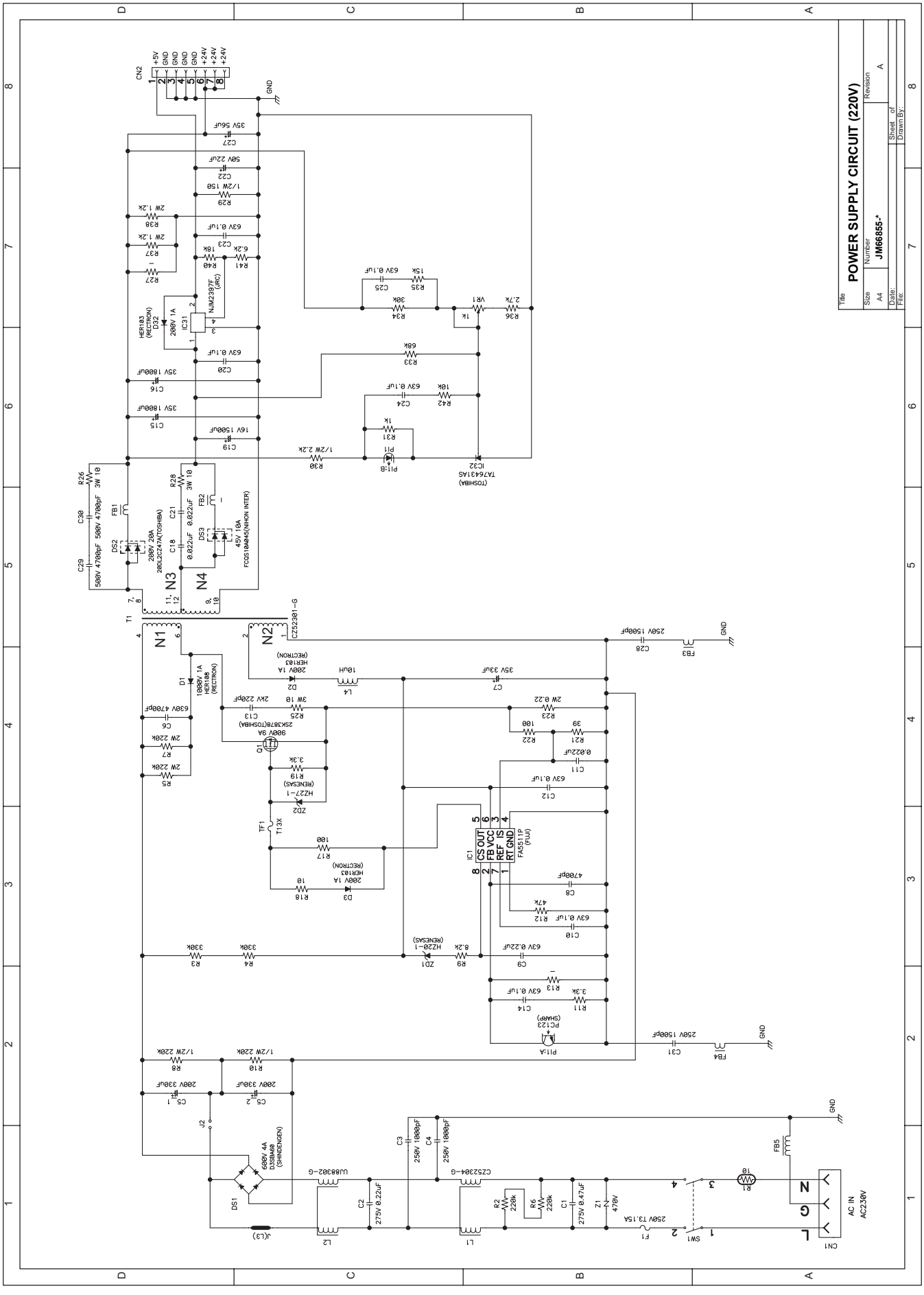
Circuit Diagram (Main PCB 13/13) [RS-232C/USB]



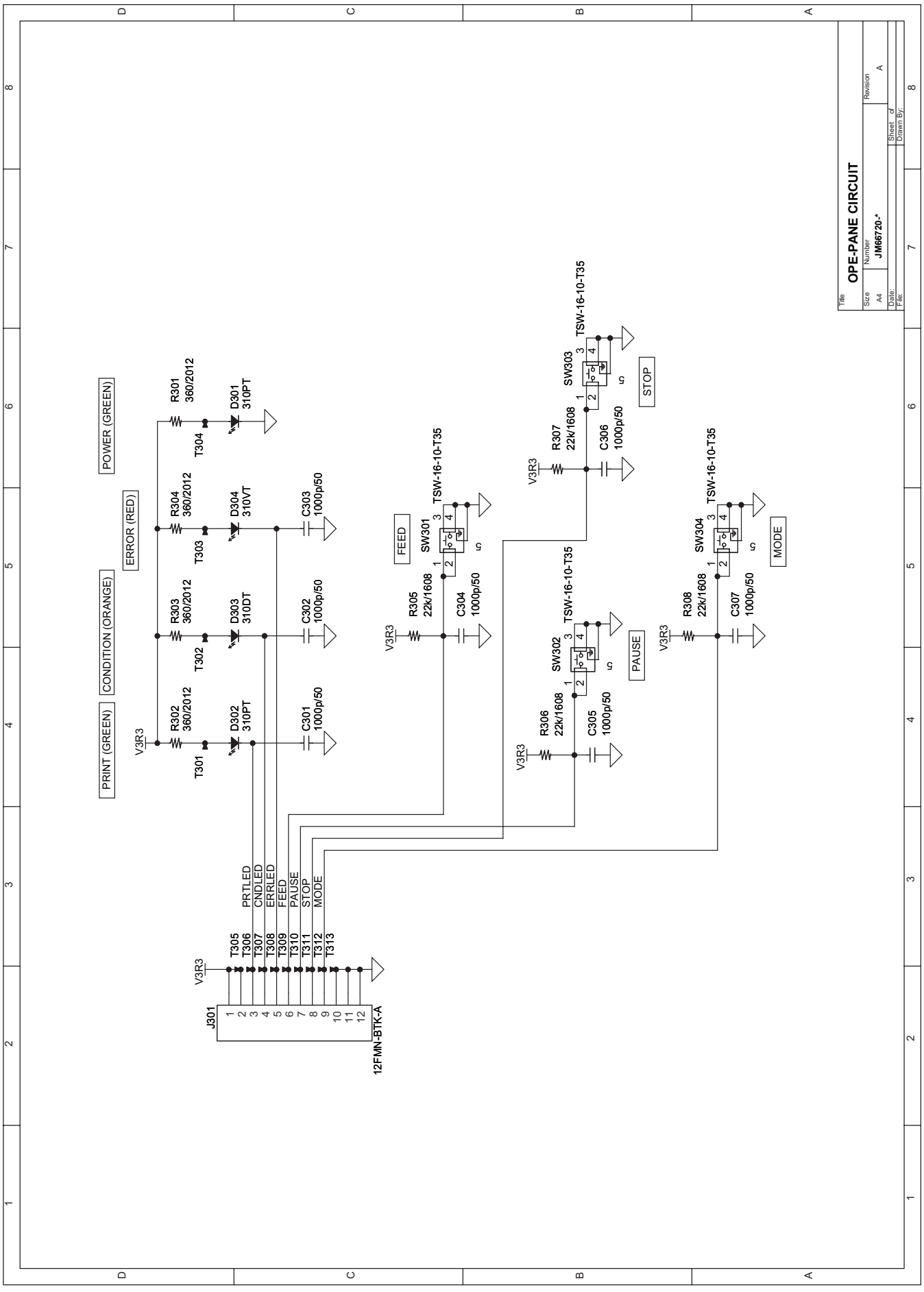
Circuit Diagram (Power Supply PCB (120V))



