BIXOLON®

UP DATE 2013.07.19

SPECIFICATIONS FOR APPROVAL

CUSTOMER :

PRODUCT TYPE : PANEL PRINTER

MODEL NAME : SPP-100II

SIGNATURE OF APPROVAL

BIXOLON CO.,LTD.
7th FL, MiraeAsset Ventura Tower,685,
Sampyeong-dong,Bundang-gu, Seongnam-si,
Gyeonggi-Do, 463-400, KOREA
TEL: 82-31-218-5515/5572
FAX: 82-31-218-5589

The Designs or Specifications are subject to change without notice

REVISION SHEET

`	Sheet	Changed contents
A		Update of specification due to the modification of the board
B	131	Addition to main component for multiple use

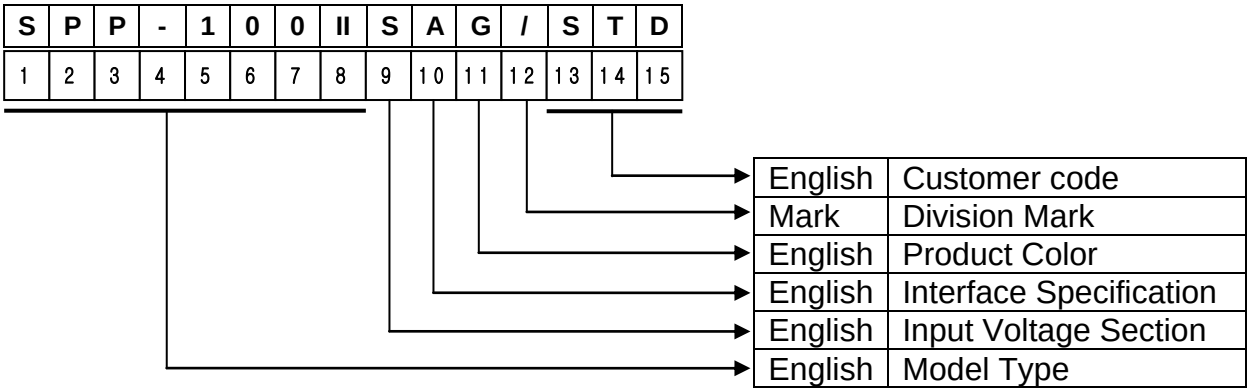
Title

SPP-100II
Specification
(Standard)

TABLE OF CONTENTS

1. GENERAL SPECIFICATIONS

1.1 Part Number Structure



1) Digit 1~8: Model type “SPP-100II”
2) Digit 9: Input Voltage Section

Mark	Input Voltage	Example
H	DC 8.5V	SPP-100IIH
S	DC 7.2V	SPP-100IIS
L	DC 5.0V	SPP-100IIL

3) Digit 10: Interface Specification

Mark	Type	Communication speed	Mark	Type	Communication speed
A	Serial	9,600bps	U	USB	USB 2.0
B		19,200bps			
C		38,400bps			
D		57,600bps			
E		115,200bps			
F		4,800bps			

4) Digit 11: Product Color section

Mark	Product Color	Example
“ ” (Blank)	Ivory	SPP-100IIHA
G	Dark Gray	SPP-100IISAG

5) Digit 12: Division Mark “/”
6) Digit 13~15: 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, Max 60 mm/second
   (duty 12.5%) 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

1.3 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 17 (including horizontal 2-dot spacing)
   Font C: 9 X 24 (including horizontal 2-dot spacing)
   Font A,B,C is selected as the default.
   24x24 Hangul,Big5,Shift JIS,GB2312
   (24 x24 can be selected as an option.)
3)Character size: 1.5 mm (.059") X 3.0 mm (.12")(W X H) (font A)
   1.125 mm (.044") X 2.125 mm (.083")(W X H) (font B)
   1.125 mm (.044") X 3.0 mm (.12")(W X H) (font C)

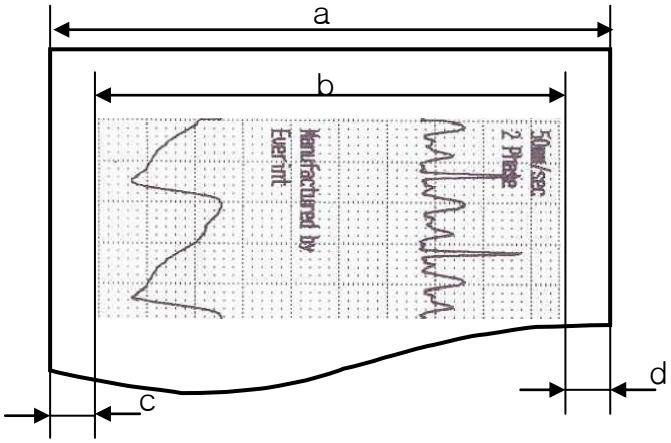
Table 1.2.1 Character Size

	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	1.5 X 3 (.059"X.12")	32	1. 5 X 6 (.059"X.24")	32	3.0 X 3 (.118" X.12")	16	3.0 X 6 (.118" X.24")	16
Font B 9X17	1.125 X 2.125 (.044"X.083")	42	1.125 X 4.25 (.044"X.166")	42	2.25 X 2.125 (.088" X.083")	21	2.25 X 4.25 (.088" X.166")	21
Font C 9X24	1.125 X 3 (.044"X.12")	42	1.125 X 6 (.044"X.24")	42	2.25 X 3 (.088"X.12")	21	2.25 X 6 (.088"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.

1.4 Paper

1)Recommended paper:
A. TF50KS-E2D (Paper thickness: 65 µm) of Nippon paper Industries Co., Ltd
B. PD 160R (75 µm) of New Oji Paper Mfg, Co., Ltd.
C. P350 (62 µm) of Kanzaki Specialty Paper, Inc.(USA)
D. Hansol Thermo 65(65 µm) of Hansol Paper Co., Ltd.(Korea)
2)Form : Paper roll
3)Paper width : 58 mm(2.28") 0,-0.1
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″) 0,-0.1mm
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]

1.5 Receive Buffer

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

1.6 Electrical Characteristic

1) Input voltage; Rating; SPP-100IIH: DC8.5V
SPP-100IIS: DC7.2V
SPP-100IIL: DC5.0V
2) current consumption (*160Dot ON at same time)
SPP-100IIH: Max approximately *9.04A
(64Dot ON at same time = 4.6A)
SPP-100IIS: Max approximately *8.5A
(64Dot ON at same time = 4A)
SPP-100IIL: Max approximately *7.57A
(64Dot ON at same time = 3.8A)

1.7 Reliability

1) Life: Thermal paper: Activation pulse resistance: 100million
Abrasion resistance: 50km
End of Life is defined as the point at which the printer reaches the beginning of the wear-out period

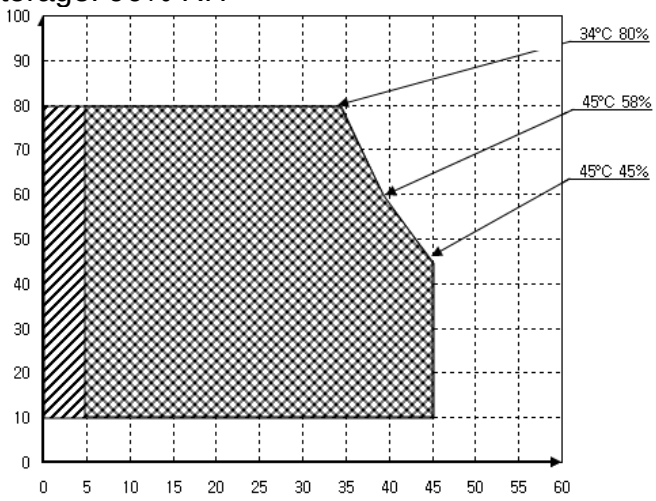
2) MTBF: 180,000 hours
Failure is defined as Random Failure occurring at the time of the Random Failure Period.

3) 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.

1.8 Environmental condition

1)Temperature: Operating: 0℃ to 45℃
Storage: -20℃ to 60℃(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.

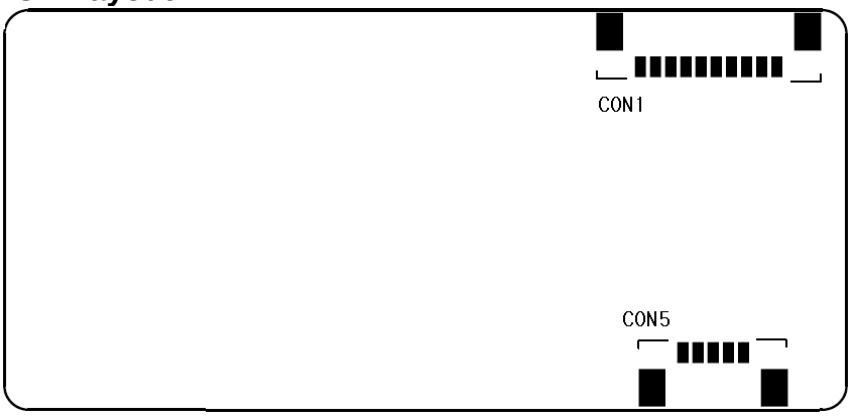
4)Impact resistance: When packed: Package: Bixolon standard package
Height: 90 cm (35.43")
Directions: 1 corner, 3 edges, and 6 surfaces
No external or internal damage should be found after the drop test, and the unit should operate normally.
When unpacked: Height 5cm (1.97")
Direction: Lift one edge 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

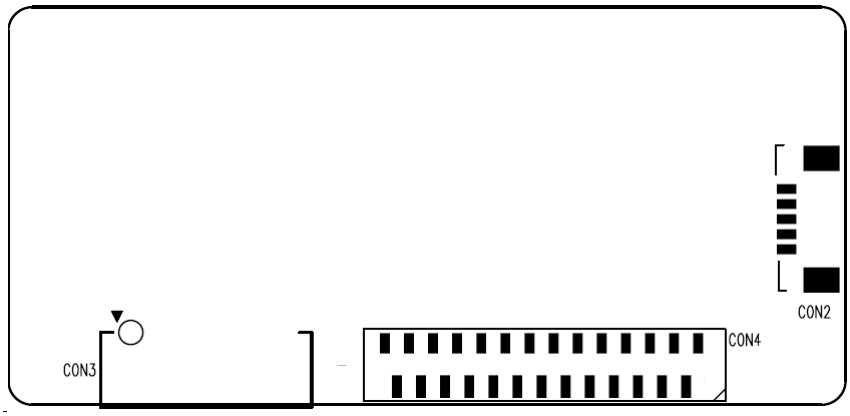
The SPP-100II must be installed horizontally or intuitively.

2. CONFIGURATION

2.1.1 MAIN PCB Layout



TOP



BOTTOM

2.2 DC Power and Interface

2.2.1 Connector(CON1)

1) Debugger Connector for Firmware

2) Don't User

2.2.2 LED & FEED Connector(CON2)

1) Don't User

2.2.3 Connector(CON3)

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

2) PIN layout

Pin NO	Signal Name	Function
1	V_{IN}	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

2.2.4 Mechanism Connector(CON4)

1) Don't User

2.2.5 USB Connector(CON5)

1) Specification : 1.25mm pitch 5pin Right angle connector
(12505WR-05 : www.yeonho.com)

2) PIN layer

Pin number	Function	
1	Don't User	For F/W download
2	VBUS	+5V
3	D-(USB_DM)	
4	D+(USB_DP)	
5	GND	

2.2.6 DC Power

1) Input voltage Rating; SPP-100IIH: DC8.5V
SPP-100IIS: DC7.2V
SPP-100IIL: DC5.0V

2) Logic voltage; 3.3VDC (Regulated automatically)

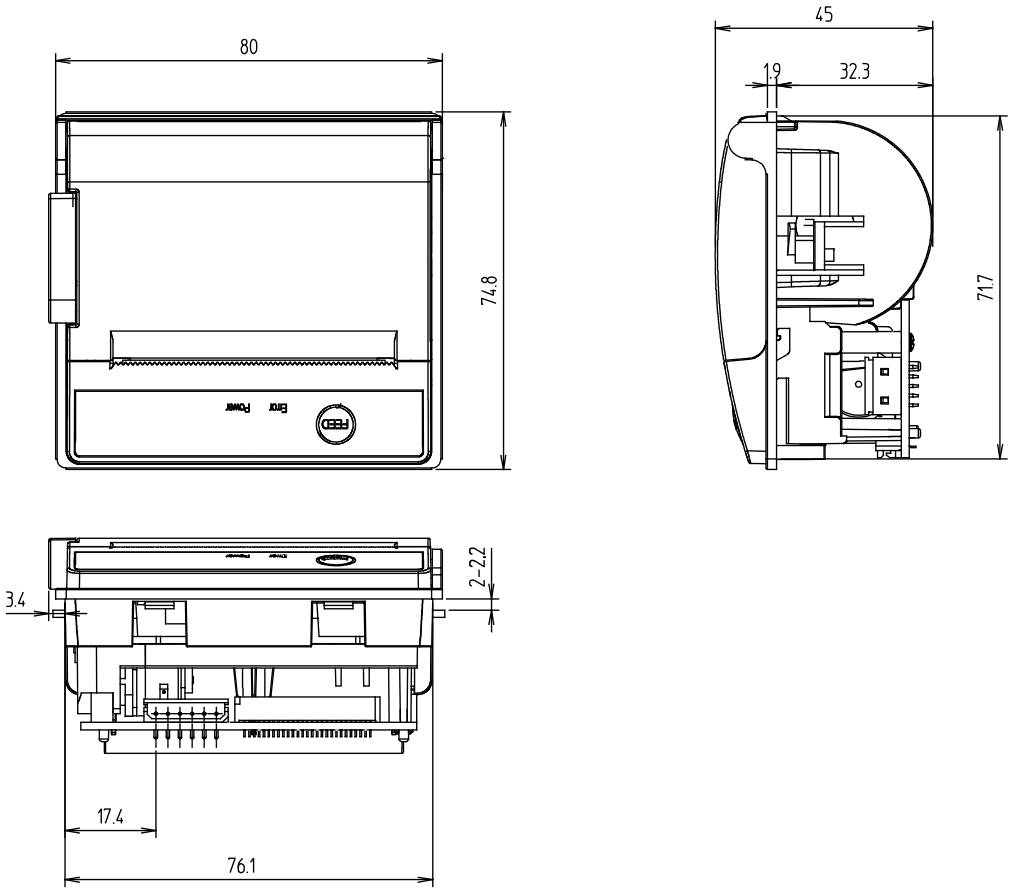
2.2.7 Serial interface (compatible with RS-232)

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 **/ 7bit**
*Parity settings:	None/**Odd/Even**
Stop bits:	1

NOTES: 1. *** depend on Software Settings.**
(option, Change available)
2. Data transmitted from the printer has 1 stop bit (fixed).

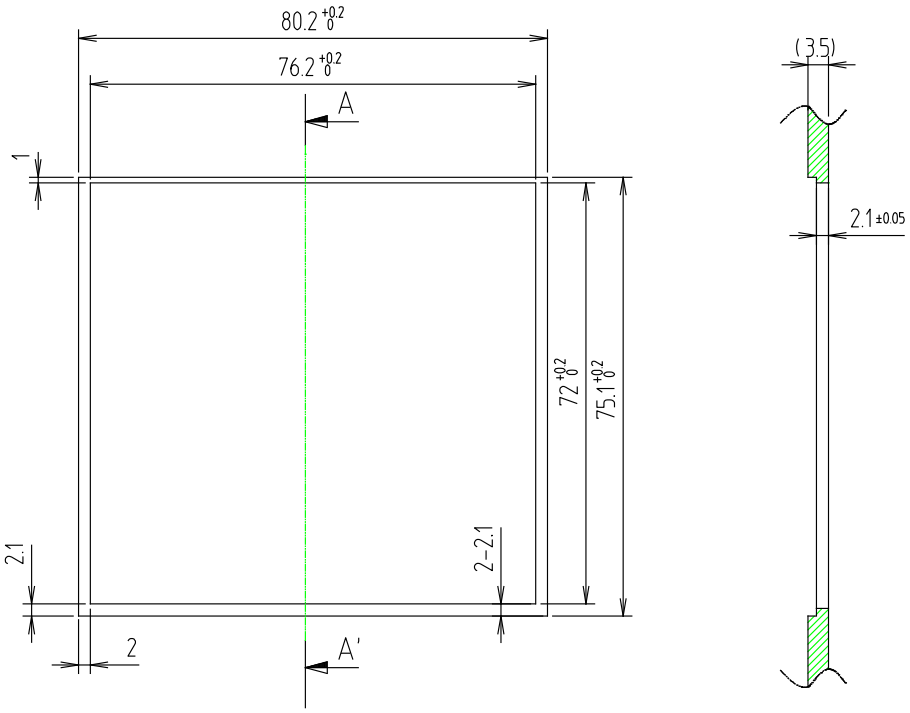
2.3 CASE Specification

2.3.1 Printer overall dimensions



2.3.2 Printer mounting method

2.3.2.1 User side dimension guide

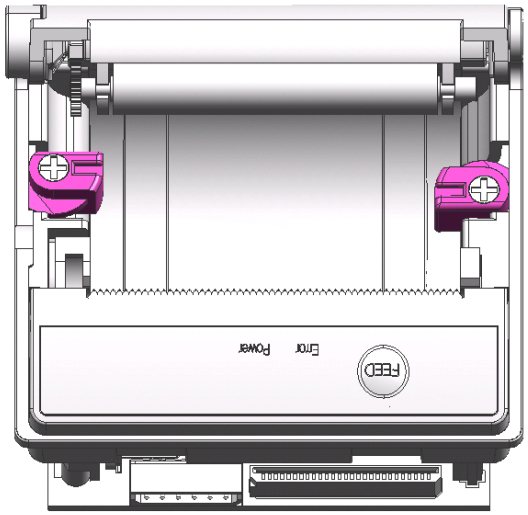


SECTION A-A'

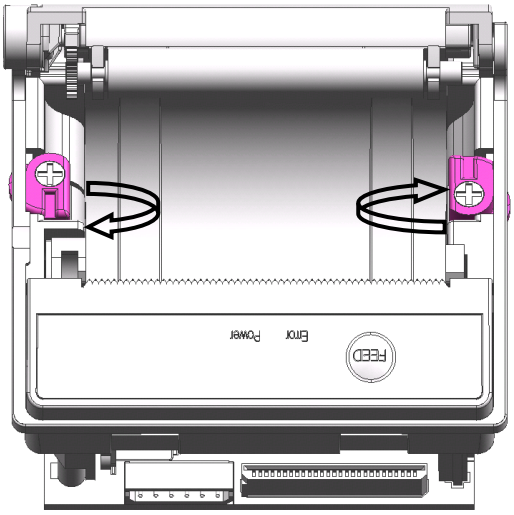
2.3.2.2 Mounting flow chart

Open Lever Lock L and R on the papers basket, install SPP-100II 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.

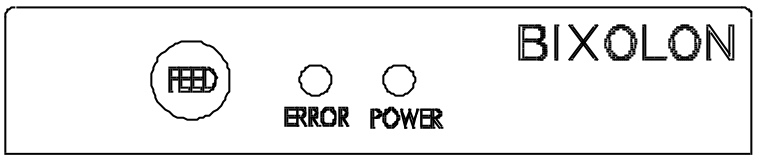
3.1.3 Error LED : RED

OFF: Normal condition

ON : Error mode

Blinking: Paper empty detected and thermal head overheating.

3.1.4 FEED Button and Display Layout



※The layout may be different for each customer.

3.2 Character Code Tables

The following pages show the character code tables. To find the character corresponding to a hexadecimal number, count across the top of the table for the left digit and count down the left column of the table for the right digit.

