



TEC Thermal Printer

# **B-SX4T/SX5T SERIES**

## **Product Description**

Document No. **EO10-33013B**

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- This manual is intended for both B-SX4T series and B-SX5T series. Please note that the illustrations and pictures provided are of the B-SX4T series.
- The SP40II has been developed from the B-SX4T-GS10-QP, and the differences between two are the color of the front cover and the operation panel ass'y, the model name label, and the CD-ROM. The other specifications including the firmware are common.

### **CAUTION!**

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2. *The contents of this manual may be changed without notification.*

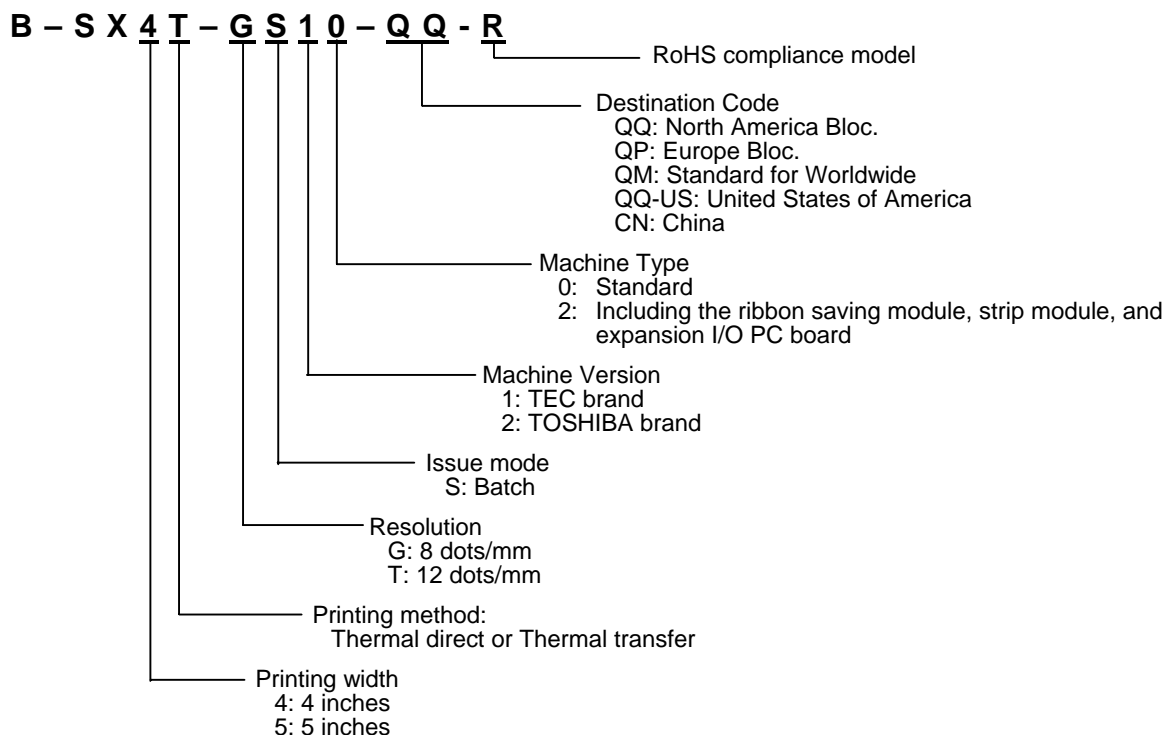
# 1. OUTLINE

## 1.1 PRINTER SPECIFICATIONS

- 1) Various bar codes, characters and graphic data can be printed using both thermal transfer and thermal direct methods. This printer can also print writable characters and logos at designated coordinates by using a graphic command.
- 2) The Centronics and RS-232C are available as standard interfaces between the printer and a PC. In addition, optional interfaces such as PCMCIA interface, USB interface, LAN interface and Wireless LAN interface are available. The expansion I/O interface, which is an option for the B-SX4T series, is provided on the B-SX5T series as standard.
- 3) A 32-bit CPU and a Field Programmable Gate Array (FPGA) equipped with several peripheral LSIs realizes high system performance.
- 4) With the element positioned at the edge of the print head, print quality is improved because the media passes straight through.
- 5) The B-SX4T series accommodates a max. format size of 104.0 mm wide by 1498.0 mm long and a max. printing speed of 10"/sec.  
The B-SX5T series accommodates a max. format size of 128.0 mm wide by 1498.0 mm long and a max. printing speed of 8"/sec.
- 6) High throughput can be obtained with "on-the-fly" formatting.
- 7) Installation space is minimized because the media is loaded internally.
- 8) The metal cover and damper provide a heavy-duty enclosure.
- 9) Various optional devices, including the Strip module including the rewinder, the ribbon saving module which economizes ribbon usage, rotary cutter module, swing cutter module, RFID module, wireless LAN module and are available.  
The strip module and the ribbon saving module are standard on the B-SX5T series.

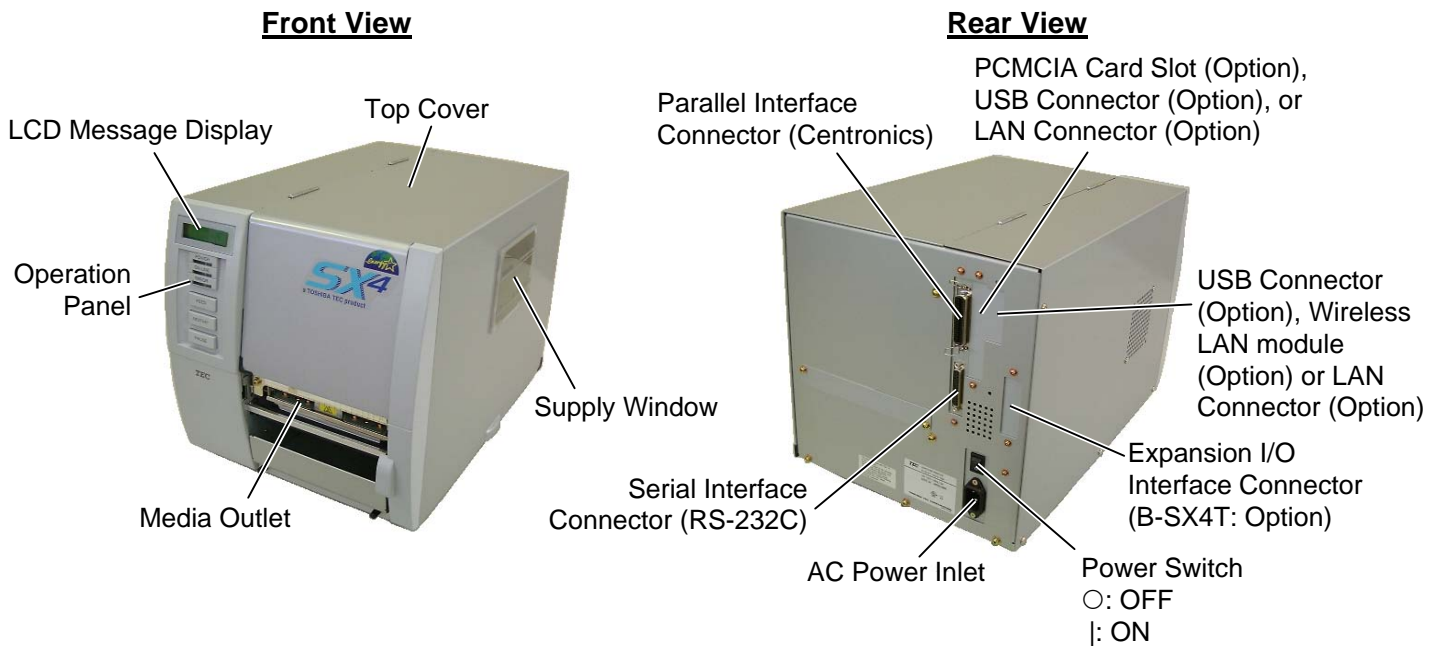
**NOTE:** Every size is written in millimeter (mm) in this manual. To obtain the size in inch, divide by 25.4.

## 1.2 DESCRIPTION OF MODEL NUMBER

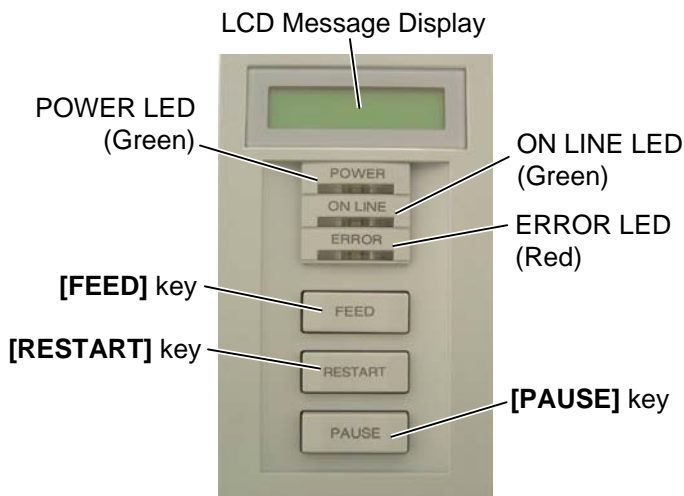


## 1.3 APPEARANCE AND DIMENSIONS (APPROXIMATE)

### 1.3.1 Front View/Rear View



### 1.3.2 Operation Panel



#### LCD Message Display

When the power is turned on and it is ready to print, ON LINE is displayed.

#### POWER LED (Green)

Lights when the power is turned on.

#### ON-LINE LED (Green)

- 1) Flashes when communicating with a host PC.
- 2) Lights while printing.

#### ERROR LED (Red)

Lights when the printer does not operate correctly.

#### FEED key

Feeds paper.

#### RESTART key

Resets the printer when paused or when an error occurs. Used to set the threshold. (Refer to the Owner's Manual.)

#### PAUSE key

Pauses printing.

Message display shows PAUSE and a remaining count. Used to set the threshold (Refer to the Owner's Manual.)

### 1.3.3 Dimensions (Approximate)

Standard: 291 mm (W) x 460 mm (D) x 308 mm (H)

With cutter module: 291 mm (W) x 521 mm (D) x 308 mm (H)

## 1.4 BASIC SPECIFICATIONS

1) Printing method ..... Thermal direct printing or thermal transfer printing

2) Print head

[B-SX4T: 4 inches]

(1) Total number of dots ..... 832 dots                      (3) Effective print width ..... 104.0 mm  
 (2) Dot density ..... 8 dots/mm                              (4) Thermal pitch ..... 0.125 mm

[B-SX5T: 5 inches]

(1) Total number of dots ..... 1536 dots                      (3) Effective print width ..... 128.0 mm  
 (2) Dot density ..... 12 dots/mm                              (4) Thermal pitch ..... 0.083 mm

3) Print speed

B-SX4T ..... 3"/sec., 6"/sec., 10"/sec.

B-SX5T ..... 3"/sec., 5"/sec., 8"/sec.

**NOTE:** *These print speeds are available when printing ratio is less than 15% of the entire label or tag paper.*

4) Format size (W) x (L)

B-SX4T ..... Max. 104.0 mm x 1498.0 mm

B-SX5T ..... Max. 128.0 mm x 1498.0 mm

5) Issue mode ..... Batch

Auto cut (Auto cut mode is available only when the optional cutter is attached.)

Strip (In case of the B-SX4T, the strip mode is available only when the optional strip module is attached.)

6) Type of bar code/two dimensional code

(1) JAN8, EAN8, JAN13, EAN13, UPC-A, UPC-E	(13) PDF417
(2) EAN8, EAN13, UPC-A, UPC-E + 2digit	(14) QR Code
(3) EAN8, EAN13, UPC-A, UPC-E + 5digit	(15) Industrial 2 of 5
(4) NW-7	(16) Customer Bar Code
(5) CODE39 (STANDARD)	(17) POSTNET
(6) CODE39 (FULL ASCII)	(18) RM4SCC (Royal Mail 4 State Customer Code)
(7) ITF	
(8) MSI	(19) KIX CODE
(9) CODE93	(20) Maxi Code
(10) CODE128	(21) Micro PDF417
(11) EAN128	(22) CP CODE
(12) Data Matrix	(23) RSS14

7) Bar code rotation ..... 0°, 90°, 180°, 270°

8) Magnification of bar code

- UPC/EAN/JAN/CODE93/128/PDF417.....Up to 6 modules can be automatically calculated using 1-module width designation (1 to 15 dots).

Bar code \ Dots/Module		2	3	4	5	6	7	8
UPC-A/E EAN8/13 JAN8/13	Min. Module Width (mm)	0.25	0.38	0.50	0.63	—	—	—
	Magnification (times)	0.76	1.14	1.51	1.91	—	—	—
CODE93 EAN128 CODE128 PDF417	Min. Module Width (mm)	0.25	0.38	0.50	0.63	0.75	0.88	1.00

Bar code \ Dots/Module		9	10	11	12	13	14	15
UPC-A/E EAN8/13 JAN8/13	Min. Module Width (mm)	—	—	—	—	—	—	—
	Magnification (times)	—	—	—	—	—	—	—
CODE93 EAN128 CODE128	Min. Module Width (mm)	1.13	1.25	1.38	1.50	1.63	1.75	1.88
PDF417		1.13	1.25	—	—	—	—	—

- NW-7/CODE39/ITF/MSI/Industrial 2 of 5 .... The width of narrow bars, wide bars and spaces can be optionally changed in a range of 1 to 99 dots.
- Data Matrix..... The width of one cell can be changed in a range of 1 to 99 dots.

9) Type of characters

[B-SX4T]

- |   |   |
|---|---|
| (1) Times Roman medium (12, 15 point)   | (9) Prestige Elite medium (10.5 point)  |
| (2) Times Roman bold (15, 18, 21 point) | (10) Prestige Elite bold (15 point)   |
| (3) Times Roman Italic (18 point)       | (11) Courier medium (15 point)  |
| (4) Helvetica medium (9, 15, 18 point)  | (12) Courier bold (18 point)  |
| (5) Helvetica bold (18, 21 point)       | (13) OCR-A, B (12 point)  |
| (6) Helvetica Italic (18 point)         | (14) Outline font (Helvetica bold, Helvetica bold proportional, Price Font (1,2,3), Times roman proportional, Pop Proportional, Proportional) |
| (7) Presentation bold (27 point)        | (15) Writable characters (2-byte character is available.)   |
| (8) Letter Gothic medium (14.3 point)   |   |

[B-SX5T]

- |   |   |
|---|---|
| (1) Times Roman medium (8, 10 point)    | (9) Prestige Elite medium (7 point)   |
| (2) Times Roman bold (10, 12, 14 point) | (10) Prestige Elite bold (10 point)   |
| (3) Times Roman Italic (12 point)       | (11) Courier medium (10 point)  |
| (4) Helvetica medium (6, 10, 12 point)  | (12) Courier bold (12 point)  |
| (5) Helvetica bold (12, 14 point)       | (13) OCR-A, B (12 point)  |
| (6) Helvetica Italic (12 point)         | (14) Outline font (Helvetica bold, Helvetica bold proportional, Price Font (1,2,3), Times roman proportional, Pop Proportional, Proportional) |
| (7) Presentation bold (18 point)        | (15) Writable characters (2-byte character is available.)   |
| (8) Letter Gothic medium (9.5 point)    |   |

10) Character code

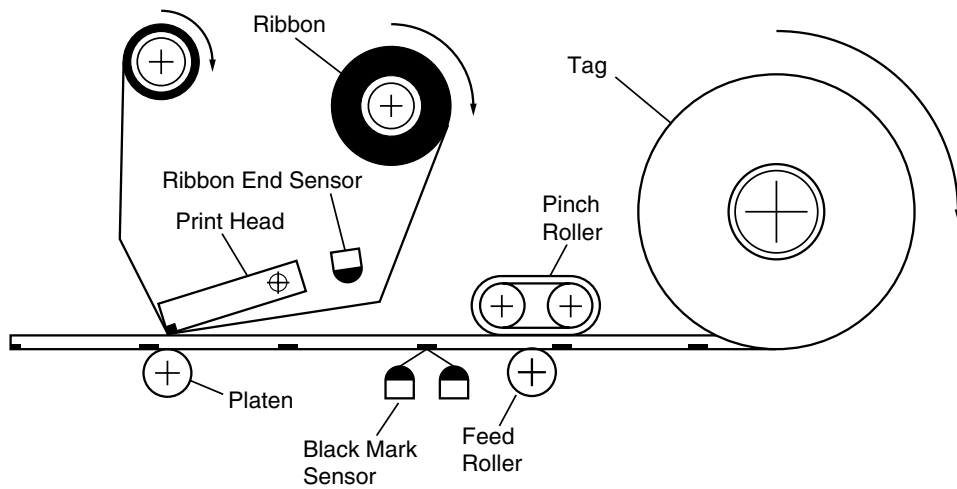
- (1) PC-850 (2) PC-8 (3) PC-852 (4) PC-857 (5) Arabic (6) LATIN 9 (7) PC-1257 (8) PC-1254 (9) PC-1253 (10) PC-1252 (11) PC-1251 (12) PC-1250 (13) PC-855 (14) PC-851

11) Character magnification

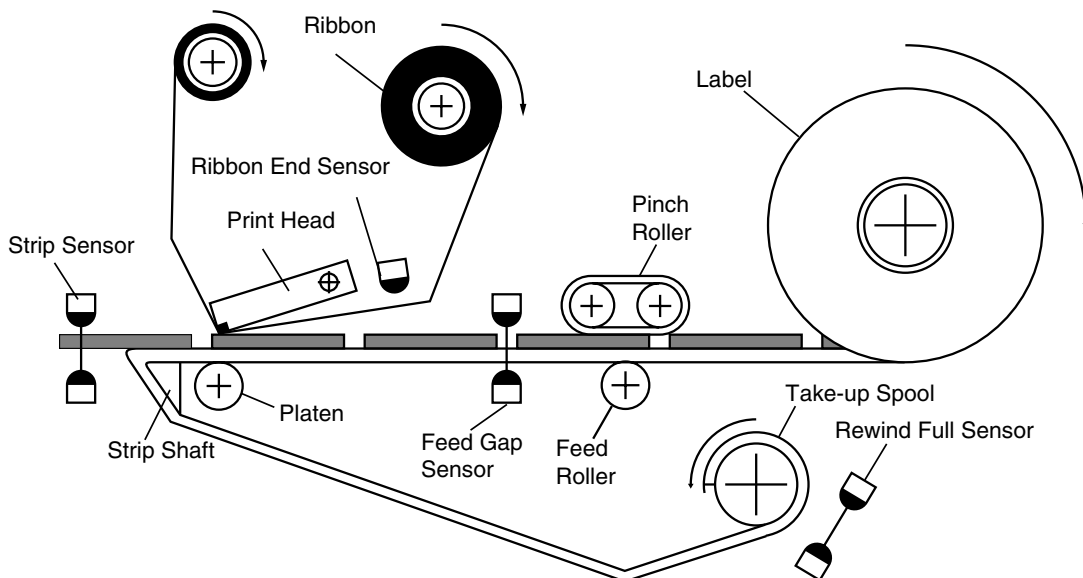
- (1) Regular font: 0.5 ~ 9.5 times (magnified by 0.5 times in each direction)  
 (2) Outline font: 2.0 ~ 85.0 mm (magnified 0.1 mm in each direction)

**NOTE:** When the outline font size is large, the ribbon may wrinkle according to the quality of the ribbon or print tone.

