SRP - 350

SAMSUNG ELECTRONICS

RECEIPT PRINTER

Operator's Manual

All specifications are subjected to change without notice

Warning - U.S.

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates uses, and can radiate radio frequency energy and , if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Notice - Canada

This Apparatus complies with class "A" limits for radio interference as specified in the Canadian department of communications radio interference regulations.

Get appareil est conforme aux normes class "A" dInter ference radio tel que specifier par ministre canadien des communications dans les reglements dInterference radio.

Caution

Some semiconductor devices are easily damaged by static electricity. You should turn the printer "OFF", before you connect or remove the cables on the rear side, in order to guard the printer against the static electricity. If the printer is damaged by the static electricity, you should turn the printer "OFF".

INTRODUCTION

The SRP-350 and SRP-350P Roll Printer are designed for use with electronic instruments such as system ECR, POS, banking equipment, computer peripheral equipment, etc.

The main features of the printer are as follows:

1. High speed printing : 35.5(1/6" Feed) lines per second.
2. Low noise thermal printing.
3. RS-232 (SRP-350). RS-485(SRP-350P) Parallel(SRP-350P).
4. The data buffer allows the unit to receive print data even during printing.
5. Peripheral units drive circuit enables control of external devices such as cash drawer.
6. Characters can be scaled up to 64 times compared to its original size.
7. Bar code printing is possible by using a bar code command.
8. Different print densities can be selected by DIP switches.

Please be sure to read the instruction in this manual carefully before using your new SRP-350/SRP-350P.

NOTE : The socket-outlet shall be near the equipment and it shall be easy accessible.

Table of Contents

Chapter 1. Setting Up the Printer

1-1. Unpacking

Your printer box should include these items. If any items are damaged or missing, please contact your dealer for assistance.

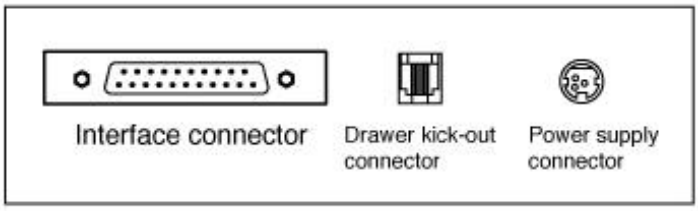
SRP-350/350P

Roll paper

Operator's Manual

1-2. Connecting the Cables

You can connect up to four cables to the printer. They all connect to the connector panel on the back of the printer, which is shown below:

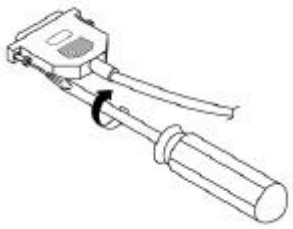


Notes : Before connecting any of the cables, make sure that both the printer and the host are turned off.

1-3. Connecting the computer

You need an appropriate interface cable.

1. Plug the cable connector securely into the printer's interface connector.
2. Tighten the screws on both sides of the cable connector.



3. Attach the other end of the cable to the computer.

1-4. Connecting the Drawer

WARNING:

Use a drawer that matches the printer specification. Using an improper drawer may damage the drawer as well as the printer.

CAUTION:

Do not connect a telephone line to the drawer kick-out connector; otherwise the printer and the telephone line may be damaged.

Plug the drawer cable into the drawer kick-out connector on the back of the printer next to the power supply connector.

1-5. Connecting the Power Supply

CAUTIONS:

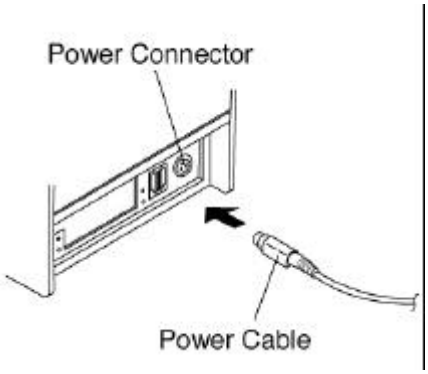
When connecting or disconnecting the power supply from the printer, make sure that the power supply is not plugged into an electrical outlet. Otherwise you may damage the power supply or the printer.