For example, 4A = J. (Page 0)

3.2.1 Page 0 – 437 (USA, Standard Europe)

	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	17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▒ 177	┴ 193	╤ 209	ß 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	0011	03	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	° 248
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	ε 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	0011	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	〒 248
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	ノ 159	ッ 175	ソ 191	マ 207	゜ 223	＼ 239	SP 255

3.2.3 Page 2 - 850 (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	0011	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	3/4 243
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	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	¡ 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 - 860 (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	ß 225	± 241
2	0010	é 130	È 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	0011	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	0100	ã 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	° 248
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	ε 238	■ 254
F	1111	Â 143	Ó 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

3.2.5 Page 4 - 863 (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	È 145	´ 161	▒ 177	┴ 193	╤ 209	β 225	± 241
2	0010	é 130	Ê 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	0011	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	° 248
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	ε 238	■ 254
F	1111	§ 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

3.2.6 Page 5 - 865 (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	0011	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	° 248
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	ε 238	■ 254
F	1111	Å 143	ƒ 159	¤ 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

3.2.7 Page 16 - 1252 (Latin I)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	€ 128	144	160	° 176	À 192	Đ 208	à 224	đ 240
1	0001	129	‘ 145	¡ 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	0010	’ 130	’ 146	¢ 162	2 178	Â 194	Ò 210	â 226	ò 242
3	0011	ƒ 131	“ 147	£ 163	3 179	Ã 195	Ó 211	ã 227	ó 243
4	0100	,, 132	” 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	0101	… 133	• 149	¥ 165	µ 181	Å 197	Õ 213	å 229	õ 245
6	0110	† 134	- 150	¦ 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	0111	‡ 135	_ 151	§ 167	• 183	Ç 199	x 215	ç 231	÷ 247
8	1000	^ 136	~ 152	¨ 168	¸ 184	È 200	Ø 216	è 232	ø 248
9	1001	‰ 137	™ 153	© 169	1 185	É 201	Ù 217	é 233	ù 249
A	1010	Š 138	š 154	ª 170	º 186	Ê 202	Ú 218	ê 234	ú 250
B	1011	‹ 139	› 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
C	1100	Œ 140	œ 156	¬ 172	¼ 188	Ì 204	Ü 220	ì 236	ü 252
D	1101	141	157	173	½ 189	Í 205	Ý 221	í 237	ý 253
E	1110	Ž 142	ž 158	® 174	¾ 190	Î 206	Þ 222	î 238	þ 254
F	1111	143	Ÿ 159	¯ 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

3.2.8 Page 17 - 866 (Cyrillic #2)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	А 128	Р 144	а 160	▒ 176	└ 192	╨ 208	р 224	Ё 240
1	0001	Б 129	С 145	б 161	▒ 177	┴ 193	╤ 209	с 225	ё 241
2	0010	В 130	Т 146	в 162	▒ 178	┬ 194	╥ 210	т 226	Є 242
3	0011	Г 131	У 147	г 163	│ 179	├ 195	╙ 211	у 227	є 243
4	0100	Д 132	Ф 148	д 164	┤ 180	─ 196	╘ 212	ф 228	Ї 244
5	0101	Е 133	Х 149	е 165	╡ 181	┼ 197	╒ 213	х 229	ї 245
6	0110	Ж 134	Ц 150	ж 166	╢ 182	╞ 198	╓ 214	ц 230	Ў 246
7	0111	З 135	Ч 151	з 167	╖ 183	╟ 199	╫ 215	ч 231	ў 247
8	1000	И 136	Ш 152	и 168	╕ 184	╚ 200	╪ 216	ш 232	° 248
9	1001	Й 137	Щ 153	й 169	╣ 185	╔ 201	┘ 217	щ 233	∙ 249
A	1010	К 138	Ъ 154	к 170	║ 186	╩ 202	┌ 218	ъ 234	· 250
B	1011	Л 139	Ы 155	л 171	╗ 187	╦ 203	■ 219	ы 235	√ 251
C	1100	М 140	Ь 156	м 172	╝ 188	╠ 204	▬ 220	ь 236	№ 252
D	1101	Н 141	Э 157	н 173	╜ 189	═ 205	▌ 221	э 237	¤ 253
E	1110	О 142	Ю 158	о 174	╛ 190	╬ 206	▐ 222	ю 238	■ 254
F	1111	П 143	Я 159	п 175	┐ 191	╧ 207	▀ 223	я 239	SP 255

3.2.9 Page 18 - 852 (Latin 2)

	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	đ 208	Ó 224	- 240
1	0001	ü 129	Ĺ 145	í 161	▒ 177	┴ 193	Đ 209	ß 225	˝ 241
2	0010	é 130	Í 146	ó 162	▓ 178	┬ 194	Ď 210	Ô 226	˛ 242
3	0011	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ń 227	ˇ 243
4	0100	ä 132	ö 148	Ą 164	┤ 180	─ 196	ď 212	ń 228	˘ 244
5	0101	ů 133	Ľ 149	ą 165	Á 181	┼ 197	Ň 213	ň 229	§ 245
6	0110	ć 134	ľ 150	Ž 166	Â 182	Ă 198	Í 214	Š 230	÷ 246
7	0111	ç 135	Ś 151	ž 167	Ě 183	ă 199	Î 215	š 231	¸ 247
8	1000	ł 136	ś 152	Ę 168	Ş 184	╚ 200	ě 216	Ř 232	° 248
9	1001	ë 137	Ö 153	ę 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
A	1010	Ő 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	ŕ 234	· 250
B	1011	ő 139	Ť 155	Ź 171	╗ 187	╦ 203	▉ 219	Ű 235	ű 251
C	1100	î 140	ť 156	Č 172	╝ 188	╠ 204	■ 220	ý 236	Ř 252
D	1101	Ź 141	Ł 157	ş 173	Ż 189	═ 205	Ţ 221	Ý 237	ř 253
E	1110	Ä 142	x 158	« 174	ż 190	╬ 206	Ů 222	ţ 238	■ 254
F	1111	Ć 143	č 159	» 175	┐ 191	¤ 207	■ 223	´ 239	255

3.2.10 Page 19 - 858 (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	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	0011	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	3/4 243
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	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	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	¡ 173	¢ 189	═ 205	▌ 221	Ý 237	2 253
E	1110	Ä 142	x 158	« 174	¥ 190	╬ 206	▐ 222	¯ 238	▪ 254
F	1111	Å 143	ƒ 159	» 175	┐ 191	¤ 207	■ 223	´ 239	SP 255

3.2.11. Page 21 - 862 (Hebrew DOS code)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	א 128	נ 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	0001	ב 129	ס 145	í 161	▒ 177	┴ 193	╤ 209	ß 225	± 241
2	0010	ג 130	ע 146	ó 162	▒ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	0011	ד 131	ף 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	0100	ה 132	פ 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	0101	ו 133	ץ 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	0110	ז 134	צ 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	0111	ח 135	ק 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	1000	ט 136	ר 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	1001	י 137	ש 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	∙ 249
A	1010	ך 138	ת 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	1011	כ 139	¢ 155	½ 171	╗ 187	╦ 203	▉ 219	δ 235	√ 251
C	1100	ל 140	£ 156	¾ 172	╝ 188	╠ 204	▬ 220	∞ 236	n 252
D	1101	ם 141	¥ 157	¡ 173	╜ 189	═ 205	▌ 221	φ 237	² 253
E	1110	מ 142	Pts 158	« 174	╛ 190	╬ 206	▐ 222	ε 238	■ 254
F	1111	ן 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

3.2.12. Page 22 - 864 (Arabic)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	° 128	β 144	NBSP 160	٠ 176	¢ 192	ذ 208	ـ 224	ّـ 240
1	0001	· 129	∞ 145	— 161	١ 177	ء 193	ر 209	ف 225	ّ 241
2	0010	· 130	ø 146	آ 162	٢ 178	آ 194	ز 210	ق 226	ن 242
3	0011	√ 131	± 147	£ 163	٣ 179	أ 195	س 211	ك 227	ه 243
4	0100	▒ 132	½ 148	¤ 164	٤ 180	ؤ 196	ش 212	ل 228	ھ 244
5	0101	⎯ 133	¼ 149	أ 165	٥ 181	ع 197	ص 213	م 229	ى 245
6	0110	⎸ 134	≈ 150	166	٦ 182	ئ 198	ض 214	ن 230	ي 246
7	0111	┼ 135	« 151	€ 167	٧ 183	ا 199	ط 215	ه 231	غ 247
8	1000	┤ 136	» 152	ا 168	٨ 184	ب 200	ظ 216	و 232	ق 248
9	1001	┬ 137	لأ 153	ب 169	٩ 185	ة 201	ع 217	ى 233	لآ 249
A	1010	├ 138	لأ 154	ت 170	ف 186	ت 202	غ 218	ي 234	لآ 250
B	1011	┴ 139	155	ث 171	؛ 187	ث 203	¦ 219	ض 235	ل 251
C	1100	┐ 140	156	، 172	س 188	ج 204	¬ 220	ع 236	ك 252
D	1101	┌ 141	لا 157	ج 173	ش 189	ح 205	÷ 221	خ 237	ي 253
E	1110	└ 142	لا 158	ح 174	ص 190	خ 206	× 222	غ 238	■ 254
F	1111	┘ 143	ا 159	خ 175	؟ 191	د 207	ع 223	م 239	255

3.2.13 Page 23 - Thai character code 42

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1111	1111
0	0000	128	๐ 144	160	ฒ 176	ย 192	เ 208	◌ 224	◌ 240
1	0001	129	๑ 145	ก 161	ณ 177	ร 193	แ 209	◌ 225	◌ 241
2	0010	130	๒ 146	ข 162	ด 178	ฤ 194	โ 210	◌ 226	◌ 242
3	0011	131	๓ 147	ค 163	ต 179	ล 195	ใ 211	◌ 227	◌ 243
4	0100	132	๔ 148	ฆ 164	ถ 180	ว 196	ไ 212	◌ 228	◌ 244
5	0101	133	๕ 149	ง 165	ท 181	ศ 197	ๅ 213	◌ 229	◌ 245
6	0110	134	๖ 150	จ 166	ธ 182	ษ 198	ๆ 214	◌ 230	◌ 246
7	0111	135	๗ 151	ฉ 167	น 183	ส 199	็ 215	◌ 231	◌ 247
8	1000	136	๘ 152	ช 168	บ 184	ห 200	่ 216	◌ 232	◌ 248
9	1001	137	๙ 153	ซ 169	ป 185	ฬ 201	้ 217	◌ 233	◌ 249
A	1010	138	ฃ 154	ฌ 170	ผ 186	อ 202	๊ 218	◌ 234	◌ 250
B	1011	139	ค 155	ญ 171	ฝ 187	ฮ 203	๋ 219	◌ 235	◌ 251
C	1100	140	ฅ 156	ฏ 172	พ 188	ะ 204	์ 220	◌ 236	◌ 252
D	1101	141	ๆ 157	ฐ 173	ฟ 189	ั 205	๎ 221	◌ 237	◌ 253
E	1110	142	็ 158	ฑ 174	ภ 190	า 206	๏ 222	◌ 238	◌ 254
F	1111	143	เ 159	ฒ 175	ม 191	ำ 207	๐ 223	◌ 239	255

3.2.14 Page 24 - 1253 (Greek)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	€ 128	144	NBSP 160	° 176	ΐ 192	Π 208	ΰ 224	π 240
1	0001	129	‘ 145	΅ 161	± 177	Α 193	Ρ 209	α 225	ρ 241
2	0010	’ 130	’ 146	Ά 162	² 178	Β 194	210	β 226	ς 242
3	0011	ƒ 131	“ 147	£ 163	³ 179	Γ 195	Σ 211	γ 227	σ 243
4	0100	” 132	” 148	¤ 164	΄ 180	Δ 196	Τ 212	δ 228	τ 244
5	0101	… 133	• 149	¥ 165	µ 181	Ε 197	Υ 213	ε 229	υ 245
6	0110	† 134	– 150	¦ 166	¶ 182	Ζ 198	Φ 214	ζ 230	φ 246
7	0111	‡ 135	— 151	§ 167	· 183	Η 199	Χ 215	η 231	χ 247
8	1000	136	152	¨ 168	Έ 184	Θ 200	Ψ 216	θ 232	ψ 248
9	1001	‰ 137	™ 153	© 169	Ή 185	Ι 201	Ω 217	ι 233	ω 249
A	1010	138	154	170	Ί 186	Κ 202	Ϊ 218	κ 234	ϊ 250
B	1011	‹ 139	› 155	« 171	» 187	Λ 203	Ϋ 219	λ 235	ϋ 251
C	1100	140	156	¬ 172	Ό 188	Μ 204	ά 220	μ 236	ό 252
D	1101	141	157	- 173	½ 189	Ν 205	έ 221	ν 237	ύ 253
E	1110	142	158	® 174	Ύ 190	Ξ 206	ή 222	ξ 238	ώ 254
F	1111	143	159	― 175	Ώ 191	Ο 207	ί 223	ο 239	255

3.2.15 Page 25 - 1254 (Turkish)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	€ 128	144	NBSP 160	° 176	À 192	Ğ 208	à 224	ğ 240
1	0001	129	‘ 145	¡ 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	0010	’ 130	’ 146	¢ 162	² 178	Â 194	Ò 210	â 226	ò 242
3	0011	ƒ 131	“ 147	£ 163	³ 179	Ã 195	Ó 211	ã 227	ó 243
4	0100	” 132	” 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	0101	… 133	• 149	¥ 165	µ 181	Å 197	Õ 213	å 229	õ 245
6	0110	† 134	– 150	¦ 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	0111	‡ 135	— 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
8	1000	ˆ 136	˜ 152	¨ 168	¸ 184	È 200	Ø 216	è 232	ø 248
9	1001	‰ 137	™ 153	© 169	¹ 185	É 201	Ù 217	é 233	ù 249
A	1010	Š 138	š 154	ª 170	º 186	Ê 202	Ú 218	ê 234	ú 250
B	1011	‹ 139	› 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
C	1100	Œ 140	œ 156	¬ 172	¼ 188	Ì 204	Ü 220	ì 236	ü 252
D	1101	141	157	- 173	½ 189	Í 205	İ 221	í 237	ı 253
E	1110	142	158	® 174	¾ 190	Î 206	Ş 222	î 238	ş 254
F	1111	143	Ÿ 159	¯ 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

3.2.16 Page 26 - 1257 (Baltic)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	€ 128	144	NBSP 160	° 176	Ą 192	Š 208	ą 224	š 240
1	0001	129	‘ 145	161	± 177	Į 193	Ń 209	į 225	ń 241
2	0010	’ 130	’ 146	¢ 162	² 178	Ā 194	Ņ 210	ā 226	ņ 242
3	0011	131	“ 147	£ 163	³ 179	Ć 195	Ó 211	ć 227	ó 243
4	0100	” 132	” 148	¤ 164	' 180	Ä 196	Ō 212	ä 228	ō 244
5	0101	… 133	• 149	165	µ 181	Å 197	Õ 213	å 229	õ 245
6	0110	† 134	– 150	¦ 166	¶ 182	Ę 198	Ö 214	ę 230	ö 246
7	0111	‡ 135	— 151	§ 167	· 183	Ē 199	× 215	ē 231	÷ 247
8	1000	136	152	Ø 168	ø 184	Č 200	Ų 216	č 232	ų 248
9	1001	‰ 137	™ 153	© 169	¹ 185	É 201	Ł 217	é 233	ł 249
A	1010	138	154	Ŗ 170	ŗ 186	Ź 202	Ś 218	ź 234	ś 250
B	1011	‹ 139	› 155	« 171	» 187	Ė 203	Ū 219	ė 235	ū 251
C	1100	140	156	¬ 172	¼ 188	Ģ 204	Ü 220	ģ 236	ü 252
D	1101	¨ 141	¯ 157	- 173	½ 189	Ķ 205	Ż 221	ķ 237	ż 253
E	1110	ˇ 142	‘ 158	® 174	¾ 190	Ī 206	Ž 222	ī 238	ž 254
F	1111	¸ 143	159	Æ 175	æ 191	Ļ 207	ß 223	ļ 239	˙ 255

3.2.17 Page 27 – 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	176	└ 192	╙ 208	ظ 224	گ 240
1	0001	۱ 129	ا 145	خ 161	177	┴ 193	╤ 209	ع 225	ل 241
2	0010	۲ 130	ب 146	د 162	178	┬ 194	╥ 210	ح 226	لا 242
3	0011	۳ 131	ب 147	ذ 163	179	├ 195	╙ 211	ع 227	ل 243
4	0100	۴ 132	پ 148	ر 164	180	─ 196	╘ 212	ع 228	م 244
5	0101	۵ 133	پ 149	ز 165	181	┼ 197	╒ 213	غ 229	م 245
6	0110	۶ 134	ت 150	ژ 166	182	╞ 198	╓ 214	غ 230	ن 246
7	0111	۷ 135	ت 151	س 167	183	╟ 199	╫ 215	غ 231	ن 247
8	1000	۸ 136	ث 152	سـ 168	184	╚ 200	╪ 216	غ 232	و 248
9	1001	۹ 137	ث 153	ش 169	185	╒ 201	┘ 217	ف 233	ه 249
A	1010	، 138	ج 154	شـ 170	186	╩ 202	┌ 218	فـ 234	هـ 250
B	1011	ـ 139	جـ 155	ص 171	187	╦ 203	219	ق 235	هـ 251
C	1100	؟ 140	چ 156	صـ 172	188	╠ 204	220	قـ 236	ی 252
D	1101	آ 141	چـ 157	ض 173	189	═ 205	221	ک 237	ی 253
E	1110	ك 142	ح 158	ضـ 174	190	╬ 206	222	کـ 238	ی 254
F	1111	۶ 143	حـ 159	ط 175	191	╩ 207	223	گ 239	255

3.2.18 Page 28 - 1251 (Cyrillic)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ђ 128	ђ 144	NBSP 160	° 176	А 192	Р 208	а 224	р 240
1	0001	Ѓ 129	‘ 145	Ў 161	± 177	Б 193	С 209	б 225	с 241
2	0010	’ 130	’ 146	ў 162	І 178	В 194	Т 210	в 226	т 242
3	0011	ѓ 131	“ 147	Ј 163	і 179	Г 195	У 211	г 227	у 243
4	0100	” 132	” 148	¤ 164	ґ 180	Д 196	Ф 212	д 228	ф 244
5	0101	… 133	• 149	Ґ 165	µ 181	Е 197	Х 213	е 229	х 245
6	0110	† 134	– 150	¦ 166	¶ 182	Ж 198	Ц 214	ж 230	ц 246
7	0111	‡ 135	— 151	§ 167	· 183	З 199	Ч 215	з 231	ч 247
8	1000	€ 136	152	Ё 168	ё 184	И 200	Ш 216	и 232	ш 248
9	1001	‰ 137	™ 153	© 169	№ 185	Й 201	Щ 217	й 233	щ 249
A	1010	Љ 138	љ 154	Є 170	є 186	К 202	Ъ 218	к 234	ъ 250
B	1011	‹ 139	› 155	« 171	» 187	Л 203	Ы 219	л 235	ы 251
C	1100	Њ 140	њ 156	¬ 172	ј 188	М 204	Ь 220	м 236	ь 252
D	1101	Ќ 141	ќ 157	- 173	Ѕ 189	Н 205	Э 221	н 237	э 253
E	1110	Ћ 142	ћ 158	® 174	ѕ 190	О 206	Ю 222	о 238	ю 254
F	1111	Џ 143	џ 159	Ї 175	ї 191	П 207	Я 223	п 239	я 255

3.2.19. Page 29 - 737 (Greek)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Α 128	Ρ 144	ι 160	▒ 176	└ 192	╨ 208	ω 224	Ώ 240
1	0001	Β 129	Σ 145	κ 161	▒ 177	┴ 193	╤ 209	ά 225	± 241
2	0010	Γ 130	Τ 146	λ 162	▒ 178	┬ 194	╥ 210	έ 226	≥ 242
3	0011	Δ 131	Υ 147	μ 163	│ 179	├ 195	╙ 211	ή 227	≤ 243
4	0100	Ε 132	Φ 148	ν 164	┤ 180	─ 196	╘ 212	ϊ 228	Ϊ 244
5	0101	Ζ 133	Χ 149	ξ 165	╡ 181	┼ 197	╒ 213	ί 229	Ϋ 245
6	0110	Η 134	Ψ 150	ο 166	╢ 182	╞ 198	╓ 214	ό 230	÷ 246
7	0111	Θ 135	Ω 151	π 167	╖ 183	╟ 199	╫ 215	ύ 231	≈ 247
8	1000	Ι 136	α 152	ρ 168	╕ 184	╚ 200	╪ 216	ϋ 232	° 248
9	1001	Κ 137	β 153	σ 169	╣ 185	╔ 201	┘ 217	ώ 233	∙ 249
A	1010	Λ 138	γ 154	ς 170	║ 186	╩ 202	┌ 218	Ά 234	· 250
B	1011	Μ 139	δ 155	τ 171	╗ 187	╦ 203	■ 219	Έ 235	√ 251
C	1100	Ν 140	ε 156	υ 172	╝ 188	╠ 204	▬ 220	Ή 236	n 252
D	1101	Ξ 141	ζ 157	φ 173	╜ 189	═ 205	▌ 221	Ί 237	² 253
E	1110	Ο 142	η 158	χ 174	╛ 190	╬ 206	▐ 222	Ό 238	■ 254
F	1111	Π 143	Θ 159	ψ 175	┐ 191	╧ 207	▀ 223	Ύ 239	SP 255

