

## ^RS – Set Up RFID Parameters


Use this command to set up RFID parameters including tag type; programming position; and error handling. In addition to reading or encoding RFID tags, the RFID ZPL commands also provide for RFID exception handling, such as setting the number of read/write retries before declaring a transponder defective (set with ^RR, ^RT, and ^WT) or setting the number of labels that will be attempted if an error occurs (set with ^RS).


For example, if an RFID label fails to program correctly or if the transponder cannot be detected, the printer ejects the label and prints **VOID** across it. The printer will try to print another label with the same data and format for the number of labels specified (parameter *n*). If the problem persists, the printer follows the error handling instructions specified by the error handling parameter (parameter *e*): the printer may remove the problematic format from the print queue and proceed with the next format (if one exists in the buffer), or it may place the printer in Pause or Error mode.







Use care when using this command in combination with ^RT or ^RF for reading tag data. Problems can occur if the data read from the tag is going to be printed on the label. Any data read from the tag must be positioned to be printed above the read/write position. Failure to do this will prevent read data from being printed on the label.

**Format** ^RSt,p,v,n,e,a,c,s

Parameters	Details
<p>t = tag type</p>	<p>Tells the printer/print engine which tag type you are using. If you specify a tag type that is not supported by your printer or firmware, the printer uses its default value. For the supported tag types and defaults, see <a href="#">Table 22 on page 420</a>.</p> <p><i>Accepted Values:</i></p> <p><b>UHF Printers</b></p> <ul style="list-style-type: none"> <li>0 = None</li> <li>1 = EPC Class 0</li> <li>2 = EPC Class 0 Plus</li> <li>3 = EPC Class 1 64-bit</li> <li>4 = EPC Class 1 96-bit</li> <li>5 = UCODE EPC 1.19</li> <li>6 = Impinj Class 0 Plus</li> <li>7 = ISO 18000-06A</li> <li>8 = EPC Class 1, Generation 2 (Gen 2)</li> <li>9 = ISO 18000-06B</li> </ul> <p><b>HF Printers</b></p> <p> <b>Note</b> • Only the R110Xi HF printer (firmware version R65.X.X) supports the use of letters for this parameter. All other printers use the numbers.</p> <ul style="list-style-type: none"> <li>A or 0 = None</li> <li>B or 1 = Auto detect (query tag to determine)</li> <li>C or 2 = Tag*It (Texas Instruments Tagit tags)</li> <li>D or 3 = I*code (Phillips Icode tags)</li> <li>E or 4 = Pico Tag (Inside Technology's)</li> <li>F or 5 = ISO 15693</li> <li>G or 6 = EPC tag (13.56 MHz)</li> <li>H or 7 = UID Tag</li> <li>I or 8 = Mifare UltraLight</li> </ul> <p><i>Default Value:</i> varies by printer (see <a href="#">Table 22 on page 420</a>)</p>

Parameters	Details
<p>p = read/write position of the tag (programming position)</p>	<p>This parameter sets the read/write position of the tag.</p> <p> <b>Important</b> • If a label format specifies a value for the programming position, this value will be used for the programming position for all labels until a new position is specified or until the tag calibration procedure is run.</p> <p><i>Accepted Values:</i></p> <p><b>For the ZD500R only:</b></p> <p><b>F0</b> to <b>Fxxx</b> (where <b>xxx</b> is the label length in millimeters or <b>999</b>, whichever is less) The printer prints the first part of a label until it reaches the specified distance and then begins programming. After programming, the printer prints the remainder of the label.</p> <p><b>B0</b> to <b>B30</b> The printer backfeeds the label for the specified distance and then begins programming. To account for the backfeed, allow empty media liner to extend out of the front of the printer when using a backward programming position.</p> <p><b>up</b> = move to the next value <b>down</b> = move to the previous value</p> <p><b>For other RFID printers:</b></p> <p><i>Absolute Mode</i> (all firmware versions): <b>xxxx</b> = <b>0</b> to label length (in dot rows). Move the media to the specified position <b>xxxx</b> on the label, measured in dot rows from the label top, before encoding. Set to <b>0</b> (no movement) if the tag is already in the effective area without moving the media.</p> <p><i>Relative Mode</i> (firmware versions V53.17.6 and later): <b>F0</b> to <b>Fxxx</b> (where <b>xxx</b> is the label length in millimeters or <b>999</b>, whichever is less) The printer prints the first part of a label until it reaches the specified distance and then begins programming. After programming, the printer prints the remainder of the label.</p> <p><b>B0</b> to <b>B30</b> (Does not apply to the RP4T printer.) The printer backfeeds the label for the specified distance and then begins programming. To account for the backfeed, allow empty media liner to extend out of the front of the printer when using a backward programming position.</p> <p><i>Default value:</i></p> <p><b>For the R2844-Z and RPAX:</b> <b>0</b> (no movement) <b>For printers using V53.17.6, V74.19.6Z, and later:</b> <b>F0</b> (which moves the leading edge of the label to the print line) <b>For all other printers or firmware:</b> label length minus 1 mm (1/16 in.)</p>

