

TOSHIBA

TOSHIBA Thermal Printer

B-EX4 SERIES

Product Description

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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 assembly, the model name label, and the CD-ROM. The other specifications including the firmware are common.

CAUTION!

1. *This manual may not be copied in whole or in part without prior written permission of TOSHIBA TEC.*
2. *The contents of this manual may be changed without notification.*
3. *Please refer to your local Authorised Service representative with regard to any queries you may have in this manual.*

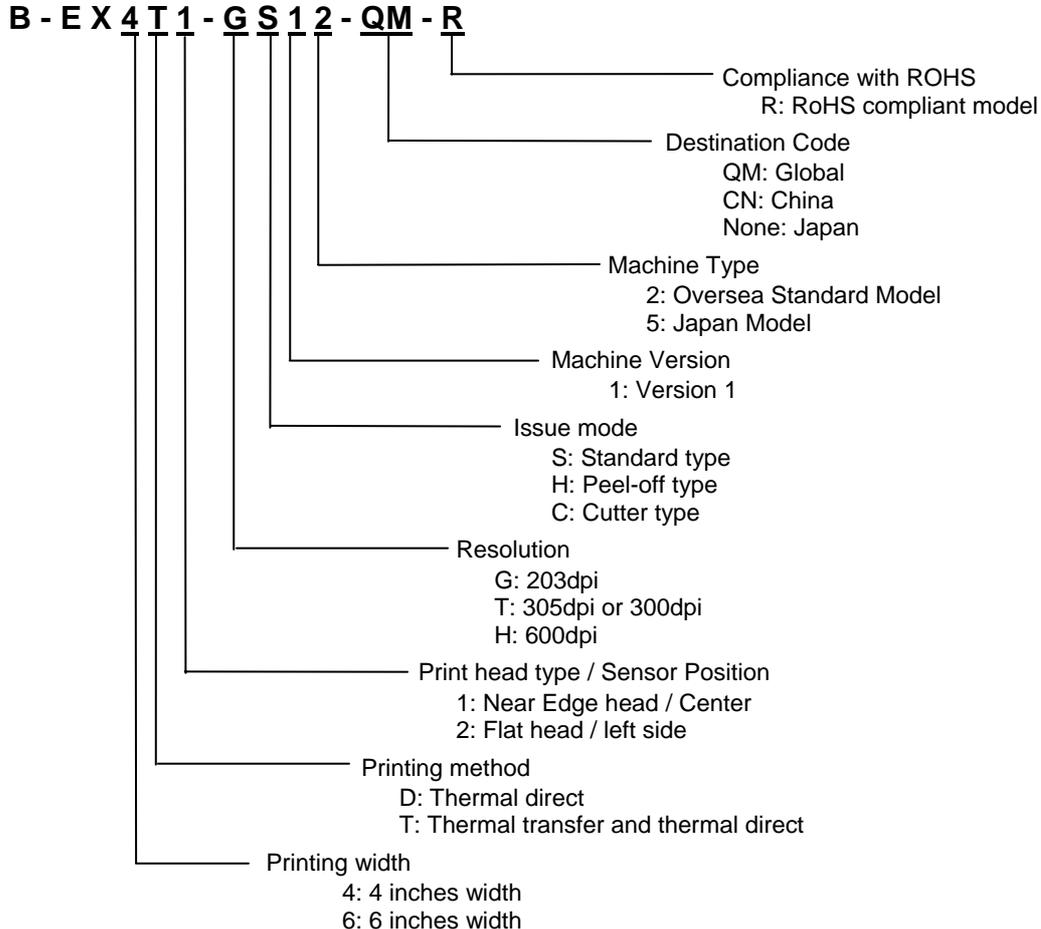
1. OUTLINE

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 USB and LAN interface are available as standard interfaces between the printer and a PC. In addition, optional interfaces such as RS-232C interface, Centronics interface, expansion I/O interface, RTC & USB Host interface and Wireless LAN interface are available.
- 3) A 32-bit CPU and ASIC 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-EX4 series accommodates a max. printing speed of 14"/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, disk cutter module, RFID module, RS-232C interface, Centronics interface, expansion I/O interface, RTC & USB Host interface and Wireless LAN interface are available.

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 Appearance

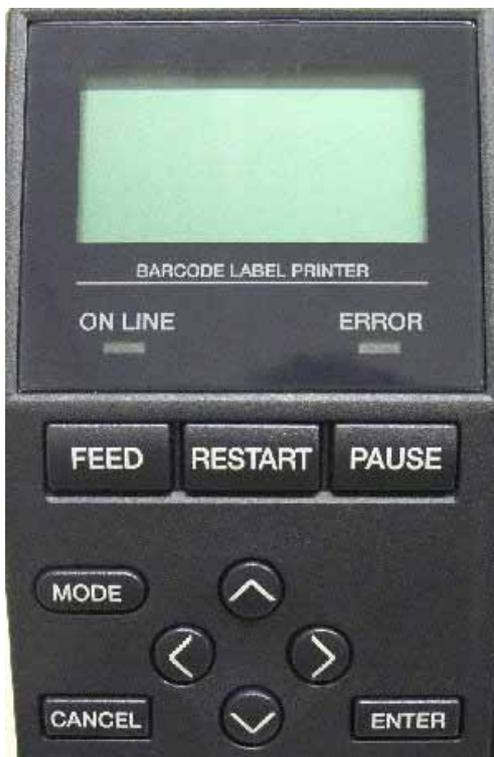
Front drawing



Side drawing



1.3.2 Operation Panel



Key	Function
[FEED]	(1) Feeds one sheet of paper. (2) Prints the data in the image buffer on one label according to the system mode setting.
[RESTART]	(1) Resumes printing after a temporary stop of label printing or after an error. (2) Places the printer in the usual initial state which is obtained when the power is turned on. (3) Switches to user mode.
[PAUSE]	(1) Stops label printing temporarily. (2) Programs the threshold values.
[MODE]	(1) Switches to user mode.
[CANCEL]	(1) Clears the job.
[ENTER]	(1) Displays help messages.
[UP]	(1) No function.
[DOWN]	(1) No function.
[LEFT]	(1) No function.
[RIGHT]	(1) Displays help messages.

1.3.3 Dimensions (Approximate)

278 mm (W) x 460 mm (D) x 310 mm (H)

1.4 BASIC SPECIFICATIONS

1) Printing method Thermal direct printing or thermal transfer printing

2) Print head

[GS model]

(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

[TS model]

(1) Total number of dots 1,248 dots (3) Effective print width 104.0 mm
(2) Dot density 12 dots/mm (4) Thermal pitch 0.083 mm

3) Print speed

GS model 3"/sec., 6"/sec., 10"/sec. 12"/sec. 14"/sec.

TS model..... 3"/sec., 5"/sec, 8"/sec., 10"/sec. 12"/sec. 14"/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)

GS model Max. 104.0 mm x 1500.0 mm

TS model..... Max. 104.0 mm x 1500.0 mm

5) Issue mode Batch

Cut (Option)

Peel-off (Option)

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) GS1 Databar (The composite is included.)

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

8) Type of characters

[GS model]

- | | |
|---|---|
| (1) Times Roman medium (12, 15 point) | (12) Courier bold (18 point) |
| (2) Times Roman bold (15, 18, 21 point) | (13) OCR-A, B (12 point) |
| (3) Times Roman Italic (18 point) | (14) Outline font (Helvetica bold, Helvetica bold proportional, Price Font (1,2,3), Times roman proportional, Pop Proportional, Proportional) |
| (4) Helvetica medium (9, 15, 18 point) | (15) Writable characters (2-byte character is available.) |
| (5) Helvetica bold (18, 21 point) | (16) Gothic 725 black |
| (6) Helvetica Italic (18 point) | (17) China font (24x24) for CHINA model only |
| (7) Presentation bold (27 point) | (18) Mincho font (24x24, 32x32), Gothic font (16x16, 24x24, 32x32, 48x48) for Japan Model |
| (8) Letter Gothic medium (14.3 point) | |
| (9) Prestige Elite medium (10.5 point) | |
| (10) Prestige Elite bold (15 point) | |
| (11) Courier medium (15 point) | |

[TS model]

- | | |
|---|---|
| (1) Times Roman medium (8, 10 point) | (12) Courier bold (12 point) |
| (2) Times Roman bold (10, 12, 14 point) | (13) OCR-A, B (12 point) |
| (3) Times Roman Italic (12 point) | (14) Outline font (Helvetica bold, Helvetica bold proportional, Price Font (1,2,3), Times roman proportional, Pop Proportional, Proportional) |
| (4) Helvetica medium (6, 10, 12 point) | (15) Writable characters (2-byte character is available.) |
| (5) Helvetica bold (12, 14 point) | (16) Gothic 725 black |
| (6) Helvetica Italic (12 point) | (17) China font (24x24) for CHINA model only |
| (7) Presentation bold (18 point) | (18) Mincho font (24x24, 32x32), Gothic font (16x16, 24x24, 32x32, 48x48) for Japan model |
| (8) Letter Gothic medium (9.5 point) | |
| (9) Prestige Elite medium (7 point) | |
| (10) Prestige Elite bold (10 point) | |
| (11) Courier medium (10 point) | |

9) 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 (15) UTF-8 (16) PC-866

10) Character magnification

- (1) Regular font: 0.5 ~ 9.5 times (magnified by 0.5 times in each direction)
(2) Outline font: 2.0 ~ 150.0 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.

11) White or black background all types of characters are available.