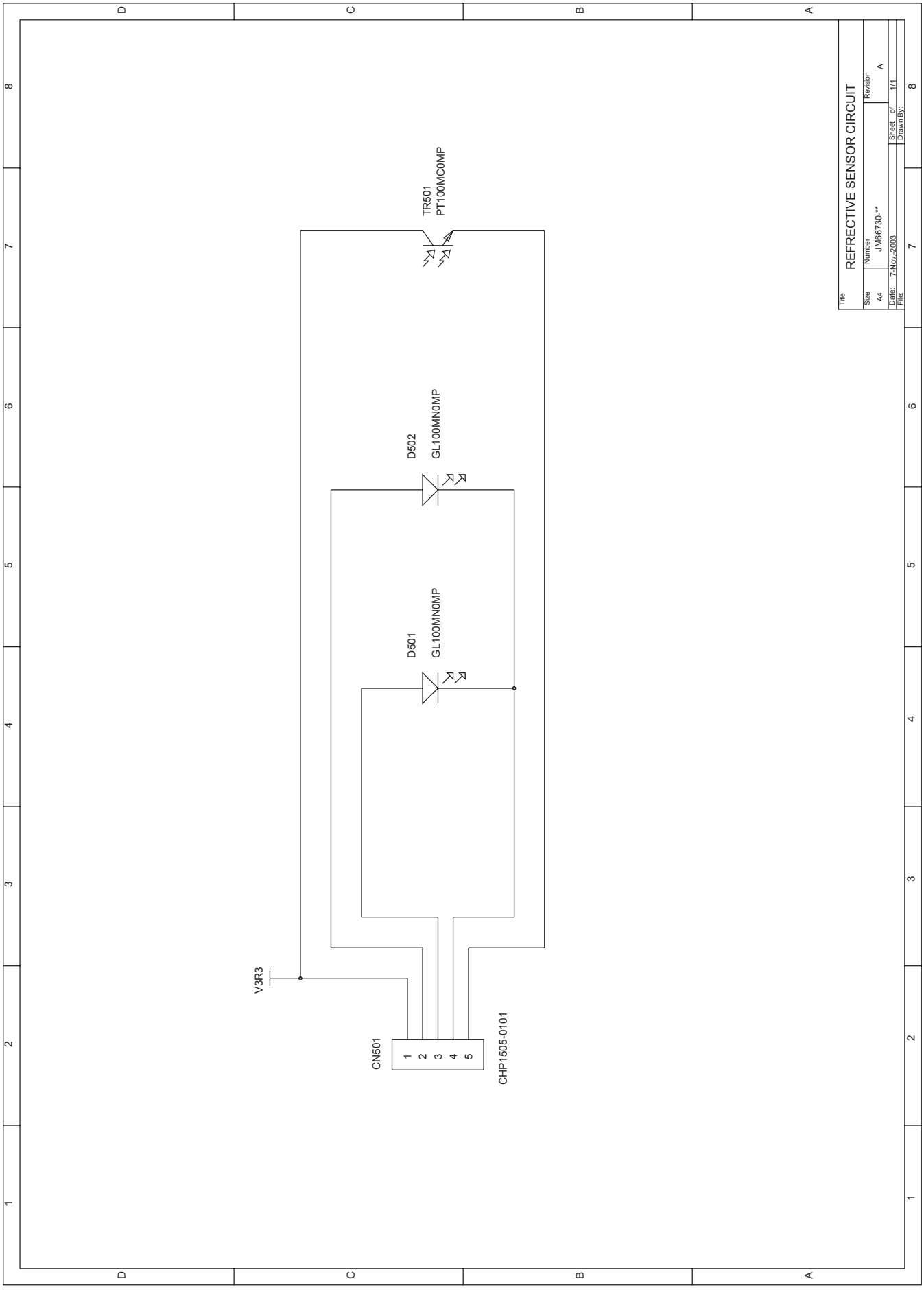
Circuit Diagram (Power Supply PCB (220V))



