

PPLB

Programmer's

Manual

Mercury Series

Revision V1.00

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CONTENTS

B1. COORDINATE SYSTEM	5
B2. COMMAND SYNTAX	7
B3. FONTS	9
B4. COMMAND SET	12
B5. COMMAND	13
A Print Text	13
B Print Bar Code.....	17
B RSS-14 Bar Code (GS1 DataBar)	22
b Print 2D Bar Code	28
C Counter	35
C Immediate Cut.....	37
D Set Darkness	38
EI Print Soft Font List	39
EK Delete Soft Font.....	40
ES Download Soft Font.....	41
FE End Form Store.....	43
FI Print Form List	44
FK Delete Form	45
FR Execute Form.....	46
FS Store Form	47
f Adjust Cutting Position	48
GG Print Graphics	49
GI Print Graphic List	50
GK Delete Graphics	51
GM Store Graphics	52
GW Print Immediate Graphics.....	55

I	Select Symbol Set	56
JB/JF	Disable OR Enable Back Feed	58
LE	Line Draw by Exclusive OR Operation	59
LO	Line Draw by OR Operation	60
LW	Draw White Line	61
N	Clear Image Buffer	62
O	Select Options.....	63
oR	Euro Character.....	64
P	Print Label.....	65
PA	Print Automatically.....	67
Q	Set Label and Gap Length	69
q	Set Label Width.....	71
R	Set Origin Point.....	72
S	Set Print Speed	73
TD	Define Date Format	75
TS	Set Real Time Clock.....	76
TT	Define Time Format.....	77
U	Print Configuration	78
UA	Enable Clear Print Buffer When Media Out/.....	79
	Ribbon Out Occurred.....	79
UB	Disable Clear Print Buffer When Media Out/ Ribbon Out Occurred	80
UE	Soft Fonts Information Through RS232.....	81
UF	Forms Information Through RS232	82
UG	Graphics Information Through RS232	83
UI	Current Codepage Information Through RS232.....	84
UM	Memory Allocation And Codepage Information Through RS232	85

UP	Memory Information, Current Codepage Through RS232 And Print Configuration	86
UQ	Printer Configuration Through RS232	87
UN/US	Disable/Enable Error Reporting.....	88
V	Define Variable	90
X	Draw Box	92
xa	Auto Calibration	93
Y	Set Serial Port	94
Z	Set Print Direction	95
ZN/ZS	Disable/Enable Flash Memory.....	97
?	Download Variables and Counters.....	98
^@	Reset Printer	99
^ee	Immediate Error Report	100
APPENDIX BA: PCX SPECIFICATION.....		101
APPENDIX BB: HOW TO MAKE A FORM		104
APPENDIX BC: FONTS.....		108
APPENDIX BD: BAR CODES		113
APPENDIX BE: DENSITY AND SPEED		118
APPENDIX BF: COMMAND REFERENCE CHART		119

B1. COORDINATE SYSTEM

The PPLB coordinates system is depicted in Figure B1-1.

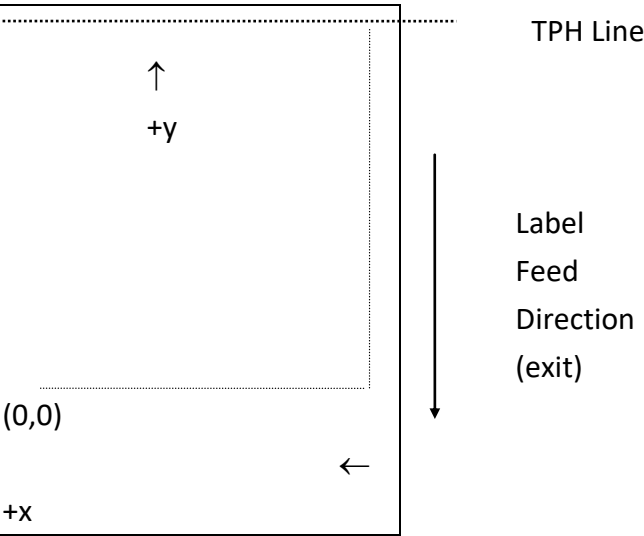


Fig. B1-1 Default Coordinate system

The origin point (0,0) of the coordinates system is at the bottom right corner under default condition (ZT). The origin point remains unchanged, while the texts, bar codes or other objects are being rotated. Negative coordinate value is not accepted. The ranges of X and Y coordinates are:

	Minimum	Maximum
X coordinate	0	It depends on printer models.
Y coordinate	0	It depends on printer models.

The measurements of the X- and Y-axis of the coordinates system are by pixels or scanned lines.

B2. COMMAND SYNTAX

All the commands of PPLB consist of one or two alpha characters to identify the specific function and some of them may require one or more additional parameters to supply the printer with sufficient information to complete the command. Each command line must be terminated with a LF (0AH) control code and no space is allowed within it, except in the section of the data string.

Basic Command Syntax

- Syntax I: commands with no parameters

Leading characters	Description
A<LF>	Command with single alpha character
AB<LF>	Command with two alpha characters

- Syntax II: commands with fixed number of parameters

Leading characters	Description
Ap ₁ ,p ₂ ,p ₃ ,...,p _n <LF>	Command with single leading alpha character
ABp ₁ ,p ₂ ,p ₃ ,...,p _n <LF>	Command with two leading alpha characters

- Syntax III: commands with optional parameters

A[p₁,p₂,p₃,...,p_n]<LF>

String

This printer language uses data string under the following conditions.

Name	for graphics, soft fonts and forms
Data	for fonts and barcodes
Prompt	An ASCII text that can be transmitted to the KDU

The data string is led and ended by the character (“). The back slash character (\) designates that the character following is a literal and will encode into the data field. Refer to the following examples:

<u>To print</u>	<u>Enter into Data Field</u>
“	\“
\	\\

Notes:

- 1. The printer ignores <CR> and ctrl-Z (1AH) control codes. Many non-document editors on PC based system send CR and LF when the enter key is pressed. The carriage return (CR) code cannot be used in place of LF.*
- 2. All commands and alpha character command, parameters are case sensitive.*

B3. FONTS

This printer language defines three types of fonts according to their stored media.

- Internal Fonts
- Soft Fonts
- Cartridge Fonts

Internal Fonts

Five internal fonts are resident in the printer's ROM and each of them has a unique ID number. Different from the soft fonts, these fonts cannot be deleted.

<i>ID number</i>	<i>Font Size</i>	<i>Remark</i>
<i>1</i>	<i>20 pitches, 6 points.</i>	
<i>2</i>	<i>17 pitches, 7 points.</i>	
<i>3</i>	<i>14.5 pitches, 10 points.</i>	
<i>4</i>	<i>13 pitches, 12 points.</i>	
<i>5</i>	<i>5.6 pitches, 24 points.</i>	<i>Upper case characters only</i>

Soft Fonts

The soft fonts can be downloaded from the host by means of some utility or application software. Once the internal fonts cannot fulfill your requirements, soft fonts may be good solutions.

The advantages of using soft fonts:

- Save memory space (Graphics occupies more memory.)
- Have better performance (They can be called repeatedly.)
- Enable the auto increment and decrement function
- Same as internal fonts, they can be scaled, rotated or reversed.
- They can be saved into either RAM or flash memory (permanent memory).
- They can be deleted, if no use or the memory space is full.

You can download the numbers of characters as many as you need. Each soft font also has a unique ID number. By the ID number, the soft font can be downloaded, selected or deleted.

The soft font ID number may range from 'a' to 'z'.

Symbol Set

The code map (table) can be redefined to another symbol set or code page. Details regarding symbol set settings, please refer to I command (Select Symbol Set).

<i>Symbol sets (Code page)</i>	<i>8-bit Character</i>	<i>7-bit Character</i>
	<i>437, 737,850, 851, 852, 855,857, 860, 861, 862,863, 865, 866, 869,1250, 1251,1252,1253, 1254, 1255,</i>	<i>USASCII, British, Danish, French, German, Italian, Spanish, Swedish and Swiss</i>

B4. COMMAND SET

The PPLB command sets can be categorized into the following four groups, according to functions and memory allocations.

- Setting commands
- Label formatting commands
- Interaction commands (through RS232)
- Object Downloading commands

B5. COMMAND

This section lists all of the commands and their descriptions in lphabetical order.

A Print Text

Syntax $A_{p_1,p_2,p_3,p_4,p_5,p_6,p_7}, \text{ "DATA" } \downarrow$
 $A_{p_1,p_2,p_3,p_4,p_5,p_6,p_7}, C_n \downarrow$
 $A_{p_1,p_2,p_3,p_4,p_5,p_6,p_7}, V_n \downarrow$
 $A_{p_1,p_2,p_3,p_4,p_5,p_6,p_7}, \text{ "DATA" } C_n \downarrow$
 $A_{p_1,p_2,p_3,p_4,p_5,p_6,p_7}, \text{ "DATA" } V_n \downarrow$

Description Prints a text string, counter or variable.

Parameters p_1 : X coordinate in dots. p_2 : Y coordinate in dots.
 p_3 : Orientation or Print Direction.

P_3 value	Description
0	No rotation (portrait)
1	90° rotation
2	180° rotation
3	270° rotation

p_4 : ID number for font selection

P_4 value	Description
1~5	Selects resident fonts, font number 1 ~

	5. Refer to the startup self-test printout to see the font list.
--	--

a ~ z	Downloaded soft fonts, a ~ z. Before selecting a soft font, first download it.
-------	--

p₅: Horizontal scale factor.

p₆: Vertical scale factor. The acceptable values for both p₅ and p₆ are from 1 to 24.

p₇: N for normal text or R for reverse text image.

"DATA": A text string

Cn: A counter value. Refer to C command.

