

SPECIFICATIONS FOR APPROVAL

CUSTOMER :
NOMENCLATURE : **2 inch Panel printer**
MODEL : **SPP-100**

SIGNATURE OF APPROVAL

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The Designs or Specifications are subject to change without notice

REVISION SHEET

REV.	Sheet	Changed contents
A		Update of specification due to the modification of the board
B		Update of specification
Title		
SPP-100 Specification (Standard)		

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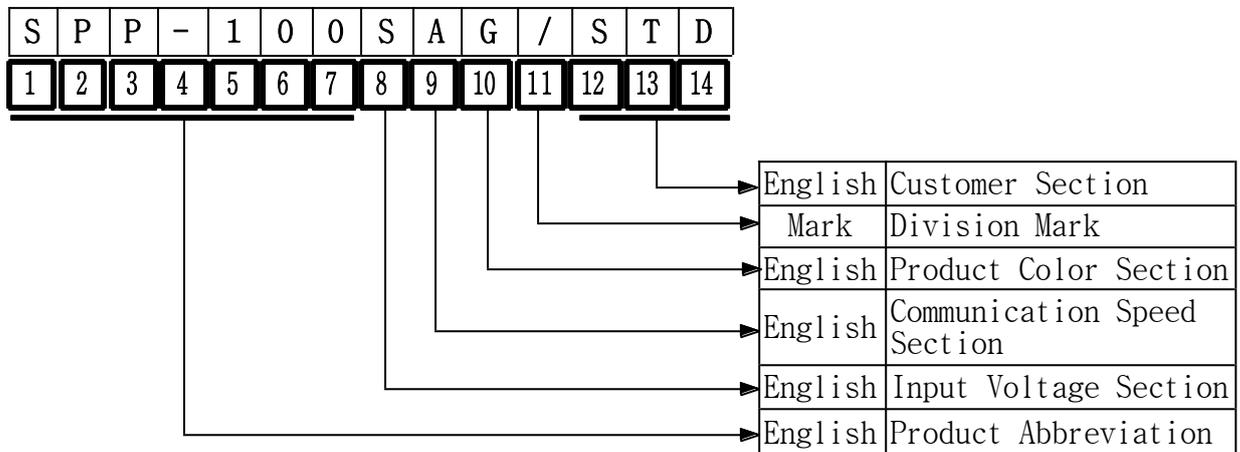
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1. GENERAL SPECIFICATIONS

1.1 Model name



- 1) Digit 1~7: Product Abbreviation “SPP-100”
- 2) Digit 8: Input Voltage Section

Mark	Input Voltage	Product Abbreviation
H	DC 8.5V	SPP-100H
S	DC 7.2V	SPP-100S
L	DC 5.0V	SPP-100L

- 3) Digit 9: Communication speed section

Mark	Communication speed	표기	Communication speed
A	9,600bps	F	4,800bps
B	19,200bps		
C	38,400bps		
D	57,600bps		
E	115,200bps		

- 4) Digit 10: Product Color section

Mark	Product Color	Product Abbreviation
	Ivory	ex) SPP-100HA
G	Dark Gray	ex) SPP-100SAG

- 5) Digit 11: Division Mark “/”
- 6) Digit 12~14: Three code for distinction of customer option or customer name
if there is no specific type, it will be skipped

1.2 Printing Specifications

- 1) Printing method: Thermal line printing
- 2) Dot density: 203 dpi X 406 dpi
- 3) Printing direction: Unidirectional with friction feed
- 4) Printing width: 48 mm (1.89"), 384 dot positions
- 5) Characters per line: Thermal paper: 32 character(default),42 character
- 6) Character spacing (default): 0.25 mm (.01")(2 dots)(font A, font B)
Programmable by control commands.
- 7) Printing speed: Approximately 16 lines/second
(duty 12.5%)
Max 60 mm/second
Printing speed may be slower, depending on the data transmission speed and combination of control commands.
- 8) Paper feeding speed: Approximately 62 mm/second
- 9) Line spacing (default): 0.75 mm

1.3 Character Specifications

- 1)Number of characters: Alphanumeric characters: 95
International characters: 12
Expanded graphic characters : 128
- 2)Character structure: Font A: 12 X 24 (including horizontal 2-dot spacing)
Font B: 9 X 24 (including horizontal 2-dot spacing)
Font A is selected as the default.
- 3)Character size: 1.25 mm (.05") X 3.0 mm (.12")(W X H)(font A)
0.875 mm (.03") X 3.0 mm (.12")(W X H)(font B)

Table 1.2.1 Character Size

	Standard		Double-height		Double-width		Quadruple-size	
	W X H (mm)	CPL	W X H (mm)	CPL	W X H (mm)	CPL	W X H (mm)	CPL
Font A 12X24	1.25 X 3 (.05"X.12")	32	1.25 X 6 (.05"X.24")	32	2.5 X 3 (1" X.12")	16	2.5 X 6 (1" X.24")	16
Font B 9X24	0.875 X 3 (.03"X.12")	42	0.875 X 6 (.03"X.24")	42	1.75 X 3 (.06"X.12")	21	1.75 X 6 (.06"X.24")	21

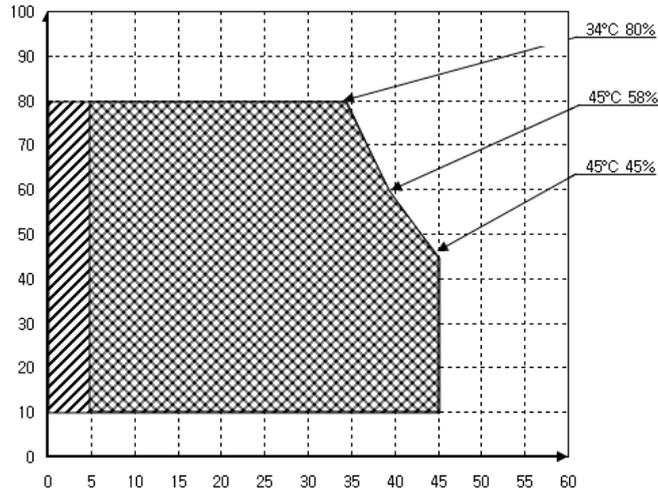
Space between characters is not included.

Characters can be scaled up to 2 times large as the standard sizes.

CPL = Characters Per Line.

1.8 Environmental conditions

- 1)Temperature: Operating: 0°C to 45°C
 Storage: -20°C to 60°C (no condensation)
- 2)Humidity: Operating: 10% to 80% RH
 Storage: 90% RH



 Printing quality is guaranteed
 +  Printer can be operated

Figure. Operating Temperature and Humidity Range

- 3)Vibration resistance: When packed: Frequency: 5 to 100 Hz
 Acceleration: 2 G
 Sweep: 5 minutes (half cycle)
 Duration: 1 hour
 Directions: x, y, and z
 No external or internal damage should be found after the vibration test, and the unit should operate normally.
- 4)Impact resistance: When packed: Package: Samsung standard package
 Height: 90 cm (35.43")
 Directions: 1 corner, 3 edges, and 6 surfaces
 No external or internal damage should be found after the drop test, and the unit should operate normally.
 When unpacked: Height 5cm (1.97")
 Direction: Lift one edge and release it (for all 4 edges).
 A printer that is not currently printing should not be damaged after it is dropped.
- 5)Acoustic noise: Operating: Approximately 50 dB (bystander position)

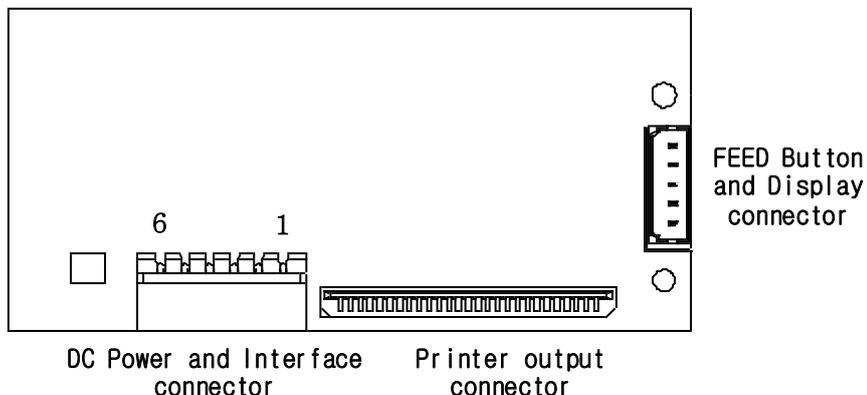
1.9 Installation

The SPP-100 must be installed horizontally or intuitively.

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2. CONFIGURATION

2.1 MAIN PCB Layout



2.2 DC Power and Interface

2.2.1 Connector

- 1) Specification : 2.5mm pitch 6pin Right angle connector
(YMAW025-06R : www.yeonho.com)
- 2) PIN layout

Pin NO	Signal Name	Function
1	VIN	Input voltage
2	RTS	1)When RTS/CTS control is selected, this signal indicates whether the printer is busy. SPACE indicates that the printer is ready to receive data, and MARK indicates that the printer is busy.
3	RXD	Receive data
4	CTS	This signal indicates whether the host computer can receive data. SPACE indicates that the host computer can receive data, and MARK indicates that the host computer cannot receive data. When DTR/DSR control is selected, the printer transmits data after confirming this signal
5	TXD	Transmit data
6	GND	Signal ground

2.2.2 DC Power

- 1) Input voltage: Rating; SPP-100H: DC8.5V
SPP-100S: DC7.2V
SPP-100L: DC5.0V
- 2) Logic voltage: 5VDC (Regulated automatically)

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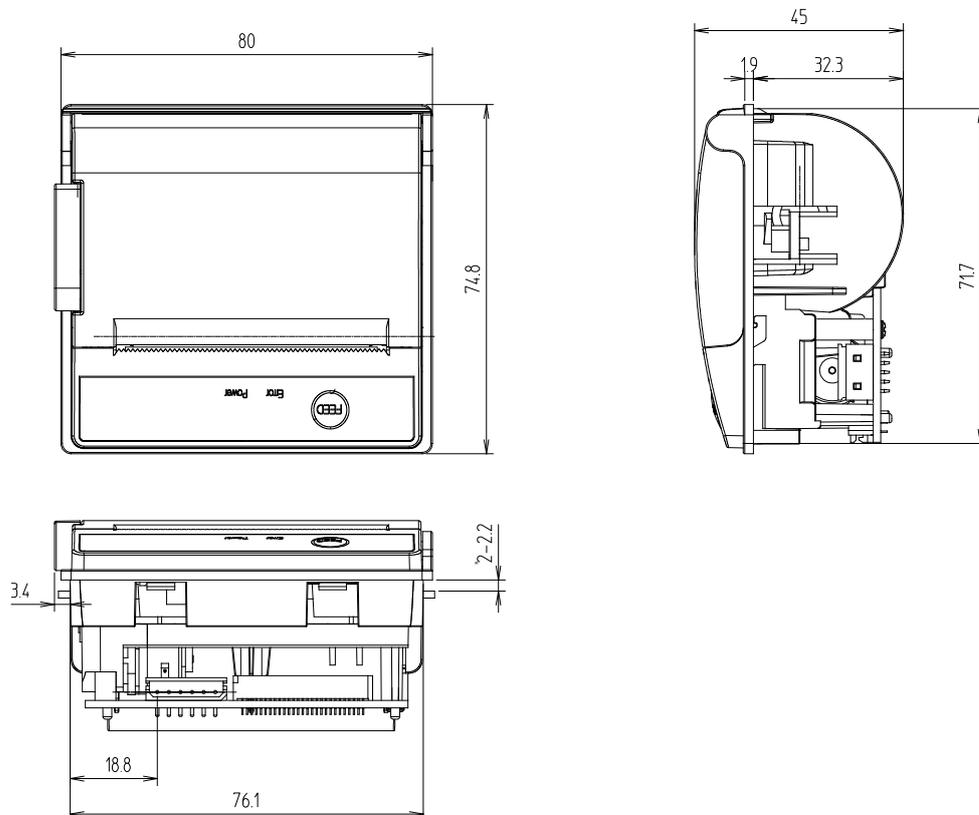
2.2.3 Serial interface (compatible with RS-232)

Data transmission: Serial
Synchronization: Asynchronous
Handshaking: **Hardware : DTR/DSR, RTS/CTR**
Software : Xon/Off (options)
Signal levels: MARK = -3 to -15 V: Logic 1/OFF
SPACE = +3 to +15 V: Logic 0/OFF
Baud rates: 4800, 9600, 19200, 38400, 57600, 115200bps
Data word lengths: 8 bits
Parity settings: None
Stop bits: 1

- NOTES:** 1. Handshaking and baud rate depend on Hardware Settings.
(option, Change available)
2. Data transmitted from the printer has 1 stop bit (fixed).