3.2.20 Page 30 - 775 (Baltic)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ć 128	É 144	Ā 160	▒ 176	└ 192	ą 208	Ó 224	- 240
1	0001	ü 129	æ 145	Ī 161	▒ 177	┴ 193	č 209	ß 225	± 241
2	0010	é 130	Æ 146	ó 162	▒ 178	┬ 194	ę 210	Ō 226	“ 242
3	0011	ā 131	ō 147	Ż 163	│ 179	├ 195	ė 211	Ń 227	¾ 243
4	0100	ä 132	ö 148	ż 164	┤ 180	─ 196	į 212	õ 228	¶ 244
5	0101	ģ 133	Ģ 149	ź 165	Ą 181	┼ 197	š 213	Õ 229	§ 245
6	0110	å 134	¢ 150	” 166	Č 182	Ų 198	ų 214	µ 230	÷ 246
7	0111	ć 135	Ś 151	¦ 167	Ę 183	Ū 199	ū 215	ń 231	„ 247
8	1000	ł 136	ś 152	© 168	Ė 184	╚ 200	ž 216	Ķ 232	° 248
9	1001	ē 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	ķ 233	∙ 249
A	1010	Ŗ 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ļ 234	· 250
B	1011	ŗ 139	ø 155	½ 171	╗ 187	╦ 203	■ 219	ļ 235	¹ 251
C	1100	ī 140	£ 156	¼ 172	╝ 188	╠ 204	▬ 220	ņ 236	³ 252
D	1101	Ź 141	Ø 157	Ł 173	ļ 189	═ 205	▌ 221	Ē 237	² 253
E	1110	Ä 142	× 158	« 174	Š 190	╬ 206	▐ 222	Ņ 238	■ 254
F	1111	Å 143	¤ 159	» 175	┐ 191	Ž 207	▬ 223	’ 239	SP 255

3.2.21 Page 31 - Thai character code 14

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	128	144	160	176	192	208	224	240
1	0001	129	145	ก 161	ฑ 177	ม 193	ะ 209	แ 225	๑ 241
2	0010	130	◌ั 146	ข 162	ฒ 178	ย 194	า 210	โ 226	๒ 242
3	0011	131	◌ั 147	ฃ 163	ณ 179	ร 195	◌ำ 211	ใ 227	๓ 243
4	0100	132	◌ิ 148	ค 164	ด 180	ฤ 196	◌ 212	ไ 228	๔ 244
5	0101	133	◌ี 149	ฅ 165	ต 181	ล 197	◌ 213	ๅ 229	๕ 245
6	0110	134	◌ึ 150	ฆ 166	ถ 182	ฦ 198	◌ 214	ๆ 230	๖ 246
7	0111	135	◌ื 151	ง 167	ท 183	ว 199	◌ 215	็ 231	๗ 247
8	1000	136	◌ุ 152	จ 168	ธ 184	ศ 200	◌ 216	◌ 232	๘ 248
9	1001	137	◌ู 153	ฉ 169	น 185	ษ 201	◌ 217	◌ 233	๙ 249
A	1010	138	◌ฺ 154	ช 170	บ 186	ส 202	◌ 218	◌ 234	๚ 250
B	1011	139	◌ 155	ซ 171	ป 187	ห 203	◌ 219	◌ 235	◌ 251
C	1100	◌ 140	◌ 156	ฌ 172	ผ 188	ฬ 204	◌ 220	◌ 236	◌ 252
D	1101	◌ 141	◌ 157	ญ 173	ฝ 189	อ 205	◌ 221	◌ 237	◌ 253
E	1110	◌ 142	◌ 158	ฎ 174	พ 190	ฮ 206	◌ 222	◌ 238	◌ 254
F	1111	◌ 143	เ 159	ฏ 175	ฟ 191	ฯ 207	฿ 223	◎ 239	◌ 255

3.2.22 Page 32 - Hebrew Old code

	HEX	0	1	2	3	4	5	6	7
HEX	BIN	0000	0001	0010	0011	0100	0101	0110	0111
0	0000	00	16	32	0 48	@ 64	P 80	א 96	נ 112
1	0001	01	17	! 33	1 49	A 65	Q 81	ב 97	ס 113
2	0010	02	18	" 34	2 50	B 66	R 82	ג 98	ע 114
3	0011	03	19	# 35	3 51	C 67	S 83	ד 99	ף 115
4	0100	04	20	$ 36	4 52	D 68	T 84	ה 100	פ 116
5	0101	05	21	% 37	5 53	E 69	U 85	ו 101	ץ 117
6	0110	06	22	& 38	6 54	F 70	V 86	ז 102	צ 118
7	0111	07	23	' 39	7 55	G 71	W 87	ח 103	ק 119
8	1000	08	24	(40	8 56	H 72	X 88	ט 104	ר 120
9	1001	09	25	) 41	9 57	I 73	Y 89	י 105	ש 121
A	1010	10	26	* 42	: 58	J 74	Z 90	ך 106	ת 122
B	1011	11	27	+ 43	; 59	K 75	[91	כ 107	{ 123
C	1100	12	28	, 44	< 60	L 76	\ 92	ל 108	| 124
D	1101	13	29	- 45	= 61	M 77	] 93	ם 109	} 125
E	1110	14	30	. 46	> 62	N 78	^ 94	מ 110	~ 126
F	1111	15	31	/ 47	? 63	O 79	_ 95	ן 111	127

3.2.23 Page 33 - 1255 (Hebrew New code)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	€ 128	144	NBSP 160	° 176	ְ 192	׀ 208	א 224	ן 240
1	0001	129	‘ 145	¡ 161	± 177	ֱ 193	ׁ 209	ב 225	ס 241
2	0010	’ 130	’ 146	¢ 162	² 178	ֲ 194	ׂ 210	ג 226	ע 242
3	0011	ƒ 131	“ 147	£ 163	³ 179	ֳ 195	׃ 211	ד 227	ף 243
4	0100	” 132	” 148	₪ 164	´ 180	ִ 196	ׄ 212	ה 228	פ 244
5	0101	… 133	• 149	¥ 165	µ 181	ֵ 197	ׅ 213	ו 229	ץ 245
6	0110	† 134	– 150	¦ 166	¶ 182	ֶ 198	׆ 214	ז 230	צ 246
7	0111	‡ 135	— 151	§ 167	· 183	ַ 199	ׇ 215	ח 231	ק 247
8	1000	ˆ 136	˜ 152	¨ 168	¸ 184	ָ 200	׈ 216	ט 232	ר 248
9	1001	‰ 137	™ 153	© 169	¹ 185	ֹ 201	217	י 233	ש 249
A	1010	138	154	× 170	÷ 186	ֺ 202	218	ך 234	ת 250
B	1011	‹ 139	› 155	« 171	» 187	ֻ 203	219	כ 235	251
C	1100	140	156	¬ 172	¼ 188	ּ 204	220	ל 236	252
D	1101	141	157	173	½ 189	ֽ 205	221	ם 237	LTR 253
E	1110	142	158	® 174	¾ 190	־ 206	222	מ 238	RTL 254
F	1111	143	159	¯ 175	¿ 191	ֿ 207	223	ן 239	255

3.2.24 Page 34 - Thai character code 11

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1111	1111
0	0000	128	144	160	176	192	208	224	240
1	0001	129	145	161	177	193	209	225	241
2	0010	130	146	162	178	194	210	226	242
3	0011	131	147	163	179	195	211	227	243
4	0100	132	148	164	180	196	212	228	244
5	0101	133	149	165	181	197	213	229	245
6	0110	134	150	166	182	198	214	230	246
7	0111	135	151	167	183	199	215	231	247
8	1000	136	152	168	184	200	216	232	248
9	1001	137	153	169	185	201	217	233	249
A	1010	138	154	170	186	202	218	234	250
B	1011	139	155	171	187	203	219	235	251
C	1100	140	156	172	188	204	220	236	252
D	1101	141	157	173	189	205	221	237	253
E	1110	142	158	174	190	206	222	238	254
F	1111	143	159	175	191	207	223	239	255

3.2.25 Page 35 - Thai character code 18

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1111	1111
0	0000	128	144	160	176	192	208	224	240
1	0001	129	145	161	177	193	209	225	241
2	0010	130	146	162	178	194	210	226	242
3	0011	131	147	163	179	195	211	227	243
4	0100	132	148	164	180	196	212	228	244
5	0101	133	149	165	181	197	213	229	245
6	0110	134	150	166	182	198	214	230	246
7	0111	135	151	167	183	199	215	231	247
8	1000	136	152	168	184	200	216	232	248
9	1001	137	153	169	185	201	217	233	249
A	1010	138	154	170	186	202	218	234	250
B	1011	139	155	171	187	203	219	235	251
C	1100	140	156	172	188	204	220	236	252
D	1101	141	157	173	189	205	221	237	253
E	1110	142	158	174	190	206	222	238	254
F	1111	143	159	175	191	207	223	239	255

3.2.26 Page 36 - 855 (Cyrillic)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	ђ 128	љ 144	а 160	░ 176	└ 192	л 208	Я 224	- 240
1	0001	Ђ 129	Љ 145	А 161	▒ 177	┴ 193	Л 209	р 225	ы 241
2	0010	ѓ 130	њ 146	б 162	▓ 178	┬ 194	м 210	Р 226	Ы 242
3	0011	Ѓ 131	Њ 147	Б 163	│ 179	├ 195	М 211	с 227	з 243
4	0100	ё 132	ћ 148	ц 164	┤ 180	─ 196	н 212	С 228	З 244
5	0101	Ё 133	Ћ 149	Ц 165	х 181	┼ 197	Н 213	т 229	ш 245
6	0110	є 134	ќ 150	д 166	Х 182	к 198	о 214	Т 230	Ш 246
7	0111	Є 135	Ќ 151	Д 167	и 183	К 199	О 215	у 231	э 247
8	1000	s 136	ў 152	е 168	И 184	╚ 200	п 216	У 232	Э 248
9	1001	S 137	Ў 153	Е 169	╣ 185	╔ 201	┘ 217	ж 233	щ 249
A	1010	і 138	џ 154	ф 170	║ 186	╩ 202	┌ 218	Ж 234	Щ 250
B	1011	I 139	Џ 155	Ф 171	╗ 187	╦ 203	█ 219	в 235	ч 251
C	1100	ї 140	ю 156	г 172	╝ 188	╠ 204	▄ 220	В 236	Ч 252
D	1101	Ї 141	Ю 157	Г 173	й 189	═ 205	П 221	ь 237	§ 253
E	1110	j 142	ъ 158	« 174	Й 190	╬ 206	я 222	Ь 238	■ 254
F	1111	J 143	Ъ 159	» 175	┐ 191	¤ 207	▀ 223	№ 239	255

3.2.27 Page 37 - 857 (Turkish)

	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	º 208	Ó 224	- 240
1	0001	ü 129	æ 145	í 161	▒ 177	┴ 193	ª 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	Õ 229	§ 245
6	0110	å 134	û 150	Ğ 166	Â 182	ã 198	Í 214	µ 230	÷ 246
7	0111	ç 135	ù 151	ğ 167	À 183	Ã 199	Î 215	231	¸ 247
8	1000	ê 136	İ 152	¿ 168	© 184	╚ 200	Ï 216	× 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	ì 236	³ 252
D	1101	ı 141	Ø 157	¡ 173	¢ 189	═ 205	¦ 221	ÿ 237	² 253
E	1110	Ä 142	Ş 158	« 174	¥ 190	╬ 206	Ì 222	¯ 238	■ 254
F	1111	Å 143	ş 159	» 175	┐ 191	○ 207	▉ 223	´ 239	255

3.2.28 Page 38 - 928 (Greek)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	128	144	160	° 176	ΐ 192	Π 208	ΰ 224	π 240
1	0001	129	145	` 161	± 177	Α 193	Ρ 209	α 225	ρ 241
2	0010	130	146	´ 162	² 178	Β 194	210	β 226	ς 242
3	0011	131	147	£ 163	³ 179	Γ 195	Σ 211	γ 227	σ 243
4	0100	132	148	164	΄ 180	Δ 196	Τ 212	δ 228	τ 244
5	0101	133	149	165	΅ 181	Ε 197	Υ 213	ε 229	υ 245
6	0110	134	150	¦ 166	Ά 182	Ζ 198	Φ 214	ζ 230	φ 246
7	0111	135	151	§ 167	· 183	Η 199	Χ 215	η 231	χ 247
8	1000	136	152	¨ 168	Έ 184	Θ 200	Ψ 216	θ 232	ψ 248
9	1001	137	153	© 169	Ή 185	Ι 201	Ω 217	ι 233	ω 249
A	1010	138	154	170	Ί 186	Κ 202	Ϊ 218	κ 234	ϊ 250
B	1011	139	155	« 171	» 187	Λ 203	Ϋ 219	λ 235	ϋ 251
C	1100	140	156	¬ 172	Ό 188	Μ 204	ά 220	μ 236	ό 252
D	1101	141	157	173	½ 189	Ν 205	έ 221	ν 237	ύ 253
E	1110	142	158	174	Ύ 190	Ξ 206	ή 222	ξ 238	ώ 254
F	1111	143	159	― 175	Ώ 191	Ο 207	ί 223	ο 239	255

3.2.29 Page 39 - Thai 16

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	128	144	160	176	192	208	224	240
1	0001	129	145	161	177	193	209	225	241
2	0010	130	146	162	178	194	210	226	242
3	0011	131	147	163	179	195	211	227	243
4	0100	132	148	164	180	196	212	228	244
5	0101	133	149	165	181	197	213	229	245
6	0110	134	150	166	182	198	214	230	246
7	0111	135	151	167	183	199	215	231	247
8	1000	136	152	168	184	200	216	232	248
9	1001	137	153	169	185	201	217	233	249
A	1010	138	154	170	186	202	218	234	250
B	1011	139	155	171	187	203	219	235	251
C	1100	140	156	172	188	204	220	236	252
D	1101	141	157	173	189	205	221	237	253
E	1110	142	158	174	190	206	222	238	254
F	1111	143	159	175	191	207	223	239	255

3.2.30 Page 40 - 1256 (Arabic)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	€ 128	گ 144	160	° 176	□ 192	ذ 208	à 224	ً 240
1	0001	پ 129	‘ 145	، 161	± 177	ء 193	ر 209	ل 225	ٌ 241
2	0010	’ 130	’ 146	¢ 162	² 178	آ 194	ز 210	â 226	ٍ 242
3	0011	ƒ 131	“ 147	£ 163	³ 179	أ 195	س 211	م 227	َ 243
4	0100	” 132	” 148	¤ 164	´ 180	ؤ 196	ش 212	ن 228	ô 244
5	0101	… 133	• 149	¥ 165	µ 181	إ 197	ص 213	ه 229	ُ 245
6	0110	† 134	– 150	¦ 166	¶ 182	ئ 198	ض 214	و 230	ِ 246
7	0111	‡ 135	— 151	§ 167	· 183	ا 199	× 215	ç 231	÷ 247
8	1000	ˆ 136	ک 152	¨ 168	¸ 184	ب 200	ط 216	è 232	ّ 248
9	1001	‰ 137	™ 153	© 169	¹ 185	ة 201	ظ 217	é 233	ù 249
A	1010	□ 138	□ 154	□ 170	؛ 186	ت 202	ع 218	ê 234	ْ 250
B	1011	‹ 139	› 155	« 171	» 187	ث 203	غ 219	ë 235	û 251
C	1100	Œ 140	œ 156	¬ 172	¼ 188	ج 204	- 220	ى 236	ü 252
D	1101	ﭻ 141	157	- 173	½ 189	ح 205	ف 221	ي 237	253
E	1110	ژ 142	158	® 174	¾ 190	خ 206	ق 222	î 238	254
F	1111	□ 143	□ 159	¯ 175	؟ 191	د 207	ك 223	ï 239	□ 255

3.2.31 Page 41 - 1258 (Vietnam)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	€ 128	144	160	° 176	À 192	Đ 208	à 224	đ 240
1	0001	129	‘ 145	¡ 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	0010	’ 130	’ 146	¢ 162	2 178	Â 194	◌̀ 210	â 226	◌̣ 242
3	0011	*ƒ* 131	“ 147	£ 163	3 179	Ă 195	Ó 211	ă 227	ó 243
4	0100	,, 132	” 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	0101	… 133	• 149	¥ 165	µ 181	Å 197	Ơ 213	å 229	ơ 245
6	0110	† 134	- 150	¦ 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	0111	‡ 135	– 151	§ 167	• 183	Ç 199	x 215	ç 231	÷ 247
8	1000	^ 136	~ 152	¨ 168	¸ 184	È 200	Ø 216	è 232	ø 248
9	1001	‰ 137	™ 153	© 169	1 185	É 201	Ù 217	é 233	ù 249
A	1010	138	154	ª 170	º 186	Ê 202	Ú 218	ê 234	ú 250
B	1011	‹ 139	› 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
C	1100	Œ 140	œ 156	¬ 172	¼ 188	◌̀ 204	Ü 220	◌́ 236	ü 252
D	1101	141	157	173	½ 189	Í 205	Ư 221	í 237	ư 253
E	1110	142	158	® 174	¾ 190	Î 206	◌̃ 222	î 238	đ 254
F	1111	143	Ÿ 159	¯ 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

3.2.32 Page 42 - Khmer (Cambodia)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	128	144	160	176	192	208	224	240
1	0001	129	145	161	177	193	209	225	241
2	0010	130	146	162	178	194	210	226	242
3	0011	131	147	163	179	195	211	227	243
4	0100	132	148	164	180	196	212	228	244
5	0101	133	149	165	181	197	213	229	245
6	0110	134	150	166	182	198	214	230	246
7	0111	135	151	167	183	199	215	231	247
8	1000	136	152	168	184	200	216	232	248
9	1001	137	153	169	185	201	217	233	249
A	1010	138	154	170	186	202	218	234	250
B	1011	139	155	171	187	203	219	235	251
C	1100	140	156	172	188	204	220	236	252
D	1101	141	157	173	189	205	221	237	253
E	1110	142	158	174	190	206	222	238	254
F	1111	143	159	175	191	207	223	239	255

3.2.33 Page 47 - 1250 (Czech)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	€ 128	144	NBSP 160	° 176	Ŕ 192	Đ 208	ŕ 224	đ 240
1	0001	129	‘ 145	˘ 161	± 177	Á 193	Ń 209	á 225	ń 241
2	0010	’ 130	’ 146	˘ 162	˛ 178	Â 194	Ň 210	â 226	ň 242
3	0011	ƒ 131	“ 147	£ 163	ł 179	Ă 195	Ó 211	ă 227	ó 243
4	0100	” 132	” 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	0101	… 133	• 149	Ą 165	µ 181	Ĺ 197	Õ 213	Í 229	ő 245
6	0110	† 134	– 150	¦ 166	¶ 182	Ć 198	Ö 214	ć 230	ö 246
7	0111	‡ 135	— 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
8	1000	ˆ 136	˜ 152	¨ 168	¸ 184	Č 200	Ř 216	č 232	ř 248
9	1001	‰ 137	™ 153	© 169	ą 185	É 201	Ů 217	é 233	ů 249
A	1010	Š 138	š 154	Ş 170	ş 186	Ę 202	Ú 218	ę 234	ú 250
B	1011	‹ 139	› 155	« 171	» 187	Ë 203	Ű 219	ë 235	ű 251
C	1100	Ś 140	ś 156	¬ 172	Ľ 188	Ě 204	Ü 220	ě 236	ü 252
D	1101	Ť 141	ť 157	- 173	" 189	Í 205	Ý 221	í 237	ý 253
E	1110	Ž 142	ž 158	® 174	ł· 190	Î 206	Ţ 222	î 238	ţ 254
F	1111	Ź 143	ź 159	Ż 175	ż 191	Ď 207	ß 223	ď 239	· 255