- 12) White or black background all types of characters are available.
- 13) Character rotation ..... 0°, 90°, 180°, 270°
- 14) Character strings rotation ..... 0°, 90°, 180°, 270°
- 15) Type of line  
 (1) Horizontal line (2) Vertical line (3) Slant line (4) Square (5) Rounded Rectangle (6) Circle
- 16) Line Width ..... 0.1 to 0.9 mm can be specified (in unit of 0.1 mm)
- 17) Mechanism  
 (1) Batch mechanism  
 This is the standard mechanism which lets the printer print continuously without winding the label or tag paper.

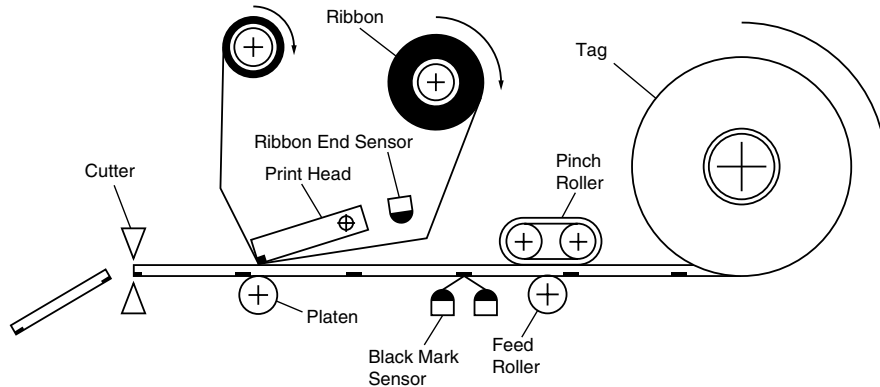


- (2) Strip mechanism (B-SX4T series: Option)  
 When the strip module is attached, labels are stripped from the backing paper by the strip shaft. The next label will not be printed until the preceding label is taken away. The backing paper is wound onto the take-up spool. By installing the rewriter guide plate the tag paper and label can be wound onto the take-up spool.



(3) Auto cut mechanism (Option)

When the cutter module is installed, the backing paper of the label stock or tag paper is cut individually (stop and cut).



18) Power supply

QQ model: AC100 ~ 120 V ±10%, 50/60Hz

QP/CN model: AC220 ~ 240 V ±10%, 50Hz

QM model: AC100 ~ 240 V ±10%, 50/60Hz

19) Current consumption

[B-SX4T]

	QQ model	QP/CN model	QM-R model (100V)	QM-R model (240V)
Printing	133 W, 1.6A	134W, 1.0A	130W, 2.5A	138W, 1.1A
Stand-by	14W, 0.18A	14W, 0.13A	11W, 0.18A	20W, 0.17A

[B-SX5T]

	QQ model	QP/CN model	QM-R model (100V)	QM-R model (240V)
Printing	130 W, 1.7A	124W, 0.7A	144W, 3.0A	142W, 1.3A
Stand-by	15W, 0.19A	16W, 0.16A	13W, 0.19A	21W, 0.17A

**NOTES:**

1. Be sure to provide an exclusive AC outlet for this machine.
2. Universal type PS unit is used for QM-R, CN-R, and SP40II-R models.

20) Rush current

QQ model: 11A

QP/CN model: 14A

QM model: 100V: 10A, 240V: 21A

**1.5 ELECTRONICS SPECIFICATIONS**

1) CPU ..... HD6417709SF100B

2) Memory

**Note:** For QM-R and SP40II-R models, the MAIN4 PC board containing large-capacity memory has been used since January 2009 (Serial No. 2609Axxxxxx and after). For CN-R model, the MAIN4 PC board is to be used as from February 2009 (Serial No. 2609Dxxxxxx and after).

(1) Program ..... 4MB Flash ROM (MAIN4 PC Board: 8MB)

(2) Backup ..... 512 Byte EE-PROM

(3) Image buffer + Work

B-SX4T ..... 8MB SD-RAM (MAIN4 PC Board: 16MB)

B-SX5T ..... 16MB SD-RAM (MAIN4 PC Board: 32MB)

(4) Chinese Font ROM ..... 8MB Flash ROM (CN model only Serial No. 2609Dxxxxxx or later))

**Note:** Program area size and Registry area size of the MAIN3 and MAIN4 PC boards

	MAIN3 PC Board	MAIN4 PC Board
Program area size	2304KB	4096KB
Registry area size	896KB	3072KB



## Specification of the MAIN4 PC Board

Model	Hardware				Software	
	Flash ROM	RAM	Kanji ROM (IC7)	Kanji Font	Registry area size	Program area size
B-SX5T-TS22-QM-R	4MB → 8MB	16MB → 32MB	None		896KB ↓ 3072KB	2304KB ↓ 4096KB
B-SX4T-GS20-QM-R		8MB → 16MB				
SP40II-R		8MB → 16MB				
B-SX5T-TS22-CN-R		16MB → 32MB	None → 8MB	Simplified Chinese		
B-SX4T-GS20-CN-R		8MB → 16MB				

Except for the memory capacity, the specification of the MAIN4 PC board is equivalent to that of the MAIN3 PC board. However, the firmware V5.0 and greater (Main program V5.0, Boot program V3.0) is installed into the MAIN4 PC board only.

## 3) Interface

## (1) RS-232C interface

- ① Communication mode: Full-duplex
- ② Transmission speed: 2400, 4800, 9600, 19200, 38400, 115200 bps (selectable)
- ③ Synchronization: start-stop synchronization
- ④ Transmission parameter
  - Parity: None, EVEN, ODD
  - Start bit: 1-bit
  - Stop bit: 1-bit or 2-bit
  - Word length: 7-bit or 8-bit
- ⑤ Error detection
  - Parity check: VRC (Vertical Redundancy Checking)
  - Framing error: This error occurs when no stop bit is found in the frame specified starting with the start bit.
- ⑥ Data entry code: ASCII, 8-bit code for European characters, 8-bit code for graphic
- ⑦ Receiving buffer: B-SX4T: 1MB, B-SX5T: 6MB
- ⑧ Protocol
  - XON/XOFF (DC1/DC3) protocol
    - When initialized after power on, this printer becomes ready to receive data and sends an XON code (11H). (Transmission or non-transmission of XON code is selectable by means of the parameter setting.)
    - The printer sends an XOFF code (13H) when the free area in the receive buffer becomes 10K Bytes or less.
    - The printer sends an XON code (11H) when the free area in the receive buffer are 512KB or more.
    - When there is no free area in the receive buffer, the printer discards received data which exceeds the receive buffer capacity without storing it in the buffer. (After detecting the XOFF code, the host computer must stop transmission before the printer receive buffer becomes full.)
    - The printer sends an XOFF code (13H) at power off time. (Transmission or non-transmission of XOFF code is selectable with the parameter setting.)
    - The DTR signal is always "High" level (Ready).
    - The RTS signal is always "High" level (Ready).
  - READY/BUSY (DTR) protocol
    - When initialized after power on, this printer becomes ready to receive data and converts the DTR signal to "High" level (READY).
    - The printer converts the DTR signal to "Low" level (BUSY) when the free area in the receive buffer amount to 10K bytes or less.
    - The printer converts the DTR signal to "High" level (READY) when the free area in the receive buffer amount to 512KB or more.
    - When there is no free area in the receive buffer, the printer discards received data which exceeds the receive buffer capacity without storing it in the buffer. (After detecting a BUSY signal, the host computer must stop transmission before the printer receive buffer becomes full.)
    - The RTS signal is always "High" level.

- XON/XOFF (DC1/DC3) protocol + READY/BUSY (DTR) protocol
  - When initialized after power on, this printer becomes ready to receive data and converts the DTR signal to "High" level (READY). The printer sends an XON code (11H).
  - When the free area in the receive buffer are 10K bytes or less, the printer converts the DTR signal to "Low" level (BUSY) and sends an XOFF code (13H).
  - When the free area in the receive buffer are 512KB or more, the printer converts the DTR signal to "High" level (READY) and sends an XON code (11H).
  - When there is no free area in the receive buffer, the printer discards received data which exceeds the receive buffer capacity without storing it in the buffer. (After detecting the XOFF code or BUSY signal, the host computer must stop transmission before the printer receive buffer becomes full.)
  - The printer sends an XOFF code (13H) at power off time.
  - The RTS signal is always "High" level.
- READY/BUSY (RTS) Protocol
  - When initialized after power on, this printer becomes ready to receive data and converts the RTS signal to "High" level (READY).
  - The printer converts the RTS signal to "Low" level (BUSY) when the free area in the receive buffer amount to 10K bytes or less.
  - The printer converts the RTS signal to "High" level (READY) when the free area in the receive buffer amount to 512KB or more.
  - When there is no free area in the receive buffer, the printer discards received data which exceed the receive buffer capacity without storing it in the buffer. (After detecting a BUSY signal, the host computer must stop transmission before the printer receive buffer becomes full.)
  - The DTR signal is always "High" level (READY).
  - The host should keep the DSR signal "High" level.

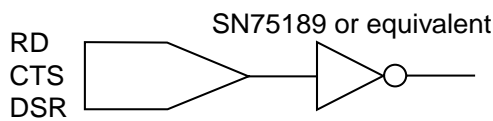
**NOTE:** Be sure to select the READY/BUSY (RTS) protocol when controlling the flow between the Windows. Also, be sure to select "Hardware" for the flow control in the Windows communication port setting.

### ⑨ Pin description

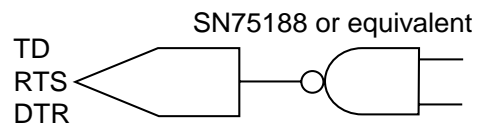
Pin No.	Signal	I/O	Description
1	FG (Frame Ground)	---	Ground line for circuit protection.
2	RD (Received Data)	Input	Data line from which the printer receives data from the host (receive data line). Logic "1" is "Low", and "0" is "High". It is LOW (MARK) while no data is being sent.
3	TD (Transmit Data)	Output	Data line from which the printer sends data to the host (send data line). Logic "1" is "low", and "0" is "High". It is LOW (MARK) while no data is being sent.
4	CTS (Clear to Send)	Input	Input signal from the host. This printer ignores this signal.
5	RTS (Request to Send)	Output	Output signal to the host. When READ/BUSY (RTS) protocol is selected, this signal means READY to receive data. When the receive buffer is nearly full, the signal turns to "Low", and "High" when nearly empty. In case of other protocol is selected, this signal is always "High" level after the power is turned on.
6	DTR (Data Terminal Ready)	Output	Output signal from the printer. When READY/BUSY (DTR) or XON/XOFF (DC1/DC3)+READY/BUSY (DTR) is selected, this signal means READY to receive data. When the receive buffer is nearly full, the signal turns to "Low", and "High" when nearly empty. In case of XON/XOFF (DC1/DC3) or READY/BUSY (RTS), this signal is always "High" level after the power is turned on.
7	SG (Signal Ground)	---	Ground line for all data and control signals.
20	DSR (Data Set Ready)	Input	Input signal from the host. It must be "High" for the printer to receive data.

⑩ Interface circuit

■ Input circuit



■ Output circuit



■ Signal level

Input voltage: "H" .. +3V ~ +15V  
 "L" ... -3V ~ -15V

Output voltage: "H" .. +6V ~ +13V  
 "L" ... -6V ~ -13V

(2) Centronics interface

① Data input method: 8-bit parallel (DATA 1~8)

② Control signals

Compatibility mode: nStrobe, nAck, Busy, PError, Select, nAutoFd, nInit, nFault, nSelectIn  
 ECP mode: HostClk, PeriphClk, PeriphAck, nAckReverse, XFlag, HostAck, nReverseRequest, nPeriphRequest, IEEE1284Active

③ Data input code: ASCII, JIS 8-bit code for European characters, 8-bit code for graphic

④ Receiving buffer: 1MB

⑤ Input/Output circuit configuration and Input/Output conditions

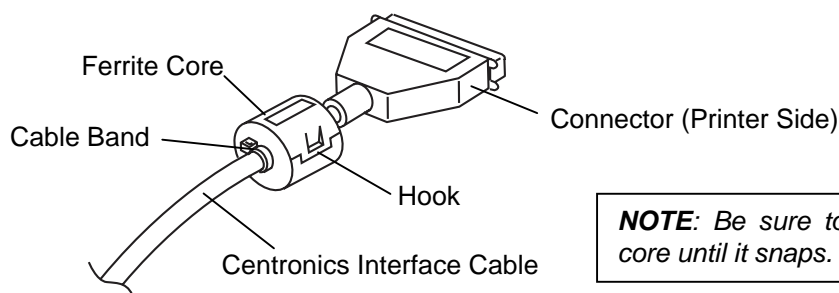
Type	Signal Name	Configuration
Input/Output	Data 1 ~ 8	
Input	nStrobe/HostClk nInit/nReverseRequest nAutoFd/HostAck nSelectIn/IEEE1284Active	
Output	Busy/PeriphAck nFault/nPeriphRequest nAck/PeriphClk Select/XFlag PError/nAckReverse	

Logical level (input)  
 "1" = 2~5V  
 "0" = 0~0.4V

Logical level (input)  
 "1" = 2.4~5V  
 "0" = 0~0.4V

**NOTE: When using a Centronics Interface Cable on the B-SX5T Series**

Please put the ferrite core on the Centronics interface cable, close to the connector (printer side), and secure it with a cable band as shown below.

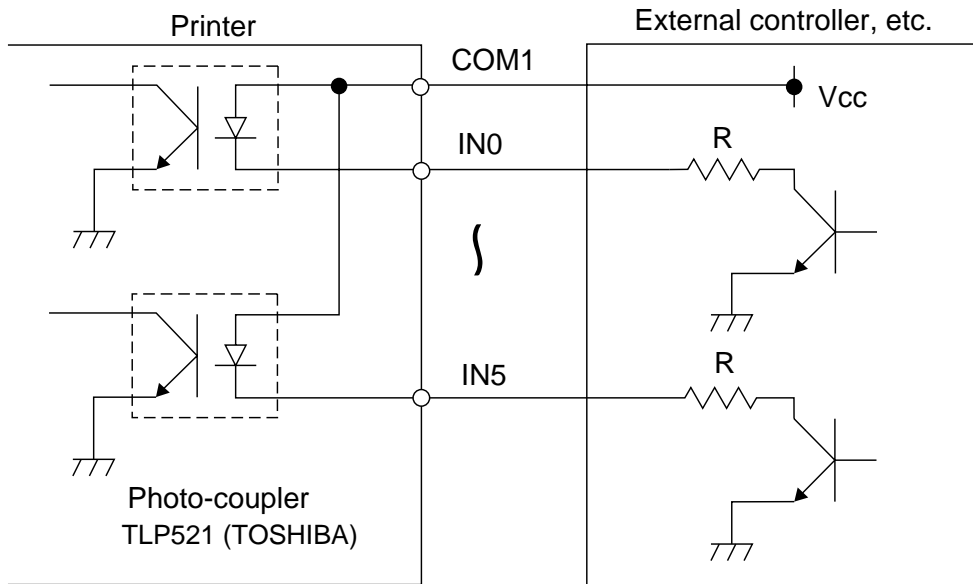


**NOTE: Be sure to close the ferrite core until it snaps.**

(3) Expansion I/O interface (B-SX4T: Option)

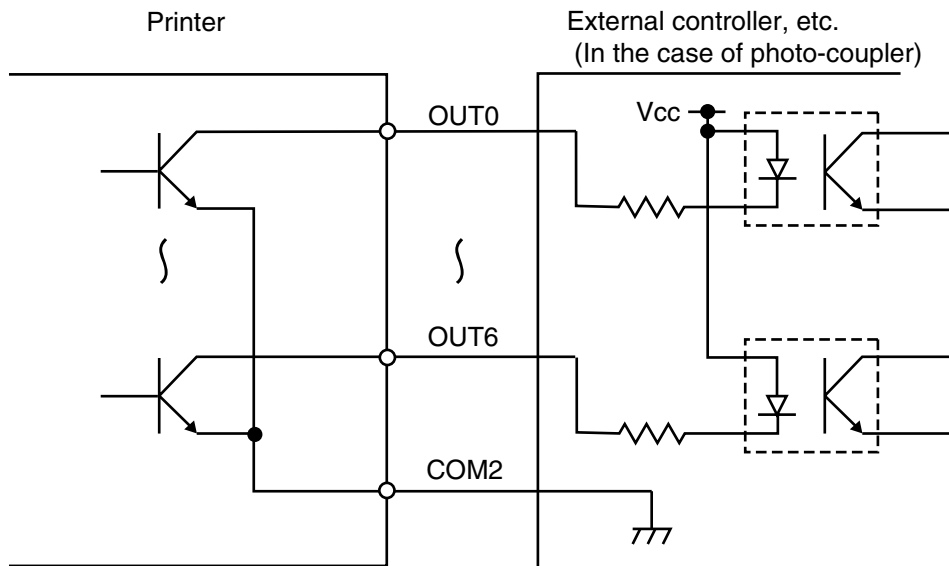
Interface circuit

■ Input circuit



There are six input circuits, and each input is a current loop using a photo-coupler. The anode of the photo-coupler is connected to common pin COM1 in each of the six circuits. Each cathode is independent. The voltage of Vcc is 24 V (max.) while the diode operating current is 16 mA.

■ Output circuit



There are seven output circuits, and each output is an open collector. The voltage of Vcc is 24V (max.) while the operating current is 150 mA. For other details, please refer to the Expansion I/O specifications stored in the enclosed CD-ROM or posted on the web site with the URL, <http://barcode.toshibatec.co.jp>.

## (4) USB

- |                  |                                 |
|------------------|---------------------------------|
| ① Standard:      | Conforming to Rev. 1.1          |
| ② Transfer type: | Control transfer, Bulk transfer |
| ③ Transfer rate: | Full speed (12M bps)            |

## (5) Network interface (LAN, PCMCIA)

- |                           |  |
|---------------------------|--|
| ① Constitution:           | <ul style="list-style-type: none"> <li>• PCMCIA board + LAN card</li> <li>• 10 Base-T or 100 Base-TX LAN board</li> </ul>  |
| ② Protocol:               | TCP/IP   |
| ③ Network specifications: | <ul style="list-style-type: none"> <li>• LPR server function</li> <li>• WEB printer function</li> <li>• Socket communication function</li> <li>• FTP server function</li> <li>• E-mail function</li> </ul> |

## 4) Sensor/switch

## (1) Head up sensor (Transmissive sensor)

This sensor, located on the left front of the printer inside as viewed from the media outlet, detects whether the print head is in position or not. When the head lever is turned to the Free position, the arm on the edge of the head lever shaft turns the sensor on.

## (2) Head block position switch (Transmissive sensor)

This sensor, located on the left side of the print head block, detects whether the print head block is in position or not. According to the position of the print head block, the arm on it turns the sensor on/off.

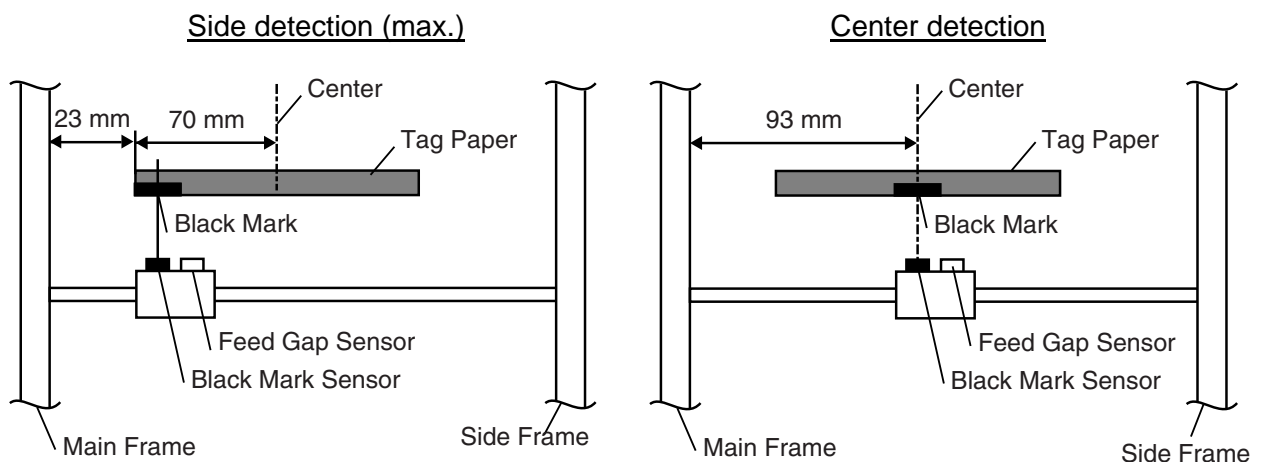
## (3) Media sensor

This sensor is comprised of the black mark sensor and feed gap sensor. It is positioned 92.1 mm from the platen.

