

***THERMAL PRINTER***

**TSP1000 SERIES**

***USER'S MANUAL***





**Federal Communications Commission  
Radio Frequency Interference  
Statement**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

For compliance with the Federal Noise Interference Standard, this equipment requires a shielded cable.

*This statement will be applied only for the printers marketed in U.S.A.*

**Statement of  
The Canadian Department of Communications  
Radio Interference Regulations**

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

*The above statement applies only to printers marketed in Canada.*

**CE  
Manufacturer's Declaration of Conformity**

***EC Council Directive 89/336/EEC of 3 May 1989***

This product, has been designed and manufactured in accordance with the International Standards EN 50081-1/01.92 and EN 50082-1/01.92, following the provisions of the Electro Magnetic Compatibility Directive of the European Communities as of May 1989.

***EC Council Directive 73/23/EEC and 93/68/EEC of 22 July 1993***

This product, has been designed and manufactured in accordance with the International Standards EN 60950, following the provisions of the Low Voltage Directive of the European Communities as of July 1993.

*The above statement applies only to printers marketed in EU.*

***Trademark acknowledgments***

**TSP1000:** Star Micronics Co., Ltd.

**ESC/POS:** Seiko Epson Corporation

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- The above notwithstanding, STAR can assume no responsibility for any errors in this manual.

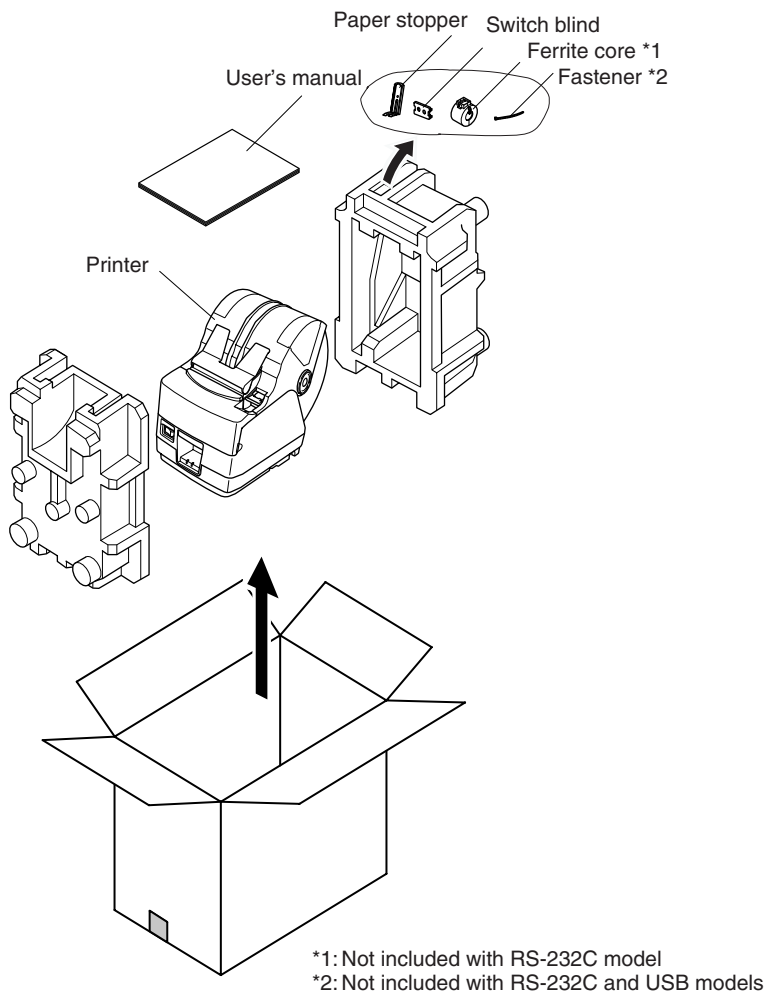
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# 1. Unpacking and Installation

## 1-1. Unpacking

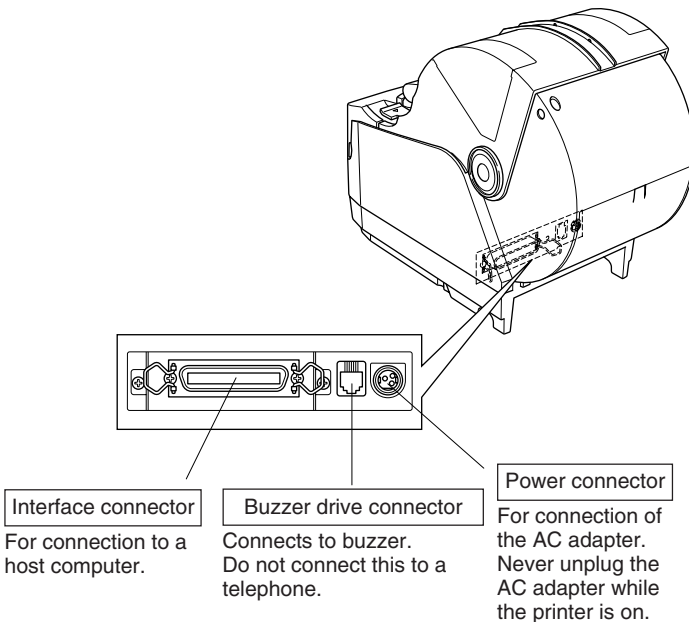
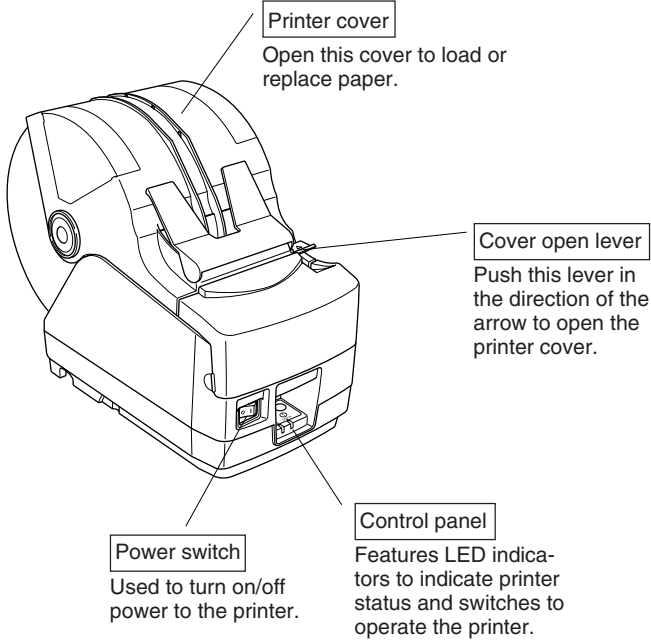
After unpacking the unit, check that all the necessary accessories are included in the package.



**Fig. 1-1 Unpacking**

If anything is missing, contact the dealer where you bought the printer and ask them to supply the missing part. Note that it is a good idea to keep the original box and all the packing materials just in case you need to pack the printer up again and send it somewhere at a later date.

## 2. Parts Identification and Nomenclature



## Choosing a place for the printer

Before actually unpacking the printer, you should take a few minutes to think about where you plan to use it. Remember the following points when doing this.

- ✓ Choose a firm, level surface where the printer will not be exposed to vibration.
- ✓ The power outlet you plan to connect to for power should be nearby and unobstructed.
- ✓ Make sure that the printer is close enough to your host computer for you to connect the two.
- ✓ Make sure that the printer is not exposed to direct sunlight.
- ✓ Make sure that the printer is well away from heaters and other sources of extreme heat.
- ✓ Make sure that the surrounding area is clean, dry, and free of dust.
- ✓ Make sure that the printer is connected to a reliable power outlet. It should not be on the same electric circuit as copiers, refrigerators, or other appliances that cause power spikes.
- ✓ Make sure that the room where you are using the printer is not too humid.

### **WARNING**

- ✓ Shut down your equipment immediately if it produces smoke, a strange odor, or unusual noise. Immediately unplug the equipment and contact your dealer for advice.
- ✓ Never attempt to repair this product yourself. Improper repair work can be dangerous.
- ✓ Never disassemble or modify this product. Tampering with this product may result in injury, fire, or electric shock.

## 3. Consumable Parts and AC Adapter

When consumable parts have run out, use those specified in the table below. Make sure that the AC adapter specified in the table is used.

Use of consumable parts or AC adapter which are not specified in the table may result in damage to the printer, fire or electric shock.

### (1) Roll paper specification

Thermal paper

Thickness: 80~105  $\mu\text{m}$

Width: 82.5 $\pm$ 0.5 mm

Outer roll diameter:  $\phi$ 180 mm or less

Take up paper roll width: 83 $^{+0.5}$  mm

Core outer/inner diameter

**Core outer**

$\phi$ 40 $\pm$ 1 mm

**Core inner**

$\phi$ 25.4 $\pm$ 1 mm

Printed surface: Outer edge of roll

Tail end handling: Do not use paste or glue to secure the roll paper or its core.

Do not fold the tail end of the paper.

### (2) Recommended paper

Mitsubishi Paper Mills Limited

T8037 (ticket), 85  $\mu\text{m}$  (thickness)

TF8067 (ticket), 84  $\mu\text{m}$  (thickness)

TF8075 (ticket), 84  $\mu\text{m}$  (thickness)

KANZAN

KLS46 (ticket)

KPO460 (ticket)

Kanzaki Specialty Papers Inc. (KSP)

Lotto482 (ticket), 84  $\mu\text{m}$  (thickness)

Depending on the type and thickness of the paper, it may be necessary to change the settings for printing darkness. To change the darkness settings, use the printing darkness settings command <ESC><RS> 'd' n or the memory switch settings. Refer to the separate Specification Manual for details.

