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## Part II. Technical User's Guide

### 5. EZ Series Printer General Specification

#### 5.1 EZ-2 Printer General Specification

##### Printer model description:

<b>EZ-2</b>	The 2 inches print width direct thermal label printer. It is suitable for plain paper and label sticker printing. Applications: P.O.S. printer, Electronic Scale printer, Data recorder, Ticket printer...etc.
<b>EZ-2C</b>	EZ-2C plus plain paper cutter. Cutter life expectancy 100,000 cuts.
<b>EZ-2S</b>	EZ-2S plus Auto Label Stripper.(Label on Demand)

##### Printer Specifications:

<b>Dimension</b>	144 W x 215 H x 127 D mm ---With internal label roll 144 W x 215 H x 320 D mm ---With external label roll
<b>Print method</b>	Direct thermal
<b>Max. paper width</b>	2.36" (60 mm)
<b>Max. printing width</b>	2.20" (56 mm)
<b>Max. print speed</b>	2" per second (50.8 mm/Sec)
<b>Dot density</b>	203 dots per inch (8 dots per mm)
<b>Power requirement</b>	Input voltage at AC 13V or DC 18V at min. 3 Amp current.
<b>Barcode symbolic</b>	EAN 8, EAN 13, UPC A, UPC E, Code 39, 93, 128, Codabar, I 2 of 5.
<b>Paper sensor types</b>	1. Plain paper detector. 2. Label gap-sizing detector. 3. Black Line reflect sensor detector. (option)
<b>Print head life</b>	50K meters printing distance when apply on plain thermal paper.
<b>Working Environment</b>	Operating Temperature: 40°F to 104°F (5°C to 40°C) Storage Temperature: -40°F to 140°F (-40°C to 60°C) Humidity: 10% to 90% non condensing, free air

Specifications are subject to change without notice.

#### 5.2 EZ-4 Printer General Specification

##### Printer model description:

<b>EZ-4</b>	The 4 inches print width direct thermal label printer. It is suitable for plain paper and label sticker printing. Applications: P.O.S. printer, Electronic Scale printer, Data recorder, Ticket printer...etc.
<b>EZ-4C</b>	EZ-4C plus plain paper cutter. Cutter life expectancy 100,000 cuts.
<b>EZ-4S</b>	EZ-4S plus Auto Label Stripper.(Label on Demand)

## Printer Specifications:

<b>Dimension</b>	198 W x 215 H x 127 D mm ---With internal label roll 198 W x 215 H x 320 D mm ---With external label roll
<b>Print method</b>	Direct thermal
<b>Max. paper width</b>	4.64" (118 mm)
<b>Max. printing width</b>	4.09" (104 mm)
<b>Max. print speed</b>	2" per second (50.8 mm/Sec)
<b>Dot density</b>	203 dots per inch (8 dots per mm)
<b>Power requirement</b>	Input voltage at AC 13V or DC 18V at min. 5 Amp current.
<b>Barcode symbolic</b>	EAN 8, EAN 13, UPC A, UPC E, Code 39, 93, 128, Codabar, I 2 of 5. EAN8 + add on 2/5, EAN13 + add on 2/5, UPC A/E + add on 2/5.
<b>Paper sensor types</b>	1. Plain paper detector. 2. Label gap-sizing detector. 3. Black line reflect sensor detector. (option)
<b>Print head life</b>	50K meters printing distance when apply on plain thermal paper.
<b>Working Environment</b>	Operating Temperature: 40°F to 104°F (5°C to 40°C) Storage Temperature: -40°F to 140°F (-40°C to 60°C) Humidity: 10% to 90% non condensing, free air

Specifications are subject to change without notice

## 6. Communication Ports Specification

### 6-1. Parallel Interface

Handshake : DSTB to printer and BUSY to host.  
Interface cable : DB25 Male (IBM-PC) 36 position parallel printer cable.  
Pin out : Tabulated below.

