TOSHIBA

TOSHIBA Barcode Printer

BX400/600 Series

RFID Supply Specification

0.0 Edition: July, 2024

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1. SCOPE

This specification applies to the optional RFID R/W kit for the BX400/600 series barcode printers below.

Options

	Model name	Application
UHF RFID kit (for BX410)	BX704-RFID-U4-S	Japan
	BX704-RFID-U4-US-S	North America, Korea, Asia
	BX704-RFID-U4-EU-S	Europe
	BX704-RFID-U4-AU-S	Australia, New Zealand
	BX704-RFID-U4-IN-S	India
UHF RFID kit (for BX610)	BX706-RFID-U4-S	Japan
	BX706-RFID-U4-US-S	North America, Korea, Asia
	BX706-RFID-U4-EU-S	Europe
	BX706-RFID-U4-AU-S	Australia, New Zealand
	BX706-RFID-U4-IN-S	India

RFID models:

	Model name	Application
BX410/610 for Mexico	BX410T-GS06-QM-S	Mexico
	BX410T-TS06-QM-S	
	BX610T-GS06-QM-S	
	BX610T-TS06-QM-S	
BX410/610 for China	BX410T-GS06-CN-S	China
	BX410T-TS06-CN-S	
	BX610T-GS06-CN-S	
	BX610T-TS06-CN-S	

2. OUTLINE

An RFID supply refers to a label or tag containing an RFID tag (inlay).
In addition, barcode printers equipped with RFID R/W kits can write data to the RFID supply and print on the surface of the paper.

3. MEDIA SPECIFICATION

The media specifications are based on the BX400/600 Series Supply Specification.

4. RIBBON SPECIFICATION

The specifications for ribbons are based on the BX400/600 Series Supply Specification.

5. RFID TAGS

The recommended RFID tags are shown in the table below. (Reading and writing performance and print quality are not guaranteed.)

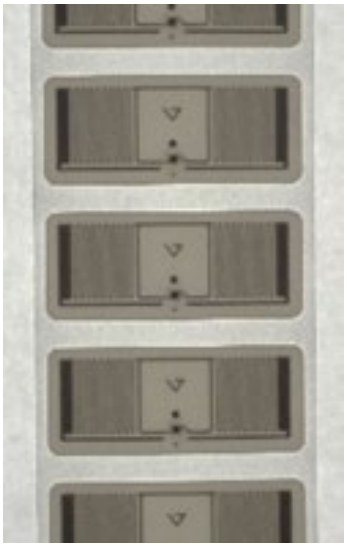
Name	RFID tag name	Chip name	Label pitch (mm)	Label length (mm)	Liner width (mm)	Label width (mm)	Thickness (mm)		Core ID (mm)	Winding direction	Media type	Print method
							With an IC	Label				
ALN-9715	ALN-9715-WRW	Higgs 4	15.875	12.9	33	30	0.35	0.21	76	Outer	Label	TT
Belt	3006852	Monza R6-P	20	17	80	73	0.3	0.22	76	Outer	Label	TT
LIMF-481M1A	LIMF-481M1A	Monza R6-P	38	28	100	85	0.33	0.25(0.16)	76.2	Inner	Label	TT
Web M730	3007808	Impinji M730	36	33	60	54	0.28	0.22	76	Outer	Label	TT

* As for the following specifications, they are individual ones with the recommended tag. Therefore, if the paper size and inlay arrangement are different, calibration is required for each tag.

No.1 ALN-9715-WRW

Manufacture: Alien
Inlay: Alien ALN-9715
RFID chip: Higgs 4
Sensor: Transmissive sensor with manual threshold setting
Antenna position: Center front

Media layout (Surface)



Feeding direction

Reference setting conditions

RFID writing conditions	RFID module destination	
	EU	US (CN), AU
Power Level	8	5
Q Value	2	2
Encoding position	+23	+25
AGC threshold	5	2
Write AGC threshold	5	2
Write retry min AGC	5	2

Note: Since the above RFID writing conditions change depending on the individual differences of the printer and the RFID module and the usage environment, they are for reference only. In an actual operation, printers and modules should be calibrated using “BCP RFID Analyze Tool” and then have the calculated values set in each printer.