Vn: A variable string. Refer to V command.

Example

N↵

A50,30,0,1,1,1,N,"This is font 1."↵

A50,70,0,2,1,1,N,"This is font 2."↵

A50,110,0,3,1,1,N,"This is font 3."↵

A50,150,0,4,1,1,N,"This is font 4."↵

A50,200,0,5,1,1,R,"FONT 5"↵

P1↵

Output

This is font 1.

This is font 2.

This is font 3.

This is font 4.

FONT 5

✂ The resident font 5 does not support lower case characters. The sub-string of counter and variable can be applied to the A command.

Syntax *Vn[st,len]↵*

Cn[st,len]↵

Parameters ***n** is the counter or variable ID.*

***st** is the start location (the first location is 0),*

***len** is the length of the sub-string.*

Example *FK"TEST"↵*

FS"TEST"↵

V00,10,N,↵

C0,10,N,+1,""↵

A100,100,0,3,1,1,N,V00[2,4]↵

00,150,0,3,1,1,N,C0[2,3]↵

E↵

R"TEST"↵

↵

BCDEF↵

2345↵

3↵

Output

CDEF

345

CDEF

346

CDEF

347

B

Print Bar Code

Syntax $Bp_1, p_2, p_3, p_4, p_5, p_6, p_7, p_8, "DATA" \downarrow$
 $Bp_1, p_2, p_3, p_4, p_5, p_6, p_7, p_8, C_n \downarrow$
 $Bp_1, p_2, p_3, p_4, p_5, p_6, p_7, p_8, V_n \downarrow$
 $Bp_1, p_2, p_3, p_4, p_5, p_6, p_7, p_8, "DATA" C_n \downarrow$
 $Bp_1, p_2, p_3, p_4, p_5, p_6, p_7, p_8, "DATA" V_n \downarrow$

Description Prints a specific bar code.

Parameters p_1 : X coordinate in dots. p_2 : Y coordinate in dots.
 p_3 : Orientation or print direction.

p_3 value	Description
0	No rotation (portrait)
1	90° rotation
2	180° rotation
3	270° rotation

p_4 : Bar code selection

p_4 Value	Bar Code Type
0	Code 128 UCC (shipping container code)
1	Code 128 auto
1A	Code 128 subset A
1B	Code 128 subset B
1C	Code 128 subset C
1E	UCC/EAN

2	Interleaved 2 of 5
2C	Interleaved 2 of 5 with check sum digit
2D	Interleaved 2 of 5 with human readable check digit
2G	German Postcode
2M	Matrix 2 of 5
2U	UPC Interleaved 2 of 5
3	Code 3 of 9
3C	Code 3 of 9 with check sum digit
9	Code 93
E30	EAN-13
E32	EAN-13 2 digit add-on
E35	EAN-13 5 digit add-on
E80	EAN-8
E82	EAN-8 2 digit add-on
E85	EAN-8 5 digit add-on
K	Codabar
P	Postnet
UA0	UPC-A
UA2	UPC-A 2 digit add-on
UA5	UPC-A 5 digit add-on
UE0	UPC-E
UE2	UPC-E 2 digit add-on
UE5	UPC-E 5 digit add-on

p₅: Narrow bar width in pixels. ⁺⁺

p₆: Wide bar width in pixels. ⁺⁺

p7: Bar code height in pixels.

p8: N - No text is printed or

B – The human readable text is printed.

“DATA”: A text string.

Cn: A counter value. Refer to C command.

Vn: A variable string. Refer to V command.

Notes: ++According to the bar ratio, the bar codes can be classified into two categories.

Type	Ratio	Narrow vs Wide (p5 vs p6)	Bar code
B2	1:2 ~ 1:3	narrow < wide	Code 3 of 9, Codabar, Interleaved 2 of 5, Matrix 2 of 5, Postnet and German Postcode.
B3	2 : 3 : 4	narrow=wide. 2 x narrow, 3 x narrow and 4 x narrow.	Code 93, Code 128, EAN8,EAN 13, UPC-A, UPC-E,UCC/EAN and Code 28UCC.

Example

N.↓

B20,20,0,E80,3,3,41,B,"0123459"↓

B20,120,0,K,3,5,61,B,"A01234D"↓

B190,300,2,1,2,2,51,B,"0123456789"↓

B20,330,0,UA0,2,2,41,B,"13579024680"↓

P1↓

Output



※ The sub-string of counter and variable can be applied to the B command.

Syntax *Vn[st,len]*
 Cn[st,len]

Parameters *n* is the counter or variable ID.
 st is the start location (the first location is 0).
 len is the length of the sub-string.

Example *FK"TEST"*
 FS"TEST"↵
 V00,10,N,""↵
 C0,10,N,+1,""↵
 B100,100,0,3,2,4,51,B,V00[2,4]
 B100,200,0,3,2,4,51,B,C0[2,3]↵
 FE↵

FR"TEST"↵

?↵

ABCDEF↵

12345↵

P3↵

Output



CDEF



345



CDEF



346



CDEF



347

B RSS-14 Bar Code (GS1 DataBar)

Syntax Bp₁,p₂,p₃,p₄,p₅,p₆,p₇,p₈,"DATA"↵

Description Prints a RSS-14 bar code (GS1 DataBar).

Parameters p₁: X coordinate in dots. p₂: Y coordinate in dots.
p₃: Orientation or print direction.

<i>p₃ value</i>	<i>Description</i>
0	No rotation (portrait)
1	90° rotation
2	180° rotation
3	270° rotation

p₄: Bar code selection

p ₄ Value	Bar Code Type
R14	RSS-14 (GS1 DataBar Omnidirectional) Width multiplier: 96 pixels; Min. Height Multiplier: 33 pixels (default)
RL	RSS Limited (GS1 DataBar Limited) Width multiplier: 74 pixels; Min. Height Multiplier: 10 pixels (default)
RS	RSS Stacked (GS1 DataBar Stacked)

	Width multiplier: 50 pixels; Min. Height Multiplier: 13 pixels (default)
RT	RSS Truncated (GS1 DataBar Truncated) Width multiplier: 96 pixels; Min. Height Multiplier: 13 pixels (default)
RSO	RSS Stacked Omnidirectional (GS1 DataBar Stacked Omnidirectional) Width multiplier: 50 pixels; Min. Height Multiplier: 69 pixels (default)
REX	RSS Expanded (GS1 DataBar Expanded) Width multiplier: 102~534 pixels; Min. Height Multiplier: 34pixels (default) Row:1~11

p₅: Pixel multiplier. Default: 1; Accepted Values: 1-10

p₆: Segments per row. (Only effective in RSS Expanded)
Default value: 22; Accepted Values: 2-22(even only)

p₇: Bar code height in pixels.

Default value: refer to parameter p₄

p₈: N - No text is printed or B – The human readable text is printed.

“DATA”: A text string. ⁺ The data format: n...n|p...p

n...n: ⁺Value:0~9, numeric ; numeric linear data, length 13.

|: Optional. Vertical bar sparates primart data from
secondary 2D data.

$p \dots p$: 2D data

Notes: +Each barcode has different max. numeric value.

p_4 Value	Max. Numeric Value
R14	99999999999999
RL	19999999999999
RS	99999999999999
RT	99999999999999
RSO	99999999999999
REX	74 digits

Example1

N┘

B100,100,0,R14,2,0,0,B,"19811219"┘

A100,200,0,3,1,1,N,"RSS-14"┘

B100,300,0,RL,2,0,0,B,"4545454545"┘

A100,350,0,3,1,1,N,"RSS Limited"┘

B100,450,0,RS,2,0,0,B,"89121121"┘

A100,520,0,3,1,1,N,"RSS Stacked"┘

B100,600,0,RT,2,0,0,B,"0911006072"┘

A100,660,0,3,1,1,N,"RSS-14 Truncated"┘

B100,720,0,RSO,2,0,0,B,"9876543210"┘

A100,900,0,3,1,1,N,"RSS-14 Stacked Omnidirectional"┘

B100,950,0,REX,2,0,0,B,"87984454546"┘

A100,1050,0,3,1,1,N,"RSS Expanded (Stacked)"┘

B100,1090,0,REX,2,4,0,B,"87984454545"┘

A100,1260,0,3,1,1,N,"RSS Expanded Stacked"

P1┘

Output



(01)0000019811219 6

RSS-14



(01)00045454545 5

RSS Limited



(01)0000089121121 9

RSS Stacked



(01)0000911006072 0

RSS-14 Truncated



(01)0009876543210 5

RSS-14 Stacked Omnidirectional



(87)984454546

RSS Expanded (Stacked)



(87)984454545

RSS Expanded Stacked

Example2

N.↓

B100,100,0,R14,4,4,33,B,"19811219|TEST".↓

A100,200,0,3,1,1,N,"RSS-14 composite".↓

B100,280,0,RL,4,4,10,B,"4545454545|TEST1".↓

A100,360,0,3,1,1,N,"RSS Limited composite".↓

B100,440,0,RS,4,4,13,B,"89121121|TEST2".↓

A100,555,0,3,1,1,N,"RSS Stacked composite".↓

B100,660,0,RT,4,4,13,B,"0911006072|TEST3".↓

A100,735,0,3,1,1,N,"RSS-14 Truncated composite".↓

B100,830,0,RSO,4,4,69,B,"9876543210|TEST4".↓

A100,1060,0,3,1,1,N,"RSS-14 Stacked Omnidirectional composite".↓

B100,1160,0,REX,4,4,34,B,"87984454545|TEST5".↓

A100,1390,0,3,1,1,N,"RSS Expanded (Stacked) composite".↓

B100,1535,0,REX,4,4,34,B,"87984454545|TEST6".↓

A100,1520,0,3,1,1,N,"RSS Expanded Stacked composite".↓

P1.↓

Output

TEST

(01)0000019811219 6
RSS-14 composite

TEST1

(01)0004545454545 5
RSS Limited composite

TEST2

(01)0000089121121 9
RSS Stacked composite

TEST3

(01)0000911006072 0
RSS-14 Truncated composite

TEST4

(01)0009876543210 5
RSS-14 Stacked Omnidirectional composite

TEST5

(87)984454545
RSS Expanded (Stacked) composite

TEST6

(87)984454545
RSS Expanded Stacked composite

b Print 2D Bar Code

Syntax `bp1,p2,p3,[specific parameters and data]`↵

Description Prints a specific 2D bar code.