PIN NO.	FUNCTION	TRANSMITTER
1	Strobe	host
2-9	Data 0-7	host
10	N/C	printer
11	Busy	printer
12	Paper empty	printer
13	Select	printer
14-16	N/C	
17	Chassis Ground	
18	N/C	
19-30	Signal Ground	
31	N/C	host
32	Fault	printer
33	Signal	ground
34-36	N/C	

#### Serial Interface

Serial port is set at the factory with 9600 baud-rate, no parity, 8 data bits, and 1 stop bit and uses XON/XOFF protocol as well as DSR/CTS. The connector is DB9 female. The pins assignment are listed below.

<b>pin no.</b>	1	2	3	4	5	6	7	8	9
<b>name</b>	+5 v	TxD	RxD	DSR	GND	DTR	N/C	DTR	N/C

## 7. Software Command

### 7.1 Introduction

**There are four basic types of software commands.**

- One-byte only control codes, see table 3.1
- Set up commands, see table 3.2
- Label formatting commands, see table 3.3
- Buffer mode commands, see table 3.4

The commands are expanded from Esc code (decimal 27).

**The commands operate in two modes.**

- In the line mode, the printer acts on the command received immediately. After power on, the printer is in the line mode.
- In the buffer mode, the printer stores the lines of commands for a label into the printer buffer, then prints multiple copies of the label without pause. Only the label formatting commands can be stored into the printer buffer.

Sign	Function	Description
♀	FF (decimal 12)	Form feed
↵	CR (decimal 13)	Carriage Return. This code moves the label to the next line and turn reverse printing off.
	LF (decimal 10)	Line feed

Table 3.1 one-byte control codes

Function	Description	Page
Esc Dn	Set print darkness level.	19
Esc In	Select one of 9 country code character sets.	19
Esc ?n	Select one of 9 barcode types	19
Esc Mnn	Set left margin.	19
Esc Nnn	Set the form feed length (01 to 25 mm) for plain thermal paper printing.	19
Esc On	Adjust the stop position of the label when in strip operation.	20
Esc ON	Disable peeler mode.	20
Esc Qnnn	Set stop position count.	20
Esc qnnn	Set stop position count.	22
Esc an	Set start position. This command is applied for micro-position adjustment.	22
Esc fnn	Forward the paper.	22
Esc Rnn	Back up the paper.	22
Esc Sn	Set print speed.	22
Esc Xn	Set the bar code X dimension	22
Esc xnw	Adjust the narrow bar to wide bar ratio.	22
Esc Fn	Select see through sensor or reflect sensor.	23
Esc C	Cutting paper.	23

Table 3.2 Setup commands

<b>Function</b>	<b>Description</b>	<b>Page</b>
Esc Ahv	Set size of ASCII character or bar code.	23
Esc A0n	Set size of ASCII text.	23
Esc V	Turn on reverse printing.	23
Esc v	Turn off reverse printing .CR also turns off reverse printing.	23
Esc {xxx..}	Treat xx between {xxx..} as bar code and prints human readable characters.	23
Esc lxxx..}	Treat xx between lxxx..} as bar code and suppresses human readable characters.	23
Esc Gnnxx..	Graphics command.	23
Esc Lxxx		24

Table 3.3 Format commands

<b>Function</b>	<b>Description</b>	<b>Page</b>
Esc B	Begin to store data in buffer (buffer size is 30K).	24
Esc E	Flag end of data to be stored in the buffer.	24
Esc Pnn	Set the quantity of labels to print, up to a maximum of 99.	24
Esc pnnn	Set the quantity of labels to print from at least 100 to 999.	24
Esc P00	Allows repeat printing of the same label by pressing the feed button.	24

Table 3.4 Buffer Mode Commands

## 7.2 Command description

### Set up commands

The setup commands must be sent before the buffer mode commands or label formatting commands.