Constraints *1

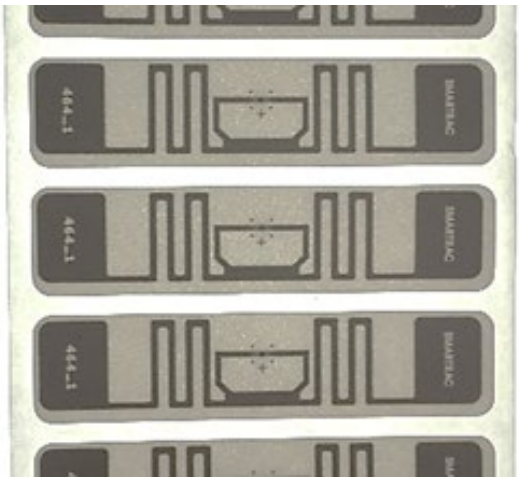
Issue mode	Constraint
Batch mode (without forward wait)	Available
Batch mode (with forward wait)	Out of specification (shorter than 20 mm)
Cut mode (disk cutter)	Out of specification (shorter than 25.4 mm)
Cut mode (rotary cutter)	Out of specification (shorter than 38 mm)
Peel-off mode	Out of specification (shorter than 25.4 mm)
Print quality	No warranty area

*1 Use the ribbon saving unit for the issuing operation.
Set “MODE2” for [RFID head-up] from the system mode.

No.2 Belt R6-P

Manufacture: Avery Dennison Smartrac
Inlay: Belt
RFID chip: Monza R6-P
Sensor: Transmissive sensor with manual threshold setting
Antenna position: Center front

Media layout (Surface)



Feeding direction

Reference setting conditions

RFID writing conditions	RFID module destination	
	EU	US (CN), AU
Power Level	5	7
Q Value	2	2
Encoding position	+24	+25
AGC threshold	2	4
Write AGC threshold	2	4
Write retry min AGC	2	4

Note: Since the above RFID writing conditions change depending on the individual differences of the printer and the RFID module and the usage environment, they are for reference only. In an actual operation, printers and modules should be calibrated using “BCP RFID Analyze Tool” and then have the calculated values set in each printer.

Constraints *1

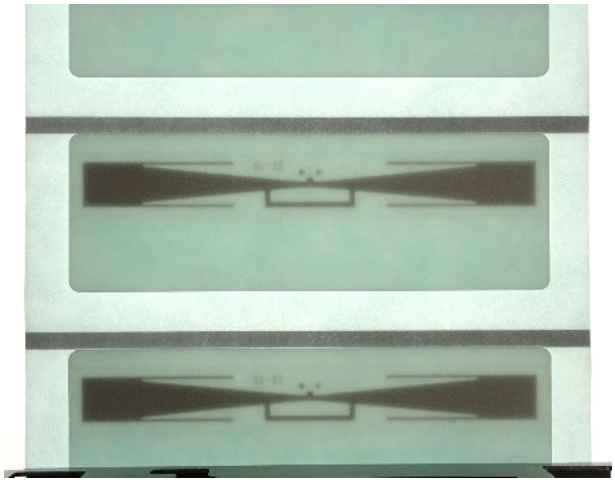
Issue mode	Constraint
Batch mode (without forward wait)	Available
Batch mode (with forward wait)	Available
Cut mode (disk cutter)	Out of specification (shorter than 25.4 mm)
Cut mode (rotary cutter)	Out of specification (shorter than 38 mm)
Peel-off mode	Out of specification (shorter than 25.4 mm)
Print quality	No warranty area

*1 Use the ribbon saving unit for the issuing operation.
Set “MODE2” for [RFID head-up] from the system mode.

No.3 LIMF-481M1A

Manufacture: TOPPAN Edge
Inlay: LIMF-481M1A
RFID chip: Monza R6-P
Sensor: Transmissive sensor with manual threshold setting
Antenna position: Center front

Media layout (Surface)



Feeding direction

Reference setting conditions

RFID writing conditions	RFID module destination	
	EU	US (CN), AU
Power Level	5	10
Q Value	2	2
Encoding position	+5	+3
AGC threshold	2	7
Write AGC threshold	2	7
Write retry min AGC	2	7

Note: Since the above RFID writing conditions change depending on the individual differences of the printer and the RFID module and the usage environment, they are for reference only. In an actual operation, printers and modules should be calibrated using “BCP RFID Analyze Tool” and then have the calculated values set in each printer.

Constraints *1

Issue mode	Constraint
Batch mode (without forward wait)	Available
Batch mode (with forward wait)	Available
Cut mode (disk cutter)	Available
Cut mode (rotary cutter)	Available
Peel-off mode	Available
Print quality	No warranty area

*1 Use the ribbon saving unit for the issuing operation.
Set “MODE2” for [RFID head-up] from the system mode.