3.2.34. International character code table

	Country	ASCII code (hexadecimal number)										
		23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	U.S.A.	#	$	@	[	\	]	^	‘	{	|	}	~
1	France	#	$	à	°	ç	§	^	‘	é	ù	è	¨
2	Germany	#	$	§	Ä	Ö	Ü	^	‘	ä	ö	ü	β
3	U.K.	£	$	@	[	\	]	^	‘	{	|	}	~
4	Denmark I	#	$	@	Æ	Ø	Å	^	‘	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain	Pt	$	@	¡	Ñ	¿	^	‘	¨	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	‘	{	|	}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denmark II	#	$	É	Æ	Ø	Å	Ü	é	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

No.	Command	Function
1	HT	Horizontal tab
2	LF	Print and line feed
3	FF	Form feed(in page mode)
4	CR	Print and carriage return.
5	ESC STX	Print Trend data
6	CAN	Cancel the print data in page mode
7	DLE EOT	Transmit real-time status
8	ESC FF	Print data in page mode
9	ESC SP	Set the character right space
10	ESC !	Set print mode
11	ESC $	Set absolute print position
12	ESC %	Select/cancel user-defined character set
13	ESC &	Define user-defined character set
14	ESC *	Specify bit image mode
15	ESC -	Turn underline mode on/off
16	ESC 2	Select default line spacing
17	ESC 3	Set line spacing
18	ESC 8	Print graph image (wave 25 or 50mm, Speed)
19	ESC =	Select peripheral device
20	ESC ?	Cancel user-defined characters
21	ESC @	Initialize printer
22	ESC D	Set horizontal tab positions
23	ESC E	Turn emphasized mode on/off
24	ESC G	Turn double-strike mode on/off
25	ESC J	Print and feed paper
26	ESC L	Select page mode
27	ESC M	Select character font
28	ESC R	Specify an international character set
29	ESC S	Select standard mode
30	ESC T	Select print direction in page mode
31	ESC V	Turn 90° clockwise rotation mode on/off
32	ESC W	Set print area in page mode
33	ESC \	Set relative print position
34	ESC a	Set position alignment

35	ESC c 5	Enable/disable panel feed buttons
36	ESC d	Print and feed n lines
37	ESC t	Select character code table
38	ESC {	Turn upside-down print mode on/off
39	FS p	Print NV bit image
40	FS q	Define NV bit image
41	GS !	Select character size
42	GS $	Set absolute vertical print position in page mode
43	GS (A	Execute test print
44	GS (E	Set NV user memory area
45	GS (L GS 8 L	Select graphics data
46	GS (k	Specify and print the symbol
47	GS *	Define downloaded bit image
48	GS /	Print downloaded bit image
49	GS :	Start/end macro definition
50	GS B	Turn white/black reverse print mode on/off
51	GS H	Select print position of HRI characters
52	GS I	Transmit printer ID
53	GS L	Set left margin
54	GS W	Set print area width
55	GS ^	Execute macro
56	GS a	Enable/Disable Automatic Status Back (ASB)
57	GS f	Select font for HRI characters
58	GS h	Set bar code height
59	GS k	Print bar code
60	GS r	Transmit status
61	GS v 0	Print raster bit image
62	GS w	Set bar code width

3.3.2. Command notation

Command

Function:	**Command function outline**
Code:	**Command format expressed in ASCII, hexadecimal, and decimal codes**
Range:	**Argument value (Setting range) for the command**
Default:	**Initial argument value for the command**
Description:	**Detailed command function description**
Remarks:	**Additional information about using the command**
Differences:	**Variations depending on the printer model**

3.3.5 Control commands

HT

Function : **Horizontal tab**

Code :

ASCII	HT
Hex	09
Decimal	9

Range: None

Default: None

Description : This command moves the print position to the next horizontal tab position. If the next horizontal tab position is not specified, this command will be void.

Remarks :
- The horizontal tab position is set by <ESC> D.
- With the underline mode turned on, the underline printing is not applied to the tab space created by this command.

Differences: None

LF

Function: **Print and line feed**

Code:

ASCII	LF
Hex	0A
Decimal	10

Range: None

Default: None

Description: This command prints the data in the print buffer and feeds one line based on the current set line spacing in standard mode.

Remarks:
- In page mode, the printer does not perform actual printing, but moving only the print position to the next line.

Differences: None

FF

Function : **Form feed (in page mode)**

Code :

ASCII	FF
Hex	0C
Decimal	12

Range: None

Default: None

Description : This commands prints all data collected in the printer buffer In page mode. After completion of printing, the printer is returned to standard mode.
if the printer receive next data then the printer buffer is evacuated.

Remarks :
- The printer is returned to standard mode after completion of printing.
- After being printed, all of the existing data in the printer buffer is not evacuated and the print position changes to the beginning of the line.
- This command works in page mode enabled by ESC L.
- This command is only effective in standard mode.
- If the paper is positioned at the print starting position, this command is ignored, not performing actual paper feeding operation.

Differences: None

CR

Function: **Print and carriage return**

Code:

ASCII	CR
Hex	0D
Decimal	13

Range: None

Default: None

Description: This command prints the data. With auto line feed enabled, it performs printing and one line feeding same as LF.

Remarks:
- Auto line feed is only enabled using the memory switch.

Differences: None

CAN

Function: **Cancel the print data in page mode**

Code:

ASCII	CAN
Hex	18
Decimal	24

Range: None

Default: None

Description: This command clears the receive buffer and print buffers in page mode.

Remarks: ■ This command is effective only in page mode that is set by ESC L.

Differences: None

DLE EOT

Function: **Transmit real-time status**

Code:

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

Range: 1 ≤ n ≤ 4

Default: None

Description This command enables commands to be operable in real-time.
This command transmits the printer-related status specified by n as follows:

n	**Function**
1	Transmit printer status
2	Transmit off-line status
3	Transmit error status
4	Transmit paper roll sensor status
5	Transmit Power/TPH status
6	Transmit receive buffer size status

■ Printer transmits the following status

n=1: Printer status

Bit	Binary	Hex	Decimal	Status
0	0	00	0	Not used. Fixed to Off
1	1	02	2	Not used. Fixed to On
2	0	00	0	Not used. Fixed to Off
3	0	00	0	Online
	0	**00**	**0**	**Not used. Fixed to Off**
4	1	10	16	Not used. Fixed to On
5~7	0	00	0	Not used. Fixed to Off

n=2: Off-line status

Bit	Binary	Hex	Decimal	Status
0	0	00	0	Not used. Fixed to Off
1	0	02	2	Not used. Fixed to Off
2	0	00	**0**	Not used. Fixed to Off
	1	**00**	**0**	Not used. Fixed to Off
3	0	00	**0**	Not used. Fixed to Off
	0	**00**	**0**	**Not used. Fixed to Off**
4	1	10	16	Not used. Fixed to On
5	**0**	**00**	**0**	**Not used. Fixed to Off**
	0	**00**	**0**	**Not used. Fixed to Off**
6,7	0	00	0	Not used. Fixed to Off

n=3: Error status

Bit	Binary	Hex	Decimal	Status
0	0	00	0	Not used. Fixed to Off
1	1	02	2	Not used. Fixed to On
2,3	0	00	0	Not used. Fixed to Off
4	1	10	16	Not used. Fixed to On
5~7	0	00	0	Not used. Fixed to Off

n=4: paper sensor status

Bit	Binary	Hex	Decimal	Status
0	0	00	0	Not used. Fixed to Off
1	1	02	2	Not used. Fixed to On
2	**1**	**04**	**4**	**Paper end sensor : paper not present**
3	**1**	**08**	**8**	**Paper end sensor : paper not present**
4	1	10	16	Not used. Fixed to On
5,6	0	00	0	Paper end sensor : paper present
	1	60	96	Paper end sensor : paper not present
7	0	00	0	Not used. Fixed to Off

n=5: Power/TPH status

Bit	Binary	Hex	Decimal	Status
0	0	00	0	Not used. Fixed to Off
1	1	02	2	Not used. Fixed to On
2	0	00	0	TPH temperature status : Normal
	1	04	4	TPH temperature status : Overheat
3	0	0	0	Not used. Fixed to Off
4	1	10	16	Not used. Fixed to On
5	0	00	0	Not used. Fixed to Off
	0	**00**	**0**	**Not used. Fixed to Off**
6	0	00	0	Not used. Fixed to Off
	0	**00**	**0**	**Not used. Fixed to Off**
7	0	00	0	Not used. Fixed to Off

n=6: Transmit receive buffer size status

■ Transmit remained data in receive buffer
■ Size of response data is 2Byte(1st Byte = Low, 2nd Byte = High)
Ex) In case of low= 0x10, high=0x01, remained buffer size will be 15000-(16+(1x256)) = 14,728Byte

Remarks:

■ the status is transmitted to the host upon being requested that can check the printer operational condition with it and takes appropriate measures accordingly.
■ The real time command is stored into the receive buffer and executed with higher priority than other commands.

Differences: None

ESC FF

Function : **Print data in page mode**

Code :

ASCII	ESC	FF
Hex	1B	0C
Decimal	27	12

Range: None

Default: None

Description : This command prints the data in the print buffer collectively in page mode.

Remarks :
■ This command is effective only in page mode that is selected by ESC L.
■ After printing, the data in the print buffer and setting values are not cleared.
■ The printer can print the data in the print buffer repeatedly using this command.
■ The printer returns to standard mode by ESC S or ESC @.

Differences: None

ESC STX

Function : **Print Trend data**

Code :

ASCII	ESC	STX
Hex	1B	01
Decimal	27	01

Range: None

Default: None

Description : Print Trend data

Remarks :
■ 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)

Differences: None

ESC SP

Function: **Set the character right space**

Code:

ASCII	ESC	SP	n
Hex	1B	20	n
Decimal	27	32	n

Range: 0 ≤ n ≤ 255

Default: n = 0

Description: ■ This command sets the size of space to right of character.
• Right space = n × [horizontal motion units].

Remarks: ■ In a double width mode, the right space will be doubled.
■ Horizontal motion unit varies depending the printer model.

Differences: Horizontal motion unit : 0.125mm(1/203 inch)

ESC !

Function: **Set print mode**

Code:

ASCII	ESC	!	n
Hex	1B	21	n
Decimal	27	33	n

Range: 0 ≤ n ≤ 255

Default: n = 0

Description: This command selects print mode(s) with bits having following meanings.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A selected
	On	01	1	Character font B selected
1,2	Off	00	0	Reserved
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	Off	00	0	Reserved
7	Off	00	0	Underline mode not selected
	On	80	128	Underline mode selected

Remarks: ■ As alternative to this command, ESC M, ESC E and ESC – can be used for the selection for character font, emphasized mode and underline mode respectively.
■ The entire character print width is underlined, but the space skipped by HT is not.
■ If both double width and double height are selected, the characters will be quadrupled.

Differences: None

ESC $

Function: **Set absolute print position**

Code:

ASCII	ESC	$	nL	nH
Hex	1B	24	nL	nH
Decimal	27	36	nL	nH

Range: 0 ≤ (nL + nH x 256) ≤ 65535 (0 ≤ nH ≤ 255, 0 ≤ nL ≤ 255)

Default: None

Description: This command specifies the next print starting position in reference to the left edge of the print area. The printing start position is calculated using (nL + nH x 256) x (vertical or horizontal motion units).

Remarks:
- ■ Any setting values that go beyond the printable area is ignored.
- ■ In standard mode, the horizontal motion unit is used for the calculation.
- ■ In page mode, the horizontal motion unit is applied when printing start poison is defined to the upper right or lower right of print area using ESC T, otherwise, the vertical motion unit is used.

Differences: Horizontal motion unit : 0.125mm(1/203 inch)

ESC %

Function: **Select/cancel user-defined character set**

Code:

ASCII	ESC	%	n
Hex	1B	25	n
Decimal	27	37	n

Range: 0 ≤ n ≤ 255

Default: n = 0

Description:
- ■ This command selects/deselects user-defined character set that is downloaded by user. To make it valid, the least significant bit should be defined like following.
  - • When n=0, the user-defined character set is deselected.
  - • When n=1, the user-defined character set is selected.

Remarks:
- ■ The resident character set is enabled and used right after canceling the

user defined character set.

Differences: None

ESC &

Function: **Define user-defined character set**

Code:

ASCII	ESC	&	y c1 c2 [x1 d1 ... d(y × x1)]... [xk d1 ... d(y × xk)]
Hex	1B	26	y c1 c2 [x1 d1 ... d(y × x1)]... [xk d1 ... d(y × xk)]
Decimal	27	38	y c1 c2 [x1 d1 ... d(y × x1)]... [xk d1 ... d(y × xk)]

Range:
y = 3
32 ≤ c1 ≤ c2 ≤ 126
0 ≤ x ≤ 12 (Font A)
0 ≤ x ≤ 9 (Font B)
0 ≤ d ≤ 255
k = c2 – c1 + 1

Default: None

Description: ■ This command defines user-defined characters for character codes in a designated range from the start character code, c1 to the end character code, c2.
- y denotes the number of bytes in the vertical direction, x the number of dots in the horizontal direction, and d the dot data for the user-defined characters.

Remarks: ■ Alphanumeric characters (20H (decimal 32) to 7EH (decimal 126)) are definable.
■ Once user defined characters are defined, they remain available until they are redefined; ESC ? or ESC @ is executed; the printer is reset.
■ The following shows the relationship between the definition data and printing result with downloaded character consisting of 9x7 dots.

d1	d3	d5	d7	d9	d11	d13	MSB LSB
d2	d4	d6	d8	d10	d12	d14	MSB LSB

Differences: None

ESC *

Function: **Specify bit image mode**

Code:

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
k = nL + nH × 256 [in case of m = 0, 1]
k = (nL + nH × 256) × 3 [in case of m = 32, 33]

Default: None

Description: ■ This command specifies the bit image for the mode m as to the number of dots specified by nL and nH.
- d specifies the bit image data with 1 for printed data and 0 for not printed.
- k denotes the number of horizontal dots.

Remarks: ■ If the bit image data being entered is beyond the number of dots to be printed, the surplus will be discarded.
■ If the value of m is beyond the conditions, the subsequent data after m will be treated as normal data.

Differences:

DPI : Dots per Inch (25.4mm)

m	Mode	Number of dots in vertical direction	Vertical dot density (DPI)	Horizontal dot density (DPI)	Number of bytes (k)
0	8-dot single-density	8	203/3	203/2	nL + nH x 256
1	8-dot double-density	8	203/3	203	nL + nH x 256
32	24-dot single-density	24	203	203/2	(nL + nH x 256) x 3
33	24-dot Double-density	24	203	203	(nL + nH x 256) x 3

ESC –

Function: **Turn underline mode on/off**

Code:

ASCII	ESC	-	n
Hex	1B	2D	n
Decimal	27	45	n

Range: 0 ≤ n ≤ 2, 48 ≤ n ≤ 50

Default: n = 0

Description: ■ This command enables the print data following it to be printer out underlined.

• The underline mode varied depending on the following values of n:

n	Function
0,48	Turns off underline mode
1,49	Turns on underline mode, set at 1-dot thick
2,50	Turns on underline mode, set at 2-dot thick

Remarks: ■ The spaces generated by horizontal tab are not underlined.
■ Using bit 7 of ESC !, the underline mode can be activated/deactivated as well.

Differences: None

ESC 2

Function: **Select default line spacing**

Code:

ASCII	ESC	2
Hex	1B	32
Decimal	27	50

Range: None

Default: None

Description: This command sets the default line spacing The default line spacing is approximately 3.75 mm, which is equivalent to 30 dots.

Remarks: ■ The line spacing can be set independently in standard mode and in

page mode.
■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: Default line spacing : 3.75 mm(30 dots)

ESC 3

Function: **Set line spacing**

Code:

ASCII	ESC	3	n
Hex	1B	33	n
Decimal	27	51	n

Range: 0 ≤ n ≤ 255

Default: Corresponding to the default line spacing defined by ESC 2

Description: ■ This command sets the line spacing using a following rule.
• Line spacing = n x (vertical or horizontal motion units)

Remarks: ■ With standard mode selected, the vertical motion unit is used.
■ In page mode, the horizontal motion unit is applied when printing start poison is defined to the upper right or lower right of print area using ESC T, otherwise, the vertical motion unit is used.
■ The line spacing is settable independently for each of standard and page modes.

Differences: Vertical or horizontal motion unit and maximum line spacing settable:

Vertical unit	Horizontal unit	Max line spacing
0.0625mm (1/406 inches)	0.125mm (1/203 inches)	15.937mm

ESC 8 1

Function: Print character string1, string 2, wave1

Code:

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

Default: None

Description: c1(String 1), c2(String 2), d(Wave data)

Remarks:
- ■ 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.

Differences: None

ESC 8 2

Function: Print character string1 ~ string4, wave1 wave2

Code:

ASCII	ESC	8	2	[c1_1…. c1_16]	[c2_1…. c2_16]	[c3_1…. c3_16]	[c4_1…. c4_16]
				[d1_1 d2_1…. d1_200 d2_200]		0x0b	
Hex	1B	38	32				
Decimal	27	56	49				

Range: 0x21 ≤ c1,c2,c3,c4 ≤0xff

Default: None

Description: c1(String 1), c2(String 2), c3(String 3), c4(String 4), d1(Wave data 1), d2(Wave data 2)

Remarks:
- ■ 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.

Differences: None

ESC 8 5(or 6)

Function: Speed of printing (only graph image mode)

Code:

ASCII	ESC	8	5	(or 6)
Hex	1B	38	35	(or 36)
Decimal	27	56	53	(or 54)

Range: 0x21 ≤ c1,c2,c3,c4 ≤0xff

Default: n = 6(50mm/sec)

Description: n = 5(25mm/sec) , n = 6 (50mm/sec)

Remarks: ■ 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.

Differences: None

ESC ?

Function: Select peripheral device

Code:

ASCII	ESC	?	n
Hex	1B	3F	n
Decimal	27	63	n

Range: 0 ≤ n ≤ 255

Default: n = 1

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.

Remarks: ■ When the printer is disabled, it ignores all transmitted data until the printer is enabled this command.

Differences: None

ESC ?

Function: **Cancel user-defined characters**

Code:

ASCII	ESC	?	n
Hex	1B	3F	n
Decimal	27	63	n

Range: 32 ≤ n ≤ 126

Default: None

Description: This command removes user-defined character specified by character code n.

Remarks: ■ In place of the deleted user-defined character, the cooresponding resident character is printed.
■ The user-defined characters for each font can be deleted independently.

Differences: None

ESC @

Function: **Initialize printer**

Code:

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

Range: None

Default: None

Description: This command cancels conditions previously set and initializes the printer to the conditions having existed at power on.

Remarks:
- The data in the printer buffer is cleared.
- The data in the receive buffer is not discarded.
- All of the settings such as print mode and line feed are cleared.
- NV graphics and NV user memory are not cleared.
- In page mode, this command removes the data in print areas, restores the initial settings and returns to standard mode.

Differences: None

ESC D

Function: **Set horizontal tab position**

Code:

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

Default: n = 8, 16, 24, 32, 40,....., 232, 240, 248

Description:
■ This command sets the horizontal tab position.
- n defines the number of columns from the beginning of the line to the horizontal tab setting.
- k denotes the number of horizontal tab positions to be set.
- The horizontal tab position is stored as a value of [character width x n] measured form the beginning of the line.

Remarks:
■ The data [n]k signifying the set position is transmitted in the ascending order and ends with a NUL code.
■ ESC D NUL cancels all horizontal tab positions.
■ Tab position is set at the value of [character width x n] from the beginning of the line.
■ The character width includes the space to the right of the character, and it will be twice the normal character when the double width characters are selected.
■ If the data [n]k is equal to or smaller than the preceding data [n]k-1, the horizontal tab setting has been completed.
■ Up to 32 horizontal tabs can be set, the data exceeding this limit is processed as normal ones.
■ Even if the character width is changed after setting the horizontal tab positions, the horizontal tab positions remain unchanged.

Differences: None

ESC E

Function: **Turn emphasized mode on / off**

Code:

ASCII	ESC	E	n
Hex	1B	45	n
Decimal	27	69	n

Range: 0 ≤ n ≤ 255

Default: n = 0

Description: ■ This command turns emphasized mode on or off by toggling the least significant bit of n like following.

- When the LSB of n is 0, emphasized mode is turned off.
- When the LSB of n is 1, emphasized mode is turned on.

