User's Manual

PNP-64 SMB

Panel Printer

MAXIM
PERIPHERALS PVT. LTD.
101, Pradhan Bldg., Aarey Road (Near Subway), Goregaon (East), Mumbai 400 063, (India).
● Phone : 2927 50 39 ● Fax : 91-22-2927 50 41 ● E-mail : support@maximppl.com

1. GENERAL SPECIFICATIONS

1.1 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: (duty 12.5%)	Approximately 18.6 lines/second Approximately 70 mm/second (Max) Printing speed may be slower, depending on the data transmission speed and combination of control commands.
8) Paper feeding speed:	Approximately 62.5 mm/second
9) Line spacing (default):	0.75 mm

1.2 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

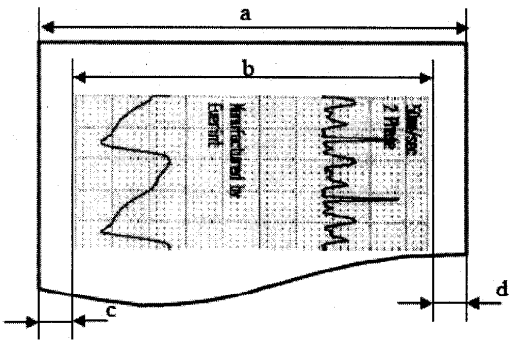
	Standard		Double-height		Double-width		Quadruple-size	
	W X H (mm)	CPL	W X H (mm)	CPL	W X H (mm)	CPL	W X H (mm)	CPL
Font A 12X24	1.25 X 3 (.05"X.12")	32	1.25 X 6 (.05"X.24")	32	2.5 X 3 (1" X.12")	16	2.5 X 6 (1" X.24")	16
Font B 9X24	0.875 X 3 (.03"X.12")	42	0.875 X 6 (.03"X.24")	42	1.75 X 3 (.06"X.12")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

1.3 Paper

1)Paper type : HANSOL PAPER 65GSM
2)Form : Paper roll
3)Paper width : 58 mm(2.36")
4)Paper roll size: Paper roll diameter: maximum of 40mm (1.57")
5)printing area : See below figure

NOTE: Paper must not be pasted to the paper core.



a = 58mm (2.28")
b = 48mm ± 0.2mm (1.89" ±0.008")
c = 5.0mm± 1.5mm (0.197" ±0.06")
d = 5.0mm± 1.5mm (0.197" ±0.06")
[All the numeric values are typical]

1.4 Receive Buffer

It is fixed at 15K bytes. (Busy point 14.5K)

1.5 Electrical Characteristics

1)Input voltage: MAX 5VDC
2)current consumption (7.2VDC, *64Dot ON at same time):
Operating: Mean: approximately 1.5 A
*Peak: approximately 2.4 A
Standby: Mean: approximately 0.07 A

1.6 Reliability

Life: Thermal paper: 15,000,000 lines
End of Life is defined as the point at which the printer reaches the beginning of the wear-out period
MTBF: 180,000 hours
Failure is defined as Random Failure occurring at the time of the Random Failure Period.
MCBF: Thermal paper: 30,000,000 lines
This is an average failure interval based on failures relating to wear-out and random failures up to the life.

1.7 Environmental conditions

1)Temperature:	Operating:	5° to 40℃ (41° to 104° F)
	Storage:	-10° to 50℃ (14° to 122° F)(except for paper)
2)Humidity:	Operating:	30% to 85% RH
	Storage:	30% to 90% RH (except for paper)

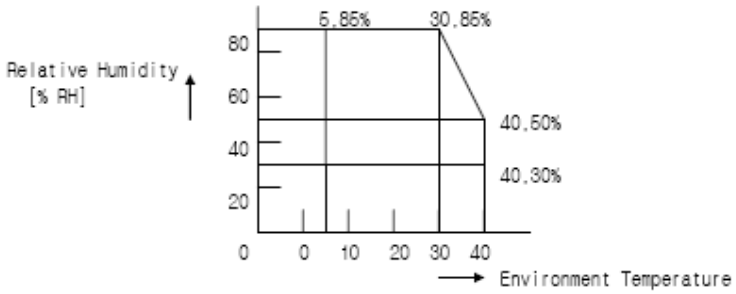


Figure. Operating Temperature and Humidity Range

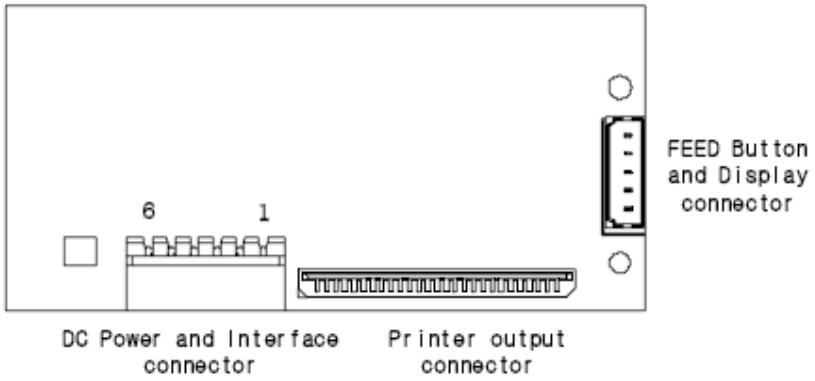
3)Vibration resistance:	When packed:	Frequency:	5 to 100 Hz
		Acceleration:	2 G
		Sweep:	5 minutes (half cycle)
		Duration:	1 hour
		Directions:	x, y, and z
	No external or internal damage should be found after the vibration test, and the unit should operate normally.		
4)Impact resistance:	When packed:	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)	

1.8 Installation

The SPP-100 must be installed horizontally or intuitively.