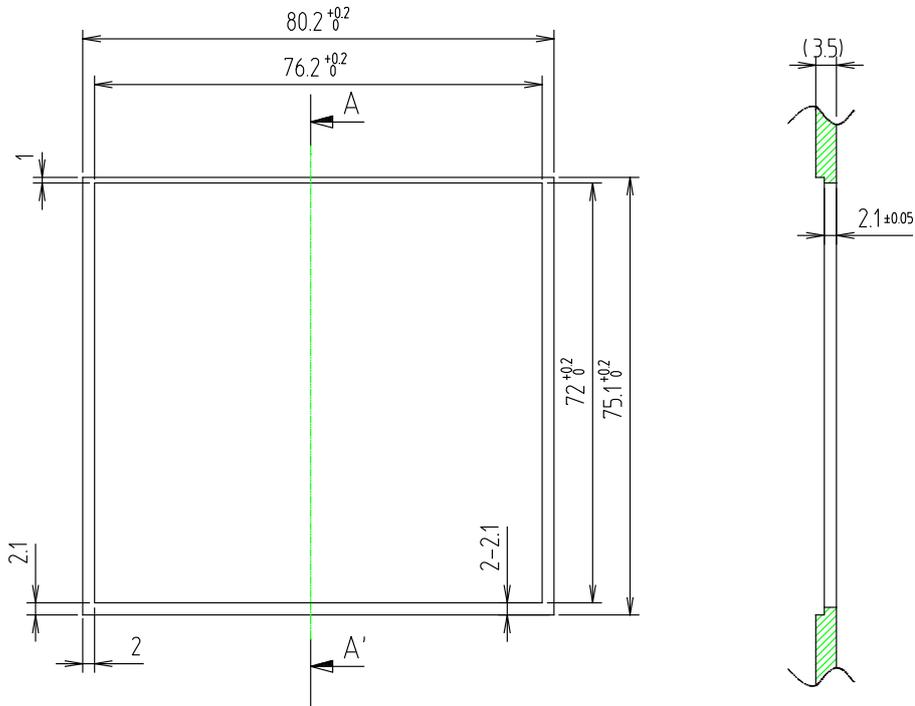
2.3 CASE Specification

2.3.1 Printer overall dimensions



2.3.2 Printer mounting method

2.3.2.1 User side dimension guide

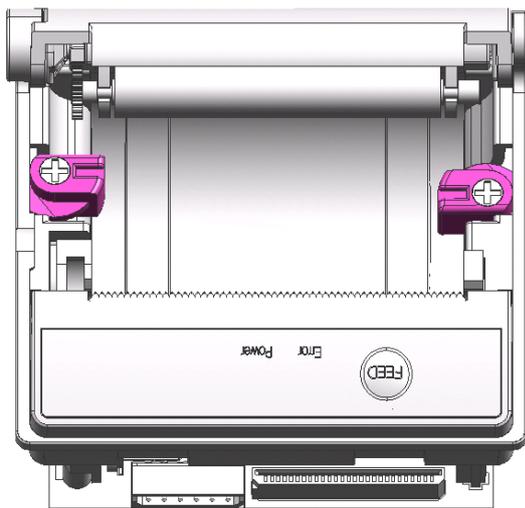


SECTION A-A'

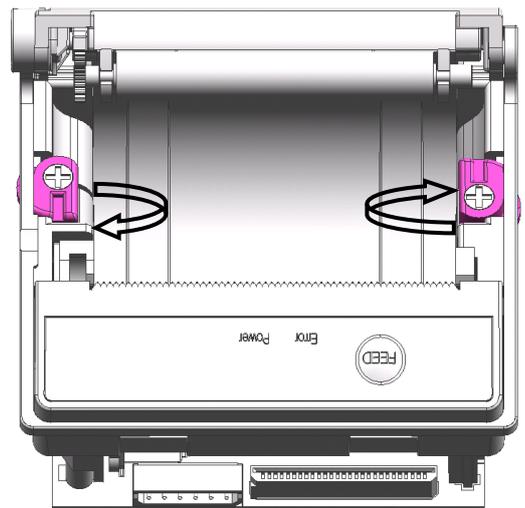
2.3.2.2 Mounting flow chart

Open Lever Lock L and R on the papers basket, install SPP-100 to the set and turn Lever lock L and R to lock.

1) Lever lock L/R Open



2) Lever lock L/R Locking



3. FUNCTION

3.1 FEED Button and Display

3.1.1 Feed Button : Non-locking push button

Press the FEED button once to advance paper one line.

You can also hold down the FEED button to feed paper continuously.

3.1.2 Power LED : GRN

ON : Power is supplied to the printer and On Line status.

OFF: Power is not supplied to the printer.

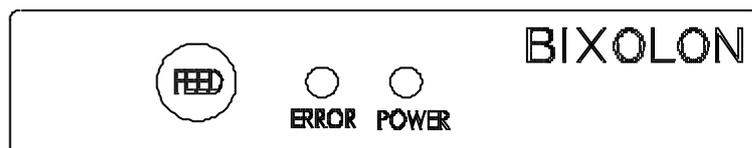
3.1.3 Error LED : RED

OFF: Normal condition

ON : Error mode

Blinking: Paper empty detected and thermal head overheating.

3.1.4 FEED Button and Display Layout



3.2 Character Code Tables

3.2.1 Page 0 (FARSI)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	۰ 128	ا 144	خ 160	۰ 176	ل 192	ظ 208	ک 224	ک 240
1	0001	۱ 129	ب 145	ح 161	۰ 177	ل 193	ع 209	ل 225	ل 241
2	0010	۲ 130	ب 146	د 162	۰ 178	ل 194	ع 210	لا 226	لا 242
3	0011	۳ 131	ب 147	ذ 163	۰ 179	ل 195	ع 211	ل 227	ل 243
4	0100	۴ 132	پ 148	ر 164	۰ 180	ل 196	ع 212	م 228	م 244
5	0101	۵ 133	پ 149	ز 165	۰ 181	ل 197	ع 213	م 229	م 245
6	0110	۶ 134	ت 150	ث 166	۰ 182	ل 198	ع 214	ن 230	ن 246
7	0111	۷ 135	ت 151	س 167	۰ 183	ل 199	ع 215	ن 231	ن 247
8	1000	۸ 136	ث 152	س 168	۰ 184	ل 200	ع 216	و 232	و 248
9	1001	۹ 137	ث 153	ش 169	۰ 185	ل 201	ع 217	ه 233	ه 249
A	1010	۰ 138	ج 154	ش 170	۰ 186	ل 202	ع 218	پ 234	پ 250
B	1011	۰ 139	چ 155	ص 171	۰ 187	ل 203	ع 219	ق 235	ه 251
C	1100	؟ 140	چ 156	ص 172	۰ 188	ل 204	ع 220	ی 236	ی 252
D	1101	آ 141	چ 157	ض 173	۰ 189	ل 205	ع 221	ک 237	ی 253
E	1110	ک 142	ح 158	ض 174	۰ 190	ل 206	ع 222	ک 238	پ 254
F	1111	۶ 143	ح 159	ط 175	۰ 191	ل 207	ع 223	ک 239	۰ 255

3.2.2 page 1 (katakana)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	— 128	⊥ 144	SP 160	— 176	タ 192	ミ 208	ニ 224	× 240
1	0001	— 129	⊥ 145	° 161	ア 177	チ 193	ム 209	ト 225	円 241
2	0010	— 130	⊥ 146	┌ 162	イ 178	ツ 194	メ 210	キ 226	年 242
3	0010	■ 131	⊥ 147	┐ 163	ウ 179	テ 195	モ 211	コ 227	月 243
4	0100	■ 132	— 148	、 164	エ 180	ト 196	ヤ 212	▲ 228	日 244
5	0101	■ 133	— 149	・ 165	オ 181	ナ 197	ユ 213	▼ 229	時 245
6	0110	■ 134	┌ 150	ヲ 166	カ 182	ニ 198	ヨ 214	▼ 230	分 246
7	0111	■ 135	┌ 151	ア 167	キ 183	ヌ 199	ラ 215	▼ 231	秒 247
8	1000	┌ 136	┌ 152	イ 168	ク 184	ネ 200	リ 216	♠ 232	〒 249
9	1001	┌ 137	┐ 153	ウ 169	ケ 185	ノ 201	ル 217	♥ 233	市 249
A	1010	┌ 138	┐ 154	エ 170	コ 186	ハ 202	レ 218	◆ 234	区 250
B	1011	┌ 139	┐ 155	オ 171	サ 187	ヒ 203	ロ 219	♣ 235	町 251
C	1100	┌ 140	┐ 156	ヤ 172	シ 188	フ 204	フ 220	● 236	村 252
D	1101	┌ 141	┐ 157	ユ 173	ス 189	ヒ 205	ン 221	○ 237	人 253
E	1110	┌ 142	┐ 158	ヨ 174	セ 190	ホ 206	・ 222	／ 238	■ 254
F	1111	┌ 143	┐ 159	ツ 175	ソ 191	マ 207	・ 223	＼ 239	SP 255

3.2.3 page 2 (pc850 : multilingual)

HEX	HEX BIN	8 1000	9 1001	A 1010	B 1011	C 1100	D 1101	E 1110	F 1111
0	0000	Ç 128	É 144	á 160	■ 176	Ł 192	š 208	Ó 224	— 240
1	0001	ü 129	æ 145	í 161	■ 177	± 193	Đ 209	β 225	± 241
2	0010	é 130	Æ 146	ó 162	■ 178	⊥ 194	É 210	Ô 226	= 242
3	0010	â 131	ô 147	ú 163	179	⊥ 195	Ě 211	Ò 227	3/4 243
4	0100	ä 132	ö 148	ñ 164	⊥ 180	— 196	È 212	ō 228	244
5	0101	à 133	ò 149	Ñ 165	Á 181	+ 197	i 213	Õ 229	§ 245
6	0110	á 134	û 150	ª 166	Â 182	ã 198	f 214	u 230	÷ 246
7	0111	ç 135	ù 151	º 167	À 183	Ã 199	î 215	þ 231	· 247
8	1000	ê 136	ÿ 152	¿ 168	© 184	Ł 200	ï 216	p 232	° 249
9	1001	ë 137	ö 153	® 169	≡ 185	ƒ 201	⌋ 217	Ú 233	¨ 249
A	1010	è 138	Ü 154	¬ 170	186	⊥ 202	⌈ 218	Û 234	· 250
B	1011	ï 139	ø 155	1/2 171	⌈ 187	⊥ 203	■ 219	Ù 235	¹ 251
C	1100	î 140	£ 156	1/4 172	⌋ 188	⌈ 204	■ 220	ý 236	³ 252
D	1101	ì 141	Ø 157	ı 173	¢ 189	= 205	ı 221	Ý 237	² 253
E	1110	Ä 142	X 158	« 174	¥ 190	† 206	ı 222	— 238	▪ 254
F	1111	Å 143	f 159	» 175	⌈ 191	⊗ 207	■ 223	´ 239	SP 255

3.2.5 International character set

Country	ASCII code (hexadecimal)												
	Hex	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
	Dec	35	36	64	91	92	93	94	96	123	124	125	126
U.S.A.	#	\$	@	[\]	^	`	{		}	~	
France	#	\$	à	°	ç	§	^	`	é	ù	è	"	
Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß	
U.K.	£	\$	@	[\]	^	`	{		}	~	
Denmark I	#	\$	@	Æ	ø	Å	^	`	æ	ø	å	~	
Sweden	#	☐	É	Ä	Ö	Å	Ü	è	ä	ö	å	ü	
Italy	#	\$	@	°	\	é	^	ù	à	ò	è	ì	
Spain	Pt	\$	@	¡	Ñ	¿	^	`	"	ñ	}	~	
Norway	#	☐	É	Æ	ø	Å	Ü	è	æ	ø	å	ü	
Denmark II	#	\$	É	Æ	ø	Å	Ü	è	æ	ø	å	ü	

3.3 COMMENTS

The commands listed in the table below are available for control of the printer.