#### 1. Esc Dn

Function : Set the print darkness level.  
Parameter : n = 0 ~ 7 ( 5 is default value)

#### 2. Esc In

Function : Select country code character Sets.  
Parameter : n = 0 ~ 9

	Country Code Character Set
0	US ASCII (8 bits) 256 characters
1	British (7 bits) 128 characters
2	German (7 bits) 128 characters
3	French (7 bits) 128 characters
4	Italian (7 bits) 128 characters
5	Danish (7 bits) 128 characters
6	Spanish (7 bits) 128 characters
7	Swedish (7 bits) 128 characters
8	Swiss (7 bits) 128 characters

#### 3. Esc ?n

Function : Select Bar code type.  
Parameter :

n	Format
1	Code 128B/C
2	Interleaved 2 of 5
3	Code 39 (default)
9	Code 93
K	Codabar
U	UPC A/E, UPC A/E + add on 2/5 (for EZ-4)
E	EAN 8/13, EAN 8/13 + add on 2/5 (for EZ-4)

#### 4. Esc Mnn

Function : Left Margin.  
Parameter : nn = 01~99 millimeters (default value is 03 mm)

#### 5. Esc Nnn

Function : Setting form feed length for plain paper.  
Parameter : nn = 01~25 millimeters

## 6. Esc On

Function : Extra Feed. (Set printer EZ-2S/EZ-4S on peeler mode)

Parameter : n = 1~7

If gap = 2 mm		If gap = 3 mm	
n = 1	8 mm	n = 1	7 mm
n = 2	7 mm	n = 2	6 mm
n = 3	6 mm	n = 3	5 mm
n = 4	5 mm	n = 4	4 mm
n = 5	4 mm	n = 5	3 mm
n = 6	3 mm	n = 6	2 mm
n = 7	2 mm	n = 7	1 mm

This command must follow Esc Qnnn or Esc qnnn.

## 7. Esc ON

Function : Disable peeler mode. (EZ-2S/ EZ-4S)

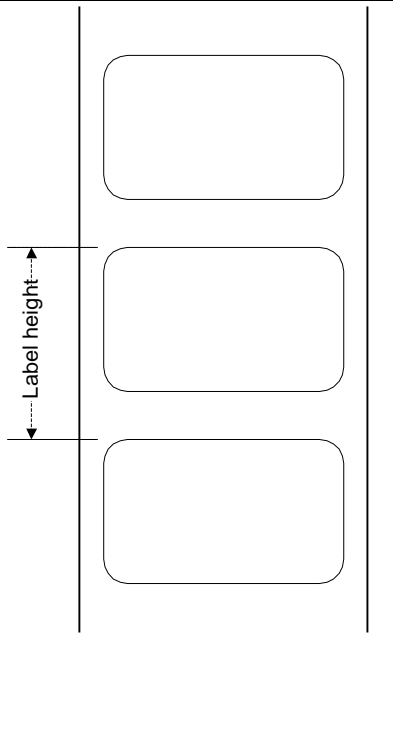
## 8. Esc Qnnn

Function : Set Top-of-form length for label paper or black-mark paper

Parameter : nnn = Q value

### LABEL PAPER:

Label Height	Q Value	Label Height	Q Value
6 mm	Q=004	28 mm	Q=160
7 mm	Q=048	29 mm	Q=152
8 mm	Q=004	30 mm	Q=144
9 mm	Q=024	31 mm	Q=136
10 mm	Q=064	32 mm	Q=128
11 mm	Q=032	33 mm	Q=120
12 mm	Q=004	34 mm	Q=112
13 mm	Q=072	35 mm	Q=104
14 mm	Q=048	36 mm	Q=096
15 mm	Q=024	37 mm	Q=088
16 mm	Q=004	38 mm	Q=080
17 mm	Q=112	39 mm	Q=072
18 mm	Q=096	40 mm	Q=064
19 mm	Q=080	41 mm	Q=056
20 mm	Q=064	42 mm	Q=048
21 mm	Q=048	43 mm	Q=040
22 mm	Q=032	44 mm	Q=032
23 mm	Q=016	45 mm	Q=024
24 mm	Q=004	46 mm	Q=016
25 mm	Q=184	47 mm	Q=008
26 mm	Q=176	48 mm	Q=004
27 mm	Q=168	>=49 mm	Q=384



### BLACK-MARK PAPER:

The width of black strip of the black mark paper must be greater than 4 mm.