### (3) AC adapter (option)

Model name: PS60L-24 A

Input: 100 to 240 V AC, 50/60 Hz

Output: DC24 $\pm$ 5%, 2.0 A (5.0 A Load 10 sec. Max.)



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***Important!***

*Access the following URL for the information of the recommended paper.  
<http://www.star-m.jp/eng/dl/dl02.htm>*

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## 4. Connecting Cables and AC Adapter

### 4-1. Interface Cable

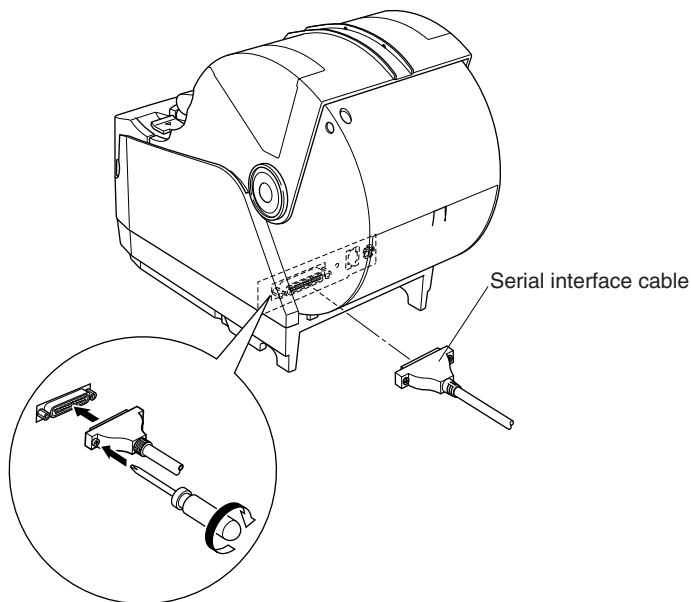
Note that the interface cable is not provided. Please use a cable that meets specifications.

#### ***Important!***

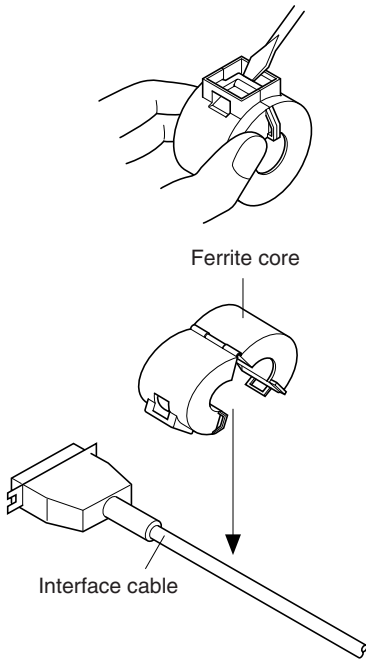
*Before connecting/disconnecting the interface cable, make sure that power to the printer and all the devices connected to the printer is turned off. Also make sure the power cable plug is disconnected from the AC outlet.*

#### 4-1-1. Serial Interface (RS-232C) Cable

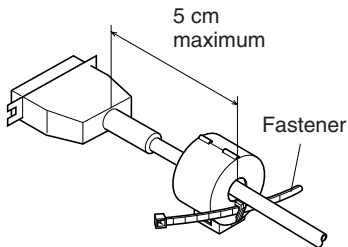
- (1) Make sure the printer is turn off.
- (2) Connect the interface cable to the connector on the rear panel of the printer.
- (3) Tighten the connector screws.



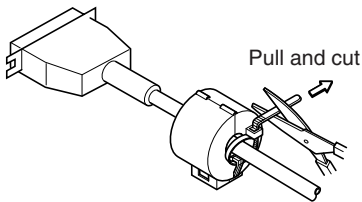
## 4-1-2. Parallel Interface Cable



- (1) Make sure the printer is turn off.
- (2) For only the parallel interface model, affix the ferrite core onto the cable as shown in the illustration below.

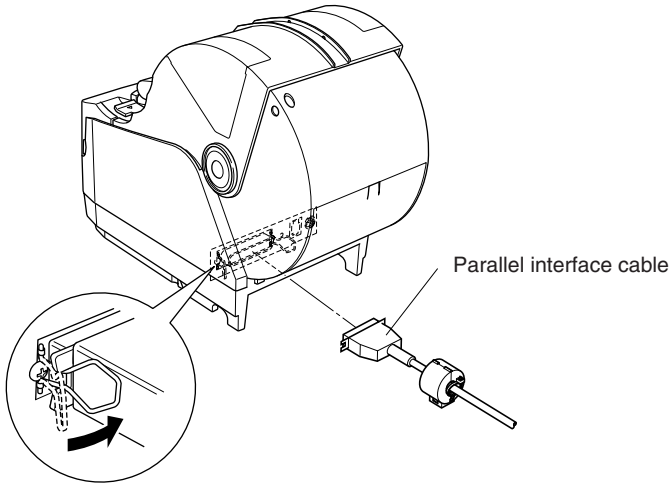


- (3) Pass the fastener through the ferrite core.



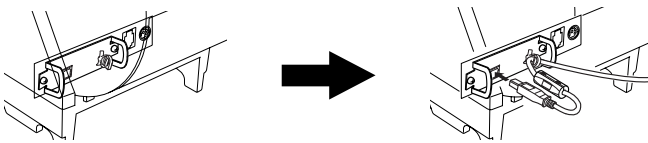
- (4) Loop the fastener around the cable and lock it. Use scissors to cut off any excess.

- (5) Connect the interface cable to the connector on the rear panel of the printer.
- (6) Fasten the connector clasps.



### 4-1-3. Connecting USB Cable

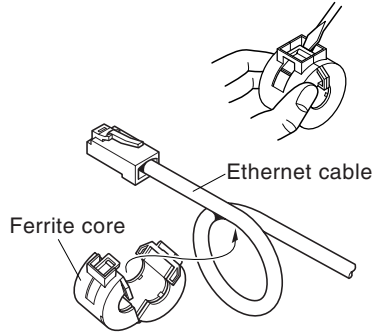
- (1) Make sure the printer is turn off.
- (2) Affix the ferrite core onto the USB cable as shown in the illustration below and make sure to pass the cable through the cable support as shown in the illustration.



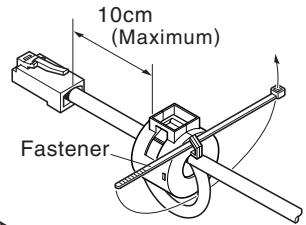
## 4-1-4. Connecting Ethernet Cable

(1) Make sure the printer is turned off.

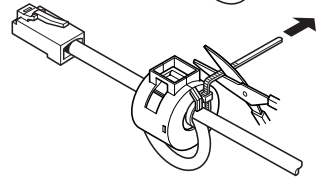
(2) Affix the ferrite core onto the ethernet cable as shown in the illustration below.



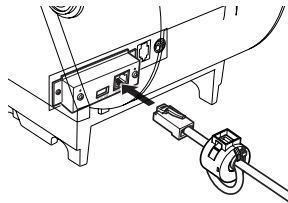
(3) Pass the fastener through the ferrite core.



(4) Loop the fastener around the cable and lock it. Use scissors to cut off any excess.



(5) Connect the ethernet cable to the connector on the interface board. Then, connect the other end of the cable to your computer.



## 4-2. Connecting to a Buzzer Drive

You can connect a buzzer drive to the printer using a modular plug. The following describes how to make the actual connection. See “Modular plug” on page 43 for details about the type of modular plug that is required. Note that this printer does not come with a modular plug or wire, so it is up to you to obtain one that suits your needs.

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**Important!**

*Make sure that the printer is turned off and unplugged from the AC outlet and that the computer is turned off before making connections.*

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Connect the buzzer drive cable to the connector on the rear panel of the printer.

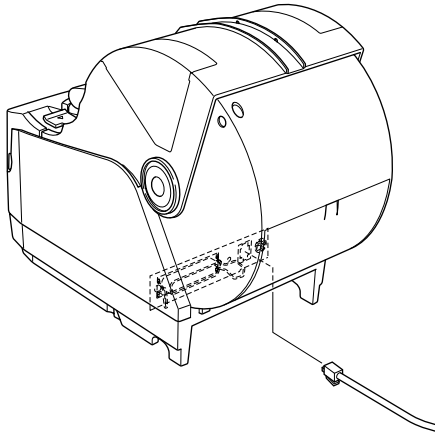
---

**Important!**

*Do not connect a telephone line into the buzzer drive connector. Failure to observe this may result in damage to the printer.*

*Also, for safety, do not connect wiring to the buzzer drive connector if there is a chance it may carry excess voltage.*

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### 4-3. Connecting the Optional AC Adapter

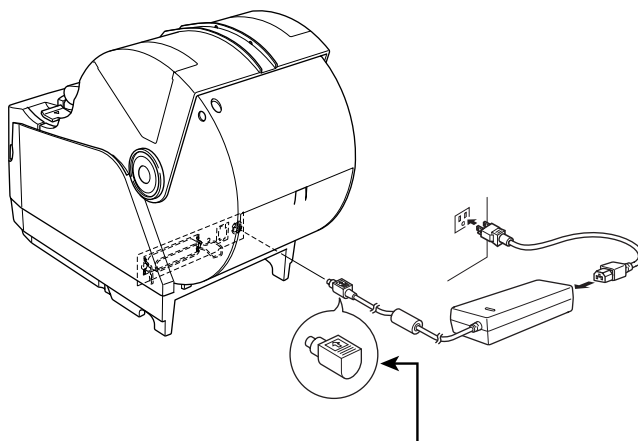
**Note:** Before connecting/disconnecting the AC adapter, make sure that power to the printer and all the devices connected to the printer is turned off. Also make sure the power cable plug is disconnected from the AC outlet.