3.3.1. command

Command	Name	Command Classification		Standard Mode
		Execution	Setting	
HT	Horizontal tab	○		○
LF	Print and line feed	○		○
CR	Print and carriage return	○		○
ESC STX	Print Trend data	○		
ESC SP	Set right-side character spacing		○	○
ESC !	Select print mode(s)		○	○
ESC \$	Set absolute print position	○		○
ESC *	Select bit-image mode	○		○
ESC -	Turn underline mode on/off		○	○
ESC 2	Select 1/6-inch line spacing		○	○
ESC 3	Set line spacing		○	○
ESC 8	Print graph image (wave 25mm,Speed)	○	○	
ESC =	Select peripheral device		○	○
ESC @	Initialize printer	○	○	○
ESC D	Set horizontal tab positions		○	○
ESC E	Turn emphasized mode on/off		○	○
ESC J	Print and feed paper	○		○
ESC R	Select an international character set		○	○
ESC V	Turn 90 clockwise rotation mode on/off		○	○
ESC \	Set relative print position	○		○
ESC a	Select justification			○
Esc c 5	Enable/disable panel feed buttons		○	○
Esc d	Print and feed paper n lines	○		○
Esc t	Select character code table		○	○
Esc {	Turn upside-down printing mode on/off		○	○
GS !	Select character size	○		(○)
GS :	Start/end macro definition	○	○	○
GS B	Turn white/black reverse printing mode on/off		○	○

Command	Name	Command Classification		Standard Mode
		Execution	Setting	
GS H	Select printing position of HRI characters		○	○
GS L	Set let margin		○	(○)
GS P	Set vertical and horizontal motion unite		○	○
GS W	Set printing area width		○	(○)
GS ^	Execute macro	○	○	○
GS f	Select font for HRI characters		○	○
GS h	Set bar code height	○		○
GS k	Print bar code	○		●
GS v	Print raster bit image			○
GS w	Set bar code width		○	○

Command classification

Executing: Printer executes the command, which does not affect the following data.

Setting: Printer uses flags to make setting, and those setting affect the following data.

Standard mode

- : Enabled
- (○): Enabled only when the command is used at the beginning of a line.
- : Enabled only when data is not present in the buffer.
- X: Disable

3.3.2. Command notation

XXXX Command

[Name]	The name of the command.
[Format]	The code sequence. ASCII indicates the ASCII equivalents. Hex indicates hexadecimal equivalents. Decimal indicates the decimal equivalent. []k indicates the contents of the [] should be repeated k times.
[range]	Gives the allowable ranges for the parameters.
[Description]	Describes the function of the command.
[Notes]	Provides important information on setting and using the printer command, if necessary.
[Default]	Gives the default values, if any, for the command parameters.
[Reference]	Lists related commands.
[Example]	Provides examples using the command.

The numbers followed by H are hexadecimal

The numbers followed by B are binary.

The numbers denoted by () are decimal.

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3.3.3. Term Definitions

The terms used in the command descriptions in this section are:

1) Term Definitions

The receive buffer is used to store data from the host computer. All received data is stored in this buffer processed in the order received.....

2) Print buffer

The print buffer is used to store image data for printing.

3) Print buffer–full state

The print buffer–full state occurs when the print buffer becomes full. If data is received in standard mode when the print buffer is full, the printer prints the data in the buffer and feeds one line automatically. This functions in the same way as the LF command (print and line feed). If data is received in page mode when the buffer is full, the printer moves the print position to the beginning of the next line and processes the preceding data.

4) Beginning of the line

The beginning of the line indicates the following conditions:

No data (including spaces skipped by **HT**) has been received in the current print buffer.
The print position has not been specified by **ESC \$** or **ESC /**

5) Printable area

This is the maximum printable area specified for the STP100S/STP100P.

The printable areas for this printer are as follows:

(Unit: Inch)

	thermal papers
The length in the horizontal direction	384/203

6) Printing area

This is the printing area specified by command (**ESC W**, **GS L**, or **GS W**). The printing area should be equal to or smaller than the printable area.

7) Ignoring

This is the printer status in which the printer does nothing after receiving all codes, including parameters.

8) Inch

This is the measurement unit used for length. 1 inch = 25.4mm

9) MSB

Most significant Bit.

10) LSB

Least Significant Bit

3.3.4 Exception Processing

1) Undefined codes

If a code which has not been defined as a command within 32bytes listed as 00H(decimal 0) through 1FH(decimal 31) in the character code tables is sent from the host computer, the undefined byte (1 byte) is ignored, and the printer continues to process the next byte of information.

Example: If the data sequence 30H(48) 32H(50) 03H(3) 32H(50) 0AH(10) 33H(51) is sent from the host computer, 03H(3) is ignored, and the data is processed as if the sequence 30H(48) 31H(49) 32H(50) 0AH(10) 33H(51) had been received (0AH has been defined as the **LF** command).

2) Undefined commands

If data that follows an ESC [1BH(27) or GS[10H(29)] code is not defined as a command, ESC or GS and the following code (a total of 2 bytes) are ignored.

Example: If the data sequence 30H(48) 1BH(27) 22H(34) 31H(49) 32H(50) is received, 1BH(27) 22H(34) is ignored as an undefined code, and the data is processed as if the sequence 30H(48) 31H(49) 32H(50) had been received.

3) Out-of-range parameter values

For commands in which a parameter value range is defined and a value sent to the printer is outside of the defined range, the command is ignored and the previously set value does not change. Normally, processing of commands with multiple parameters is terminated if a parameter outside of the defined range is encountered; the subsequent data is processed normally.

Example: if the data sequence 1BH(27) 52H(82) 15H(21) is sent from the host computer, 1BH(27) 52H(82) (**ESC R**) is a valid code, but the argument 15H(21) is outside the defined range. Therefore, the printer ignores the code sequence and does not change the previous setting for the international character set

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3.3.5 Control commands

HT

[Name]	Horizontal tab	
[Format]	ASCII	HT
	Hex	09
	Decimal	9
[Description]	Moves the print position to the next horizontal tab position.	
[Notes]	This command is ignored unless the next horizontal tab position has been set. If the next horizontal tab position exceeds the printing area, the printer sets the printing position to [printing area width + 1]. Horizontal tab positions are set with ESC D . If this command is received when the printing position is at [printing area width + 1], the printer executes print buffer-full printing of the current line and horizontal tab processing from the beginning of the next line.	
[Reference]	ESC D	

LF

[Name]	Print and line feed	
[Format]	ASCII	LF
	Hex	0A
	Decimal	10
[Description]	Prints the data in the print buffer and feeds one line based on the current line spacing.	
[Note]	This command sets the print position to the beginning of the line.	
[Reference]	ESC2, ESC3	

CR

[Name]	Print and carriage return.	
[Format]	ASCII	HT
	Hex	0D
	Decimal	13
[Description]	When automatic line feed is enabled, this command functions the same as LF ; when automatic line feed is disabled, this command is ignored.	

ESC STX

[Name] Print Trend data

[Format] ASCII ESC STX
Hex 1B 01
Decimal 27 01

[Range]

[Description] Print Trend data

[Notes] ● This command is malfunctioning if graphic trend image has not been defined.
● If a graphic trend image exceeds the trend image buffer(384 bytes), excess data is not printed at the same time and excess data is considered as other commands.
● This command is not affected by print modes (emphasized, underline, etc)

[Default]

[Reference] ESC 4

ESC SP n

[Name] Set right-side character spacing

[Format] ASCII ESC SP *n*
Hex 1B 20 *n*
Decimal 27 32 *n*

[Range] $0 \leq n \leq 255$

[Description] Sets the character spacing for the right side of the character to [*n* × horizontal or vertical motion units].

[Notes] ● The right-side character spacing for double-width mode is twice the normal value. When the characters are enlarged, the right-side character spacing is *n* times the normal value.
● This command sets values independently in each mode (standard and page modes).
● The horizontal and vertical motion unit are specified by GS P. Changing the horizontal or vertical motion unit does not affect the Current right-side spacing.
● The GS P command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.
● In standard mode, the horizontal motion unit is used.
● In page mode, the horizontal or vertical motion unit is differs. Depending on the starting position of the printable area as follows:
① When the starting position is set to the upper left or lower right of the printable area using ESC T, the horizontal motion unit (*x*) is used.
② When the starting position is set to the upper right or lower left of the printable area using ESC T, the vertical motion unit (*y*) is used.
● The maximum right-side spacing is 255/180 inches. Any setting

exceeding the maximum is converted to the maximum automatically.

[Default] n = 0
 [Reference] **GS P**

ESC ! n

[Name] Select print mode(s)

[Format] ASCII ESC ! n
 Hex 1B 21 n
 Decimal 27 33 n

[Range] $0 \leq n \leq 255$

[Description] selects print mode(s) using n as following table in next page.

- [Notes]
- When both double-height and double width modes are selected, quadruple size characters are printed.
 - The printer can underline all characters, but can not underline the space set by **HT**, **ESC \$**, or **ESC W**, and 90 clockwise rotated characters.
 - The thickness of the underline is that selected by **ESC-**, regardless of the character size.
 - When some characters in a line are double or more height, all the characters on the line are aligned at the baseline.
 - **ESC E** can also turn on or off emphasized mode. However, the setting of the last received command is effective.
 - **ESC -** can also turn on or off underline mode. However, the setting of the last received command is effective.
 - **GS !** can also select character size. However, the setting of the last received command is effective.

[Default] n = 0

[Reference] **ESC-**, **ESC E**, **GS !**

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	32 character (font A : 12 × 24)
	On	01	1	42 character (font B : 9 × 24)
1	Off	00	0	Undefined
	On	02	2	16 character (HANGUL : 24 × 24)
2	-	-	-	Undefined
3	Off	00	0	Emphasized mode not selected
	On	08	8	Emphasized mode selected
4	Off	00	0	Double-height mode not selected.
	On	10	16	Double-height mode selected.
5	Off	00	0	Double-width mode not selected.
	On	20	32	Double-width mode selected.
6	-	-	-	Undefined.
7	Off	00	0	Underline mode not selected.
	On	80	128	Underline mode selected.

ESC \$ *nL nH*

[Name]	Set absolute print position				
[Format]	ASCII	ESC	\$	<i>nL</i>	<i>nH</i>
	Hex	1B	24	<i>nL</i>	<i>nH</i>
	Decimal	27	36	<i>nL</i>	<i>nH</i>
[Range]	0 ≤ <i>nL</i> ≤ 255				
	0 ≤ <i>nH</i> ≤ 255				
[Description]	Sets the distance from the beginning of the line to the position at which subsequent characters are to be printed. The distance from the beginning of the line to the print position is [(<i>nL</i> + <i>nH</i> × 256) × (vertical or horizontal motion unit)] inches.				
[Notes]	<ul style="list-style-type: none"> ● Setting <i>s</i> outside the specified printable area are ignored. ● The horizontal and vertical motion unit are specified by GS P. ● The GS P command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount. ● In standard mode, the horizontal motion unit (<i>x</i>) is used. 				
[Reference]	ESC \, GS P				

ESC * *m nL nH d1... dk*

[Name]	Select bit-image mode						
[Format]	ASCII	ESC	*	<i>m</i>	<i>nL</i>	<i>nH</i>	<i>d1... dk</i>
	Hex	1B	2A	<i>m</i>	<i>nL</i>	<i>nH</i>	<i>d1... dk</i>
	Decimal	27	42	<i>m</i>	<i>nL</i>	<i>nH</i>	<i>d1... dk</i>
[Range]	<i>m</i> = 0, 1, 32, 33						
	0 ≤ <i>nL</i> ≤ 255						
	0 ≤ <i>nH</i> ≤ 3						
	0 ≤ <i>d</i> ≤ 255						
[Description]	Selects a bit-image mode using <i>m</i> for the number of dots specified by <i>nL</i> and <i>nH</i> , as follows:						

<i>m</i>	Mode	Vertical Direction		Horizontal Direction(*1)	
		Number of Dots	Dots Density	Dots Density	Number of Data (<i>k</i>)
0	8-dot single-density	8	67 DPI	100 DPI	<i>nL</i> + <i>nH</i> × 256
1	8-dot double-density	8	67 DPI	200 DPI	<i>nL</i> + <i>nH</i> × 256
32	24-dot single-density	24	200 DPI	100 DPI	(<i>nL</i> + <i>nH</i> × 256) × 3
33	24-dot double-density	24	200 DPI	200 DPI	(<i>nL</i> + <i>nH</i> × 256) × 3

- [Notes]
- The *nL* and *nH* indicate the number of dots of the bit image in the horizontal direction. The number of dots is calculated by *nL*+*nH*×256.
 - If the bit-image data input exceeds the number of dots to be printer on a line, the excess data is ignored.
 - *d* indicates the bit-image data. Set a corresponding bit to 1 to printer a dot or to 0 to not print a dot.
 - If the values of *m* is out of the specified range, *nL* and data

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following are processed as normal data.