No.4 Web M730

Manufacture: Avery Dennison Smartrac
Inlay: Web
RFID chip: Impinji M730
Sensor: Transmissive sensor with manual threshold setting
Antenna position: Center front

Media layout (Surface)

Feeding direction

Reference setting conditions

RFID writing conditions	RFID module destination	
	EU	US (CN), AU
Power Level	5	5
Q Value	2	2
Encoding position	+9	+6
AGC threshold	2	2
Write AGC threshold	2	2
Write retry min AGC	2	2

Note: Since the above RFID writing conditions change depending on the individual differences of the printer and the RFID module and the usage environment, they are for reference only. In an actual operation, printers and modules should be calibrated using “BCP RFID Analyze Tool” and then have the calculated values set in each printer.

Constraints *1

Issue mode	Constraint
Batch mode (without forward wait)	Available
Batch mode (with forward wait)	Available
Cut mode (disk cutter)	Available
Cut mode (rotary cutter)	Out of specification (shorter than 38 mm)
Peel-off mode	Available
Print quality	No warranty area

*1 Use the ribbon saving unit for the issuing operation.
Set “MODE2” for [RFID head-up] from the system mode.

6. PRECAUTIONS

6.1 RFID Media Storage

Do not store RFID media near the printer (such as on the printer or around the media outlet). This may affect the reading and writing performance to RFID tags.

6.2 Roll Shape of RFID Media

Pay attention to the winding direction, media core I.D. and winding pressure of the RFID media. (See the table in “5. RFID TAGS”.) RFID labels can float and hit the media path, thermal head and cause media jams. Although it depends on the status of the glue, tag and liner, labels with enclosed RFID tags tend to become would easily and this may cause media jams.

6.3 Sensor

Depending on the antenna pattern embedded in the RFID tag, the reflectance and transmittance of the media sensor may be affected. In that case, set the manual threshold. (For details, refer to the Key Operation Specification.)

6.4 Cutter

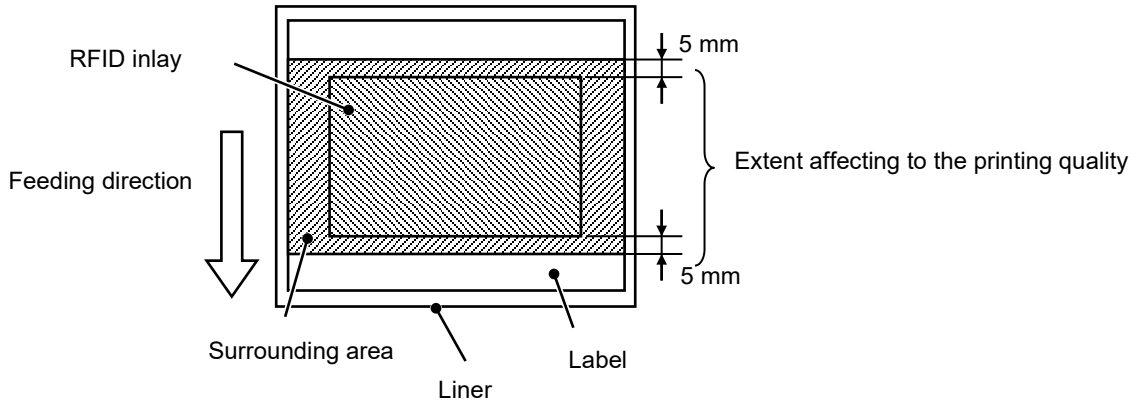
When printing is attempted with the cut mode, do not try to disconnect the antenna and IC chip of the RFID tag because there is a possibility of damage to the cutter. The cutting position can be changed by the cut position fine adjustment. (For details, refer to the Key Operation Specification.)

6.5 ESD

When printing RFID tags is attempted in an environment with low humidity, data writing to the RFID tag may fail due to static electricity being charged to the media or ribbon.

6.6 Printing on RFID Inlay

Since the RFID inlay portion and the entire area of both sides and the surrounding area from 5 mm before and after the feeding direction are affected by the step difference due to the thickness of the antenna and the IC chip, the printing quality is lowered (printing scraping, printing omission, etc. occur). Due to this, the printing quality in the area showing below is not guaranteed.