12) Character rotation 0°, 90°, 180°, 270°

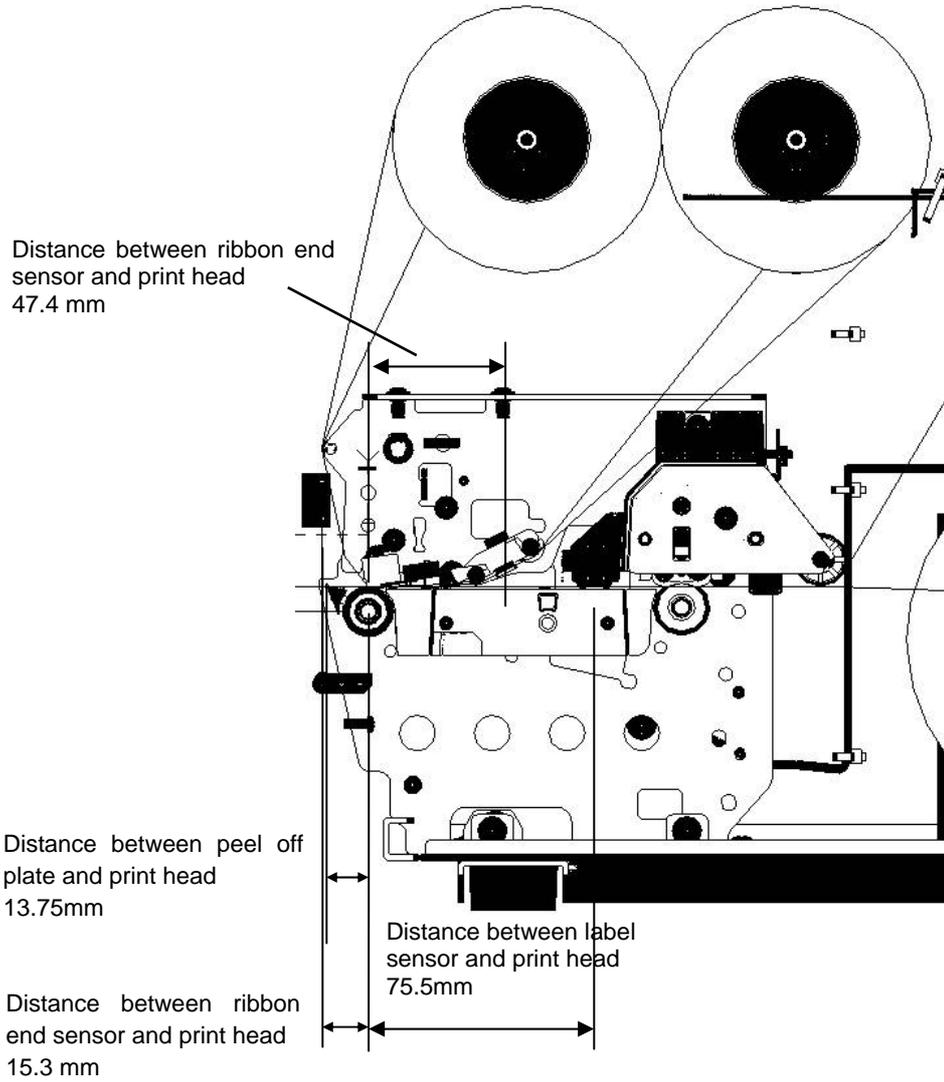
13) Character strings rotation 0°, 90°, 180°, 270°

14) Type of line

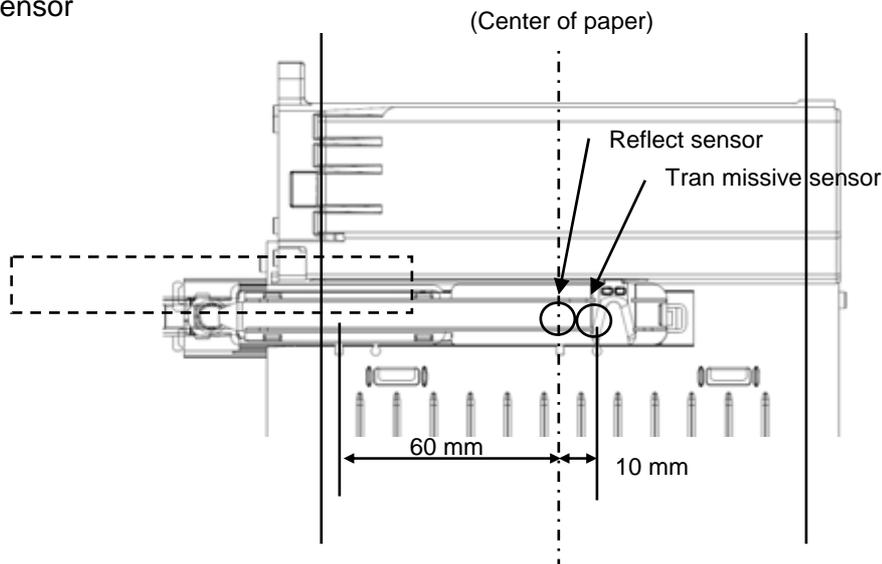
- (1) Horizontal line (2) Vertical line (3) Slant line (4) Square (5) Rounded Rectangle (6) Circle

15) Line Width 0.1 to 0.9 mm can be specified (in unit of 0.1 mm)

16) Mechanism
 (1) Mechanism



(2) Label Sensor

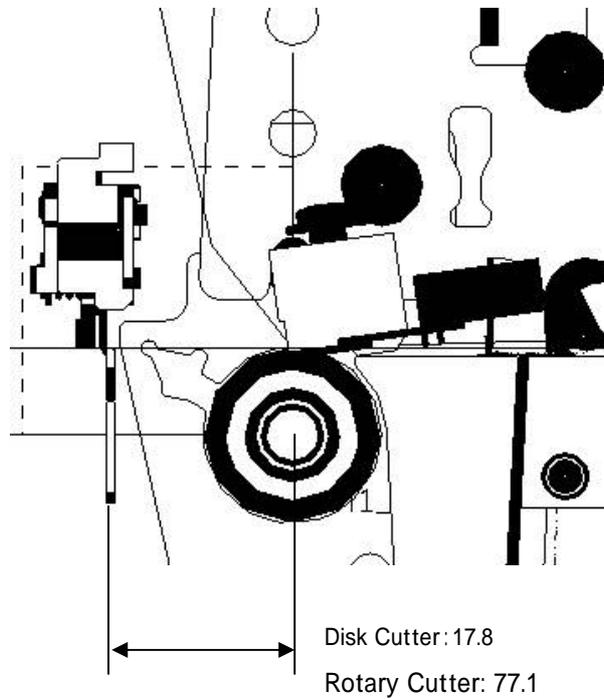


(3) Cutter mechanism

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

Disk cutter: Stop and cut

Rotary cutter: Non stop cut



Item		Specification					
Cutter type		DISK CUTTER	ROTARY CUTTER				
Possible cut size	Paper width	30.0mm -	25.0 - 120.0mm				
	Tag	25.4- 500mm (T.B.D)	3"/sec	30.0 - 1500mm(T.B.D)			
			6"/sec	30.0 - 1500mm(T.B.D)			
	Label	38.0 - 1500mm (T.B.D)	3"/sec	No Head-up	Head-up		
				6"/sec	94.0 - 1500mm	38.0 - 1500mm	
				6"/sec	106.0 - 1500mm	38.0 - 1500mm	
Thickness		80 - 170µm(T.B.D)					
Cutter life		1,000,000 cut (160µm tag) (T.B.D)					

* Cutter life is confirmed by using same width paper.

18) Power supply

CN model: AC220 - 240 V \pm 10%, 50Hz
 QM model: AC100 - 240 V \pm 10%, 50/60Hz

19) Current consumption

[B-EX4T1]

	CN model	QM-R model (100V)	QM-R model (240V)
Printing	116.75W, 0.5912A	123.37W, 1.4576A	115.35W, 0.5859A
Sleep mode	5.7W, 0.0869A	4.5W, 0.0893A	5.7W, 0.0861A

NOTES:

Be sure to provide an exclusive AC outlet for this machine. (This is 20% slant line print)
 Energy Star Program appliance

20) Rush current

CN model: 65A
 QM model: 100V: 28A, 240V: 68A

1.5 ELECTRONICS SPECIFICATIONS

1) CPU R8A77211C133BGV

2) Memory

- (1) Program 2 x 16MB Flash ROM
- (2) Image buffer + Work 2 x 16MB SDRAM

Model	Hardware			
	Flash ROM	SDRAM	Font ROM	Type Font
B-EX4T1-GS12-QM-R	16MB	32MB	None	
B-EX4T1-TS12-QM-R			8MB	Simplified Chinese
B-EX4T1-GS12-CN-R				
B-EX4T1-TS12-CN-R				
B-EX4T1-TS15-R	32MB	32MB	8	MINCHO GOTHIC

3) Interface

(1) USB

- | | |
|-------------------|--|
| 1) Standard: | USB V2.0 |
| 2) Transfer mode: | Control transfer, Bulk transfer |
| 3) Transfer rate: | Full speed (12M bps) |
| 4) Class | Printer class |
| 5) USB interface | Connector: USB-Type B
Power: Self-power |
| 6) USB cable | Type-A and Type-B cable of USB V2.0 |

(2) Wired LAN

- | | |
|----------------------|---|
| 1) Standard: | IEEE802.3 |
| 2) Protocol: | Physical layer: 10BASE-T, 100BASE-TX
Auto negotiation 10/100Mbps. Full/Half, Duplex
Data link layer: CSMA/CD
Network layer: IP, ICMP, ARP
Transport layer: TCP, UDP
Application layer: Server: LPR, SOCKET, HTTP, FTP
Client: POP3, SMTP, DHCP, WINS
Agent: SMMP |
| ③ Network interface: | Connector RJ-45 |

(3) RS-232C interface (Option)

- 1) Communication mode: Full-duplex
- 2) Transmission speed: 2400,4800,9600,19200, 38400, 115200 bps (selectable)
- 3) Asynchronous communication method
- 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-EX4T: 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.