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: 5VDC @ 2.5 Amps peak
2) Logic voltage: 5VDC (Regulated automatically)

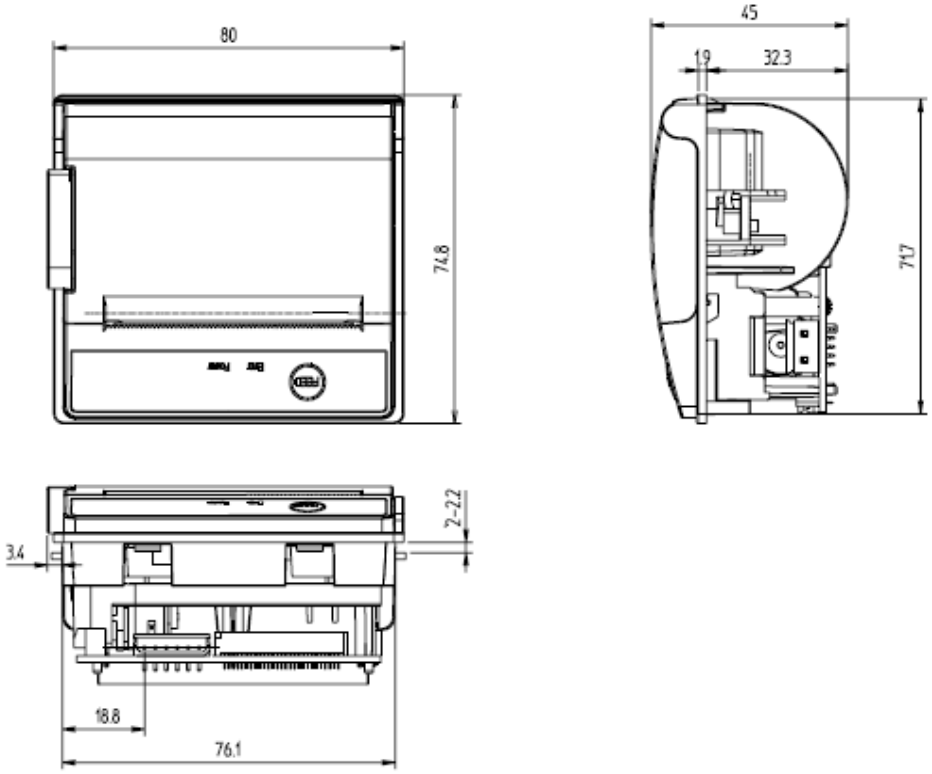
2.2.3 Serial interface (compatible with RS-232)

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:	38400 bps
	2400, 4800, 9600, 19200, 38400, 57600 bps (options)
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).

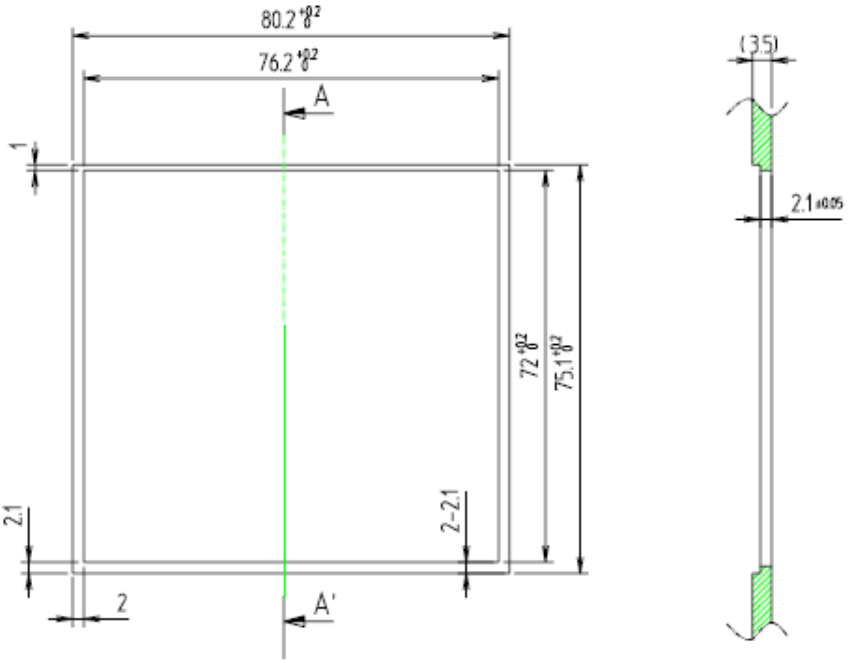
2.3 CASE Specification

2.3.1 Printer overall dimensions



2.3.2 Printer mounting method

2.3.2.1 User side dimension guide

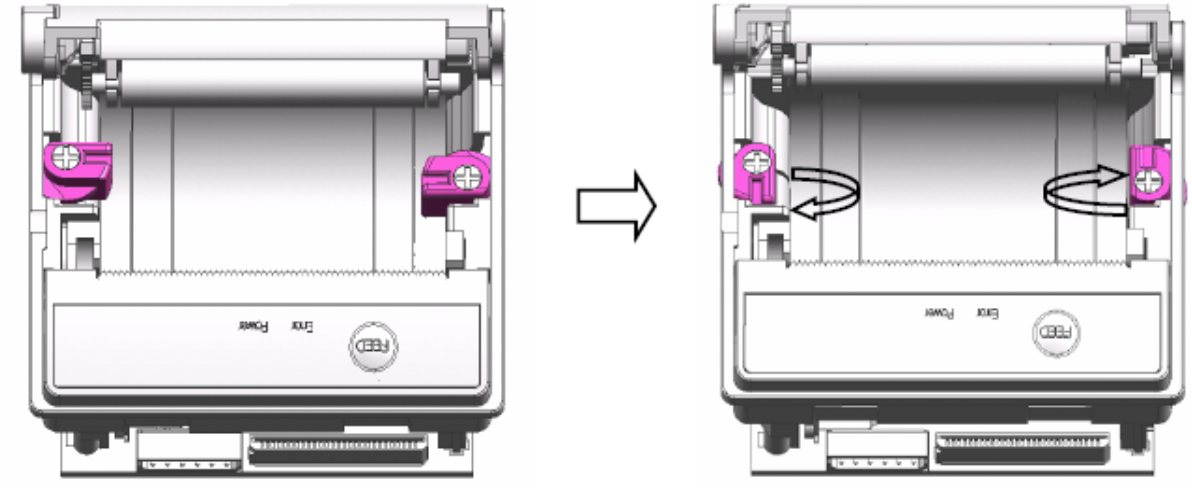


2.3.2.2 Mounting flow chart

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 geed paper continuously.