(1) Connect the AC adapter to the power cable.

**Note:** Use only the standard AC adapter and power cable.

(2) Connect AC adapter to the connector on the printer.

(3) Insert the power cable plug into an AC outlet.



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#### ***Important!***

*When disconnecting the cable, take hold of the cable connector to pull it out. Releasing the lock makes it easy to disconnect the connector.*

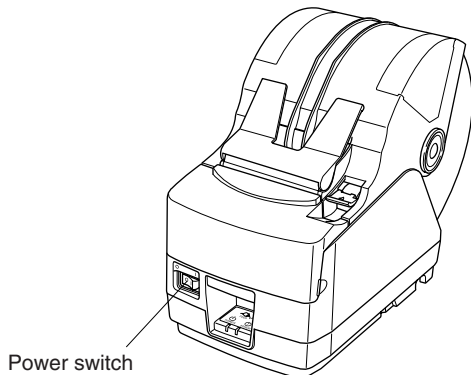
*Pulling the cable excessively could cause damage to the connector.*

---

## 4-4. Turning Power On

Make sure that the AC adapter has been connected as described in 4-3.

- (1) Set the power switch located on the front of the printer to on.  
The POWER lamp on the control panel will light up.



---

### ***Important!***

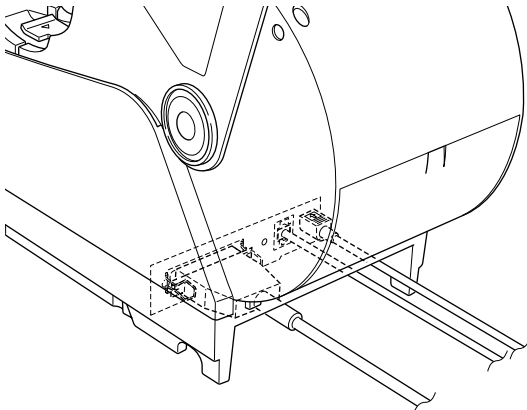
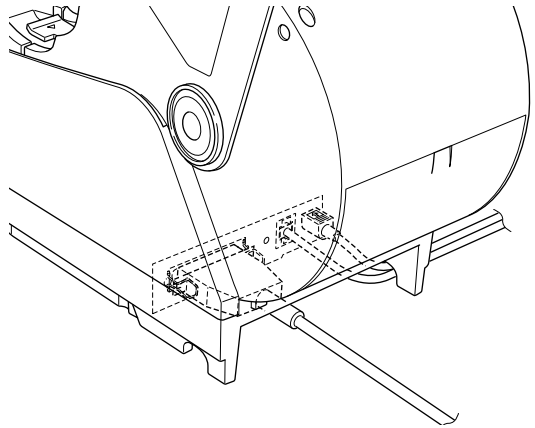
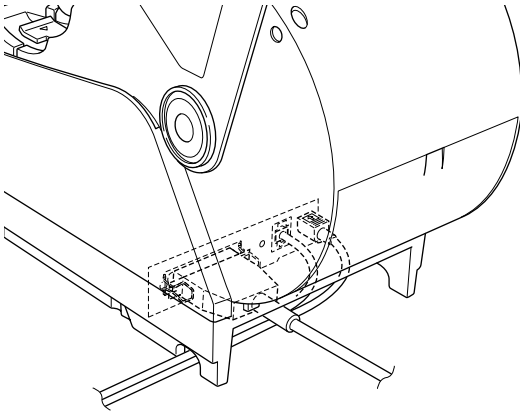
*We recommend that you unplug the printer from the power outlet whenever you do not plan to use it for long periods. Because of this, you should locate the printer so that the power outlet it is plugged into is nearby and easy to access.*

---



## 4-5. Installing the Cable

Install the cable as shown in the diagram below.

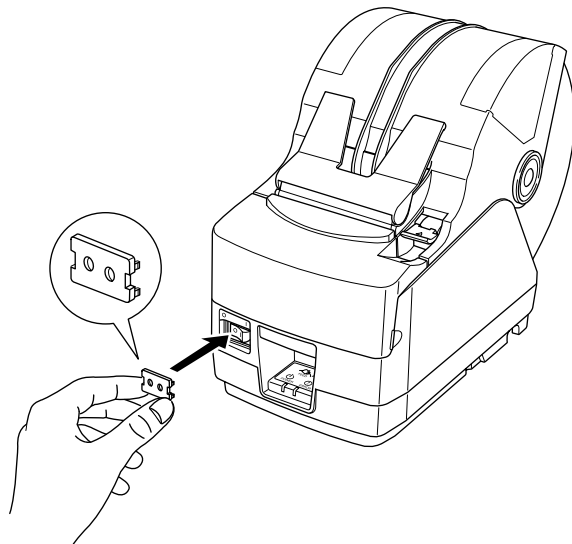


## 4-6. Switch Blind Installation

It is not necessary to install the switch blind. Only install it if it is necessary for you. By installing the switch blind, the following become possible.

- Preventing the power switch from being operated by mistake.
- Ensuring that other people can not easily operate the power switch.

Install the switch blind as shown in the diagram below.



The power switch can be turned ON (I) and OFF (O) by inserting a narrow instrument (ball pen etc) in the holes in the switch blind.

---

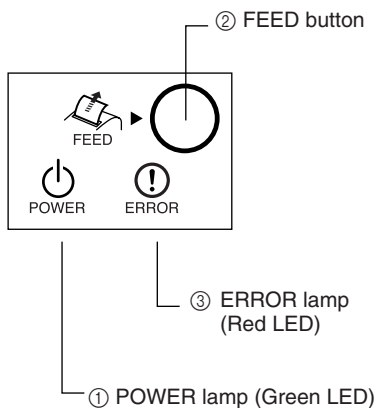
### ***Important!***

*We recommend that you unplug the printer from the power outlet whenever you do not plan to use it for long periods. Because of this, you should locate the printer so that the power outlet it is plugged into is nearby and easy to access.*

---

# 5. Control Panel and Other Functions

## 5-1. Control Panel



- ① POWER lamp (Green LED)  
Lights when the power is ON
- ② FEED button  
Press the FEED button to feed roll paper.
- ③ ERROR lamp (Red LED)  
Indicates various errors in combination with POWER lamp

## 5-2. Errors

### (1) Automatically recoverable error

Error Description	POWER lamp	ERROR lamp	Recovery Conditions
Head high temperature detection	Flashes at 0.5 second intervals	Off	Automatically recovered after the print head has cooled.
Cover open error	On	On	Automatically recovered by closing the printer cover.

### (2) Recoverable error

Error Description	POWER lamp	ERROR lamp	Recovery Conditions
Paper cut error	Off	Flashes at 0.125 second intervals	Recovered If the cutter returns to the home position after turning the power OFF and ON.

### Note:

- 1) If the cutter doesn't return to the home position, or doesn't perform the initial movement, it cannot be recovered.
- 2) If the paper is jammed, turn the power off, clear the jammed paper, then turn the power ON.

### (3) Non recoverable error

Error Description	POWER lamp	ERROR lamp	Recovery Conditions
RAM error	Off	Flashes at 1.0 second intervals	This is not a recoverable error. Consult dealer for repairs.
EERROM error	Off	Flashes at 0.75 second intervals	This is not a recoverable error. Consult dealer for repairs.
Flash ROM error	Off	Flashes at 0.5 second intervals	This is not a recoverable error. Consult dealer for repairs.
Thermistor error	Off	Flashes at 1.5 second intervals	This is not a recoverable error. Consult dealer for repairs.
Power supply error	Off	Flashes at 2 second intervals	This is not a recoverable error. Consult dealer for repairs.

#### **Note**

- 1) If a non recoverable error occurs, turn the power OFF immediately.
- 2) When Power supply error occurs, there is a possibility that the power supply unit has a trouble.

For other non recoverable errors, please consult the dealer for repairs.

### (4) Paper detection error

Error Description	POWER lamp	ERROR lamp	Recovery Conditions
Paper out error	On	Flashes at 0.5 second intervals	Automatically recovered by loading a new paper roll, then closing the printer cover.
Paper near end	On	Flashes at 2 second intervals	Indicators show that the paper end is approaching, but the printer continues to print.

## 5-3. Self Printing

### (1) Test Printing

Turn the power on while holding the FEED button depressed.

Test printing will be performed according to the Ver. No., DIP switch settings and memory switch settings.

```
*** TSP1000 Ver1.00
```

```
Interface : Parallel
```

```
DIP Switch 1
```

```
Sw 12345678
```

```
On ******
```

```
Off
```

### (2) Hexadecimal Dump Mode

Open the printer cover, then turn the power on while holding the FEED button.

