RFID Inlay Placement/Power Guidelines

www.zebra.com/rfid-guidelines

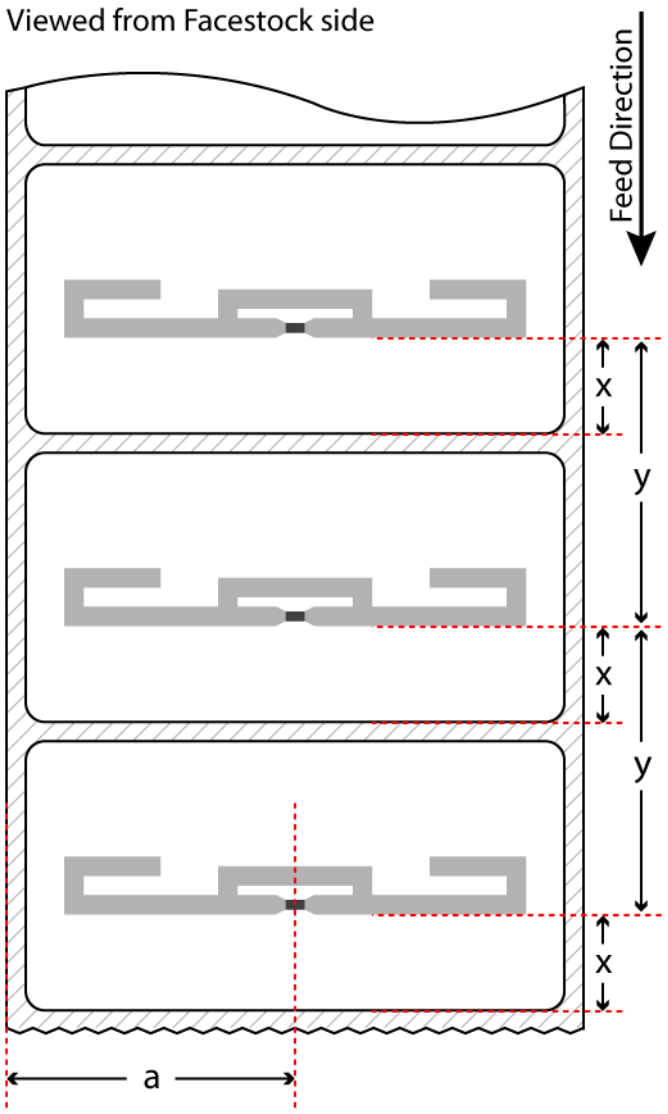
Zebra ZE500R
Model Number: ZE5004X-XXXXRX0Z
Revision Date: 26-Sep-18

This document defines the optimal encode position for RFID inlays when used with Zebra Printer/Encoders. These guidelines are provided for two purposes.

1. To define the optimal inlay position (x), minimum inlay pitch (y), and encoder power setting for RFID media ***without use of the program position command***. Media converted to these guidelines require ***no RFID calibration step***, and no extra media movement for RFID encoding. This is the optimal method to print and encode RFID media.
2. For media converted to a compatible inlay pitch (y), but different inlay position (x), these guidelines should be used to determine the required inlay program position. Program position is set by parameter "p" of the ^RS command. This can be useful for encoding directly to wet inlays, or for using media converted to a different inlay position.

Three critical dimensions define transponder placement and pitch, as shown in the schematic to the right and explained below.

Parameter	Name	Definition	Explanation
a (mm)	Inlay Center	Left liner edge to inlay center Viewed from facestock side, feed direction down	RF coupling with the inlay can change horizontally across the width of the label. This dimension is relative to the inlay *antenna center*, which is not always the same as the chip location. "a" is typically defined with a ±3mm tolerance.
x (mm)	Inlay Position	Label Start to inlay antenna leading edge	This dimension ensures proper RF coupling with the inlay in the current label. It is relative to the inlay *antenna leading edge*. This is also the optimal distance from the printline to inlay antenna during encoding. "x" is generally given with a ±3mm tolerance.
y (mm)	Inlay Pitch	Distance from inlay antenna leading edge to inlay antenna leading edge.	If Inlays are spaced too close together, coupling to multiple inlays can sometimes occur. This dimension ensures coupling with only the inlay in the current label. "y" defines the *minimum* pitch required to avoid multiple coupling.

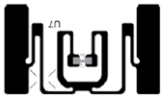


Example 1: Determine the optimal converting position for an Avery AD-223 Inlay in a 4"x2" label with 1/8" gap for the R110Xi UHF to be used in Region 0. The guideline specifies a=51mm, x=34mm, y≥51mm. Since the label + gap length, 2.125", is greater than "y", inlay pitch is compatible with the guideline. The leading edge of the inlay antenna should be placed 34mm from the "Label Start". In this case, "Label Start" is the leading edge of the label.