If the power supply's rated voltage and your outlet's voltage do not match, contact your dealer for assistance. Do not plug in the power cord. Otherwise, you may damage the power supply or the printer.

1. Make sure that the printer's power switch is turned off, and the power supply's power cord is unplugged from the electrical outlet.

2. Check the label on the power supply to make sure that the voltage required by the power supply matches that of your electrical outlet.

3. Plug in the power supply's cable as shown below. Notice that the flat side of the plug faces down.



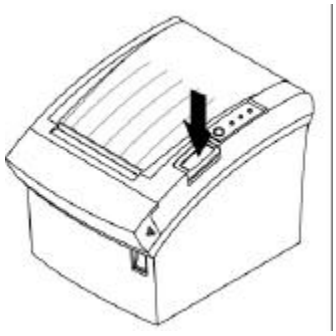
Notes : To remove the DC cable connector, make sure that the power supply's power cord is unplugged; then grasp the connector at the arrow and pull it straight out.

1-6. Installing or Replacing the Paper Roll

Notes : Be sure to use paper rolls that meet the specifications. Do not use paper rolls that have the paper glued to the core because the printer cannot detect the paper end correctly.

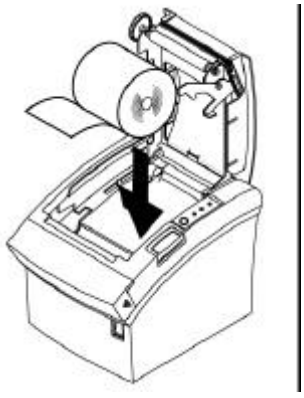
1. Make sure that the printer is not receiving data; otherwise, data may be lost.

2. Open the paper roll cover by pressing the cover-open button.

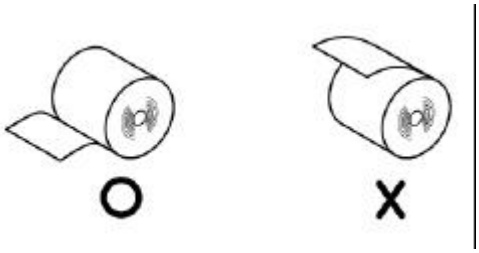


3. Remove the used paper roll core if there is one.

4. Insert the paper roll as shown.



5. Be sure to note the correct direction that the paper comes off the roll.



6. Pull out a small amount of paper, as shown. Then close the cover.

7. Tear off the paper as shown.

1-7. Adjustments and Settings

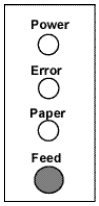
The SRP-350 is set up at the factory to be appropriate for almost all users. It does, however, offer some settings for users with special requirements.

It has DIP switches that allow you to change communication settings, such as handshaking and parity check, as well as print density.

The SRP-350 also has a near-end sensor for the paper. This can give you a warning when the paper is almost out. If you find that there is not enough paper remaining on the roll when the near-end detector is triggered, you can change the near-end sensor setting.

1-8. Using the Printer

Control Panel



Button

The button can be disabled by the ESC c 5 command.

Press the FEED button once to advance paper one line. You can also hold down the FEED
button to feed paper continuously.

Panel lights

POWER
The POWER light is on whenever the printer is on.

ERROR
This indicates an error.

PAPER OUT
This light indicates the near end of the paper roll. Install a new paper roll and the printer will continue printing.

When the light blinks, it indicates the self-test printing standby state or macro execution standby state when the macro execution command is used.