- If the width of the printing area set by GS L and GS W less than the width required by the data sent with the ESC command, the following will be performed on the line in question (but the printing cannot exceed the maximum printable area):
 - ① The width of the printing area is extended to the right to accommodate the amount of data.
 - ② If step ① does not provide sufficient width for the data, the left margin is reduced to accommodate the data.

For each bit of data in single-density mode, the printer prints two dots: for each bit of data in double-density mode, the printer prints one dot. This must be considered in calculating The amount of data that can be printed in one line.
- After printing a bit image, the printer returns to normal data processing mode.
- This command is not affected by print modes(emphasized, double-strike, and underline, etc.), except upside-down mode.
- Refer to figure 3.11.3 for the developing position of a bit image in page mode.
- The relationship between the image data and the dots to be printed is as follows:

ESC - *n*

[Name] Turn underline mode on/off
 ASCII ESC - *n*
 Hex 1B 2D *n*
 Decimal 27 45 *n*

[Range] $0 \leq n \leq 2, 48 \leq n \leq 50$

[Description] Turns underline mode on or off, based on the following values of *n*:

<i>n</i>	Function
0,48	Turns off underline mode
1,49	Turns off underline mode(1-dot thick)
2,50	Turns off underline mode(2-dot thick)

- [Notes]
- The printer can underline all characters (including right-side character spacing), but cannot underline the space set by HT.
 - The printer cannot underline 90 clockwise rotated characters and white/ black inverted characters.
 - When underline mode is turned off by setting the value of *n* to 0 or 48, the following data is not underlined, and the underline thickness set before the mode is turned off does not change. The default underline thickness is 1 dot.
 - Changing the character size does not effect the current underline thickness.
 - Underline mode can also be turned on or off by using ESC !. Note, however, that the last received command is effective.

[Default] $n = 0$
[Reference] **ESC !**

ESC 2

[Name] Select 1/6-inch line spacing
[Format] ASCII ESC 2
 Hex 1B 32
 Decimal 27 50
[Description] Selects 1/6-inch line spacing.
[Note] The line spacing can be set independently in standard mode and in page mode.
[Reference] **ESC 3**

ESC 3 n

[Name] Set line spacing
[Format] ASCII ESC 3 n
 Hex 1B 33 n
 Decimal 27 51 n
[Range] Sets the line spacing to [n X (vertical or horizontal motion unit)] inches.
[Description] $0 \leq n \leq 255$
[Notes] ● The line spacing can be set independently in standard mode and in page mode.
 ● The horizontal and vertical motion unit are specified by GS P. Changing the horizontal or vertical motion unit does not affect the current line spacing.
 ● The GS P command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum vertical movement amount.
 ● In standard mode, the vertical motion unit (y) is used.
 ● In page mode, this command functions as follows, depending on the starting position of the printable area:
 ① When the starting position is set to the upper left or lower right of the printable area using ESC T, the vertical motion unit (y) is used.
 ② When the starting position is set to the upper right or lower left of the printable area using ESC T, the horizontal motion unit (x) is used.
 ● The maximum line spacing is 40 inches. When the setting value exceeds the maximum, it is converted to the maximum automatically.
[Default] $n + 60(1/6\text{inch})$
[Reference] **ESC 2, GS P**

ESC 8 1

[Name]	Print character string1, string 2, wave1
[Format]	ASCII ESC 8 1 [c1_1....c1_16] [c2_1....c2_16] [d1....d200] 0x0b Hex 1B 38 31 Decimal 27 56 49
[Range]	0x21 ≤ c1,c2 ≤0xff
[Description]	c1(String 1), c2(String 2), d(Wave data)
[Notes]	<ul style="list-style-type: none">●Each character string limits length to 16 bytes(MAX).●If it is not necessary printing, must fill bytes of blanks(0x20).●The wave data consist of 200 bytes.●Printing data of string, wave and background may overlap each other.●Can not change the character size (only 9X24). In this mode, does not effected by ESC ! command.
[Default]	
[Reference]	

ESC 8 2

[Name]	Print character string1 ~ string4, wave1 wave2
[Format]	ASCII ESC 8 2 [c1_1....c1_16] [c2_1....c2_16] [c3_1....c3_16] [c4_1....c4_16] [c4_1....c4_16] [d1_1 d2_1....d1_200 d2_200] 0x0b Hex 1B 38 32 Decimal 27 56 50
[Range]	0x21 ≤ c1,c2,c3,c4 ≤0xff
[Description]	c1(String 1), c2(String 2), c3(String 3), c4(String 4), d1(Wave data 1), d2(Wave data 2)
[Notes]	<ul style="list-style-type: none">●Each character string limits length to 16 bytes(MAX).●If it is not necessary printing, must fill bytes of blanks(0x20).●The wave data consist of 400 bytes.●Printing data of string, wave and background may overlap each other.●Can not change the character size (only 9X24). In this mode, does not effected by ESC ! command.
[Default]	
[Reference]	

ESC 8 6 (or 7)

[Name]	Speed of printing (only graph image mode)
[Format]	ASCII ESC 8 5 (or 6) Hex 1B 38 35 (or 36) Decimal 27 56 53 (or 54)
[Range]	
[Description]	n = 5(25mm/sec) , n = 6 (50mm/sec)
[Notes]	<ul style="list-style-type: none">● This command is not affected by normal print modes (emphasized, double-strike, and underline, etc.)● Default speed is 50mm/sec. However, the setting of the last received command is effective.
[Default]	n = 6(50mm/sec)

[Reference]

ESC = *n*

[Name] Select peripheral device
[Format] ASCII ESC = *n*
Hex 1B 3D *n*
Decimal 27 61 *n*
[Range] $0 \leq n \leq 255$
[Description] Selects the device to which the host computer sends data, using *n* as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer disabled.
	On	01	1	Printer enabled.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

[Notes] ●When the printer is disabled, it ignores all transmitted data until the printer is enabled this command.

[Default] $n = 1$

ESC @

[Name] Initialize printer
[Format] ASCII ESC @
Hex 1B 40
Decimal 27 64

[Description]

ESC D *n1...nk* NUL

[name] Set horizontal tab positions
[Format] ASCII ESC D *n1...nk* NUL
Hex 1B 44 *n1...nk* 00
Decimal 27 68 *n1...nk* 0

[Range] $1 \leq n \leq 255$
 $0 \leq k \leq 32$

[Description] Sets horizontal tab positions.

●*n* specifies the column number for setting a horizontal tab

- position from the beginning of the line.
- k indicates the total number of horizontal tab positions to be set.
- [Notes]
- The horizontal tab position is stored as a value of [character width X n] measured from the beginning of the line. The character width includes the right-side character spacing, and double-width characters are set with twice the width of normal characters.
 - This command cancels the previous horizontal tab settings.
 - When setting $n = 8$, the print position is moved to column 9 by sending HT.
 - Up to 32 tab positions ($k = 32$) can be set. Data exceeding 32 tab positions is processed as normal data.
 - Transmit [n] k in ascending order and place a NUL code 0 at the end.
 - When [n] k is less than or equal to the preceding value [n] $k-1$, tab setting is finished and the following data is processed as normal data.
 - ESC D NUL cancels all horizontal tab positions.
 - When [n] k exceeds the number of characters printable on one line, the tab position set is equal to the maximum printable column plus 1.
 - The previously specified horizontal tab positions do not change, even if the character width changes.
- [Default] The default tab positions are at intervals of 8 characters (columns 9, 17, 25, ...) for font A (12 X 24) when the right-side character spacing is 0.
- [Reference] HT

ESC E n

- [Name] Turn emphasized mode on/off
- [Format]
- | | | | |
|---------|-----|----|-----|
| ASCII | ESC | E | n |
| Hex | 1B | 45 | n |
| Decimal | 27 | 69 | n |
- [Range] $0 \leq n \leq 255$
- [Description] Turns emphasized mode on or off.
- When the LSB of n is 0, emphasized mode is turned off.
 - When the LSB of n is 1, emphasized mode is turned on.
- [Notes]
- Only the LSB of n is effective.
 - ESC ! also turns on and off emphasized mode. However, the last received command is effective.
- [Default] $n = 0$
- [Reference] ESC !

ESC J n

- [Name] Print and feed paper
- [Format]
- | | | | |
|---------|-----|----|-----|
| ASCII | ESC | J | n |
| Hex | 1B | 4A | n |
| Decimal | 27 | 74 | n |

- [Range] $0 \leq n \leq 255$
- [Description] Prints the data in the print buffer and feeds the paper [$n \times$ (vertical or horizontal motion unit)] inches.
- [Notes]
- After printing is completed, this command sets the print starting position to the beginning of the line.
 - The paper feed amount set by this command does not affect the values set by **ESC 2** or **ESC 3**.
 - The horizontal and vertical motion unit are specified by **GS P**.
 - The **GS P** command can change the vertical (and horizontal) motion unit. However, the value cannot be less than the minimum vertical movement amount, and it must be in even units of the minimum vertical movement amount.
 - In standard mode, the printer uses the vertical motion unit (y).
 - When this command is used in page mode, the command functions as follows, depending on the starting position of the printable area.
 - ① When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the vertical motion unit (y) is used.
 - ② When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the horizontal motion unit (x) is used.
 - The maximum paper feed amount is 40 inches. Even if a paper feed amount of more than 40 inches is set, the printer feeds the paper only 40 inches.
 - When label mode is selected and a paper feed amount that exceeds the length of one label is set, the printer feeds the label paper to the next print starting position.
- [Reference] **GS P**

ESC R n

- [Name] Select an international character set
- [Format]
- | | | | |
|---------|-----|----|-----|
| ASCII | ESC | R | n |
| Hex | 1B | 52 | n |
| Decimal | 27 | 82 | n |
- [Range] $0 \leq n \leq 10$
- [Description] Selects an international character set n from the following table:

n	Character set
0	U.S.A.
1	France
2	Germany
3	U.K
4	Denmark I
5	Sweden
6	Italy
7	Spain
8	Japan

9	Norway
10	Denmark II

Country	HEX DEC	ASCII Code											
		23 35	24 36	40 64	5B 91	5C 92	5D 93	5E 94	60 96	7B 123	7C 124	7D 125	7E 126
0 U.S.A		#	\$	@	[\]	^	`	{	:	}	~
1 France		#	\$	□	°	□	\$	^	`	□	□	□	□
2 Germany		#	\$	\$	□	□	□	^	`	□	☺	□	β
3 U.K		£	\$	@	[\]	^	`	{	:	}	~
4 Denmark I		#	\$	@	□	∅	□	^	`	□	ø	□	~
5 Sweden		#	α	□	□	□	□	□	□	□	☺	□	☺
6 Italy		#	\$	@	°	\	□	^	□	□	□	□	☺
7 Spain		#	\$	@	□	☺	□	^	`	□	☺	}	~
8 Japan		#	\$	@	[¥]	^	`	{	:	}	~
9 Norway		#	α	□	□	∅	□	□	□	□	æ	ø	□
10 Denmark II		#	\$	□	□	∅	□	□	□	□	æ	ø	□

ESC V *n*

[Name] Turn 90° clockwise rotation mode on/off
 [Format] ASCII ESC V *n*
 Hex 1B 56 *n*
 Decimal 27 86 *n*
 [Range] $0 \leq n \leq 1, 48 \leq n \leq 49$
 [Description] turns 90° clockwise rotation mode on off.
 N is used follows:

<i>n</i>	Function
0,48	Turn off 90° clockwise rotation mode
1,49	Turns on 90° clockwise rotation mode

[Notes]

- When underline mode is turned on, the printer does not underline 90° clockwise-rotated characters. However, underline mode can be selected.
- Double-wide and double-height commands in 90° rotation mode enlarge characters in the opposite directions from double-height and double-width commands in normal mode.
- This command has no effect in page mode.
- If this command is input in page mode, the printer performs only internal flag operations.

