^B7 — PDF417 Bar Code

Description The ^B7 command produces the PDF417 bar code, a two-dimensional, multirow, continuous, stacked symbology. PDF417 is capable of encoding over 1,000 characters per bar code. It is ideally suited for applications requiring large amounts of information at the time the bar code is read.

The bar code consists of three to 90 stacked rows. Each row consists of start and stop patterns and symbol characters called *code-words*. A code-word consists of four bars and four spaces. A three code-word minimum is required per row.

The PDF417 bar code is also capable of using the structured append option (^FM), which allows you to extend the field data limitations by printing multiple bar codes. For more information on using structured append, see *^FM* (Included in this document)

- PDF417 has a fixed print ratio.

- Field data (^FD) is limited to 3K of character data.

Format ^B7o,h,s,c,r,t

| Parameters	Details
o = orientation	*Accepted Values:* 　N = normal 　R = rotated 90 degrees (clockwise) 　I = inverted 180 degrees 　B = read from bottom up, 270 degrees *Default Value:* current ^FW value
h = bar code height for individual rows (in dots)	*Accepted Values:* 1 to height of label *Default Value:* value set by ^BY This number multiplied by the module equals the height of the individual rows in dots. If this number is not specified, the overall bar code height, divided by the number of rows, equals the height of the individual rows in dots, where the overall bar code height is defined by the ^BY command. 1 is not a recommended value.
s = security level	*Accepted Values:* 1 to 8 (error detection and correction) *Default Value:* 0 (error detection only) This determines the number of error detection and correction code-words to be generated for the symbol. The default level provides only error detection without correction. Increasing the security level adds increasing levels of error correction and increases the symbol size.
c = number of data columns to encode	*Accepted Values:* 1 to 30 *Default Value:* 1:2 (row-to-column aspect ratio) You can specify the number of code-word columns giving control over the width of the symbol.

| Parameters	Details
r = number of rows to encode	*Accepted Values:* 3 to 90
	Default Value: 1:2 (row-to-column aspect ratio)
	You can specify the number of symbol rows giving control over the height of the symbol. For example, with no row or column values entered, 72 code-words would be encoded into a symbol of six columns and 12 rows. Depending on code-words, the aspect ratio is not always exact.
t = truncate right row indicators and stop pattern	*Accepted Values:*
	N = no truncation
	Y = perform truncation
	Default Value: N

Example 1 • This is an example of a PDF417 bar code:

ZPL II CODE	PDF417 BAR CODE

`^XA`
`^BY2,3`
`^FO10,10^B7N,5,5,,83,N`
`^FDZebra Technologies`
`Corporation strives to be`
`the expert supplier of`
`innovative solutions to`
`speciality demand labeling`
`and ticketing problems of`
`business and government.`
`We will attract and retain`
`the best people who will`
`understand our customer's`
`needs and provide them with`
`systems, hardware, software,`
`consumables and service`
`offering the best value,`
`high quality, and reliable`
`performance, all delivered`
`in a timely manner.`
`^FS^XZ`	

> **Example 2 •** This is an example of a PDF417 without and with truncation selected:
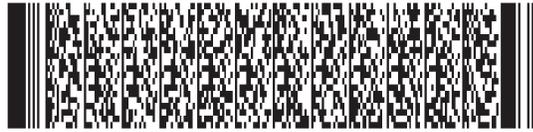
PDF417 without Truncation being selected
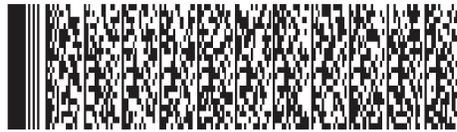
PDF417 with Truncation being selected

> **Example 3 •** This example shows the ^B7 command used with field hex (^FH) characters:

ZPL II CODE	GENERATED LABEL
``` ^XA ^FO50,50^BY3,3.0^B7N,8,5,7,21,N ^FH_^FD[)>_1E06_1DP12345678_1DQ160 _1D1JUN123456789A2B4C6D8E_1D20LA6-987 _1D21L54321 ZES_1D15KG1155 _1DBSC151208_1D7Q10GT_1E_04^FS ^XZ ```	

Comments   Noted in this bulleted list:

- If both columns and rows are specified, their product must be less than 928.
- No symbol is printed if the product of columns and rows is greater than 928.
- No symbol is printed if total code-words are greater than the product of columns and rows.
- Serialization is not allowed with this bar code.
- The truncation feature can be used in situations where label damage is not likely. The right row indicators and stop pattern is reduced to a single module bar width. The difference between a non truncated and a truncated bar code is shown in the previous examples.

Special Considerations for ^BY When Using PDF417

When used with ^B7, the parameters for the ^BY command are:

w = module width (in dots)

Accepted Values: 2 to 10

Default Value: 2

r = ratio

Fixed Value: 3 (ratio has no effect on PDF417)

h = height of bars (in dots)

Accepted Values: 1 to 32000

Default Value: 10

PDF417 uses this only when row height is not specified in the ^B7 h parameter.

Special Considerations for ^FD When Using PDF417

The character set sent to the printer with the ^FD command includes the full ASCII set, except for those characters with special meaning to the printer.

See *Zebra Code Page 850 — Latin Character Set* (Included later), *^CC ~CC* , and *^CT ~CT* (Included in this document).

- CR and LF are also valid characters for all ^FD statements. This scheme is used:

  \& = carriage return/line feed

  \\ = backslash (\)

- ^CI13 must be selected to print a backslash (\).

^FM – **Multiple Field Origin Locations**

Description The ^FM command allows you to control the placement of bar code symbols.

It designates field locations for the PDF417 (^B7) and MicroPDF417 (^BF) bar codes when the structured append capabilities are used. This allows printing multiple bar codes from the same set of text information.

The structured append capability is a way of extending the text printing capacity of both bar codes. If a string extends beyond what the data limitations of the bar code are, it can be printed as a series: 1 of 3, 2 of 3, 3 of 3. Scanners read the information and reconcile it into the original, unsegmented text.
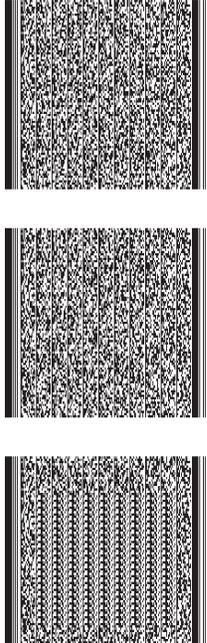
The ^FM command triggers multiple bar code printing on the same label with ^B7 and ^BF only. When used with any other commands, it is ignored.

Format ^FMx1,y1,x2,y2,...

Parameters	Details

x1 = x-axis location of first symbol (in dots)	*Accepted Values:*
	    0 to 32000
	    e = exclude this bar code from printing
	Default Value: a value must be specified

y1 = y-axis location of first symbol (in dots)	*Accepted Values:*
	    0 to 32000
	    e = exclude this bar code from printing
	Default Value: a value must be specified

x2 = x-axis location of second symbol (in dots)	*Accepted Values:*
	    0 to 32000
	    e = exclude this bar code from printing
	Default Value: a value must be specified

y2 = y-axis location of second symbol (in dots)	*Accepted Values:*
	    0 to 32000
	    e = exclude this bar code from printing
	Default Value: a value must be specified

… = continuation of X,Y pairs	*Maximum number of pairs:* 60

Example • This example shows you how to generate three bar codes with the text "Zebra Technologies Corporation strives to be…" would need to be repeated seven times, which includes 2870 characters of data (including spaces) between ^FD and ^FS:

ZPL II CODE	GENERATED LABEL
| ```
^XA
^FM100,100,100,600,100,1200
^BY2,3
^B7N,5,5,9,83,N
^FDZebra Technologies
Corporation strives to be
the expert supplier of
innovative solutions to
specialty demand labeling
and ticketing problems of
business and government.
We will attract and retain
the best people who will
understand our customer's
needs and provide them with
systems, hardware, software,
consumables and service
offering the best value,
high quality, and reliable
performance, all delivered
in a timely manner
…
^FS^XZ
``` | |

1

1	The ellipse is not part of the code. It indicates that the text needs to be repeated seven times, as mentioned in the example description.

Example • This example assumes a maximum of three bar codes, with bar code 2 of 3 omitted:

ZPL II CODE	GENERATED LABEL
| ```
^XA
^FM100,100,e,e,100,1200
^BY2,3
^B7N,5,5,9,83,N
^FDZebra Technologies
Corporation strives to be
the expert supplier of
innovative solutions to
specialty demand labeling
and ticketing problems of
business and government.
We will attract and retain
the best people who will
understand our customer's
needs and provide them with
systems, hardware, software,
consumables and service
offering the best value,
high quality, and reliable
performance, all delivered
in a timely manner
…
^FS^XZ