The sensor position is adjustable according to the black mark position. It can be manually moved from the center to the left edge of media.

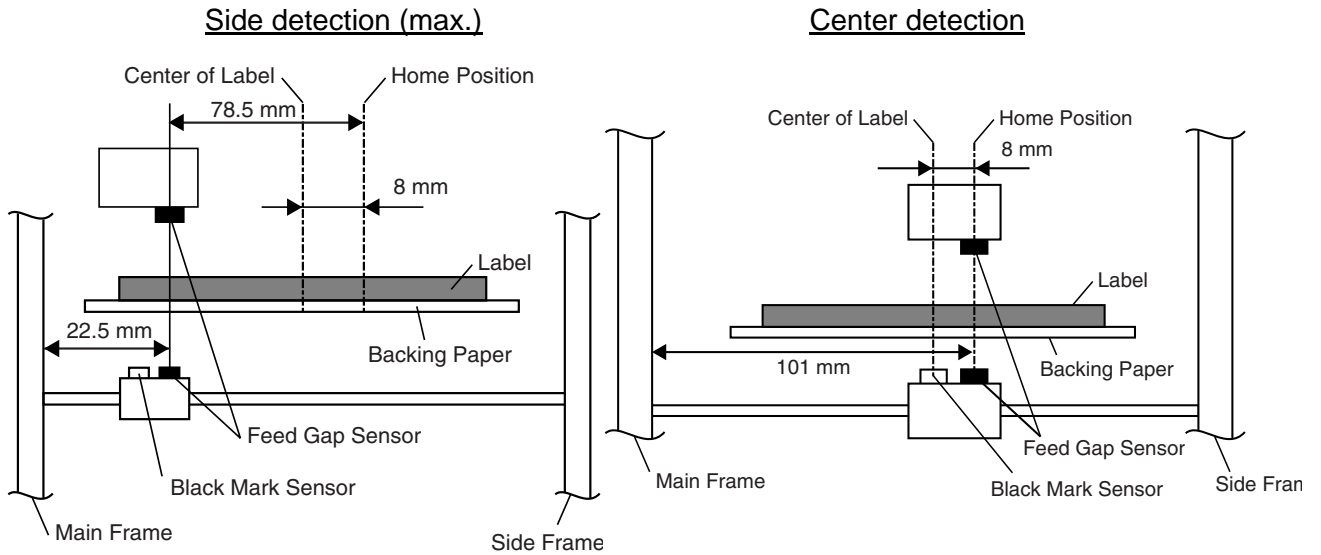
## ■ Black mark sensor (Reflective sensor)

This sensor detects the difference of potential between the black mark and tag paper to find the print position of the tag paper.



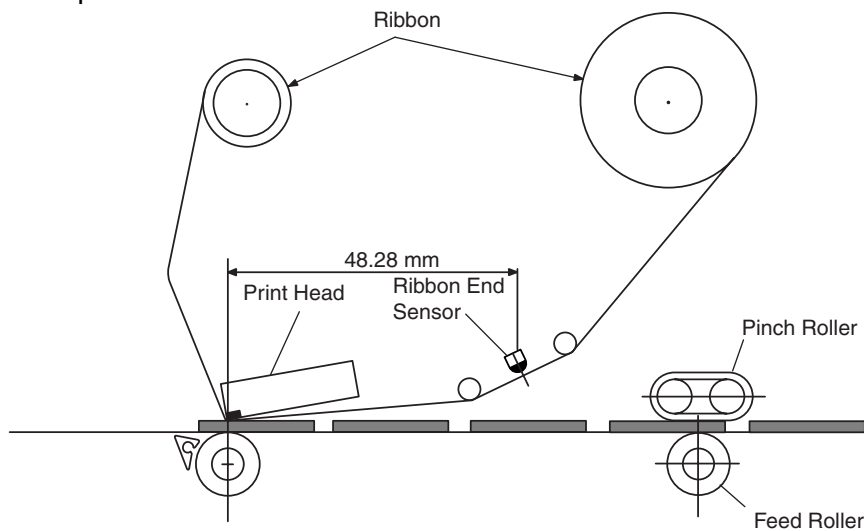
■ Feed gap sensor (Transmissive sensor)

This sensor detects the difference in potential between the backing paper and the label to find the print position of the label. The feed gap sensor is located at 8 mm to the right of the black mark sensor.



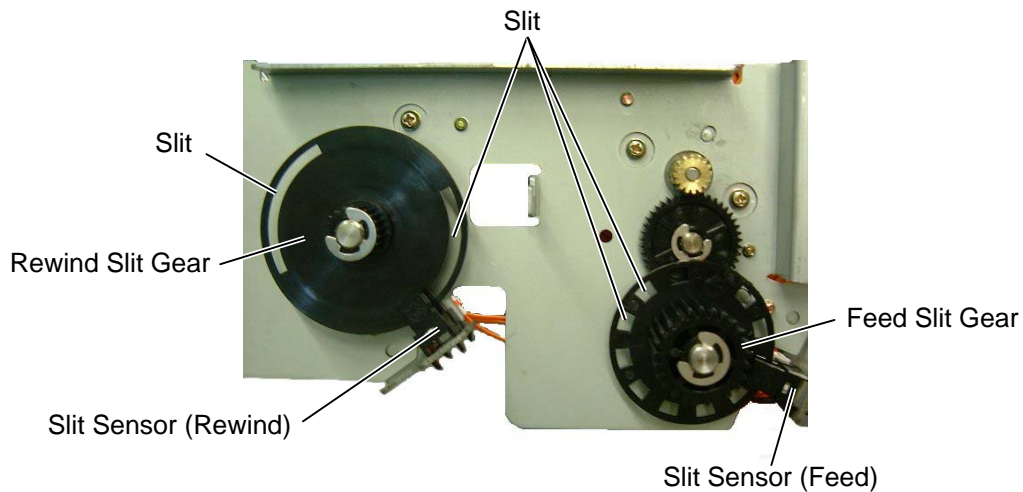
(4) Ribbon end sensor (Reflective sensor)

When printing in thermal transfer mode (using the ribbon), this sensor detects the difference in potential between the ribbon and the ribbon end to indicate the ribbon end. It is positioned at 48.28 mm from the platen.



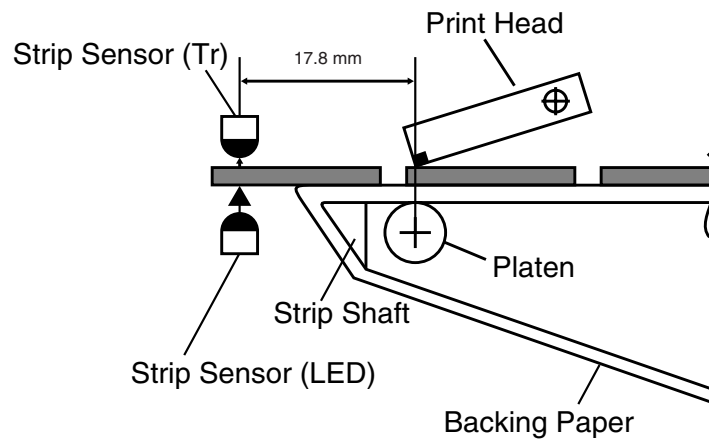
## (5) Slit sensor (Transmissive sensor)

This sensor detects the rotation count of the ribbon shaft and the ribbon motors. The ribbon motors torque works to take up slack in the ribbon and is dependent on the detected count. The slit sensor is a photo coupler combining an LED and a transistor.



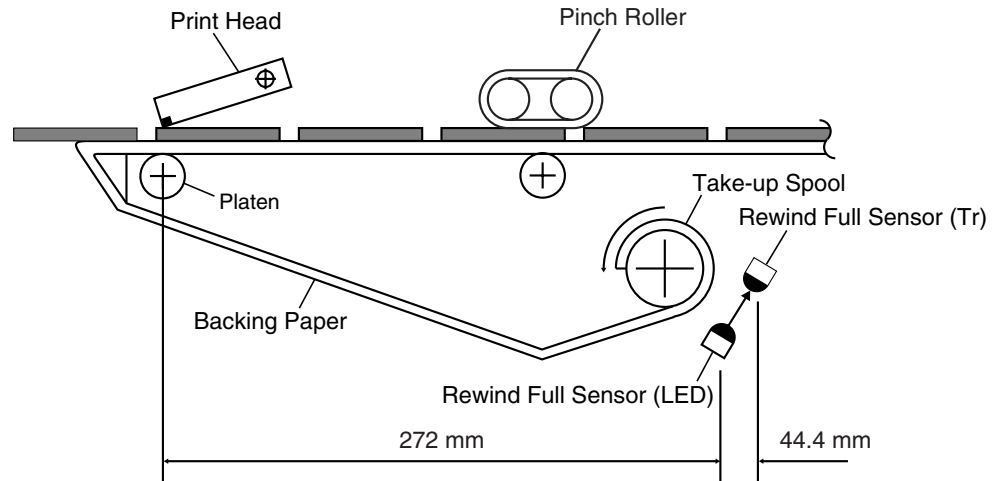
## (6) Strip sensor (Transmissive sensor)

This sensor detects whether or not the label has been taken away from the media outlet and controls the label feed. It is positioned 17.8 mm from the platen.



**(7) Rewind full sensor (Transmissive sensor)**

This sensor detects that the built-in rewinder is full when winding backing paper or printed media onto the take-up spool. It is positioned at 316.4 mm (Tr side) and 272 mm (LED side) from the platen. A rewinder full status is detected when the backing paper blocks the light from the LED.

**(8) Cutter home position switch (micro switch) for Swing Cutter**

A cam positioned at the end of the cutter motor arm turns the micro switch on/off in accordance with the cutter motion cycle (one rotation). The micro switch status indicates if the cutter is in the home position.



## 2. SUPPLY SPECIFICATIONS

Information regarding the supply specifications contained in Product Description is essential to service engineers. Detail specifications and other information on the media and ribbon are described in Supply Manual by model. It is issued by and sent from TOSHIBA TEC H.Q (Sales Division) upon release of new model or manual's revision. When purchasing the supplies locally, be sure to refer to the Supply Manual for details. Use of non-specified media may shorten the print head life and result in problems with bar code readability or print quality. Be sure to read carefully and understand the Supply Manual since it also includes the details about notes, precision of the print start position, limitations on printing, etc. When selling the products to VARs, instruct them to buy media and ribbons that the substances described in the following precautions are not included

### 2.1 MEDIA

#### [B-SX4T]

(Unit: mm)

Item	Label dispensing mode	Batch mode	Strip mode	Cut mode	
				Rotary cutter (*2)	Swing cutter
Media pitch	Label	10.0 – 1500.0	25.4 – 1500.0	3"/sec., 6"/sec.: 38.0 - 1500.0	38.0 – 1500.0
	Tag	10.0 – 1500.0	----	3"/sec., 6"/sec.: 30.0 – 1500.0	25.4 – 1500.0
Label length		8.0 – 1498.0	23.4 – 1498.0	3"/sec., 6"/sec.: 32.0 – 1494.0	25.0 – 1494.0(*1)
Width including backing paper (See NOTE 5.)		30.0 – 112.0	50.0 – 112.0	30.0 – 112.0	
Label width (See NOTE 5.)		27.0 – 109.0			
Gap length		2.0 – 20.0		6.0 – 20.0	
Black mark length (Tag paper)		2.0 – 10.0			
Effective print width		10.0 – 104.0±0.2			
Effective print length	Label	6.0 – 1496.0	21.4 – 1496.0	3"/sec., 6"/sec.: 30.0 - 1492.0	23.0 – 1492.0
	Tag	8.0 – 1498.0	----	3"/sec., 6"/sec.: 28.0 – 1498.0	23.4 – 1498.0
Print speed up/slow down area		1.0			
Thickness	Label	0.13 – 0.17			
	Tag	0.15 – 0.29			
Max. effective length for on the fly issue		1361.0			
Maximum outer roll diameter		Ø200 (See NOTE 9.)			
Roll direction		Inside			
Inner core diameter		Ø76.2±0.3			

#### [B-SX5T]

(Unit: mm)

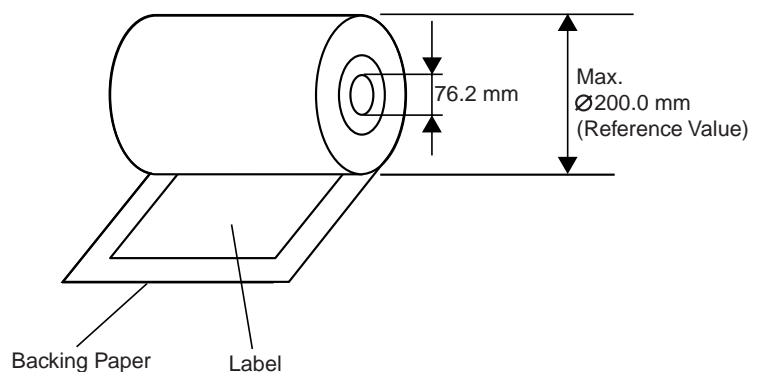
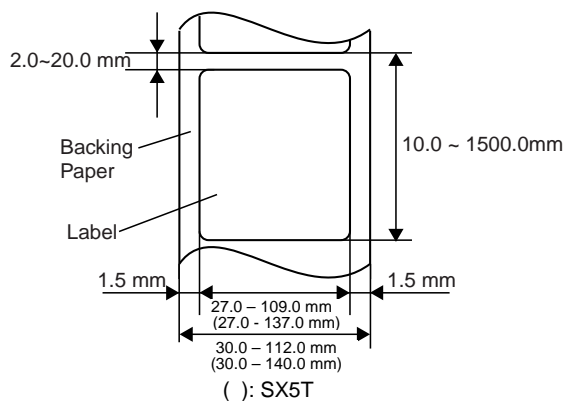
Item	Label dispensing mode	Batch mode	Strip mode	Cut mode	
				Rotary cutter	Swing cutter
Media pitch	Label	10.0 – 1500.0	25.4 – 1500.0	38.0 - 1500.0	38.0 – 1500.0
	Tag	10.0 – 1500.0	----	3"/sec., 5"/sec.: 30.0 – 1500.0 8"/sec.: 38.0 – 1500.0	25.4 – 1500.0
Label length		8.0 – 1498.0	23.4 – 1498.0	32.0 – 1494.0	25.0 – 1494.0(*1)
Width including backing paper (See NOTE 5.)		30.0 – 140.0	50.0 – 140.0	30.0 – 112.0	30.0 – 140.0
Label width (See NOTE 5.)		27.0 – 137.0		27.0 – 109.0	
Gap length		2.0 – 20.0		6.0 – 20.0	
Black mark length (Tag paper)		2.0 – 10.0			
Effective print width		10.0 – 128.0±0.2			
Effective print length	Label	6.0 – 1496.0	21.4 – 1496.0	30.0 - 1492.0	23.0 – 1492.0
	Tag	8.0 – 1498.0	----	3"/sec., 5"/sec.: 28.0 – 1498.0 8"/sec.: 36.0 – 1498.0	23.4 – 1498.0
Print speed up/slow down area		1.0			
Thickness	Label	0.13 – 0.17			
	Tag	0.15 – 0.29			
Max. effective length for on the fly issue		749.0			
Maximum outer roll diameter		Ø200 (See NOTE 9.)			
Roll direction		Inside			
Inner core diameter		Ø76.2±0.3			

**NOTES:**

1. To ensure print quality and print head life use only TOSHIBA TEC specified media.
2. The media length specifications for use of the cutter are:
  - \*1: When issuing a label using the swing cutter, label length should be 35.0 mm – (Gap length/2).
  - \*2: The rotary cutter does not support the print speed of 10"/sec.
3. When marking black marks on the label rolls, they should be marked at the gaps.
4. "On the fly issue" means that the printer can feed and print without stopping between labels.
5. There are restrictions in use of the media which is narrower than 50 mm. For details, refer to TOSHIBA TEC Head Quarters.
6. When perforating the media, it should be done from the print side to the reverse side.
7. The reflectance of the black mark should be 10% or less when the wavelength is 950nm.
8. The label length should be at least three times as long as the gap.
9. When taking up the printed media onto the take-up spool in batch mode, the outer roll diameter must not exceed 180mm.
10. When cutting the thermal label, secure a gap of 6 mm or more, and cut in the middle of the gap.
11. For the backing paper Glassine paper 7K white or equivalent should be used. Also, the light transmission rate of the backing paper should be 22% or above.
12. Ink used for pre-printing the media should not contain hard substances such as carbonic calcium (CaCO<sub>3</sub>) and Kaolin (Al<sub>2</sub>O<sub>3</sub>, 2SiO<sub>2</sub>, 2H<sub>2</sub>O).
13. Thermal paper used for the direct thermal printing must not have the specifications which exceed Ca<sup>2+</sup>, K<sup>+</sup>, Na<sup>+</sup> 800 ppm, K<sup>+</sup> 250 ppm, and Cl<sup>-</sup> 500 ppm.
14. Avoid using media containing SiO<sub>2</sub> or talc which wears the print head protection layer.

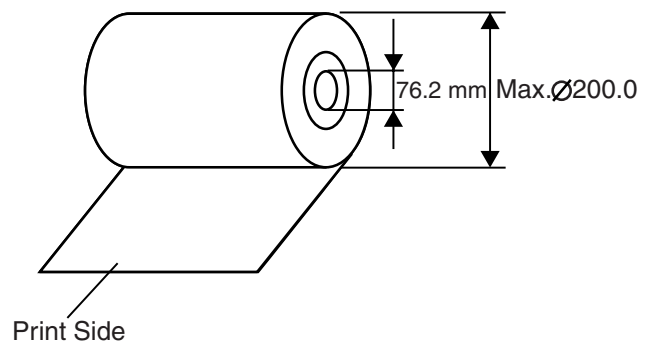
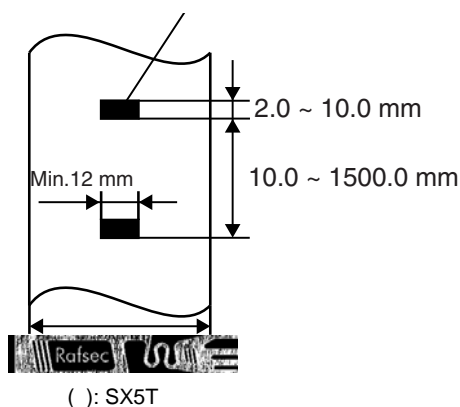
1) Label

< Design >



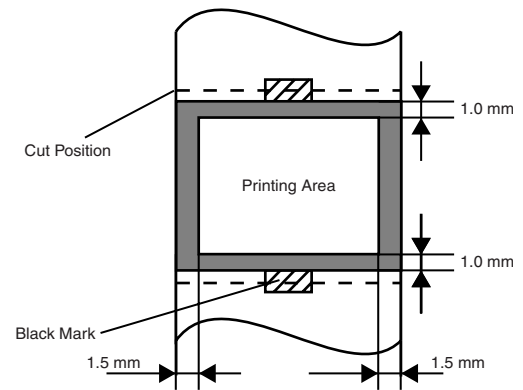
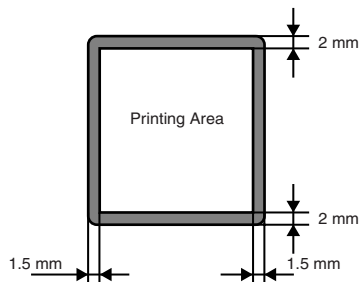
2) Tag paper

Black mark or Square holes  
(Round holes are not acceptable.)