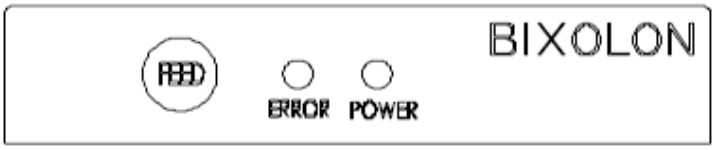
3.1.2 Power LED : GRN

ON : Power is supplied to the printer and On Line status.
OFF: Power is not supplied to the printer.
Blink(short term) Printer disable status

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 (PC437: U.S.A., Standard Europe)(International character set: U.S.A.)

	HEX	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
HEX	BIN	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	NUL 00	DLE 16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	0001	01	XON 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▓ 177	┴ 193	╤ 209	β 225	± 241
2	0010	02	18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	█ 178	┬ 194	╥ 210	Γ 226	≤ 242
3	0010	03	XOFF 19	#← 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≥ 243
4	0100	EOT 04	20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	0101	ENQ 05	21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	0110	06	22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	0111	07	23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	1000	BS 08	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 249
9	1001	HT 09	25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	θ 233	• 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	1011	11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	¢ 155	1/2 171	╗ 187	╦ 203	▌ 219	δ 235	√ 251
C	1100	FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	¦ 124	î 140	£ 156	1/4 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
D	1101	CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	} 125	ì 141	¥ 157	¡ 173	╜ 189	═ 205	▐ 221	ϕ 237	2 253
E	1110	14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	Pt 158	« 174	╛ 190	╬ 206	▀ 222	∈ 238	■ 254
F	1111	15	31	/ 47	? 63	O 79	_ 95	o 111	SP 127	Å 143	ƒ 159	» 175	┐ 191	╧ 207	■ 223	∩ 239	SP 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	ー 176	タ 192	ミ 208	三 224	240
1	0001	129	145	。 161	ア 177	チ 193	ム 209	上 225	円 241
2	0010	130	146	「 162	イ 178	ツ 194	メ 210	下 226	年 242
3	0010	131	147	」 163	ウ 179	テ 195	モ 211	中 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	ァ 167	キ 183	ヌ 199	ラ 215	231	秒 247
8	1000	136	152	ィ 168	ク 184	ネ 200	リ 216	232	〒 249
9	1001	137	153	ゥ 169	ケ 185	ノ 201	ル 217	233	市 249
A	1010	138	154	ェ 170	コ 186	ハ 202	レ 218	234	区 250
B	1011	139	155	ォ 171	サ 187	ヒ 203	ロ 219	235	町 251
C	1100	140	156	ャ 172	シ 188	フ 204	ワ 220	236	村 252
D	1101	141	157	ュ 173	ス 189	ヘ 205	ン 221	237	人 253
E	1110	142	158	ョ 174	セ 190	ホ 206	゛ 222	238	254
F	1111	143	159	ッ 175	ソ 191	マ 207	゜ 223	239	SP 255

3.2.3 page 2 (pc850 : multilingual)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	▓ 176	└ 192	ð 208	Ó 224	240
1	0001	ü 129	æ 145	í 161	▒ 177	┴ 193	Ð 209	ß 225	± 241
2	0010	é 130	Æ 146	ó 162	░ 178	┬ 194	Ê 210	Ô 226	‗ 242
3	0010	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	¾ 243
4	0100	ä 132	ö 148	ñ 164	┤ 180	─ 196	È 212	õ 228	¶ 244
5	0101	à 133	ò 149	Ñ 165	Á 181	┼ 197	ı 213	Õ 229	§ 245
6	0110	å 134	û 150	ª 166	Â 182	ã 198	Í 214	µ 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	╚ 200	Ï 216	Þ 232	° 248
9	1001	ë 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
A	1010	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250
B	1011	ï 139	ø 155	½ 171	╗ 187	╦ 203	█ 219	Ù 235	¹ 251
C	1100	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	ý 236	³ 252
D	1101	ì 141	Ø 157	¡ 173	¢ 189	═ 205	¦ 221	Ý 237	² 253
E	1110	Ä 142	× 158	« 174	¥ 190	╬ 206	Ì 222	¯ 238	■ 254
F	1111	Å 143	ƒ 159	» 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255

3.2.4 page 3 (PC860 : Portuguese)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	0001	ü 129	À 145	í 161	▓ 177	┴ 193	╤ 209	β 225	± 241
2	0010	é 130	È 146	ó 162	│ 178	┬ 194	╥ 210	Γ 226	≤ 242
3	0010	â 131	ô 147	ú 163	┤ 179	├ 195	╙ 211	π 227	≥ 243
4	0100	ä 132	õ 148	ñ 164	╡ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	0101	à 133	ò 149	Ñ 165	╢ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	0110	Á 134	ú 150	ª 166	╖ 182	╞ 198	╓ 214	µ 230	÷ 246
7	0111	ç 135	ù 151	º 167	╕ 183	╟ 199	╫ 215	τ 231	≈ 247
8	1000	ê 136	Ì 152	¿ 168	╣ 184	╚ 200	╪ 216	Φ 232	° 249
9	1001	Ê 137	õ 153	Ò 169	║ 185	╔ 201	┘ 217	θ 233	• 249
A	1010	è 138	Ü 154	¬ 170	╗ 186	╩ 202	┌ 218	Ω 234	• 250
B	1011	Í 139	¢ 155	1/2 171	╝ 187	╦ 203	▉ 219	δ 235	√ 251
C	1100	Ô 140	£ 156	1/4 172	╜ 188	╠ 204	■ 220	∞ 236	n 252
D	1101	ì 141	Ù 157	¡ 173	╛ 189	═ 205	▌ 221	ϕ 237	² 253
E	1110	Ã 142	Pt 158	« 174	╞ 190	╬ 206	▐ 222	238	■ 254
F	1111	Â 143	Ó 159	» 175	┐ 191	╧ 207	▀ 223	239	SP 255

