



RFID Inlay Placement/Power Guidelines

www.zebra.com/transponders

Zebra RZ600

Model Number: RZ600-XXXX-XXXRX

Revision Date: 11-Jul-14

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 <i>antenna center</i> , which is not always the same as the chip location. "a" is typically defined with a $\pm 3\text{mm}$ 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 <i>antenna leading edge</i> . This is also the optimal distance from the printline to inlay antenna during encoding. "x" is generally given with a $\pm 3\text{mm}$ 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 <i>minimum pitch</i> required to avoid multiple coupling.

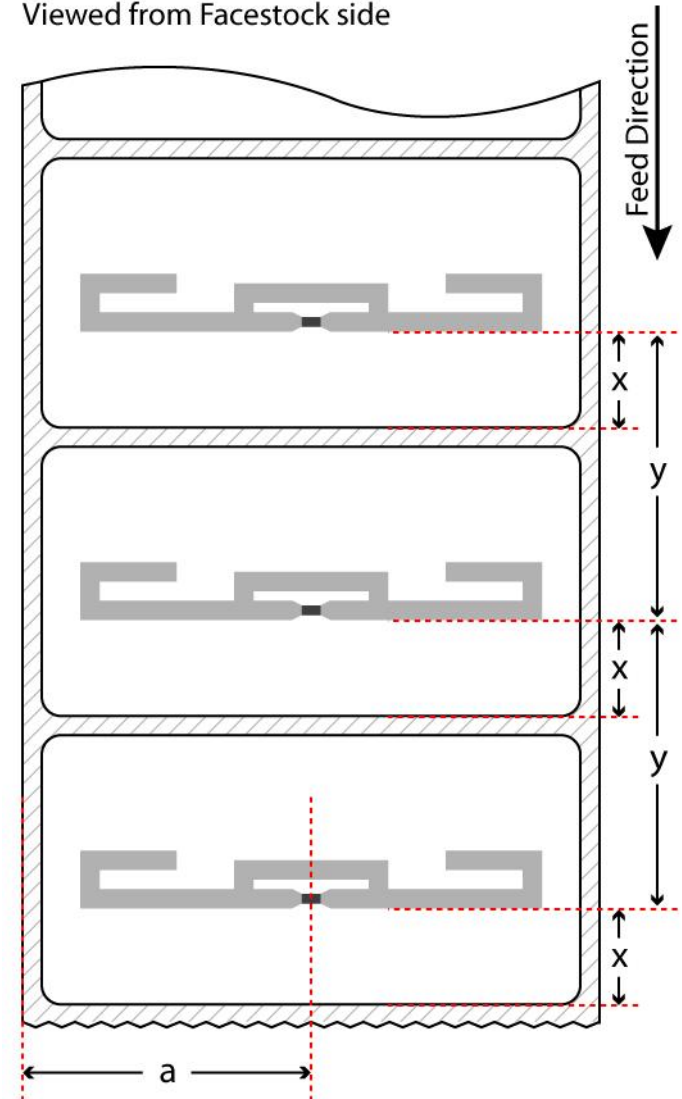
Example 1: Determine the optimal converting position for an Avery AD-223 Inlay in a 4"x2" label with 1/8" gap for the R110Xi UHF to be used in Region 0. The guideline specifies a=51mm, x=34mm, y 51mm. Since the label + gap length, 2.125", is greater than "y", inlay pitch is compatible with the guideline. 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 Raflatrac 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:










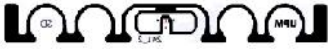
- Guidelines are only valid for the specified printer model and region.
- Many inlays look similar, but behave very differently. Guidelines are only valid for the specific inlay listed.
- Inlay orientation is critical. Images are shown as viewed through the media facestock, with feed direction down.
- 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.