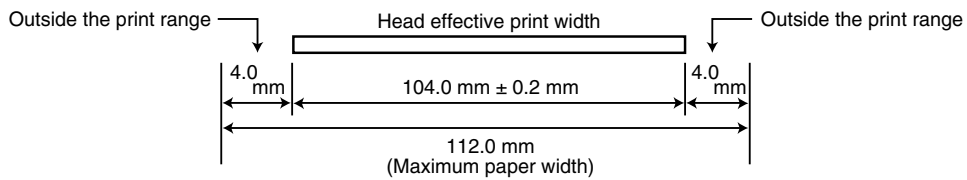
**NOTE:** The reflection rate of the black mark is 10% or less at wavelength of 950nm. A square hole can substitute for the black mark. When the square hole is used, no printing is allowed on the black side.

< Non Print Area >

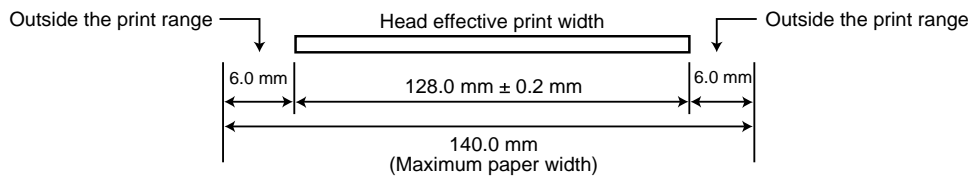


3) Relationship between the head effective print width and paper.

[B-SX4T]



[B-SX5T]



**NOTE:** The specifications differ depending on the issue mode. For details, refer to the media specification table on page 2-1.

## 2.2 RIBBON

No.	Item		Specification
1	Shape		Spool type
2	Width	B-SX4T	41 to 112 mm
		B-SX5T	41 to 134 mm
3	Max. length		600 m
4	Max. OD		∅ 90 mm
5	Back treatment		Coated
6	Core	Material	Cardboard
		Shape	See the following figures.
7	Leader tape		Polyester film (Opaque), 300 ± 5 mm long
8	End tape		Polyester film (Opaque), 250 ± 5 mm long
9	Winding method		The ink side faces outside of ribbon winding

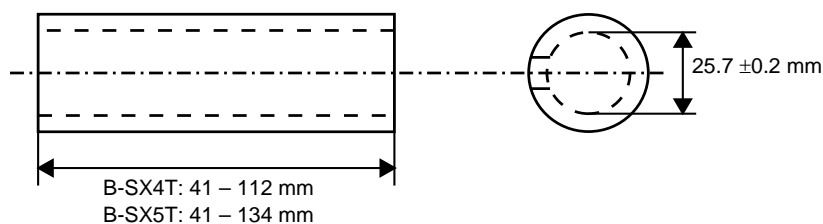
- NOTES:**
1. To ensure print quality and print head life use only TOSHIBA TEC specified ribbons.
  2. To avoid ribbon wrinkles use a ribbon which is wider than the media by 5 mm or more. However, too much difference in width between the two may cause wrinkles.
  3. When using a 112 mm wide media, be sure to use a 108 mm wide ribbon. Use of other ribbons may cause ribbon wrinkles.
  4. When using a 134 mm wide media, be sure to use a 130 mm wide ribbon. Use of other ribbons may cause ribbon wrinkles.

## [B-SX4T]

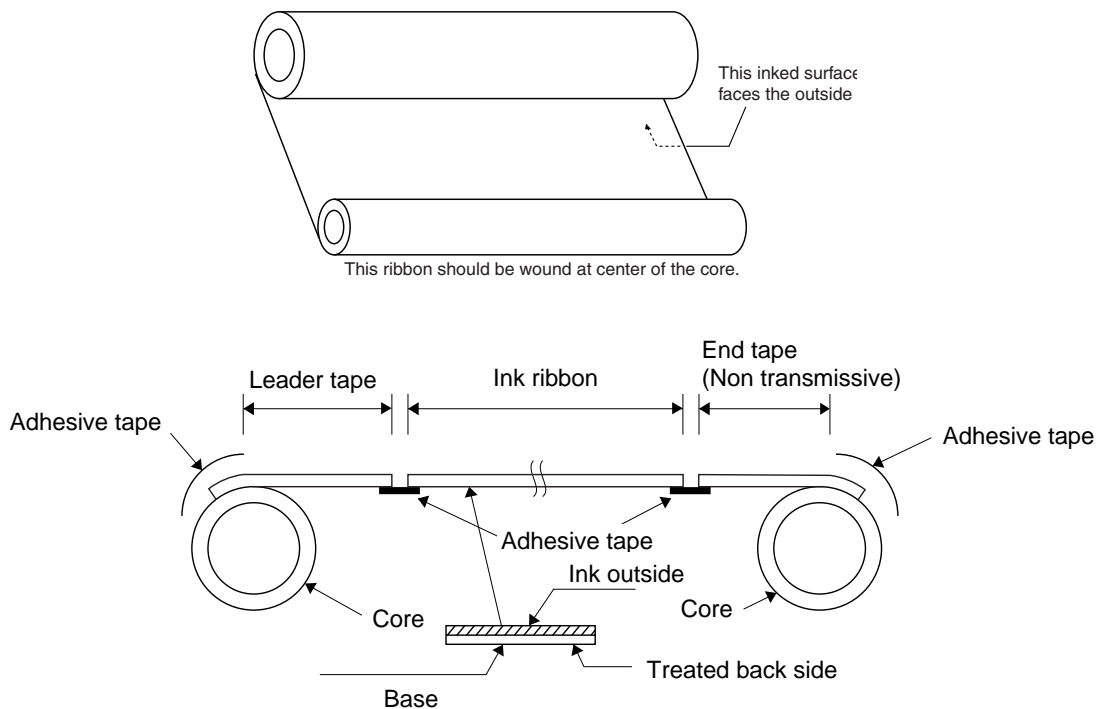
Ribbon width	41 mm	50 mm	68 mm	84 mm	112 mm <sup>(NOTE 3)</sup>
Proper media width	30 to 36 mm	36 to 45 mm	45 to 63mm	63 to 79 mm	71 to 112mm

## [B-SX5T]

Ribbon width	41 mm	50 mm	68 mm	102 mm	134 mm <sup>(NOTE 4)</sup>
Proper media width	30 to 36 mm	36 to 45 mm	45 to 63mm	63 to 97 mm	97 to 140 mm



**NOTE:** When purchasing ribbon locally, they must meet the above size. There may be TOSHIBA TEC-approved ribbons which do not fall within the above size, however, they have no functional problem.



## 2.3 CARE AND HANDLING OF THE MEDIA AND RIBBON

### **CAUTION!**

*Be sure to read carefully and understand the Supply Manual. Use only media and ribbon which meet specified requirements. Use of non-specified media and ribbon may shorten the head life and result in problems with bar code readability or print quality. All media and ribbon should be handled with care to avoid any damage to the media, ribbon or printer. Read the following guideline carefully.*

- Do not store the media and ribbon for longer than the manufactures recommended shelf life.
- Store media rolls on the flat end, do not store them on the curved sides as this might flatten that side causing erratic media advance and poor print quality.
- Store the media in plastic bags and always reseal after opening. Unprotected media can get dirty and the extra abrasion from the dust and dirt particles will shorten the print head life.
- Store the media and ribbon in a cool, dry place. Avoid areas where they would be exposed to direct sunlight, high temperature, high humidity, dust or gas.

For further information please contact your local distributor or your media and ribbon manufacturer.

## 2.4 SPECIFICATION OF RFID TAG (for B-9704-RFID-U1-US/EU-R, H1-QM-R)

### 2.4.1 General Description

The RFID supplies are RFID tag (wireless IC tag) inlays designed to be converted into tag and label applications. Printers, which are equipped with an RFID kit, can print data on the surface of RFID tags as well as write data on them.

The B-SX series optional RFID kit, B-9704-RFID-U1-US, is destined for North America and operates in the UHF band 902MHz to 928MHz. And B-9704-RFID-U1-EU/U1-EU-R is destined for Europe and operates in the UHF band 869.5MHz.

B-9704-RFID-H1-QM/H1-QM-R operates in the HF band 13.56MHz, to which Tagsys RFID module Medio002 (to be separately purchased) can be attached.

**NOTE:** *Regarding the specification of RFID supplies and the ribbon used for printing on them, refer to Section 2.1 MEDIA and Section 2.2 RIBBON.*

### 2.4.2 Available RFID Tag

Available RFID tag types are different depending on the RFID modules, as follows:

(1) B-9704-RFID-U1-US and B-9704-RFID-U1-EU/U1-EU-R

- EPC C0
- EPC C1
- EPC C1 Gen2 (Only when the RFID module supports GEN2.)
- ISO18000-6B

(2) B-9704-RFID-H1-QM/H1-QM-R

- TAGSYS C210
- TAGSYS C220
- TAGSYS C240
- TAGSYS C320 (Only when the TAGSYS S003 module is used.)
- I-Code
- Tag-it
- ISO15693

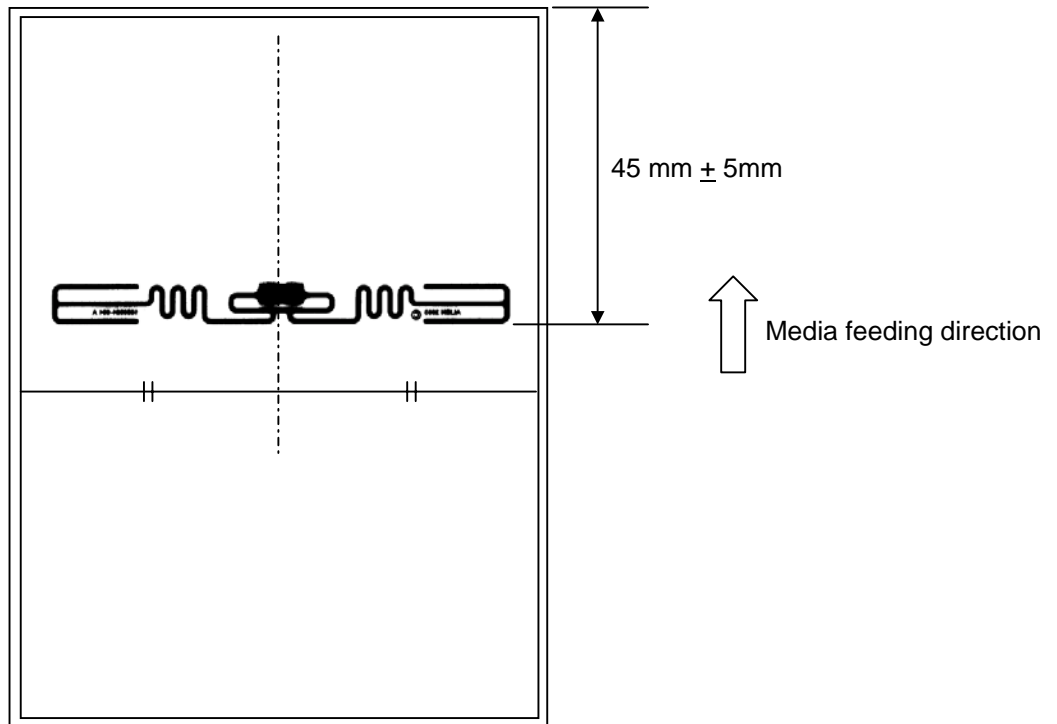
### 2.4.3 Location of RFID Tag

The location of an RFID tag on a label influences on the accuracy of writing data on the RFID tag. It is impossible to define the one best location for every RFID tag on labels because the best location depends on the type of RFID tag and RFID tag antenna. The B-SX RFID Analyze Tool (7FM001113) can evaluate the accuracy of writing data on the RFID tag. For the usage of this tool, refer to the B-SX RFID Analyze Tool Operation Specification (TAA-2195).

As a guideline, the best location for some common RFID tags is given below. It is recommended to use the B-SX RFID Analyze Tool to check the accuracy of writing data on an RFID tag to be used, then determine a specific location of the RFID tag. If the RFID tag cannot be placed on the best location specified, perform a forward/reverse feed before an issue using the RFID tag position adjustment command ([ESC]@[003])

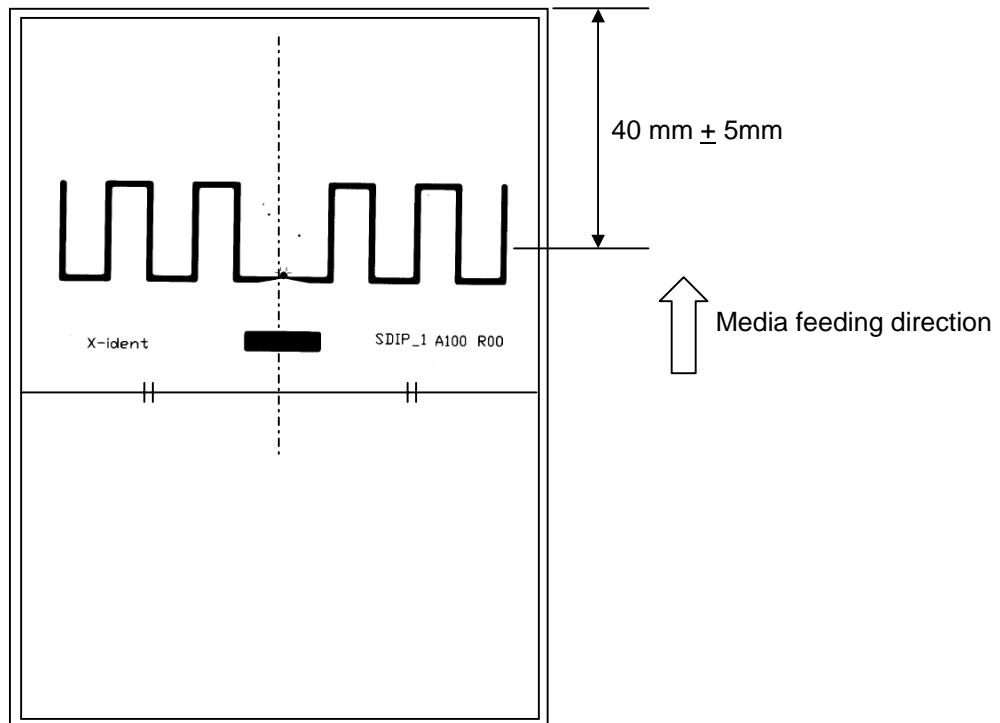
#### (1) Alien's EPC C1 Squiggle Tag

It is recommended to locate the vertical center of an RFID tag in the area  $45\text{mm} \pm 5\text{mm}$  from a leading edge of a label and the horizontal center with the horizontal center of the label.



## (2) X-ident's ISO 18000-6B Tag

It is recommended to locate the vertical center of an RFID tag in the area  $40\text{mm} \pm 5\text{mm}$  from a leading edge of a label and the horizontal center with the horizontal center of the label.



#### 2.4.4 Cautions for using RFID Tags

##### (1) Lift-up of Print Head

An RFID tag chip or the print head may be damaged when the print head passes over the chip. This can be prevented by using the ribbon saving module (standard feature for the B-SX5T and optional for the B-SX4T). The print head is lifted by the ribbon saving module when it passes over the chip to prevent it from touching the chip. The print head is lifted by approximately 1 mm from the platen.

##### 2) Storage of RFID Supplies

Do not store RFID tags close to printers, or their communication performance may not be as specified when they are used.

##### 3) Roll-type RFID Supplies

When RFID supplies are to be rolled, roll hardness must be concerned. Although it depends on the type of glue, tag, and backing paper, RFID-tag embedded labels tend to stay rolled. Especially, when they are wound outside, a media jam error may occur. Unless otherwise specified, it is recommended that the RFID-tag embedded labels be wound inside.

##### 4) Sensor

When the transmissive sensor or reflective sensor is enabled, transmissivity or reflectivity of a label or tag may vary at an RFID-tag embedded area depending on the pattern of an antenna or other factors. In such cases, a manual threshold setting is required in Online mode. For details, refer to the B-SX Key Operation Specifications (TAA-1379).



## 5) Cutter

When an RFID label or tag is used in cut issue mode, care must be taken not to cut an antenna of the RFID tag or an IC chip in order not to damage the cutter.

## 6) Static Electricity

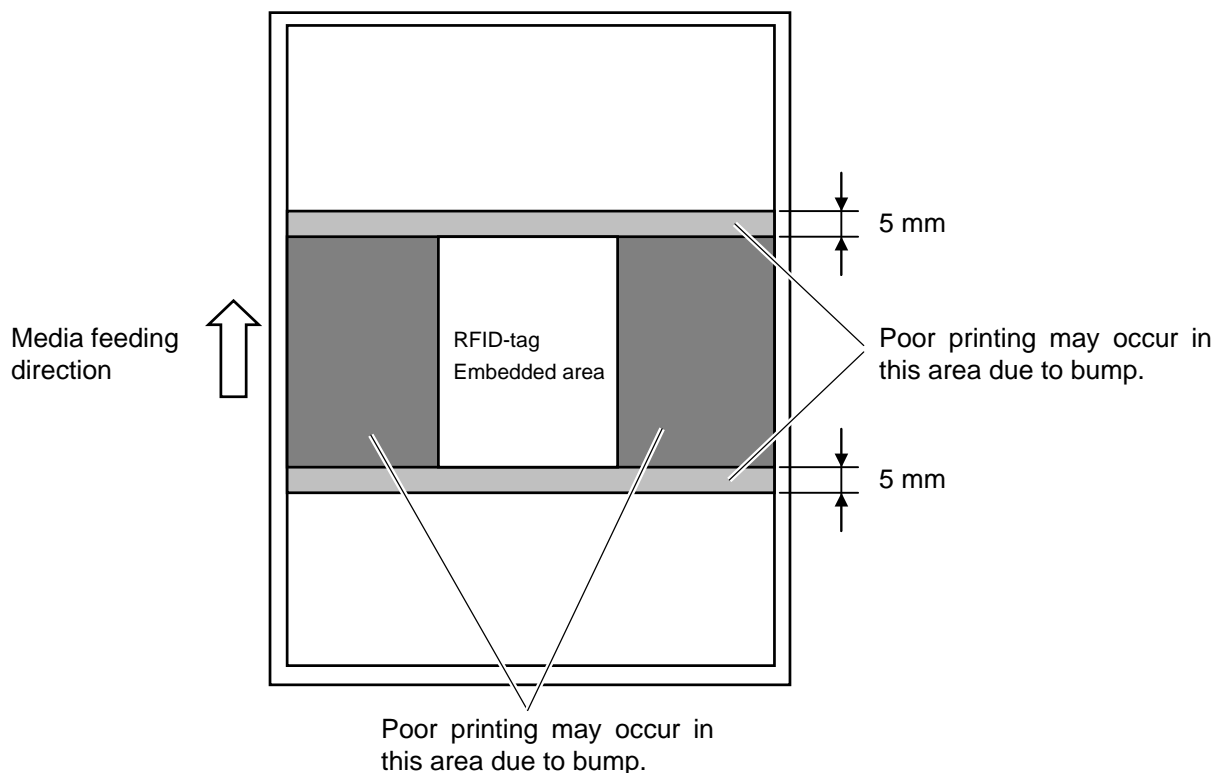
When printing is performed in a place where humidity is low or under some specific conditions, writing data on an RFID tag may fail due to static electricity generated by a label or a ribbon.