Remarks: ■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

ESC G

Function: **Turn double-strike mode on/off**

Code:

ASCII	ESC	G	n
Hex	1B	47	n
Decimal	27	71	n

Range: 0 ≤ n ≤ 255

Default: n = 0

Description: ■ This command turns double-strike mode on or off by toggling the least significant bit of n like following.

- When the LSB of n is 0, emphasized mode is turned off.
- When the LSB of n is 1, emphasized mode is turned on.

Remarks: ■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

ESC J

Function: **Print and feed paper**

Code:

ASCII	ESC	J	n
Hex	1B	4A	n
Decimal	27	74	n

Range: 0 ≤ n ≤ 255

Default: None

Description: This command prints the data in the print buffer and feeds the paper [n X vertical motion unit].

Remarks:
- The maximum feed amount available varies depending on the printer model.
- With standard mode selected, the vertical motion unit is used.
- In page mode, the horizontal motion unit is applied when printing start poison is defined to the upper right or lower right of print area using ESC T, otherwise, the vertical motion unit is used.
- When used in page mode, this command moves only the print position, not executing actual printing.

Differences: Vertical motion unit and maximum feed amount:

Vertical unit	**Max feed amount**
0.0625mm (1/406 inches)	15.937mm

ESC L

Function: **Select page mode**

Code:

ASCII	ESC	L
Hex	1B	4C
Decimal	27	76

Range: None

Default: None

Description: This command switches from standard mode to page mode.

Remarks:
■ For printing in page mode, ESC T defines the print direction and starting position that is within the print area specified by ESC W.
■ The conditions by the following commands are defined independently in standard mode and page mode.
• ESC SP, ESC 2, and ESC 3
■ The following commands are not activated in page mode.
• ESC L, FS q, GS (A, GS (E, GS T
■ The following commands are not effective in page mode.
The conditions set by these commands in page mode are available when the printer returns to standard mode.
• ESC V, ESC a, ESC {, GS L, and GS W
■ The printer resumes standard mode by the use of ESC S, FF, and ESC@.
■ In page mode, the command, FF, prompts printing the data in the printer buffer collectively. LF, CR, ESC J, and ESC d just move the print position, not performing actual printing.

Differences: None

ESC M

Function: **Select character font**

Code:

ASCII	ESC	M	n
Hex	1B	4D	n
Decimal	27	77	n

Range: n = 0, 1, 48, 49

Default: n = 0

Description: This command selects only-byte character fonts using n as following.

n	Function
0, 48	Character font A selected
1, 49	Character font B selected

Remarks:
■ The printer model has it own configuration of Font A and B.
■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

ESC R

Function: **Specify international character set**

Code:

ASCII	ESC	R	n
Hex	1B	52	n
Decimal	27	82	n

Range: 0 ≤ n ≤ 13

Default: n = 0

Description: This command specifies international characters according to n values.

n	Character set	n	Character set
0	U.S.A	7	Spain I
1	France	9	Norway
2	Germany	10	Denmark II
3	U.K	11	Spain II
4	Denmark I	12	Latin America
5	Sweden	13	Korea
6	Italy		

Remarks: ■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

ESC S

Function: **Select standard mode**

Code:

ASCII	ESC	S
Hex	1B	53
Decimal	27	83

Range: None

Default: None

Description: This command enables standard mode.

Remarks: ■ The data in the printer buffer is cleared and the setting by ESC W returns to the default.
■ The conditions by the following commands are defined independently in standard mode and page mode.
- ESC SP, ESC 2, and ESC 3

■ In standard mode, CAN, ESC FF and GS $ are ignored.

Differences: None

ESC T

Function: **Select print direction in page mode**

Code:

ASCII	ESC	T	n
Hex	1B	54	n
Decimal	27	84	n

Range: 0 ≤ n ≤ 3, 48 ≤ n ≤ 51

Default: n = 0

Description: This command selects the print direction and starting position in page mode.

n	Print Direction	Starting Position
0,48	Left to right	Upper left
1,49	Bottom to top	Lower left
2,50	Right to left	Lower right
3,51	Top to bottom	Upper right

Remarks:

■ The print direction set by this command id not effective in standard mode.

■ If this command is processed in standard mode, the setting by this command is effective when the printer changes to page mode.

■ Depending on the print starting position set by this command, the horizontal motion unit or vertical motion unit is used for the following commands.

- When the starting position is the upper left or lower right of the print area; ESC SP, ESC $, ESC \ use the horizontal motion unit and ESC 3, ESC J, GS $ the vertical motion unit.
- When the starting position is the upper right or lower left of the print area; ; ESC SP, ESC $, ESC \ use the vertical motion unit and ESC 3, ESC J, GS $ the horizontal motion unit.

■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

ESC V

Function: **Turn 90°clockwise rotation mode on/off**

Code:

ASCII	ESC	V	n
Hex	1B	56	n
Decimal	27	86	n

Range: 0 ≤ n ≤ 2, 48 ≤ n ≤ 50

Default: n = 0

Description: ■ This command turns 90° clockwise rotation mode on/off in standard mode according to the value of n as following
- When the value of n is equal to 0 or 48, 90°clockwise rotation mode is turned off.
- When the value of n is equal to 1, 2, 48, or 50, 90°clockwise rotation mode is turned on.

Remarks: ■ In underline mode, the underline printing for 90° clockwise rotated characters does not work, and the relationship between vertical and horizontal directions is reversed.
■ The 90° clockwise rotation mode is not effective in page mode.
■ If set in page mode, the 90° clockwise rotation mode has effect after the printer returns to standard mode.
■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

ESC W

Function: **Set print area in page mode**

Code:

ASCII	ESC	W	xL	xH	yL	yH	dxL	dxH	dyL	dyH
Hex	1B	57	xL	xH	yL	yH	dxL	dxH	dyL	dyH
Decimal	27	87	xL	xH	yL	yH	dxL	dxH	dyL	dyH

Range: 0 ≤ (xL + xH x 256) ≤ 65535 (0 ≤ xL ≤ 255, 0 ≤ xH ≤ 255)
0 ≤ (yL + yH x 256) ≤ 65535 (0 ≤ yL ≤ 255, 0 ≤ yH ≤ 255)
1 ≤ (dxL + dxH x 256) ≤ 65535 (0 ≤ dxL ≤ 255, 0 ≤ dxH ≤ 255)
1 ≤ (dyL + dyH x 256) ≤ 65535 (0 ≤ dyL ≤ 255, 0 ≤ dyH ≤ 255)

Default: • When a paper width of 58mm is selected:
(xL + xH x 256) = 0 (xL=0, xH=0)
(yL + yH x 256) = 0 (yL=0, yH=0)

(dxL + dxH x 256) = 384 (dxL=128, dxH=1)
(dyL + dyH x 256) = 2400 (dyL=6, dyH=9)

Description: ■ This command set the position and the size of the printing area in page mode as following.
• Horizontal starting position = [(xL + xH x 256) x (horizontal motion units)]
• Vertical starting position = [(yL + yH x 256) x (vertical motion units)]
• Horizontal printing area width = [(dxL + dxH x 256) x (horizontal motion units)]
• Vertical printing area width = [(dyL + dyH x 256) x (vertical motion units)]

Remarks: ■ The horizontal and vertical starting positions are out of the printable area, this command is canceled and the following data is processed as normal data.
■ If (Horizontal starting position + Horizontal printing area width) is beyond the printable area, the Horizontal printing area width is set to (Horizontal printing area - Horizontal starting position).
■ If (Vertical starting position + Vertical printing area width) is beyond the printable area, the Vertical printing area width is set to (Vertical printing area - Vertical starting position).
■ This command is not effective in standard mode. If this command is processed in standard mode, the setting by this command is effective when the printer returns to page mode.
■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: The maximum printable area(Max horizontal printable area, Max vertical printable area):

Max horizontal printable area	Max vertical printable area
48mm(384dots)	300mm(2400dots)

ESC \

Function: **Set relative print position**

Code:

ASCII	ESC	\	nL	nH
Hex	1B	5C	nL	nH
Decimal	27	92	nL	nH

Range: 0 ≤ (nL + nH x 256) ≤ 65535 (0 ≤ nL 255, 0 ≤ nH ≤ 255)

Default: None

Description: ■ This command sets the print starting position based on the current

position to [(nL + nH × 256) × horizontal or vertical motion unit].
• The print starting position is moved to (nL + nH x 256)in the right direction based on the current position.

Remarks:
■ The printer ignores any setting that exceeds the print area.
■ When the print area has been exceeded, this command is ignored.
■ With standard mode selected, the vertical motion unit is used.
■ In page mode, the horizontal motion unit is applied when printing start poison is defined to the upper right or lower right of print area using ESC T, otherwise, the vertical motion unit is used.
■ Even if the underline mode is turned on, the space skipped by this command is not printed underlined.

Differences: None

ESC a

Function: **Set position alignment**

Code:

ASCII	ESC	a	n
Hex	1B	61	n
Decimal	27	97	n

Range: 0 ≤ n ≤2, 48 ≤ n ≤50

Default: n = 0

Description: This command specifies position alignment for all data in one line in standard mode, using n as follows:

n	**Alignment**
0, 48	Left alignment
1, 49	Center alignment
2, 50	Right alignment

Remarks:
■ This command is not effective in page mode. If this command is processed in page mode, the setting by this command becomes effective when the printer returns to standard mode.
■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

ESC c5

Function: Enable/disable panel FEED buttons

Code:

ASCII	ESC	**c**	5	n
Hex	1B	63	35	n
Decimal	27	99	53	n

Range: 0 ≤ n ≤ 255

Default: n = 0

Description: Enables or disables the panel FEED buttons.

Remarks:
- 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.
- 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 feed.

Differences: None

ESC d

Function: **Print and feed n lines**

Code:

ASCII	ESC	d	n
Hex	1B	64	n
Decimal	27	100	n

Range: 0 ≤ n ≤ 255

Default: None

Description: This command feeds the paper by n lines after printing the data in the print buffer.

Remarks:
- The per-line paper feed amount is based on the value set by the line

spacing related commands, ESC 2 and ESC 3.
■ In page mode, this command moves only the print position, not performing actual print.
■ If the feed amount set is beyond the maximum feed amount, the feed amount will be set to the maximum feed
amount automatically.

Differences: None

ESC t

Function: **Select character code table**

Code:

ASCII	ESC	t	n
Hex	1B	74	n
Decimal	27	116	n

Range: 0 ≤ n ≤ 5, 16 ≤ n ≤ 19, 21 ≤ n ≤ 31, 33 ≤ n ≤ 41, n=255

Default: For model not supporting Thai character: n=0
For model supporting Thai character support : n = 20

Description: This command specifies code page according to the value of n as follows:

n	**Code page**
0	Page 0 437 (USA, Standard Europe)
1	Page 1 Katakana
2	Page 2 850 (Multilingual)
3	Page 3 860 (Portuguese)
4	Page 4 863 (Canadian-French)
5	Page 5 865 (Nordic)
16	Page 16 1252 (Latin I)
17	Page 17 866 (Cyrillic #2)
18	Page 18 852 (Latin 2)
19	Page 19 858 (Euro)
21	Page 21 862 (Hebrew DOS code)

n	**Code page**
22	Page 22 864 (Arabic)
23	Page 23 Thai42
24	Page 24 1253 (Greek)
25	Page 25 1254 (Turkish)
26	Page 26 1257 (Baltic)

27	Page 27 Farsi
28	Page 28 1251 (Cyrillic)
29	Page 29 737 (Greek)
30	Page 30 775 (Baltic)
31	Page 31 Thai14
33	Page 33 1255 (Hebrew New code)
34	Page 34 Thai 11
35	Page 35 Thai 18
36	Page 36 855 (Cyrillic)
37	Page 37 857 (Turkish)
38	Page 38 928 (Greek)
39	Page 39 Thai 16
40	Page 40 1256 (Arabic)
41	Page 41 1258 (Vietnam)
42	Page 42 Khmer (Cambodia)
47	Page 47 1250 (Czech)
255	User Code Page (Space)

Remarks : ■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

ESC {

Function : **Turns upside-down printing mode on/off**

Code :

ASCII	ESC	{	n
Hex	1B	7B	n
Decimal	27	123	n

Range: 0 ≤ n ≤ 255

Default: n = 0

Description : This command selects/deselects upside-down printing mode according to the least significant bit as follows.

LSB	Upside-down mode

0	Turned off
1	Turned on

Remarks :

■ This command is valid only when entered at the beginning of the line.
■ The upside-down print mode has no effect in page mode. If this command is processed in page mode, upside-down printing mode is enabled when the printer returns to standard mode.
■ 180 rotated characters are printed from right to left in upside-down print mode.
■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Example

Normal	Upside- down Mode
ABCDEF	ABCDEF

Differences: None

FS p

Function : **Print NV bit image**

Code :

ASCII	FS	p	n	m
Hex	1C	70	n	m
Decimal	28	112	n	m

Range: 1 ≤ n ≤ 255
0 ≤ m ≤ 3, 48 ≤ m ≤ 51

Default: None

Description : This command prints NV bit image n using the mode specified by m as follows:

m	**Mode**
0, 48	Normal
1, 49	Double-width
2, 50	Double-height
3, 51	Quadruple

Remarks :
■ GS (L and GS (8 can be used for printing NV bit image.
■ The NV bit image is defined by FS q.
■ n is assigned to each NV bit image to be stored in download order by FS q.
■ This command has no effect with NV bit image not defined in advance.
■ In page mode, the NV bit image is saved without being printed.
■ The printer does not print the NV bit image that is beyond one line of print area.
■ When using unidirectional print mode, there will be no vertical m is alignment between the top and bottom parts of the printed pattern.

Differences:

DPI : Dots per Inch (25.4mm)

Mode	**Vertical Dot Density (DPI)**	**Horizontal Dot Density (DPI)**
Normal	203	203
Double-width	203	203/2
Double-height	203/2	203
Quadruple	203/2	203/2

FS q

Function: **Define NV bit image**

Code:

ASCII	FS	q	n	[xL xH yL d1...dk]1... [xL xH yL d1...dk]n
Hex	1C	71	n	[xL xH yL d1...dk]1... [xL xH yL d1...dk]n
Decimal	28	113	n	[xL xH yL d1...dk]1... [xL xH yL d1...dk]n

Range:
1 ≤ n ≤ 255
1 ≤ (xL + xH ×256) ≤ 1023 (0 ≤ xL ≤ 255, 0 ≤ xH ≤ 3)
1 ≤ (yL + yH ×256) ≤ 288 (0 ≤ yL ≤ 255, yH=0,1)
0 ≤ d ≤ 255
k = (xL + xH × 256) × (yL + yH × 256) × 8

Default: None

Description:
■ This command defines the NV bit image in the NV memory.
- n denotes the number of the NV being defined.
- (xL, xH) and (yL, yH) set the number of dots in the horizontal and vertical directions to [(xL + xH × 256) x 8] and [(yL + yH × 256) x 8] respectively for the NV bit image.

Remarks:
■ GS (L and GS (8 can be used for defining NV bit image.
■ When this command is entered, all NV bit images previously defined are removed from the NV memory.
■ After completion of this command, the printer executes a software reset to restore the settings as when turned on.
■ The NV bit image is printed by FS p.
■ During the execution of this command, paper feed button, LSB and real time functions will not operate.
- Bit image data and print result are as follows:

d1	dY+1	…	. . .	MSB LSB
d2	dY+2	…	dk-2	MSB LSB
. . .	. . .	…	dk-1	MSB LSB
dY	dY x 2	…	dk	MSB LSB

■ NV memory is devided into 2 areas for mono and 2-color graphics. The

capacity of each NV memory area is 256KB.

Differences: None

GS !

Function: **Select character size**

Code:

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

Range: 0 ≤ n ≤ 255
(1 ≤ Vertical enlargement ≤ 8, 1 ≤ Horizontal enlargement ≤ 8)

Default: n = 0

Description: ■ This command selects the character height and width using bits 0 to 3, and bits 4 to 7 respectively as follows:

Bit	Function	Setting
0	Specifies the number of times normal font size in the vertical direction	Refer to Table 2 [Enlarged in vertical direction]
1		
2		
3		
4	Specifies the number of times normal font size in the horizontal direction	Refer to Table 1 [Enlarged in horizontal direction]
5		
6		
7		

• Table 1 [Enlarged in horizontal direction]

Hex	Decimal	Enlargement
00	0	1 time (standard)
10	16	2 times
20	32	3 times
30	48	4 times
40	64	5 times
50	80	6 times
60	96	7 times
70	112	8 times

• Table 2 [Enlarged in vertical direction]

Hex	Decimal	Enlargement
00	0	1 time (standard)
01	1	2 times
02	2	3 times
03	3	4 times
04	4	5 times

05	5	6 times
06	6	7 times
07	7	8 times

Remarks:
■ The character size set by this command is valid for alphanumeric, user-defined characters, multi-byte code characters such as Chinese, Japanese, and Korean.
■ Double width and double height modes can be set by ESC !.
■ Multi-byte code characters are specified only by this command.
■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences: None

GS $

Function: **Set absolute vertical print position in page mode**

Code:

ASCII	GS	$	nL	nH
Hex	1D	24	nL	nH
Decimal	29	36	nL	nH

Range: 0 ≤ (nL + nH x 256) ≤ 65535 (0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255)

Default: None

Description: This command sets the absolute vertical print starting position to [(nL + nH × 256) × (vertical or horizontal motion unit)].

Remarks:
■ This command is activated only in page mode and ignored in standard mode.
■ Either vertical or horizontal motion unit is used according to the print direction set by ESC T as follows:
• With the starting position of the upper left or lower right on the print area, the vertical motion unit is used.
• In other cases, the horizontal motion unit is used.
■ The configuration beyond the print area set by ESC W is ignored.

Differences: None

GS (A

Function: **Execute test print**

Code:

ASCII	GS	(	A	pL	pH	n	m
Hex	1D	28	41	pL	pH	n	m
Decimal	29	40	65	pL	pH	n	m

Range: (pL + pH x 256) = 2 (pL=2, pH=0)
0 ≤ n ≤ 2, 48 ≤ n ≤ 50
1 ≤ m ≤ 2, 49 ≤ m ≤ 50

Default: None

Description: ■ This command prints a specified pattern for testing on a roll paper.

• Roll paper is selected with n specified as follows:

n	**Paper type**
0, 48 1, 49 2, 50	Roll paper

• Different kinds of test patterns are selected according to m as follows:

m	**Test pattern**
1, 49	Hexadecimal dump mode
2, 50	Self-test printing(configuration + default code page)
3, 51	Not operated

Remarks: ■ The printer cancels a macro definition in progress If this command is processed. The macro becomes invalid.
■ After completion of this command, a software reset is executed automatically to restore the printer status set during power cycling.
■ All of the data transmitted from the host to the printer is printed and identified in hexadecimal dump mode.
■ The real time command and LSB operations are not executed during the printing of printer configuration (m=2, 50).

Differences: None

GS (E

Function: **Set NV user memory area**

Code:

ASCII	GS	(	E	pL	pH	fn	[parameter]
Hex	1D	28	45	pL	pH	fn	[parameter]
Decimal	29	40	69	pL	pH	fn	[parameter]

Range: None

Default: None

Description: This command stores the customized values to the NV user memory area and uses them for the printer operation. The table below explains the functions available in this command. Executes commands related to the user setting mode by specifying the function code fn.

fn	Format	No.	Function
1	GS (E pL pH fn d1 d2	1	Start the user setting mode
2	GS (E pL pH fn d1 d2 d3	2	End the user setting mode (Performs a soft reset)
3	GS (E pL pH fn [a1 b18...b11]...[ak bk8...bk1]	3	Set value(s) for the memory switch
4	GS (E pL pH fn a	4	Transmit the settings of the memory switch to the host

Remarks:
■ pL, pH is used to set the number of bytes following pH to (pL + pH x 256).
■ The change in the items of the NV user memory is available only after entering the user setting mode.
■ After completing the user setting mode (Function 2), the printer performs software reset to restore the initial settings in effect at power on. Receive and print buffers are cleared as well.
■ Since frequent write operation by this command may deteriorate the performance of the NV memory, it is recommended to write to NV memory when the significant change in the setting is required.
■ While processing this command, the printer remains busy. Therefore the data transmission by the host is not available. The real time commands and LSB operations are not processed.