When the cover is closed, “\*\*\* HEX DUMP PRINTING \*\*\*” is printed, and the printer enters the Hexadecimal Dump Mode.

Each of the signals sent from the computer to the printer will be printed out in hexadecimal code.

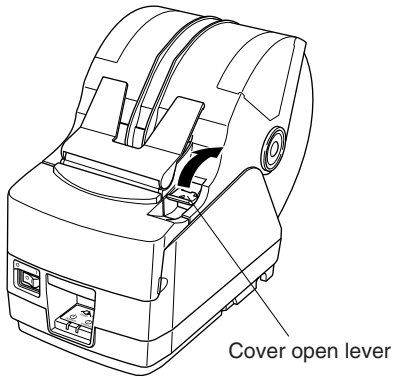
This function allows you to check if a control code sent to the printer by the program being used is correct or not. The final line is not printed if its data is less than one full line. However, if the FEED button is pushed, the final line is printed. To turn off the mode, it is necessary to turn off the printer completely.

```
*** HEX DUMP PRINTING ***
```

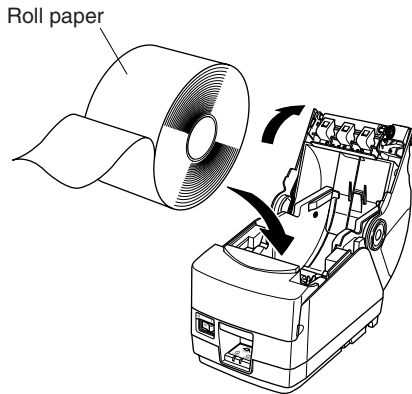
```
20 21 22 23 24 25 26 27      !"#$$%&'
28 29 2A 2B 2C 2D 2E 2F      ()*+,-./
30 31 32 33 34 35 36 37      01234567
38 39 3A 3B 3C 3D 3E 3F      89:;<=>?
40 41 42 43 44 45 46 47      @ABCDEFGH
48 49 4A 4B 4C 4D 4E 4F      IJKLMNOP
50 51 52 53 54 55 56 57      PQRSTUVWXYZ
```

## 6. Loading the Roll Paper

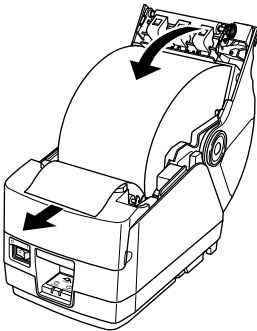
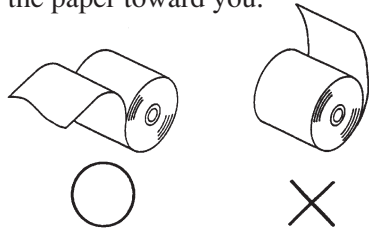
Be sure to use roll paper that matches the printer's specification.

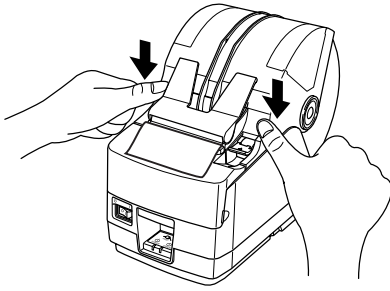


- (1) Push the Cover open lever, and open the printer cover.



- (2) While observing the direction of the roll, set the paper roll into the hollow, and pull on the leading edge of the paper toward you.



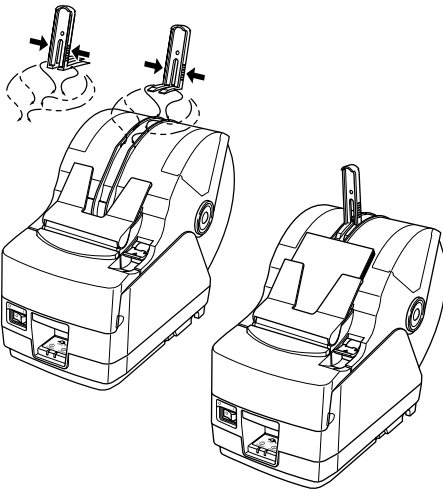


- (3) Pull on the edge of the paper to remove any slack and then push down both sides of the printer cover to close.

**Note:** Make sure that the printer cover is securely closed.

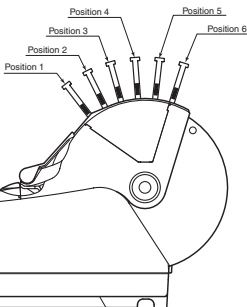
- (4) If the printer cover is closed after turning on the power, the cutter operates automatically and the front end of the paper is cut.

**Note:** If the cutter does not operate after the printer cover is closed, open the cover and close it again securely.



- (5) If necessary, attach the paper stopper to the paper cover as shown below. The output tray can hold up to 30 sheets (thickness: 80–105  $\mu\text{m}$ , length: 50–150 mm).

**Note:** When attaching the paper stopper to the paper cover, position the stopper according to the length of the cut paper. (Refer to the following table.)



	Paper length (mm)
Position 1	50 – 100
Position 2	100 – 120
Position 3	120 – 140
Position 4	140 – 160
Position 5	160 – 180
Position 6	180 – 200

---

**Important!**

1. *Do not touch the cutter blade.*
    - *There is a cutter inside the paper outlet slot. Not only should you not put your hand in the paper outlet slot while printing is in progress, never put your hand into the outlet even when printing is not in progress.*
    - *The printer cover can be opened when replacing the paper. However, since the cutter blade is on the inside of the printer cover, be careful not to place your face or hands too close to the cutter blade.*
  2. *Do not operate the cover open lever while pressing on the printer cover with your hand.*
  3. *Do not pull out paper while the printer cover is closed.*
  4. *The heating element and the driver IC of the thermal head are easily damaged. Do not touch them with metal objects, sandpaper, etc.*
  5. *During and immediately after printing, the area around the thermal head is very hot. Do not touch it, as you could be burned.*
  6. *Printing quality may suffer if the thermal head heating element becomes soiled by being touched with your hands. Do not touch the thermal head heating element.*
  7. *There is a risk of damage to the driver IC of the thermal head from static electricity. Never directly touch the IC.*
  8. *The printing quality and working life of the thermal head cannot be guaranteed if any paper other than that recommended is used. In particular, paper containing [Na<sup>+</sup>, K<sup>+</sup>, Cl<sup>-</sup>] may drastically reduce the working life of the thermal head. Please exercise caution.*
  9. *Do not operate the printer if there is moisture on the front surface of the head from condensation, etc.*
-

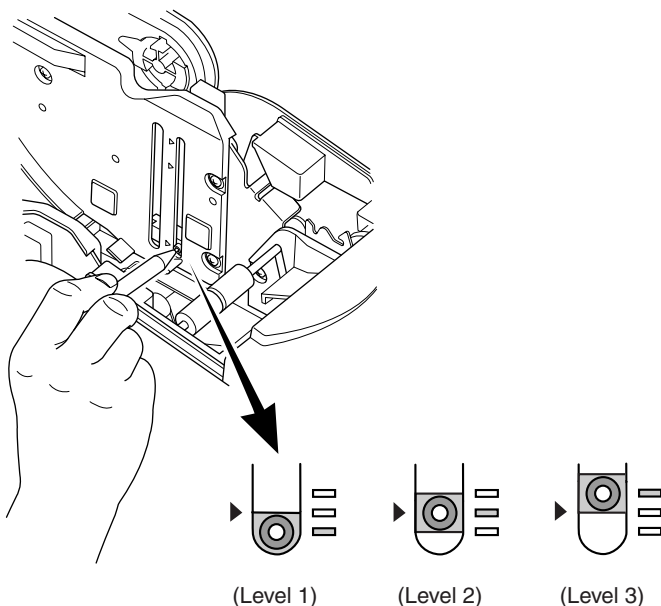


## 7. Adjusting the Near-end Sensor

Use the following procedure to adjust the near-end sensor so it is compatible with the size of roll paper you are using.

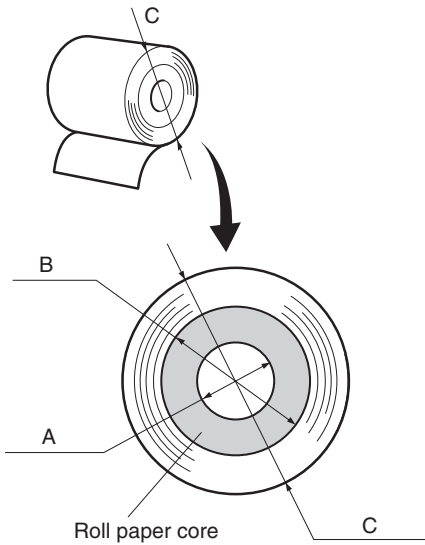
- ① Open the printer cover.
- ② Determine the diameter of the roll paper you are using and find the required setting in the table below.
- ③ Insert the tip of a ballpoint pen or similar object into the hole of the adjuster, and then push and side the adjuster to the desired setting.

When changing the setting, make sure that the position of the hole is aligned with the alignment mark indicated by the arrow.