6.7 Ambient Temperature

The wireless performance varies with the ambient temperature. Therefore, if the temperature changes from the ambient one at the time of specifying the RFID settings such as writing conditions, writing data to the RFID tag may fail.

6.8 Peel-off Mode

Peeling off may not be performed normally depending on the RFID media to be used, according to its glue, RFID tag or liner.

6.9 Minimum Label Pitch

When using the RFID media with a short label pitch, data may be written to the RFID tag adjacent to the target RFID tag and this may not be properly performed.
The place where data are written differs depending on the type of RFID tag. Therefore, use the BCP RFID Analyze Tool in advance to ensure that the data are successfully written to the target RFID tag.

6.10 Poor RFID Tag

The RFID media may contain poor RFID tags when shipped from the manufacturer. The defect rate varies depending on the type of tag and the embedded method. RFID media manufacturers need to mark the poor RFID tags so that they can be identified or eliminate those tags in the manufacturing process. End users should check with the manufacturer how to identify the poor ones.

6.11 Writing Accuracy

In all environments and conditions of use, it is impossible to guarantee a 100% writing accuracy. Writing accuracy may depend on external factors such as tag (IC, inlay design/size) conditions, temperature and humidity conditions and noise. Confirm in advance in the actual use environment. As a function of the printer, if writing has failed, an invalid pattern (horizontal line) is printed on the RFID label.

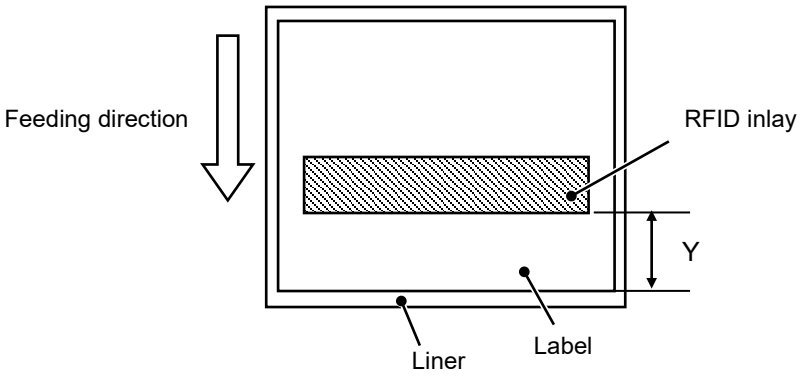
6.12 Manual Cut Mode and Cut Mode

When printing is attempted with the manual cut mode and cut mode and the position is moved to the RFID tag wiring position by backward feeding, the RFID media may be removed from the platen and the issue may not be continued.

6.13 RFID Inlay Placement Constraints

RFID inlays should basically be placed within 50 mm of the top of the paper. (Y≦50mm in the figure below)
When the RFID inlay is placed behind 50 mm from the top of the paper, there is a possibility that reverse feeding of 50 mm or more is attempted when moving from the RFID tag writing position to the home position. In that case, the printer is unable to successfully conduct backward feeding.

When printing is attempted with the manual cut mode or cut mode, the RFID inlay should be placed at least 30 mm away from the top of the paper. (Y≧30mm in the figure below)
If the RFID inlay is not 30 mm or more away from the top of the paper, backward feeding may be performed when moving from the issue start position (home position) to the RFID tag writing position, so that the RFID media may be removed from the platen and the issue may not be continued.



7. HOW TO IMPROVE RFID WRITING SUCCESS RATE

Since writing quality may deteriorate due to the influence of an electric field, magnetic field or the tag performance is not constant, the following are ways to improve the writing success rate.

(1) Number of write retries
The RFID setting in the printer system mode allows you to change the number of RFID write retries. If the number of retries is increased, the writing rate can be improved, but the issue time of the printer depends on the RFID write time, so the issue time may be long. (For details, refer to the Key Operation Specification.)

(2) Adjustment of the writing position on retrying
In the RFID setting of the printer system mode, if RFID writing fails, there is a function for self-activating the changing of the tag writing position and rewriting automatically. Enabling this feature can improve the writing ratio. However, since this function works even if the RFID tag is damaged, the total issuance time may be long if damaged or poor RFID tags are included. (For details, refer to the Key Operation Specification.)

(3) Change of the antenna installation position
The antenna installation position can be changed on the RFID unit. The writing operation sometimes fails due to the position of the inlay; however, this may be improved by changing the antenna position. (For details, refer to the Installation Manual.)

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