Serial Interface Specification

DIP Switch Set 1 Functions

SW	FUNCTION	ON	OFF	DEFAULT
1	Data Receive Error	Ignore	Print ¡ ?¡ ±	OFF
2	Mode Selection	STAR	EPSON	OFF
3	HandShaking	XON/OFF	DTR/DSR	OFF
4	Word length	7 bits	8 bits	OFF
5	Parity check	Yes	No	OFF
6	Parity selection	EVEN	ODD	OFF
7	Baud rate selection	Refer to the Following Table		ON
8				OFF

Baud rate selection

Transmission speed	SW – 7	SW – 8
2400 baud	ON	ON
4800 baud	OFF	ON
9600 baud	ON	OFF
19200 baud	OFF	OFF

Dip Switch Set 2 Functions

SW	FUNCTION	ON	OFF	DEFAULT
1	Reserved	-	-	-
2	Reserved	-	-	-
3	Reserved	-	-	
4	Reserved	-	-	
5	Select Print Density	Refer to the Following Table		OFF
6				OFF
7	Reserved	-	-	-
8	Reserved	-	-	-

Print Density

Print Density	SW - 5	SW – 6
1 (Light)	ON	ON
2	OFF	OFF
3	ON	OFF
4 (Dark)	OFF	ON

Parallel Interface Specification

Dip Switch Set 1 Functions

SW	FUNCTION	ON	OFF	DEFAULT
1	Reserved	-	-	OFF
2	Reserved	-	-	OFF
3	Reserved	-	-	OFF
4	Reserved	-	-	OFF
5	Reserved	-	-	OFF
6	Reserved	-	-	OFF
7	Reserved	-	-	OFF
8	Reserved	-	-	OFF

Dip Switch Set 2 Functions

SW	FUNCTION	ON	OFF	DEFAULT
1	Reserved	-	-	-
2	Reserved	-	-	-
3	Reserved	-	-	
4	Reserved	-	-	
5	Select Print Density	Refer to the Following Table		OFF
6				OFF
7	Reserved	-	-	-
8	Reserved	-	-	-

Print Density

Print Density	SW - 5	SW – 6
1 (Light)	ON	ON
2	OFF	OFF
3	ON	OFF
4 (Dark)	OFF	ON

Chapter 2. Hexadecimal Dumping

This feature allows experienced users to see exactly what data is coming to the printer. This can be useful in finding software problems. When you turn on the hexadecimal dump function, the printer prints all commands and data in hexadecimal format along with a guide section to help you find specific commands.

To use the hexadecimal dump function, follow these steps:

1. After you make sure that the printer is off, open the cover.
2. Turn on the printer, while holding down the FEED button.
3. Close the cover, then the printer enters the hexadecimal dump mode.
4. Run any software program that sends data to the printer. The printer will print all the codes it receives in a two-column format. The first column contains the hexadecimal codes and the second column gives the ASCII characters that corresponds to the codes.

```
1B 21 00 1B 26 02 40 40 40 40        . ! . . & . @ @ @ @
02 0D 1B 44 0A 14 1E 28 28 28        . . . D . . . . (   (   (
00 01 0A 41 0D 42 0A 43 43 43        . . . A . B . C    C C
```

   - A period (.) is printed for each code that has no ASCII equivalent.
   - During the hex dump, all commands except **DLE EOT** and **DLE ENQ** are disabled.

5. When the printing finishes, turn off the printer.
6. Turn on the printer and then the hexadecimal mode is off.

Chapter 3. The self test

The self-test checks whether the printer has any problems. If the printer does not function properly, contact your dealer. The self-test checks the following;

1. Make sure paper roll has been installed properly.
2. Turn on the power while holding down the FEED button. The self-test begins.
3. The self-test prints the current printer status, which provides the control ROM version and the DIP switch setting.
4. After printing the current printer status, self-test printing will print the following, and pause (The PAPER LED light blinks).