Differences: None

<Function 1> GS (E pL pH fn d1 d2 (fn=1)

Code:

ASCII	GS	(	E	pL	pH	fn	d1	d2
Hex	1D	28	45	pL	pH	fn	d1	d2
Decimal	29	40	69	pL	pH	fn	d1	d2

Range: (pL + pH x 256) = 1 (pL=1, pH=0)
fn=1
d1=73, d2=78

Default: None

Description: This command starts the user setting mode, enabling the printer to notify that the mode has changed as follows:
[Mode change feedback]

	Hexadecimal	**Decimal**	**Number of Data**
Header	37H	55	1 byte
Flag	20H	32	1 byte
NUL	00H	0	1 byte

Remarks:
■ This command is effective only in standard mode, not in page mode.
■ Upon entering the user mode setting mode by this command, the printer transmits “mode change feedback” to the host.
■ The user setting mode should be enabled prior to processing <Function 2> through 12. Otherwise, those functions are ignored.
■ After confirming “mode change feedback”, it is recommended to send the command to reconfigure the NV user memory.

Differences: None

<Function 2> GS (E pL pH fn d1 d2 d3 (fn=2)

Code:

ASCII	GS	(	E	pL	pH	fn	d1	d2	d3
Hex	1D	28	45	pL	pH	fn	d1	d2	d3
Decimal	29	40	69	pL	pH	fn	d1	d2	d3

Range: (pL + pH x 256) = 1 (pL=1, pH=0)
fn=2
d1=79, d2=85, d3=84

Default: None

Description: This command terminates the user setting mode and performs a software reset.

Remarks: ■ This command activates setting items set in the user setting mode.
■ All the setting items will be effective only after performing this command.
■ After executing a software reset, the printer resumes the setting in effect at power on.

Differences: None

<Function 3> GS (E pL pH fn [a1 b18...b11]...[ak bk8...bk1] (fn=3)

Code:

ASCII	GS	(	E	pL	pH	fn	[a1 b18...b11]... [ak bk8...bk1]
Hex	1D	28	45	pL	pH	fn	[a1 b18...b11]... [ak bk8...bk1]
Decimal	29	40	69	pL	pH	fn	[a1 b18...b11]... [ak bk8...bk1]

Range: 10≤ (pL + pH x 256) ≤ 65535
fn=3
a=1,2,3,4,5,6,11,12
b=48, 49, 50

Default: All switches are set to Off(b = 48)

Description: ■ This command changes all the Memory Switch(Msw) 1 through 8 to the value specified by b simultaneously as follows:

• When b=48,49, the corresponding bit is set to Off and On respectively.
• When b=50, there is no change in the memory switch.

■ The setting items of the memory switch 1 are as follows:

Msw	Value		Function
	7	6	
1-6~7	48	48	Print density 1(Default)
	48	49	Print density 2
	49	48	Print density 3(Dark)

■ The setting items of the memory switch 2 are as follows:

Msw	Value	Function
2-1	48	Specification for Destination: Single byte country
	49	Specification for Destination: Double byte country

■ Code page selection using the memory switch 2-3 through 2-8.

Msw2-8	Msw2-7	Msw2-6	Msw2-5	Msw2-4	Msw2-3	Character Table
48	48	48	48	48	48	PC437
48	48	48	48	49	48	Katakana
48	48	48	49	48	48	PC850
48	48	48	49	49	48	PC860
48	48	49	48	48	48	PC863
48	48	49	48	49	48	PC865
48	48	49	49	48	48	WPC1252
48	48	49	49	49	48	PC866
48	49	48	48	48	48	PC852
48	49	48	48	49	48	PC858
48	49	48	49	48	48	PC862
48	49	48	49	49	48	PC864
48	49	49	48	48	48	Thai42
48	49	49	48	49	48	WPC1253
48	49	49	49	48	48	WPC1254
48	49	49	49	49	48	WPC1257
49	48	48	48	48	48	Farsi
49	48	48	48	49	49	WPC1251
49	48	48	49	48	48	PC737
49	48	48	49	49	49	PC775
49	48	49	48	48	48	Thai 14
49	48	49	48	49	48	Hebrew old
49	48	49	49	48	48	WPC1255
49	48	49	49	49	48	Thai 11
49	49	48	48	48	48	Thai 18
49	49	48	48	49	48	PC855

49	49	48	49	48	48	PC857
49	49	48	49	49	48	PC928
49	49	49	48	48	48	Thai 16
49	49	49	48	49	48	WPC1256
49	49	49	49	48	48	WPC1258
49	49	49	49	49	48	Khmer
48	48	49	48	48	49	WPC1250

■ The setting items of the memory switch 3 are as follows : Specify the emulations to be enabled using the memory switch 3-1 through 3-3

Msw3-3	Msw3-2	Msw3-1	Emulation seletion	Remark
48	48	48	Emulation 1 (default)	
48	48	49	Emulation 2	Reserved
48	49	48	Emulation 3	Reserved
48	49	49	Emulation 4	Reserved
49	48	48	Emulation 5	Reserved

■ Serial Baud rate Setting

Msw3-8	Msw3-7	Msw3-6	Baud rate(Bps)	Remark
48	**48**	**48**	**9600**	**(Default)**
48	**48**	**49**	**19200**	
48	**49**	**48**	**38400**	
48	**49**	**49**	**57600**	
49	**48**	**48**	**115200**	
49	**48**	**49**	**4800**	

■ Single byte font selection using the memory switch 4-3 through 4-4.

Msw	Value		Single byte font selection	Remark
	4	3		
4-3~4	48	48	Font A	12x24
	48	49	Font B	9x17
	49	48	Font C	9x24

■ **Serial Setting**

Msw	Function	ON(49)	OFF(48)	Remark
4-5	Word length	7bit	8bit	
4-6	Parity selection	Yes	No	
4-7	Parity check	EVEN	ODD	
4-8	Handshaking	XON / XOFF	DTR/DSR	

■ The setting items of the memory switch 5 are as follows:

Msw	Value	Function
5-1~8	48	Reserved

■ The setting items of the memory switch 6 are as follows:

Msw	Value	Function
6-1~8	48	Reserved

Differences: None

<Function 4> GS (E pL pH fn a (fn=4)

Code:

ASCII	GS	(	E	pL	pH	fn	a
Hex	1D	28	45	02	00	04	a
Decimal	29	40	69	2	0	4	a

Range: pL + pH x 256) = 2 (pL=2, pH=0)
fn=4
a=1,2,3,4,5,6,11,12

Default: None

Description: This command transmits the setting value of the memory switch

corresponding to a.

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Identifier	21H	33	1 byte
Setting value	30H or 31H	48 or 49	8 bytes
NUL	00H	0	1 byte

■ The setting value is sent from bit 8 to bit 1, consisting of 8 bytes in total.

- Off: Hexadecimal = 30H / Decimal = 48
- On: Hexadecimal = 31H / Decimal = 49

Differences: None

GS (L, GS 8 L

Function : **Select graphics data**

Code :

ASCII	GS	(	L	pL	pH	m	fn	[parameter]
Hex	1D	28	4C	pL	pH	m	fn	[parameter]
Decimal	29	40	76	pL	pH	m	fn	[parameter]

ASCII	GS	8	L	p1	p2	p3	p4	m	fn	[parameter]
Hex	1D	38	4C	p1	p2	p3	p4	m	fn	[parameter]
Decimal	29	56	76	p1	p2	p3	p4	m	fn	[parameter]

Range: None

Default: None

Description : This command processes graphics data according to the function code (fn).

fn	**No.**	**Format**	**Function**
0, 48	48	GS (L pL pH m fn	Transmits the NV graphics memory capacity
2, 50	50	GS (L pL pH m fn	Prints the graphics data in the print buffer
3, 51	51	GS (L pL pH m fn	Transmits the remaining capacity of the NV graphics memory
64	64	GS (L pL pH m fn d1 d2	Transmits the defined NV graphics key code list
65	65	GS (L pL pH m fn d1 d2 d3	Deletes all NV graphics data
66	66	GS (L pL pH m fn kc1 kc2	Deletes the specified NV graphics data
67	67	GS (L pL pH m fn kc1 kc2 b xL xH yL yH [cd1…dk]1…[c d1…dk]b	Defines the graphics data in the non-volatile memory
69	69	GS (L pL pH m fn kc1 kc2 x y	Prints the specified NV graphics data
112	112	GS (L pL pH m fn a bx by c xL xH yL yH d1…dk	Stores the graphics data in the print buffer memory

Remarks :
- This command is adapted to print image data.
- pL, pH specifies the number of bytes following pH using (pL + pH x 256).
- Since frequent writing operation could cause the damage to the NV

memory, it is recommended to write only when being required.
■ While storing data by this command, the printer is in BUSY state where receiving of data is not available. Therefore, it is not recommended to send data during this process.
■ The real time commands and LSB operations are not allowed during NV memory operation process.

Differences: None

<Function 48> GS (L pL pH m fn (fn=0, 48)

Code :

ASCII	GS	(	L	pL	pH	m	fn
Hex	1D	28	4C	pL	pH	m	fn
Decimal	29	40	76	pL	pH	m	fn

Range: (pL + pH x 256) = 1 (pL=2, pH=0)
m=48
fn=0, 48

Default: None

Description : Transmits the total capacity of the NV bit-image memory (number of bytes in the memory area).

Remarks :

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Identifier	21H	33	1 byte
Setting value	30H or 31H	48 or 49	8 bytes
NUL	00H	0	1 byte

■ The total capacity data is converted to character codes corresponding to decimal data, then transmitted from the MSB.
■ The data length is variable.
■ The total capacity of the NV user memory is selectable as any one of[0, 64K, 128K, 192K, 256K] bytes with GS (E. The default value is 256K.

Differences: None

<Function 50> GS (L pL pH m fn (fn=2, 50)

Code :

ASCII	GS	(	L	pL	pH	m	fn
Hex	1D	28	4C	pL	pH	m	fn

Decimal	29	40	76	pL	pH	m	fn

Range: (pL + pH x 256) = 1 (pL=2, pH=0)
m=48
fn=2, 50

Default: None

Description : This command prints the graphics data defined by the process of Function 112.

Remarks :
- The graphics data stored in the printer buffer is printed.
- This command is available in standard mode, not in page mode.
- The graphics data is defined by Function 112.
- The required amount of line feed pitch is used for printing graphics data, regardless of the existing setting value of the pitch.

Differences: None

<Function 51> GS (L pL pH m fn (fn=3, 51)

Code:

ASCII	GS	(	L	pL	pH	m	fn
Hex	1D	28	4C	pL	pH	m	fn
Decimal	29	40	76	pL	pH	m	fn

Range: (pL + pH x 256) = 2 (pL=2, pH=0)
m=48
fn=3, 51

Default: None

Description: This command transmits the setting value of the memory switch corresponding to a.

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Identifier	21H	33	1 byte
Setting value	30H – 39H	48 - 57	1 - 8 bytes
NUL	00H	0	1 byte

- The setting value is sent from bit 8 to bit 1, consisting of 8 bytes in total.
  - Off: Hexadecimal = 30H / Decimal = 48
  - On: Hexadecimal = 31H / Decimal = 49

Remarks: None

Differences: None

<Function 64> GS (L pL pH m fn d1 d2 (fn=64)

Code:

ASCII	GS	(	L	pL	pH	m	fn	d1	d2
Hex	1D	28	4C	pL	pH	m	fn	d1	d2
Decimal	29	40	76	pL	pH	m	fn	d1	d2

Range: (pL + pH x 256) = 4 (pL=4, pH=0)
m=48
fn=64
d1=75, d2=67

Default: None

Description: ■ Transmits the defined NV graphics key code list.

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	72H	114	1 byte
Status	40H or 41H	64 or 65	1 byte
Data	30H – 39H	48 - 57	2 - 80 bytes
NUL	00H	0	1 byte

■ When the key code is not present :

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	72H	114	1 byte
Status	40H	64	1 byte
NUL	00H	0	1 byte

Remarks: ■ If the number of the key code exceed 40, the key code is transmitted dividing up to 40.
- The status if the continuous transmission data block is present is 41H.
- The status if the continuous transmission data block is not present is 40H.

■ After the [Header-NULL] is transmitted, the printer receives a response from the host ; then it performs the process defined by the response.(See the tables below.)
- When the status(existence of the next data block) is Hexadecimal=41H (Decimal = 65)

Response		**Process performed**
ASCII	Decimal	

ACK	6	Transmits the next data
NAK	21	Transmits the previous data again
CAN	24	Ends the process.

- When the status (for the last data block) is Hexadecimal = 40H (Decimal = 64)

Response		Process performed
ASCII	Decimal	
ACK	6	Ends the process
NAK	21	Transmits the previous data again
CAN	24	Cancels the process.

Differences: None

<Function 65> GS (L pL pH m fn d1 d2 d3 (fn=65)

Code :

ASCII	GS	(	L	pL	pH	m	fn	d1	d2	d3
Hex	1D	28	4C	pL	pH	m	fn	d1	d2	d3
Decimal	29	40	76	pL	pH	m	fn	d1	d2	d3

Range: (pL + pH x 256) = 5 (pL=5, pH=0)
fn=65
d1=67, d2=76, d3=82

Default: None

Description : This command removes all defined NV graphics data.

Remarks : ■ The graphics data is define by Function 67 into the NV graphics memory with the sector dedicated for storing NV graphics data.

Differences: None

<Function 66> GS (L pL pH m fn kc1 kc2 (fn=66)

Code :

ASCII	GS	(	L	pL	pH	m	fn	kc1	kc2
Hex	1D	28	4C	pL	pH	m	fn	kc1	kc2
Decimal	29	40	76	pL	pH	m	fn	kc1	kc2

Range: (pL + pH x 256) = 4 (pL=4, pH=0)
m=48
fn=66

32 ≤ kc1 ≤ 126
32 ≤ kc2 ≤ 126

Default: None

Description : Deletes the NV graphics data defined by the codes kc1 and kc2.

Remarks : ■ The graphics data is define by Function 67.

Differences: None

<Function 67> GS (L pL pH m fn kc1 kc2 b xL xH yL yH [cd1…dk]1…[c d1…dk]b (fn=67)

Code :

ASCII	GS	(	L	pL	pH	m	fn	kc1 kc2 b xL xH yL yH [cd1…dk]1…[c d1…dk]b
Hex	1D	28	4C	pL	pH	m	fn	kc1 kc2 b xL xH yL yH [cd1…dk]1…[c d1…dk]b
Decimal	29	40	76	pL	pH	m	fn	kc1 kc2 b xL xH yL yH [cd1…dk]1…[c d1…dk]b

Range:

GS (L parameter
3 ≤ (pL + pL x 256) ≤ 65535 (0≤pL≤255, 0≤ pH≤255)

GS (8 parameter
3 ≤ (p1 + p2 x 256) +p3 x 65535+p4 x 16777216) ≤ 4294967295
(0 ≤ p1L ≤ 255, 0 ≤ p2 ≤ 255, 0 ≤ p3 ≤ 255, 0 ≤ p4 ≤ 255)

Common parameter
m=48, fn=67, a=48
32 ≤ kc1 ≤ 126
32 ≤ kc2 ≤ 126
b=1,2
1 ≤ (xL + xH x 256) ≤ 8192
1 ≤ (yL + yH x 256) ≤ 2304
c=49
0 ≤ d ≤ 255
k = (int ((xL + xH x 256) + 7) / 8) x (yL + yH x 256)

Default: None

Description : ■ The following parameters are used to define the raster graphics data.
- b specifies the number of colors for the defined data.

- xL and xH specify the number of dots in horizontal direction to (xL + xH x 256).
- yL and yH specify the number of dots in horizontal direction to (yL + yH x 256) dots.

Remarks :

■ If new NV graphics data is saved or the existing data is modified, all of the existing data in NV graphics memory are flushed and updated using this command. The rest of NV graphics data groups having no change should be redefined along with the new group stored.
■ When NV graphics data groups are saved, each of the groups is allocated with N in the order of download.

Differences: None

<Function 69> GS (L pL pH m fn kc1 kc2 x y (fn=69)

Code :

ASCII	GS	(	L	pL	pH	m	fn	kc1	kc2	x	y
Hex	1D	28	4C	pL	pH	m	fn	kc1	kc2	x	y
Decimal	29	40	76	pL	pH	m	fn	kc1	kc2	x	y

Range:

(pL + pH x 256) = 6 (pL=6, pH=0)
m=48, fn=69
32 ≤ kc1 ≤ 126
32 ≤ kc2 ≤ 126
x=1, 2
y=1, 2

Default: None

Description :

■ Prints the NV graphics data defined by the codes kc1 and kc2.
• The graphics data is enlarged by x and y in the horizontal and vertical directions.

Remarks :

■ This command prints the NV graphics data defined by Function 67.
■ In page mode, this command is not effective.
■ NV graphics data beyond the print area for one line is not printed.

Differences: None

<Function 112> GS (L pL pH m fn a bx by c xL xH yL yH d1…dk (fn=112)

Code :

ASCII	GS	(	L	pL	pH	m	fn	a bx by c xL xH yL yH d1…dk
Hex	1D	28	4C	pL	pH	m	fn	a bx by c xL xH yL yH

								d1…dk
Decimal	29	40	76	pL	pH	m	fn	a bx by c xL xH yL yH d1…dk

Range:

GS (L parameter
11 ≤ (pL + pL x 256) ≤ 65535 (0≤pL≤255, 0≤ pH≤255)

GS 8 L parameter
11 ≤ (p1 + p2 x 256) +p3 x 65535+p4 x 16777216) ≤ 4294967295
(0 ≤ p1L ≤ 255, 0 ≤ p2 ≤ 255, 0 ≤ p3 ≤ 255, 0 ≤ p4 ≤ 255)

Common parameter
m=48
fn=112
a=48
c=49
1 ≤ (xL + xH x 256) ≤ 1662 (When by =1)
1 ≤ (xL + xH x 256) ≤ 831 (When by =2)
1 ≤ (xL + xH x 256) ≤ 831 (When by =1)
1 ≤ (xL + xH x 256) ≤ 415 (When by =2)
0 ≤ d ≤ 255
k = (int ((xL + xH x 256) + 7) / 8) x (yL + yH x 256)

Default: None

Description :

■ This command stores the raster graphics data in the print buffer, enlarged by bx and by in the horizontal and vertical directions.

- xL, xH specifies the raster graphics data in the horizontal directionas (xL + xH x 256) dots.
- yL, yH specifies the raster graphics data in the vertical direction to (yL + yH x 256) dots.
- d denotes the stored data(raster format).
- k denotes the number of the graphics data.

Remarks :

■ The graphics data is stored in the printer buffer directly.
■ NV graphics data beyond the print area for one line is not printed.
■ Real time command is not effective during processing of this command.

Differences: None

GS (k

Function: **Specify and print the symbol**

Code: None

Range: None

Default: None

Description: ■ This command processes the data concerning two-dimensional code.
- Symbol type is specified by cn.
- Function code is specified by fn.

cn	Type of Symbol
48	PDF417 (2-dimensional code)
49	QR CODE (2-dimensional code)

cn	fn	Function	
48	65	Function 065	PDF417: Specify the number of columns
	66	Function 066	PDF417: Specify the number of rows
	67	Function 067	PDF417: Specify the width of module
	68	Function 068	PDF417: Specify the module height
	69	Function 069	PDF417: Specify the error correction level
	70	Function 070	PDF417: Specify the option
	80	Function 080	PDF417: Store the received data in the symbol storage area
	81	Function 081	PDF417: Print the symbol data in the symbol storage area
	82	Function 082	PDF417: Send the size information of the symbol data in the symbol storage area

cn	fn	Function	
49	65	Function 165	QR CODE: Select the module
	67	Function 167	QR CODE: Select the size of module
	69	Function 169	QR CODE: Select the error correction level
	80	Function 180	QR CODE: Store the data in the symbol storage area
	81	Function 181	QR CODE: Print the data in the symbol storage area
	82	Function 182	QR CODE: Transmit the size information of the symbol data in the symbol storage area

Remarks: PDF417 symbol data (when cn=48)

■ The symbol data is defined, stored to the symbol storage area by Function 080 and printed by the specification of Function 081. The symbol data in the area remains reserved until the following processes are executed:
- Performing Function 080
- Performing ESC @
- Performing the printer reset and power-off

■ The setting values of Functions 065 to 070 are utilized for the processing of Function 080 or 082. The printable area must be large enough to accommodate different-size symbols. If not, the symbol may not be printed.
■ The same symbol data is repeatedly printed by executing Function 081 after performing Function 080.
■ The same symbol data is printed differently by executing Function 081 after setting the feature of the symbol by using Functions 065 through 070.
■ By using Function 082, the symbol size printed by Function 081 is Available.