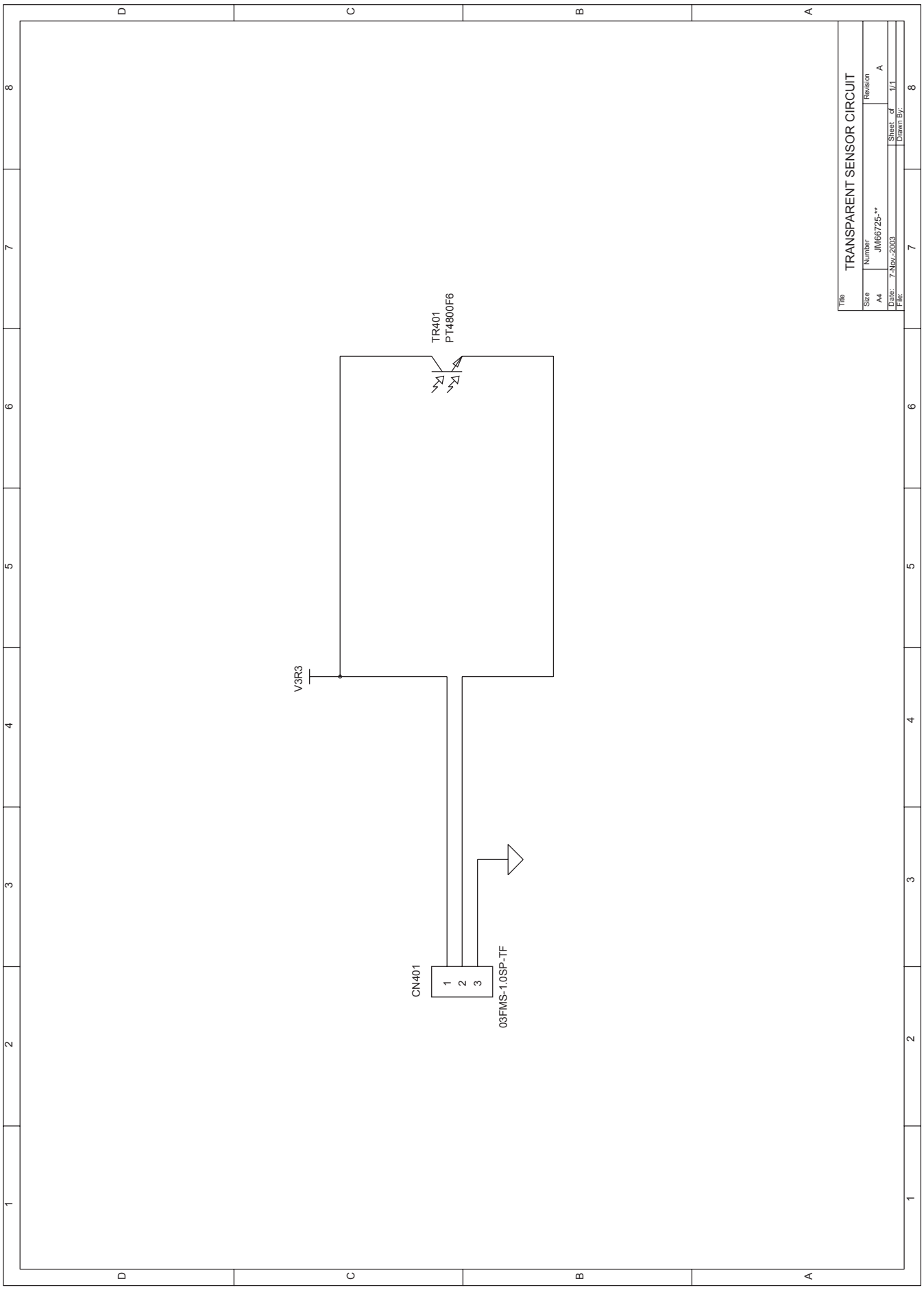
Circuit Diagram (Ope-pane PCB)



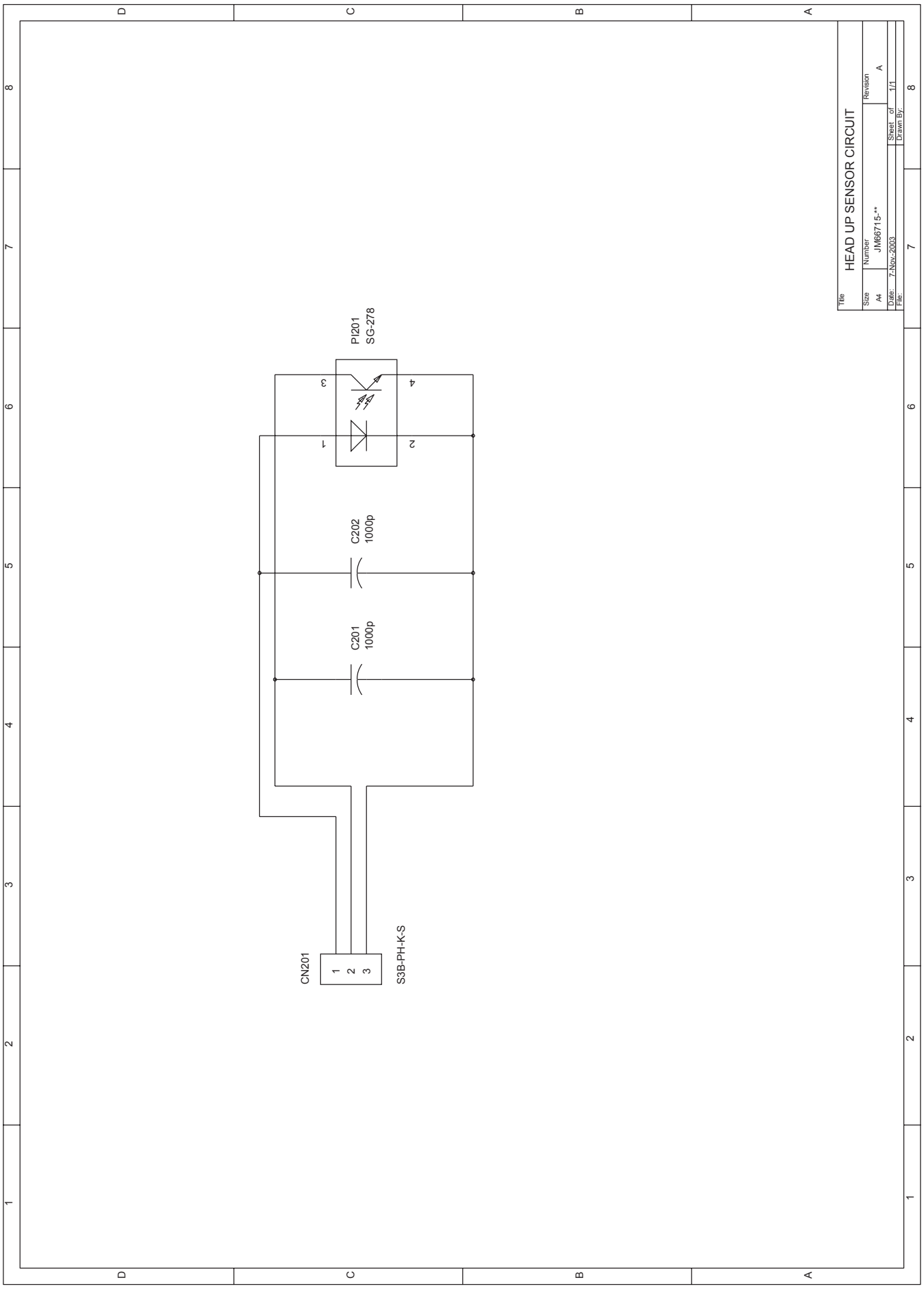
Circuit Diagram (Reflective Sensor PCB)