Self-test printing.
Please press the FEED button

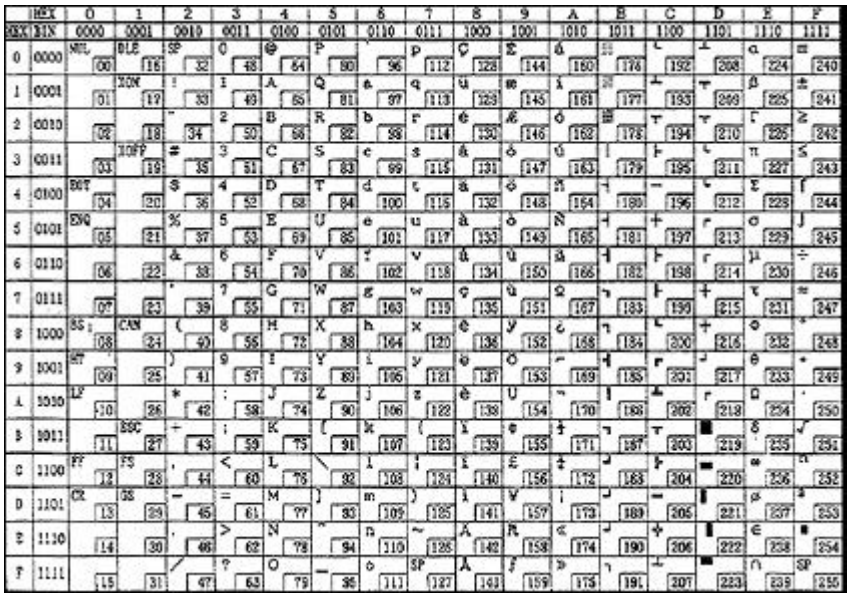
5. Press the FEED button to continue printing. The printer prints a pattern using the built-in character set.
6. The self-test automatically ends and cuts the paper after printing the following.

***** completed *****

The printer is ready to receive data as soon as it completes the self-test.

Chapter 4. Code Table

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 (PC437 : USA, Standard Europe)
(International Character Set : USA)

	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	¾ 243
4	0100	ä 132	ö 148	ñ 164	┤ 180	─ 196	È 212	õ 228	244
5	0101	à 133	ò 149	Ñ 165	Á 181	┼ 197	ı 213	Õ 229	§ 245
6	0110	å 134	û 150	ª 166	Â 182	ã 198	Í 214	µ 230	÷ 246
7	0111	ç 135	ù 151	º 167	À 183	Ã 199	Î 215	þ 231	¸ 247
8	1000	ê 136	ÿ 152	¿ 168	© 184	╚ 200	Ï 216	Þ 232	° 248
9	1001	ë 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
A	1010	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250
B	1011	ï 139	ø 155	½ 171	╗ 187	╦ 203	■ 219	Ù 235	¹ 251
C	1100	î 140	£ 156	¼ 172	╝ 188	╠ 204	▬ 220	ý 236	³ 252
D	1101	ì 141	Ø 157	¡ 173	¢ 189	═ 205	¦ 221	Ý 237	² 253
E	1110	Ä 142	× 158	« 174	¥ 190	╬ 206	Ì 222	¯ 238	■ 254
F	1111	Å 143	ƒ 159	» 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255

Page 2 (PC850 : Multilingual)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	240
1	0001	ü 129	À 145	í 161	▒ 177	┴ 193	╤ 209	β 225	± 241
2	0010	é 130	È 146	ó 162	▒ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	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	⌐ 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	½ 171	╗ 187	╦ 203	■ 219	δ 235	√ 251
C	1100	Ô 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
D	1101	ì 141	Ù 157	¡ 173	╜ 189	═ 205	▌ 221	ø 237	² 253
E	1110	Ä 142	₧ 158	« 174	╛ 190	╬ 206	▐ 222	238	■ 254
F	1111	Å 143	Ó 159	» 175	┐ 191	╧ 207	▀ 223	239	SP 255