QRCODE Symbol Data (cn = 49)
■ The symbol data is defined, stored to the symbol storage area by Function 180 and printed by the specification of Function 181. The symbol data in the area remains reserved until the following processes are executed:
- Performing Function 180
- Performing ESC @
- Performing the printer reset and power-off

■ The setting values of Functions 165 to 169 are utilized for the processing of Function 180 or 182. The printable area must be large enough to accommodate different-size symbols. If not, the symbol may not be printed.
■ The same symbol data is repeatedly printed by executing Function 181 after performing Function 180.
■ The same symbol data is printed differently by executing Function 181 after setting the feature of the symbol by using Functions 165 through 169.
■ By using Function 182, the symbol size printed by Function 181 is available.

Differences: None

<Function 065> GS (k pL pH cn fn n (fn=65)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	30	41	n
Decimal	29	40	107	3	0	48	65	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=48, fn=65
0 ≤ n ≤ 30

Default:

n = 0

Description:

■ This command specifies the number of columns in the data area of PDF417.
- When n=0, automatic processing is set
- When n is not 0, the number of columns of the data area is set to n code word.

Remarks:

■ Settings of this command affect the processing of Functions 081 and 082.
■ With auto processing (n=0) specified, the maximum number of columns in the data area is set to 30 columns.
■ The following data is excluded from the number of columns:
- Start and stop patterns
- Indicator code word of left and right

■ With auto processing (n=0) specified, the number of columns is calculated using the following information.
- Printing area when processing Functions 081, 082
- Module width (Function 067)
- Option setting (Function 070)

■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 066> GS (k pL pH cn fn n (fn=66)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	30	42	n
Decimal	29	40	107	3	0	48	66	n

Range: (pL + pH x 256) = 3 (pL=3, pH=0)
cn=48, fn=66
n=0, 3 ≤ n ≤ 90

Default: n = 0

Description: ■ This command specifies the number of rows in the data area of PDF417.
- When n=0, automatic processing is set
- When n is not 0, the number of rows is set to n rows.

Remarks: ■ Settings of this function affect the processing of Functions 081 and 082.
■ With auto processing (n=0) specified, the maximum number of rows is set to 90.
■ With auto processing (n=0) specified, the number of rows is calculated by using the following information:
- Printing area when processing Functions 081, 082
- Module height (Function 068)

■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences: None

<Function 067> GS (k pL pH cn fn n (fn=67)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	30	43	n
Decimal	29	40	107	3	0	48	67	n

Range: (pL + pH x 256) = 3 (pL=3, pH=0)
cn=48
fn=67
1 ≤ n ≤ 4

Default: n = 3

Description: This command sets the width of the module of PDF417 symbol to n dots.

Remarks:
■ Settings of this command affect the processing of Functions 081 and 082.
■ The setting unit for printer models varies.
■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:
■ Setting unit(1 dot) : 0.125(1/203 inch)

<Function 068> GS (k pL pH cn fn n (fn=68)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	30	44	n
Decimal	29	40	107	3	0	48	68	n

Range:
(pL + pH x 256) = 3 (pL=3, pH=0)
cn=48, fn=68, 2 ≤ n ≤ 8

Default:
n = 3

Description:
This command sets the module height of PDF417 to [the module width x n].

Remarks:
■ Settings of this command affect the processing of Functions 081 and 082.
■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:
None

<Function 069> GS (k pL pH cn fn m n (fn=69)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m	n
Hex	1D	28	6B	04	00	30	45	m	n
Decimal	29	40	107	4	0	48	69	m	n

Range:
(pL + pH x 256) = 4 (pL=4, pH=0)
cn=48, fn=69, m=48, 48 ≤ n ≤ 56

Default:
None

Description:
■ This command specifies the error correction level for PDF417.
• The error correction level is set by “level”.

Remarks:

■ Settings of this function affect the processing of Functions 081 and 082.

■ Error correction level specified by “level” (m=48) is as follows:
The number of the error correction codeword is unchanged regardless of the number of codeword in the data area.

n	Function	Number of error correction codeword
48	Error correction level 0	2
49	Error correction level 1	4
50	Error correction level 2	8
51	Error correction level 3	16
52	Error correction level 4	32
53	Error correction level 5	64
54	Error correction level 6	128
55	Error correction level 7	256
56	Error correction level 8	512

■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences: None

<Function 070> GS (k pL pH cn fn m (fn=70)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	30	46	m
Decimal	29	40	107	3	0	48	70	m

Range: (pL + pH x 256) = 3 (pL=3, pH=0)
cn=48, fn=70, m=0,1

Default: m = 0

Description: This command selects the option for PDF417.

m	Function
0	Select the standard PDF417
1	Select the simplified PDF417

Remarks:

■ Settings of this function affect the processing of Functions 081 and 082.

■ When simplified PDF417 symbol is canceled, standard PDF417 symbol is automatically selected.

■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences: None

<Function 080> GS (k pL pH cn fn m d1...dk (fn=80)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m	d1...dk
Hex	1D	28	6B	pL	pH	30	50	30	d1...dk
Decimal	29	40	107	pL	pH	48	80	48	d1...dk

Range:

4 ≤ (pL + pH x 256) ≤ 65535 (0 ≤ pL ≤ 255, 0 ≤ pH ≤ 255)
cn=48, fn=80, m=48
0 ≤ d ≤ 255
k = (pL + pH x 256) – 3

Default: None

Description: This command stores the PDF417 symbol data (d1...dk) in the symbol storage area.

Remarks:

■ The data stored in the symbol storage area by this command remains reserved after processing Function 081 or 082.
■ The following data should not be included in the symbol data d1..dk since this information is automatically added by the printer:
- Start pattern and stop pattern.
- Indicator codeword of left and right.
- The descriptor of symbol length (the first code word in the data area).
- The error correction codeword calculated by modulus 929.

■ The setting of this command remains effective until the following processing is performed:
- Executing Function 080
- Executing ESC @
- Executing printer reset or power-off

Differences: None

<Function 081> GS (k pL pH cn fn m (fn=81)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	30	51	m
Decimal	29	40	107	3	0	48	81	m

Range: (pL + pH x 256) = 3 (pL=3, pH=0)
cn=48
fn=81
m=48

Default: None

Description: This command encodes and prints the PDF417 symbol data in the symbol save area.

Remarks:

■ In standard mode, this command is available only when printer is at the beginning of a line or the printer buffer is empty.
■ A symbol exceeding the printing area in size can not be printed.
■ Printing operation is not processed under the following conditions:
- There is no data (Function 080 is not processed).
- If [(number of columns x number of rows) < number of code word] when automatic processing is specified for number of columns and number of rows.
- Number of code word exceeds 928 in the data area.

■ The following data is added automatically by the encode processing:
- Start pattern and stop pattern.
- Indicator code word of left and right.
- The descriptor of symbol length (the first code word in the data area).
- The error correction code word calculated by modulus 929.
- Pad codeword.

■ The data area includes the following codewords:
- Data specified by Function 080.
- The descriptor of symbol length (the first code word in the data area).
- The error correction code word calculated by modulus 929.
- Pad codeword.

■ When automatic processing (Function 065) is specified, the number of columns is calculated using the following information:
- Current printing area
- Module width (Function 067)
- Option setting (Function 070)
- Codeword in the data area
- The maximum number of columns is 30.

■ When auto processing (Function 066) is specified in page mode, the number of rows is calculated using the following information:

• Current printing area
• Module height (Function 068)
• Codeword in the data area
• The maximum number of rows is 90.

■ Except for character size and upside-down printing mode, none of print mode such as emphasized, double-strike, etc, affects the printing of the symbol.

■ In standard mode, the paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol.

■ In page mode, the printer stores the symbol data in the print buffer without executing actual printing.

■ The quiet zone is not included in the printing data. Be sure to include the adequate quiet zone for executing of this command.

• The quiet zone means the spaces surrounding the symbol such as upper, lower, left, and right spaces.

Differences: None

<Function 082> GS (k pL pH cn fn m (fn=82)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	30	52	m
Decimal	29	40	107	3	0	48	82	m

Range: (pL + pH x 256) = 3 (pL=3, pH=0)
cn=48
fn=82
m=48

Default: None

Description: This command encodes and sends the size information of the PDF417 symbol data in the symbol storage area.

Remarks: ■ In standard mode, this command is available only when printer is at the beginning of a line or the printer buffer is empty.

■ The size information for each data is as follows:

Send data	Hex	Decimal	Data
Header	37H	55	1 byte
Identifier	2FH	47	1 byte
Horizontal size	30H – 39H	48 – 57	1 – 5 byte
Separator	1FH	31	1 byte
Vertical size	30H – 39H	48 – 57	1 – 5 byte

Separator	1FH	31	1 byte
Fixed value	31H	49	1 byte
Separator	1FH	31	1 byte
Other information	30H or 31H	48 or 49	1 byte
NUL	00H	0	1 byte

• Horizontal size and vertical size denotes the number of dots of the symbol.

■ The following data indicates whether or not printing of the symbol is possible:

Hex	Decimal	Condition
30H	48	Printing is possible
31H	49	Printing is impossible

■ The quiet zone is not included in the printing data. Be sure to include the adequate quiet zone for executing of this command.

Differences: None

<Function 165> GS (k pL pH cn fn n1 n2 (fn=65)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n1	n2
Hex	1D	28	6B	04	00	31	41	n1	n2
Decimal	29	40	107	4	0	49	65	n1	n2

Range: (pL + pH x 256) = 3 (pL=3, pH=0)
cn=49
fn=65
n1 = 49, 50
n2 =0

Default: n1 = 50, n2 = 0

Description: This command sets the QR Code model as follows:

n1	Function
49	Model 1
50	Model 2

Remarks: ■ The setting of this command affects <Function 181> and <Function 182>.
■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

<Function 167> GS (k pL pH cn fn n (fn=67)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	31	43	n
Decimal	29	40	107	3	0	49	67	n

Range: (pL + pH x 256) = 3 (pL=3, pH=0)
cn=49
fn=67
1<=n<8

Default: n = 3

Description: This command sets the size of the QR Code module to n dots.

Remarks:
■ The setting of this command affects the processing of <Function 181> and <Function 182>.
■ Since the QR CODE module is square, n = module width = module height.
■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

<Function 169> GS (k pL pH cn fn n (fn=69)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	31	45	n
Decimal	29	40	107	3	0	49	69	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=49
fn=69
48≤n≤51

Default:

n = 48

Description:

This command sets the error correction level for QR Code.

n	Function	Recovery Amount (%)
48	Error Correction Level L	7
49	Error Correction Level M	15
50	Error Correction Level Q	25
51	Error Correction Level H	30

Remarks:

■ The setting of this command affects the processing of <Function 181> and <Function 182>.
■ Reed-Solomon correction is employed to generate a series of error correction codewords.
■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 180> GS (k pL pH cn fn m d1...dk (fn=80)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m	d1...dk
Hex	1D	28	6B	pL	pH	31	50	30	d1...dk
Decimal	29	40	107	pL	pH	49	80	48	d1...dk

Range:

4 ≤ (pL + pH x 256) ≤7092 (0 ≤ pL ≤ 255, 0 ≤ pH ≤ 27)
cn=49
fn=80
m=48
0 ≤ d ≤ 255
k = (pL + pH x 256) – 3

Default: None

Description: This command saves symbol data of the QR Code to the symbol storage area.

Remarks:

■ The symbol data is defined, stored to the symbol storage area by Function 180 and printed by the specification of Function 181. The data remains reserved after completion of printing.

■ The following shows the data available for encoding of QR code.

Character Type	**Usable Characters**
Numeric Data	“0” ~ “9”
Alphanumeric Data	“0” ~ “9”, “A” ~ “Z”, SP, $, %, *, +, - , ., /, :
Kanji Data	Shift JIS value
8bit Byte Data	00H ~ FFH

■ The setting of this command remains effective until the following processing is performed:

- Performing Function 180
- Performing ESC @
- Performing the printer reset or power-off

Differences: None

<Function 181> GS (k pL pH cn fn m (fn=81)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	31	51	m
Decimal	29	40	107	3	0	49	81	m

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=49
fn=81
m=48

Default:

None

Description:

This command encodes and prints QR Code symbol data saved in the symbol storage area.

Remarks:

■ In standard mode, this command is available only when printer is at the beginning of a line or the printer buffer is empty.
■ A symbol exceeding the printing area in size can not be printed.
■ Printing operation is not processed under the following conditions:
• There is no data. (Function 180 is not executed)
• If [(number of columns x number of rows) < number of code words], the numbers of columns and rows are automatically processed.
• The four types of data compression modes are listed below. According to the symbol data in the data storage area, automatically selects the best suitable compression mode.
*Numeric Data Code
*Alphanumeric Data mode
*Kanji Data mode
*8 bit Data mode
■ The following data is automatically added by the encoding processing:
• Position sensor pattern
• Segregator for the position sensor pattern
• Timing pattern
• Format information
• Version information
• Error correction code text
• Pad code text
• Indicator for counting bits of bytes
• Mode indicator
• Concluder
• Queue pattern (when model 2 is selected)
• Expansion pattern (when model 1 is selected)
■ Except for character size and upside-down printing mode, none of print mode such as emphasized, double-strike, etc, affects the printing of the symbol.

■ In standard mode, the paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol.
■ In page mode, the printer stores the symbol data in the print buffer without executing actual printing.
■ The quiet zone is not included in the printing data. Be sure to include the adequate quiet zone for executing of this command.

Differences: None

<Function 182> GS (k pL pH cn fn m (fn=82)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	31	52	m
Decimal	29	40	107	3	0	49	82	m

Range: (pL + pH x 256) = 3 (pL=3, pH=0)
cn=49
fn=82
m=48

Default: None

Description: This command transmits the size information of the QR Code symbol data encoded by Function 180.

Remarks:

■ In standard mode, this command is available only when printer is at the beginning of a line or the printer buffer is empty.

■ The size information of each data is as follows:

Send data	**Hex**	**Decimal**	**Data**
Header	37H	55	1 byte
Flag	36H	54	1 byte
Horizontal size	30H – 39H	48 – 57	1 – 5 byte
Separator	1FH	31	1 byte
Vertical size	30H – 39H	48 – 57	1 – 5 byte
Separator	1FH	31	1 byte
Fixed Value	31H	49	1 byte
Separator	1FH	31	1 byte
Other Information	30H or 31H	48 or 49	1 byte
NUL	00H	0	1 byte

• Horizontal size and vertical size denotes the number of dots of the symbol.

■ The following data indicates whether or not printing of the symbol is possible:

Hex	**Decimal**	**Condition**
30H	48	Printing is possible
31H	49	Printing is impossible

■ The quiet zone is not included in size information.

Differences: None

GS *

Function: **Define downloaded bit image**

Code:

ASCII	GS	*	x	y	[d1...d(x x y x 8)]
Hex	1D	2A	x	y	[d1...d(x x y x 8)]
Decimal	29	42	x	y	[d1...d(x x y x 8)]

Range:
1 ≤ x ≤ 255
1 ≤ y ≤ 48 (where x x y ≤ 1536)
0 ≤ d ≤ 255

Default: None

Description:
■ This command defines the downloaded bit image using the number of dots specified by x and y.
- x and y specify the number of dots in the horizontal and vertical directions respectively.
- D defines the bit image data.
- K denotes the number of the definition data.

Remarks:
■ The bit image can be printed by downloaded graphics function, GS (8.
■ The downloaded bit image is available until ESC @, printer reset or power cycling is executed.
■ The user-defined character and the downloaded bit image cannot be defined simultaneously.
- The user-defined character is cleared preceding the execution of this command.
- The downloaded bit image data is cleared with ESC & executed.

Differences: None

GS /

Function: **Print downloaded bit image**

Code:

ASCII	GS	/	m
Hex	1D	2F	m
Decimal	29	47	m

Range: 0 ≤ m ≤ 3, 48 ≤ m ≤ 51

Default: None

Description: This command prints the downloaded bit image defined by GS * according to the mode denoted by m.

DPI : Dots per Inch (25.4mm)

m	Mode	Vertical dot density(DPI)	Horizontal dot density(DPI)
0, 48	Normal	180	180
1, 49	Double-width	180	90
2, 50	Double-height	90	180
3, 51	Quadruple	90	90

Remarks:

■ The download bit image is defined by GS *.
■ This command is ignored when if a downloaded bit image is not defined.
■ In standard mode, this command works only when the print buffer is empty and the printer is in the start of the line. m is treated as normal data if the print buffer has data.
■ In page mode, the bit image data is accumulated in the print buffer, but does not perform the actual printing.
■ Except for character size and upside-down printing mode, none of print mode such as emphasized, double-strike, etc, affects the printing of the downloaded bit image.
■ The default dot density set by GS L is applied to printing of the downloaded bit image.

Differences:

DPI : Dots per Inch (25.4mm)

m	Mode	Vertical dot density(DPI)	Horizontal dot density(DPI)
0, 48	Normal	203	203
1, 49	Double-width	203	203/2
2, 50	Double-height	203/2	203
3, 51	Quadruple	203/2	203/2

GS :

Function: **Start/end macro definition**

Code:

ASCII	GS	:
Hex	1D	3A
Decimal	29	58

Range: None

Default: None

Description: ■ This command starts or ends macro definition.

Remarks: ■ The printer starts macro definition during normal operation and finishes it during macro definition upon receiving this command.
■ The printer performs printing during macro definition.
■ The macro is executed by GS ^.
■ The maximum number of macro data to be defined varies with respect to printer models. The data exceeding this limit is not stored.
■ ESC @ does not clear the existing defined macro. The macro remains effective until the printer reset and power cycling are executed.

Differences: None

GS B

Function: **Turns white/black reverse printing mode on / off**

Code:

ASCII	GS	B	n
Hex	1D	42	n
Decimal	29	66	n

Range: 0 ≤ n ≤ 255

Default: n = 0

Description: ■ This command selects white/black reverse printing mode by setting the least significant bit of n.
• When the LSB of n is 0, white/black reverse mode is turned off.
• When the LSB of n is 1, white/black reverse mode is turned on.

Remarks: ■ This command does not affect multi-byte characters such as Kanji, Japanese and Korean.
■ The right space defined by ESC SP is affected by this command.

■ In white/black reverse mode, the underline mode is not effective.
■ This mode remains effective until ESC @, printer reset or power cycling is executed.

Differences: None

GS H

Function: **Selects print position of HRI characters**

Code:

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

Range: 0 ≤ n ≤ 3, 48 ≤ n ≤ 51

Default: n = 0

Description: ■ This command selects the printing position of HRI (Human Readable Interpretation) characters when printing a bar code.
• The printing position is set according to the value of as follows:

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

Remarks: ■ The font of the HRI characters is defined by GS f.
■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences: None

GS I

Function: **Transmits printer ID**

Code:

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

Range: 1 ≤ n ≤ 69

Default: None

Description: ■ This command transmits the printer ID or information.

• Transmits 1 byte of printer ID, using n as follows:

n	Printer ID	Specification
1,49	Printer model ID	Printer model
2,50	Type ID	Printer type
3,51	Printer feature ID	Printing method and Printer size

• Transmits specified printer information, using n as follows:

n	Printer ID type	Specification
65	Firmware version	Firmware version
66	Manufacturer	BIXOLON
67	Printer model	Printer model
68	Serial Number	Serial Number
69	Code page	Currently enabled code page

Remarks : ■ Printer information (When n=65, 66, 67, 68, 69) consist of [Header ~ NULL] data as shown below:

Transmitted data	Hex	Decimal	Amount of data
Header	5FH	95	1byte
Printer information	Depends on the model	Depends on the model	0-15 bytes
NUL	00H	0	1byte

■ The firmware version can be confirmed by self- test printing.

Differences: ■ The printer ID is shown according to printer models as follows:

Printer ID	SPP-100II
1(Printer model ID)	**0x40**
2(Type ID)	Type ID varies depending on functions the printer supports as follows: - 0x00 (Default) - 0x01 (Multi-byte character)
3(Printer feature ID)	**0x62**
66(Manufacturer)	BIXOLON
67(Printer model)	**SPP-100II**
68(Serial Number)	-
69(Language of Font)	Code page currently being used. Refer to cod page setting command, ESC t.