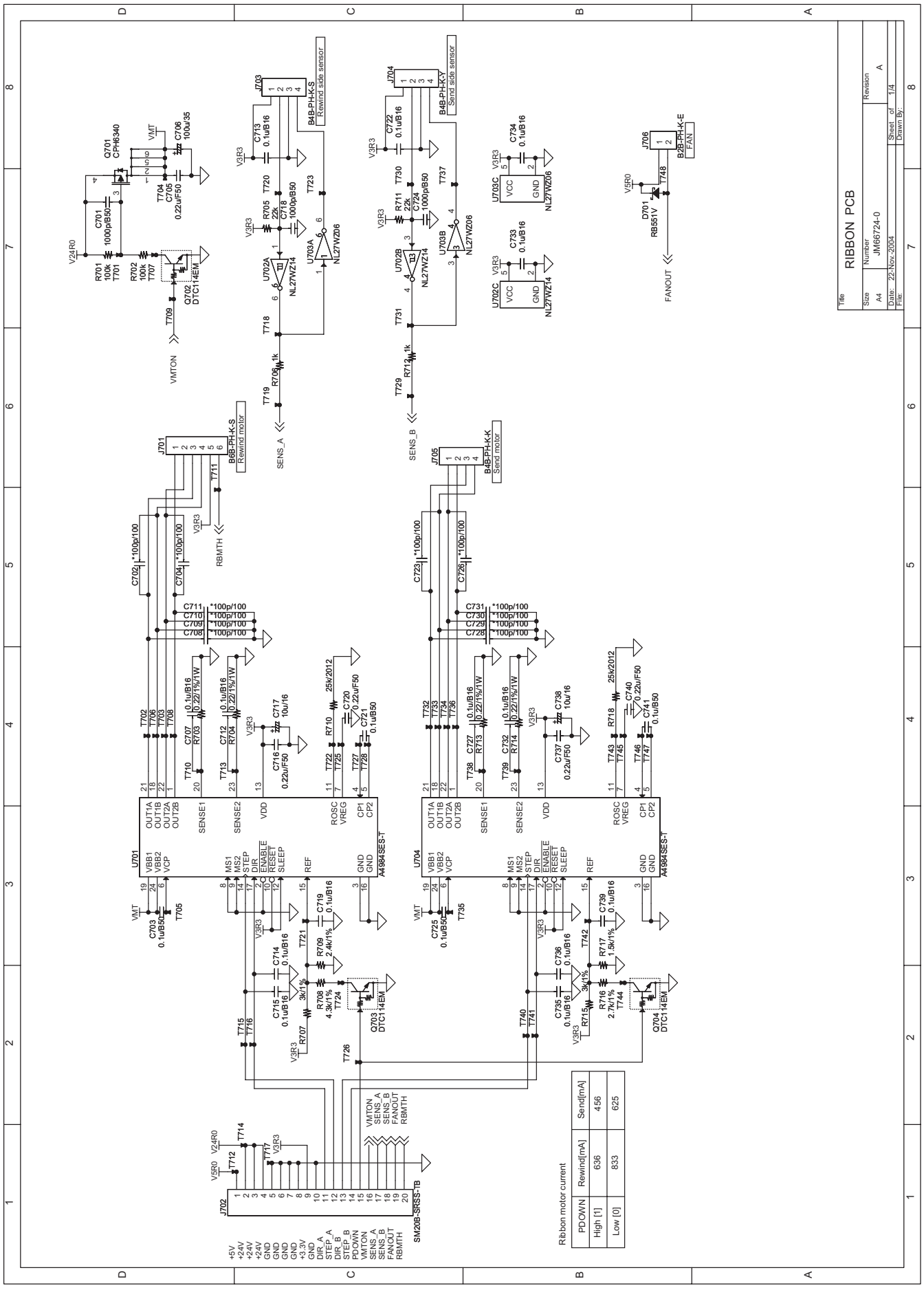
Circuit Diagram (Transparent Sensor PCB)