[Default] *n* = 0
 [Reference] ESC !, ESC -

ESC \ *nL nH*

[Name] Set relative print position
 [Format] ASCII ESC \ *nL nH*

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	Hex	1B	5C	<i>nL</i>	<i>nH</i>
	Decimal	27	92	<i>nL</i>	<i>nH</i>
[Range]	$0 \leq nL \leq 255$ $0 \leq nH \leq 255$				
[Description]	Sets the print starting based on the current position by using the horizontal or vertical motion unit. <ul style="list-style-type: none"> ● This command sets the distance from the current position to $[(nL + nH \times 256) \times (\text{horizontal or vertical motion unit})]$. 				
[Notes]	<ul style="list-style-type: none"> ● Any setting that exceeds the printable area is ignored. ● When pitch <i>n</i> is specified to the right: $nL + nH \times 256 = N$ ● When pitch <i>n</i> is specified to the left (the negative direction), use the complement of 65536. When pitch <i>n</i> is specified to the left: $nL + nH \times 256 = 65536 - N$ ● The print starting position moves from the current position to $[N \times \text{horizontal or vertical motion unit}]$ ● The horizontal and vertical motion unit are specified by GS P. ● The GS P command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount. ● In standard mode, the horizontal motion unit is used. 				
[Reference]	ESC \$, GS P				

ESC a n

[Name]	Select justification				
[Format]	ASCII	ESC	a	<i>n</i>	
	Hex	1B	61	<i>n</i>	
	Decimal	27	97	<i>n</i>	
[Range]	$0 \leq n \leq 2, 48 \leq n \leq 50$				
[Description]	Aligns all the data in one line to the specified position. N selects the type of justification as follows:				

<i>n</i>	Justification
0,48	Left justification
1,49	Centering
2,50	Right justification

[Notes]	<p>The command is enabled only when input at the beginning of the line.</p> <p>If this command is input in page mode, the printer performs only internal flag operation.</p> <p>This command does not affect printing in page mode.</p> <p>Lines are justified within the specified printing area.</p> <p>Spaces set by HT, ESC \$, and ESC / are all justified.</p>
[Default]	<i>n</i> = 0
[Example]	

Left justification

Centering

Right justification

ABC
ABCD
ABCDE

ABC
ABCD
ABCDE

ABC
ABCD
ABCDE

ESC c 5 n

[Name] Enable/disable panel FEED buttons

[Format] ASCII ESC c 5 n
Hex 1B 63 35 n
Decimal 27 99 53 n

[Range] $0 \leq n \leq 255$

[Description] Enables or disables the panel FEED buttons.

- When the LSB of n is 0, the panel FEED buttons are enabled.
- When the LSB of n is 1, the panel FEED buttons are disabled.

[Notes]

- Only the LSB of n is effective.
- When the panel button are disabled, none of them are usable when the printer cover is closed.
- In the printer, the panel button is the PAPER FEED button.
- When the printer cover is open, the PAPER FEED button is enabled regardless of the setting of this command.
- When in GS FF execution or macro execution standby, the PAPER FEED button in enabled regardless of the setting of this command. However, the paper cannot be fed.

[Default] $n = 0$

ESC d n

[Name] Print and feed paper n lines

[Format] ASCII ESC D n
Hex 1B 64 n
Decimal 27 100 n

[Range] $0 \leq n \leq 255$

[Description] Prints the data in the print buffer and feeds the paper n line.

- This command sets the print starting position to the beginning of the line.
- This command does not affect the line spacing set by ESC 2 or ESC 3.
- The maximum paper feed amount is 40 inches. Even if a paper feed amount of more than 40 inches is set, the printer feeds the paper only 40 inches.
- When label mode is selected and a paper feed amount that exceeds the length of one label is set, the printer feeds the label paper to the next print starting position.

[reference] ESC 2, ESC 3

ESC t n

[Name] Select character code table.

[Format] ASCII ESC t n

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Hex 1B 74 n
 Decimal 27 116 n
 [Range] 0 ≤ n ≤ 5, n = 11, 255
 [Description] Selects a page n from the character code table

n	Page
0	0 : PC437 [U.S.A., standard Europe]
1	1 : Katakana
2	2 : PC850 [Multilingual]
3	3 : PC860 [Portuguese]
4	4 : PC863 [Canadian-French]
5	5 : PC865 [Nordic]
11	11 : PC858 [Euro]
255	Space page

[Default] n = 0

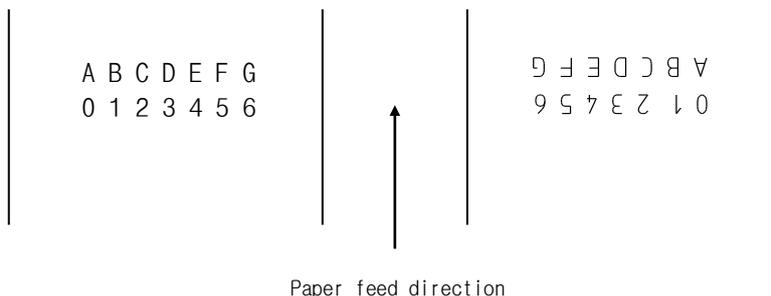
ESC { n

[Name] Turns upside-down printing mode on/off
 [Format] ASCII ESC { n
 Hex 1B 7B n
 Decimal 27 123 n
 [Range] 0 ≤ n ≤ 255
 [Description] Turns upside-down printing mode on or off.
 ● When the LSB of n is 0, upside-down printing mode is turned off.
 ● When the LSB of n is 1, upside-down printing mode is turned on.
 ● Only the LSB of n is effective.
 ● This command is enabled only when input at the beginning of a line.
 ● When this command is input in page mode, the printer performs only internal flag operations.
 ● This command does not affect printing in page mode.
 ● In upside-down printing mode, the printer rotates the line to be printed by 180° and then prints it.
 [Notes]
 [Default] n = 0
 [Example]

When upside-down printing mode
is off

When upside-down printing mode
is on

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GS ! n

[Name] Select character size

[Format] ASCII GS ! n

Hex 1D 21 n

Decimal 29 33 n

[Range] $0 \leq n \leq 255$

Where $1 \leq \text{Number of times of character height} \leq 2$

$1 \leq \text{Number of times of character width} \leq 2$

[Description] Selects the character height using bits 0 to 1 and selects the character width using bits 4 to 7, as follows:

Bit	Off/On	Hex	Decimal	Function
0	Character height selection. See Table 2.			
1				
2				
3				
4	Character width selection. See Table 1			
5				
6				
7				

Table 1
Character width Selection

Hex	Decimal	Width
00	0	1(normal)
10	16	2(double-width)

Table 2
Character Height Selection

Hex	Decimal	Height
00	0	1(normal)
01	1	2(double-height)

- [Notes]
- This command is effective for all characters (except for HRI characters).
 - If n is outside of the defined range, this command is ignored.
 - In standard mode, the vertical direction is the paper feed

direction, and the horizontal direction is perpendicular to the paper feed direction. However, when character orientation changes in 90 clockwise-rotation mode, the relationship between vertical and horizontal directions is reversed.

- In page mode, vertical and horizontal directions are based on the character orientation.
- When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.
- The ESC ! command can also turn double-width and double-height modes on or off. However, the setting of the last

[Default] n = 0

[Reference] ESC !

GS :

[Name] Start or ends macro definition.

[Format] ASCII GS :
Hex 1D 3A
Decimal 29 58

[Description] Starts or ends macro definition.

[Notes] ● Macro definition ends when this command is received during macro definition.

● When **GS ^** is received during macro definition, the printer ends macro definition and clears the definition.

● Macro is not defined when the power is turned on.

● The defined contents of the macro are not cleared by **ESC @**. Therefore, **ESC@** can be included in the contents of the macro Definition.

● If the printer receives GS: again immediately after previously receiving GS:, the printer remains in the macro undefined state.

● The contents of the macro can be defined up to 2048bytes. If the macro definition exceeds 2048bytes, excess data is not stored.

[Reference] GS ^

GS B n

[Name] Turn white/black reverse printing mode on/off

[Format] ASCII GS B n
Hex 1D 42 n
Decimal 29 66 n

[Range] $0 \leq n \leq 255$

[Description] Turns white/black reverse printing mode on or off.

● When the LSB of n is 0, white/black reverse printing mode is turned off.

● When the LSB of n is 1, white/black reverse printing mode is turned on.

[Notes] ● Only the LSB of n is effective.

● This command is available for built-in characters and user-defined characters.

● When white/black reverse printing mode in on, it also applied to

character spacing set by **ESC SP**.

- This command does not affect bit image, downloaded bit image, bar code, HRI characters, and spacing skipped by **HT**, **ESC \$**, and **ESC /**
- This command does not affect the space between lines.
- White/black reverse mode has a higher priority than underline mode.
Even if underline mode is on, it is disabled (but not canceled) when white/ black reverse mode is selected.

[Default] n = 0 (canceled)

GS H n

[Name] Select printing position of HRI characters

[Format]

ASCII	ESC	H	n
Hex	1D	48	n
Decimal	29	72	n

[Range] $0 \leq n \leq 3$, $48 \leq n \leq 51$

[Description] Selects the printing position of HRI characters when printing bar code.

n selects the printing position as follows:

n	Printing position
0,48	Not printed
1,49	Above bar code
2,50	Below bar code
3,51	Both above and below the bar code

- HRI indicates Human Readable interpretation.

[Default] n = 0

GS I n

[Name] Transmit printer ID

[Format]

ASCII	ESC	I	n
Hex	1D	49	n
Decimal	29	73	n

[Range] $1 \leq n \leq 3$,

[Description] Transmits the printer ID specified by n as follows:

n	Printer ID	Specification	ID(hexadecimal)
1,49	Printer model ID	STP-103S / STP-103P	20
2,50	Type ID		00
3,51	ROM version ID	Depends on ROM version	12

GS L nL nH

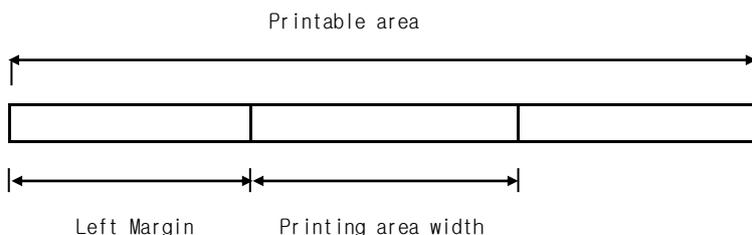
[Name] Set left margin

[Format]

ASCII	GS	L	nL	nH
Hex	1D	4C	nL	nH

Decimal 29 76 nL nH
 [Range] $0 \leq nL \leq 255$
 $0 \leq nH \leq 255$
 [Description] Sets the left margin using nL and nH .

- The left margin is set to $[(nL + nH \times 256) \times (\text{horizontal motion unit} \times 6)]$ inches.



- [Notes]
- This command is enabled only at the beginning of a line.
 - If this command is input in page mode, the printer performs only internal flag operations.
 - This command does not affect printing in page mode.
 - If the setting exceeds the printable area, the maximum value of the printable area is used.
 - The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current left margin.
 - The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot change to be less than the minimum horizontal movement amount.

[Default] $nL = 0, nH = 0$
 [Reference] **GS P, GS W**

GS P $x y$

[Name] Set horizontal and vertical motion units
 [Format] ASCII GS P $x y$
 Hex 10 50 $x y$
 Decimal 29 80 $x y$
 [Range] $0 \leq x \leq 255$
 $0 \leq y \leq 255$
 [Description] Sets the horizontal and vertical motion units to $1/x$ inch, respectively.
 When x is set to 0, the default setting value is used.
 When y is set to 0, the default setting value is used.
 [Notes] ● The horizontal direction is perpendicular to the paper feed direction and the vertical direction is the paper feed direction.
 ● In standard mode, the following commands use x or y , regardless of character rotation (upside-down or 90 clockwise rotation):

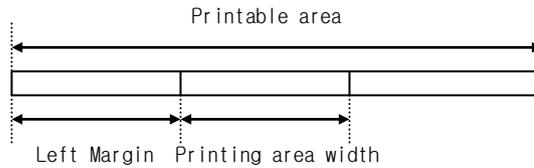
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- ① Command using x : ESC SP, ESC \$, ESC /, GSC, GS L, GS W
- ② Command using y : ESC 3, ESC J, GS A
- This command does not affect the previously specified values.
- The calculated result from combining this command with others is truncated to the minimum value of the mechanical pitch or an exact multiple of that value.