Viewed from Facestock side





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Date	Manufacturer	Part #	Inlay Orientation (Size not to scale)	Region 0 (US/Canada/Mexico)					Region 1 (Europe)				
				Position (mm)			Power		Position (mm)			Power	
				a (±3)	x (±3)	y (≥)	Read	Write	a (±3)	x (±3)	y (≥)	Read	Write
1/27/2011	Alien	ALN-9630		35	21	22	10	18	35	21	22	10	18
1/27/2011	Alien	ALN-9630		35	11	22	19	24	35	11	22	19	24
03/31/09	Alien	ALN-9640		51	14	16	18	18	51	14	25	18	18
12/23/09	Alien	ALN-9654		51	9	25	20	20	51	9	25	20	20
02/08/13	Alien	ALN-9662		40	8	25	23	27					
03/31/09	Avery	AD-223		51	24	16	15	15	51	22	25	15	15
03/31/09	Avery	AD-223		51	13	16	21	21	rfid@zebra.com				
07/20/10	Avery	AD-224		51	23	16	18	18	51	24	16	18	18
07/20/10	Avery	AD-224		51	12	16	24	24	51	13	16	24	24
6/23/2011	Avery	AD-226		51	23	16	13	22	51	23	16	13	22

Date	Manufacturer	Part #	Inlay Orientation (Size not to scale)	Region 0 (US/Canada/Mexico)					Region 1 (Europe)				
				Position (mm)			Power		Position (mm)			Power	
				a (±3)	x (±3)	y (≥)	Read	Write	a (±3)	x (±3)	y (≥)	Read	Write
6/23/2011	Avery	AD-226		51	12	16	18	23	51	12	16	18	23
9/19/2012	Avery	AD-227		51	14	16	16	18	rfid@zebra.com				
2/9/2011	Avery	AD-231		38	12	25	12	10	rfid@zebra.com				
2/9/2011	Avery	AD-231		38	5	25	12	12	rfid@zebra.com				
2/8/2013	Avery	AD-380iL		38	4	51	16	18					
2/8/2013	Avery	AD-380iL		38	7	51	9	18					
09/15/09	Avery	AD-814		19	20	38	12	12	rfid@zebra.com				
02/08/13	Avery	AD-824		19	5	63	18	21					
03/16/09	Avery	AD-843		51	7	45	10	10	rfid@zebra.com				
11/18/08	Smartrac	3001490 M3 SD		51	20	20	15	15	rfid@zebra.com				

Date	Manufacturer	Part #	Inlay Orientation (Size not to scale)	Region 0 (US/Canada/Mexico)					Region 1 (Europe)				
				Position (mm)			Power		Position (mm)			Power	
				a (±3)	x (±3)	y (≥)	Read	Write	a (±3)	x (±3)	y (≥)	Read	Write
11/18/08	Smartrac	3001490 M3 SD		51	13	20	18	18	51	14	20	18	18
02/17/09	Smartrac	3001572 M3 Dogbone		73	15	30	15	15	73	14	30	18	18
12/23/09	Smartrac	3001600 M3 Frog		38	16	80	18	18	38	18	80	15	15
12/02/09	Smartrac	3001784 Viper M3		70	17	20	12	12	rfid@zebra.com				
8/28/2012	Smartrac	3002028 M5 Belt		38	13	20	20	20	rfid@zebra.com				
8/28/2012	Smartrac	3002028 M5 Belt		38	7	20	20	20	rfid@zebra.com				
2/16/2011	Smartrac	3002154 Viper M4		55	16	20	5	9	55	16	20	5	9
2/16/2011	Smartrac	3002154 Viper M4		55	16	20	5	9	55	16	20	5	9
3/10/2013	Smartrac	3002241 NXP G2iM Dogbone		rfid@zebra.com					52	16	30	10	15
4/25/2015	Smartrac	3002407 Viper M5		65	18	20	10	12	65	18	20	10	12

				Region 0 (US/Canada/Mexico)					Region 1 (Europe)				
Inlay				Position (mm)			Power		Position (mm)			Power	
Date	Manufacturer	Part #	Orientation (Size not to scale)	a (±3)	x (±3)	y (≥)	Read	Write	a (±3)	x (±3)	y (≥)	Read	Write
9/18/2013	Trace Tech ID Solutions	TE14 THINPROPELLER		55	21	17	16	16	55	21	17	16	16
7/11/2014	Trace Tech ID Solutions	TE35 Gain		52	8	30	10	11	52	8	30	10	11