## Adjustment value according to the paper you are using

Paper thickness ( $\mu\text{m}$ )	When using the paper roll with a core whose inside diameter (A): $\phi 25.4$ , outside diameter (B): $\phi 32$					
	Detected diameter (C) (Approx. mm)			Remained paper length (Approx. m)		
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3
85	$\phi 44$	$\phi 48$	$\phi 52$	10	14	19
105				6	9	12



### Note:

- 1) The standard model is set to level 2 prior to being shipped from the factory.
- 2) The C dimension and the remained paper length are the calculated values. There may be some variations in actual mechanism.
- 3) The remaining paper lengths shown in the table above are for reference only. Adjust the near-end sensor to suit the actual conditions of use.
- 4) If thick paper is used ( $100\mu\text{m} \leq \text{paper thickness}$ ), there will be looseness in the roll paper itself which makes it easier for detection variations to occur. Set to Level 3.

## 8. Preventing and Clearing Paper Jams

### 8-1. Preventing Paper Jams

The paper should not be touched during ejection and before it is cut. Pressing or pulling the paper during ejection may cause a paper jam, paper cutting failure or line feed failure.

### 8-2. Removing Paper Jam

If a paper jam occurs, clear it as described below.

(1) Set the power switch to off to turn off power to the printer.

(2) Push the cover open lever, and open the printer cover.

If the printer cover will not open on auto cutter models, it means that the auto cutter is not at the home position. In this case, return the auto cutter to the home position by following the instructions provided in section 8-3. Then open the printer cover after the paper jam has been removed.

(3) Remove the jammed paper.

**Note:** Take care not to damage the printer when removing the jammed paper. Since it is easy to damage the thermal head in particular, take care not to touch it.

(4) Position the roll paper straight and close the printer cover gently.

**Note:**

1) Make sure that the paper is positioned straight. If the printer cover is closed with the paper skewed, a paper jam may result.

2) Lock the printer cover by pressing down both sides. Make sure that the printer cover is securely closed.

(5) Set the power switch to on to turn on power to the printer. Make sure that the ERROR LED is not lit.

**Note:** While the ERROR LED is lit, the printer will not accept any commands such as the print command, so make sure that the printer cover is locked properly.

### 8-3. Releasing a Locked Cutter

If the auto cutter locks up or fails to cut the paper, follow the steps below.

---

#### **Caution**

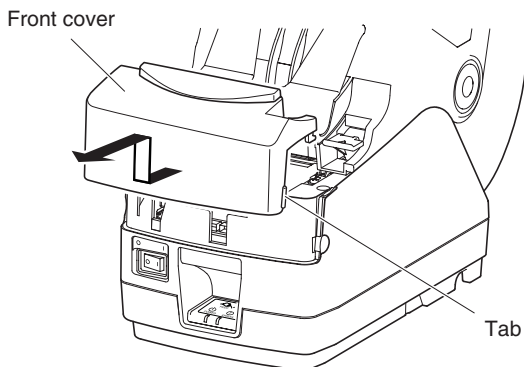
*Since working on the cutter may be dangerous, be sure to turn off the printer first.*

---

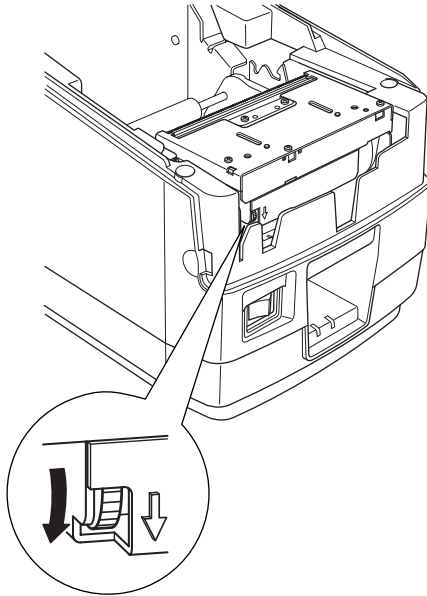
- (1) Set the power switch to OFF to turn off the printer.
- (2) Slide off the front cover to reveal the auto cutter.
- (3) Remove any jammed paper.

**Note:** Be careful not to damage the printer while removing any jammed paper.

Since the thermal print head is particularly sensitive, be sure not to touch it.



- (4) If the cutter's moving blade is protruding, rotate the knob in the direction of an arrow to return the moving blade to its home position.  
When the check window is completely white, the moving blade is at its home position.
- Note:**
- 1) Do not apply extreme pressure to the moving blade.
  - 2) If the moving blade is protruding too much, the printer cover cannot be opened. Trying to open the printer cover may damage the cutter.
- (5) Open the printer cover, remove any jammed paper, and then re-install the paper roll.
- (6) Install the front cover, and then set the power switch to ON.



## 9. Periodical Cleaning

Printed characters may become partially unclear due to accumulated paper dust and dirt. To prevent such a problem, paper dust collected in the paper holder and paper transport section and on the surface of the thermal head must be removed periodically. Such cleaning is recommended to be carried out once six month or one million lines.

### 9-1. Cleaning the Thermal Head

To remove blackish dust collected on the surface of the thermal head, wipe it with Isopropyl alcohol (IPA).

**Note:** The thermal head is easy to damage, so clean it gently with a soft cloth. Take sufficient care not to scratch it when cleaning it.

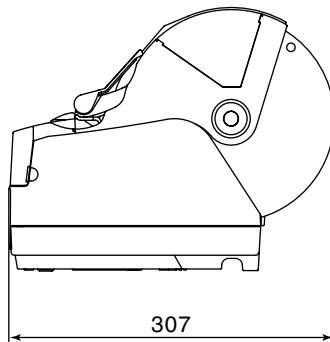
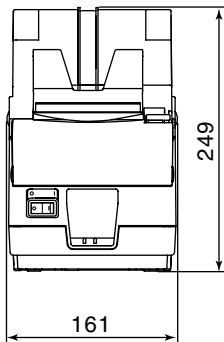
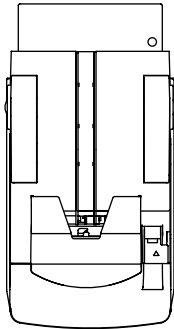
### 9-2. Cleaning the Paper Holder

Use a soft cloth to remove paper dust from the paper holder and paper transport section.

# Appendix A: Specifications

## A-1. General Specifications

- |                             |   |
|-----------------------------|---|
| (1) Printing method         | Direct line thermal printing  |
| (2) Print speed             | Max. 1440 dots/sec. (180 mm/sec.)   |
| (3) Dot density             | 203 dpi: 8 dots/mm (0.125 mm/dot)   |
| (4) Printing width          | Max. 80 mm  |
| (5) Number of print columns | 53 (12 × 24 dots)   |
| (6) Roll paper              | Refer to chapter 3 for details on the recommended roll paper.<br>Paper width: 82.5 ± 0.5 mm<br>Roll diameter: ø180 mm or less |
| (7) Overall dimension       | 161 (W) × 307 (D) × 249 (H) mm  |
| (8) Weight                  | Approx. 3.0 kg  |
| (9) Noise Approx.           | 57 dB   |



Unit : mm

## A-2. Auto Cutter Specifications

- (1) Cutting frequency      Max. 20 cuts per minute  
(2) Thickness of paper      0.080 ~ 0.105 mm

## A-3. Interface

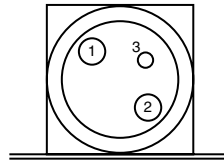
RS232C serial interface/Two-way parallel interface (IEEE 1284)/USB interface/  
Ethernet interface

## A-4. Electrical Characteristics

- (1) Input Voltage      DC 24V±10%  
(2) Current Consumption    Operating: Approx. 2.0 A (at ASCII printing)  
                                  Peak:      Approx. 10 A (at print duty 100%,  
                                  for 10 seconds or less)  
                                  Stand-by: Approx. 0.1 A

### (3) Power Connector

Pin No.	Function
1	Drive power
2	Signal GND
3	N.C.
Shell	Frame ground



<Viewed from Connector Surface>

---

### **Important!**

- When using a printer power supply other than the optional AC adaptor (PS60L-24A), be sure that the following cautions are observed.
  - Use a power supply of DC 24 V ±10% and more than 2.0 A (5.0 A Load 10 sec. Min) with SELV output approved by IEC60950.
  - Be careful about installing the printer in an area where there is noise. Take the appropriate measures to protect against electrostatic AC line noise, etc.
- 

## A-5. Option

- (1) USB Interface Board Unit (IFBD-HU04)  
(2) Parallel Interface Board Unit (IFBD-HC04)  
(3) 25 Pin RS-232C Interface Board Unit (IFBD-HD04)  
(4) 9 Pin RS-232C Interface Board Unit (IFBD-HN04)  
(5) Ethernet Interface Board Unit (IFBD-HE04)



# A-6. Environmental Requirements

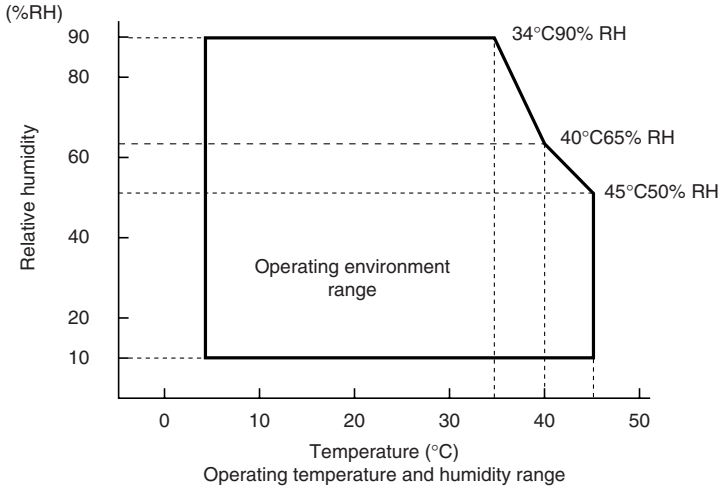
## (1) Operating

Temperature

5°C to 45°C

Humidity

10% to 90% RH (without condensation)