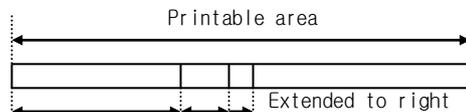
[Default] $x = 203, y = 406$
 [Reference] ESC SP, ESC \$, ESC 3, ESC J, GS L, GS W, GS /

GS W nL nH

[Name] Set printing area width
 [Format] ASCII GS W nL nH
 Hex 1D 57 nL nH
 Decimal 29 87 nL nH
 [Range] $0 \leq nL \leq 255$
 $0 \leq nH \leq 255$
 [Description] Sets the printing area width to the area specified by nL and nH.
 ● The printing area width is set to $[(nL + 256 \times nH) \times \text{horizontal motion unit}]$ inches.



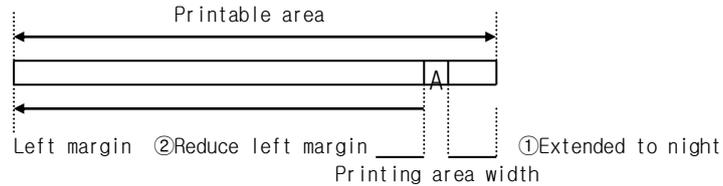
- [Notes]
- This command is effective only at the beginning of a line.
 - If this command is input in page mode, the printer performs only internal flag operations.
 - This command has no effect in [age, mode].
 - The maximum possible setting for the print range is the same as the maximum printable area in the horizontal position. Settings exceeding the maximum setting are rounded down to the maximum setting.
 - The GS P command can change the horizontal (and vertical) motion units. However, the value cannot be less than the minimum horizontal movement amount.
 - When the first printing character is developed, the following processes are performed on the line in question only, if the horizontal width of the character (including the right space) being developed is less than the printable area.
 - ① The set printing area width is extended to the right to accommodate one character.



Left margin

Printing area width set by *nL* and *nH*

② If the printing area width is still insufficient at ①, the left margin is reduced to accommodate one character.



③ If the printing area width is still insufficient at ① and ②, the right space is deleted.

● When developing the bit image for a downloaded bit image, the following processes are performed if the width of the printing area is less than the width required by the data sent with the ESC * or GS / command:

- ① The printing area width is extended to the right to accommodate the data.
- ② If the printing area is still insufficient at , the left margin is reduced to accommodate the data.

[Default] *nL* = 0, *nH* = 2
 [Reference] **GS L**, **GS P**

GS ^ *r t m*

[Name] Execute macro
 [Format] ASCII GS ^ *r t m*
 HEX 1D 5E *r t m*
 Decimal 29 94 *r t m*
 [Range] $0 \leq r \leq 255$
 $0 \leq t \leq 255$
 $0 \leq m \leq 1$
 [Description] Executes a macro.

- *r* specifies the number of times to execute the macro.
- *t* specifies the waiting time for executing the macro.
 The waiting time is $t \times 100$ msec for every macro execution.
- *m* specifies macro executing mode.
- When the LSB of *m* = 0:
 The macro executes *r* times continuously at the interval specified by *t*.
- When the LSB of *m* = 1:
 After waiting for the period specified by *t*, the LED indicator blinks and the printer waits for the PAPER FEED button to be pressed. After the button is pressed, the printer executes the

- macro once, The printer repeats the operation r times.
- [Notes]
- This command waits for a period of $(t \times 100\text{msec})$ after a macro is executed by t .
 - If this command is received while a macro is being defined, the macro definition is aborted and definition is cleared.
 - If the macro is not defined or if r is 0, nothing is executed.
 - When the macro is executed by pressing the PAPER FEED button ($m=1$), Paper can not be fed by using the PAPER FEED button.
- [Reference] **GS:**

GS b n

- [Name] Turns smoothing mode on/off
- [Format]
- | | | | |
|---------|----|----|---|
| ASCII | GS | b | n |
| HEX | 1D | 62 | n |
| DECIMAL | 29 | 98 | n |
- [Range] $0 \leq n \leq 255$
- [Description] Turns smoothing mode on or off
 When the LSB of n is 0, smoothing mode is turned off
 When the LSB of n is 1, smoothing mode is turned on
- [Notes]
- Only the lowest bit of n is valid
 - Smoothing mode is available for built-in, User-defined characters
 - Even if smoothing mode is turned in, smoothing is not performed when either of character width or character height in the normal size
- [Default] $n=0$
- [Reference] **ESC !, GS !**

GS f n

- [Name] Select font for Human Readable interpretation (HRI) characters.
- [Format]
- | | | | |
|---------|----|-----|---|
| ASCII | GS | f | n |
| Hex | 1D | 66 | n |
| Decimal | 29 | 102 | n |
- [Range] $n = 0, 1, 48, 49$
- [Description] Selects a font for the HRI characters used when printing a bar code.
 n selects a font from the following table:

n	Font
0,48	Font A (12 * 24)
1,49	Font B (9 * 24)

GS h n

- [Name] Set bar code height

[Format] ASCII GS h *n*
 Hex 1D 68 *n*
 Decimal 29 104 *n*

[Range] $1 \leq n \leq 255$

[Description] Sets the height of the bar code.
 n specifies the number of dots in the vertical direction.

[Default] *n* = 162

[Reference] **GS K**

GS k m d1...dk NUL

GS k m n d1...dn

[name] Print bar code

[Format] ① ASCII GS k *m* d1...dk NUL
 Hex 1D 6B *m* d1...dk 00
 Decimal 29 107 *m* d1...dk 0

② ASCII GS k *m* *n* d1...dn
 Hex 1D 6B *m* *n* d1...dn
 Decimal 29 107 *m* *n* d1...dn

[Range] ① $0 \leq m \leq 6$ (*k* and *d* depends on the bar code system used)
 ② $65 \leq m \leq 73$ (*n* and *d* depends on the bar code system used)

[Description] Selects a bar code system and prints the bar code.
 M selects a bar code system as follows:

<i>m</i>	Bar Code System	Number of Characters	Remarks	
①	0	UPC-A	$11 \leq k \leq 12$	$48 \leq d \leq 57$
	1			
	2	JAN 13(EAN)	$12 \leq k \leq 13$	$48 \leq d \leq 57$
	3	JAN8(EAN)	$7 \leq k \leq 8$	$48 \leq d \leq 57$
	4	CODE39	$1 \leq k$	$48 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43, 45, 46, 47$
	5	ITF	$1 \leq k$ (even number)	$48 \leq d \leq 57$
	6	CODABAR	$1 \leq k$	$48 \leq d \leq 57, 65 \leq d1 \leq 68, 36, 43, 45, 46, 47, 58$
②	65	UPC-A	$11 \leq n \leq 12$	$48 \leq d \leq 57$
	66			
	67	JAN13(EAN)	$12 \leq n \leq 13$	$48 \leq d \leq 57$
	68	JAN8(EAN)	$7 \leq n \leq 8$	$48 \leq d \leq 57$
	69	CODE39	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43, 45, 46, 47$
	70	ITF	$1 \leq n \leq 255$ (even number)	$48 \leq d \leq 57$
	71	CODABAR	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d1 \leq 68, 36, 43, 45, 47, 58$
	72	CODE93	$1 \leq n \leq 255$	$0 \leq d \leq 127$
73	CODE128	$2 \leq n \leq 255$	$0 \leq d \leq 127$	

[Notes for]

- This command ends with a NUL code.
- When the bar code system used is UPC-A or UPC-E, the printer prints the bar code data after receiving 12bytes bar code data and processes the following data as normal data.
- When the bar code system used is JAN13, the printer prints the bar code after receiving 13bytes bar code data and processes the following data as normal data.
- When the bar code system used is JAN8, the printer prints the bar code after receiving 8bytes bar code data and processes the following data as normal data.
- The number of data for ITF bar code must be even numbers. When an odd number of data is input, the printer ignores the last received data.
- If n is outside of the specified range, the printer stops command processing and processes the following data as normal data.
- If the horizontal size exceeds printing area, the printer only feeds the paper.
- This command feeds as much paper as is required to print the bar code, regardless of the line spacing specified by **ESC 2** or **ESC 3**.
- This command is enabled only when no data exists in the print buffer. When data exists in the print buffer, the printer processes the data following m as normal data.
- After printing bar code, this command sets the print position to the beginning of the line.
- This command is not affected by print modes (emphasized, double-strike, underline, or character size), except for upside-down mode.

[Notes in page mode]

- This command develops bar code data in the print buffer, but does not print it. After processing bar code data, this command moves the print position to the right side dot of the bar code.
- If d is out of the specified range, the printer stops command processing and processes the following data as normal data. In this case the data buffer position does not change.
- If bar code width exceeds the printing area, the printer does not print the bar code but moves the data buffer position to the left side out of the printing area.
- Refer to Figure 3.11.3 for bar code data buffer position.

[When CODE93 (m=72) is used :]

- The printer prints an HRI character (□) as start character at the beginning of the HRI character string.
- The printer prints an HRI character (□) as a stop character at the end of the HRI character string.

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- The printer prints HRI characters (■ + an alphabetic character) as a control character (<00>H to <1F>H and <7F>H) :

Control character			HRI character	Control character			HRI character
ASCII	Hex	Decimal		ASCII	Hex	Decimal	
NUL	00	0	■U	DLE	10	16	■P
SOH	01	1	■A	DC1	11	17	■Q
STX	02	2	■B	DC2	12	18	■R
ETX	03	3	■C	DC3	13	19	■S
EOT	04	4	■D	DC4	14	20	■T
ENQ	05	5	■E	NAK	15	21	■U
ACK	06	6	■F	SYN	16	22	■V
BEL	07	7	■G	ETB	17	23	■W
BS	08	8	■H	CAN	18	24	■X
HT	09	9	■I	EM	19	25	■Y
LF	0A	10	■J	SUB	1A	26	■Z
VT	0B	11	■K	ESC	1B	27	■A
FF	0C	12	■L	FS	1C	28	■B
CR	0D	13	■M	GS	1D	29	■C
SO	0E	14	■N	RS	1E	30	■D
SI	0F	15	■O	US	1F	31	■E
				DEL	7F	127	■T

<Example> Printing GS k 72 7 67 111 100 101 13 57 51



[When CODE128 (m=73) is used :]

- Refer to Appendix J for the information of the CODE128 bar code and its code table.
- When using the CODE128 in this printer, take the following points into account for data transmission :
 - ① The top of the bar code data string must be code set selection character (any of CODE A, CODE B OR CODE C) which selects the first code set.

[Description of the CODE128 Bar Code]

In CODE128 bar code system, it is possible to represent 128 ASCII characters and 2-digit numerals using one bar code character that is defined by combining one of the 103 bar code characters and 3 code sets. Each code set is used for representing the following characters :

- * Code set A : ASCII characters 00H to 5FH
- * Code set B : ASCII characters 20H to 7FH
- * Code set C : 2-digit numeral characters using one character (100 numerals from 00 to 99)

The following special characters are also available in CODE128 :

- * SHIFT characters

In code set A, the character just after SHFIT is processed as a character for code set B. In code set B, the character just after SHIFT is processed as the character for code set A. SHIFT characters cannot be

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used in code set C.

- * Code set selection character (CODE A, CODE B, CODE C)
This character switches the following code set to code set A, B, or C.
 - * Function character (FNC1, FNC2, FNC3, FNC4)
The usage of function characters depends on the application software.
In code set C, only FNC 1 is available.
- ② Special characters are defined by combining two characters “{“ and one character. The ASCII character “{“ is defined by transmitting “{“ twice consecutively.