Parameters	Details
v = length of void printout	<p>Sets the length of the void printout in vertical (Y axis) dot rows.</p> <p><i>Accepted values:</i> 0 to label length</p> <p><i>Default value:</i> label length</p>
n = number of labels to try encoding	<p>The number of labels that will be attempted in case of read/encode failure.</p> <p><i>Accepted values:</i> 1 to 10</p> <p><i>Default value:</i> 3</p>
e = error handling	<p>If an error persists after the specified number of labels are tried, perform this error handling action.</p> <p><i>Accepted values:</i></p> <ul style="list-style-type: none"> <li>N = No action (printer drops the label format causing the error and moves to the next queued label)</li> <li>P = Place printer in Pause mode (label format stays in the queue until the user cancels)</li> <li>E = Place printer in Error mode (label format stays in the queue until the user cancels)</li> </ul> <p><i>Default value:</i> N</p> <p> <b>Note</b> • You can set the printer to send an error message to the host for each failure. To enable or disable this unsolicited error message, refer to the ^SX and ^SQ ZPL commands. Use V for the condition type for an RFID error.</p>

Parameters	Details
a = signals on applicator	 <b>Note</b> • This parameter does not apply to the R2844-Z. For the R4Mplus, this parameter applies only to printers with firmware version SP994X (R4Mplus European version). <p><b>Single Signal Mode</b> In this mode, one start print signal starts printing. Then, at the program position (parameter p), the printer automatically stops and encodes the tag. Printing continues, and a single end print signal signifies the completion of the label.</p> <p><b>Double Signal Mode</b> With RFID, when there is a non-zero program position, the label is logically split into two parts. The first part is printed, the tag encodes, and then the second part prints. If this parameter is set to “D,” then the label is split into two and requires both portions of the label to be controlled by the applicator. This means that a start print signal triggers the first portion of the label, and then when the printer reaches the RFID program position (and the motor stops), an end print signal is provided. In this mode, a second start print signal is required to print the rest of the label. When the label is complete, a final end print signal is provided.</p>  <b>Note</b> • If parameter p is zero, then single signal mode is used (parameter ignored). If p is F0 (or B0) with backfeed-after, then single signal mode is used (parameter ignored). <p><i>Accepted values:</i></p> <p>S = single signal</p> <p>D = double signal (For the R110PAX4, Double mode will work only if the read/write position is changed from the default of zero.)</p> <p><i>Default value:</i> S</p>
c = reserved	Not applicable.
s = void print speed	 <b>Note</b> • This parameter does not apply to the R2844-Z printer or the ZD500R printer. For the R4Mplus printer, this parameter applies only to printers with firmware version SP994X (R4Mplus European version). <p>If a label is voided, the speed at which “VOID” will be printed across the label.</p> <p><i>Accepted values:</i> any valid print speed</p> <p><i>Default value:</i> the printer’s maximum print speed</p>

**Supported Tag Types** Table 22 shows the tag types supported by different RFID printers/print engines and firmware versions. Depending on your country or on the firmware version that you are using, your printer may not support all of the tag types listed. If you specify an unsupported tag type, the printer uses the default value. If a tag type is shown as supported but does not work with your printer, you may need to upgrade the printer’s firmware (see <http://www.zebra.com/firmware>).