## (2) Transport/storage (except for paper)

Temperature

-20°C to 60°C

Humidity

10% to 90% RH (without condensation)

# A-7. Reliability

## (1) LIFE

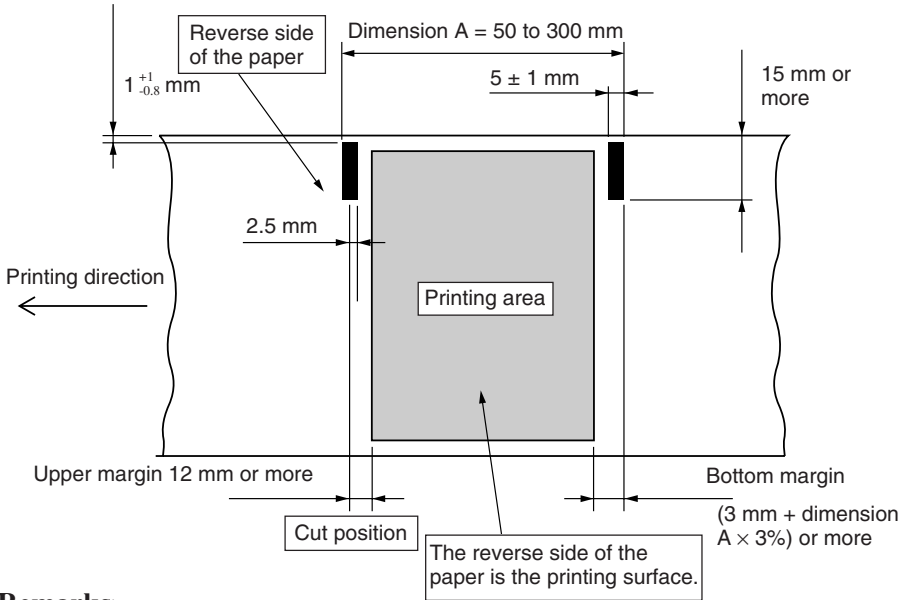
20 million lines (based on an average printing rate of 12.5% with paper thickness in the range 80 µm to 85 µm)

## (2) Cutter life

1.0 million cuttings (if the paper thickness is 100 µm or less)

0.3 million cuttings (if the paper thickness is more than 100 µm)

## A-8. Black Mark Specifications



### <Remarks>

- 1) The cut position shown above is when the print starting position correct value for Appendix G: memory switch 2 is the default setting.
- 2) The black mark's PCS value must be 0.90 or more.
- 3) Note that accuracy of starting printing with the black mark sensor must be within  $\pm 2$  mm of the standard printing positions, the printing length must be within  $\pm 2$  mm of the set value in consideration of discrepancies occurring in the processing accuracy of the platen diameter and environmental temperature in the initial state, and a -5% error margin against the set value must be taken into account in consideration of life expectancy and attention paid to the print layout when using pre-printed paper.
- 4) The printing area must be within the usable range shown in the above diagram when using black marks. With regards to the top margin, approximately 11 mm is established between the print position and the cut position (auto cutter,) and the paper is fed through 1 mm or more (eight dot lines) if printing is performed after the cutting operations, making a total of 12 mm or more for the margin. Ensure that the margin shown in the above diagram is used to prevent the printing area value in the paper feed direction from exceeding the pitch of the black mark. Note that if this margin is not used, it may result in pages being skipped and other defects.

[Example of the printing area setting]

<When the pitch of the black mark (dimension A) is 100 mm>

Top margin: 12 mm / bottom margin:  $3 \text{ mm} + (100 \text{ mm} \times 0.03) = 6 \text{ mm}$

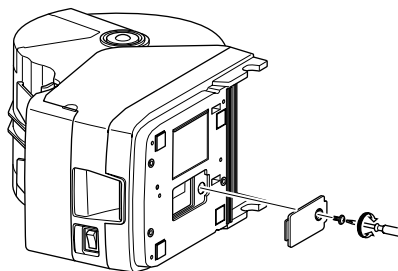
From this, it is clear that the printing area in the paper feed direction must be 82 mm or less.

## Appendix B: Dip Switch Setting

Two DIP switches are provided at the bottom of the printer, and can be set as given in the table below. Be sure to set the power switch to off before changing the settings. It is recommended to use a pointed item like a pen or flat-blade driver screw to change the settings. The settings will become effective when the power switch is set to on again.

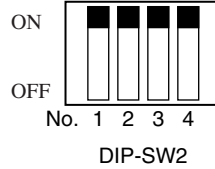
The following is the procedure for changing the settings on DIP switches.

1. Make sure the printer is turned off.
2. Remove the screw from the DIP switch cover. Then take off the DIP switch cover, as shown in the illustration below.



3. Set the switches using a pointed tool, such as a pen or flat-blade screwdriver.
4. Replace the DIP switch cover. Then secure it with the screw. The new settings take effect when you turn on the printer.

## B-1. Parallel Interface Model



DIP-SW 1

Switch	Function	ON	OFF
1-1	Command emulation	See table below	
1-2	Command emulation		
1-3	Should not be changed (Should be set to on)		
1-4	Sensor adjustment	Valid	Invalid
1-5	Pin #31 (INIT) reset signal	Valid	Invalid
1-6	Handshaking conditions (conditions for BUSY)	Offline or receive buffer full	Receive buffer full
1-7	Automatic status back function	Invalid	Valid
1-8	Should not be changed (Should be set to on)		

The factory settings of DIP switch are all on.

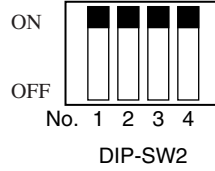
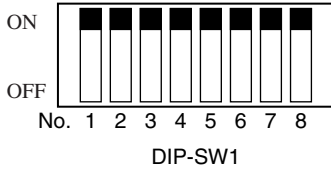
Switch 1-1	Switch 1-2	Command emulation
ON	ON	Star Line Mode
OFF	ON	Star Page Mode
OFF	OFF	ESC/POS Mode

DIP-SW 2

Switch	Function	ON	OFF
2-1	Always ON	Should be set to on	
2-2			
2-3			
2-4			

The factory settings of DIP switch are all on.

## B-2. Serial Interface (RS-232C) Model



DIP-SW 1

Switch	Function	ON	OFF
1-1	Command emulation	See table below	
1-2	Command emulation		
1-3	Should not be changed (Should be set to on)		
1-4	Sensor adjustment	Valid	Invalid
1-5	Should not be changed (Should be set to on)		
1-6	Handshaking conditions (conditions for BUSY)	Offline or receive buffer full	Receive buffer full
1-7	Automatic status back function	Invalid	Valid
1-8	Should not be changed (Should be set to on)		

The factory settings of DIP switch are all on.

Switch 1-1	Switch 1-2	Command emulation
ON	ON	Star Line Mode
OFF	ON	Star Page Mode
OFF	OFF	ESC/POS Mode

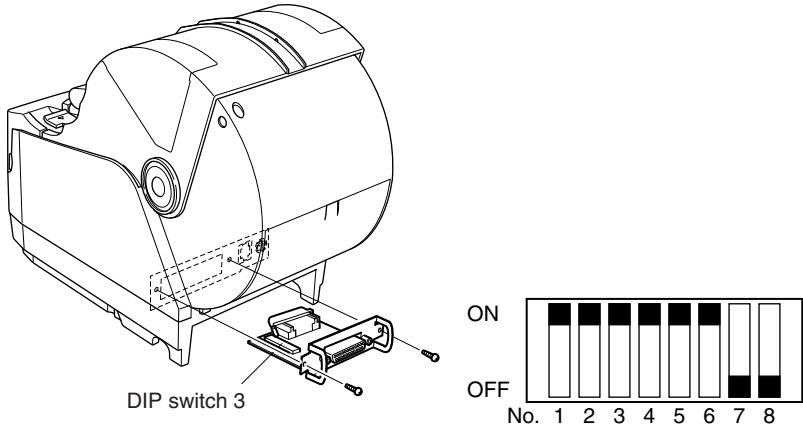
DIP-SW 2

Switch	Function	ON	OFF
2-1	Always ON	Should be set to on	
2-2			
2-3			
2-4			

The factory settings of DIP switch are all on.

The following is the procedure for changing the settings on DIP switch No. 3.

1. Turn off the printer and all components connected to it.
2. Remove the 2 screws.
3. Remove the serial interface board unit.
4. Change the setting of the DIP switches.
5. Replace the serial interface board unit.  
Then secure it with the screws.
6. Turn on the printer and all components connected to it.



DIP-SW3

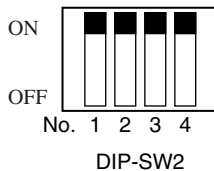
The factory settings of DIP switch are all on, except for switches 7 and 8.