3.2.5 Page 4 (PC863 : Canadian – French)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	┆ 160	▒ 176	└ 192	╨ 208	α 224	240
1	0001	ü 129	É 145	´ 161	▓ 177	┴ 193	╤ 209	β 225	± 241
2	0010	é 130	Ê 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	0010	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	0100	Â 132	Ë 148	¨ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	0101	à 133	Ï 149	˚ 165	┤ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	0110	134	û 150	³ 166	╡ 182	╞ 198	╓ 214	µ 230	÷ 246
7	0111	ç 135	ù 151	¯ 167	╢ 183	╟ 199	╫ 215	τ 231	≈ 247
8	1000	ê 136	¤ 152	Î 168	╖ 184	╚ 200	╪ 216	Φ 232	° 249
9	1001	ë 137	Ô 153	⌐ 169	╕ 185	╔ 201	┘ 217	θ 233	• 249
A	1010	è 138	Ü 154	¬ 170	╖ 186	╩ 202	┌ 218	Ω 234	· 250
B	1011	Ï 139	¢ 155	1/2 171	╗ 187	╦ 203	▉ 219	δ 235	251
C	1100	î 140	£ 156	1/4 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
D	1101	‗ 141	Ù 157	3/4 173	╜ 189	═ 205	▌ 221	ϕ 237	² 253
E	1110	À 142	Û 158	« 174	╛ 190	╬ 206	▐ 222	238	■ 254
F	1111	§ 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	239	SP 255

3.2.6 Page 5 (PC865 : Nordic)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	240
1	0001	ü 129	æ 145	í 161	▓ 177	┴ 193	╤ 209	β 225	± 241
2	0010	é 130	Æ 146	ó 162	⁞ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	0010	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	0100	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	0101	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	0110	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	0111	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	1000	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 249
9	1001	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	1010	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	1011	ï 139	ø 155	1/2 171	╗ 187	╦ 203	▉ 219	δ 235	251
C	1100	î 140	£ 156	1/4 172	╝ 188	╠ 204	■ 220	∞ 236	n 252
D	1101	ì 141	Ø 157	¡ 173	╜ 189	═ 205	▌ 221	φ 237	² 253
E	1110	Ä 142	Pt 158	« 174	╛ 190	╬ 206	▐ 222	238	■ 254
F	1111	Å 143	ƒ 159	¤ 175	┐ 191	╧ 207	▀ 223	239	SP 255

3.2.7 Page 11 (PC858 : Euro)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	▒ 176	└ 192	ð 208	Ó 224	¯ 240
1	0001	ü 129	æ 145	íz 161	▓ 177	┴ 193	Ð 209	ß 225	± 241
2	0010	é 130	Æ 146	ó 162	■ 178	┬ 194	Ê 210	Ô 226	= 242
3	0011	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	¾ 243
4	0100	ä 132	ö 148	ñ 164	┤ 180	─ 196	È 212	õ 228	¶ 244
5	0101	à 133	ò 149	Ñ 165	Á 181	┼ 197	€ 213	σ 229	§ 245
6	0110	å 134	û 150	ª 166	Â 182	ã 198	Í 214	µ 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	╚ 200	Ï 216	Þ 232	° 248
9	1001	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
A	1010	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250
B	1011	Ï 139	ø 155	½ 171	╗ 187	╦ 203	▉ 219	Ù 235	¹ 251
C	1100	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	ý 236	³ 252
D	1101	ì 141	Ø 157	¡ 173	¢ 189	═ 205	¦ 221	Ý 237	² 253
E	1110	Ä 142	× 158	« 174	¥ 190	╬ 206	Ì 222	¯ 238	■ 254
F	1111	Å 143	ƒ 159	» 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	SP 128	SP 144	SP 160	SP 176	SP 192	SP 208	SP 224	SP 240
1	0001	SP 129	SP 145	SP 161	SP 177	SP 193	SP 209	SP 225	SP 241
2	0010	SP 130	SP 146	SP 162	SP 178	SP 194	SP 210	SP 226	SP 242
3	0010	SP 131	SP 147	SP 163	SP 179	SP 195	SP 211	SP 227	SP 243
4	0100	SP 132	Ö 148	SP 164	SP 180	SP 196	SP 212	SP 228	SP 244
5	0101	SP 133	SP 149	SP 165	SP 181	SP 197	SP 213	SP 229	SP 245
6	0110	SP 134	SP 150	SP 166	SP 182	SP 198	SP 214	SP 230	SP 246
7	0111	SP 135	SP 151	SP 167	SP 183	SP 199	SP 215	SP 231	SP 247
8	1000	SP 136	SP 152	SP 168	SP 184	SP 200	SP 216	SP 232	SP 249
9	1001	SP 137	SP 153	SP 169	SP 185	SP 201	SP 217	SP 233	SP 249
A	1010	SP 138	SP 154	SP 170	SP 186	SP 202	SP 218	SP 234	SP 250
B	1011	SP 139	SP 155	SP 171	SP 187	SP 203	SP 219	SP 235	SP 251
C	1100	SP 140	SP 156	SP 172	SP 188	SP 204	SP 220	SP 236	SP 252
D	1101	SP 141	SP 157	SP 173	SP 189	SP 205	SP 221	SP 237	SP 253
E	1110	SP 142	SP 158	SP 174	SP 190	SP 206	SP 222	SP 238	SP 254
F	1111	SP 143	SP 159	SP 175	SP 191	SP 207	SP 223	SP 239	SP 255

3.2.9 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 COMMENDS

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	○		○
DLE EOT	Real-tine status transmission	○		○
DLE ENQ	Real-time request to printer	○		○
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 15mm, speed, GRAPH)	○	○	
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 I	Transmit print ID	○		○
GS L	Set let margin		○	(○)
GS P	Set vertical and horizontal motion unite		○	○
GS W	Set printing area width		○	(○)
GS ^	Execute macro	○	○	○
GS a	Enable/disable Automatic Status Back	○	○	○
GS b	Turn smoothing mode on/off		○	○
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, it 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.