1
``` |  |

1	The ellipse is not part of the code. It indicates that the text needs to be repeated seven times, as mentioned in the example description.

Comments Subsequent bar codes print once the data limitations of the previous bar code have been exceeded. For example, bar code 2 of 3 prints once 1 of 3 has reached the maximum amount of data it can hold. Specifying three fields does not ensure that three bar codes print; enough field data to fill three bar code fields has to be provided.

The number of the x,y pairs can exceed the number of bar codes generated. However, if too few are designated, no symbols print.

Zebra Code Pages

This section provides you with a visual of the different Zebra Code pages.

Zebra Code Page 850 — Latin Character Set

This is the Zebra Code Page 850:

Note • For hex 5C, a cent sign prints for all printer resident fonts. A backslash prints for downloaded fonts.

CHR	HEX	DEC	CHR	HEX	DEC	CHR	HEX	DEC	CHR	HEX	DEC	CHR	HEX	DEC	CHR	HEX	DEC	CHR	HEX	DEC
	20	32	0	30	48	@	40	64	P	50	80	`	60	96	p	70	112	Ç	80	128
!	21	33	1	31	49	A	41	65	Q	51	81	a	61	97	q	71	113	ü	81	129
"	22	34	2	32	50	B	42	66	R	52	82	b	62	98	r	72	114	é	82	130
#	23	35	3	33	51	C	43	67	S	53	83	c	63	99	s	73	115	â	83	131
$	24	36	4	34	52	D	44	68	T	54	84	d	64	100	t	74	116	ä	84	132
%	25	37	5	35	53	E	45	69	U	55	85	e	65	101	u	75	117	à	85	133
&	26	38	6	36	54	F	46	70	V	56	86	f	66	102	v	76	118	å	86	134
'	27	39	7	37	55	G	47	71	W	57	87	g	67	103	w	77	119	ç	87	135
(	28	40	8	38	56	H	48	72	X	58	88	h	68	104	x	78	120	ê	88	136
)	29	41	9	39	57	I	49	73	Y	59	89	i	69	105	y	79	121	ë	89	137
*	2a	42	:	3a	58	J	4a	74	Z	5a	90	j	6a	106	z	7a	122	è	8a	138
+	2b	43	;	3b	59	K	4b	75	[	5b	91	k	6b	107	{	7b	123	ï	8b	139
,	2c	44	<	3c	60	L	4c	76	¢/	5c	92	l	6c	108			7c	124	î	8c	140
−	2d	45	=	3d	61	M	4d	77	]	5d	93	m	6d	109	}	7d	125	ì	8d	141
.	2e	46	>	3e	62	N	4e	78	^	5e	94	n	6e	110	~	7e	126	Ä	8e	142
/	2f	47	?	3f	63	O	4f	79	_	5f	95	o	6f	111	⌂	7f	127	Å	8f	143

CHR	HEX	DEC	CHR	HEX	DEC	CHR	HEX	DEC	CHR	HEX	DEC	CHR	HEX	DEC	CHR	HEX	DEC	CHR	HEX	DEC
É	90	144	á	a0	160	░	b0	176	└	c0	192	ð	d0	208	Ó	e0	224	-	f0	240
æ	91	145	í	a1	161	▒	b1	177	┴	c1	193	Ð	d1	209	ß	e1	225	±	f1	241
Æ	92	146	ó	a2	162	▓	b2	178	┬	c2	194	Ê	d2	210	Ô	e2	226	‗	f2	242
ô	93	147	ú	a3	163	│	b3	179	├	c3	195	Ë	d3	211	Ò	e3	227	¾	f3	243
ö	94	148	ñ	a4	164	┤	b4	180	─	c4	196	È	d4	212	õ	e4	228	¶	f4	244
ò	95	149	Ñ	a5	165	Á	b5	181	┼	c5	197	ı	d5	213	Õ	e5	229	§	f5	245
û	96	150	ª	a6	166	Â	b6	182	ã	c6	198	Í	d6	214	µ	e6	230	÷	f6	246
ù	97	151	º	a7	167	À	b7	183	Ã	c7	199	Î	d7	215	þ	e7	231	¸	f7	247
ÿ	98	152	¿	a8	168	©	b8	184	╚	c8	200	Ï	d8	216	Þ	e8	232	°	f8	248
Ö	99	153	®	a9	169	╣	b9	185	╔	c9	201	┘	d9	217	Ú	e9	233	¨	f9	249
Ü	9a	154	¬	aa	170	║	ba	186	╩	ca	202	┌	da	218	Û	ea	234	·	fa	250
ø	9b	155	½	ab	171	╗	bb	187	╦	cb	203	█	db	219	Ù	eb	235	¹	fb	251
£	9c	156	¼	ac	172	╝	bc	188	╠	cc	204	▄	dc	220	ý	ec	236	³	fc	252
Ø	9d	157	¡	ad	173	¢	bd	189	═	cd	205	¦	dd	221	Ý	ed	237	²	fd	253
×	9e	158	«	ae	174	¥	be	190	╬	ce	206	Ì	de	222	¯	ee	238	■	fe	254
ƒ	9f	159	»	af	175	┐	bf	191	¤	cf	207	▀	df	223	´	ef	239		ff	255

^CC ~CC – Change Caret

Description   The `^CC` command is used to change the format command prefix. The default prefix is the caret (^).

Format   `^CCx` or `~CCx`

Parameters	Details
x = caret character change	*Accepted Values:* any ASCII character
	Default Value: a parameter is required. If a parameter is not entered, the next character received is the new prefix character.

Example • This is an example of how to change the format prefix to / from a ::

```
^XA
^CC/
/XZ
```

The forward slash (/) is set at the new prefix. Note the `/XZ` ending tag uses the new designated prefix character (/).

Example • This is an example of how to change the format prefix from ~ to a `/`:

```
~CC/
/XA/JUS/XZ
```

^CT ~CT – Change Tilde

Description The ^CT and ~CT commands are used to change the control command prefix. The default prefix is the tilde (~).

Format ^CTa or ~CTa

Parameters	Details
a = change control command character	*Accepted Values:* any ASCII character *Default Value:* a parameter is required. If a parameter is not entered, the next character received is the new control command character.

Example • This is an example of how to change the control command prefix from a ^ to a +:

```
^XA
^CT+
^XZ
+HS
```