DIP-SW 3

Switch	Function	ON	OFF
3-1	Baud Rate	See table below	
3-2			
3-3	Data Length	8 bits	7 bits
3-4	Parity Check	Disabled	Enabled
3-5	Parity	Odd	Even
3-6	Handshake	DTR/DSR	XON/XOFF
3-7	Should not be changed (Should be set to off)	—	—
3-8			

Baud Rate	Switch 3-1	Switch 3-2
4800BPS	OFF	ON
9600BPS	ON	ON
19200BPS	ON	OFF
38400BPS	OFF	OFF

## B-3. USB Interface Model



DIP-SW1

Switch	Function	ON	OFF
1-1	Command emulation	See table below	
1-2	Command emulation		
1-3	Should not be changed (Should be set to on)		
1-4	Sensor adjustment	Valid	Invalid
1-5	USB mode	See table below	
1-6	Handshaking conditions (conditions for BUSY)	Offline or receive buffer full	Receive buffer full
1-7	Automatic status back function	Invalid	Valid
1-8	Should not be changed (Should be set to on)		

The factory settings of DIP switch are all on.

Switch 1-1	Switch 1-2	Command emulation
ON	ON	Star Line Mode
OFF	ON	Star page Mode
OFF	OFF	ESC/POS Mode

Switch 1-5	USB Mode
ON	Mode 1 (Printer class)
OFF	Mode 2 (Vendor class)

### Note:

- 1) A STAR USB Printer Driver Set is needed for using the USB interface on Windows 98 or 98SE . You can download the STAR USB Printer Driver Set from the following website.
- 2) Download the Mode 2 (vendor class) driver set from the following website for use.

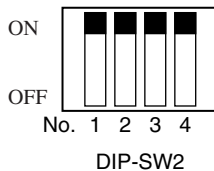
Printer Driver URL <http://www.star-m.jp/eng/dl/dl02.htm>

DIP-SW 2

Switch	Function	ON	OFF
2-1~2-4	Always ON	Should be set to on	

The factory settings of DIP switch are all on.

## B-4. Ethernet Interface Model



### DIP-SW1

Switch	Function	ON	OFF
1-1	Command emulation	See table below	
1-2	Command emulation		
1-3	Should not be changed (Should be set to on)		
1-4	Sensor adjustment	Valid	Invalid
1-5	Should not be changed (Should be set to on)		
1-6	Handshaking conditions (conditions for BUSY)	Offline or receive buffer full	Receive buffer full
1-7	Should not be changed (Should be set to on)		
1-8	Should not be changed (Should be set to on)		

The factory settings of DIP switch are all on.

Switch 1-1	Switch 1-2	Command emulation
ON	ON	Star Line Mode
OFF	ON	Star Page Mode
OFF	OFF	ESC/POS Mode

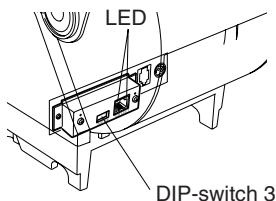
### DIP-SW 2

Switch	Function	ON	OFF
2-1~2-4	Always ON	Should be set to on	

The factory settings of DIP switch are all on.



## DIP-SW 3



Switch	Function	ON	OFF
3-1	Always OFF	Should be set to off	
3-2	Initialization of settings	Valid	Invalid
3-3	Always OFF	Should be set to off	
3-4	#9100 Multi-session (Maximum 8 sessions)	Valid	Invalid

The factory settings of DIP switch are all OFF.

The firmware must be ver.2.02 or later.

### ■ LED Display

Green : Lights when other party connection is recognized as 10BASE-T.

Orange : Lights when packets are received.

### Installing the Printer Driver and the LPR Port Driver Set

To use the Ethernet interface from Microsoft's Windows 95/98 and ME, the "Star LPR Port Driver Set" along with the printer driver is necessary.

Download the Printer Driver and the Star LPR Port Driver Set from the following Web site.

Printer Driver URL : <http://www.star-m.jp/eng/dl/dl02.htm>

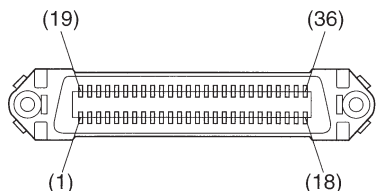
\* To use Windows NT 4.0/2000/XP, the "Star LPR Port Driver Set" is unnecessary.

## Appendix C: Parallel Interface

The two-way parallel interface is compatible with the IEEE1284 compatibility mode and nibble mode. Refer to the separate Specification Manual for details.

**Table of Connection Signals for Each Mode**

Pin No.	Direction	Compatibility Mode Signal Name	Nibble Mode Signal Name
1	In	nStrobe	Host Clock
2	In/Out	Data0	Data0
3	In/Out	Data1	Data1
4	In/Out	Data2	Data2
5	In/Out	Data3	Data3
6	In/Out	Data4	Data4
7	In/Out	Data5	Data5
8	In/Out	Data6	Data6
9	In/Out	Data7	Data7
10	Out	nAck	PtrClk
11	Out	Busy	PtrBusy/Data3,7
12	Out	PError	AckDataReq/Data2,6
13	Out	Select	Xflag/Data1,5
14		—	HostBusy
15		—	—
16		Signal GND	Signal GND
17		Frame GND	Flame GND
18	OUT	+5V	+5V
19~30		Twisted Pair Return	Twisted Pair Return
31	In	nInit	nInit
32	Out	nFault	nDataAvail/Data0,4
33		External GND	—
34		—	—
35		—	—
36	In	nSelectIn	1284Active



This connector mates with an Amphenol 57-30360 connector

Parallel interface connector (printer side)

**Note:**

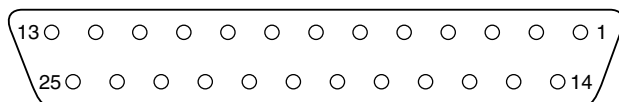
- 1) The first letter “n” of each signal name indicates that the signal is active “L”. If any one of the above signals is not available, bidirectional communication cannot be accomplished.
- 2) In interfacing signals, be sure to use twist-paired wires for signal lines, and the return side must be connected to signal ground level.

# Appendix D: Serial Interface (RS-232C)

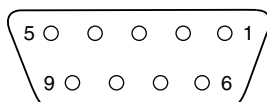
## D-1. RS-232C Connector

Pin No. 25 Pin 9 Pin	Signal name	Direction	Function
1	F-GND	—	Frame ground
2	3 TXD	OUT	Transmission data
3	2 RXD	IN	Receive data
4	7 RTS	OUT	Same as DTR signal.
5	N/C		Not used
8	CTS	IN	Status of this signal is not checked.
6	6 DSR	IN	<p><b>STAR Mode</b> Status of this signal is not checked.</p> <p><b>ESC/POS Mode</b> In DTR/DSR communication mode, indicates whether data receive from host is enabled or disabled. Space: Receive enabled Mark: Receive disabled (except when transmitting data by DLE EOT, and GS a) This signal is not checked in the X-ON/X-OFF communication mode.</p>
7	5 S-GND	—	Signal ground
8~19	1,9 N/C		Not used
20	4 DTR	OUT	<p><b>STAR Mode</b> Indicates whether data receive from host is enabled or disabled.</p> <p><b>1) DTR/DSR Communication Mode</b> Space when receive is enabled.</p> <p><b>2) X-On/X-Off Communication Mode</b> Always space, except during following conditions:</p> <ul style="list-style-type: none"> <li>• Period between reset and communication enabled</li> <li>• During self printing</li> </ul> <p><b>ESC/POS Mode</b> Indicates whether data receive from host is enabled or disabled.</p> <p><b>1) DTR/DSR Communication Mode</b> This signal indicates whether the printer is busy. SPACE indicates that the printer is ready to receive data, and MARK indicates that the printer is busy. The busy condition can be changed by using DIP SW 1-6 as follows:</p>

Pin No.		Signal name	Direction	Function																										
25 Pin	9 Pin																													
				<table border="1"> <thead> <tr> <th rowspan="2">Printer status</th> <th colspan="2">DIP SW 1-6</th> </tr> <tr> <th>OFF</th> <th>ON</th> </tr> </thead> <tbody> <tr> <td>1. During the period from when the power is turned on (including resetting using the interface) to when the printer is ready to receive data.</td> <td>BUSY</td> <td>BUSY</td> </tr> <tr> <td>2. During the self printing.</td> <td>BUSY</td> <td>BUSY</td> </tr> <tr> <td>3. When the cover is open.</td> <td>-</td> <td>BUSY</td> </tr> <tr> <td>4. When the printer stops printing due to a paper-end.</td> <td>-</td> <td>BUSY</td> </tr> <tr> <td>5. During macro executing standby status.</td> <td>-</td> <td>BUSY</td> </tr> <tr> <td>6. When an error has occurred.</td> <td>-</td> <td>BUSY</td> </tr> <tr> <td>7. When the receive buffer becomes full.</td> <td>BUSY</td> <td>BUSY</td> </tr> </tbody> </table> <p><b>2) X-On/X-Off Communication Mode</b>  Always space, except during following conditions:</p> <ul style="list-style-type: none"> <li>• Period between reset and communication enabled</li> <li>• During self printing</li> </ul>	Printer status	DIP SW 1-6		OFF	ON	1. During the period from when the power is turned on (including resetting using the interface) to when the printer is ready to receive data.	BUSY	BUSY	2. During the self printing.	BUSY	BUSY	3. When the cover is open.	-	BUSY	4. When the printer stops printing due to a paper-end.	-	BUSY	5. During macro executing standby status.	-	BUSY	6. When an error has occurred.	-	BUSY	7. When the receive buffer becomes full.	BUSY	BUSY
Printer status	DIP SW 1-6																													
	OFF	ON																												
1. During the period from when the power is turned on (including resetting using the interface) to when the printer is ready to receive data.	BUSY	BUSY																												
2. During the self printing.	BUSY	BUSY																												
3. When the cover is open.	-	BUSY																												
4. When the printer stops printing due to a paper-end.	-	BUSY																												
5. During macro executing standby status.	-	BUSY																												
6. When an error has occurred.	-	BUSY																												
7. When the receive buffer becomes full.	BUSY	BUSY																												
21~24		N/C		Not used																										
25		$\overline{\text{INIT}}$	IN	Status of this signal is not checked.																										