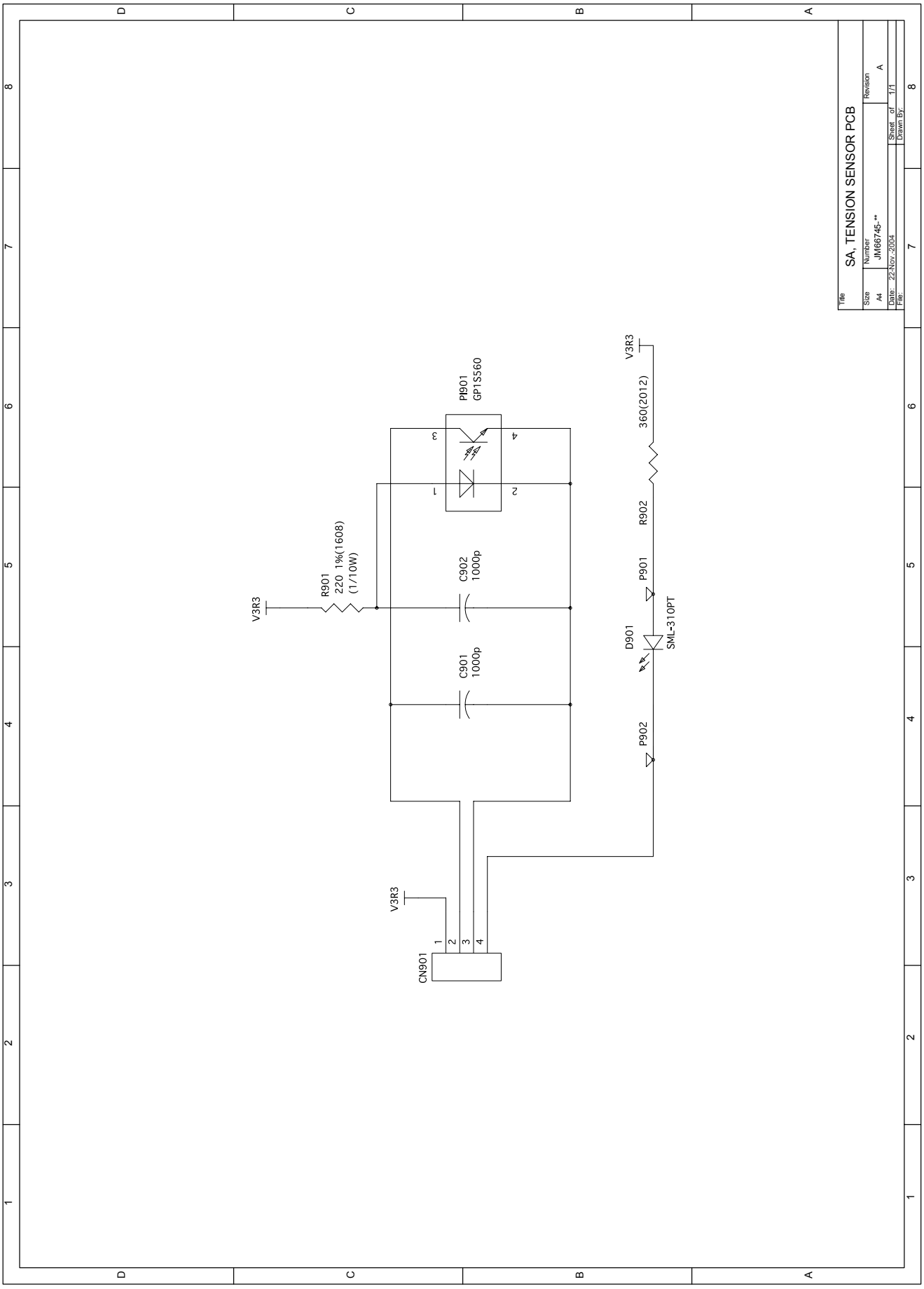
Circuit Diagram (Head Up Sensor PCB)



Circuit Diagram (Ribbon PCB)



Circuit Diagram (Tension Sensor PCB)



APPENDICES

APPENDICES

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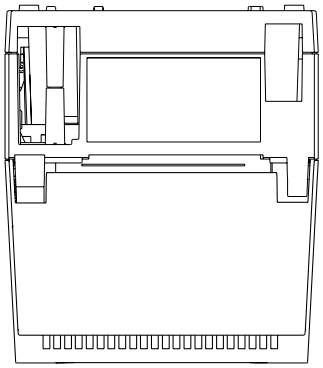
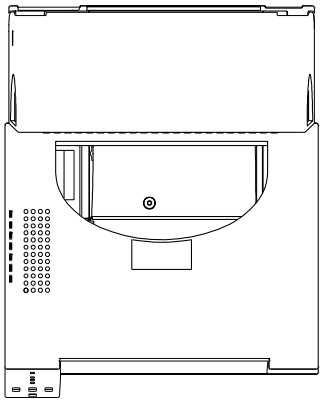
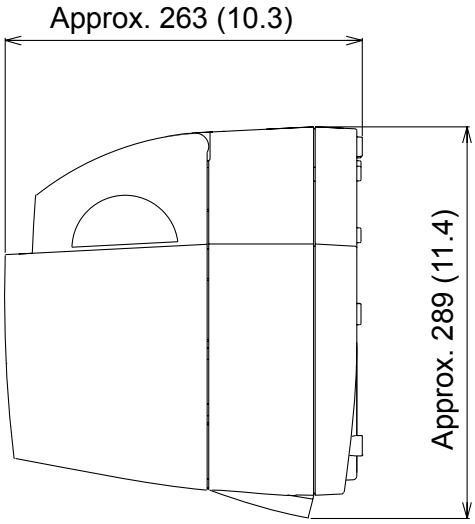
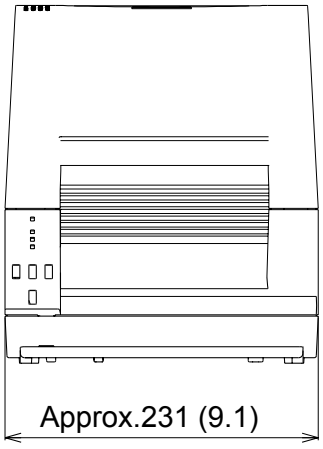
A. External Size Diagram

Unit: mm (inch)