The description of the symbols on the drawings--

Z = distance between tear line and the edge of black strip against paper feed direction (in mm).

X = distance between tear line and the edge of black strip from paper feed direction (in mm)

Y = width of black strip (in mm)

RL= distance between two tear lines (your label size length in mm)

**Formula A :  $Q=(46-X-(\text{INT}((46-X)/RL)*RL))*8$**

Use for  $X < 46$  mm and tear line is outside of black strip

INT : integer ; if  $Q \leq 0$ , set  $Q=004$

Example:

RL= 26 mm and X= 6 mm

$Q=(46-6-(\text{INT}((46-6)/26)*26))*8$

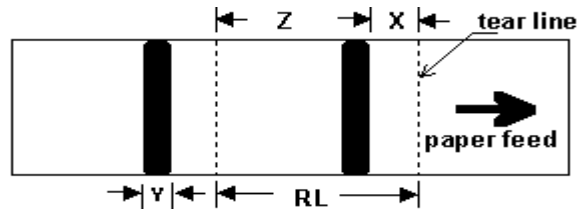
$Q=(46-6-(\text{INT}((40/26)*26))*8$

$Q=(46-6-(1*26))*8$

$Q=(46-6-26)*8$

$Q=14*8$

$Q=112$



**Formula B :  $Q=(46+Z-(\text{INT}+((46-Y+Z)/RL)*RL))*8$**

Use for tear line is inside of black strip or  $X > 46$  mm

Example (1) tear line is inside of black strip

RL=26 mm , Z= 4 mm and Y= 6 mm

$Q=(46+4-(\text{INT}((46-6+4)/26)*26))*8$

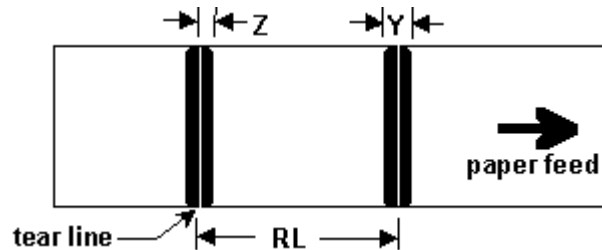
$Q=(46+4-(\text{INT}(44/26)*26))*8$

$Q=(46+4-(1*26))*8$

$Q=(46+4-26)*8$

$Q=24*8$

$Q=192$



Example (2) 75(e)-285..5(pl)-2eple (2) 75(e)-285..5(p4(112)]TJ)0241Æ30-1L6

44332.25

Q= 192



## 9. Esc qnnn

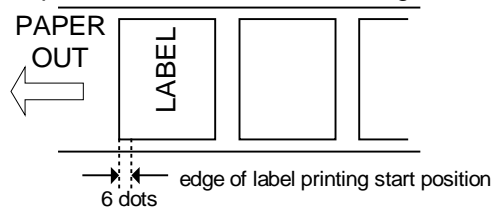
Function : Set Top-of-form length in millimeters.( Included label gap)  
Parameter : nnn = label height  
Example : ←q027 (Real label length is 25 mm, label gap is 2 mm, so control code is 027.)

## 10. Esc an

Function : Micro position adjustment.  
Parameter : n = 0~7

n	Value (dot)
0	0
1	2
2	4
3	6
4	8
5	10
6	12
7	14

Example : ←a3 (Printing start position will be 6 dots from edge of label)



## 11. Esc fnn

Function : Forward label.  
Parameter : nn = 01~29 millimeters (The distance from print head line to label tear bar is 24 mm.)