Page 3 (PC860 : Portuguese)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	¦ 160	▒ 176	└ 192	╨ 208	α 224	240
1	0001	ü 129	È 145	´ 161	▒ 177	┴ 193	╤ 209	ß 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	Ã 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	ª 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	¹ 168	╕ 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	½ 171	╗ 187	╤ 203	■ 219	δ 235	251
C	1100	î 140	£ 156	¼ 172	╝ 188	╠ 204	▬ 220	∞ 236	n 252
D	1101	ì 141	Ù 157	¾ 173	╜ 189	═ 205	▌ 221	ø 237	² 253
E	1110	Ä 142	Ö 158	« 174	╛ 190	╬ 206	▐ 222	238	■ 254
F	1111	§ 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	239	SP 255

Page 4 (PC 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	á 160	▒ 176	└ 192	╨ 208	α 224	240
1	0001	ü 129	æ 145	í 161	▒ 177	┴ 193	╤ 209	ß 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	½ 171	╗ 187	╦ 203	■ 219	δ 235	251
C	1100	î 140	£ 156	¼ 172	╝ 188	╠ 204	▬ 220	∞ 236	n 252
D	1101	ì 141	Ø 157	¡ 173	╜ 189	═ 205	▌ 221	ø 237	² 253
E	1110	Ä 142	Pt 158	« 174	╛ 190	╬ 206	▐ 222	238	■ 254
F	1111	Å 143	ƒ 159	¤ 175	┐ 191	╧ 207	▀ 223	239	SP 255

Page 5 (PC 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	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	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	ª 166	Â 182	ã 198	Í 214	µ 230	÷ 246
7	0111	ç 135	ù 151	º 167	À 183	Ã 199	Î 215	þ 231	¸ 247
8	1000	ê 136	ÿ 152	¿ 168	© 184	╚ 200	Ï 216	Þ 232	° 248
9	1001	ë 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
A	1010	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250
B	1011	ï 139	ø 155	½ 171	╗ 187	╦ 203	■ 219	Ù 235	¹ 251
C	1100	î 140	£ 156	¼ 172	╝ 188	╠ 204	▬ 220	ý 236	³ 252
D	1101	ì 141	Ø 157	¡ 173	¢ 189	═ 205	¦ 221	Ý 237	² 253
E	1110	Ä 142	× 158	« 174	¥ 190	╬ 206	Ì 222	¯ 238	■ 254
F	1111	Å 143	ƒ 159	» 175	┐ 191	¤ 207	▬ 223	´ 239	SP 255

Page 19(PC858:Euro)

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

Page 255 (Space Page)

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

International Character Set

Chapter 5. Control Commands

Command Notation

[Name] The name of the command.
[Format] The code sequence.
ASCII indicates the ASCII equivalents.
Hex indicates the hexadecimal equivalents.
Decimal indicates the decimal equivalents.
[ ] k indicates the contents of the [ ] should be repeated k times.
[Range] Gives the allowable ranges for the arguments.
[Description] Describes the function of the command.

Explanation of Terms

LSB Least Significant Bit

Control Commands

HT

[Name] Horizontal tab.
[Format] ASCII HT
Hex 09
Decimal 9
[Description] Moves the print position to the next horizontal tab position.
[Notes]
- This command is ignored unless the next horizontal tab position has been set.
- If the next horizontal tab position exceeds the printing area, the printer sets the printing position to [Printing area width + 1].
- Horizontal tab positions are set with **ESC D**.
  If this command is received when the printing position is at [printing area width + 1], the printer executes print buffer-full printing of the current line and horizontal tab processing from the beginning of the next line.
- The default setting of the horizontal tab position for the paper roll is font A(12 x 24) every 8th character (9th, 17th, 25th, … column).