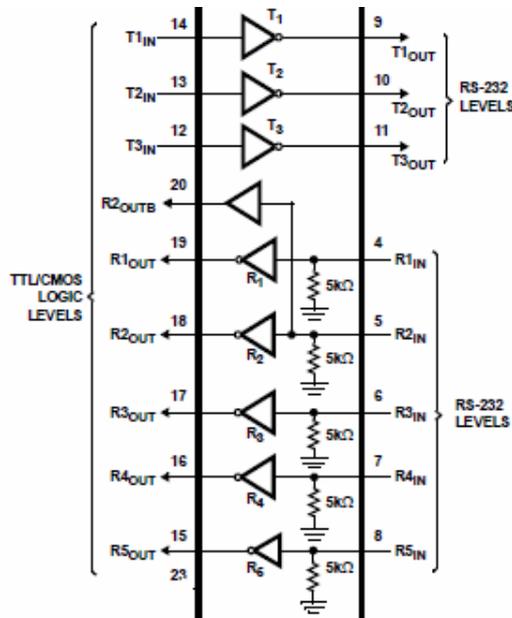
NOTE: Be sure to select the READY/BUSY (RTS) protocol when controlling the flow between the Windows. Also, be sure to select “Hardware” for the flow control in the Windows communication port setting.

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

* Circuit



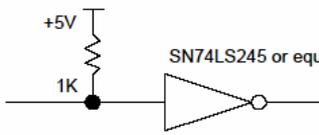
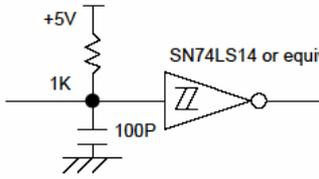
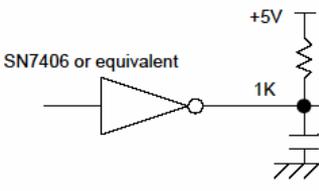
* Signal level

 Input voltage: "H" .. +2.4 V to + 25V
 "L" ... -25V to 0.6V

 Output voltage: "H" = MIN +5.0V, Typ. +5.4V
 "L" = MIN -5.0V, Typ. -5.4V

(4) Centronics interface (Option)

- 1) Data input method: 8-bit parallel (DATA 1 to 8)
- 2) Control signals
 - SPP mode: nStrobe, nAck, Busy, PError, Select, nAutoFd, nInit, nFault, nSelectIn
 - Nibble mode: HostClk, PtrClk, PtrBusy, AckDataReq, Xflag, HostBusy, nInit, nDataAvail, IEEE1284Active
- 3) Data input code: ASCII, JIS 8-bit code for European characters, 8-bit code for graphic
- 4) Receiving buffer: 6MB (Max. 65536 lines)
- 5) Input/Output circuit configuration and Input/Output conditions

	Signal	Configuration	
Input	DATA1 ~ 8		Logic level (Input) "1" = 2 ~ 5 V "0" = 0 ~ 0.4 V
	nStrobe/HostClk/HostClk nInit/nInit/ nReverseRequest nAutoFd/HostBusy/ HostAck nSelectIn/IEEE1284Active/ IEEE1284Active		
Output	Busy/PtrBusy/PeriphAck nFault/nDataAvail/ nPeriphRequest nAck/PtrClk/PeriphClk Select/Xflag/XFlag PError/AckDataReq/ nAckReverse		Logic level (Input) "1" = 2.4 ~ 5 V "0" = 0 ~ 0.4 V

Connector

Amp. Japan 552742-1 or equivalent

Printer side:

DDK 57RE-40360-73B or equivalent

Amp. Japan 552470-1 or equivalent

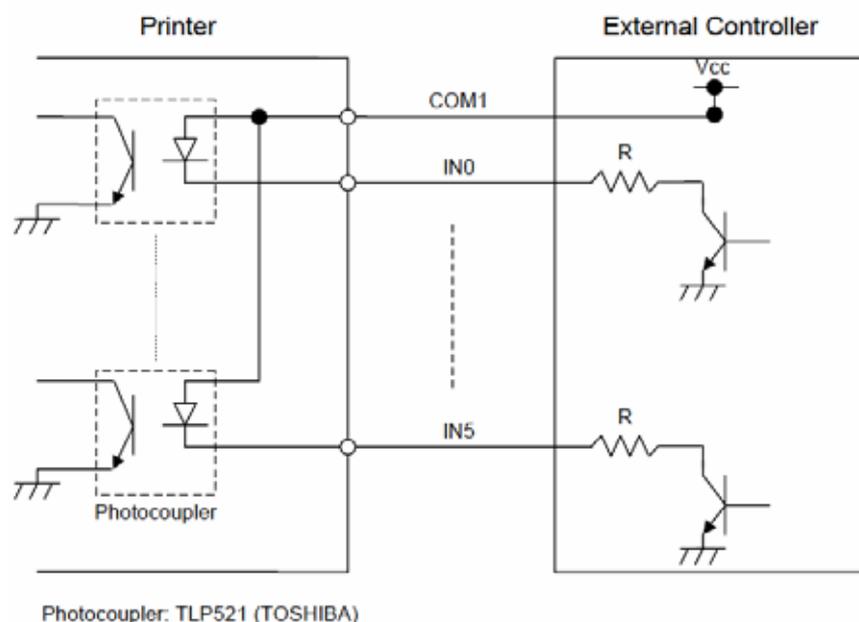
Cable side:

DDK 57E-30360 or equivalent

(5) Expansion I/O interface (Option)

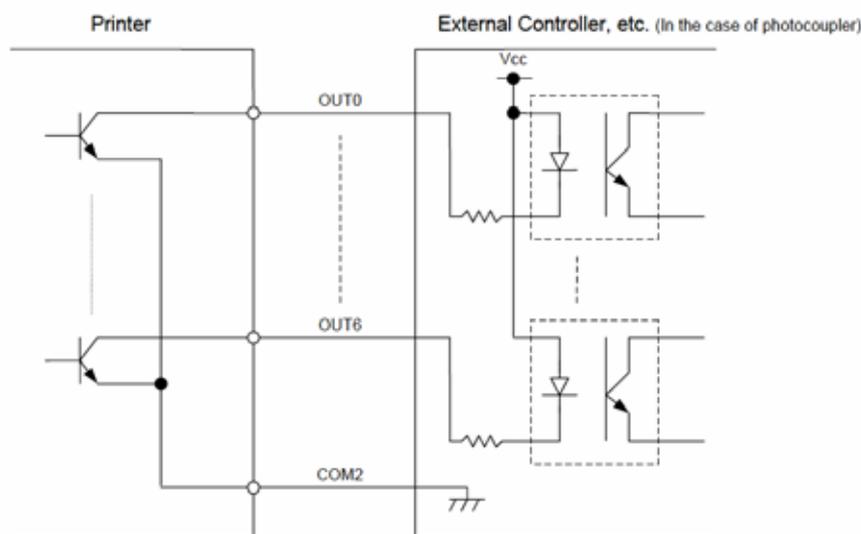
Interface circuit

* Input circuit



There are 6 input circuits, and each input is a current loop using the photo coupler. The anode of the photo coupler of each circuit is connected to the common pin COM 1. The cathodes are independent. The voltage of Vcc is 5 to 24 V, while the diode operating current is 16 mA (average).

* Output circuit



There are 7 output circuits, and each output is an open collector. The voltage of Vcc is 5 to 24 V, while the drive current is 150 mA (max.).

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>.

(6) USBH (Option)

- 1) Standard: USB V2.0
- 2) Transfer mode: Control transfer, Bulk transfer
- 3) Transfer rate: Full speed (12M bps)
- 4) USB interface: Connector: USB-Type A
Power supply specification: 500mA output

(7) Wireless LAN (Option)

- 1) Standard: IEEE802.11b/g
- 2) Protocol:
 - Physical layer: 802.11b/g
 - Data link layer: CSMA/CA
 - Network layer: IP, ICMP, ARP
 - Transport layer: TCP, UDP
 - Application layer: Server: LPR, SOCKET, HTTP, FTP
Client: POP3, SMTP, DHCP, WINS
Agent: SNMP
Security: IEEE802.11i
Encryption: WEP (64/128bit), TKIP (WPA), AES (WPA2)
Authentication: Shared key (for WEP), PSK, PEAP, TLS, TTLS, MD5, LEAP, EAP-FAST
- 3) Communicable distance: Class1, 100m (When there is no obstacle),
360 deg. (depending on conditions)
- 4) Antenna: Built-in (Not available for external antenna)
- 5) Certification: WiFi, CCX V3, V4

4) Sensor/switch

Transmittive sensor	Transmittive (Movable/Adjustable)
Refrective sensor	Refrective (Movable/Adjustable)
Outer temperature sensor	Detect range: 0 to 70
Head temperature sensor	Detect range 0 to 80
Head up sensor	Optical slit sensor
Ribbon rotation detect sensor	Optical slit sensor (Ribbon diameter detection for rewinder, back tension block)
Ribbon end sensor	Refrective (Detect silver area of ribbon end tape)

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

Disc Cutter module for B-EX Series

Item			B-EX4T	
Media pitch	Label	Min.	25.4mm	
		Max.	1500mm	
	Tag paper	Min.	25.4mm	
		Max.	1498mm	
Media width (Backing paper width)	Min.	30mm	75mm	
	Max.	120mm	160mm	
Label width	Min.	27mm	72mm	
	Max.	117mm	157mm	
Gap length	Min.	2mm		
	Max.	20mm		
Black mark length	Min.	2mm		
	Max.	10mm		
Media thickness	Min.	130µm		
	Max.	170µm (IBEST-S)		