Parameters `p1`: X coordinate in dots. `p2`: Y coordinate in dots.
 `p3`: 2D bar code type.

p ₃ Value	Bar Code
A	Aztec-Specific Options
M	Maxi Code
P	PDF-417
D	Data Matrix
Q or QR	QR Code

Aztec-Specific Options

`[p4,p5,p6,p7,p8]"Data"`

`p4`: Barcode scale

Default value: 3; Other values: 1~55

`p5`: Error correction level & Symbol layer

`e0` = default value (23% +3 error correction)

`e1~e99` = 1%~99% error correction

`e101~e104` = 1~4 layers in compacted symbol

`e201~e232` = 1~32 layers in full symbol

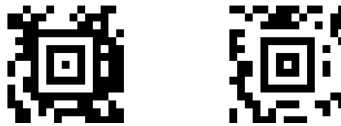
`e300` = Rune symbol

- p6: Enable ASCII (DEC 27); the default value is disabling.
- p7: Enable menu support option; the default value is disabling.
- p8: Mirror image.

Example

```
N␣
b20,20,A,d7,"0123456789"␣
b220,20,A,r,d7,"0123456789"␣
P1␣
```

Output



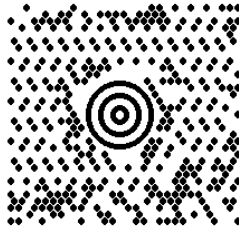
Maxi Code

```
[“CL,CC,PC,Data”]
CL: Class code, 3 digits.
CC: Country code, 3 digits.
PC: Post code, 4 or 5 digits for USA and 6 characters for
    other countries.
Data: Up to 84 characters.
```

Example

```
N␣
b80,80,M,"003,840,547017051,ABCDEFGH"␣
A120,300,0,4,1,1,N," ABCDEFGHI "␣
P1␣
```

Output



ARGOXINFO

PDF-417

[w,h,s,c,p,f,x,y,r,l,t,o], "Data"

w: Maximum print width in dots.

h: Maximum print height in dots.

s: Error correction level, 0 ~ 8.

c: Data compression level, 0 or 1. The default value is 0.

p(xxx,yyy,mm): Print human readable.

xxx: horizontal start location.

yyy: vertical start location.

mm: maximum characters per line.

f: Bar code origin point. 0= Upper left corner of barcode.

1= Center of barcode (default).

x: Module width, 2 ~ 9 in dots.

y: Module height, 4 ~ 99 in dots.

r: Maximum row count.

l: Maximum column count.

t: Truncation flag, 0=normal and 1=truncated.

o: Rotation. 0-0°, 1-90°, 2-180° and 3-270°.

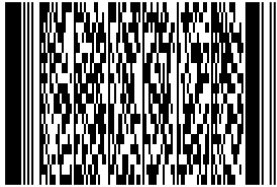
Example

N┘

b80,80,P, 800,800,s5,f0,x2,y10,r80,o0,l4," ABCDEFGHI "┘

A180,320,0,4,1,1,N,"PDF417"↵
P1↵

Output



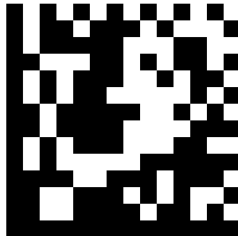
PDF417

Data Matrix [c,r,h,v,o],"Data"
c: Number of columns.
r: Number of rows.
h: Minimum square data module size, 1~40.
The default value is 5.
v: Inverse image of barcode.
o: Rotation. 0-0°, 1-90°, 2-180° and 3-270°.

Example N↵
b120,100,D,h15,o0,"ABCDEFGHI"↵
A160,50,0,4,1,1,N,"ABCDEFGHI"↵
P1↵

Output

ARGOXINFO



QR Code [p4,p5,p6,p7,p8,p9]"Data"

p4: Code model -prefix m.

Default value: Model 2

Other values: 1= Model 1, 2= Model 2

p5: Barcode scale- prefix s

Default value: 3

Other values: 1~99

p6: Error correction level- prefixe

Default value: M

Other values: L= Lower error correction, most data

M= Default

Q= Optimized for error correction over data

H= Highest error correction, latest data

p7: Data input mode- prefix i

Default value: A

Other values: A= Automatic data

M= It depends on initializing the manual
date mode and the data type is set by
the first character in the fixed data field.

p8: Append symbol- prefix **D**

Description	Sub-prefix	Values
Symbol Number	c	01~16
Divisions	d	01~16
Parity	p	00~FF Hex.

p9: If the parameter p7 is = iM,

the first character in the data must be one of the following:

N -Numeric (0~9)

A -Alphanumeric (0~9, A~Z, a~z and space, \$, %, *, +, -, /, :)

K –Kanji (Shift JIS character ranges 8410-9FFC and E040-EAA4Hex)

B xxxx –For 8-bit byte mode; xxxx is indicate number of characters. (A Simple or Traditional Chinese word is 2 characters)

data: Fixed data field.

Enter into data field	To Print
\"	"
\“TEST\”	“TEST”
\\	\
\\john\\	\\john\\
\↵	Ø

Example

N.↓
ZT.↓
q832.↓
Q629,24.↓
JB.↓
D8.↓
S4.↓
OD.↓
b100,100,Q,"立象科技\".↓
b100,300,Q,"小明伙".↓
b250,100,Q,"\\123456\\".↓
b250,300,Q,"ABCDEFGH".↓
b400,100,Q,"立象 123 科 ABC 技".↓
b400,300,Q,"小明[]%\$伙\\ \".↓
b550,100,Q,"\$%*+-.:".↓
A500,300,0,3,1,1,N,"QR Code".↓
P1.↓

Output



QR Code

C

Counter

Syntax Cp₁,p₂,p₃,p₄,"MSG" ↵

Description This command defines a counter variable. It is useful in printing the labels numbered in sequence. In general, it will be used together with the Form function.

To print the contents of the counter, you may use A (print text) or B (print bar code) commands.

Parameters p₁: Counter ID. Acceptable value ranges from 00 to 99.
p₂: Maximum digit number. Acceptable values are from 1 to 29.
p₃: Justification code.
L for left justification, R for right justification,
N for no justification and C for centralization.
p₄: Amount to increment or decrement the field by.
There should be a + or - sign before the step value.
"MSG": A text string that will be sent to KDU or host.

Example N↵
FK"TEST"↵
FS"TEST"↵
C0,6,N,+1,"Enter Code:" ↵
A100,100,0,4,1,1,N,"Label: "↵
A300,100,0,4,1,1,N,C0↵

FE↵

Above example stores a form to the printer. If you retrieve this form and enter the counter value like the following way, the printer will print two labels by the input counter value.

FR"TEST"↵

?↵

1000↵

P2↵

Output

Label : 1000

Label : 1001

C Immediate Cut

Syntax C↵

Description This command is used to rotate cutter once to immediately cut the media. Also, it can be use to immediately cut without media installed to adjust and clean the cutter blade.

Parameters None.

Example C↵

Notes:

- 1. This command can not be used inside a form. Within a form, character C represents counter command function.*
- 2. The cutter must be installed.*

D Set Darkness

Syntax	Dp_1 ↵
Description	This command is used to set the print darkness. In general, the proper darkness value is depending on the media, print-out pattern and speed.
Parameters	p_1 : Darkness. Acceptable values ranges from 0 to 15.
Example	N ↵ $D10$ ↵ $A100,100,0,3,1,1,N,"DARKNESS=10"$ ↵ $P1$ ↵

Notes: Refer to [APPENDIX BE: DENSITY AND SPEED](#).

EI **Print Soft Font List**

Syntax EI↵

Description This command causes the printer to print the list of soft fonts that have been downloaded to RAM or flash memory from the host.

Parameters None

Example EI↵

Output If no soft font exists, the output will be

```
Soft Font Information:  
No Soft Font Stored.
```

If soft fonts with ID C, D, E, F and G are stored in the printer, the output will be

```
Soft Font Information:  
g  
f  
e  
d  
c
```

EK

Delete Soft Font

Syntax

EK"ID"↵

EK"*"↵

Description

This command causes the printer to delete the soft fonts that are currently stored in RAM or flash memory.

Once a soft font is deleted, it cannot be selected or printed out, unless downloaded again.

Parameters

ID Font ID, a ~ z.

* All fonts will be deleted from RAM or flash memory.

Example

EK"b"↵

This causes printer to delete a soft font with ID b.

ES

Download Soft Font

Syntax ES"ID"......

Description This command is used to download a soft font and store it in RAM or flash memory. The soft font can be deleted by EK command. If it is stored in RAM, it will be automatically cleared when the printer is turned off. The soft fonts can be kept, if they are stored in the flash memory.

Refer to the A command for selecting a soft font and printing it.

Parameters ID One upper case letter from a to z.
......

The basic format of a soft font is

Font Descriptor
Character 0
...
Character N-1

Font Descriptor

Byte 0	0
Byte 1	No. of characters to be downloaded
Byte 2	0
Byte 3	Image height, IV
Byte 4	Width in pixels for space code
Byte 5	0
Byte 6 ~ 0FH	0

Character Parameters and Image

Byte 0	Movement in pixel
Byte 1	Character width in bytes, BW
Byte 2 ~	Image data, the length is BW*IV

Note: No line separator (LF) is required.