## 12. Esc Rnn

Function : Back up label.  
Parameter : nn = 01~29 millimeters

## 13. Esc Sn

Function : Set print speed.  
Parameter : n=1;1 inch per second  
n=2 ;2 inches per second

## 14. Esc Xn

Function : Bar code X dimension (width).  
Parameter : n = 2 ~ 4 ( 2 is default value)

n = 2	2 dot X dimension(default)
n = 3	3 dot X dimension
n =4	4 dot X dimension

## 15. Esc xnw

Function : Narrow bar to wide bar ratio.  
Parameter : n (narrow) = 2 ~ 4  
w (wide) = 4 ~ 12

## 16. Esc Fn

Function : Select see through sensor or reflect sensor  
Parameter : n=0 select see through sensor (default)  
              n=1 select reflect sensor

## 17. Esc C

Function : Cutting paper  
Parameter : none

## Label formatting Command

### 1. Esc Ahv

Function : Set size of ASCII character or bar code; A11:16x26 dot  
Parameter : h (horizontal expansion) = 1 ~ 4 (1 is default)  
              v (vertical expansion) = 1 ~ 8 (1 is default)

### 2. Esc A0n

Function : Set size of ASCII text.  
Parameter : n = 0 ~ 4

n	Size
0	1 x Vertical expansion (8x10 dot)
1	1 x Vertical expansion bolded
2	2 x Vertical expansion bolded
3	3 x Vertical expansion bolded
4	2 x Vertical 2x horizontal expansion

### 3. Esc V

Function : Turn on text highlight printing.  
Parameter : none

Normal	Highlight
TEXT	<b>TEXT</b>

### 4. Esc v

Function : Turn off text highlight printing  
Parameter : none

### 5. Esc {XXX...}

Function : Bar code with human readable.  
Parameter : xxx... = barcode data

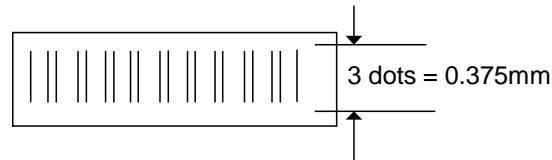
### 6. Esc !XXX...}

Function : Bar code without human readable.  
Parameter : xxx... = barcode data

### 7. Esc Gnnxxx

Function : Graphics command.  
Parameter : nn = number of graphic bytes  
              xx..= the data represent one line of graphic pattern, each x is 8 bits  
                  binary data (1= black, 0= white)  
Example : ←G10AAAAAAAAAA ("A" ASCII code is 0X41 binary 01000001)  
              ←G10AAAAAAAAAA  
              ←G10AAAAAAAAAA

Print result :



## 8. Esc Lxxx

Function : Graphics command.

Parameter : xx.= the data represent one line of graphic pattern, each x is 8 bits binary data (1= black, 0= white); always 104 bytes.

Example :     |← 104 BYTES →|  
          ← LAAAAA.....AAA  
          ← LAAAAA.....AAA  
          ← LAAAAA.....AAA  
          ← LAAAAA.....AAA  
              :  
              :

## Buffer mode Command

The buffer mode starts when the printer receives the buffer mode begin command Esc B. In the buffer mode the printer stores the lines of commands for a label into the printer buffer, then prints multiple copies of the label without pause. Only the label formatting commands can be stored into the printer buffer.

### 1. Esc B

Function : Begin to Store data in buffer.

### 2. Esc E

Function : Ending of buffer mode.

### 3. Esc Pnn

Function : Set the quantity of labels to print. **Do not send** a CR/LF at the end of the command.

Parameter : nn = 01~99

### 4. Esc pnnn

Function : Set the quantity of labels to print. **Be sure to send** a CR/LF at the end of the command.

Parameter : nn = 100~999

### 5. Esc P00

Function : Allow repeat printing of the same label by pressing the feed button. If you use strip function, this command can re-print the same label by removing the loose label detected by the sensor.