Specific character	Transmit data		
	ASCII	Hex	Decimal
SHIFT	{S	7B,53	123,83
CODE A	{A	7B,41	123,65
CODE B	{B	7B,42	123,66
CODE C	{C	7B,43	123,67
FNC1	{1	7B,31	123,49
FNC2	{2	7B,32	123,50
FNC3	{3	7B,33	123,51
FNC4	{4	7B,34	123,52
“{ “	{{	7B,7B	123,123

<Example> Example data for printing “No. 123456”
In this example, the printer first prints “No.” using CODE B, then prints the following numbers using CODE C.
GS k 73 10 123 66 78 111 46 123 67 12 34 56



- * If the top of the bar code data is not the code set selection character, the printer stops command processing and processes the following data as normal data.
 - * If combination of “{“ and the following character does not apply any special character, the printer stops command processing and processes the following data as normal data.
 - * The printer does not print HRI characters that correspond to the shift characters or code set selection characters.
 - * HRI character for the function character is space.
 - * HRI characters for the control character (<00>H to <1F>H and <7F>H) are space.
- <Others> Be sure to keep spaces on both right and left sides of a bar code.
(Spaces are different depending on the types of the bar code.)

GS v 0 xL xH yL yH dl...dk

[Name] Print raster bit image

[Format] ASCII GS v 0 m xL xH yL yH dl...dk

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HEX	1D	76	30	m	xL	xH	yL	yH	d1...dk
DECIMAL	29	118	48	m	xL	xH	yL	yH	d1...dk

[Range] $0 \leq m \leq 3, 48 \leq m \leq 51$
 $0 \leq xL \leq 255$
 $0 \leq xH \leq 255$
 $0 \leq yL \leq 255$
 $0 \leq d \leq 255$
 $k = (xL + xH \times 256) \times (yL + yH \times 256) \quad (k=0)$

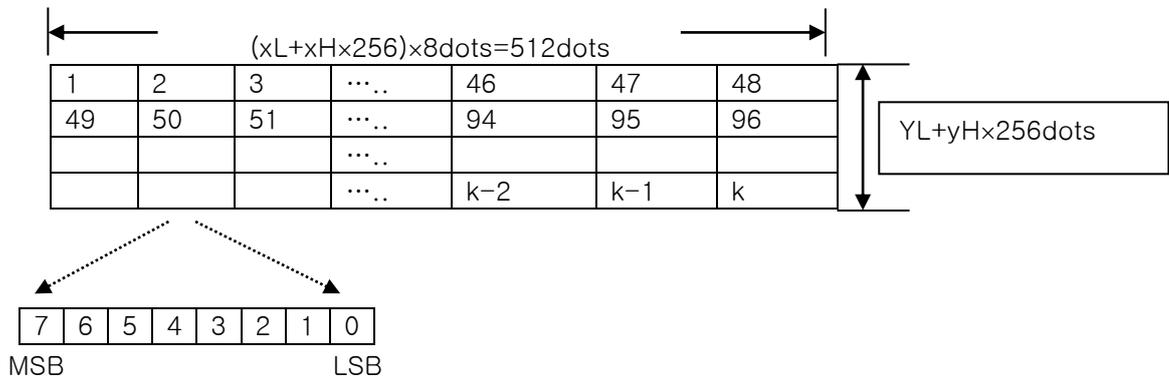
[Description] Selects raster bit-image mode.
 The value of m selects the mode, as follows

m	Mode	Vertical dot density	Horizontal dot density
0,48	Normal	200dpi	200dpi
1,49	Double-width	200dpi	100dpi
2,50	Double-height	100dpi	200dpi
3,51	Quadruple	100dpi	100dpi

- xL, xH, selects the number of data bits $(xL + xH \times 256)$ in the horizontal direction for the bit image
- yL, yH, selects the number of data bits $(yL + yH \times 256)$ in the vertical direction for the bit image

- [Notes]
- In standard mode, this command is effective only when there is no data in the print buffer
 - This command has no effect in all print modes (character size, emphasized, double-strike, upside-down, underline, white/black reverse printing. Etc.) for raster bit image
 - If the printing area width set by GS L and GS W is less than the minimum width, the printing area is extended to the minimum width only on the line in question. The minimum width means 1dot in normal ($m=0,48$) and double-height ($m=2,50$), 2dots in double-width ($m=1,49$), and quadruple ($m=3,51$) modes
 - Data outside the printing area is read in and discarded on a dot-by-dot basis
 - The position at which subsequent characters are to be printed for raster bit image is specified by HT, ESC \$, ESC W, and GS L. If the position at which subsequent characters are to be printed is not a multiple of 8, print speed may decline
 - The ESC a setting is also effective on raster bit images
 - When this command is received during macro definition, the printer ends macro definition, and begins performing this command. The definition of this command should be cleared
 - d indicates the bit-image data. Set time a bit 1 prints a dot and setting it to 0 does not print a dot

[Example] When $xL+xH \times 256=48$



GS w n

[Name] Set bar code width
 [Format] ASCII GS w n
 Hex 1D 77 n
 Decimal 29 119 n
 [Range] $2 \leq n \leq 6$
 [Description] Set the horizontal size of the bar code.
 n specifies the bar code width as follows:

N	Module width (mm) for Multi-level Bar Code	Bi-level Bar Code	
		Thin element width(mm)	Thick element width(mm)
2	0.282	0.282	0.706
3	0.423	0.423	1.129
4	0.564	0.564	1.411
5	0.706	0.706	1.834
6	0.847	0.847	2.258

- Multi-level bar codes are as follows:
UPC-A, UPC-E, JAN13, CODE93, CODE128
- Bi-level bar codes are as follows:
CODE39, ITF, CODABAR

[Default] n = 3
 [Reference] **GS k**

3.4 Continuous Printing Operating Time

3.4.1 Paper feed motor

The following chart gives the maximum paper feed speed vs the step motor Voltage(at 25°C)

Operation Voltage	Paper Feed speed	Duty Cycle(%)
5V	20mm/sec	60
7.2V	50mm/sec	30
8.5V	62.5mm/sec	15

In order to avoid stepper motor overheat, it is strongly advised to respect the maximum ON/OFF duty cycle as indicated above. Note that the maximum period for the ON time is 45 seconds (when the duty cycle is not 100%).

3.5 Error mode

3.5.1 Printer disabled

When the printer powered, it will get stuck in disable mode. When the printer is disabled, it ignores all transmitted data until the printer is enabled (ESC 3D) or (ESC 38) commands

3.5.2 Paper empty (Error LED : short term blinks)

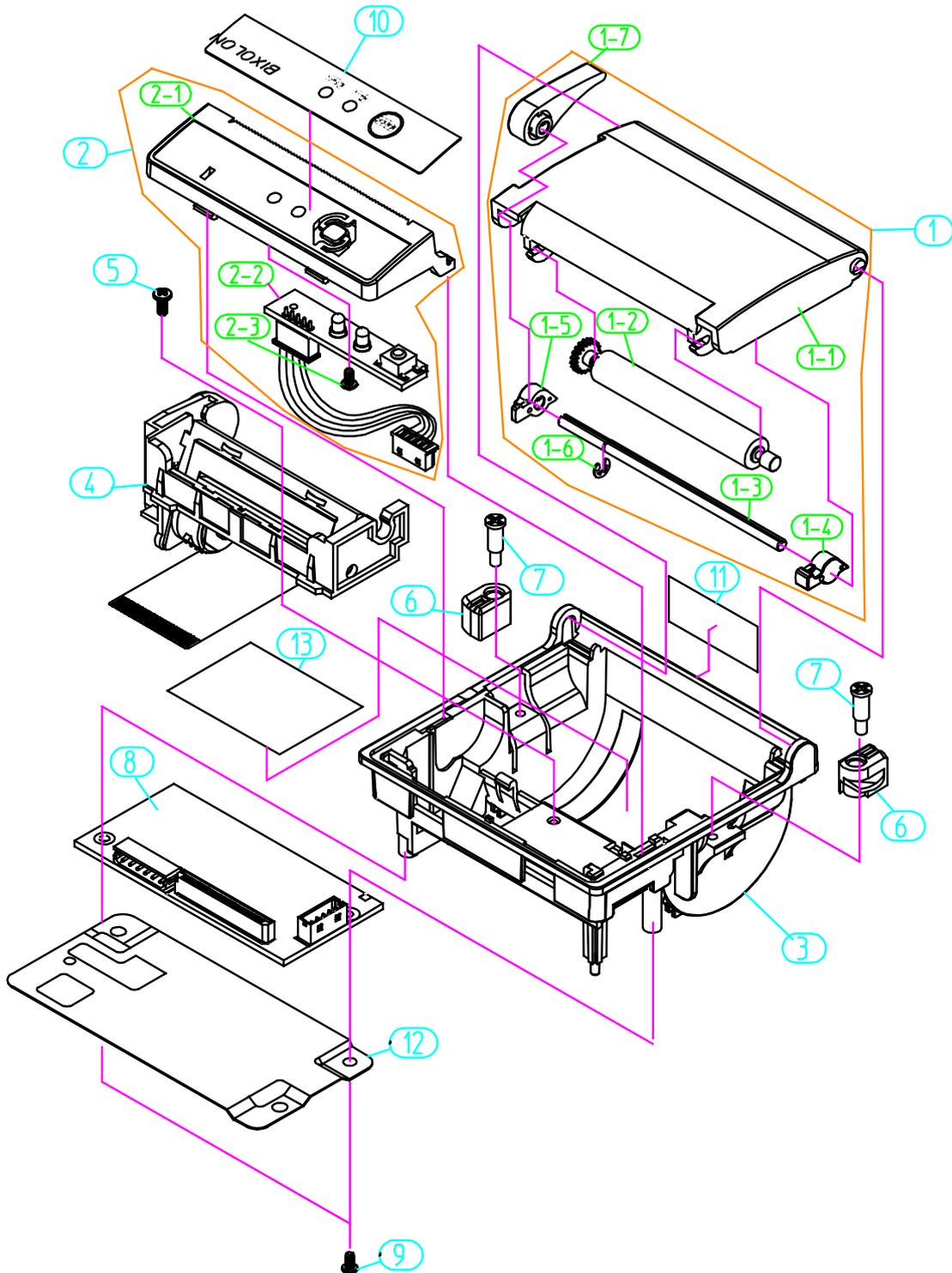
Error LED notifies whether or not printer has a paper. When the paper comes out, Error LED blinks with a short term. If the printer detects paper, Error LED blinking will be stop. First, Printer clears Receive buffer & all of variables and after all printer will be stuck in disable mode automatically to prevent garbage printing. When the printer is disabled, it ignores all transmitted data until the printer is enabled ESC 3D or 38 commands

3.5.3 TPH overheat (Error LED : long term blinks)

Error LED notifies whether or not TPH get a heat. When the TPH reaches to 60 degree, Error LED blinks with a long term and printing stop. If the TPH temperature goes down under the 50 degree, Error LED blinking will be stop. First, printer clears Receive buffer & all of variables and after all printer will be stuck in disable mode automatically to prevent garbage printing. When the printer is disabled, it ignores all transmitted data until the printer is enabled ESC 3D or 38 commands