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 sane 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 be 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 uses 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[1DH(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

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.

DLE EOT n

[Name] Real-time status transmission.

[Format]

ASCII	DLE	EOT	n
HEX	10	04	n
Decimal	16	4	n

[Range] $1 \leq n \leq 4$

[Description] Transmits the selected printer status specified by n in real time, according to the following parameters:

n=1 : Transmit printer status.
n=2 : Transmit off-line status.
n=3 : Transmit error status.
n=4 : transmit paper roll sensor status.

n=1 : printers status.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	On	02	2	Not used. Fixed to On
2	Off	00	0	Not used.
3	Off	00	0	On-line
	On	08	8	Off-line
4	On	10	16	Not used. Fixed to On
5-6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to Off

n=2 : Off-line status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to off.
1	On	02	2	Not used. Fixed to on.
2	Off	00	0	Cover is closed.
	On	04	4	Cover is open.
3	Off	00	0	Paper is not being fed by using the PAPER FEED button.
	On	08	8	Paper is being fed by the PAPER FEED button.
4	On	10	16	Not used. Fixed to on.
5	Off	00	0	Not used. Fixed to off.
6	Off	00	0	Not used. Fixed to off.
7	Off	00	0	Not used. Fixed to off.

n=3 : Error status

Bit	Off/On	Hex	decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	-	-	-	Undefined.
3	Off	00	0	Not used. Fixed to Off.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Not used. Fixed to Off.
6	Off	00	0	Not used. Fixed to Off.
7	Off	00	0	Not used. Fixed to Off.

n=4 : Continuous paper sensor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2,3	Off,Off	00	0	Paper roll near-end sensor is Off.
	On,On	0C	12	Paper roll near-end sensor is On.
4	On	10	16	Not used. Fixed to On.
5,6	Off	00	0	Paper roll sensor. Paper present.
	On	60	96	Paper roll end detected by paper roll sensor
7	Off	00	0	Not used. Fixed to Off.

DLE ENQ n

[Name] Real time request to printer

[Format] ASCII DLE ENQ n
HEX 10 05 n
DECIMAL 16 5 n

[Range] 1≤ n ≤2

[Description] Respond to a request from the host computer. n specifies the requests as follows

n	Request
1	Recover from an error and restart printing from the line where the error occurred
2	Recover from an error after clearing the receive and print buffers

[Notes] •This command is effective only when an auto-cutter error occurs
•The printer starts processing data upon receiving this command
•This command is executed even when the printer is off-line, the receive buffer is full, or there is an error status with a serial interface model.
•With a parallel interface model, this command can not be executed when the printer is busy. this command is executed even when the printer is off-line or there is an error status The status is also transmitted whenever the data sequence of <10H><05H><n>(1≤n≤2) is received Exampled: In ESC * m nL nH dk dl = <10>H, d2=<05>H, d3=<01>H
•This command should not e contained within another command that consists of two or mote bytes Examples:
If you attempt to transmit ESC 3 n to the printer, but DTR(DSR for the host computer)goes to MARK before n is transmitted, and DLE ENQ 2 interrupts before n is received, the code <10>H for DLE ENQ 2 is processed as the code for ESC 3 <10>H
•DLE ENQ 2 enables the printer to recover from an error after clearing the data in the receive buffer and the print buffer. The print retains the settings(by ESC !, ESC 3, etc) that were in effect when the error occurred. The printer can be initialized completely by using this command and ESC @. This command is enabled only for errors that have the possibility of recovery, excepts for print head temperature error.
•When the printer is disabled with ESC =(Select peripheral device), the error recovery functions(DLE ENQ 1, DLE ENQ 2)are enabled, and the other functions are disabled.

[Reference] DLE EOT

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 is 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:
  - ①When 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.
  - ②When 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₩, 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 $ *nL* *nH*
Hex 1B 24 *nL* *nH*
Decimal 27 36 *nL* *nH*
[Range] $0 \le nL \le 255$
$0 \le nH \le 255$
[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 [(*nL* + *nH* ×256)×(vertical or horizontal motion unit)] inches.
[Notes] ●Setting s 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 (*x*) is used.
[Reference] ESC\, GS P

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

[Name] Select bit-image mode

[Format]

ASCII	ESC	*	*m*	*nL*	*nH d1... dk*
Hex	1B	2A	*m*	*nL*	*nH d1... dk*
Decimal	27	42	*m*	*nL*	*nH d1... dk*

[Range] *m* = 0, 1, 32, 33
0 ≤ *nL* ≤ 255
0 ≤ *nH* ≤ 3
0 ≤ *d* ≤ 255

[Description] Selects a bit-image mode using m for the number of dots specified by *nL* and *nH*, as follows:

m	Mode	Vertical Direction		Horizontal Direction(*1)	
		Number of Dots	Dots Density	Dots Density	Number of Data (k)
0	8-dot single-density	8	67 DPI	100 DPI	*nL* + *nH* × 256
1	8-dot double-density	8	67 DPI	200 DPI	*nL* + *nH* × 256
32	24-dot single-density	24	200 DPI	100 DPI	(*nL* + *nH* × 256) × 3
33	24-dot double-density	24	200 DPI	200 DPI	(*nL* + *nH* × 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 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):
  ①The width of the printing area is extended to the right to accommodate the amount of data.
  ②If 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 ≤n ≤2, 48 ≤n ≤50