Rotary cutter module for the B-EX4T

Item			203-dpi model		305-dpi model	
	Head up function		Disabled	Enabled	Disabled	Enabled
Media pitch	Label	Min.	3ips: 87mm	3ips: 38mm	3ips: 94mm	3ips: 38mm
			6ips: 99mm	6ips: 38mm	5ips: 102mm	5ips: 38mm
					8ips: 113mm	8ips: 38mm
	Max.	1500mm				
	Tag paper	Min.	3ips: 30mm		3ips: 30mm	
			6ips: 30mm		5ips: 30mm	
			8ips: 38mm			
Max.	1500mm					
Media width (Backing paper width)	Min.	30mm				
	Max.	112mm				
Label width	Min.	27mm				
	Max.	109mm				
Gap length	Min.	6mm				
	Max.	20mm				
Black mark length	Min.	2mm				
	Max.	10mm				

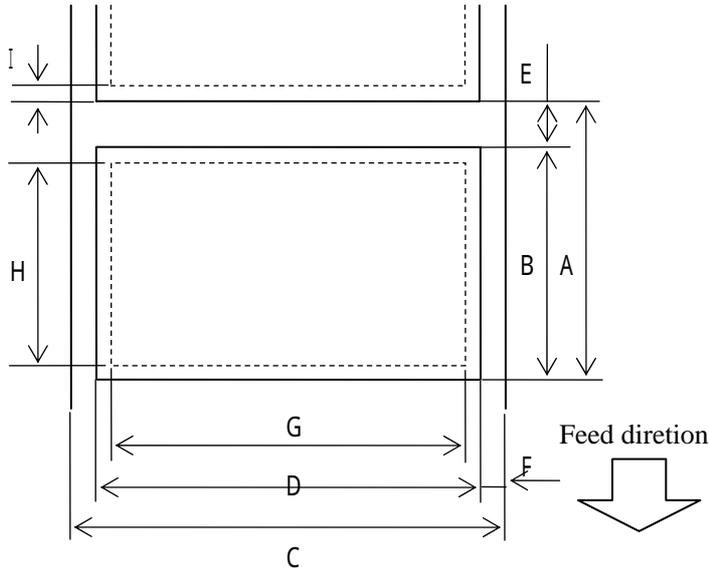
Media thickness	Label	Min.	130µm
		Max.	170µm
	Tag paper	Min.	150µm
		Max.	290µm

Peel-off module for the B-EX series

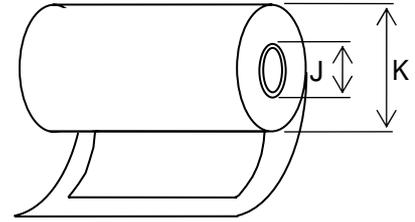
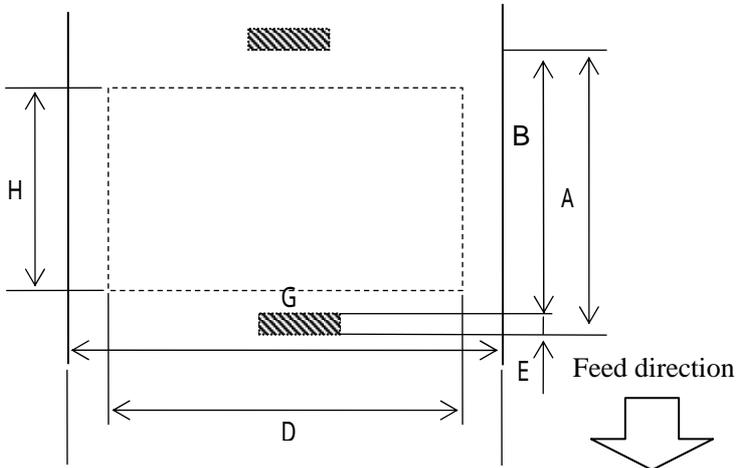
Item		B-EX4T
Label pitch	Min.	25.4mm
	Max.	256mm
Label length	Min.	23.4mm
	Max.	254mm
Backing paper width	Min.	50mm
	Max.	120mm
Gap length	Min.	2mm
	Max.	20mm
Black mark length	Min.	2mm
	Max.	10mm
Media thickness	Min.	130µm
	Max.	170µm

NOTES:

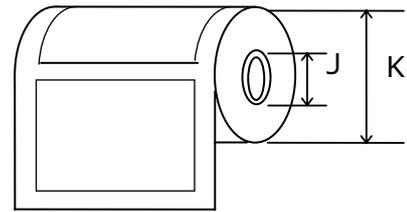
1. *To ensure print quality and print head life use only TOSHIBA TEC specified media.*
2. *The media length specifications for use of the cutter are:
*1: When issuing a label using the swing cutter, label length should be 35.0 mm – (Gap length/2).
2: The rotary cutter does not support the print speed 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 (CaCO₃) and Kaolin (Al₂O₃, 2SiO₂, 2H₂O).*
13. *Thermal paper used for the direct thermal printing must not have the specifications which exceed Ca²⁺, K⁺, Na⁺ 800 ppm, K⁺ 250 ppm, and Cl⁻ 500 ppm.*
14. *Avoid using media containing SiO₂ or talc which wears the print head protection layer.*



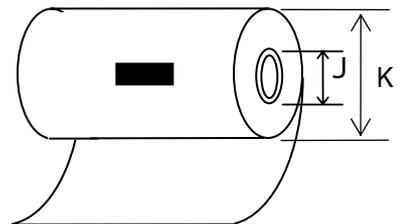
Black Mark (Reverse Side)



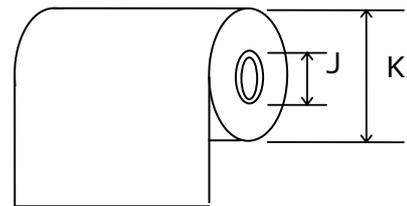
Roll method: Labels facing inside



Roll method: Labels facing outside



Roll method: Labels facing inside



Roll method: Labels facing outside

[mm]

Model		B - EX 4 T 1											
Thermal head resolution		8 dot/mm (203dpi)					12 dot/mm (305dpi)						
Thermal head width		104.0mm					106.7mm (Effective area 104.0mm)						
Logical printable area													
Item	Mode	Batch	Strip	Cut				Batch	Strip	Cut			
				Disk Cutter	Rotary cutter		Disk Cutter			Rotary cutter			
					Head up					Head up			
				No	Yes			No	Yes				
A: Pitch	Lable	Min.	10.0	25.4	25.4	3ips:	3ips:	10.0	25.4	25.4	3ips:	3ips:	
						87.4	38.0				94.0	38.0	
						6ips:	6ips:				5ips:	5ips:	
						99.0	38.0				102.0	38.0	
						10ips:- (*1)	10ips:- (*1)				8ips:	8ips:	
						113.0	38.0				10ips:- (*1)	10ips:- (*1)	
	12ips:- (*1)	12ips:- (*1)	12ips:- (*1)	12ips:- (*1)									
	14ips:- (*1)	14ips:- (*1)	14ips:- (*1)	14ips:- (*1)									
	—	—	—	—									
	Max.	1500.0	256.0	1500.0				1500.0	256.0	1500.0			
Tag	Min.	10.0	-	25.4	3ips: 30.0	3ips: 30.0		10.0	-	25.4	3ips: 30.0	3ips: 30.0	
					6ips: 30.0	6ips: 30.0					5ips: 30.0	5ips: 30.0	
					10ips: - (*1)	10ips: - (*1)					8ips: 38.0	8ips: 38.0	
					12ips: - (*1)	12ips: - (*1)					10ips: - (*1)	10ips: - (*1)	
					14ips: - (*1)	14ips: - (*1)					12ips: - (*1)	12ips: - (*1)	
											14ips: - (*1)	14ips: - (*1)	
Max.	1500.0	-	1500.0				1500.0	-	1500.0				
B: Label length	Min.	8.0	23.4	23.4	3ips:(*1)	3ips:	8.0	23.4	23.4	3ips: ^(*1)	3ips: 25.0		
					81.0	25.0				81.0	25.0		
	6ips: ^(*3)	6ips:	5ips: ^(*2)	5ips: 25.0									
	93.0	25.0	89.0	25.0									
8ips: ^(*4)	8ips: 25.0	100.0	25.0	8ips: ^(*4)	8ips: 25.0								
Max.	1498.0		1490.4				1498.0		1494.0				

C:	Liner width	Min.	30.0	50.0	30.0	30.0	30.0	50.0	30.0	30.0				
	Tag width	Max.	120.0				120.0							
D:	Label width	Min.	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0				
		Max.	117.0				117.0							
E:	Gap width	Min.	2.0		6.0		2.0		6.0					
		Max.	20.0				20.0							
F:	Black mark width	Min.	2.0				2.0							
		Max.	10.0				10.0							
G:	Printable width	Max.	104.0 +/-0.2				104.0 +/-0.2							
H:	Printable length	Label	Min.	6.0	21.4	21.4	3ips:	3ips:	6.0	21.4	21.4	3ips:	3ips:	
							79.0	23.0				79.0	23.0	
							6ips:	6ips:				5ips:	5ips:	
							91.0	23.0				87.0	23.0	
							10ips:-	10ips:-				8ips:	8ips:	
							(*1)	(*1)				98.0	23.0	
		12ips:-	12ips:-	10ips:-	10ips:-									
		(*1)	(*1)	(*1)	(*1)									
		14ips:-	14ips:-	12ips:-	12ips:-									
		(*1)	(*1)	(*1)	(*1)									
—	—	14ips:-	14ips:-											
		(*1)	(*1)											
		Min.	1496.0	252.0	1492.0		1496.0	252.0	1492.0					
Tag	Min.	8.0	-	21.4	3ips: 28.0	8.0	-	21.4	3ips: 28.0					
					6ips: 28.0				5ips: 28.0					
					10ips: - (*1)				8ips: 36.0					
					12ips: - (*1)				10ips: - (*1)					
					14ips: - (*1)				12ips: - (*1)					
					—				14ips: - (*1)					
	Max.	1498.0	-	1498.0		1498.0	-	1498.0						
I:	Non print area for	Slow-up	1.0				1.0							
	slow-up/slow-down	Slow-dwon	1.0 / 1.5 (14ips)				1.0 / 1.5 (14ips)							

Maximum printable length for on the fly issue	749.0	749.0
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- (1) Rotary cutter does not support 10 ips or more print speed.
- (2) The head position may needed to adjust when paper thickness is over 200µm.