Example

EK"a" ↵

ES"a"...

N↵

A50,30,0,a,1,1,N,"SOFT FONT a" ↵

P1↵

FE

End Form Store

Syntax

FE↵

Description

This command is used to end a form store sequence. Once the printer receives such command, it will save the form data into RAM or flash memory. The form data is started by FS command and ended by FE command.

Parameters

None.

Example

FS"FORMA" ↵
...
FE↵

FI Print Form List

Syntax FI↵

Description This command causes the printer to print the list of forms that have been downloaded to RAM or flash memory from the host.

Parameters None

Example FI↵

Output If no form exists the output will be

Form Information:
No Form Stored.

If the forms with names FORMA, FORMB and FORMC are stored in printer the output will be

Form Information:
FORMC
FORMB
FORMA

FK

Delete Form

Syntax FK"FORMNAME"↵
FK"*"↵

Description This command causes the printer to delete forms currently stored in RAM or flash memory.
Once a form is deleted it can not be retrieved and printed except it is reloaded again.

Note: "Delete form" and "store form" will affect flash memory life.

Parameters FORMNAME: Form name with a maximum of 18 characters.
*: All forms will be deleted from RAM or flash memory.

Example FK"*"↵
This causes the printer to delete all forms stored in RAM or flash memory.

FR

Execute Form

Syntax

FR"FORMNAME"↵

Description

This command is used to retrieve a form that is currently saved in printer and execute it.

The major advantage of using form is that you may retrieve and execute at any time as long as it exists in printer.

Parameters

FORMNAME
Form name with a maximum of 18 characters.

Example

FK"FRMA"↵; delete form "FRMA"
FS"FRMA"↵; start loading a new form
A50,30,0,4,1,1,N,"THIS IS FRMA."↵
FE↵; end form store

FR"FRMA"↵; retrieve and execute
P1↵; a copy of form "FRMA"

Output

THIS IS FRMA.

FS

Store Form

Syntax FS"FORMNAME"↵

Description This command begins a form store sequence until the FE command is received. The destination of storing depends on ZS or ZN command. If flash memory is enabled (ZS) the form will be saved to flash memory, otherwise it is saved to RAM.

Note: "Delete form" and "store form" will affect flash memory life.

Parameters FORMNAME
Form name with a maximum of 18 characters.

Notes:

- 1. When updating a form with the same form name, use the FK command to delete the old one before storing the new one.*
- 2. Refer to the example at FR command for the whole form related commands.*

f **Adjust Cutting Position**

Syntax `fp1↵`

Description This command is used to adjust the cutting position. Due to media differences, when cutter function is enabled, use this command to have the printer cut the media in more precise position.

Parameters `p1`: Cut position measured in dots. Acceptable range: 070 to 130. The default value is 100.

Example `f100↵`

GG

Print Graphics

Syntax

GGp₁,p₂,"GNAME" ↵

Description

This command is used to print a graphic with PCX format that has been previously downloaded and saved in printer.

Parameters

p₁: X coordinate in dots.

p₂: Y coordinate in dots.

GNAME: Graphic name with a maximum of 18 characters.

Example

N↵

GG100,50,"PCXGRAPH"↵

P1↵

GI **Print Graphic List**

Syntax GI↓

Description This command causes the printer to print the list of graphics that had been download to RAM or flash memory from host.

Parameters None.

Example GI↓

Output If no PCX graphics exist the output will be

```
Graphics Information:  
No Graphics Stored.
```

If the graphics with names GRAPH A, GRAPH B and are stored in printer the output will be

```
Graphics Information:  
GRAPH B  
GRAPH A
```

GK

Delete Graphics

Syntax GK"GNAME"↵
GK"*"↵

Description This command causes the printer to delete graphics currently stored in RAM or flash memory. Once a graphic is deleted it can not be retrieved and printed except it is reloaded again.

Note: "Delete graphics" and "store graphics" will affect flash memory life.

Parameters GNAME: Graphic name with a maximum of 18 characters.
*: All graphics will be deleted from RAM or flash memory.

Example GK"*"↵

This causes printer to delete all graphics stored in RAM or flash memory.

GM

Store Graphics

Syntax

GM"GNAME"p₁↵
PCX file

Description

This command causes the printer to store graphics object in RAM or flash memory.

The destination of storing depends on ZS or ZN command. If flash memory is enabled(ZS) the graphics will be saved to flash memory, otherwise it is saved to RAM.

Note:

- 1. To verify that the graphic was successfully stored you may send a G1 command after downloading.*
- 2. "Delete graphics" and "store graphics" will affect flash memory life.*

Parameters

GNAME: Graphic name with a maximum of 18 characters.

p₁: The size (decimal) in bytes of PCX files.

PCX file: The graphics should be in PCX format. Refer to the Appendix BA for the specification of PCX graphics.

Example

GK"PCXA"↵ ; delete a graphic name PCXA
GM"PCXA"3858↵ ; store a graphic name PCXA
with size 3858 bytes

[PCX file for PCXA graphics]...

N↵
A30,30,0,4,1,1,R,"PCXA..."↵
GG30,100,"PCXA"↵ ; print the graphic name PCXA
P1↵
GK"*"↵

irst delete PCXA graphics, download a new one, print
some texts and the PCXA. After printing, delete all graphics
stored in printer.

Output



Notes:

The example of storing and recalling PCX graphics under Dos prompt is as below:

copy/b head+PCXA.pcx+tail LPT1: ; send this three files to the printer

ZS	
GK"PCXA"↵	} head
GM"PCXA"3858↵	
[Any *.pcx graphics]	
	→ PCXA.pcx
N↵	} tail
A30,30,0,4,1,1,R,"PCXA..."↵	
GG30,100,"PCXA"↵	
P1↵	

GW

Print Immediate Graphics

Syntax GWp₁,p₂, p₃,p₄,[...raster image...]↵

Description This command is used to print a graphic with binary format. Note that the graphic format is not a PCX one. You should send row by row without compression. The '1' represents blank pixel and '0' for black pixel.

After being printed the graphic image will be cleared immediately. You can not recall or reprint it again.

Parameters p₁: X coordinate in dots.
 p₂: Y coordinate in dots.
 p₃: Graphic width in bytes.
 p₄: Height in pixels.

I Select Symbol Set

Syntax |p₁,p₂,p₃,┘

Description This command is used to select the proper symbol set.
The factory default symbol set is Code page 437 (English).

Parameters p₁: data bit number. 8 for 8-bit data and 7 for 7-bit data.
p₂: Symbol set.
p₃: KDU country code.

8 bit data (p ₁ =8)	Symbol Set (Code page)	7 bit data (p ₁ =7)	Symbol set
0	English (437)	0	USASCII
1	Latin 1 (850)	1	British
2	Slavic (852)	2	German
3	Portugal (860)	3	French
4	Canadian/French (863)	4	Danish
5	Nordic (865)	5	Italian
6	Turkish (857)	6	Spanish
7	Icelandic (861)	7	Swedish
8	Hebrew (862)	8	Swiss
9	Cyrillic (855)		
10	Cyrillic CIS 1 (866)		

11	Greek (737)	
12	Greek 1 (851)	
13	Greek 2 (869)	
8 bit data (p ₁ =8)	Symbol Set (Code page)	7 bit data (p ₁ =7)
A	Latin 1 (1252)	
B	Latin 2 (1250)	
C	Cyrillic (1251)	
D	Greek (1253)	
E	Turkish (1254)	
F	Hebrew (1255)	

Note:

1. 300dpi printer models support Code page 437, 850,852, 860, 863, 865, 1254 only.)

Example

N,␣

I7,5,001␣

A50,30,0,3,1,1,N,"£100"␣

P1␣

This example selects 7 bit data, Italian symbol set.

Output

£100

JB/JF

Disable OR Enable Back Feed

Syntax

Disable back feed:

JB↵

Enable back feed:

JF↵

Description

This command is used to adjust the stop position. The back feed action is disabled at factory settings. After JF the printer will feed about one more inch so that the user can see the whole label.

Parameters

None.

LE

Line Draw by Exclusive OR Operation

Syntax `LEp1,p2,p3,p4↵`

Description This command is used to draw a line by an “exclusive OR” operation.

Parameters p₁: X coordinate in dots.
 p₂: Y coordinate in dots.
 p₃: Horizontal length in dots.
 p₄: Vertical height in dots.

Example `N↵`
 `LE50,30,100,10↵`
 `LE100,20,5,110↵`
 `P1↵`

Output



LO

Line Draw by OR Operation

Syntax

LO p_1, p_2, p_3, p_4 ↵

Description

This command is used to draw a line by an “OR” operation.

Parameters

p1: X coordinate in dots.

p2: Y coordinate in dots.

p3: Horizontal length in dots.

p4: Vertical height in dots.

Example

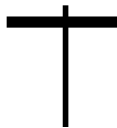
N↵

LO50,30,100,10↵

LO100,20,5,110↵

P1↵

Output



LW

Draw White Line

Syntax

LWp₁,p₂,p₃,p₄↵

Description

This command is used to draw a white line, so it may erase previous image.

Parameters

p1: X coordinate in dots.

p2: Y coordinate in dots.

p3: Horizontal length in dots.

p4: Vertical height in dots.

Example

N↵

LE50,30,100,10↵

LE50,60,100,10↵

LE50,90,100,10↵

LE50,120,100,10↵

LW100,20,5,110↵

P1↵

Output



N Clear Image Buffer

Syntax N↵

Description This command is used to clear the image buffer before filling any image.

Parameters None.