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

n	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 ≤ n ≤ 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 print able are 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(1/6inch)
[Reference] ESC 2, GS P

ESC 8 1

[Name] Print wave1, wave2 15mm
[Format] ASCII ESC 8 1 15 X (Repeat)
[S1_1, S2_1, W1_1, W2_1, … W1_16, W2_16]
…
[S1_15, S2_15, W1_225, W2_225, … W1_240, W2_240]

Hex 1B 38 31
Decimal 27 56 49
[Range] 0x21 ≤ S1,S2 ≤0xff (ADD 0x10, 0x11), 0 ≤ i, j≤ 16
[Description] S1(String 1), S2(String 2), W(Wave data)
[Notes] ●Each string limits length to 15 bytes(MAX).
●If it is not necessary printing, must fill bytes of blanks(0x20).
●The wave data consist of 225 bytes, There is no EOF data
●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 rotated character
[Format] ASCII ESC 8 2 *S_1, S_2 … S_495, S_496*
Hex 1B 38 32
Decimal 27 56 50
[Range] 0x21 ≤ S_i≤0xff (1 ≤ i ≤ 496)
[Description] S (String)

[Notes] ●String limits length to 496 bytes(MAX).
●If it is not necessary printing, must fill bytes of blanks(0x20).
●The wave data consist of 496 bytes.
●If you want to print any other character, change code page
●Change the character size available
(Character size is 24X12, 24X9 Because it was rotated).
In this mode, effected by ESC ! command.
Plz don't use rotate command in this mode

[Default]
[Reference]

ESC 8 6 (or 7)

[Name] Speed of printing (only graph image mode)
[Format]

ASCII	ESC	8	6 (or 7)	
Hex	1B	38	36 (or 37)	
Decimal	27	56	54 (or 55)	

[Range]
[Description] n = 36(25mm/sec) , n = 37 (50mm/sec)
[Notes] ● This command is not affected by normal print modes
(emphasized, double-strike, and underline, etc.)
● Default speed is 25mm/sec. However, the setting of the last received command is effective.
●
[Default] n = 36(25mm/sec)
[Reference]

ESC 8 8

[Name] Feed the paper by 2mm
[Format]

ASCII	ESC	8	8
Hex	1B	38	38
Decimal	27	56	56

[Range]
[Description]
[Notes] ● This command is not affected by line space mode
● Feed the paper by only 2mm
[Default]
[Reference]

ESC 8 9

[Name] Printing graph image
[Format]

ASCII	ESC	8	9	1	m	n
						V_1[H_1, H_2 … H_m], … n V_n[H_1, H_2 … H_m]
Hex	1B	38	38	31		
Decimal	27	56	56	49		

[Range] 1 ≤ m ≤ 48(dec), 1 ≤ n ≤ 256(dec)
[Description] m = Horizental byte number, n= Vertical byte number

[Notes] ● This command has no effect in all print modes(character size, emphasized, double strike, upside-down, underline, white/black reverse printing, etc..)for raster image.

[Default]

[Reference]

ESC = *n*

[Name] Select peripheral device

[Format]

ASCII	ESC	=	*n*
Hex	1B	3D	*n*
Decimal	27	61	*n*

[Range] 0 ≤ n ≤ 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 ≤*n* ≤255

0 ≤*k* ≤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 ≤*n* ≤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 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 ≤*n* ≤255

[Description] Prints the data in the print buffer and feeds the paper [*n* X (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 bless 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 40inches. 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	#	$	§	••	••	••	^	`	••	••	••	ß
3	U.K	£	$	@	[	\	]	^	`	{	:	}	~
4	Denmark I	#	$	@	••	Ø	••	^	`	••	ø	••	~
5	Sweden	#	¤	••	••	••	••	••	••	••	••	••	••
6	Italy	#	$	@	°	\	••	^	••	••	••	••	••
7	Spain	#	$	@	••	••	••	^	`	••	••	}	~
8	Japan	#	$	@	[	¥	]	^	`	{	:	}	~
9	Norway	#	¤	••	••	Ø	••	••	••	æ	ø	••	••
10	Denmark II	#	$	••	••	Ø	••	••	••	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] $0 \le n \le 1,\ 48 \le n \le 49$

[Description] turns 90° clockwise rotation mode on off.
N is used follows:

n	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 n 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*
Hex	1B	5C	*nL*	*nH*
Decimal	27	92	*nL*	*nH*

[Range] 0 ≤*nL* ≤255
0 ≤*nL* ≤255

[Description] Sets the print starting based on the current position by using the horizontal or vertical motion unit.
●This command sets the distance from the current position to [(*nL* + *nH* X 256)X(horizontal or vertical motion unit)].

[Notes] ●Any setting that exceeds the printable area is ignored.
●When pitch n is specified to the right:
nL +*nH* X 256 = *N*
●When pitch n is specified to the left(the negative direction), use the complement of 65536.
When pitch n is specified to the left:
nL + *nH* X 256 = 65536-*N*
●The print starting position moves from the current position to [*N* X 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	*n*
Hex	1B	61	*n*
Decimal	27	97	*n*

[Range] 0 ≤*n* ≤2, 48 ≤*n* ≤50

[Description] Aligns all the data in one line to the specified position.
N selects the type of justification as follows:

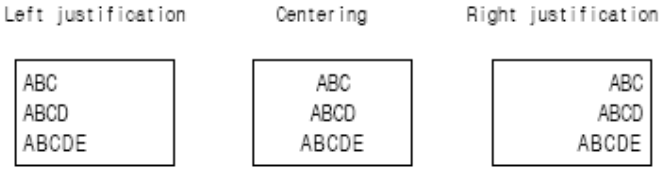
n	Justification
0,48	Left justification
1,49	Centering
2,50	Right justification

[Notes] The command is enabled only when input at the beginning of the line.
If this command is input in page mode, the printer performs only internal flag operation.
This command does not affect printing in page mode.

Lines are justified within the specified printing area.
Spaces set by HT, ESC $, and ESC / are all justified.