(*1) In case of cut issue by using rotary cutter, label length of 3 ips is below.

Label length $\geq 91.0\text{mm} - (\text{Gap width}/2)$

(*2) In case of cut issue by using rotary cutter, label length of 5 ips is below.

Label length $\geq 99.0\text{mm} - (\text{Gap width}/2)$

(*3) In case of cut issue by using rotary cutter, label length of 6 ips is below.

Label length $\geq 103.0\text{mm} - (\text{Gap width}/2)$

(*4) In case of cut issue by using rotary cutter, label length of 8 ips is below.

Label length $\geq 110.0\text{mm} - (\text{Gap width}/2)$

(*5) In case of cut issue by using disk cutter, label length is below.

Label length $\geq 18.0\text{mm} - (\text{Gap width}/2)$

2.2 RIBBON

No.	Item		Specification
1	Shape		Spool type
2	Width	B-EX4T	40 to 112 mm
3	Max. length		600 m
4	Max. OD		ø 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

Method: Print head lifting mechanism using a solenoid

Function:

a) Non-stop ribbon save (The function is selectable in the printer system mode).

When a non-print area is detected while the printer is feeding or printing the media, this module raises the print head to save the ribbon without stopping the media feed.

Note: Max. ribbon save amount is 50%.

b) Rotary cutter

When using the rotary cutter, the ribbon save function is required to be enabled.

Min. non-print area required to enable the ribbon save function

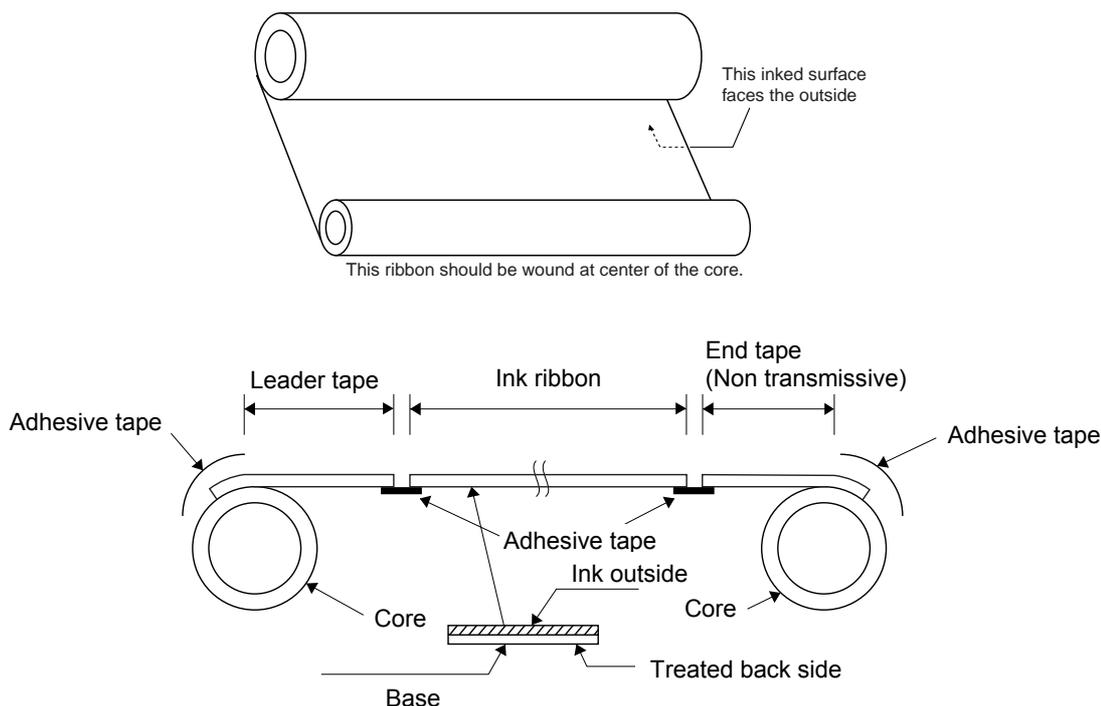
4", 203-dpi model

Print speed	3ips	6ips	10ips	12ips	14ips
Min. non-print area	20mm	20mm	35mm	60mm	75mm

4", 305-dpi model

Print speed	3ips	5ips	8ips	10ips	12ips	14ips
Min. non-print area	20mm	20mm	25mm	35mm	60mm	75mm

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-EX700-RFID-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-EX series optional RFID kit, B-EX700-RFID-H1-QM-R, is destined for Europe and operates in the UHF band 13.56MHz.

(RFID module and antenna are locally purchased.)

Although the specified frequency band can be used in the other countries than Europe, the destination is limited to Europe because the certification is obtained only for Europe.

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

- TagSys C210, C220, C240, 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-EX RFID Analyze Tool can evaluate the accuracy of writing data on the RFID tag. For the usage of this tool, refer to the B-EX RFID Analyze Tool Operation Specification.

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-EX6T and optional for the B-EX4T). 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-EX Key Operation Specifications.

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

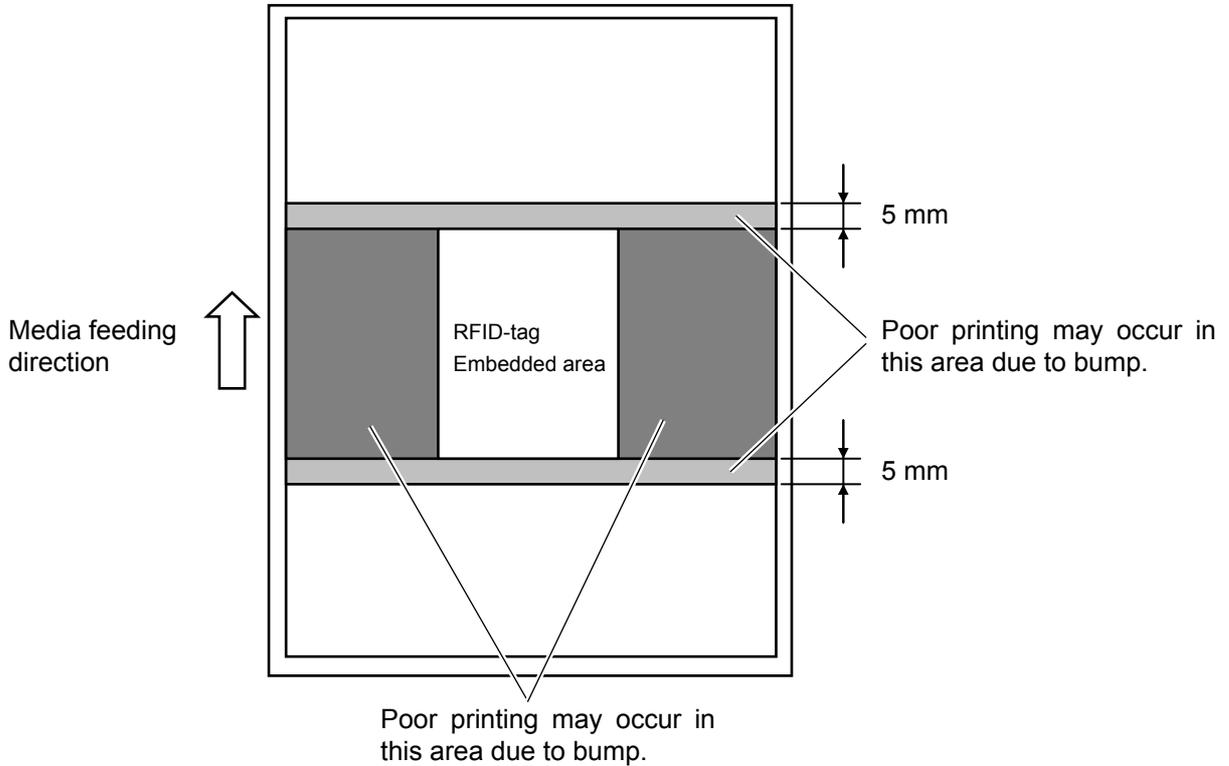
When printing is performed in a place where humidity is low or under some specific conditions, writing data on an RFID tag may fail due to static electricity generated by a label or a ribbon.

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-EX RFID Analyze Tool 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-EX Key Operation Specification.

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-EX Key Operation Specification.

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-EX4T/EX6T 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-EX4T/EX6T Key Operation Specification.

NOTE: The writing control by AGC is impossible in the H1 series.

2.5 SPECIFICATION OF RFID TAG (for B-EX700-RFID-U2-EU-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-EX700-RFID-U2-EU-R is destined for Europe/India and operates in the UHF band (869.85MHz).

2.5.2 Available RFID Tag

EPC Generation 2, ISO-18000-6C

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.