Note: Since this printer automatically clears the image buffer after a P command is execute, the N command may not be necessary. But for other compatible printers, this command can be accepted to clear the image buffer.

O

Select Options

Syntax	O[D,C,N,L]↵	
Description	This command is used to select various printer options. In general, it depends on the configuration of your printer.	
Parameters	D: Enable direct thermal (without ribbon). C[p₁]: Enable cutter. p₁ sets the number of labels to print prior to cut. If the lowercase b is specified for p₁, the batch function is enabled. The printer will end off print-out with cutting the label once. N: Enable dispenser. L: On demand mode. The printer will print the next label out when pressing the feed button. Every time when the printer is started up, the defaults are cutter disabled, and dispenser disabled.	
Example	O↵	; thermal transfer, disables cutter and dispenser
	OD↵	; direct thermal, disables cutter and dispenser
	OC↵	; thermal transfer, enables cutter and disables dispenser

Notes: The cutter and dispenser cannot be enabled at the same time.

oR **Euro Character**

Syntax oR[p₁, p₂].↵

Description This command is used to replace the Euro cash sign in any ASCII character. This command is only used in Font 1~4.

Parameters p₁: E. (If p₂ parameter is not set, the Euro cash sign will be mapped to 213 DEC (D5 HEX) in all code pages.)
p₂: Valid DEC number is from 0 to 255. The ASCII character map position of valid code page is replaced by the Euro character.

P

Print Label

Syntax Pp₁[,p₂]

Description This command is used to output the contents of the image buffer.

Parameters p₁: Number of label sets, 1 ~ 65535.
p₂: Number of copies per label, 1 ~ 65535.

Example FK"TEST"
FS"TEST"
C0,6,N,+1,"Enter Start No.:"
A20,50,0,4,1,1,N,"Label: "
A120,50,0,4,1,1,N,C0
FE

N
Q20,0
FR"TEST"
?
100
P2,3

This example downloads a form and prints 2 label sets with 3 pieces per set.

Output

Label : 100

Label : 100

Label : 100

Label : 101

Label : 101

Label : 101

PA

Print Automatically

Syntax

PA p_1 [, p_2].↵

Description

This command is used for form application. It prints the form, as soon as all variable data have been input.

Parameters

p_1 : Number of label sets, 1 ~ 65535.

p_2 : Number of copies per label, 1 ~ 65535.

Example

```
FK"TEST1"↵
FS"TEST1"↵
C0,6,N,+1,"Enter Start No.:"↵
A20,50,0,4,1,1,N,"Label: "↵
A120,50,0,4,1,1,N,C0↵
PA2↵
FE↵

N↵
Q20,0↵
FR"TEST1"↵
?↵
100↵
```

Output

Label : 100

Label : 101

Q

Set Label and Gap Length

Syntax

$Qp_1,p_2[\pm p_3]\downarrow$

Description

This command is used to set the label and gap length measured in dots.

Parameters

- p_1 : For label with gap, p_1 is to set the label length. For continuous media, p_1 is to set the feed distance after the last image line.
- p_2 : Gap length. For continuous media (without gap), this parameter should be set to 0. For black line media, p_2 should be set to B plus black line thickness in dots.
- $\pm p_3$: For gap and continuous media, this parameter is to set positive vertical offset length. For black line media, this parameter is to set the length between black line and perforation line.

Example

```
N↓  
Q100,20↓  
A20,30,0,2,1,1,N,"Q command:" ↓  
A20,60,0,2,1,1,N,"Label with gap"↓  
A20,90,0,2,1,1,N,"Gap length: 20 dots"↓  
P1↓  
  
N↓
```

A20,30,0,2,1,1,N,"Q command:" ↵
A20,60,0,2,1,1,N,"Continuous Label" ↵
P1↵

N↵
Q496,B24-40↵
A20,30,0,2,1,1,N,"Q command:" ↵
A20,60,0,2,1,1,N,"Black Line Media" ↵
A20,90,0,2,1,1,N,"With Perforation" ↵
P1↵

Note: If the label size is not properly set, the printer may print off the edge of the label or tag and onto the backing or platen roller, while showing error message.

q

Set Label Width

Syntax qp₁↵

Description This command sets the label width. This command is an alternative to sending the R command for center labels that are narrower than the print head.

Parameters p₁: Label width in dots.

Example N↵
q250↵
A20,30,0,2,1,1,N,"q command:"↵
A20,60,0,2,1,1,N,"Label width: 250 dots"↵
P1↵

Note: This command will automatically set the left margin. The incorrect label width will cause the image shift to the left or right, even lost.

R Set Origin Point

Syntax R p₁,p₂↵

Description This command moves the origin point for the X and Y axes. After this command is sent, all coordinates are set according to the new origin.

Parameters p₁: Horizontal margin measured in dots.
p₂: Vertical margin measured in dots.

The print direction commands (ZB and ZT) will affect the location of the origin point. Refer to the Z command for details.

S

Set Print Speed

Syntax Sp₁↵

Description This command is used to set a particular speed for a label or batch of labels to be printed.

Parameters p₁: A single character (0 to 7) representing a particular speed setting. The range depends on your printer model.

p ₁ Value	Speed	p ₁ Value	Speed
0 or 1	1 ips (25 mmps)	6	6 ips (150 mmps)
2	2 ips (50 mmps)	7	7 ips (175 mmps)
3	3 ips (75 mmps)	8	
4	4 ips (100 mmps)		
5	5 ips (125 mmps)		

Example S2↵

The sample above sets the printer to a speed of 2 ips.

Notes: Refer to [APPENDIX BE: DENSITY AND SPEED.](#)

TD Define Date Format

Syntax TD[p₁][p₂][p₃][+n]↵

Description This command defines the date format for printing. You may define special characters as separators.

Parameters p₁: y2 (year displayed as 2 numerals).
y4 (year displayed as 4 numerals).
p₂: me (month displayed as 3 letters).
mn (month displayed as 2 numerals).
p₃: dd (day).
[+n]: n (date offset range from 1 to 255 days).

Example TDdd-me-y2↵
A100,100,0,4,1,2,N,TD↵ ; 06-JAN-06
A100,200,0,4,1,2,N,TD+7↵ ; 13-JAN-06

TDdd,mn,y4↵
A100,100,0,4,1,2,N,TD↵ ; 06,01,2006
A100,200,0,4,1,2,N,TD+7 ; 13,01,2006

TS Set Real Time Clock

Syntax	TSp1,p2,p3,p4,p5,p6.↵
Description	This command is used to set the RTC if it is installed.
Parameters	p1 : Month, 01 ~ 12. p2 : Day, 01 ~ 30. p3 : Year, 00 ~ 99. p4 : Hour in 24 hour format. 00 ~ 23. p5 : Minutes, 00 ~ 59. p6 : Seconds, 00 ~ 59.
Example	TS10,06,00,12,30,00.↵ ; Sets the time to ; Oct. 6, 00 ; 12:30:00 PM

TT Define Time Format

Syntax TT[p1][p2][p3].

Description This command defines the time format for printing. You may define special characters as separators.

Parameters p1 : h (hours). If a '+' exists the hour is in 12 hour format and 'PM' or 'AM' will be printed.
p2 : m (minutes).
p3 : s (seconds).

Example

TTh:m:s.	; 13:30:20
TTh/m.	; 13/30
TTh:m:s+.	; 01:30:20PM
TT+ h:m.	; PM 01:30

U **Print Configuration**

Syntax U↵

Description This command is used to print the printer configuration including settings, firmware version, accessories, etc..

Parameters None.

Example U↵

UA **Enable Clear Print Buffer When Media Out/ Ribbon Out Occurred**

Syntax UA↵

Description This command is used to clear the print buffer when media-out or media-out occurred. After this command is sent, the remained copies of label will not be printed if a media out condition is detected.

Parameters None.

Example UA↵

UB Disable Clear Print Buffer When Media Out/ Ribbon Out Occurred

Syntax UB␣

Description This command is used to clear the UA command and restore the default setting to allow the printer to resume the printing job after supplying new label roll (or ribbon roll).

Parameters None.

Example UB␣

UE

Soft Fonts Information Through RS232

Syntax

UE↓

Description

This command is used to inquire the stored soft fonts in printer. After this command is sent, the printer will send the information of soft fonts stored in the printer back to the host through the RS232 port.

Parameters

None.

Example

UE↓

Output

Soft Font Information:

B

A

UF Forms Information Through RS232

Syntax UF↵

Description This command allows printer to send the information of forms currently stored in the printer back to the host through RS232 port.

Parameters None.

Example UF↵

Output Form Information:
form3
form2
form1

UG

Graphics Information Through RS232

Syntax UG↵

Description This command allows printer to send the information of graphics currently stored in the printer back to the host through RS232 port.

Parameters None.

Example UG↵

Output Graphics Information:
No Graphics Stored.

UI **Current Codepage Information Through RS232**

Syntax UI↓

Description This command causes printer to send the information about current selected codepage back to the host through RS232 port. The printer will send feedback in the following format:

UI p₁,p₂,p₃
p₁: data bit number.
p₂: symbol set
p₃: country code

Parameters None.

Example UI↓

Output UI8,0,001

Notes: See I command for additional information.

UM Memory Allocation And Codepage Information Through RS232

Syntax UM␣

Description This command causes printer to send memory status and current selected codepage back to the host through RS232 port. The printer will send feedback to the host in the following format:

UM p₁,p₂,p₃, p₄,p₅

p₁: User space allocation size in KBytes

p₂: Free memory for user space in KBytes

p₃: USB mass storage allocation in KBytes

p₄: USB mass storage free memory in KBytes

p₅: The same data format with UI command

Parameters None.

Example UM␣

Output UM428,2344,0,0
UI8,0,001

Notes: See I, UI commands for additional information.