[Default] n = 0

[Example]



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 ≤*n* ≤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 ≤*n* ≤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
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-doun printing mode on or off.

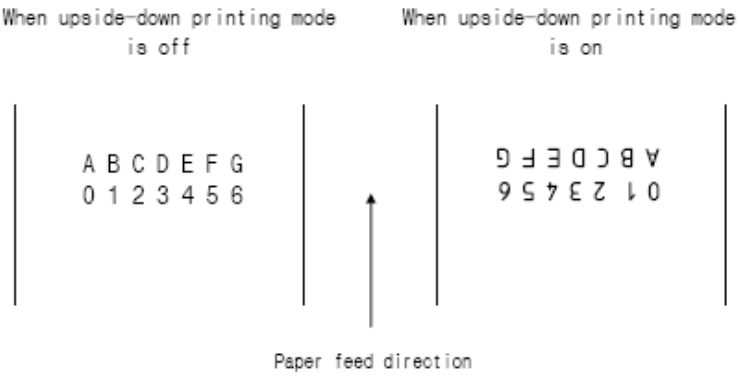
- When the LSB of n is 0, upside-down printing mode is turned off.
- When the LSB of n is 1, upside-down printing mode is turned on.

[Notes]

- 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.

[Default] *n* = 0

[Example]



GS ! n

[Name] Select character size

[Format]

ASCII	GS	!	*n*
Hex	1D	21	*n*
Decimal	29	33	*n*

[Range] 0 ≤*n* ≤255
Where 1 ≤Number of times of character height ≤2
1 ≤Number of times of character width ≤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 ≤n ≤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 ≤n ≤ 3 , 48 ≤n ≤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 ≤n ≤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

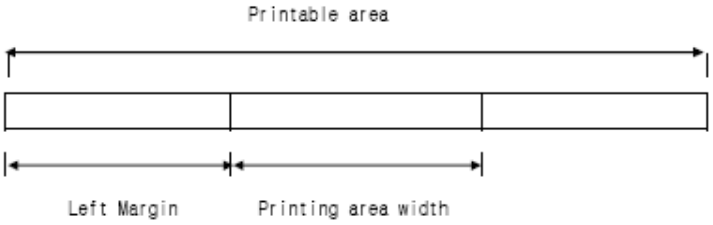
[Format]

ASCII	GS	L	*nL*	*nH*
Hex	1D	4C	*nL*	*nH*
Decimal	29	76	*nL*	*nH*

[Range] 0 ≤*nL* ≤255
0 ≤*nH* ≤255

[Description] Sets the left margin using *nL* and *nH*.

●The left margin is set to [(*nL* + *nH* X 256)X(horizontal motion unit6)]inches.



[Notes]
- ●This command is enabd only at the beginning kof a line.
- ●If this command is input in page mode, the printer performs only intermal 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 vertocaal motion unit ate does not Affect the current left margin.
- ●The GS P command can change the horizontal (and vertical) motion unit. However the valeue cannot change be less than minimum horizontal movenent 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	1D	50	*x*	*y*
Decimal	29	80	*x*	*y*

[Range]
0 ≤ *x* ≤255
0 ≤ *y* ≤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):
  - 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

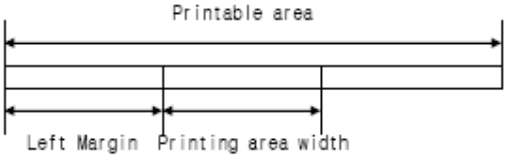
[Format]

ASCII	GS	W	nL	nH
Hex	1D	57	nL	nH
Decimal	29	87	nL	nH

[Range] 0 ≤nL ≤255
0 ≤nH ≤255

[Description] Sets the printing area width to the area specified by nL and nH.

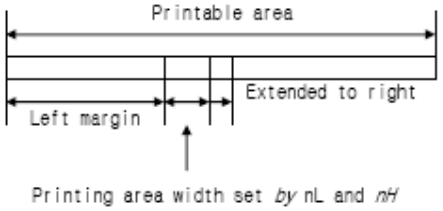
- The printing area width is set to [(nL + 256 X nH)X horizontal motion unit] inches.



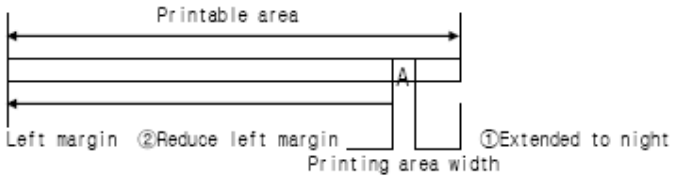
[Notes]

- 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 sane 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.

  ①The set printing area width is extended to the right to accommodate one character.



②If the printing area width is still insufficient at①, the left margin is reduced to accommodate one character.



③If the printing area width is still insufficient at ①and 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 width the ESC * or GS / command:

①The printing area width is extended to the right to accommodate the data.

②If 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 ≤ *r* ≤255
0 ≤ *t* ≤255
0 ≤ *m* ≤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* X 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 X 100msec) 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 a n

[Name] Enabled/disable Automatic Status Back(ASB)

[Format]

ASCII	GS	a	n
HEX	1D	61	n
DECIMAL	29	97	n

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

[Description] Enables or disables ASB and specifies the status items to include, using n as follows:

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Not used.
1	Off	00	0	On-line/off-line status disabled
	On	02	2	On-line/off-line status enabled
2	Off	00	0	Error status disabled
	On	04	4	Error status enabled
3	Off	00	0	Paper roll sensor status disabled
	On	08	8	Paper roll sensor status enabled
4~7	-	-	-	Undefined

[Notes]