## 7) Printing on Bump (Chip/Antenna) Area

Embedding an RFID tag in labels creates bumps in a chip/antenna area in the labels, causing incomplete printing.

Uneven printing or incomplete printing can occur easily, especially within 5 mm back and forth of the RFID tag, and right and left sides of the RFID-tag embedded area, as shown in the figure below.

**NOTE:** The degree of poor printing quality differs depending on height of a chip/antenna used.



## 8) Ambient Temperature

Low temperature deteriorates wireless performance, under which conditions writing data on an RFID tag may fail.

## 9) Head-up Back feed

When an RFID label is used, a back feed may be required before an issue depending on the location of an RFID tag in the label.

A printer without the ribbon saving module may not be able to perform a back feed properly because the print head may be caught by an edge of the label. For this reason, the ribbon saving module must be installed in the printer when media, which requires a back feed before an issue, is used.

#### 10) Strip Issue

Stripping performance in strip issue mode depends on the type of glue, tag, and backing paper. For some RFID supplies used, an issue may not be performed properly in strip issue mode.

#### 11) Caution for Minimum Label Pitch Length

When media, of which label pitch length is short, is used, data may be written on an RFID tag next to the target RFID tag.

As the location, where data is to be written, differs among RFID tag types, a check must be performed to make sure that the data is written on the target RFID tags.

The B-SX RFID Analyze Tool (7FM001113) can be used for this purpose.

#### 12) Defective RFID Supply

RFID supplies may include defective RFID tags at the time of shipment from the maker. The defect rate differs depending on tag types, method of converting to supplies, etc.

The RFID supply maker should provide a way to distinguish defective tags by printing a mark on them or any other methods.

Or, defective tags should be rejected in the production process.

How to distinguish a defective tag from good one must be notified to end users.

### 2.4.5 Improvement of Writing Accuracy

As RFID tags use wireless technologies, writing data on the RFID tag may fail depending on environment and characteristics of the RFID tags.

In order to improve the accuracy of writing data on the RFID tags, the following method can be used:

#### 1) Change of the maximum number of RFID write retries

The maximum number of RFID write retries is variable and can be changed by the RFID settings in System mode. Setting the high number can improve the writing accuracy. However, overall printing throughput may become worse because a retry is also performed for tags on which data cannot be written.

For details of settings, refer to the B-SX Key Operation Specification (TAA-1379).

#### 2) Enabling of RFID adjustment for retry

The printer has the RFID adjustment for retry feature. If writing data on the RFID tag fails, the printer automatically feeds the RFID tag forward or backward for a specified length in order to retry writing data.

Enabling this feature can improve the writing accuracy. However, overall printing throughput may become worse because a retry is also performed for tags on which data cannot be written.

For details of settings, refer to the B-SX Key Operation Specification (TAA-1379).

#### 3) Adjustment of location of antenna

The RFID antenna, which is attached to the bottom area of the printer head, is fixed with the screw to the mold side for B-9704-RFID-U1-EU/U1-EU-R and B-9704-RFID-H1-QM/H1-QM-R and to the metal side for B-9704-RFID-U1-US when it is shipped.

Whether the antenna is attached to the mold side or metal side is currently determined based on the best distance for common RFID tags. The antenna can be attached to the metal side for B-9704-RFID-U1-EU/U1-EU-R and B-9704-RFID-H1-QM/H1-QM-R and to the mold side for B-9704-RFID-U1-US in order to improve writing accuracy.

The location of the antenna must be determined after measuring the distance using the B-SX RFID Analyze Tool (7FM001113).

## 2.5 SPECIFICATION OF RFID TAG (for B-SX704-RFID-U2-EU/AU-R)

### 2.5.1 General Description

The RFID supplies are RFID tag (wireless IC tag) inlays designed to be converted into tag and label applications. Printers, which are equipped with an RFID kit, can print data on the surface of RFID supplies as well as write data on the embedded RFID tags.

The B-SX704-RFID-U2-EU-R is destined for Europe and operates in the UHF band (869.7-870.0 MHz). The B-SX704-RFID-U2-AU-R is destined for Australia and operates in the UHF band (918.25-925.75 MHz).

### 2.5.2 Available RFID Tag

- EPC Generation 2

### 2.5.3 Location of RFID Tag

The location of an RFID tag in a label influences on the accuracy of writing data on the RFID tag. It is impossible to define the one best location for every RFID tag in labels because the best location depends on the type of RFID tag and RFID tag antenna.

The RFID Analyze Tool (7FM001113) can evaluate the accuracy of writing data on the RFID tag. For the usage of this tool, refer to the RFID Analyze Tool Operation Specification (TAA-2195).

As a guideline, the best location for some common RFID tags is given below.

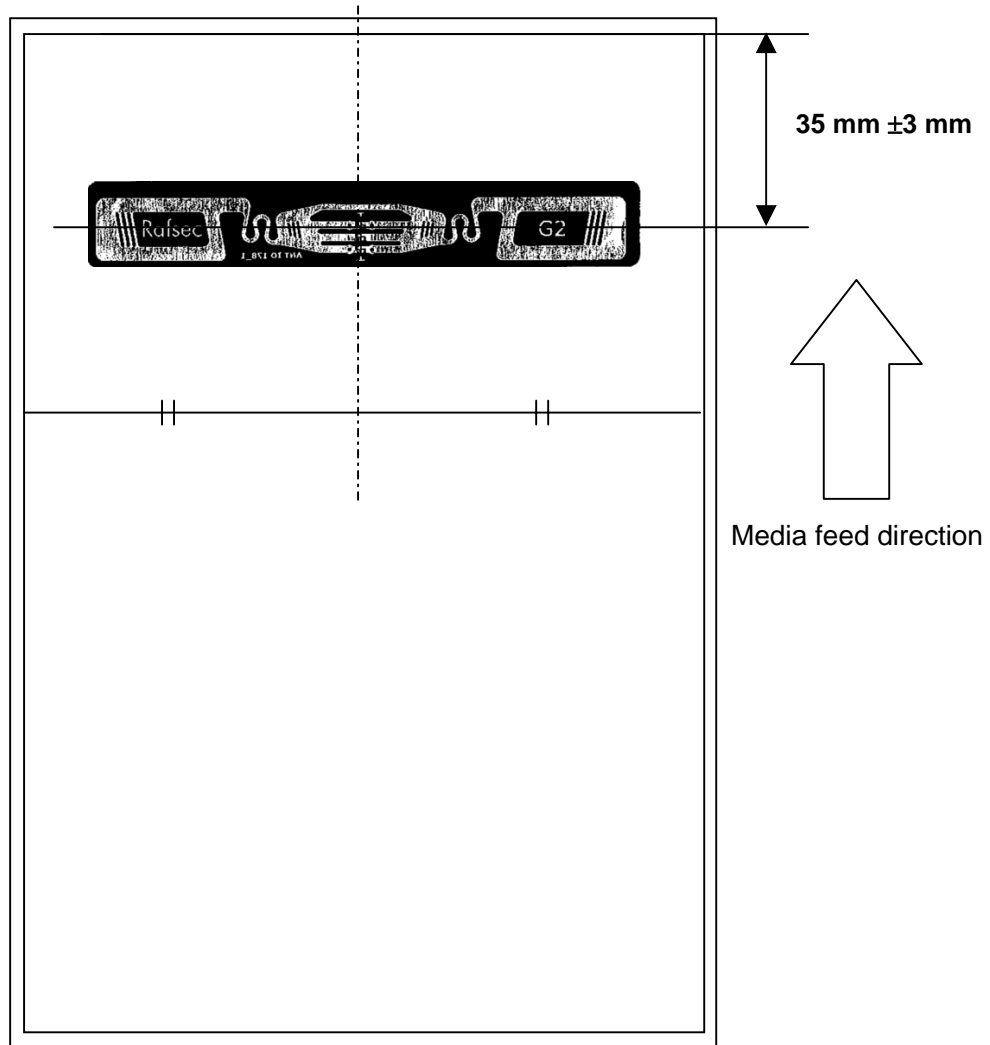
It is recommended to use the RFID Analyze Tool to evaluate the accuracy of writing data on an RFID tag to be used, then determine a specific location of the RFID tag.

If the RFID tag cannot be placed on the best location specified, perform a forward/reverse feed before a data write using the RFID Tag Position Adjustment Command ([ESC]@003).

Note that the best location described in this specification may not be applicable depending on the type or paper or glue even if the same RFID tags are used. This guideline applies to RFID labels for thermal transfer issue. When using the media made of PET or thermal paper, the best location needs to be found again.

(1) UPM Raflatac's Rafsec Short Dipole 2 Tag

It is recommended to locate the vertical center of an RFID tag at 35 mm ± 3 mm from a leading edge of a label and align the horizontal center with the horizontal center of the label.



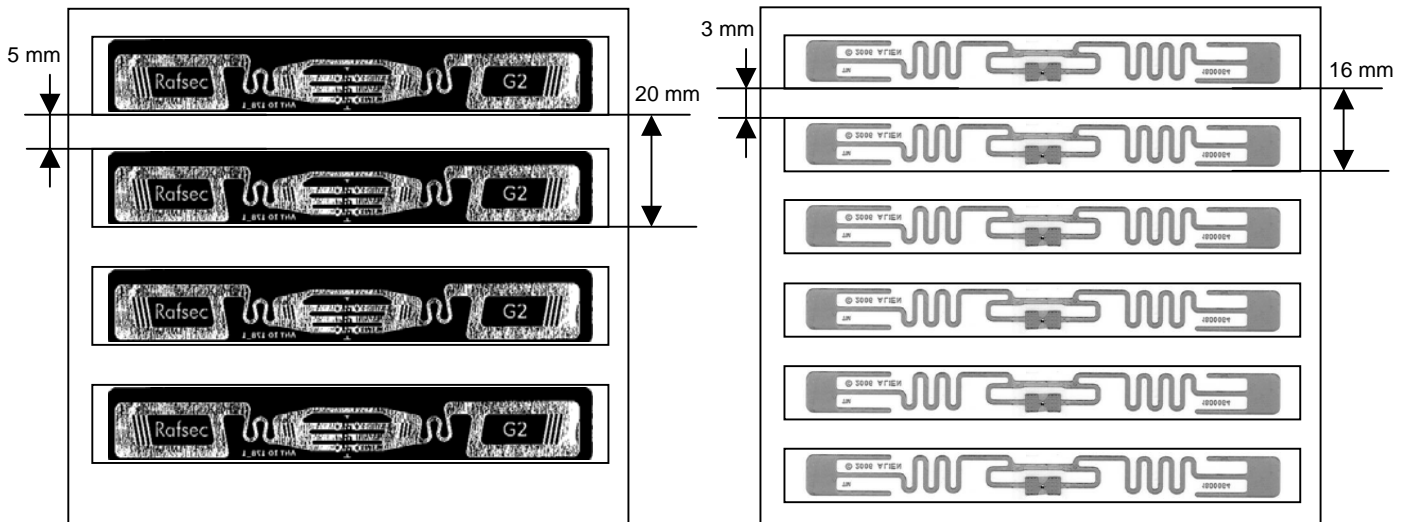
### 2.5.4 Short-pitch Tag

A short-pitch tag kit is supplied with the B-SX704-RFID-U2-EU/AU-R to enable the RFID kit to encode short-pitch tags properly. When the short-pitch tag kit is attached to the printer, the write field will be narrower.

The RFID kit is designed so that the second label is positioned just above the antenna while the first label is at the print start position, when using the following short-pitch label.

For B-SX704-RFID-U2-EU-R

For B-SX704-RFID-U2-AU-R



After printing a label, a reverse feed for a distance equivalent to one label pitch is required to write data onto its tag. During this reverse feed, the bottom edge of the printed label may be stuck on the print head edge, causing a feed jam. This is because the labels become thicker due to embedded tags. When several labels are issued in a batch, set the offset printing parameter to 1 (Offset printing is performed without a reverse feed of the first label.) in order to make the printer issue labels without performing a reverse feed. In this case, however, the printer does not print or write data on the first label, so it is wasteful. This mode is not suitable for applications where a small number of labels are issued on an as-needed basis.

For details of the offset printing feature, refer to the B-SX4T/SX5T External Equipment Interface Specification (EAA-1380).

### 2.5.5 Cautions for using RFID Tags

#### 1) Lift-up of Print Head

An RFID tag chip or the thermal head may be damaged when the thermal head passes over the chip. This can be prevented by using the ribbon saving module (standard feature for the B-SX5T and optional for the B-SX4T) by which the thermal head is lifted up preventing it from touching the chip when it passes over the chip.

When the thermal head is lifted up, the distance from the platen roller to the head is approximately 1 mm.

#### 2) Storage of RFID Supplies

Do not store RFID tags close to printers, or their communication performance may not be as specified when they are used.

**3) Roll-type RFID Supplies**

When RFID supplies are to be rolled, roll hardness must be concerned.

Although it depends on the type of glue, tag, and backing paper, RFID-tag embedded labels tend to stay rolled. Especially, when they are wound outside, a media jam error may occur. Unless otherwise specified, it is recommended that the RFID-tag embedded labels be wound inside.

**4) Sensor**

When the transmissive sensor or reflective sensor is enabled, transmissivity or reflectivity of a label or tag may vary at an RFID-tag embedded area depending on the pattern of an antenna or other factors. In such cases, a manual threshold setting is required in the printer system mode. For details, refer to the B-SX4T/5T Key Operation Specifications (EAA-1379).

**5) Cutter**

When an RFID label or tag is used in cut issue mode, care must be taken not to cut the antenna or the IC chip of an RFID tag in order not to damage the cutter.

**6) Static Electricity**

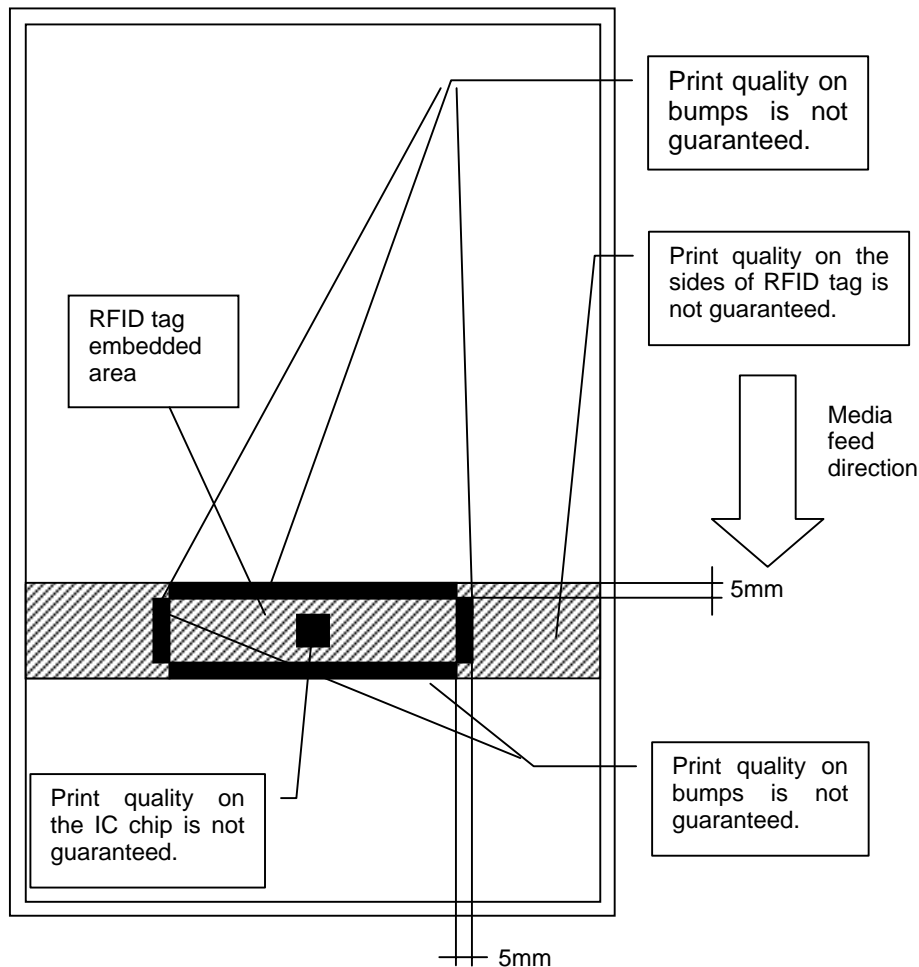
When printing is performed in a place where humidity is low or under some specific conditions, writing data on an RFID tag may fail due to static electricity generated by a label or a ribbon.

## 7) Printing on Bump (Chip/Antenna) Area

Embedding RFID tags in labels creates bumps in a chip/antenna area in the labels, causing incomplete printing.

Especially, in the areas 5 mm from and left and right sides of the RFID-tag embedded area shown in the figure below, uneven printing or incomplete printing can occur easily.

\* The degree of poor printing quality differs depending on height of a chip/antenna used.



## 8) Ambient temperature

Low operating temperature deteriorates wireless performance, under which conditions writing data on an RFID tag may fail.

## 9) Strip issue

Stripping performance in strip issue mode depends on the type of glue, tag, and backing paper. For some RFID supplies used, an issue may not be performed properly in strip issue mode.

**10) Caution for minimum label pitch length**

When short-pitch media is used, data may be written on a next RFID tag instead of the target RFID tag. As the location, where data is to be written, differs among RFID tag types, a check must be performed using the labels to be used to make sure that the data is written on the target RFID tags. The RFID Analyze Tool (7FM001113) can be used for this purpose.

**11) Defective RFID Tag**

Defective tags could be embedded while they are converted into labels, and the error rate differs depending on the tag types or the conversion methods.

Label manufacturers should mark such defective labels with something to indicate the tag is defective, or should prevent defective tags from being used.

Also, how to identify defective tags and good tags should be properly notified to end users.

**12) PRINT POSITION ACCURACY**

When using RFID tag embedded media, the print position accuracy may exceed the guaranteed tolerance of  $\pm 1$  mm in all issue modes.

It is required to check the print position accuracy for each media type.

**13) PAPER JAM ERROR**

Depending on the type of glue or the flexibility of labels, a label may come unstuck in front of the sensor unit, which cause a paper jam. Particularly, the frequency of paper jam could become higher on the condition of low operating temperature or use of short-pitch labels.

It is required to check the media feed using the media to be used under the actual operating environment.



### 2.5.6 Improvement of Writing Accuracy

As RFID tags use wireless technologies, writing data on the RFID tag may fail depending on environment and characteristics of the RFID tags.

In order to improve the accuracy of writing data on the RFID tags, the following method can be used:

(1) Change of the maximum number of write retries

The maximum number of write retries is variable and can be changed in the system mode. Setting the greater value can improve the writing accuracy. However, overall printing throughput may become worse because a retry is also performed for tags on which data cannot be written. For details of settings, refer to the B-SX4T/SX5T Key Operation Specification (EAA-1379).

(2) Enabling of RFID adjustment for retry

The printer has the RFID adjustment for retry feature. If writing data on the RFID tag fails, the printer automatically feeds the RFID tag forward or backward for a specified length in order to retry a data write.