UP Memory Information, Current Codepage Through RS232 And Print Configuration

Syntax UP↵

Description This command causes printer to send the information about current selected codepage and memory allocation back to the host through RS232 port and print printer configuration on labels.

Parameters None.

Example UP↵

Output UM428,2344,0,0
 UI8,0,001

Notes:

- 1. The printer will print configuration on labels.*
- 2. See I, UM, UI, and U commands for additional information.*

UQ

Printer Configuration Through RS232

Syntax UQ↵

Description This command causes printer to send its configuration information back to the host through RS232 port.

Parameters None.

Example UQ↵

UN/US

Disable/Enable Error Reporting

Syntax

UN↵
US↵

Description

This command is used to disable/enable the feedback from the printer. The printer sends its feedback through the RS232 port. The default is disabled.

Parameters

None.

Example

US↵

If an error occurs the printer will send a NACK(15H), followed by the error number to the host. If no error, the printer will echo an ACK(06H), after a P command is received. For major problems, e.g. media out, the LEDs on the panel of the printer will blink.

Error Code	Description
00	No error
01	Command parser error
03	Data error for bar code
04	Memory overflow
07	Media out error
08	Object error (include soft font, form, graphics are repeat)
09	Object error (include soft font, form, graphics not found)

10	Data error (not in data entry mode)
71	Ribbon out error
81	Cutter fail

V Define Variable

Syntax `Vp1,p2,p3,"MSG"↵`

Description This command defines the variable in forms. This command is useful to print labels numbered in sequence. To print the contents of the variable, you may use A (print text) or B (print bar code) commands.

Parameters p₁: Variable ID. Acceptable values from 00 to 99.
p₂: Maximum digit number for the variable. Acceptable value ranges from 1 to 99. If you use KDU, the length should be limited under 16.
p₃: Justification code. L for left justification, R for right justification, N for no justification and C for center alignment.
"MSG": A text string that will be sent to KDU or host.

Example `N↵
FK"TEST2"↵
FS"TEST2"↵
V0,16,L,"Enter Title:"↵
C0,6,N,+1,"Enter Code:"↵
A100,100,0,4,1,1,N,V0↵
A355,100,0,4,1,1,N,C0↵
A100,150,0,4,1,1,N,V00C0↵`

A100,200,0,4,1,1,N,"Test"V00"ABCDE"CO.
FE.

This example stores a form to the printer, if you retrieve the form and enter the counter and variable with following procedure, the printer will print two labels with the input data.

Q050,0.
FR"TEST2"..
?..
Part Number:..
1234..
P2,1..

Output

Part Number: 1234
Part Number: 1234
13-DEC-2014Part Number: 1234
Part Number: 1235
Part Number: 1235
13-DEC-2014Part Number: 1235

X Draw Box

Syntax `Xp1,p2,p3,p4,p5↵`

Description This command is used to draw a box by an “OR” operation.

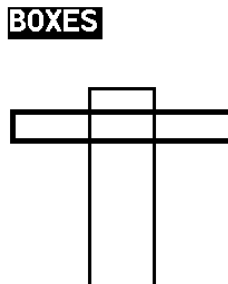
Parameters

- p₁: X coordinate of start point in dots.
- p₂: Y coordinate of start point in dots.
- p₃: Thickness of four edges.
- p₄: X coordinate of end point in dots.
- p₅: Y coordinate of end point in dots.

Example

```
N↵
A50,30,0,4,1,1,R,"BOXES"↵
X50,120,5,250,150↵
X120,100,3,180,280↵
P1↵
```

Output



xa **Auto Calibration**

Syntax xa↵

Description This command is used to have the printer automatically perform the calibration. The printer will feed label stock for certain length to detect the label characteristics and gap length.

Parameters None.

Example xa↵

Y Set Serial Port

Syntax Yp₁,p₂,p₃,p₄↵

Description This command is used to setup the serial port on the printer for matching with the host. The protocol between the host and the printer should be same otherwise unpredictable results will occur.

Parameters p₁: Baud rate. Acceptable values are:

p ₁ Value	Speed
11	115,200 baud
57	57,600 baud
38	38,400 baud
19	19,200 baud
96	9,600 baud
48	4,800 baud
24	2,400 baud

p₂: Parity.

O - odd parity, E - even parity and N - none parity.

p₃: Data bit number, 7 or 8.

p₄: Stop bit number, 1 or 2.

Example Y19,N,8,1↵

Z

Set Print Direction

Syntax Zp₁↵

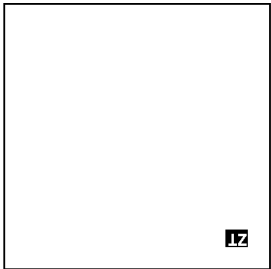
Description This command is used to set the print direction for all graphics, texts, bar codes, lines and boxes.

Parameters p₁: Direction. Acceptable values are B or T.
 B: Print from the bottom of image. The graphics, images or texts etc. that are sent from the top are diagonally symmetrical with those sent from the bottom.
 T: Print from the top of image. The default value is T.

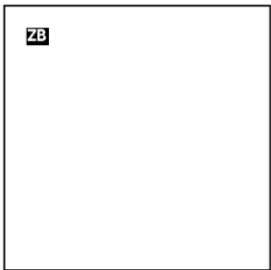
Example N↵
 ZT↵
 A80,80,0,4,1,1,R,"ZT"↵
 X40,40,3,480,480↵
 P1↵

 N↵
 ZB↵
 A80,80,0,4,1,1,R,"ZT"↵
 X40,40,3,480,480↵
 P1↵

Output



Label feed



Label feed

ZN/ZS

Disable/Enable Flash Memory

Syntax

ZN↵

ZS↵

Description

This command is used to disable/enable the flash memory.

All PCX graphics, soft fonts and forms can be stored to RAM or flash memory. But the objects that are stored in RAM will be cleared after the printer is turned off. ZS command can store objects in flash memory after the printer is turned off. (Enable ZS command will affect flash memory life.)

Example

ZS↵

FK"TEST3"↵

FS"TEST3"↵

A100,100,0,4,1,1,N,"Test Flash"↵

FE↵

If the flash memory is enable and you send the example file, then restart the printer and retrieve the form. The printer will print out the correct result.

FR"TEST3"↵

P1↵

?

Download Variables and Counters

Syntax

?_

Description

This command is used to inform the printer that the data following are input variables or counter values.

This command is used to send data variables or counters to the printer after a form is stored. The amount of data following the question mark and LF must exactly match with the total number and order of variables and counters in that specific form.

Refer to the C and V commands for examples.

^@

Reset Printer

Syntax

^@↵

Description

This command is used to restart the printer. Forms, soft fonts and graphics that were stored in flash memory will not be cleared after this command is sent.

Parameters

None.

Example

^@↵

Notes: This command is unavailable while the printer is in dump mode.

^ee Immediate Error Report

Syntax ^ee↵

Description This command is used to get printer error and status report immediately via RS232 port.

Parameters None.

Example ^ee↵

Error Code	Description
00	No error
01	Command parser error
07	Media or ribbon empty error
11	Print Head Up (Open)
12	Pause Mode or Paused in Peel Mode
50	Printer Busy
81	Cutter fail

APPENDIX BA: PCX SPECIFICATION

This section contains the basic PCX format that will be accepted by your printer. The raster image data at PCX file are compressed. It reduces the file size and saves the time for communication between the host and the printer.

Note that all of the word (16 bits) or long word (32 bits) data are in Intel formats, i.e. the most significant byte is at highest address.

PCX Header (128 bytes)
First raster line
...
Last raster line

Header

The header includes 128 byte data.

<i>Location</i>	<i>Contents</i>
0H	0AH, PCX mark
1H	Version
2H	0
3H	Bits per pixel, this should be 1.
4H ~ 5H	X coordinate at upper left point, 0.
6H ~ 7H	Y coordinate at upper left point, 0.

8H ~ 9H	X coordinate at lower right point
0AH ~ 0BH	Y coordinate at lower right point
0CH ~ 0DH	Horizontal resolution. Ignored.
0EH ~ 0FH	Vertical resolution. Ignored.
10H ~ 3FH	All 0s
40H	0
41H	Plane no., this should be 1.
42H ~ 43H	Bytes per raster line
44H ~ 45H	0
46H ~ 47H	Horizontal pixel count - 1
48H ~ 49H	Vertical pixel count - 1
4AH ~ 7FH	All 0

Note: The alignment of word or long word for PCX file is at Intel format. That is the most significant bytes is located at highest location and least significant byte is located at lowest location.

Raster Data

There are two types of raster data.

- CC, pattern0
- pattern1

The control byte must be greater than C0H and pattern1 is less than C0H.

rep=CC & 3FH

rep represents the repeat count of pattern0 after expansion. For example, a raster line data,

3AH, C0H, C1H, 41H, 41H, 41H, 41H, 41H

After compression, they become

3AH, **C1H**, C0H, **C1H**, C1H, **C5H**, 41H

1 at pattern byte stands for white pixel and 0 for black pixel. If the width in pixels is not a multiple of 8, the bits of "1" must be filled at the end of each row to form an integral part of bytes.

APPENDIX BB: HOW TO MAKE A FORM

In general a form contains texts, bar codes and graphics. Some of the fields are fixed, while the others are subject to change. While making a form, you may need to perform some of the following tasks:

- Download graphics
- Download a form
- Define variables and counters
- Set positions for texts, bar codes and graphics
- Retrieve and execute a form

Download graphics

GK"LOGO"↵	; delete the previous one if it exists
GM"LOGO"1024↵	; start pcx graphics. 1024 is the total size of the graphics
...graphics...	; 1024 does not include LF code, ↵.