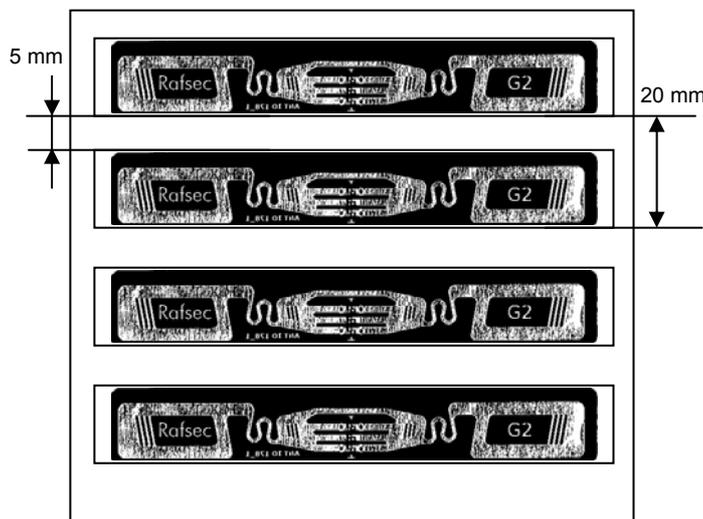
The RFID Analyze Tool can evaluate the accuracy of writing data on the RFID tag. For the usage of this tool, refer to the RFID Analyze Tool Operation Specification.

2.5.4 Short-pitch Tag

A short-pitch tag kit is supplied with the B-EX700-RFID-U2-EU-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.

B-EX700-RFID-U2-EU-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-EX4T/EX6T External Equipment Interface Specification.

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-EX6T and optional for the B-EX4T) 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-EX4T/EX6T Key Operation Specifications.

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

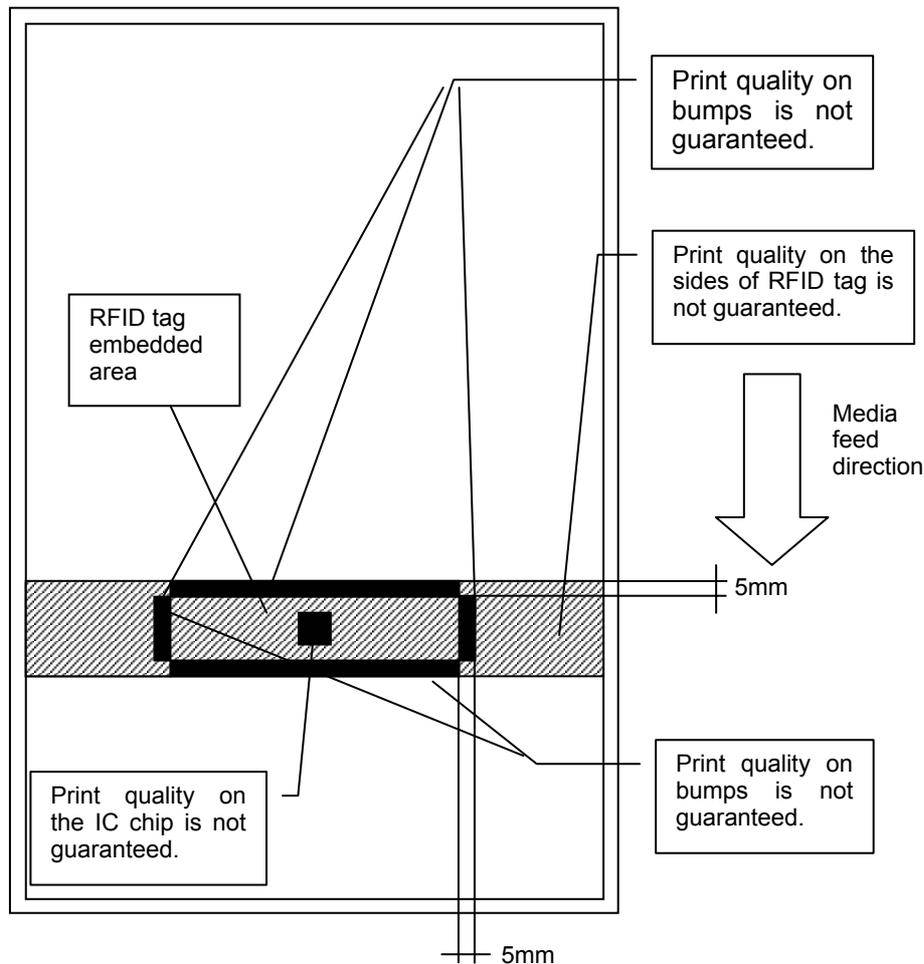
When printing is performed in a place where humidity is low or under some specific conditions, writing data on an RFID tag may fail due to static electricity generated by a label or a ribbon.

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 ± 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-EX4T/EX6T Key Operation Specification.

(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-EX4T/EX6T Key Operation Specification.

(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-EX4T/EX5T 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- EX4T/EX6T Key Operation Specification.

2.6 SPECIFICATION OF RFID TAG (for B-EX700-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-EX700-RFID-U2-US-R (Serial Number: 2809Axxxxxx or later) is destined for North America, Australia, Taiwan, South Korea, Brazil, Mexico and operates in the following UHF band.

US setting	902.75 to 927.25MHz (UHF for North America)
AU setting	918.25 to 925.75MHz (UHF for Australia)
TW setting	922.25 to 927.25MHz (UHF for Taiwan)
KR setting	920.4 to 913.6MHz (UHF for South Korea)

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.

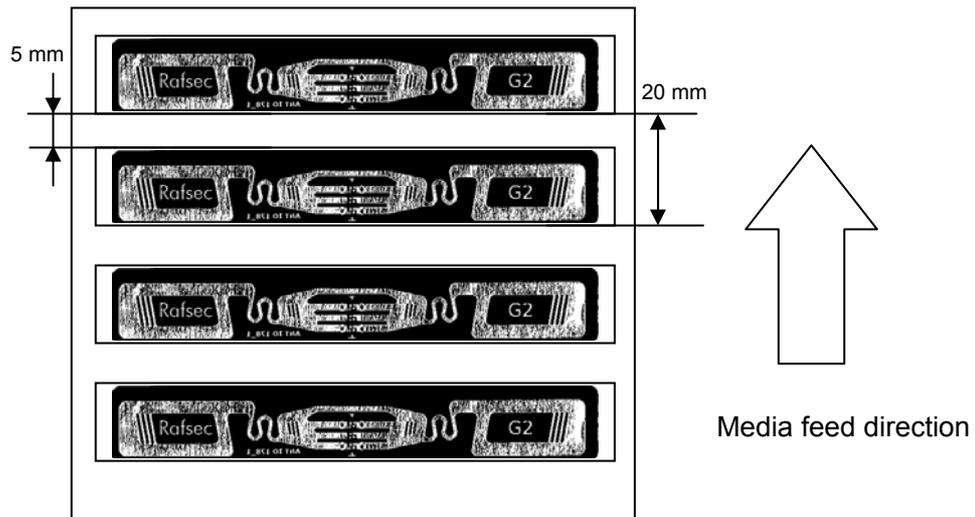
The RFID Analyze Tool can evaluate the accuracy of writing data on the RFID tag. For the usage of this tool, refer to the RFID Analyze Tool Operation Specification.

2.6.4 Short-pitch Tag

A short-pitch tag kit is supplied with the B-EX700-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-EX4T/EX6T External Equipment Interface Specification.

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-EX5T and optional for the B-EX4T) 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-EX4T/B-E6T Key Operation Specifications.

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

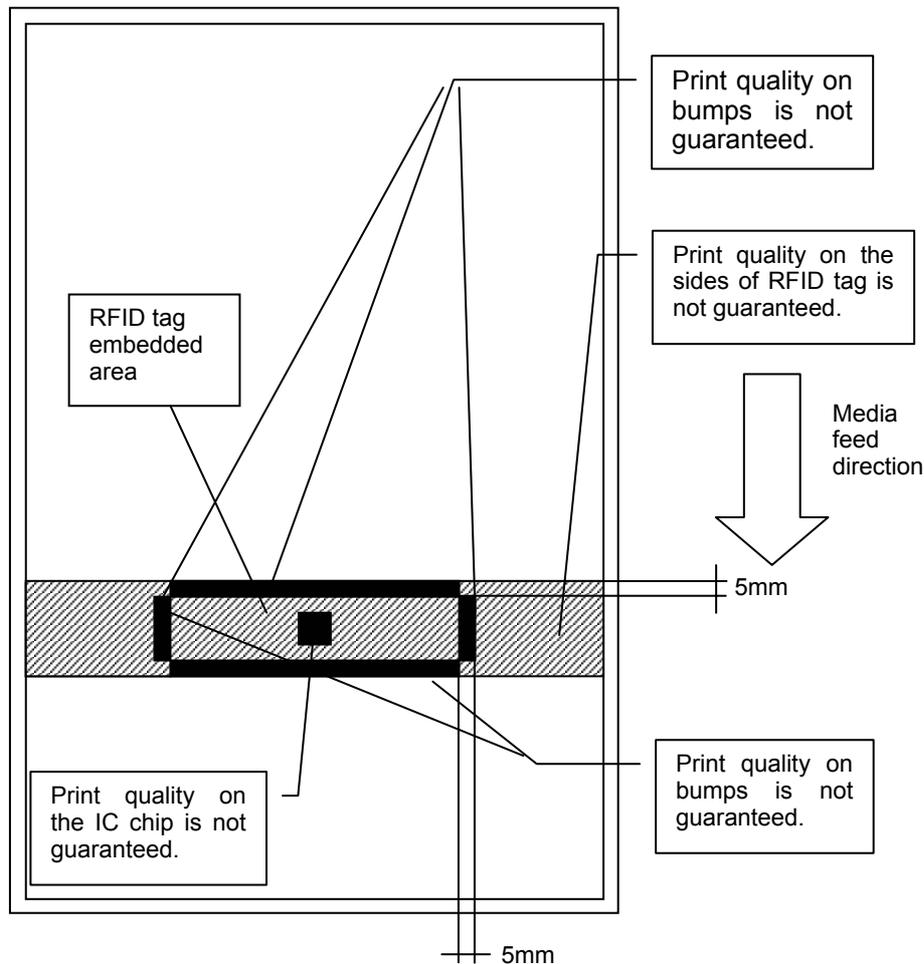
When printing is performed in a place where humidity is low or under some specific conditions, writing data on an RFID tag may fail due to static electricity generated by a label or a ribbon.