Enabling this feature can improve the writing accuracy. However, overall printing throughput may become worse because a retry is performed even for defective tags.

For details of settings, refer to the B-SX4T/SX5T Key Operation Specification (EAA-1379).

(3) Adjustment of location of antenna

When writing data on tags, especially on short-pitch tags, the antenna may communicate with non-target tags, and this lowers the write rate.

The B-SX4T/SX5T has a feature to pinpoint a target tag by evaluating the output power (AGC) of tags. Setting an AGC threshold for data write enables choosing a tag of which AGC is higher than the threshold, determining this tag to be a target tag positioned just above the antenna, and writing data on it. This feature can prevent writing data to non-target tags (= off the antenna).

For details of settings, refer to the B-SX4T/SX5T Key Operation Specification (EAA-1379).

## 2.6 SPECIFICATION OF RFID TAG (for B-SX704-RFID-U2-US-R)

### 2.6.1 General Description

The RFID supplies are RFID tag (wireless IC tag) inlays designed to be converted into tag and label applications. Printers, which are equipped with an RFID kit, can print data on the surface of RFID supplies as well as write data on the embedded RFID tags.

The B-SX704-RFID-U2-US-R (Serial Number: 2808Yxxxxxx and earlier) is destined for U.S.A./Canada and operates in the UHF band (902.75-927.5 MHz).

The B-SX704-RFID-U2-US-R (Serial Number: 2809Axxxxxx or later) is destined for U.S.A./Canada, Australia, South Korea, Taiwan and operates in the following UHF band.

U.S.A./Canada: 902.75 to 927.5 MHz

Australia: 918.25 to 925.75 MHz

South Korea: 910.4 to 913.6 MHz

Taiwan: 922.25 to 927.25 MHz

### 2.6.2 Available RFID Tag

- EPC Generation 2, ISO-18000-6C

### 2.6.3 Location of RFID Tag

The location of an RFID tag in a label influences on the accuracy of writing data on the RFID tag. It is impossible to define the one best location for every RFID tag in labels because the best location depends on the type of RFID tag and RFID tag antenna.

The RFID Analyze Tool (7FM001113) can evaluate the accuracy of writing data on the RFID tag. For the usage of this tool, refer to the RFID Analyze Tool Operation Specification (TAA-2195).

As a guideline, the best location for some common RFID tags is given below.

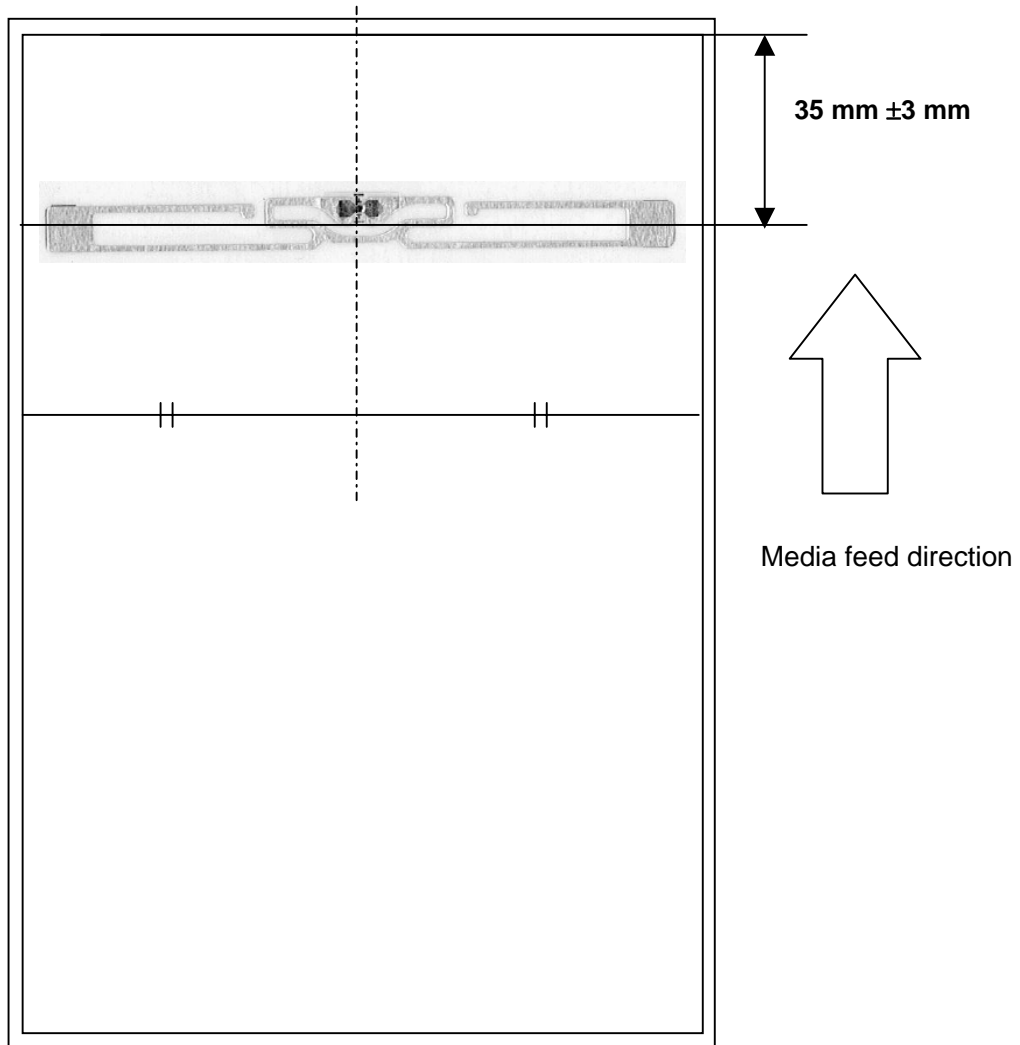
It is recommended to use the RFID Analyze Tool to evaluate the accuracy of writing data on an RFID tag to be used, then determine a specific location of the RFID tag.

If the RFID tag cannot be placed on the best location specified, perform a forward/reverse feed before a data write using the RFID Tag Position Adjustment Command ([ESC]@003).

Note that the best location described in this specification may not be applicable depending on the type or paper or glue even if the same RFID tags are used. This guideline applies to RFID labels for thermal transfer issue. When using the media made of PET or thermal paper, the best location needs to be found again.

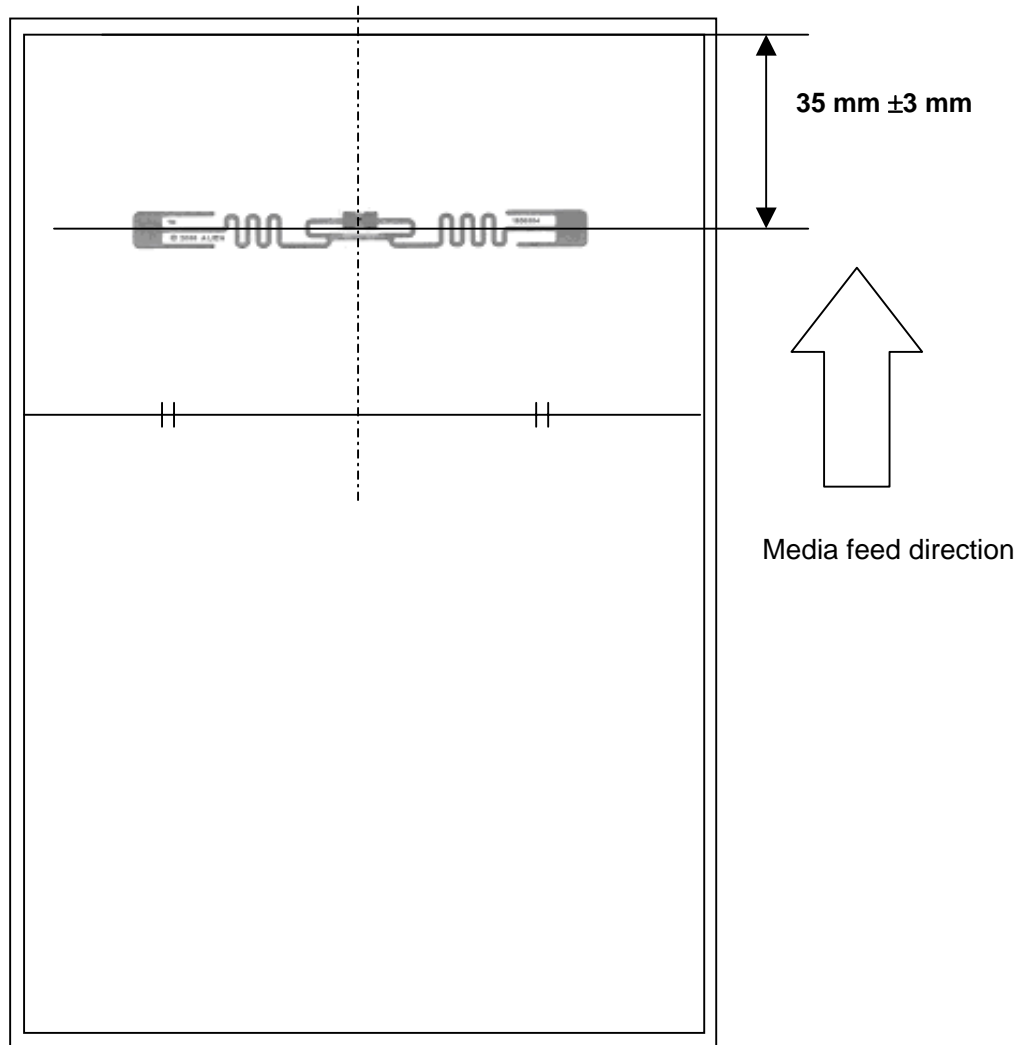
(1) Avery Dennison AD-222 Tag

It is recommended to locate the vertical center of an RFID tag at 35 mm  $\pm$  3 mm from a leading edge of a label and align the horizontal center with the horizontal center of the label.



(2) Alien Squiggle Tag

It is recommended to locate the vertical center of an RFID tag at 35 mm ± 3 mm from a leading edge of a label and align the horizontal center with the horizontal center of the label.

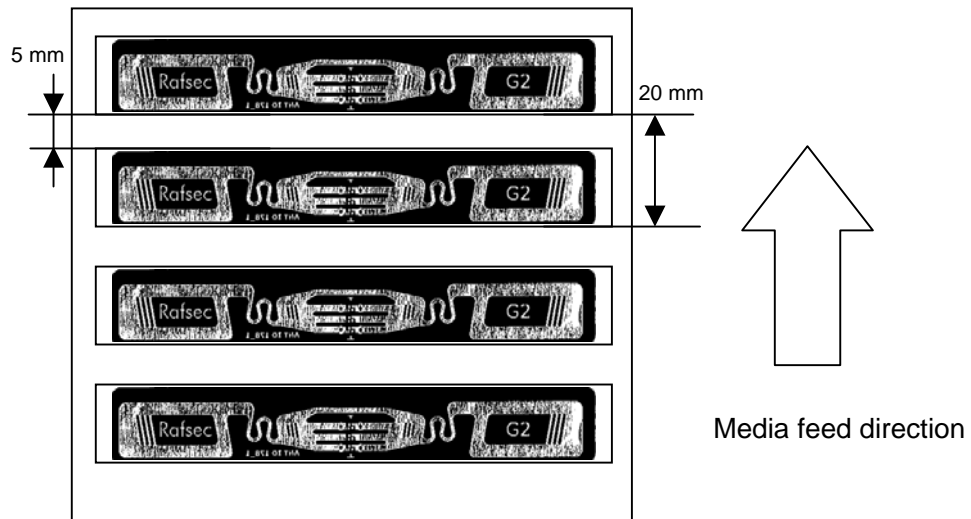


### 2.6.4 Short-pitch Tag

A short-pitch tag kit is supplied with the B-SX704-RFID-U2-US-R to enable the RFID kit to encode short-pitch tags properly. When the short-pitch tag kit is attached to the printer, the write field will be narrower.

The RFID kit is designed so that the second label is positioned just above the antenna while the first label is at the print start position, when using the following short-pitch label.

Rafsec Short Dipole2 Tag



After printing a label, a reverse feed for a distance equivalent to one label pitch is required to write data onto its tag. During this reverse feed, the bottom edge of the printed label may be stuck on the print head edge, causing a feed jam. This is because the labels become thicker due to embedded tags. In most cases, this problem can be avoided by enabling the ribbon saving function of the printer which raises the thermal head during a reverse feed. When using short-pitch tags, enable the ribbon saving function.

When several labels are issued in a batch, set the offset printing parameter to 1 (Offset printing is performed without a reverse feed of the first label.) in order to make the printer issue labels without performing a reverse feed. In this case, however, the printer does not print or write data on the first label, so it is wasteful. This mode is not suitable for applications where a small number of labels are issued on an as-needed basis.

For details of the offset printing feature, refer to the B-SX4T/SX5T External Equipment Interface Specification (TAA-1380).

[Printer settings for use of short-pitch tags]

In the printer system mode, set the RFID-related parameters as follows:

Q value: 2, WT AGC (AGC threshold for data write): 10, WT MIN AGC (AGC threshold lower limit for retry): 10

When using short-pitch tags, a target tag is identified by measuring the AGC of tags within the read range. A tag of which AGC is equal to or higher than the specified threshold (10) is considered to be positioned just above the antenna (=target tag), and a data write is performed on it.

When the AGC is less than the threshold, a data write is not performed on such tag.

### **2.6.5 Cautions for using RFID Tags**

#### **1) Lift-up of Print Head**

An RFID tag chip or the thermal head may be damaged when the thermal head passes over the chip. This can be prevented by using the ribbon saving module (standard feature for the B-SX5T and optional for the B-SX4T) by which the thermal head is lifted up preventing it from touching the chip when it passes over the chip.

When the thermal head is lifted up, the distance from the platen roller to the head is approximately 1 mm.

#### **2) Storage of RFID Supplies**

Do not store RFID tags close to printers, or their communication performance may not be as specified when they are used.

#### **3) Roll-type RFID Supplies**

When RFID supplies are to be rolled, roll hardness must be concerned.

Although it depends on the type of glue, tag, and backing paper, RFID-tag embedded labels tend to stay rolled. Especially, when they are wound outside, a media jam error may occur. Unless otherwise specified, it is recommended that the RFID-tag embedded labels be wound inside.

#### **4) Sensor**

When the transmissive sensor or reflective sensor is enabled, transmissivity or reflectivity of a label or tag may vary at an RFID-tag embedded area depending on the pattern of an antenna or other factors. In such cases, a manual threshold setting is required in the printer system mode. For details, refer to the B-SX4T/5T Key Operation Specifications (EAA-1379).

#### **5) Cutter**

When an RFID label or tag is used in cut issue mode, care must be taken not to cut the antenna or the IC chip of an RFID tag in order not to damage the cutter.

#### **6) Static Electricity**

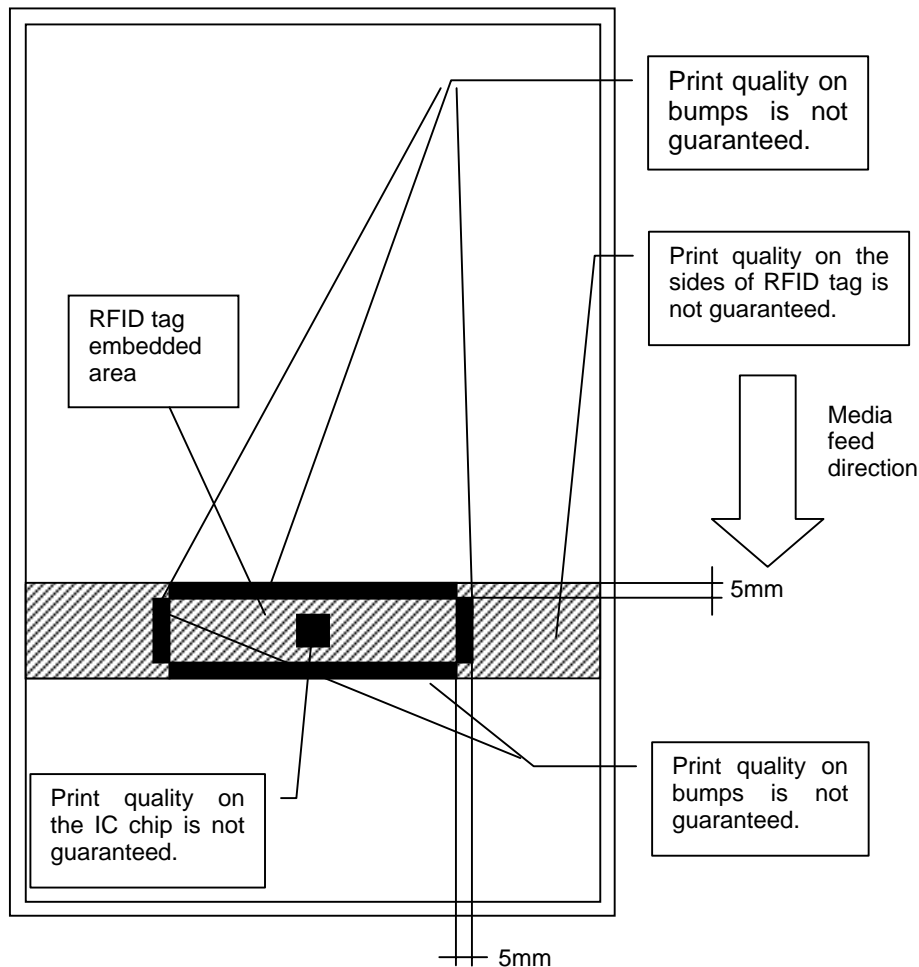
When printing is performed in a place where humidity is low or under some specific conditions, writing data on an RFID tag may fail due to static electricity generated by a label or a ribbon.

### 7) Printing on Bump (Chip/Antenna) Area

Embedding RFID tags in labels creates bumps in a chip/antenna area in the labels, causing incomplete printing.

Especially, in the areas 5 mm from and left and right sides of the RFID-tag embedded area shown in the figure below, uneven printing or incomplete printing can occur easily.

\* The degree of poor printing quality differs depending on height of a chip/antenna used.



### 8) Ambient temperature

Low operating temperature deteriorates wireless performance, under which conditions writing data on an RFID tag may fail.

### 9) Strip issue

Stripping performance in strip issue mode depends on the type of glue, tag, and backing paper. For some RFID supplies used, an issue may not be performed properly in strip issue mode.

**10) Caution for minimum label pitch length**

When short-pitch media is used, data may be written on a next RFID tag instead of the target RFID tag. As the location, where data is to be written, differs among RFID tag types, a check must be performed using the labels to be used to make sure that the data is written on the target RFID tags. The RFID Analyze Tool (7FM001113) can be used for this purpose.

**11) Defective RFID Tag**

Defective tags could be embedded while they are converted into labels, and the error rate differs depending on the tag types or the conversion methods.

Label manufacturers should mark such defective labels with something to indicate the tag is defective, or should prevent defective tags from being used.

Also, how to identify defective tags and good tags should be properly notified to end users.

**12) PRINT POSITION ACCURACY**

When using RFID tag embedded media, the print position accuracy may exceed the guaranteed tolerance of  $\pm 1$  mm in all issue modes.

It is required to check the print position accuracy for each media type.

**13) PAPER JAM ERROR**

Depending on the type of glue or the flexibility of labels, a label may come unstuck in front of the sensor unit, which cause a paper jam. Particularly, the frequency of paper jam could become higher on the condition of low operating temperature or use of short-pitch labels.

It is required to check the media feed using the media to be used under the actual operating environment.