Refer to the appendix BA for the PCX specification.

Download a Form

FK"TICKET"↵	; delete the previous one if it exists
FS"TICKET"↵	; start the form store sequence of the form "TICKET"

FE↓ ; end a form sequence

Define Variables and Counters

V00,15,N,"Start From"↓ ; variable 00 with a maximum length of 15

V01,15,N,"Destination"↓ ; variable 01 for destination

C0,6,N,+1,"Ticket no."↓ ; counter 0, stepped by +1

Set Positions

The positions are depending on the label dimension and the output format.

q700↓ ; set label width

ZT↓ ; set print direction

GG50,100,"LOGO"↓ ; place "LOGO" to position x=50, y=100

A100,150,0,4,1,1,N,"From"↓ ; fixed text at x=100, y=150, font 4

A350,150,0,4,1,1,N,"to"↓ ; fixed text at x=250, y=150, font 4

A200,150,0,3,1,1,N,V00↓ ; variable at x=200, y=150, font 3

A415,150,0,3,1,1,N,V01↓ ; variable at x=415, y=150, font 3

B250,200,0,1,3,3,96,B,C0↓ ; counter using code 128 with bar code height 96, and print readable digits

Retrieve and Execute

FR"TICKET"↓ ; retrieve form "TICKET"

?↓ ; start download of variables and counter

New York↵	; V00 value
Mexico↵	; V01 value
100200↵	; C0 value
P3,1↵	; print 3 label sets, 1 copy of each label

Once a form or graphics is stored, you can print labels just by sending a few commands.

Program List

```

GK"LOGO"↵
GM"LOGO"1024↵
...graphics...
FK"TICKET"↵
FS"TICKET"↵

V00,15,N,"Start From"↵
V01,15,N,"Destination"↵
C0,6,N,+1,"Ticket no."↵

q700↵
ZT↵
GG50,100,"LOGO"↵
A100,150,0,4,1,1,N,"From"↵
A350,150,0,4,1,1,N,"to"↵
A200,150,0,3,1,1,N,V00↵
A415,150,0,3,1,1,N,V01↵

```

B250,200,0,1,3,3,96,B,C0↵
FE↵

FR"TICKET"↵

?↵

New York↵

Mexico↵

100200↵

P3,1↵

APPENDIX BC: FONTS

Internal Fonts

There are 5 internal fonts for the PPLB emulation. Each has 20 eight-bit and 9 seven-bit symbol sets. Font 5 supports upper case characters, 0~9, #,\$%&+,-.:/\, and space only.

Font 1

ABCDEFGHIJKLMN OPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz

Font 2

ABCDEFGHIJKLMN OPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz

Font 3

ABCDEFGHIJKLMN OPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz

Font 4

ABCDEFGHIJKLMN OPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz

Font 5

ABCDEFGHIJKLM
NOPQRSTUVWXYZ

Symbol

Code Page 437(English)

```

20H-2FH: !"#$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: @ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZ[\]^_
60H-6FH: `abcdefghijklmnopqrstuvwxyz
70H-7FH: pqrstuvwxyz[
80H-8FH: {~
90H-9FH: €øǿōōūūyōüçƒŸ ſ
A0H-AFH: αiouñᳵȡȢ ½¼ı
B0H-BFH: 
C0H-CFH: 
D0H-DFH: 
E0H-EFH: αβγπΣσµτφΘΩδ øε
F0H-FFH: 

```

Code Page 852(Slavic)

```

20H-2FH: !"#$%&'()*+,-./
30H-3FH: 0123456789;:<=>?
40H-4FH: @ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZ[\]^_
60H-6FH: `abcdefghijklmnopqrstuvwxyz
70H-7FH: ¨¡¢£¥¦§¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏÐÑÒÓÔÕÖ×ØÙÚÛÜÝÞßàáâãäåæçèéêëìíîïðñòóôõö÷øùúûüýþÿ
80H-8FH: 
90H-9FH: 
A0H-AFH: 
B0H-BFH: 
C0H-CFH: 
D0H-DFH: 
E0H-EFH: 
F0H-FFH: 

```

**Code Page 863
(Canadian/French)**

```

20H-2FH: !"#$%&'()*+,-./
30H-3FH: 0123456789:;<>=?
40H-4FH: @ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZ[\]^_
60H-6FH: `abcdefghijklmnopqrstuvwxyz
70H-7FH: pqrstuvwxyz{|}~
80H-8FH: Çüéàáâãäåæçèéëìíîïðñ
90H-9FH: ÊËëĖİıŮůûÜúÝý Þþ Ææ
A0H-AFH: Ĩ Œœ Šš Žž ½¼¾
B0H-BFH:
C0H-CFH:
D0H-DFH:
E0H-EFH: αβΓπΣσμτφΘΩδ εε ζζ
F0H-FFH:

```

Code Page 850(Latin 1)

[illegible]

Code Page 860(Portugal)

```

20H-2FH: !"#$%&'()*+,-./
30H-3FH: 0123456789:;<=?
40H-4FH: @ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZ[\]^_
60H-6FH: 'abcdefghijklmnopqrstuvwxyz
70H-7FH: `pqrstuvwxyz{|}~
80H-8FH: ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿
90H-9FH: º»¼½¾¿
A0H-AFH: º»¼½¾¿
B0H-BFH: º»¼½¾¿
C0H-CFH: º»¼½¾¿
D0H-DFH: º»¼½¾¿
E0H-EFH: º»¼½¾¿
F0H-FFH: º»¼½¾¿

```

Code Page 865(Nordic)

```

20H-2FH: !"#$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: @ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZ[\]^_
60H-6FH: `abcdefghijklmnopqrstuvwxyz
70H-7FH: ¨¡¢£¥¦§¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿
80H-8FH: ¨¡¢£¥¦§¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿
90H-9FH: ¨¡¢£¥¦§¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿
A0H-AFH: ¨¡¢£¥¦§¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿
B0H-BFH: ¨¡¢£¥¦§¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿
C0H-CFH: ¨¡¢£¥¦§¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿
D0H-DFH: ¨¡¢£¥¦§¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿
E0H-EFH: ¨¡¢£¥¦§¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿
F0H-FFH: ¨¡¢£¥¦§¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿

```


Code Page 851(Greel 1)

20H-2FH: !"#\$%&'()*+,-./
30H-3FH: 0123456789;:<=>?
40H-4FH: @ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZ[\]^_
60H-6FH: `abcdefghijklmnopqrstuvwxyz
70H-7FH: ¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿
80H-8FH: À Á Â Ã Ä Å Æ Ç È É Ê Ë
90H-9FH: Ì Í Î Ï Ð Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ à á â ã ä å æ ç è é ê ë ì í î ï ð ñ ò ó ô õ ö ø ù ú û ü ý þ ÿ

Code Page 869(Greek 2)

```

20H-2FH: !"#$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: @ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZ[\]^_
60H-6FH: 'abcdefghijklmno
70H-7FH: pqrstuvwxyz
80H-8FH: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
90H-9FH: iïò ÿöñ áâéñí
A0H-AFH: i:óúABΓΔΕΖΗΘΙ
B0H-BFH: KΛΜΝ ΞΟ
C0H-CFH: ΠΡ Σ
D0H-DFH: ΤΥΦΧΨΩαβγ δε
E0H-EFH: ζηθικλμνξοπρστ
F0H-FFH: υφχψω ωύύύύ?

```

USASCI I

```

20H-2FH: !"#$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: @ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZ[\]^_
60H-6FH: 'abcdefghijklmnopqrstuvwxyz
70H-7FH: pqrstuvwxyz
80H-8FH:
90H-9FH: TS
A0H-AFH: !"#$%&'()*+,-./
B0H-BFH: 0123456789:;<=>?
C0H-CFH: @ABCDEFGHIJKLMNO
D0H-DFH: PQRSTUVWXYZ[\]^_
E0H-EFH: 'abcdefghijklmnopqrstuvwxyz
F0H-FFH: pqrstuvwxyz ?

```

British

```

20H-2FH: !"#$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: @ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZ[\]^_
60H-6FH: 'abcdefghijklmnopqrstuvwxyz
70H-7FH: pqrstuvwxyz
80H-8FH:
90H-9FH: TS
A0H-AFH: !"#$%&'()*+,-./
B0H-BFH: 0123456789:;<=>?
C0H-CFH: @ABCDEFGHIJKLMNO
D0H-DFH: PQRSTUVWXYZ[\]^_
E0H-EFH: 'abcdefghijklmnopqrstuvwxyz
F0H-FFH: pqrstuvwxyz ?

```

German

```

20H-2FH: !"#$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: $ABCDEF GHIJKL MN
50H-5FH: PQRSTU VWXYZaöü^
60H-6FH: ' abcdefghijklmnö
70H-7FH: pqrstuvwxyzaöüß
80H-8FH:
90H-9FH:  TS
A0H-AFH: !"#$%&'()*+,-./
B0H-BFH: 0123456789:;<=>?
C0H-CFH: $ABCDEF GHIJKL MN
D0H-DFH: PQRSTU VWXYZaöü^
E0H-EFH: ' abcdefghijklmnö
F0H-FFH: pqrstuvwxyzaöü?