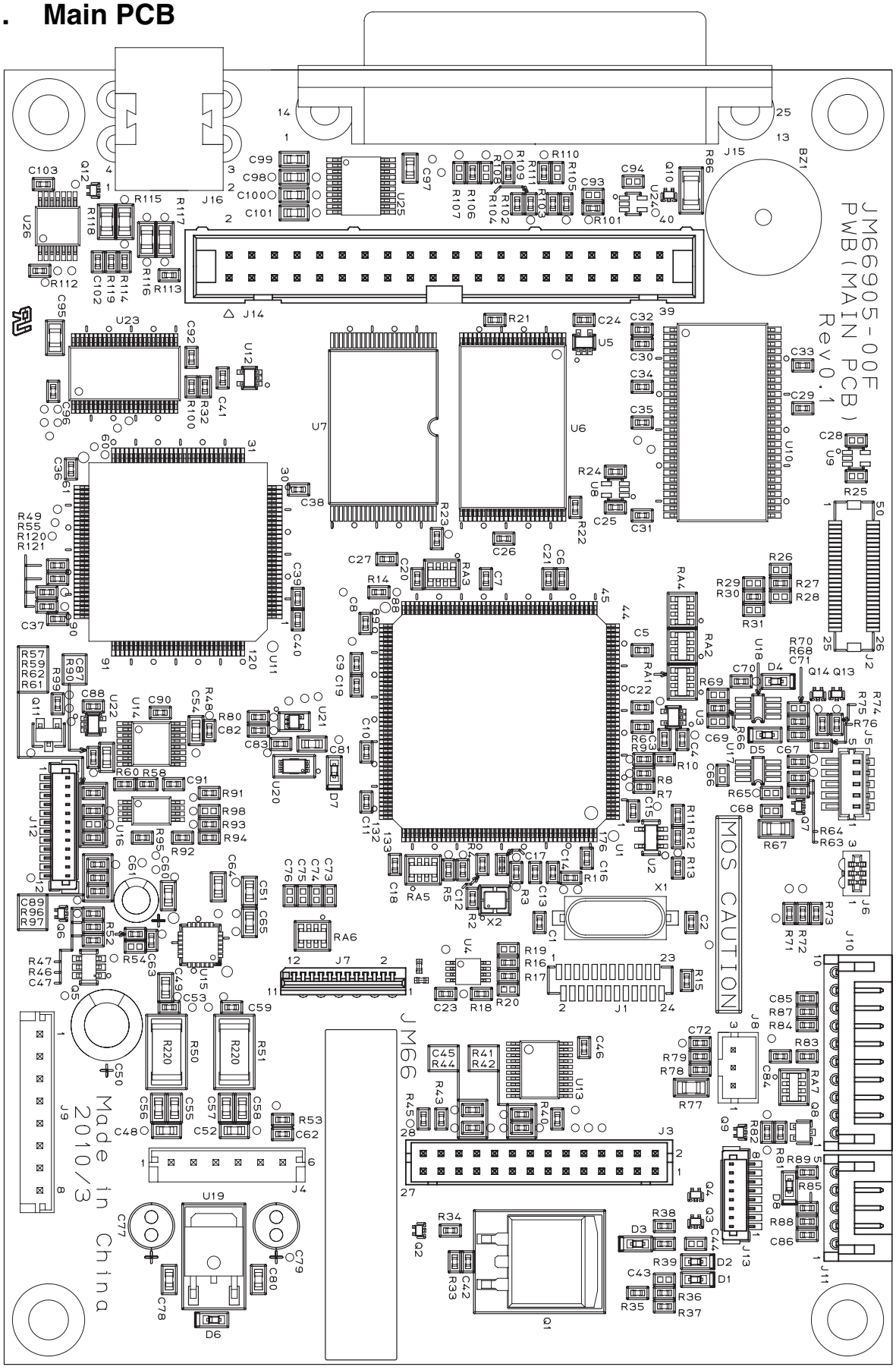




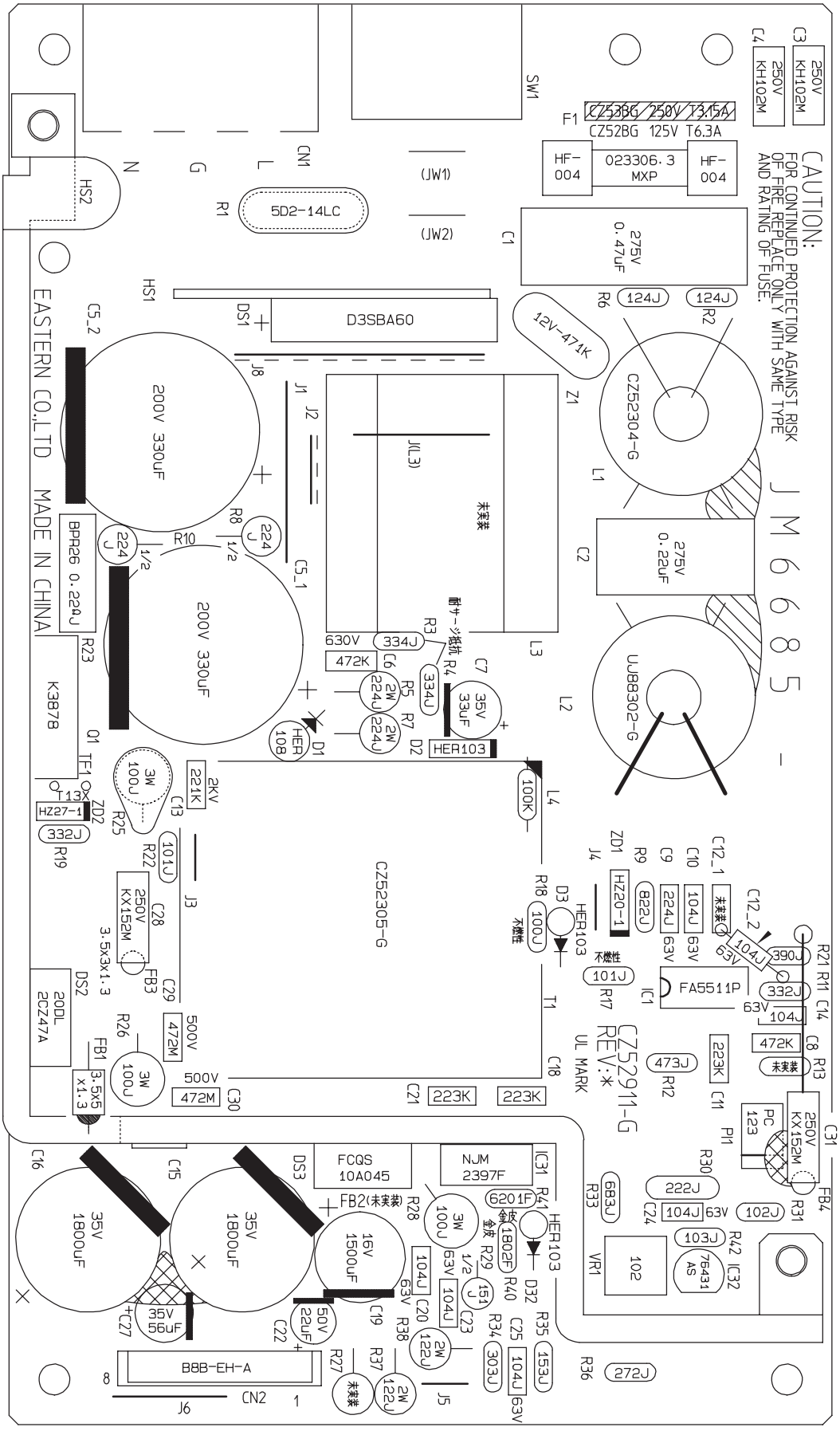


B. Mounting Diagrams