### 2.6.6 Improvement of Writing Accuracy

As RFID tags use wireless technologies, writing data on the RFID tag may fail depending on environment and characteristics of the RFID tags.

In order to improve the accuracy of writing data on the RFID tags, the following method can be used:

- (1) Change of the maximum number of write retries  
The maximum number of write retries is variable and can be changed in the system mode. Setting the greater value can improve the writing accuracy. However, overall printing throughput may become worse because a retry is also performed for tags on which data cannot be written. For details of settings, refer to the B-SX4T/SX5T Key Operation Specification (TAA-1379).
- (2) Enabling of RFID adjustment for retry  
The printer has the RFID adjustment for retry feature. If writing data on the RFID tag fails, the printer automatically feeds the RFID tag forward or backward for a specified length in order to retry a data write.  
Enabling this feature can improve the writing accuracy. However, overall printing throughput may become worse because a retry is performed even for defective tags.  
For details of settings, refer to the B-SX4T/SX5T Key Operation Specification (TAA-1379).
- (3) Adjustment of location of antenna  
When writing data on tags, especially on short-pitch tags, the antenna may communicate with non-target tags, and this lowers the write rate.  
The B-SX4T/SX5T has a feature to pinpoint a target tag by evaluating the output power (AGC) of tags. Setting an AGC threshold for data write enables choosing a tag of which AGC is higher than the threshold, determining this tag to be a target tag positioned just above the antenna, and writing data on it. This feature can prevent writing data to non-target tags (= off the antenna).  
For details of settings, refer to the B-SX4T/SX5T Key Operation Specification (TAA-1379).

## 2.7 SPECIFICATION OF RFID TAG (for B-SX704-RFID-U2-CN-R)

### 2.7.1 General Description

The RFID supplies are RFID tag (wireless IC tag) inlays designed to be converted into tag and label applications. Printers, which are equipped with an RFID kit, can print data on the surface of RFID supplies as well as write data on the embedded RFID tags.

The B-SX704-RFID-U2-CN-R is destined for China and operates in the UHF band (920.625-924.375 MHz).

### 2.7.2 Available RFID Tag

- EPC Class1 Generation 2

### 2.7.3 Location of RFID Tag

The location of an RFID tag in a label influences on the accuracy of writing data on the RFID tag. It is impossible to define the one best location for every RFID tag in labels because the best location depends on the type of RFID tag and RFID tag antenna.

The RFID Analyze Tool can evaluate the accuracy of writing data on the RFID tag. For the usage of this tool, refer to the RFID Analyze Tool Operation Specification (TAA-2195).

As a guideline, the best location for some common RFID tags is given below.

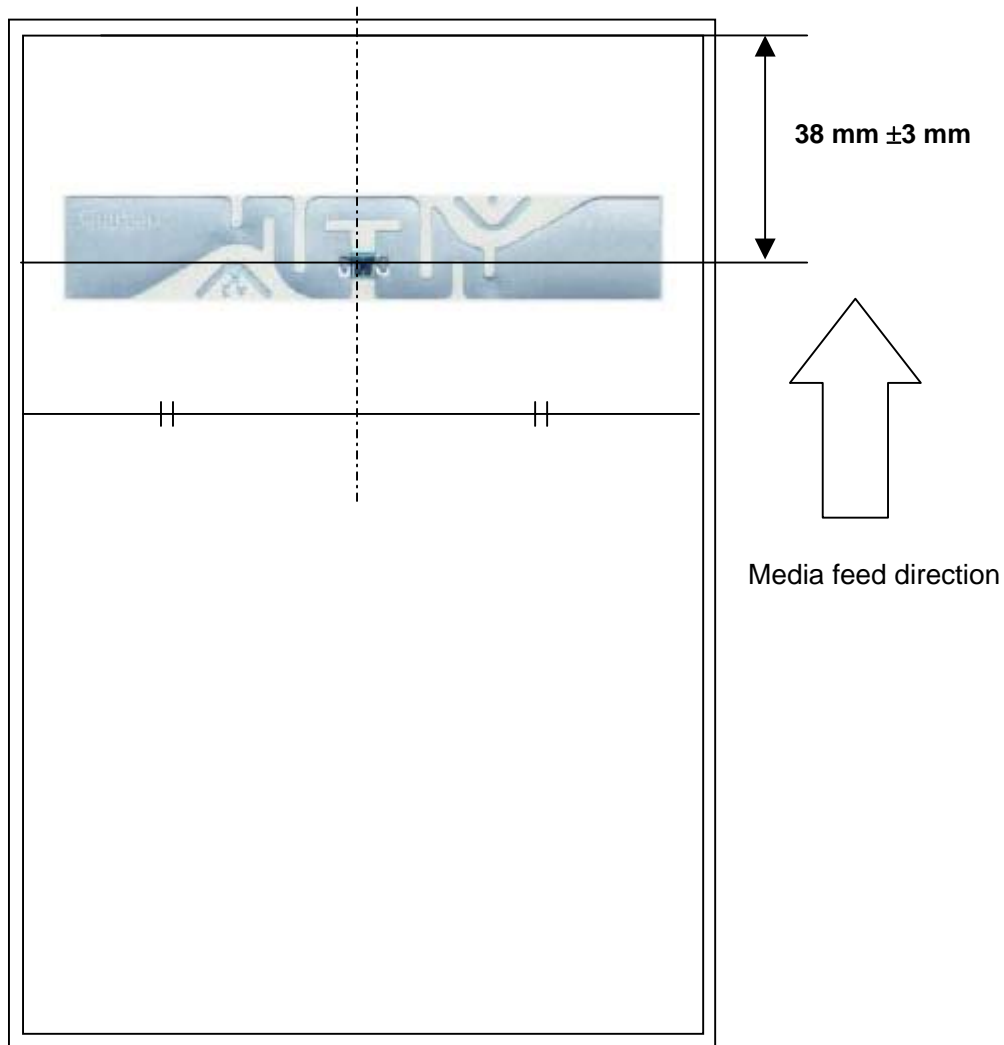
It is recommended to use the RFID Analyze Tool to evaluate the accuracy of writing data on an RFID tag to be used, then determine a specific location of the RFID tag.

If the RFID tag cannot be placed on the best location specified, perform a forward/reverse feed before a data write using the RFID Tag Position Adjustment Command ([ESC]@003).

Note that the best location described in this specification may not be applicable depending on the type or paper or glue even if the same RFID tags are used. This guideline applies to RFID labels for thermal transfer issue. When using the media made of PET or thermal paper, the best location needs to be found again.

## (1) Omron Wave tag

It is recommended to locate the vertical center of an RFID tag at  $38\text{ mm} \pm 3\text{ mm}$  from a leading edge of a label and align the horizontal center with the horizontal center of the label.



## [Printer settings for use of this tag]

In the printer system mode, set the RFID-related parameters as follows:

Q value: 2, WT AGC (AGC threshold for data write): 10, WT MIN AGC (AGC threshold lower limit for retry): 10

As the AGC value of this tag is high, the antenna may be able to communicate with non-target tags. To prevent interferences from non-target tags, a target tag is identified by measuring the AGC of the tags within the read range. A tag of which AGC is equal to or higher than the specified threshold (10) is considered to be positioned just above the antenna (=target tag), and a data write is performed on it. When the AGC is less than the threshold, a data write is not performed on such tags.

### 2.7.4 Short-pitch Tag

A short-pitch tag kit is supplied with the B-SX704-RFID-U2-CN-R to enable the RFID kit to encode short-pitch tags properly.

However, an adjustment will be necessary for each type of short-pitch tags individually. When short-pitch tags are used, consult TOSHIBA TEC Japan.

### 2.7.5 Cautions for using RFID Tags

#### 1) Lift-up of Print Head

An RFID tag chip or the thermal head may be damaged when the thermal head passes over the chip. This can be prevented by using the ribbon saving module (standard feature for the B-SX5T and optional for the B-SX4T) by which the thermal head is lifted up preventing it from touching the chip when it passes over the chip.

When the thermal head is lifted up, the distance from the platen roller to the head is approximately 1 mm.

#### 2) Storage of RFID Supplies

Do not store RFID tags close to printers, or their communication performance may not be as specified when they are used.

#### 3) Roll-type RFID Supplies

When RFID supplies are to be rolled, roll hardness must be concerned.

Although it depends on the type of glue, tag, and backing paper, RFID-tag embedded labels tend to stay rolled. Especially, when they are wound outside, a media jam error may occur. Unless otherwise specified, it is recommended that the RFID-tag embedded labels be wound inside.

#### 4) Sensor

When the transmissive sensor or reflective sensor is enabled, transmissivity or reflectivity of a label or tag may vary at an RFID-tag embedded area depending on the pattern of an antenna or other factors. In such cases, a manual threshold setting is required in the printer system mode. For details, refer to the B-SX4T/5T Key Operation Specifications (EAA-1379).

#### 5) Cutter

When an RFID label or tag is used in cut issue mode, care must be taken not to cut the antenna or the IC chip of an RFID tag in order not to damage the cutter.

#### 6) Static Electricity

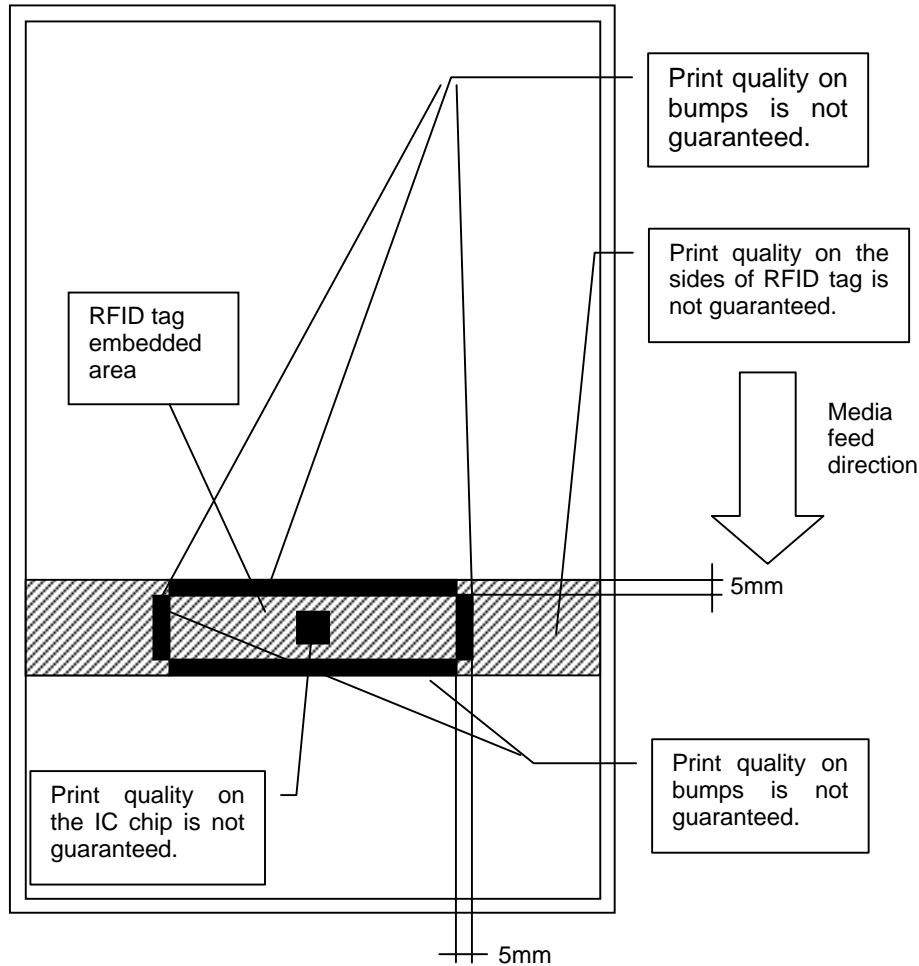
When printing is performed in a place where humidity is low or under some specific conditions, writing data on an RFID tag may fail due to static electricity generated by a label or a ribbon.

7) Printing on Bump (Chip/Antenna) Area

Embedding RFID tags in labels creates bumps in a chip/antenna area in the labels, causing incomplete printing.

Especially, in the areas 5 mm from and left and right sides of the RFID-tag embedded area shown in the figure below, uneven printing or incomplete printing can occur easily.

\* The degree of poor printing quality differs depending on height of a chip/antenna used.



8) Ambient temperature

Low operating temperature deteriorates wireless performance, under which conditions writing data on an RFID tag may fail.

9) Strip issue

Stripping performance in strip issue mode depends on the type of glue, tag, and backing paper. For some RFID supplies used, an issue may not be performed properly in strip issue mode.

**10) Caution for minimum label pitch length**

When short-pitch media is used, data may be written on a next RFID tag instead of the target RFID tag. As the location, where data is to be written, differs among RFID tag types, a check must be performed using the labels to be used to make sure that the data is written on the target RFID tags. The RFID Analyze Tool can be used for this purpose.

**11) Defective RFID Tag**

Defective tags could be embedded while they are converted into labels, and the error rate differs depending on the tag types or the conversion methods.

Label manufacturers should mark such defective labels with something to indicate the tag is defective, or should prevent defective tags from being used.

Also, how to identify defective tags and good tags should be properly notified to end users.

**12) PRINT POSITION ACCURACY**

When using RFID tag embedded media, the print position accuracy may exceed the guaranteed tolerance of  $\pm 1$  mm in all issue modes.

It is required to check the print position accuracy for each media type.

**13) PAPER JAM ERROR**

Depending on the type of glue or the flexibility of labels, a label may come unstuck in front of the sensor unit, which cause a paper jam. Particularly, the frequency of paper jam could become higher on the condition of low operating temperature or use of short-pitch labels.

It is required to check the media feed using the media to be used under the actual operating environment.

### 2.7.6 Improvement of Writing Accuracy

As RFID tags use wireless technologies, writing data on the RFID tag may fail depending on environment and characteristics of the RFID tags.

In order to improve the accuracy of writing data on the RFID tags, the following method can be used:

(1) Change of the maximum number of write retries

The maximum number of write retries is variable and can be changed in the system mode. Setting the greater value can improve the writing accuracy. However, overall printing throughput may become worse because a retry is also performed for tags on which data cannot be written. For details of settings, refer to the B-SX4T/SX5T Key Operation Specification (EAA-1379).

(2) Enabling of RFID adjustment for retry

The printer has the RFID adjustment for retry feature. If writing data on the RFID tag fails, the printer automatically feeds the RFID tag forward or backward for a specified length in order to retry a data write.

Enabling this feature can improve the writing accuracy. However, overall printing throughput may become worse because a retry is performed even for defective tags.

For details of settings, refer to the B-SX4T/SX5T Key Operation Specification (EAA-1379).

(3) Adjustment of location of antenna

When writing data on tags, especially on short-pitch tags, the antenna may communicate with non-target tags, and this lowers the write rate.

The B-SX4T/SX5T has a feature to pinpoint a target tag by evaluating the output power (AGC) of tags. Setting an AGC threshold for data write enables choosing a tag of which AGC is higher than the threshold, determining this tag to be a target tag positioned just above the antenna, and writing data on it. This feature can prevent writing data to non-target tags (= off the antenna).

For details of settings, refer to the B-SX4T/SX5T Key Operation Specification (EAA-1379).

## 3. OPTIONAL KIT

Option Name	Type	Applicable Model		Use
		B-SX4T/5T- QQ/QP	B-SX4T/5T-QM-R	
Swing cutter module	B-4205-QM	O	X	This cutter module uses a swing or rotary cutter. It cuts backing paper of labels and tag paper automatically in "Stop and cut" mode.
	B-4205-QM-R	X	O	
Rotary cutter module	B-8204-QM	O	X	
	B-8204-QM-R	X	O	
Strip module (B-SX4T only)	B-9904-H-QM	O	X	This strip module strips the label from the backing paper with the take-up block and strip block. When the rewriter guide plate is attached, the tag paper and label with backing paper are wound.
	B-9904-H-QM-R	X	O	
Ribbon saving module (B-SX4T only)	B-9904-R/R2-QM	O	X	The ribbon saving module moves the print head up and down by using a solenoid to save the ribbon loss as far as possible.
	B-9904-R2-QM-R	X	O	
PCMCIA interface board	B-9700-PCM-QM	O	X	This board enables use of the following PCMCIA cards. LAN card: 3 COM EtherLink® III (recommended) ATA card: Conforming to PC card ATA standard Flash memory card: 1MB and 4MB card
	B-9700-PCM-QM-R	X	O	
Expansion I/O interface board (B-SX4T only)	B-7704-IO-QM	O	X	Installing this board allows connection to external devices.
	B-7704-IO-QM-R	X	O	
Built-in LAN interface board	B-9700-LAN-QM	O	X	This board enables the printer to be used in a LAN network.
	B-9700-LAN-QM-R	X	O	
USB interface board	B-9700-USB-QM	O	X	Installing this board enables a connection with a PC which has a USB interface.
	B-9700-USB-QM-R	X	O	
RFID module	B-9704-RFID-U1-US	O	X	Installing this module enables read and write of RFID tags. Applicable frequency band differs depending on the module types: U1-US: UHF, 902MHz to 928MHz U1-EU/EU-R: UHF, 869.5MHz H1-QM/QM-R: HF, 13.56MHz U2-EU-R: UHF, 869.7-870.0MHz U2-AU-R: UHF, 918.25-925.75MHz U2-US-R (US): UHF, 902.75 to 927.5MHz (AU): UHF, 918.25 to 925.75MHz (TW): UHF, 922.25 to 927.25MHz (KR): UHF, 910.4 to 913.6MHz U2-CN-R: UHF, 920.625-924.375MHz
	B-9704-RFID-U1-EU			
	B-9704-RFID-H1-QM			
	B-9704-RFID-H1-QM-R	O	O	
	B-9704-RFID-U1-EU-R	X	O	
	B-SX704-RFID-U2-EU/AU/US/CN-R	X	O	
Fanfold Paper Guide	B-4905-FF-QM	O	X	This is a paper guide exclusively used for fanfold paper. Attaching it in place of the standard paper guide allows the printer to print on fanfold paper.
	B-4905-FF-QM-R	O	O	
Wireless LAN Module	B-9700-WLAN-QM-R	X	O	Installing this PC board allows a communication by wireless LAN.

O: Installable

X: Not installable

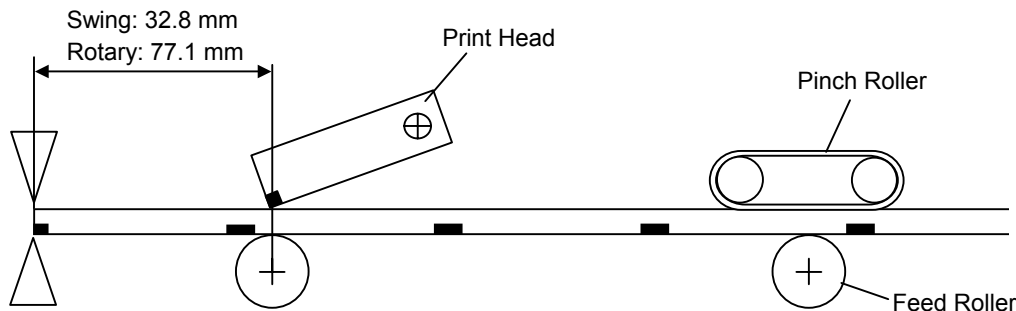
**NOTE:** To purchase the optional kits, please contact the TOSHIBA TEC Head Quarters.