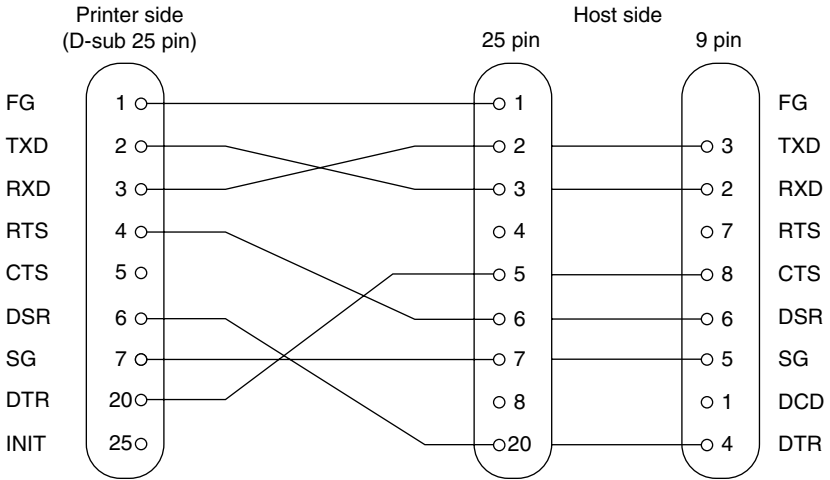
D-sub 25 Pin



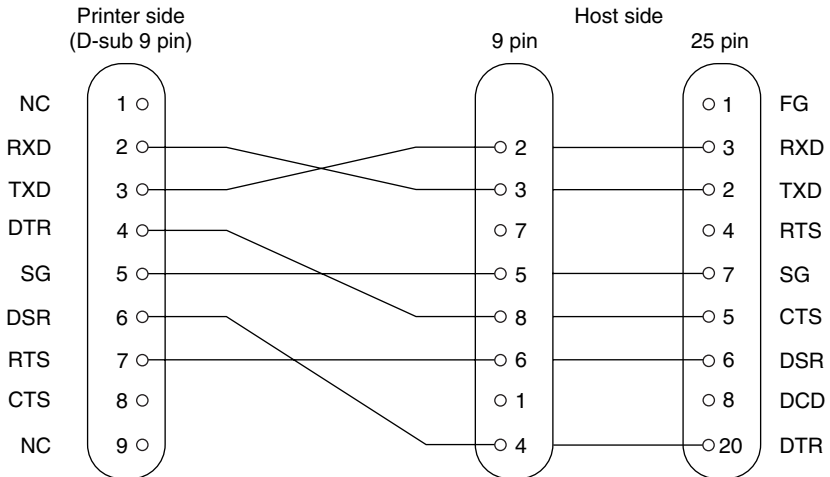
D-sub 9 Pin

## D-2. Cable Connections

The followings are a recommended interface cable connections.



**Note:** Use shielded wire less than 3m in length.



**Note:** Use shielded wire less than 3m in length.

## D-3. Electrical Characteristics

Voltage	Data signal	Control signal	Binary status
-3V to -15V	Mark	OFF	1
+3V to +15V	Space	ON	0

# Appendix E: USB Interface and Ethernet Interface

## E-1. USB Interface Specifications

1. General Specification: Conforms to USB 2.0 Specifications
2. Communication Speed: USB Full Speed Mode (12 Mbps)
3. Communication Method: USB Bulk Transmission Mode
4. Power Specifications: USB Self-power Function
5. Connector: USB Up-Stream Port Connector (USB Type-B)

## E-2. Ethernet Interface Specifications

1. General Specification: Conforms to IEEE802.3
2. Communication Media: 10 Base-T (Connectable to 100 Base-T)
3. Communication Speed: 12 Mbps
4. Protocol: TCP/IP
5. TCP/IP detail: ARP, RARP, BOOTP, DHCP, LPR, #9100, IPP, POP3, HTTP, TELNET, SMTP, SNMP
6. Connector: RJ-45 (8-pin modular)

# Appendix F: Buzzer Driver Circuit

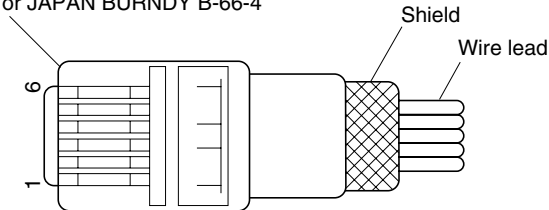
This printer is equipped with a circuit for driving the buzzer. A 6-pin modular connector for connection of the buzzer is located on the back of the printer. To connect to the drive circuit, connect the buzzer to the modular connector using a cable supplied by you like that one shown in the figure below.

## ***Important!***

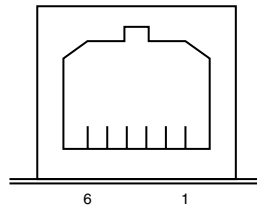
*Never connect any other type of plug to the buzzer connector.*

## **Modular plug**

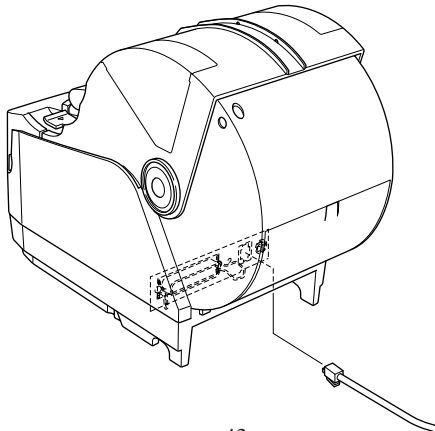
Modular plug: MOLEX 90075-0007,  
AMP641337, or JAPAN BURNDY B-66-4



Pin No.	Signal name	Function	I/O direction
1	FG	Frame ground	—
2	DRV1	Drive signal 1	OUT
3	+24V	Drive power	OUT
4	+24V	Drive power	OUT
5	N.C.	Not connected	—
6	N.C.	Not connected	—

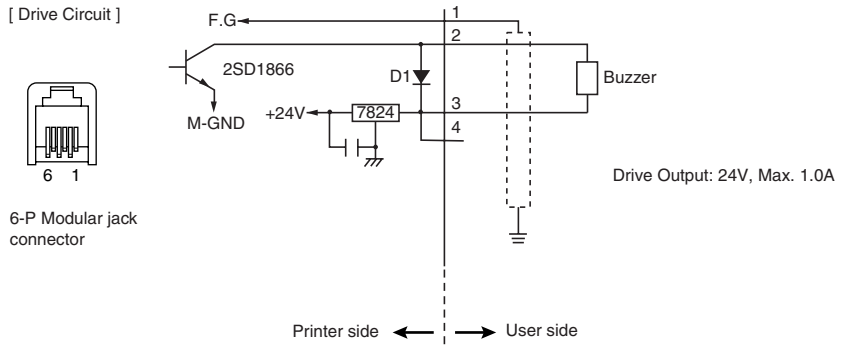


<Viewed from Connector Surface>

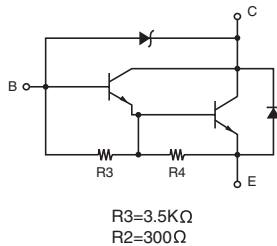


## Drive circuit

The recommended drive unit is shown below.



Reference  
2SD1866 Circuit Configuration



### Note:

- 1) Pin 1 must be shield drain wire connected to buzzer device frame ground.
- 2) For continuous driving, Maximum drive output is 0.1A.
- 3) Absolute maximum ratings for diodes D1 ( $T_a = 25^\circ\text{C}$ ) is:  
Average Rectified Current  $I_o = 1\text{A}$
- 4) Absolute maximum rating for transistors 2SD1866 ( $T_a = 25^\circ\text{C}$ ) is:  
Collector current  $I_c = 2\text{A}$



## Appendix G: Memory Switch Settings

Each memory switch is stored in EEPROM. For details on the functions and settings of memory switches, see the separate Specification Manual. The table below shows the factory settings for the memory switches.

Memory Switch	Hexadecimal Code
0	0000
1	0000
2	0000
3	0000
4	0000
8	0000
9	0000

### ***Warning!***

Changing the memory switch settings can cause the printer to fail to operate correctly.







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Please access the following URL  
<http://www.star-m.jp/eng/dll/dl02.htm>  
for the latest revision of the manual.

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