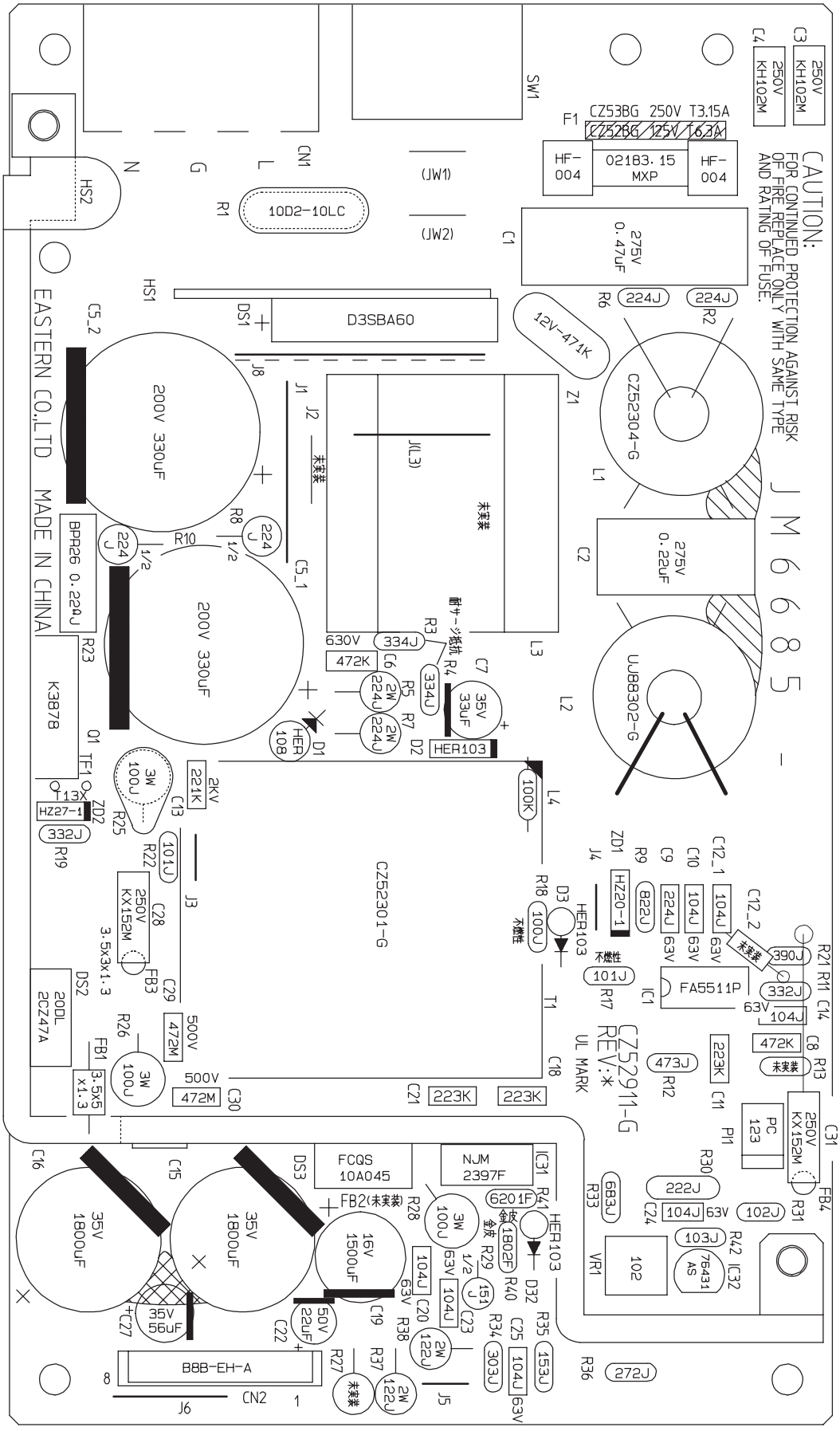
B-1. Main PCB



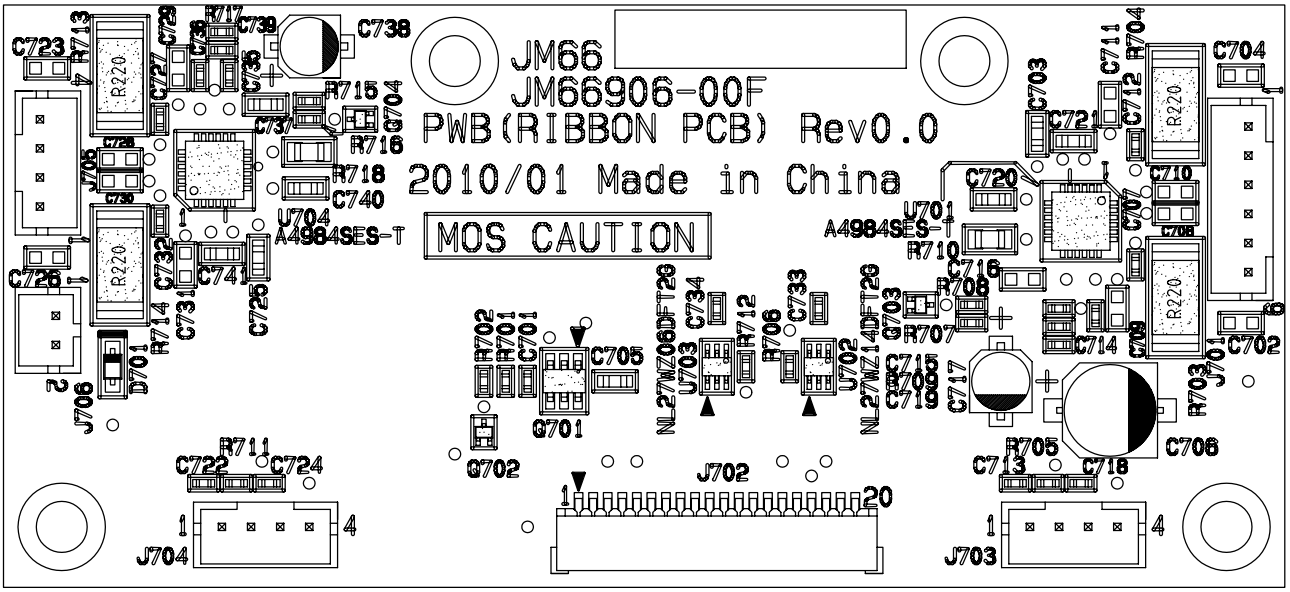
B-2. Power Supply PCB (120V)