- If any of the status items in the table above are enabled, the printer transmits the status when this command is executed The printer automatically transmits the status whenever the enabled status item changes. The disabled status items may change, in this case, because each status transmission represents the current status
- If all status items are disabled, the ASB function is also disabled
- If the ASB is enabled as a default, the printer transmits the status when the printer data reception and transmission is possible at the first time from when the printer is turned on
- The following four status bytes are transmitted without confirming whether the host is ready to receive data . the four status bytes must be consecutive, except for the Xoff code
- Since this command is executed after the data is processed in the receive buffer, there may be a time lag between data reception and status transmission
- When the printer is disabled by ESC =(select peripheral device), the four status bytes are transmitted whenever the status changes.
- When using DLE EOT, GS I, or GS r, the status transmitted by these commands and ASB status must be differentiated
- The status to be transmitted are as follows

First byte(printer information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Not used. Fixed to off
1	Off	00	0	Not used. Fixed to off
2	Off	00	0	Not used.
3	Off	00	0	On-line
	On	08	8	Off-line
4	On	10	16	Not used. Fixed to on
5	Off	00	0	Cover is closed
	On	20	32	Cover is open
6	Off	00	0	Paper is not being fed by using the paper feed button
	On	40	64	Paper is being fed by using the paper feed button
7	Off	00	0	Not used. Fixed to off

Second byte(printer information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	-	-	-	Undefined
1	-	-	-	Undefined
2	-	-	-	Undefined
3	Off	00	0	Not used. Fixed to off
4	Off	00	0	Not used. Fixed to off
5	Off	00	0	Not used. Fixed to off
6	Off	00	0	Not used. Fixed to off
7	Off	00	0	Not used. Fixed to off

Third bytes(paper sensor information

Bit	Off/On	Hex	Decimal	Status for ASB
0,1	Off, Off	00	0	Paper roll near-end sensor: paper adequate
	On, On	03	3	Paper roll near-end sensor: paper near end
2,3	Off, Off	00	0	Paper roll end sensor: paper present
	On, On	0C	12	Paper roll end sensor: paper not present
4	Off	00	0	Not used. Fixed to off
5,6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off

Fourth byte(paper sensor information)

Bit	Off/on	Hex	Decimal	Status for ASB
0-3	-	-	-	Undefined
4	off	00	0	Not used. Fixed to off
5,6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off

[Default] n=0
[Reference] DLE EOT, GS r

GS b n

[Name] Turns smoothing mode on/off

[Format]

ASCII	GS	b	n
HEX	1D	62	n
DECIMAL	29	98	n

[Range] 0 ≤ n ≤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 ≤*n* ≤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] ①0 ≤*m* ≤6 (k and d depends on the bar code system used)
②65 ≤*m* ≤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 bode system as follows:

m		Bar Code System	Number of Characters	Remarks
①	0	UPC-A	11≤k≤12	48≤d≤57
	1			
	2	JAN 13(EAN)	12≤k≤13	48≤d≤57
	3	JAN8(EAN)	7≤k≤8	48≤d≤57
	4	CODE39	1≤k	48≤d≤57,65≤d≤90,32, 36,37,43,45,46,47
	5	ITF	1≤k (even number)	48≤d≤57
	6	CODABAR	1≤k	48≤d≤57,65≤d1≤68, 36,43,45,46,47,58
②	65	UPC-A	11≤n≤12	48≤d≤57
	66			
	67	JAN13(EAN)	12≤n≤13	48≤d≤57
	68	JAN8(EAN)	7≤n≤8	48≤d≤57
	69	CODE39	1≤n≤255	48≤d≤57,65≤d≤90,32, 36,37,43,45,46,47
	70	ITF	1≤n≤255 (even number)	48≤d≤57
	71	CODABAR	1≤n≤255	48≤d≤57,65≤d1≤68 36,43,45,47,58
	72	CODE93	1≤n≤255	0≤d≤127
	73	CODE128	2≤n≤255	0≤d≤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 n 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.
- The printer prints HRI characters (■ + an alphabetic character) as a control character (<00>H to <1F>H and <7F>H) :

Control character			HRI	Control character			HRI
ASCII	Hex	Decimal	character	ASCII	Hex	Decimal	character
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 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
HEX	1D	76	30	m	xL	xH	yL	yH	dl…dk
DECIMAL	29	118	48	m	xL	xH	yL	yH	dl…dk

[Range] $0 \le m \le 3,\ 48 \le m \le 51$
$0 \le xL \le 255$
$0 \le xH \le 255$
$0 \le yL \le 255$
$0 \le d \le 255$
$k=(xL+xH\times256)\times(yL+yH\times256)\ \ (k=0)$

[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

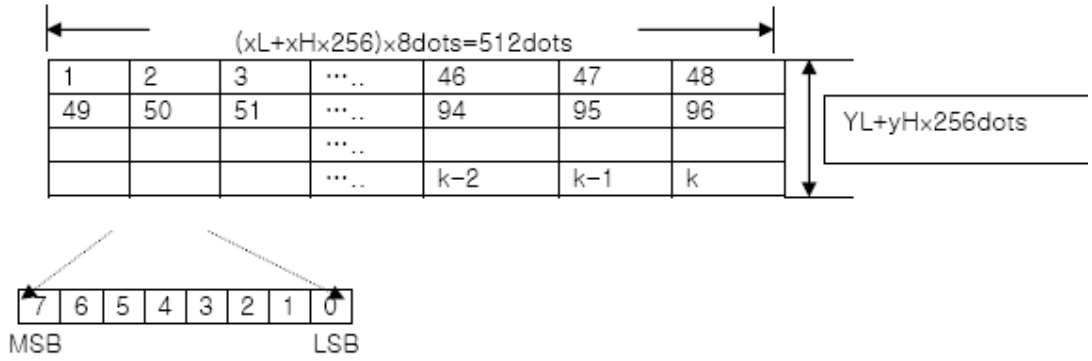
3,51	Quadruple	100dpi	100dpi

•xL, xH, selects the number of data bits(xL+xH×256)in the horizontal direction for the bit image

•yL, yH, selects the number of data bits (yL+yH×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 al 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×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℃)

Operation Voltage	Paper Feed speed	Duty Cycle(%)
5V	20mm/sec	60

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%).