4. Exploded View & Part List

4.1 SPP-100 Exploded View(2006.12.11)



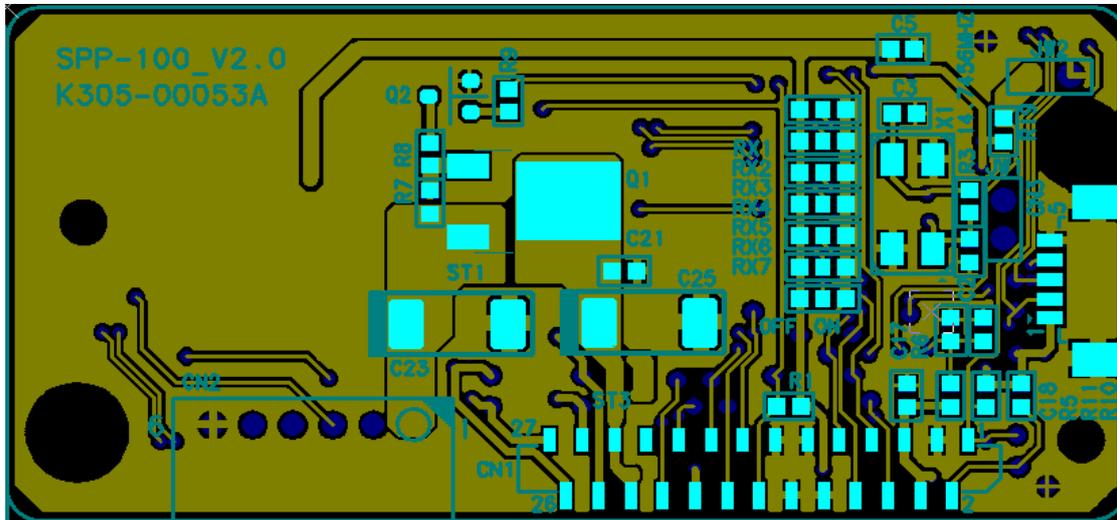
4.2 SPP-100 Part List

2011.08.25

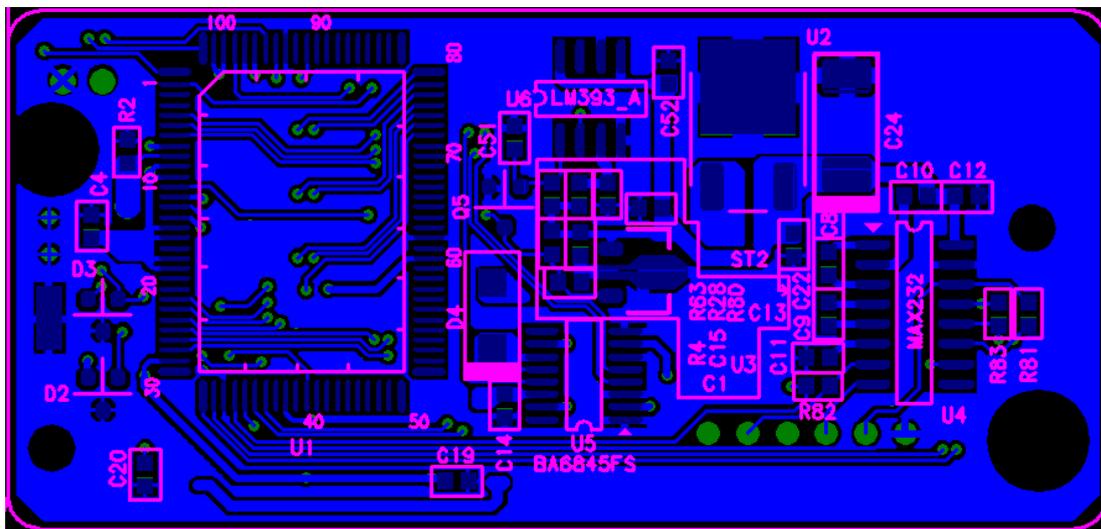
NO	LEVEL	PART NO	PARTS NAME	Unit	Q'T	Specification	A/S	REMARK
1	1	AT05-00014A	Cover paper Ass'y I/V	EA	1	SPP-100 I/V	Y	
		AT05-00014B	Cover paper Ass'y D/G			SPP-100 D/G		
		AT05-00014C	Cover paper Ass'y SES			SPP-100 SES		
1-1	2	KM05-00143A	Cover paper	EA	1	PC 301V-7 FR(40)	N	14A, 14B
		KM05-00054A	Cover paper(삼성)	EA	1	PC EH-1050T W0234B(제일모직)		14C
1-2	2	AR05-00003A	Platen roller Ass'y	EA	1	SMP640U	N	
1-3	2	KM05-00143A	Shaft lever	EA	1	C3604	N	
1-4	2	KM05-00145A	Lever L	EA	1	POM LuceI N109-LD	N	
1-5	2	KM05-00144A	Lever R	EA	1	POM LuceI N109-LD	N	
1-6	2	6004-000272	E-Ring(Φ1.5)	EA	1	Φ1.5,0.4T	N	
1-7	2	KM05-00146A	Lever knob I/V	EA	1	ABS AF312-16133 FR(17)	N	14A, 14C
		KM05-00146B	Lever knob D/G			ABS AF312-8C201 FR(17)		14B
2	1	AT05-00015C	Cover head Ass'y I/V	EA	1	SPP-100 I/V	Y	
		AT05-00015D	Cover head Ass'y D/G			SPP-100 D/G		
		AT05-00015F	Cover head Ass'y SES			SPP-100 SES		
2-1	2	KM05-00147A	Cover head I/V	EA	1	PC+ABS GN5001RFH EP54, V0	N	15C, 15F
		KM05-00147B	Cover head D/G			PC+ABS GN5001RFH E0469, V0		15D
2-2	2	AP04-00062A	Sub PCB Ass'y	EA	1	SPP-100	Y	15C, 15D
		AP04-00062C	Sub PCB Ass'y			SPP-100 SES		15F
2-3	1	6002-001121	Screw Tapping	EA	1	M2*4	N	
3	1	KM05-00148A	Case bottom I/V	EA	1	ABS AF312-16133 FR(17)	N	
		KM05-00148B	Case bottom D/G			ABS AF312-8C201 FR(17)		
4	1	AD05-00001B	Printer mecha	EA	1	SMP640UK	Y	
5	1	KC05-00044A	Screw tapping	EA	1	M2.3*5,BH+,BLK	Y	
6	1	KM05-00149A	Lever lock	EA	2	ABS AF312-16133 FR(17)	Y	
7	1	KC05-00043A	Screw special	EA	2	2.6*7.3*4.5,+M2.6,SWCH18A	Y	
8	1	AP03-00004B	ASSY PCB-Main	EA	1	SPP-100H	Y	
		AP03-00005B				SPP-100S		
		AP03-00005C				SPP-100S(삼성전자向)		
		AP05-00127B				SPP-100L		
9	1	6002-001121	Screw tapping	EA	2	M2*4	Y	
10	1	KA05-00056A	Label control	EA	1	71.7*13.9	Y	
11	1	JE68-00108A	Label sticker	EA	1	SMP710,ACRIL,T0.1	N	
12	1	KA05-00002A	Label warning	EA	1	PET(TETRON), 33.5*25*T0.175	Y	

4.3 PCB View

4.3.1 TOP Side



4.3.2 Bottom Side



Note)

1) PCB type by model nmae

Model name	D4	Q1	Q2	ST1	U2	ST2
SPP-100H	3216,0ohm	Mount	Mount	Open	Mount	Open
SPP-100S	3216,0ohm	Delete	Delete	Short	Mount	Open
SPP-100L	3216,0ohm	Delete	Delete	Short	Delete	Short

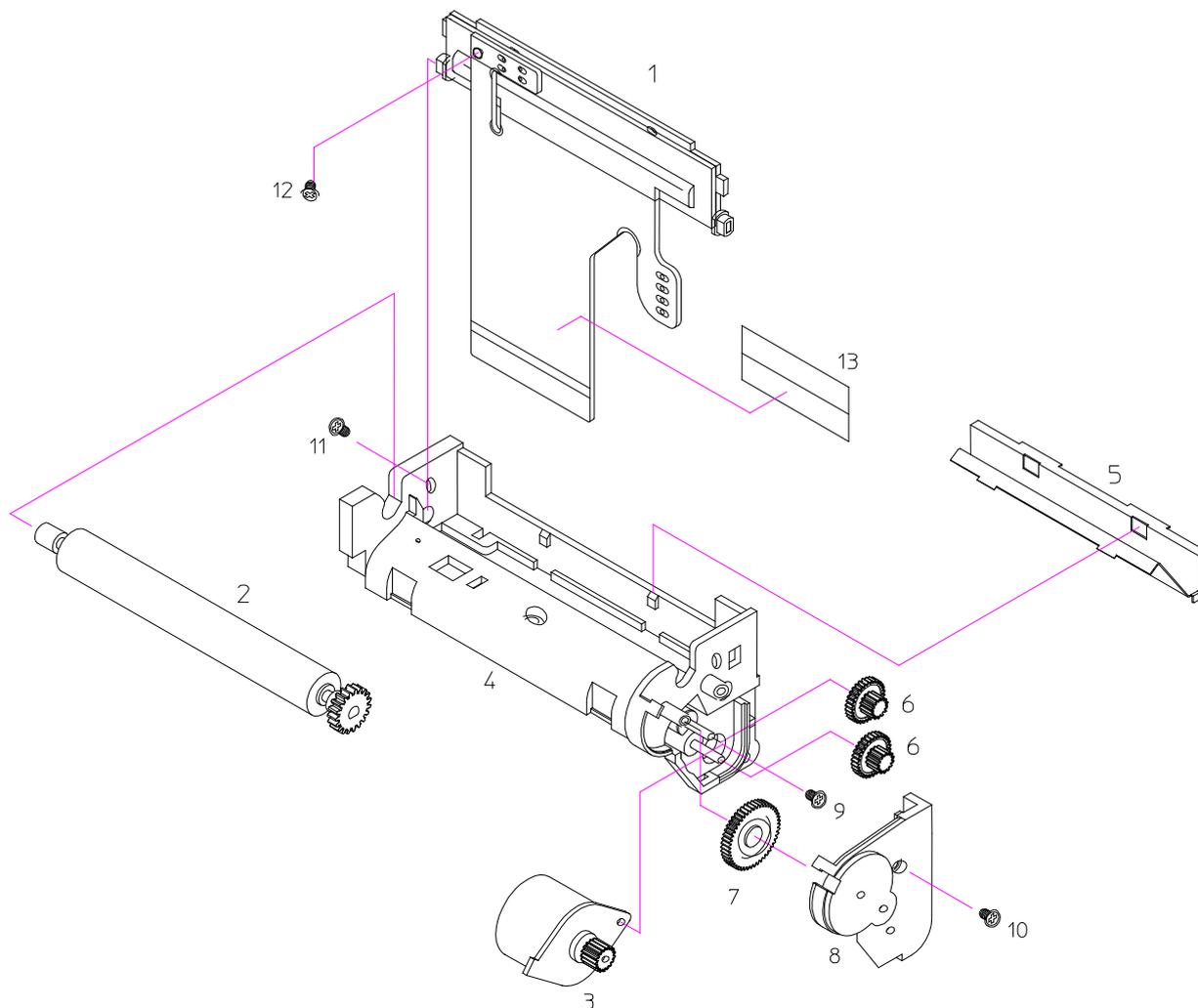
2) PCB type by Communication speed

Communication speed	RX1	RX2	RX3	Remark
9,600bps	OFF	OFF	OFF	A
19,200bps	ON	OFF	ON	B
38,400bps	ON	ON	OFF	C
57,600bps	OFF	ON	ON	D
115,200bps	ON	ON	ON	E
4,800bps	OFF	ON	OFF	F

Note) When RX232 communicating, R81,R82,R83 should be deleted.

3) Silk of PCB can be changed without the notice for use

4.4 Mechanism(SMP640U) Exploded View



4.5 Mechanism(SMP640UK) Part List

No	Code no	Description	Specification	Q'ty	Service
1	AE05-00009A	ASS' Y BRACKET TPH	TPH/FPC/Bracket/Photo-sensor /Bush	1	Y
2	AR05-00003A	ASS'Y PLATEN ROLLER	Roller /Shaft	1	Y
3	K105-00016A	MOTOR-STEP	5V,25G.CM,BIPOLAR	1	N
4	JE72-00223B	FRAME-MAIN	SMP640U,LUCELN109,BLACK,W64.5	1	N
5	JE70-00300A	PLATE-PRESSURE	SMP640U,SUS304CSP,0.25T	1	Y
6	JE72-00001D	GEAR DECELERATION B 2.0	LUCELN109LD,POM,natural ,SAC210,3.8,*8	2	Y
7	JE72-00222B	GEAR-DECELERATION C	SMP640U,LUCEL H1510	1	Y
8	JE72-00223A	FRAME-COVER	SMP640U,LUCELN109,BLACK,W25.6	1	Y
9	6001-000805	SCREW- MACHINE,M1.7*4	CH,+<M1.7,L5,NIPLT,SWRCH10	1	Y
10	6002-001140	SCREW-TAPPING,M2*4	PH,2,M2.0,L4.0,NIPLT	1	Y
11	KC05-00017A	SCREW-TAPPING,M2*5	M2*L5	1	Y
12	6002-001124	SCREW- TAPPING,M1.7*2	CH,+,2,M1.7(0.45),L2,BLK	1	Y
13	KA05-00011A	LABEL STICKER	ART PAPER T0.1	1	N