Table 22 • Supported Tag Types and Default Values

Printer	UHF Printers												HF Printers		
	ZD500R	R110Xi4	R110Xi R170Xi	R110PAX4				R4Mplus				RZ400/ RZ600	R110Xi HF	R2844-Z	
Firmware Version	V74.19.6Z and later	V53.17.7 and later	R60.13.X R60.15.X and later	R62.13.X	R62.15.X and later	R63.13.X	R63.15.X and later	SP9940, SP999E, SP1027E, SP1082E, and earlier	SP994F, SP999F, SP1027F, SP1082F, and later	SP1056D and earlier	SP1056E and later	R53.16.X and later	R65.13.X	R65.15.X and later	all
Tag Type															
UHF Tag Types and Options															
None (no tag type specified)	—	—	*	*	*	*	—	—	—	—	—	—	—	—	—
EPC Class 0	—	—	*	*	*	*	—	—	—	—	—	—	—	—	—
EPC Class 0 Plus	—	—	*	*	*	*	—	—	—	—	—	—	—	—	—
EPC Class 1 64-bit	—	—	*	*	*	*	—	—	—	—	—	—	—	—	—
EPC Class 1 96-bit	—	—	#	*	#	*	—	*	*	*	—	—	—	—	—
UCODE EPC 1.19	—	—	* a	*	—	*	#	*	#	*	#	*	—	—	—
Impinj Class 0 Plus	—	—	*	*	*	*	—	—	—	—	—	—	—	—	—
ISO 18000-06A	—	—	—	—	*	—	—	*	*	*	—	—	—	—	—
EPC Class 1, Generation 2 (Gen 2)	#	#	*	#	*	#	—	#	*	#	*	#	#	—	—
ISO 18000-06B	—	—	*	*	*	*	—	*	*	*	*	*	—	—	—
HF Tag Types and Options															
Auto-detect the tag type by querying the tag	—	—	—	—	—	—	—	—	—	—	—	—	—	—	#
Tag*It (Texas Instruments Tagit tags)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	*
I*code (Phillips Icode tags)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	*
Pico Tag (Inside Technology's)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	*
ISO 15693	—	—	—	—	—	—	—	—	—	—	—	—	#	#	*
EPC tag	—	—	—	—	—	—	—	—	—	—	—	—	—	—	*
UID Tag	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mifare UltraLight	—	—	—	—	—	—	—	—	—	—	—	—	*	*	—

# = Default value \* = Accepted value — = Not supported

a. Requires R60.13.0.13ZD or later.

➔ **Example 1** • The following are examples of Absolute Mode and Relative Mode for the tag position parameter (parameter *p*).

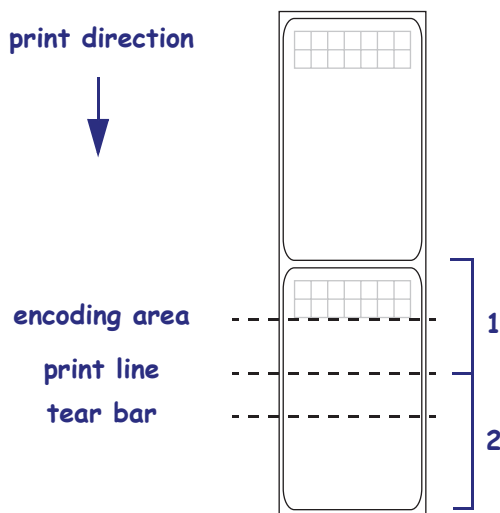
**Absolute Mode**

1. ^RS,520 sets the encode position at 520 dots from the top edge of the label.
2. ^RS,0 programs the tag without moving the media.

**Relative Mode**

1. ^RS,F1 sets the encode position 1 mm forward from the leading edge of the label.
2. ^RS,B10 sets the encode position 10 mm backwards from the leading edge of the label.
3. ^RS,F0 sets the encode position at the leading edge of the label.
4. ^RS,B0 sets the encode position at the leading edge of the label.

➔ **Example 2** • The following shows the difference between absolute and relative programming positions for the tag position parameter (parameter *p*) with a 6-inch (152-mm, 1216-dot) label length. The end results are that the tag is programmed with the label in the same position.



1	^RS,496, Absolute Mode, 496 dots from the top of the label
2	^RS,F90, Relative Mode, 90 mm from the leading edge of the label