### 3.1 CUTTER MODULE: B-4205-QM/QM-R (Swing Cutter), B-8204-QM/QM-R (Rotary Cutter)

This compact cutter module uses a built-in swing/rotary cutter. The specification is provided below:

Cutter Type		B-4205-QM/QM-R	B-8204-QM/QM-R
Cut method		Stop and cut	Rotary cut
Media width		B-SX4T	30.0 mm – 112.0 mm
		B-SX5T	30.0 mm – 140.0 mm
Media pitch	B-SX4T	Tag	25.4 mm – 1500.0 mm
		Label	38.0 mm – 1500.0 mm
	B-SX5T	Tag	25.4 mm – 1500.0 mm
		Label	38.0 mm – 1500.0 mm
Media thickness		Tag	0.15 – 0.29 mm
		Label	0.13 – 0.17 mm
Cutter life		300000 cuts (0.274-mm thick tag paper) 1000000 cuts (0.160-mm thick tag paper)	
Home position detection		Micro switch	Photo coupler



### 3.2 STRIP MODULE: B-9904-H-QM/QM-R (option for the B-SX4T)

This strip module consists of the take-up block and the strip block. Installing the strip module enables the printer to not only remove labels from the backing paper, but wind the tag paper or label with backing paper onto the take-up spool by using the rewinder guide plate. The rewind full sensor is provided to detect the overflow if the wound tag paper or label exceeds the specified amount is provide.

### 3.3 RIBBON SAVING MODULE: B-9904-R-QM (option for the B-SX4T)

By moving the print head up and down with a solenoid, the ribbon saving module saves loss of the ribbon as far as possible. It is small enough to be put into the print block.

### 3.4 RIBBON SAVING MODULE: B-9904-R2-QM/QM-R (option for the B-SX4T)

This ribbon saving module uses the solenoid with stronger pull force, which improves the ribbon saving function. It is necessary to upgrade the firmware to V1.2A or greater to use this module.

### 3.5 PCMCIA INTERFACE BOARD: B-9700-PCM-QM/QM-R

The PCMCIA Interface board allows use of the following ATA card, LAN card, or flash memory card when connected to the CPU PC board.

- Number of slots: Type II slot - 2 slots

Type	Maker	Description	Remarks	
ATA Card	San Disk, Hitachi	A card conforming to the PC card ATA standard	-----	
LAN Card	3 COM	3CCE589ET Series	Install into the slot (2) only. (This card installed into the slot (1) will not work.)	
Flash Memory Card (4 MB)	Maxell	EF-4M-TB [CC]	Read/Write	
	Maxell	EF-4M-TB [DC]		
	Centennial Technologies INC.	FL04M-15-11119-03		
	Flash Memory Card (1 MB)	INTEL	IMC004FLSA	Read (See NOTE.)
		Simple TECHNOLOGY	STI-FL/4A	
		Mitsubishi	MF84M1-G7DAT01	
		PC Card KING MAX	FJN-004M6C	
		Centennial Technologies Inc.	FL04M-20-11138-67	
		PC Card	FJP-004M6R	
Flash Memory Card (1 MB)	Maxell	EF-1M-TB [AA]		
	Mitsubishi	MF81M1-GBDAT01		

**NOTE:** Reading a read-only-type flash memory is possible if it has been used on the TOSHIBA TEC printer, such as B-472 and B-572.

### 3.6 EXPANSION I/O INTERFACE BOARD: B-7704-IO-QM/QM-R (option for the B-SX4T)

This interface board is used to connect the printer to external devices, such as a labeler. The input/output signals from the connected external devices can control label feeding or printing and indicate the print status.

### 3.7 BUILT-IN LAN INTERFACE BOARD: B-9700-LAN-QM/QM-R

This board enables the printer to connect to the host by means of Local Area Network.

- Supporting 10/100M bps
- Internal 32 bit wide data pass (for the packet buffer memory)
- Conforming to IEEE 802.3/802.3u, 100 Base-Tx/10Base-T physical layer
- Auto negotiation: 10/100M bps, Full/Half Duplex

### 3.8 USB INTERFACE BOARD: B-9700-USB-QM/QM-R

Installing this board enables a connection to a PC which has a USB interface.

- Conforming to USB 1.1
- Supporting Full-speed (12M bps) transmission
- Supporting the two types of data transmission types, Control transmission and Bulk transmission.

### 3.9 RFID MODULE: B-9704-RFID-U1-US/U1-EU/U1-EU-R/H1-QM/H1-QM-R

Installing this module enables the printer to write data on an RFID tag as well as to print on the surface of RFID supplies.

The three RFID module types are different from each other in frequency band and applicable countries.

**NOTE:**

1) *Non-RoHS type*

*An RFID module can be installed on an RFID-ready B-SX4T or B-SX5T printer only.*

*(Serial No. 2604Wxxxxxx or later)*

*Also, an RFID module is supported by firmware version V3.1 or greater (Main program) and V1.1A or V2.0A (Boot program).*

2) *RoHS type*

*An RFID module can be installed on the B-SX4T-GS20-QM-R or B-SX5T-TS22-QM-R.*

*Also, an RFID module is supported by firmware version V4.1 or greater (Main program) and V1.1A or V2.0A (Boot program).*

**Specification**

Item	B-9704-RFID-U1-US	B-9704-RFID-U1-EU/U1-EU-R	B-9704-RFID-H1-QM/H1-QM-R
RFID module to be used	AWID MPR-1510A-RM	U1-EU model AWID MPR-1580A-RM U1-EU-R model AWID MPR-1510 RM- V2.6HR1-EU	TagSys MEDIO S002 * An RFID module is not included in this model when shipped from the factory. (Note 3)
Frequency band	UHF (902 to 928MHz) FH-SS (Frequency Hopping Spectrum Spread)	UHF (869.525MHz)	HF (13.56MHz)
Applicable countries	U.S.A and Canada	Austria, Belgium, Cyprus, Czech, Denmark, Estonia, Germany, Greece, Finland, France, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, the Netherlands, and U.K.	
Available RFID tags	EPC Class 0 (Read only) EPC Class 1 ISO 18000-6B EPC Class 1 Gen 2		TAGSYS C210 TAGSYS C220 TAGSYS C240 I-Code Tag-It ISO 15693
Output power	500mW	500mW	200mW

### 3.10 RFID MODULE: B-SX704-RFID-U2-EU/AU/US/CN-R

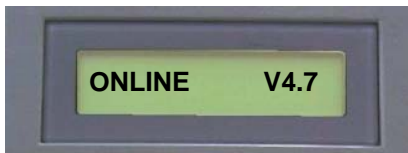
Installing this module enables the printer to write data on an RFID tag as well as to print on the surface of RFID supplies.

#### Applicable model:

- (1) This optional device is intended for the following models:  
 B-SX4T-GS20-QM/CN-R and B-SX5T-TS22-QM/CN-R, RFID ready printer.  
 An RFID Ready printer can be identified by the model name sticker on the front of the printer.  
 Be careful not to install this product in the B-SX4T-GS10-QQ/QQ-US, B-SX5T-TS10-QQ/QQ-US, B-SX4T-GS10-CN and B-SX5T-TS12-CN RFID Ready printers.
- (2) To use this device, printer firmware V4.5 or greater is required. Upgrade the firmware to V4.5 or greater, if necessary. For the downloading procedure, refer to the B-SX4T/SX5T Series Maintenance Manual.  
 Note that a RAM clear needs to be performed after downloading, so print out the maintenance counter and parameter settings prior to downloading. After performing a RAM clear, restore the printer parameter settings to the former states.
- (3) The countries where the use of this device is allowed are as follows:

Model Name	Frequency Band	Applicable Countries
B-SX704-RFID-U2-EU-R	UHF 869.7 to 870.0MHz (Center frequency: 869.85MHz)	EU member states and EFTA member states
B-SX704-RFID-U2-AU-R	UHF 918.25 to 925.75MHz (Center frequency: 922MHz)	Australia
B-SX704-RFID-U2-CN-R	UHF 920.625 to 924.375MHz (Center frequency: 922.5MHz)	China
B-SX704-RFID-U2-US-R (Serial Number: 2808Yxxxxxx and earlier)	UHF 902.75 to 927.5MHz (Center frequency: 915.125MHz)	U.S.A., Canada

- (4) As from the January 2009 production (Serial Number 2809Axxxxxx and after), the AU (Australia) specification has been supported by the B-SX704-RFID-U2-US-R RFID Module. Also the KR (South Korea) and TW (Taiwan) specifications have been added.  
 The firmware of the B-SX4T/SX5T-R series barcode printer should be V4.7 or greater. If V4.6A or less, please install the firmware V4.7 into the printer.  
 Make sure the firmware version is V4.7 and greater when turning on the printer.



When the firmware version is V4.6A or less, it is necessary to upgrade the firmware to V4.7 and greater. For the downloading procedure, refer to the B-SX4T/SX5T Series Maintenance Manual.  
 For the printer to which back side the sticker MAIN4-R is attached, the firmware V5.0 and greater has been installed. Since the firmware V5.0 and greater is exclusive to this printer, do not install the firmware V4.7 into it.



To use this device, printer firmware V4.7 or greater is required. Upgrade the firmware to V4.5 or greater, if necessary. For the downloading procedure, refer to Section 7 PROGRAM DOWN LOAD. Note that a RAM clear needs to be performed after downloading, so print out the maintenance counter and parameter settings prior to downloading. After performing a RAM clear, restore the printer parameter settings to the former states.

Destination Code Setting should be performed in the system mode of the printer according to the destination.

The countries where the use of this device is allowed are as follows:

Model Name	Setting	Frequency Band	Applicable Countries
B-SX704-RFID-U2-US-R (Serial Number: 2809Axxxxxx or later)	US	UHF 902.75 to 927.5MHz	U.S.A., Canada
	AU	UHF 918.25 to 925.75 MHz	Australia
	KR	UHF 910.4 to 913.6 MHz	South Korea
	TW	UHF 922.25 to 927.25 MHz	Taiwan

### Specification:

The specification of the B-SX704-RFID-U2-EU/AU/US/CN-R is as follows.

Item	Specification
Module	EU: TOSHIBA TEC TRW-EUM-01 for Europe AU: TOSHIBA TEC TRW-AUM-01 for Australia US (Serial Number 2808Yxxxxxx and earlier): TOSHIBA TEC TRW-USM-01 for U.S.A. and Canada US (Serial Number 2809Axxxxxx or earlier): TOSHIBA TEC TRW-USM-01 for U.S.A., Canada, Australia, South Korea, Taiwan CN: TOSHIBA TEC TRW-CNM-01 for CHina
Applicable standard	EU: ETSI EN 300 220 AU: C-Tick AS.NZS 428(2003); A1 US: FCC Part15 Subpart C TW: NCC (National Communications Commission) LP2002 Low-power Radio-frequency Devices Technical Specifications KR: KCC (Korea Communications Commission) Radio Certification Standard No. 2008-26 Article 98
Frequency range	EU: 869.7 - 870.0MHz AU: 918.25 - 925.75MHz US: 902.75 - 927.5MHz KR: 910.4 - 913.6 MHz TW: 922.25 - 927.25 MHz CN: 920.625 - 924.375MHz
Center frequency	EU: 869.85MHz AU: 922MHz US: 915.125MHz KR: 912MHz TW: 924.75MHz CN: 922.5MHz
Output power (ERP)	EU: Max. 5mW (Power class 7a)
Output power (Conducted)	10 - 100mW
Modulation method (RW→Tag)	DSB-ASK
Modulation method (Tag→RW)	Back scatter ASK
Transmission speed (RW→Tag)	40kbps
Transmission speed (Tag→RW)	40kbps
Encoding (RW→Tag)	PIE
Encoding (Tag→RW)	FM0
Number of channels	EU: 1 AU: 31 (Frequency Hopping) US: 99 (Frequency Hopping) TW: 21 (Frequency Hopping) KR: 17 (Frequency Hopping) CN: 16 (Frequency Hopping)
Duty Cycle	EU: Max. 100% (Class 4)
Carrier sense feature	None
Environmental standard	RoHS directive
Available RFID tags	EPC C1 Gen2, ISO-18000-6C

### 3.11 Wireless LAN Board: B-9700-WLAN-QM-R

#### ■ Hardware Specification

Item	Specification		
Wired LAN part	Connected to a wired LAN port of the printer.		
Wireless LAN part	IEEE802.11a	Transfer mode	Conforming to IEEE802.11a Orthogonal Frequency-Division Multiplexing (OFDM)
		Channel	Depending on countries
		Transmission speed	54, 48, 36, 24, 18, 12, 9, 6 (Mbps) (Fix/automatic)
		Access method	CSMA/CA+ACK (RTS/CTS)
		Wireless category	Small power data communication system (5.150 to 5.250GHz)
		Radio wave power	10mW/MHz or less
	IEEE802.11b	Transfer mode	Conforming to IEEE802.11b DSSS
		Channel	Depending on countries
		Transmission speed	11, 5.5, 2, 1 (Mbps) (Fix/automatic)
		Access method	CSMA/CA+ACK (RTS/CTS)
		Wireless category	Small power data communication system (2.4 to 2.497GHz)
		Radio wave power	10mW/MHz or less
	IEEE802.11g	Transfer mode	Conforming to IEEE802.11g OFDM, DSSS
		Channel	Depending on countries
		Transmission speed	54, 48, 36, 24, 18, 12, 9, 6, 11, 5.5, 2, 1 (Mbps) (Fix/automatic)
		Access method	CSMA/CA+ACK (RTS/CTS)
		Wireless category	Small power data communication system (2.4 to 2.4835GHz)
		Radio wave power	10mW/MHz or less
	Antenna	Chip type, diversity antenna	

#### ■ Software Specification

Item	Specification
Unit type	Access point [Station]
Operating mode	Standard, [Compatible], Advanced
Default country code	US
Default IP address	192.168.10.21
Default subnet mask	255.255.255.0
Default password	Described separately.
Encryption	WEP (64, 128, 152 bit) or AES, AES-OCB (128 bit) TKIP (only when using WPA, WPA-PSK) TWSEL (Unique encryption) only when a POS is connected.
Parameter setting	Browser or telnet (For telnet, internal use only)
Browser	Microsoft IE5.01 or greater
Protocol	IP (RFC791), ICMP (RFC792), UDP (RFC768) TCP (RFC793, 896), ARP (RFC826), HTTPD (RFC1866), TELNET FTPD (RFC959), DHCP (RFC2131), SNMP

### ■ Country code

As available frequency bands are different from country to country, be sure to set a country code before installing a wireless LAN module in a user's printer. Also, ask an end user to confirm a country code. Use of a wireless LAN module with a wrong country code could violate each country's Laws and Regulations for Radio Equipment, and violators could be subject to penalties. The country code cannot be changed through the Web browser, but TELNET.

<How to set a country code using TELNET>

**CAUTION!** The following information must not be disclosed to users. (Internal use only)

- (1) Disconnect the LAN cable connected to the printer, connect the printer to a host PC with a straight LAN cable via a relay connector.  
When using a hub in place of a relay connector, use a cross cable or
- (2) Open the MS-DOS prompt, type in "telnet 192.168.10.21" (default IP address).
- (3) Enter a password, "tebcpc", to log in.
- (4) From the top menu, change a country code using the following command.  
=>ctryXX (XX=new country code. See Country Code Table.)
- (5) The new country code will become effective by turning the printer off and on again.
- (6) A country code can be checked by typing "=>ctry" on the telnet console.

### Country Code Table

Country code	Country name	Country code	Country name	Country code	Country name
US	U.S.A./Canada	GR	Greece	IE	Ireland
FR	France	SE	Sweden	GB	U.K.
PT	Portugal	HU	Hungary	AU	Australia
NO	Norway	BE	Belgium	FI	Finland
DE	Germany	IT	Italy	LU	Luxembourg
ES	Spain	NL	Netherlands	CH	Switzerland
IS	Iceland	LI	Liechtenstein	NZ	New Zealand
AT	Austria	DK	Denmark		

### ■ MAC address

MAC address of the Wireless LAN module will be necessary when setting the MAC address filtering function of an access point. As it is printed on the top of the wired LAN connector on the Wireless LAN Board, write down it on Installation Manual before mounting the covers so that an end user can know the MAC address.

MAC Address

12-digit code printed on the right side of "W" is MAC address.



**NOTE:** MAC address can be checked by using “arp -a” command on MS-DOS Prompt.

<Example>

The following screen shows an example of executing an arp -a command on MS-DOS Prompt. After wireless LAN board (default IP address: 192.168.10.21) is pinged, IP address and MAC address are displayed.

```

Microsoft(R) Windows 98
(C)Copyright Microsoft Corp 1981-1999.

C:\WINDOWS>PING 192.168.10.21

Pinging 192.168.10.21 with 32 bytes of data:

Reply from 192.168.10.21: bytes=32 time=1ms TTL=128
Reply from 192.168.10.21: bytes=32 time=1ms TTL=128
Reply from 192.168.10.21: bytes=32 time=1ms TTL=128
Reply from 192.168.10.21: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.10.21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\WINDOWS>ARP -a

Interface: 157.69.10.61 on Interface 0x2000003
Internet Address      Physical Address      Type
-----
157.69.10.2          00-e0-63-54-90-75    dynamic
192.168.10.21       00-b0-d0-d2-00-23    dynamic
    
```

ARP -a command

IP Address of Host PC

Address of other  
(Refer to Note)

IP address of printer

MAC address of printer

**NOTE:** As obtained IP address and MAC address are stored in the cache of the host for a certain period of time, other device’s address may be displayed.

■ LED

<Operation>

LED	Status	LAN status
LED1 (Red)	ON	Communicating
	Blink	Starting
LED 2 (Orange)	ON	Wired LAN is connected.
	Blink	Communicating with the printer
	OFF	Disconnected from the printer.
LED 3 (Orange)	ON	In case of station mode: Log in the access point. In case of access point mode: User unit is log in.
	Blink	Communicating with a device connected via wireless LAN.
	OFF	In case of station mode: Log out from the access point. In case of access point mode: User unit is log out.



## &lt;Downloading the firmware&gt;

LED	Status	LAN status
LED1 LED2 LED3	Blink at the same time	Firmware is being overwritten.

## &lt;Error&gt;

LED	Status	LAN status
LED2	Blink	Wired LAN error
LED3	Blink	Wireless LAN error

### ■ Certification

The wireless LAN module complies with the following standards.

FCC: Part 15B/Part 15C/Part 15E

CE: R&TTE (Certification for wireless LAN module)

IC: Canada EMC standard (To be certified in August 2005)

### ■ Precautions

- When using this product, please follow the Laws and Regulations for Radio Equipment.
- IEEE802.11g and IEEE802.11b uses 2.4GHz band. As a microwave uses the same frequency band, interference may take place depending on the location where this product is installed.
- Also, this frequency band is IMS band. Do not use this product in locations where use may be forbidden, for example, in an airport or hospital.
- This product communicates with other devices by radio. Depending on the installation location, orientation, environment, etc., its communication performance may deteriorate or devices installed near by may be affected.
- Before installing this product, conduct a site survey.

### ■ Handling Precautions for B-9700-WLAN-QM

- Even in a country where the printer is shipped, this wireless LAN module cannot be used unless the country code is matched.
- Use of this module in Japan is prohibited.
- Regarding the shipment to Canada:  
This module is under application for certification as of June 2005, and to be certified in August 2005. Until then, a shipment or use of this module to/in Canada is forbidden by the Radio Waves Law of Canada. As soon as certified, we will announce to you separately. The country code is "US".
- IEEE802.11a standard  
IEEE802.11a-compliant devices are only for indoor use. Outdoor use is prohibited by Radio Law. (As of June 2005)
- How to connect to telnet and set a country code must be secret to end users. Use of a wireless LAN module with a wrong country code could violate each country's Laws and Regulations for Radio Equipment, and violators could be subject to penalties.
- Take security measures to prevent illegal access.

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