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 ± 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-EX4T/EX6T Key Operation Specification.

(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-EX4T/EX6T Key Operation Specification.

(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-EX4T/EX6T 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-EX4T/EX6T Key Operation Specification.

2.7 SPECIFICATION OF RFID TAG (for B-EX700-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-EX700-RFID-U2-CN-R is destined for China, Hong Kong, Singapore, Thailand and operates in the UHF band (920.625-924.375 MHz).

2.7.2 Available RFID Tag

EPC UHF Gen2, ISO-18000-6C

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.

2.7.4 Short-pitch Tag

A short-pitch tag kit is supplied with the B-EX700-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 B-EXT1-TS15-R and optional for B-EXT1-GS12-QM-R and B-EXT1-GS12-CN-R) 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-EX4T/6T Key Operation Specifications.

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

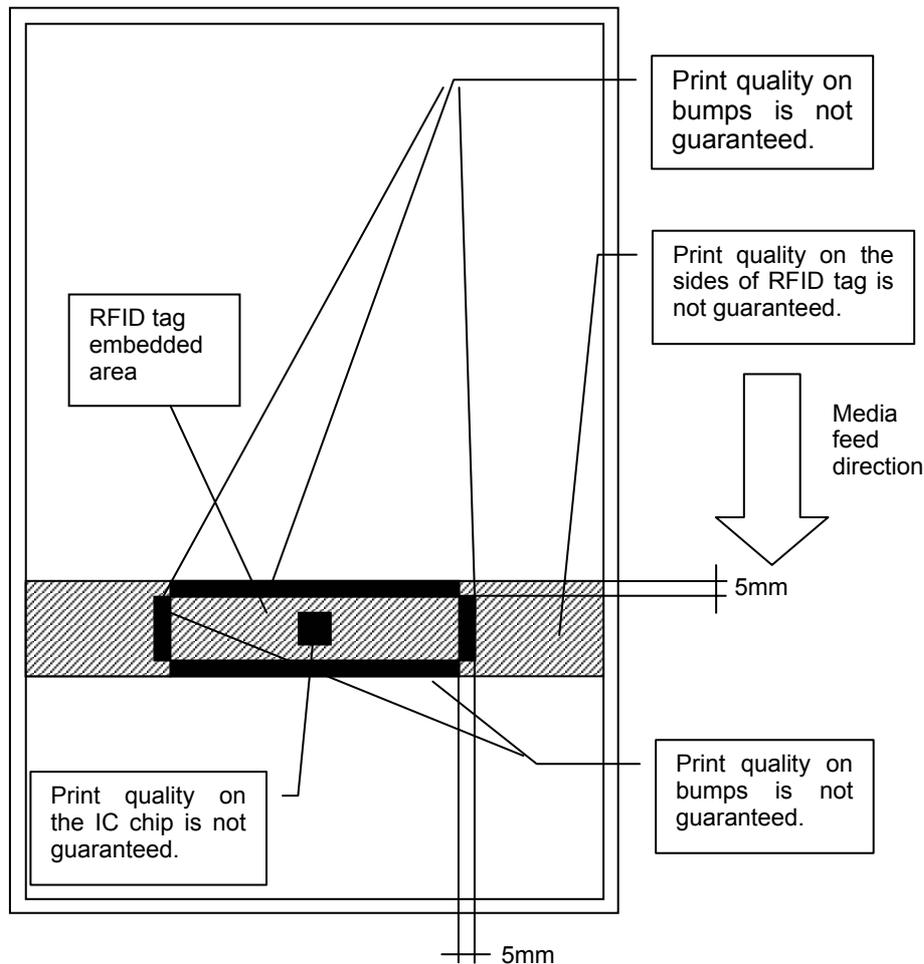
When printing is performed in a place where humidity is low or under some specific conditions, writing data on an RFID tag may fail due to static electricity generated by a label or a ribbon.

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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.

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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 ± 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-EX4T/EX6T Key Operation Specification.

(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-EX4T/EX6T Key Operation Specification.

(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-EX4T/EX6T 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-EX4T/EX6T Key Operation Specification.

3. OPTIONAL KIT

Option Name	Type	Applicable Model	Use
Disc cutter module	B-EX204-QM-R	B-EX4T1/T2	This cutter module uses a disc or rotary cutter. It cuts backing paper of labels and tag paper automatically in "Stop and cut" mode.
	B-EX206-QM-R	B-EX6T2	
Rotary cutter module	B-EX204-R-QM-R	B-EX4T1/T2 except HS	
Peel off module (with internal rewinder)	B-EX904-H-QM-R	B-EX4T1/T2	This strip module strips the label from the backing paper with the take-up block and strip block. When the rewinder guide plate is attached, the tag paper and label with backing paper are wound.
	B-EX906-H-QM-R	B-EX6T2	
Ribbon saving module	B-EX904-R-QM-R	B-EX4T1	The ribbon saving module moves the print head up and down by using a solenoid to save the ribbon loss as far as possible.
Expansion I/O card	B-EX700-IO-QM-R	All models	Installing this board allows connection to external devices.
RTC/USB host I/F card	B-EX700-RTC-QM-R	All models	Can be using the USB memory.
RFID module	B-EX700-RFID-H1-QM-R	All models	Installing this module enables read and write of RFID tags.
	B-EX700-RFID-U2-EU-R		
	B-EX700-RFID-U2-US-R		
	B-EX700-RFID-U2-CN-R		
Narrow width platen kit	B-EX904-PK-QM-R	B-EX4T1	
Linerless platen kit	B-EX904-LP-QM-R	B-EX4T2	
Wireless LAN Module	B-EX700-WLAN-QM-R	All models	Installing this PC board allows a communication by wireless LAN.
Parallel I/F card	B-EX700-CEN-QM-R	All models	
Serial I/F card	B-EX700-RS-QM-R	All models	

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

3.1 CUTTER MODULE: B-EX204-QM-R (Disk Cutter), B-EX204-R-QM-R (Rotary Cutter)

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

1) Disc cutter module:

Specification

Cut width:	Max. 112 mm
Cutter type:	Disk cutter
Cutting method:	Stop and cut
Accuracy:	±1mm
Min. cut length:	10.0mm
Cutter life:	1,000,000 cuts (170µm tag paper or backing paper)
Interlock switch:	Provided.

Media size

Item			4" model	6" model
Media pitch	Label	Min.	12mm	
		Max.	1500mm	
	Tag paper	Min.	10mm	
		Max.	1498mm	
Media width (Backing paper width)	Min.	15mm	75mm	
	Max.	120mm	160mm	
Label width	Min.	13mm	72mm	
	Max.	117mm	157mm	
Gap length	Min.	2mm		
	Max.	20mm		
Black mark length	Min.	2mm		
	Max.	10mm		
Media thickness	Min.	130µm		
	Max.	170µm		

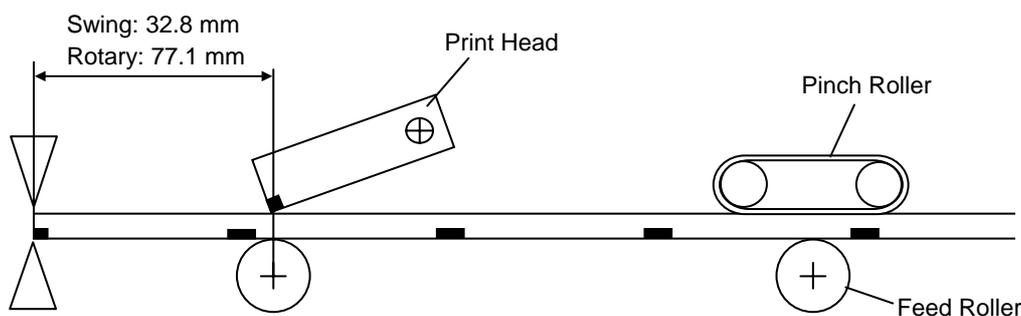
2) Rotary cutter module

Specification

Cut width:	Max. 112 mm
Cutter type:	Rotary cutter
Cutting method:	Non stop cut
Accuracy:	±1mm
Min. cut length:	30 mm (Conditions such as the print speed and printer settings are described in the following table.)
Cutter life:	1,000,000 cuts
Interlock switch:	Provided.