```

French

```

20H-2FH: !"f$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: aAbCDEFGHIJkLmNOp
50H-5FH: pQRSTUVWxyz°c$^
60H-6FH: ' abcdefghijklmnö
70H-7FH: pqrstuvwxyzeüë"
80H-8FH:
90H-9FH: TS
A0H-AFH: !"f$%&'()*+,-./
B0H-BFH: 0123456789:;<=>?
C0H-CFH: aAbCDEFGHIJkLmNOp
D0H-DFH: pQRSTUVWxyz°c$^
E0H-EFH: ' abcdefghijklmnö
F0H-FFH: pqrstuvwxyzeüë"

```

Danish

20H-2FH: !"#\$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: @ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZæøå
60H-6FH: 'abcdefghijklmnopqrstuvwxyz
70H-7FH: pqrstuvwxyzæøå
80H-8FH:
90H-9FH:
A0H-AFH: !"#\$%&'()*+,-./
B0H-BFH: 0123456789:;<=>?
C0H-CFH: @ABCDEFGHIJKLMNO
D0H-DFH: PQRSTUVWXYZæøå
E0H-EFH: 'abcdefghijklmnopqrstuvwxyz
F0H-FFH: pqrstuvwxyzæøå?

Spanish

20H-2FH: !"#\$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: iABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZññü
60H-6FH: áabcdefghijklmnopqrstuvwxyz
70H-7FH: pqrstuvwxyzéíó
80H-8FH:
90H-9FH:
A0H-AFH: !"#\$%&'()*+,-./
B0H-BFH: 0123456789:;<=>?
C0H-CFH: iABCDEFGHIJKLMNO
D0H-DFH: PQRSTUVWXYZññü
E0H-EFH: áabcdefghijklmnopqrstuvwxyz
F0H-FFH: pqrstuvwxyzéíó?

Swiss

20H-2FH: !"#\$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: \$ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZäçè^
60H-6FH: 'abcdefghijklmnopqrstuvwxyz
70H-7FH: pqrstuvwxyzäöüé
80H-8FH:
90H-9FH:
A0H-AFH: !"#\$%&'()*+,-./
B0H-BFH: 0123456789:;<=>?
C0H-CFH: \$ABCDEFGHIJKLMNO
D0H-DFH: PQRSTUVWXYZäçè^
E0H-EFH: 'abcdefghijklmnopqrstuvwxyz
F0H-FFH: pqrstuvwxyzäöü?

Italian

20H-2FH: !"#\$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: \$ABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZ°çè^
60H-6FH: àabcdefghijklmnopqrstuvwxyz
70H-7FH: pqrstuvwxyzàòèì
80H-8FH:
90H-9FH:
A0H-AFH: !"#\$%&'()*+,-./
B0H-BFH: 0123456789:;<=>?
C0H-CFH: \$ABCDEFGHIJKLMNO
D0H-DFH: PQRSTUVWXYZ°çè^
E0H-EFH: àabcdefghijklmnopqrstuvwxyz
F0H-FFH: pqrstuvwxyzàòèì?

Swedish

20H-2FH: !"#\$%&'()*+,-./
30H-3FH: 0123456789:;<=>?
40H-4FH: éABCDEFGHIJKLMNO
50H-5FH: PQRSTUVWXYZäöå
60H-6FH: éabcdefghijklmnopqrstuvwxyz
70H-7FH: pqrstuvwxyzäöå
80H-8FH:
90H-9FH:
A0H-AFH: !"#\$%&'()*+,-./
B0H-BFH: 0123456789:;<=>?
C0H-CFH: éABCDEFGHIJKLMNO
D0H-DFH: PQRSTUVWXYZäöå
E0H-EFH: éabcdefghijklmnopqrstuvwxyz
F0H-FFH: pqrstuvwxyzäöå?

APPENDIX BD: BAR CODES

Internal Bar Codes

The PPLB supports the following bar codes.

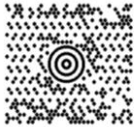
1D Bar Code Type	
Code 128 UCC (shipping container code)	 (01) 2 3456789 012345678 9 Code128-UCC
Code 128 auto	 0123456789012345678 Code128
Code 128 subset A	 123ABC!e _# Code128 subset A
Code 128 subset B	 123ABCabc Code128 subset B
Code 128 subset C	 1234567890 Code128 subset C
UCC/EAN	 (01)23456789012345(67)8 UCC/EAN
Interleaved 2 of 5	 00123456789011 I25

Interleaved 2 of 5 with check sum digit	 0123456789011 I25(with checksum)
Interleaved 2 of 5 with human readable check digit	 001236 I25(with human readable check digit)
German Postcode	 01234.567.890.11 2 German Postcode
Matrix 2 of 5	 012345 Matrix25
UPC Interleaved 2 of 5	 0 12 34567 89012 8 UPC I25
Code 3 of 9	 0123 Code39
Code 3 of 9 with check sum digit	 0123 Code39(With check sum)
Code 93	 012345676 Code93
RSS-14 (GS1 DataBar Omnidirectional)	 (01)3333123456789 1 RSS-14
RSS Limited (GS1 DataBar Limited)	 (01)0001234567890 5 RSS Limited

RSS Stacked (GS1 DataBar Stacked)	 (01)0000089121121 9 RSS Stacked
RSS Truncated (GS1 DataBar Truncated)	 (01)0000089121121 9 RSS Truncated
RSS Stacked Omnidirectional (GS1 DataBar Stacked Omnidirectional)	 (01)0001234567890 5 RSS Stacked Omnidirectional
RSS Expanded (GS1 DataBar Expanded)	 (22)27788 RSS Expanded
EAN-13	 0 123456 789029 EAN-13
EAN-13 2 digit add-on	 0 123456 789012 23 EAN-13(+2)
EAN-13 5 digit add-on	 0 123456 789029 11111 EAN-13(+5)
EAN-8	 0123 4565 EAN-8
EAN-8 2 digit add-on	 0123 4565 78 EAN-8(+2)
EAN-8 5 digit add-on	 0123 4565 78901 EAN-8(+5)

Codabar	 A1234567B Codabar
Postnet	 Postnet
UPC-A	 0 12345 67890 5 UPC-A
UPC-A 2 digit add-on	 0 12345 67890 5 12 UPC-A(+2)
UPC-A 5 digit add-on	 0 12345 67890 5 12345 UPC-A(+5)
UPC-E	 0 012345 7 UPC-E
UPC-E 2 digit add-on	 0 12345 67890 5 12 UPC-E(+2)
UPC-E 5 digit add-on	 0 012345 7 67890 UPC-E(+5)

2D Bar Code Type	
Aztec-Specific Options	 Aztec

Maxi Code	 MAXICODE
PDF-417	 PDF-417
Data Matrix	 Data Matrix
QR Code	 QR Code

APPENDIX BE: DENSITY AND SPEED

PPLB	Command Syntax	WLP-660 WLP-666	WP-660 WP-666	WP-880 WP-888	WL-880 WL-888	I4-240	I4-250	I4-350
Density range	Dp ₁	00~15	00~15	00~15	00~15	00~15	00~15	00~15
Default density		4	7	7	7	8	8	8
Speed range	Sp ₁ (Unit: ips)	2~6	2~7	2~6	2~6	2~6	2~8	2~6
Default speed		5	5	3	3	5	6	5

APPENDIX BF: COMMAND REFERENCE CHART

COMMANDS	DESCRIPTION	WLP series	WL series WP series	I4 series	
A	Print Text	*	*	*	
B	Print Bar Code	*	*	*	
B	RSS-14 Bar Code (GS1 DataBar)	*	*	*	
b	Print 2D Bar Code	*	*	*	
C	Counter	*	*	*	
C	Immediate Cut		*	*	
D	Set Darkness	*	*	*	
EI	Print Soft Font List	*	*	*	
EK	Delete Soft Font	*	*	*	
ES	Download Soft Font	*	*	*	
FE	End Form Store	*	*	*	
FI	Print Form List	*	*	*	
FK	Delete Form	*	*	*	
FR	Execute Form	*	*	*	
FS	Store Form	*	*	*	
f	Adjust Cutting Position		*	*	
GG	Print Graphics	*	*	*	
GI	Print Graphic List	*	*	*	
GK	Delete Graphics	*	*	*	
GM	Store Graphics	*	*	*	
GW	Print Immediate Graphics	*	*	*	
I	Select Symbol Set	*	*	*	
JB/JF	Disable OR Enable Back Feed	*	*	*	
LE	Line Draw by Exclusive OR Operation	*	*	*	
LO	Line Draw by OR Operation	*	*	*	
LW	Draw White Line	*	*	*	
N	Clear Image Buffer	*	*	*	
O	Select Options	*	*	*	
oR	Euro Character	*	*	*	
P	Print Label	*	*	*	
PA	Print Automatically	*	*	*	
Q	Set Label and Gap Length	*	*	*	
q	Set Label Width	*	*	*	
R	Set Origin Point	*	*	*	
S	Set Print Speed	*	*	*	

COMMANDS	DESCRIPTION	WLP series	WL series WP series	I4 series	
TD	Define Date Format	*	*	*	
TS	Set Real Time Clock	*	*	*	
TT	Define Time Format	*	*	*	
U	Print Configuration	*	*	*	
UA	Enable Clear Print Buffer When Media Out/Ribbon Out occurred	*	*	*	
UB	Disable Clear Print Buffer When Media Out/Ribbon Out Occurred	*	*	*	
UE	Soft Fonts Information Through RS232		*	*	
UF	Forms Information Through RS232		*	*	
UG	Graphics Information Through RS232		*	*	
UI	Current Codepage Information Through RS232		*	*	
UM	Memory Allocation And Codepage Information Through RS232		*	*	
UP	Memory Allocation And Codepage Information Through RS232 And Print Configuration		*	*	
UQ	Printer Configuration Through RS232		*	*	
UN/US	Disable/Enable Error Reporting		*	*	
V	Define Variable	*	*	*	
X	Draw Box	*	*	*	
xa	Auto Calibration	*	*	*	
Y	Set Serial Port		*	*	
Z	Set Print Direction	*	*	*	
ZN/ZS	Disable/Enable Flash Memory	*	*	*	
?	Download Variables and Counters	*	*	*	
^@	Reset Printer	*	*	*	
^ee	Immediate Error Report	*	*	*	