GS L

Function: **Set left margin**

Code:

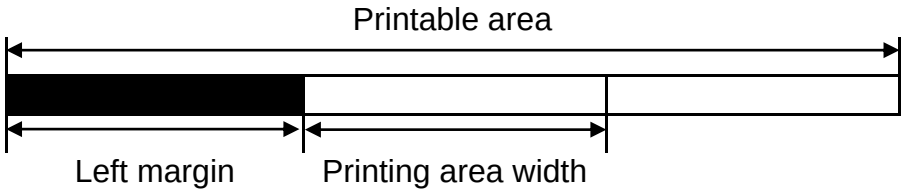
ASCII	GS	L	nL	nH
Hex	1D	4C	nL	nH
Decimal	29	76	nL	nH

Range: 0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255

Default: (nL + nH x 256)=0 (nL=0, nH=0)

Description: This command sets the left margin specified to [(nL + nH x 256) x (horizontal motion units)].

Remarks:
- The left margin is not effective in page mode. If the left margin is enabled in page mode, the setting is available when the printer returns to standard mode.
- When the setting is beyond the printable area, the left margin is automatically set to the maximum value of the printable area.
- Since the left margin is the same as the leftmost side of the printable area, the left side of the printable area is changed according to the left margin specified.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.



Differences: None

GS W

Function: **Set printing area width**

Code:

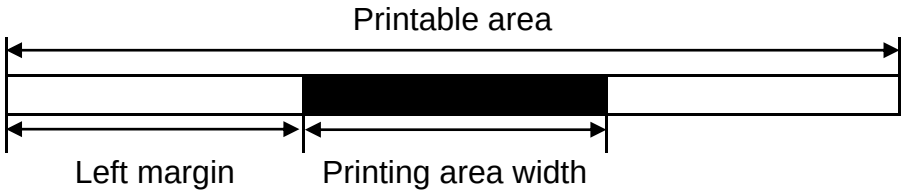
ASCII	GS	W	nL	nH
Hex	1D	57	nL	nH
Decimal	29	87	nL	nH

Range: 0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255

Default: (nL + nH x 256)=384 (nL=128, nH=1)

Description: This command sets the printing area width to [(nL + nH x 256) x (horizontal motion units)].

Remarks:
- The printing area width is not effective in page mode. If the printing area width is enabled in page mode, the setting is available when the printer returns to standard mode.
- When (left margin + printing area width) exceeds the printable area, the printing area width is automatically set to (printing area width - left margin).
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.



Differences: None

GS ^

Function: **Execute macro**

Code:

ASCII	GS	^	r	t	m
Hex	1D	5E	r	t	m
Decimal	29	94	r	t	m

Range: 0 ≤ r ≤ 255
0 ≤ t ≤ 255
m=0, 1

Default: None

Description: ■ This command executes a macro using parameters as following:
- r specifies the number of times to execute the macro.
- t specifies the waiting time before the macro is executed.
- m specifies macro executing mode as shown below.

m	Function
0	Executes the macro r times continuously at the interval specified by t.
1	The printer waits for the paper FEED button to be pressed for the time specified by t. The macro is executed once when the button is pressed. This operation is repeated r times.

Remarks: ■ The macro is defined by GS:
■ If the macro is not defined or r = 0, the command is ignored.
■ The macro function is useful to print the same data repeatedly.

Differences: None

GS a

Function: **Enable/Disable Automatic Status Back (ASB)**

Code:

ASCII	GS	a	n
Hex	1D	61	n
Decimal	29	97	n

Range: 0 ≤ n ≤ 255

Default: n = 0

Description: ■ This enables or disables ASB (Automatic Status Back) according to n.
• ASB is enabled when n > 0.

Remarks: ■ ASB is the function that transmit the printer status such as cover open/close and Online/Offline] continuously at the time interval specified regardless of the status change if ASB is enabled. Using this ASB function, the host can check to see if the printer is running properly.
■ Once ASB has been enabled, the printer continues to transmit the current printer status at the specified interval until ASB is disabled.
■ When n = 0, ASB is disabled. The printer stops transmitting the status.
■ With parallel and USB interface, the printer status is transmitted whenever the host computer changes to the reverse mode regardless of the printer status change. It is recommended that the periodic time interval at which the host changes to reverse mode is more than 500ms in order to receive the correct status.
■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

■ The printer information transmitted is comprised of 4 bytes as follows:
• First byte(printer information)

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

• Second byte(printer information)

Bit	Off/On	Hex	Decimal	Function
0	**Off**	**00**	**0**	**Not used. Fixed to Off**
1	**Off**	**00**	**0**	**Not used. Fixed to Off**
2	**Off**	**00**	**0**	**Not used. Fixed to Off**
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 byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	**Not used. Fixed to Off**
1	On	03	3	**Not used. Fixed to On**
2,3	Off	00	0	Paper end sensor : paper present
	On	0C	12	Paper end sensor : no paper present
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

• Fourth byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Function
0	On	01	1	Not used. Fixed to On
1	On	02	2	Not used. Fixed to On
2	On	04	4	Not used. Fixed to On
3	On	08	8	Not used. Fixed to On
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

Differences: None

GS f

Function: **Select font for HRI characters**

Code:

ASCII	GS	f	n
Hex	1D	66	n
Decimal	29	102	n

Range: n = 0, 1, 48, 49

Default: n = 0

Description: This command selects a font for the HRI(Human Readable Interpretation) characters used when printing a bar code, using n as follows:

n	**Font**
0, 48	Font A
1, 49	Font B

Remarks:
- The setting of this command is applied to only HRI characters.
- The printing position of HRI characters are specified by GS H.
- The configurations of Font A and B vary depending on the printer model.

Differences: None

GS h

Function: **Selects bar code height**

Code:

ASCII	GS	h	n
Hex	1D	68	n
Decimal	29	104	n

Range: 1 ≤ n ≤ 255

Default: n = 162

Description: This command sets the height of the bar code to n dots.

Remarks:
- The unit of n depends on the printer model.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences: Unit of one dot : 0.125mm(1/203 inch)

GS k

Function: **Print bar code**

Code:

①	**ASCII**	GS	k	m	d1...dk	NUL
	Hex	1D	6B	m	d1...dk	NUL
	Decimal	29	107	m	d1...dk	NUL
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 ≤ m ≤ 6 ② 65 ≤ m ≤ 73
K, m, n depend on the barcode system

Default: None

Description: ■ This command selects a bar code system and prints the bar code.
- k indicates the number of bytes of bar code data.
- n specifies the number of bytes of bar code data.
- d specifies the character code data of the bar code data to be printed.

For range ①

m	Bar Code System	Range of k	Range of d
0	UPC-A	11 ≤ k ≤ 12	48 ≤ d ≤ 57
1	UPC-E	11 ≤ k ≤ 12	48 ≤ d ≤ 57
2	JAN13(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, d=32,36,37,43,45,46,47
5	ITF	1 ≤ k (even number)	48 ≤ d ≤ 57
6	CODABAR	1 ≤ k	48 ≤ d ≤ 57, 65 ≤ d ≤ 68, d=36,43,45,46,47,58

For range ②

m	Bar Code System	Range of k	Range of d
65	UPC-A	11 ≤ n ≤ 12	48 ≤ d ≤ 57
66	UPC-E	11 ≤ n ≤ 12	48 ≤ d ≤ 57
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, d=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 ≤ d ≤ 68, d=36,43,45,46,47,58

72	CODE93	1 ≤ n ≤ 255	0 ≤ d ≤ 127
73	CODE128	2 ≤ n ≤ 255	0 ≤ d ≤ 127

Remarks:
- The bar code width exceeding the print area cannot be specified.
- Except for character size and upside-down printing mode, none of print mode such as emphasized, double-strike, etc, affects the printing of the barcode.
- The quiet zone of the bar code (left and right spaces of the bar code) should be considered when using this command.

Differences: None

GS r

Function: **Transmit status**

Code:

ASCII	GS	r	n
Hex	1D	72	n
Decimal	29	114	n

Range: n = 1, 2, 49, 50

Default: None

Description: The command transmits the status specified by n as follows:

n	Function
1, 49	Transmits paper sensor status

Remarks:
- The status is one byte.
- The status to be transmitted is as follows:
  - Paper sensor status (n=1, 49):

Bit	Off/On	Hex	Decimal	Function
0, 1	Off	00	0	Reserved
2, 3	Off	00	0	Paper end sensor : Paper present
	On	0C	12	Paper end sensor : Paper not present
4	Off	00	0	Fixed
5	Off	00	0	Reserved
6	Off	00	0	Reserved
7	Off	00	0	Fixed

- This command can be executed in real-time mode using DLE.

Differences: None

GS v 0

Function: **Print raster bit image**

Code:

ASCII	GS	v	0	m	xL	xH	yL	yH	d1...dk
Hex	1D	76	30	m	xL	xH	yL	yH	d1...dk
Decimal	29	118	48	m	xL	xH	yL	yH	d1...dk

Range:

0 ≤ m ≤ 3, 48 ≤ m ≤ 51
1 ≤ (xL + xH x 256) ≤ 128 (0 ≤ xL ≤ 128, xh=0)
1 ≤ (yL + yH x 256) ≤ 4095 (0 ≤ yL ≤ 255, 0 ≤ yH ≤ 15)
0 ≤ d ≤ 255
k = (xL + xH x 256) x (yL + yH x 256)

Default: None

Description: ■ This command prints a raster bit image according to the mode defined by m.

DPI : Dots per Inch (25.4mm)

m	Mode	Vertical dot density (DPI)	Horizontal dot density (DPI)
0, 48	Normal	180	180
1, 49	Double-width	180	90
2, 50	Double-height	90	180
3, 51	Quadruple	90	90

• xL, xH specifies (xL + xH x 256) byte(s) in the horizontal direction for the bit image.
• yL, yH specifies (yL + yH x 256) dot(s) in the vertical direction for the bit image.
• d specifies the definition data of the bit image data.

Remarks:

■ In standard mode, this command is effective when the printer buffer is empty and the printer is in the beginning of the line. If the buffer is not empty, after processing m, the printer treats the following data as normal data.
■ In page mode, the bit image is stored in the print buffer, not being printed.
■ None of the print modes such as emphasized, double-strike, etc, affects the printing of the bit image.
■ The default dot density set by GS L is applied to printing of the bit image.

Differences:

DPI: Dots per Inch (25.4mm)

m	Mode	Vertical dot density (DPI)	Horizontal dot density (DPI)
0, 48	Normal	203	203
1, 49	Double-width	203	203/2
2, 50	Double-height	203/2	203
3, 51	Quadruple	203/2	203/2

GS w

Function: **Set bar code width**

Code:

ASCII	GS	w	n
Hex	1D	77	n
Decimal	29	119	n

Range: 2 ≤ n ≤ 6

Default: n = 3

Description: ■ This command sets the horizontal size of the bar code, using n as follows:

n	Multi-level bar code module width (mm)	Binary-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

• n specifies the bar code module width.

Remarks: ■ The setting of this command is effective for the following bar codes:
• Multi-level bar codes (UPC-A, UPC-E, JAN13, HAN8, CODE93, CODE128)
• Binary-level bar codes (CODE39, ITF, CODABAR)
■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

n	Multi-level bar code module width (mm)	Binary-level bar code	
		Thin element width (mm)	Thick element width (mm)
2	0.250	0.250	0.625
3	0.375	0.375	1.000
4	0.500	0.500	1.250
5	0.625	0.625	1.625
6	0.750	0.750	2.000

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
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

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3.5.3 TPH overheat (Error LED : long term blinks)

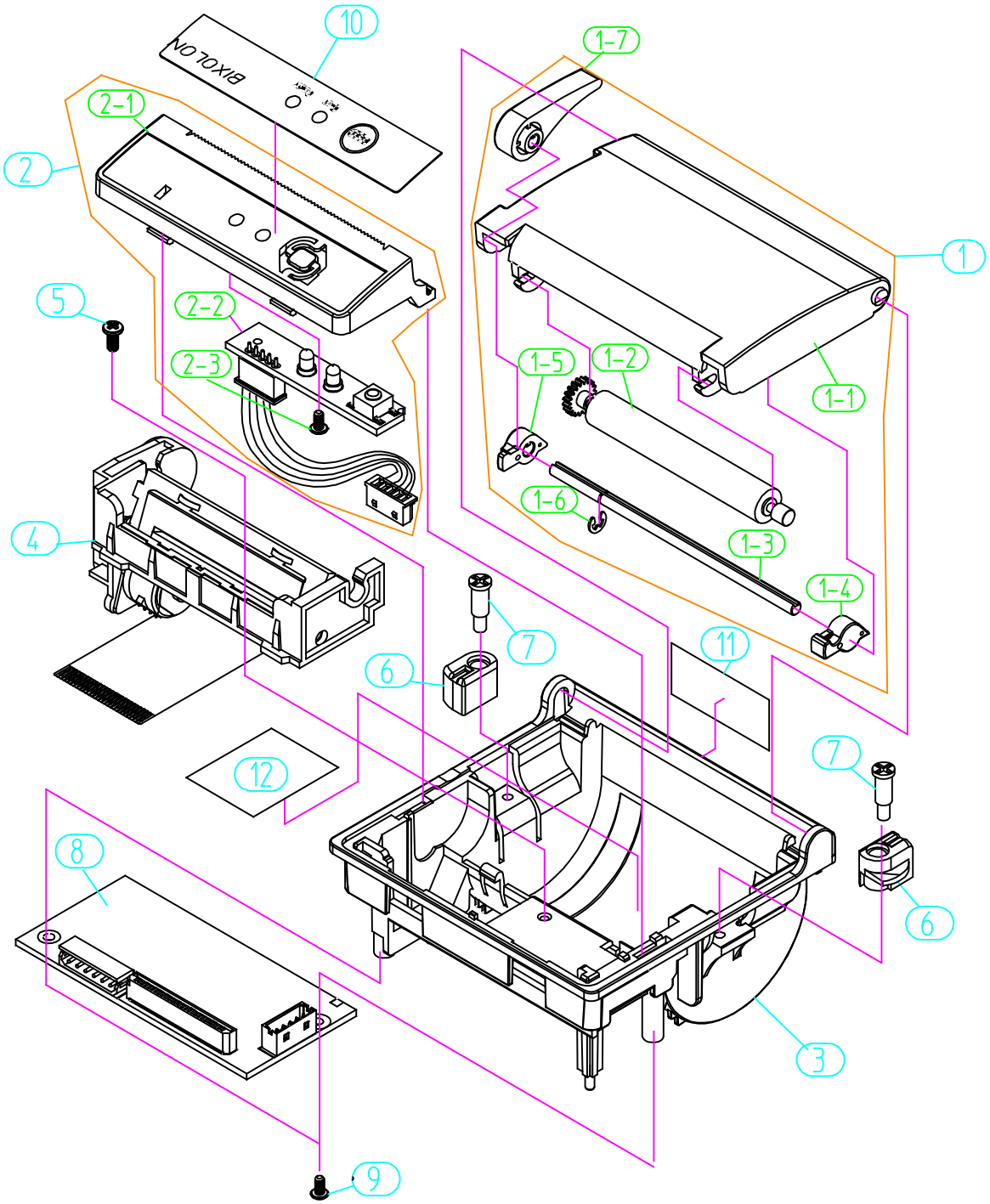
Error LED notifies whether or not TPH get a heat. When the TPH reaches to 60 degree,

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-100II Exploded View



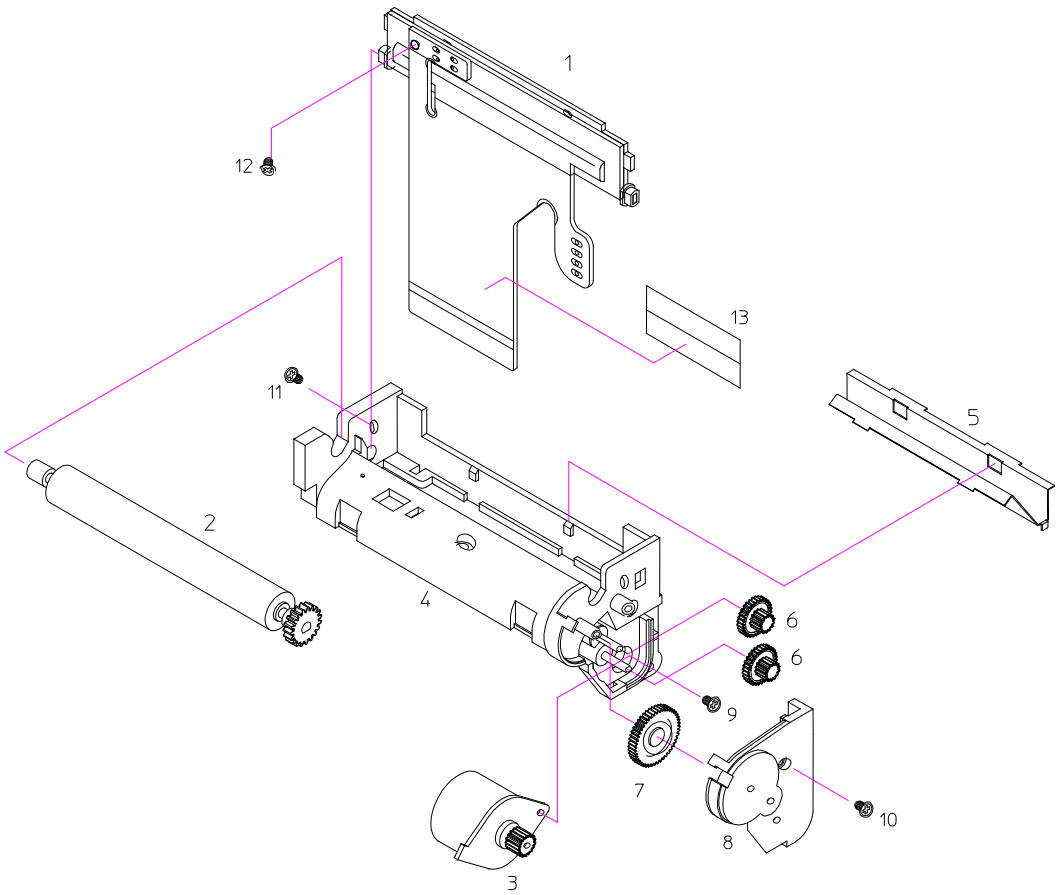
4.2 SPP-100II Part List

NO	LEVEL	Code no	PARTS NAME	Unit	Q'T	Specification	A/S	REMARK
1	1	AT05-00014A	Cover paper Ass'y I/V	EA	1	SPP-100II I/V	Y	
		AT05-00014B	Cover paper Ass'y D/G			SPP-100II D/G		
		AT05-00014C	Cover paper Ass'y SES			SPP-100II SES		
1-1	2	KM05-00143A	Cover paper	EA	1	PC 301V-7 FR(40)	N	14A,14B
		KM05-00054A	Cover paper(Samsung)	EA	1	PC EH-1050T W0234B(cii)		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 Lucel N109-LD	N	
1-5	2	KM05-00144A	Lever R	EA	1	POM Lucel 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-100II I/V	Y	
		AT05-00015D	Cover head Ass'y D/G			SPP-100II D/G		
		AT05-00015F	Cover head Ass'y SES			SPP-100II 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-100II	Y	15C,15D
		AP04-00062C	Sub PCB Ass"y			SPP-100II 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,SWCH 18A	Y	
8	1	AP04-00194A	ASSY PCB-Main	EA	1	SPP-100II	Y	
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 Main component for multiple use

Name		1th	2th	3th
SDRAM (64Mb)	PART NO	Winbond: W9864G6JH	ISSI: IS42S16400F	Zentel: A3V64S40ETP
	Code no	K509-00002F	K509-00002C	K509-00002E
Serial flash	PART NO	EON: EN25QH16	ESMT: F25L16QA-100PA	WINBOND: W25Q16CVSSIG
	Code no	K504-00116A	K504-00116B	K504-00116C
Regulator	PART NO	HTC: LM37102D		
	Code no	K304-00136A		
RS232 IC	PART NO	ST: ST3232	IKSEMICON: ILX3232TSD	
	Code no	K509-00005A	K509-00016A	

4.4 Mechanism(SMP640UK) Exploded View



4.5 Mechanism(SMP640UK) Part List

No	Code no	Description	Specification	Q'ty	A/S
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