Media size (TBD)

Item			203-dpi model		305-dpi model	
Head up function			Disabled	Enabled	Disabled	Enabled
Media pitch	Label	Min.	3ips: 87mm	3ips: 38mm	3ips: 94mm	3ips: 38mm
			6ips: 99mm	6ips: 38mm	5ips: 102mm	5ips: 38mm
		Max.	1500mm			
	Tag paper	Min.	3ips: 30mm		3ips: 30mm	
			6ips: 30mm		5ips: 30mm	
		Max.	1500mm			
Media width (Backing paper width)		Min.	30mm			
		Max.	112mm			
Label width		Min.	27mm			
		Max.	109mm			
Gap length		Min.	6mm			
		Max.	20mm			
Black mark length		Min.	2mm			
		Max.	10mm			
Media thickness	Label	Min.	130µm			
		Max.	170µm			
	Tag paper	Min.	150µm			
		Max.	290µm			

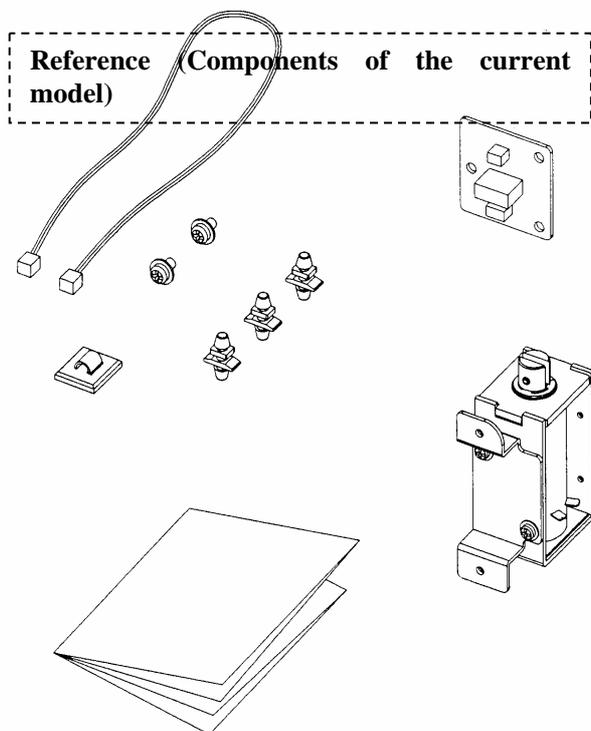


3.2 PEEL OFF MODULE: B-EX904-H-QM-R

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 rewriter 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-EX904-R-QM-R

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.



- | |
|---|
| <ol style="list-style-type: none"> 1. Solenoid 2. Harness (Connected to the Main PC board) 3. Relay PC board (with harness) 4. Locking support 5. M4×8 Double sems screw 6. Cable clamp 7. Installation manual 8. Arm |
|---|

a) Non-stop ribbon save

(The function is selectable in the printer system mode.)

When a non-print area is detected while the printer is feeding or printing the media, this module raises the print head to save the ribbon without stopping the media feed.

Note: Max. ribbon save amount is 50%.

b) Rotary cutter

When using the rotary cutter, the ribbon save function is required to be enabled.

Min. non-print area required to enable the ribbon save function

4", 203-dpi model

Print speed	3ips	6ips	10ips	12ips	14ips
Min. non-print area	20mm	20mm	35mm	TBD	TBD

4", 305-dpi model

Print speed	3ips	5ips	8ips	10ips	12ips	14ips
Min. non-print area	20mm	20mm	25mm	35mm	TBD	TBD

3.4 EXPANSION I/O CARD: B-EX700-IO-QM-R

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.

3.5 RTC/USB host INTERFACE BOARD: B-EX700-RTC-QM-R

Installing this board enables a connection USB memory.

- * Conforming to USB 1.1 USB HOST
- * Supporting Full-speed (12M bps) transmission

3.6 RFID MODULE: B-EX700-RFID-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.

HF RFID kit destined for Europe (RFID module and antenna are locally purchased.)
 Although the specified frequency band can be used in the other countries than Europe, the destination is limited to Europe because the certification is obtained only for Europe.

- Antenna cover
- Ribbon guide
- RFID module plate
- Antenna frame
- Cord bush
- Cable clamp
- Harness
- Screws
- Nylon washer
- Spacer
- Installation Manual

Specification

Item	Description
Module	TagSys MEDIO S002 (Locally purchased)
Frequency	13.56MHz
Output power	200mW
Environmental standard	RoHS Directive
Available RFID tags	TagSys C210, C220, C240, I-Code, Tag-it, ISO15693

3.7 RFID MODULE: B-EX700-RFID-U2-EU/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-EXT1-GS12-QM-R and B-EXT1-GS12-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-EXT1-TS15-R RFID Ready printers.

- (2) The countries where the use of this device is allowed are as follows:

Model Name	Frequency Band	Applicable Countries
B-EX704-RFID-U2-EU-R	UHF 869.7 to 870.0MHz (Center frequency: 869.85MHz)	EU member states and EFTA member states
B-EX704-RFID-U2-CN-R	UHF 920.625 to 924.375MHz (Center frequency: 922.5MHz)	China
B-EX704-RFID-U2-US-R (Serial Number: 2808Yxxxxxx and earlier)	UHF 902.75 to 927.5MHz (Center frequency: 915.125MHz)	U.S.A., Canada

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-EX700-RFID-U2-EU/ US/CN-R is as follows.

Item	Specification
Module	EU: TOSHIBA TEC TRW-EUM-01 for Europe 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 to Tag)	DSB-ASK
Modulation method (Tag to RW)	Back scatter ASK
Transmission speed (RW to Tag)	40kbps
Transmission speed (Tag to RW)	40kbps
Encoding (RW to Tag)	PIE
Encoding (Tag to 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

3.8 Wireless LAN Board: B-EX700-WLAN-QM-R

Country code:

Be sure to set the country code beforehand because the frequency band differs depending on the country. Please ask end-users to confirm the country code setting. Using the printer with wrong country code may conflict with the radio law of each country, causing a penalty.

Setting the country code not listed below will be processed as that of Japan.

Country code	Country	11b Usable Channel	11g Usable Channel
392	Japan	1-14	1-13
840	USA	1-11	1-11
124	Canada	1-11	1-11
36	Australia	1-13	1-13
554	New Zealand	1-13	1-13
484	Mexico	1-11	1-11
710	South Africa	1-13	1-13
156	China	1-13	1-13
344	Hong Kong	1-13	1-13
158	Taiwan	1-11	1-11
410	Republic of Korea	1-13	1-13
56	Belgium	1-13	1-13
528	Netherlands	1-13	1-13
442	Luxembourg	1-13	1-13
250	France	1-13	1-13
380	Italy	1-13	1-13
276	Germany	1-13	1-13
208	Denmark	1-13	1-13
372	Ireland	1-13	1-13
826	United Kingdom	1-13	1-13
300	Greece	1-13	1-13
724	Spain	1-13	1-13
620	Portugal	1-13	1-13
40	Austria	1-13	1-13
246	Finland	1-13	1-13
752	Sweden	1-13	1-13
203	Czech Republic	1-13	1-13
233	Estonia	1-13	1-13
196	Cyprus	1-13	1-13
428	Latvia	1-13	1-13
440	Lithuania	1-13	1-13
348	Hungary	1-13	1-13
470	Malta	1-13	1-13
616	Poland	1-13	1-13
705	Slovenia	1-13	1-13
703	Slovakia	1-13	1-13
100	Bulgaria	1-13	1-13
642	Romania	1-13	1-13
578	Norway	1-13	1-13
438	Liechtenstein	1-13	1-13
352	Iceland	1-13	1-13
756	Switzerland	1-13	1-13

MAC Address:

MAC address is described on the wireless LAN module and the accessory sticker.

It is required when using the MAC address filtering function of the Access Point (AP). Please describe it in the installation manual, etc. which is managed by end-users.

The MAC address can be confirmed by the maintenance counter print in the system mode.

Specification:

1) Hardware

Item	Description		
Standard	IEEE802.11b/g		
Enabled Device	B-EP2DL/B-EP4DL Series		
Operating Temperature	0°C to +50°C		
Destination	Japan	USA	Europe
Frequency (Center Channel)	2412 to 2484MHz	2412 to 2462MHz	2412 to 2472MHz
Channel	1 to 14ch	1 to 11ch	1 to 13ch
Spacing	5MHz		
Transmission speed/ Modulation	IEEE802.11b	Transmission method	Conforming to IEEE802.11b DSSS method
		Channel	Depending on the country
		Data transmission speed/ Modulation	11/5.5Mbps:CCK 2Mbps:DQPSK 1Mbps:DBPSK
	IEEE802.11g	Transmission method	Conforming to IEEE802.11g OFDM method DSSS method
		Channel	Depending on the country
		Data transmission speed/ Modulation	54/48Mbps:64QAM 36/24Mbps:16QAM 18/12Mbps:QPSK 9/6Mbps:BPSK
Antenna	Chip type antenna (Built-in module)		
Aerial power	802.11b	13dBm(19.95mW) Max	
	802.11g	11dBm(12.59mW) Max	

2) Software

Item	Description	
Connection mode (Refer to Note 1)	Infrastructure, Adhoc	
Default Country Code	JPN	
Default IP Address	192.168.xxx.yyy Set the printer ID for xxx,yyy.	
Default Subnet Mask	255.255.0.0	
Default ESSID	TOSHIBATEC	
Security	IEEE802.11i	
	Cryptography	WEP (64/128bit), TKIP(WPA), AES(WPA2)
	Authorization	Shared Key (for WEP), PSK, PEAP, TLS, TTLS, MD5, LEAP, EAP-FAST
	Browser	Microsoft IE5.01 and greater
Protocol (Refer to Note 2)	TCP/IP,Socket,LPD (LPR) ,DHCP/WINS,HTTPD, (SNMP)	
Wireless LAN Parameter Setting and Status monitor (Refer to Note 3)	Parameter Setting: Command (PC Setting Tool) Status monitor: via HTTP	

NOTES:

1. *The printer constantly performs communication with cordless handset in Adhoc mode, therefore, the consumption current in standby status increases, causing the time available of the battery pack to be reduced.*
2. *SNMP protocol is only for the download with the network tool.*
3. *Part of the parameter setting can be performed by key operations.*