Example :   ←B←S2←D5←Q128←?3←M18←A12—TEST↵  
              ←{1234}↵  
              ←M28\$100.00↵  
              ←E←P00

## 7.3 Examples

### 1. Using label paper

DOS command: COPY TEST1.DAT PRN

Esc label page size speed darkness barcode (code 39) text or barcode size  
←Q176 ←S2←D5←?3←A12←M18--code39-- ↵  
←{1234} ↵ Carriage Return  
←M28\$100.00 ↵ data  
♀ left margin  
♀ form feed



### 2. Using buffer mode

DOS command: COPY TEST2.DAT PRN

←B←D5←S2←Q176←?3 ←M18←A12-- code39 -- ↵  
←{1234} ↵  
←M28\$100.00 ↵  
←E←P10



### 3. Using cutter

DOS command: COPY TEST3.DAT PRN

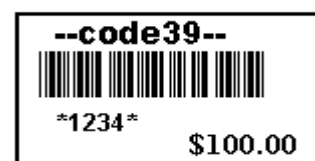
←N10←?3←M18←A12—code39 -- ↵  
←{1234} ↵  
←M28\$100.00 ↵  
♀  
←C



### 4. Using peeler

DOS command: COPY TEST4.DAT PRN

←B←S2←D5←Q176←O3←?3←M18←A12-- code39 -- ↵  
←{1234} ↵  
←M28\$100.00 ↵  
←E←P10



### 5. Text highlight

←N15←S2←D5←?3←M18←{1234} ↵  
←V←M18TEXT←v ↵  
♀



## 6. Using black-mark paper

DOS command: COPY TEST5.DAT PRN

←F1←Q992 /\* remark F1 and Q992 command is gobble command \*/

←S2←D7 /\* remark S2 and D7 command is gobble command \*/

♀

←M07←A11PAYMENT TIME ↵

←M07←A22 10:20 AM ↵

←M07←A11FEE PAID ↵

←M07←A22 \$ 12.50 ↵

←M07←A11DEPARTURE TIME ↵

←M07←A22 02:20 PM ↵

♀

PAYMENT TIME <b>10:20 AM</b> FEE PAID <b>\$ 12.50</b> DEPARTURE TIME <b>02:20 PM</b>
---

## 7. C sample program to test the printer with Black line sensor.

```
#include <stdio.h>
#define FORMFEED      12
main()
{
    printf("\n\n PM-202 test  \n\n");
    printf("Initial Step: set the Q value\n");
    printf("Press a key to start\n");
    getchar();

    fprintf(stdprn,"%c%s",27,"F1");
    fprintf(stdprn,"%c%s",27,"Q992");
    fprintf(stdprn,"%c",FORMFEED);
    fprintf(stdprn,"%c%s",27,"S2");
    fprintf(stdprn,"%c%s",27,"D7");
    do{
        printf("Print label...\n");
        printf("Press a key to start\n");
        printf("Press ctrl-break to quit\n");
        getchar();
        fprintf(stdprn,"%c%s",27,"M07");
        fprintf(stdprn,"%c%s",27,"A11");
        fprintf(stdprn,"%s%c","PAYMENT TIME",'\n');
        fprintf(stdprn,"\n");
        fprintf(stdprn,"%c%s",27,"A22");
        fprintf(stdprn,"%s%c","10:20 AM",'\n');
        fprintf(stdprn,"%c",FORMFEED);
    }while(1);
}
```

## Appendix A. Printer Character set

U.S. ASCII 8 bit

(IBM compatible)

0	☐	☺	☹	♥	♦	♣	♠	●	◻	○	◼	♂	♀	♪	♫	☀
16	▶	◀	↕	!!	¶	§	■	↕	↑	↓	→	←	↔	▼	▲	
32		!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/
48	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
64	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
80	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
96	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
112	p	q	r	s	t	u	v	w	x	y	z	{		}	~	␣
128	Ç	Ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
144	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	¢	£	¥	₪	ƒ
160	á	í	ó	ú	ñ	Ñ	␣	¿	¬	¬	½	¼	¡	«	»	
176	☐	☐	☐													
192	L	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥
208	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥
224	α	β	Γ	π	Σ	σ	μ	γ	Φ	θ	Ω	δ	∞	∅	ε	∩
240	≡	±	≥	≤	∫	∫	÷	≈	○	●	●	√	n	²	▪	z <sub>3</sub>