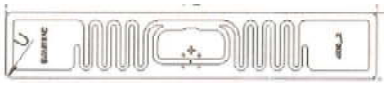
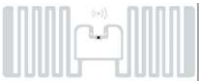
Example 2: Determine the program position for a Raflatac Short Dipole #3001490 converted to a=50mm, x=2mm, y=20mm for the RZ400 UHF to be used in Region 0. The guideline specifies a=51mm, x=13mm, y≥20mm. In this case, "a" and "y" are compatible with the guideline, but "x" is not. To encode the inlay, the label needs to move *backward* into the printer by a distance of: 13mm – 2mm = 11mm. This can be accomplished by setting parameter "p" of the ^RS command to "B11". Program position capabilities vary by printer model and firmware version. See the Zebra RFID Programming Guide and firmware release notes for more information.

Note:

- Guidelines are only valid for the specified printer model and region.
- Many inlays look similar, but behave very differently. Guidelines are only valid for the specific inlay listed.
- Inlay orientation is critical. Images are shown as viewed through the media facestock, with feed direction down.
- For media compliant to the guidelines below, do not run the printer RFID calibrate procedure.
- "Label Start" is defined by one of three different methods: 1) The leading edge of a label, 2) The leading edge of a black mark, or 3) The leading edge of a notch (See printer specifications for mark and notch requirements).
- Because "y" is defined as a minimum distance, for some inlays "y" can actually be smaller than "x". In this case, a program position is required to run the media at the minimum pitch.
- Inlay pitch, "y", is not always equal to the label length + 1/8" gap. In some cases, labels are converted with a larger gap, to accommodate the minimum pitch requirement.
- Guidelines are established using the latest printer firmware. See www.zebra.com for firmware updates.

					All Regions				
		Inlay			Position (mm)			Power	
Post	Date	Manufacturer	Part #	Orientation (Size not to scale)	a (±3)	x (±3)	y (≥)	Read	Write
Yes	10/26/16	Alien	ALN-9640		50	29	40	10	10
Yes	10/26/16	Alien	ALN-9640		50	35	40	10	10
Yes	11/23/15	Alien	ALN-9654G		53	20	25	5	5
Yes	10/3/17	Alien	ALN-9662		39	21	50	10	18
Yes	4/2/14	Alien	ALN-9740		51	28	16	10	10
Yes	7/17/15	Alien	ALN-9762		41	21	40	10	17
Yes	9/5/18	Avery	AD-229 R6		47	39	35	10	18
Yes	9/5/18	Avery	AD-229 R6		47	27	35	10	18
Yes	4/2/14	Avery	AD-227m5		51	38	16	10	10
Yes	2/16/16	Avery	AD-383w u7		29	18	50	5	5
Yes	9/5/18	Avery	AD-661 R6		49	16	50	10	10

Guidelines are subject to change without notice.

					All Regions				
		Inlay			Position (mm)			Power	
Post	Date	Manufacturer	Part #	Orientation (Size not to scale)	a (±3)	x (±3)	y (≥)	Read	Write
Yes	9/5/18	Avery	AD-661 R6		49	18	50	10	10
YES	7/14/15	Boing Tech	1020358 Monza R6		51	26	25	5	5
Yes	7/14/15	Boing Tech	1020358 Monza R6		51	26	25	5	5
Yes	4/4/18	SMARTRAC	3004230 Belt		37	25	35	10	10
Yes	4/4/18	SMARTRAC	3004230 Belt		37	25	35	10	10
Yes	6/20/18	SMARTRAC	3004859 Miniweb		23	25	45	10	10
yes	6/20/18	SMARTRAC	3004859 Miniweb		23	28	45	10	10
Yes	3/9/15	SMARTRAC	3D FROG		40	3	55	10	10
Yes	4/2/14	SMARTRAC	Dogbone G2iL		51	17	30	15	15
Yes	4/2/14	SMARTRAC	Dogbone M4		51	16	30	10	10
Yes	2/15/17	SMARTRAC	ShortDipole M4		49	23	40	10	10

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		All Regions							
		Inlay			Position (mm)			Power	
Post	**Date**	**Manufacturer**	**Part #**	**Orientation (Size not to scale)**	**a (±3)**	**x (±3)**	**y (≥)**	**Read**	**Write**
Yes	2/15/17	SMARTRAC	ShortDipole M4		49	23	50	15	15
Yes	4/2/14	SMARTRAC	ShortDipole M5		51	35	25	10	10
Yes	2/15/17	SMARTRAC	ShortDipole G2iM		50	36	45	15	15
Yes	2/15/17	SMARTRAC	ShortDipole G2iM		50	24	45	15	15

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