B-3. Power Supply PCB (220V)

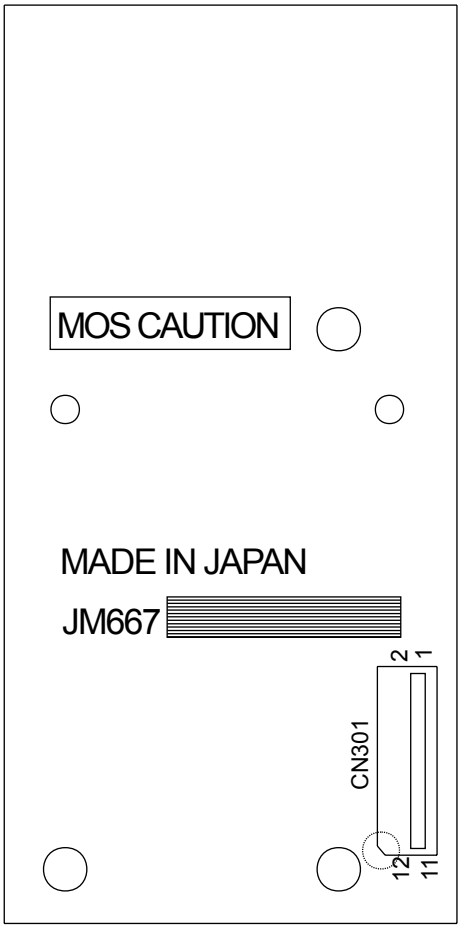


B-4. Ribbon PCB

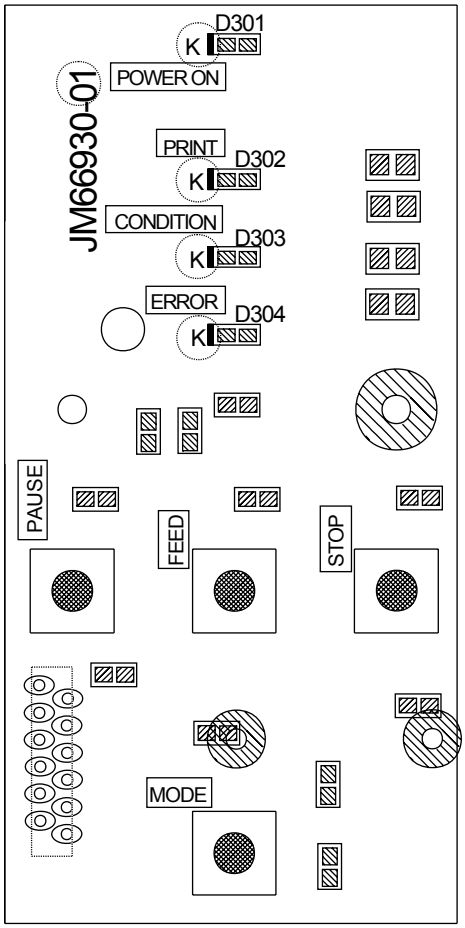


B-5. Ope-pane PCB

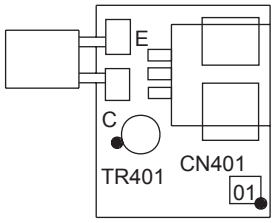
[Parts side]



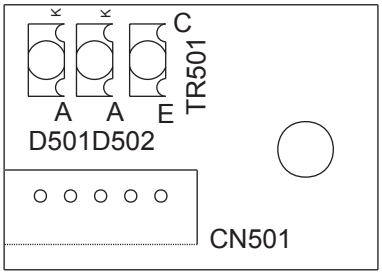
[Solder side]



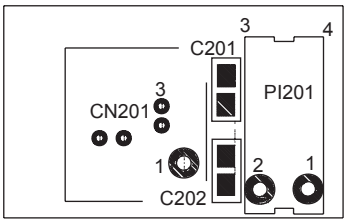
B-6. Transparent Sensor PCB



B-7. Reflective Sensor PCB

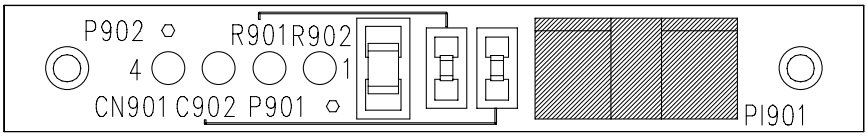


B-8. Head Up Sensor PCB

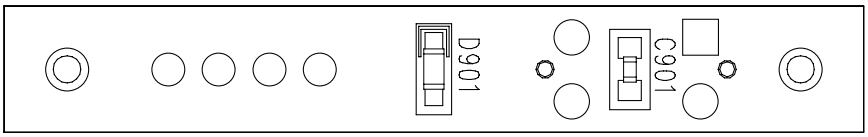


B-9. Tension Sensor PCB

[Parts side]



[Solder side]



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