[Reference] **ESC D**

LF

[Name] Print and line feed.
[Format] ASCII LF
Hex 0A
Decimal 10
[Description] Prints the data in the print buffer and feeds one line based on the current line spacing.
[Note] This command sets the print position to the beginning of the line.
[Reference] **ESC 2**, **ESC 3**

FF

[Name] Print and return to standard mode in page mode.

[Format] ASCII FF

Hex 0C

Decimal 12

[Description] Prints the data in the print buffer collectively and returns to standard mode.

[Notes]
- The buffer data is deleted after being printed.
- The printing area set by **ESC W** is reset to the default setting.
- The printer does not execute paper cutting.
- This command sets the print position to the beginning of the line.
- This command is enabled only in page mode.

[Reference] **ESC FF, ESC L, ESC S**

CR

[Name] Print and carriage return.

[Format] ASCII CR

Hex 0D

Decimal 13

[Description] When automatic line feed is enabled, this command functions the same as **LF**; when automatic line feed is disabled, this command is ignored.

[Notes]
- Sets the print starting position to the beginning of the line.
- The automatic line feed is ignored with a serial interface model.
- This command is set according to the DIP switch 1-1 setting with a parallel interface model.

[Reference] **LF**

CAN

[Name] Cancel print data in page mode.

[Format] ASCII CAN

Hex 18

Decimal 24

[Description] In page mode, deletes all the print data in the current printable area.

[Notes]
- This command is enabled only in page mode.
- If data that existed in the previously specified printing area also exists in the currently specified printing area, it is deleted.

[Reference] **ESC L, ESC W**

DLE EOT n

[Name] Real-time status transmission.

[Format]

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

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

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

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

[Notes]

- The printer transmits the current status. Each status is represented by one-byte data.
- The printer transmits the status without confirming whether the host computer can receive data.
- The printer executes this command upon receiving it.
- This command is executed even when the printer is off-line, the receive buffer is full, or there is an error status with a serial interface model.
- With a parallel interface model, this command can not be executed when the printer is busy. This command is executed even when the printer is off-line or there is an error status when DIP switch 2-1 is on with a parallel interface model.
- The status is transmitted whenever the data sequence of <10>H<04>H<n>($1 \leq n \leq 4$) is received.
  Example:
  In **ESC * m nL nH d1… dk**, d1=<10>H, d2=<04>H, d3=<01>H
- This command should not be used within the data sequence of another command that consists of 2 or more bytes.
  Example:
  If you attempt to transmit **ESC 3 n** to the printer, but DTR(DSR for the host computer) goes to MARK before n is transmitted and then **DLE EOT 3** interrupts before n is received, the code <10>H for **DLE EOT 3** is processed as the code for **ESC 3** < 10>H.
- When Auto Status Back(ASB) is enabled using the **GS a** command, the status transmitted by the **DLE EOT** command and the ASB status must be differentiated. (Refer to Appendix G, TRANSMISSON STATUS IDENTIFICATION)

n = 1 : Printer status.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	Drawer open/close signal is LOW (connector pin 3).
	On	04	4	Drawer open/close signal is HIGH (connector pin 3).
3	Off	00	0	On-line.
	On	08	8	Off-line.
4	On	10	16	Not used. Fixed to On.
5-6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

n = 2 : Off-line status.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	Cover is closed.
	On	04	4	Cover is open.
3	Off	00	0	Paper is not being fed by using the PAPER FEED button.
	On	08	8	Paper is being fed by the PAPER FEED button.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	No paper-end stop.
	On	20	32	Printing stops due to paper end.
6	Off	00	0	No error.
	On	40	64	Error occurs.
7	Off	00	00	Not used. Fixed to Off.

Bit 5 : Becomes on when the paper end sensor detects paper end and printing stops.

n = 3 : Error status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	-	-	-	Undefined.
3	Off	00	0	No auto-cutter error.
	On	08	8	Auto-cutter error occurs.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurs.
6	Off	00	0	No auto-recoverable error.
	On	40	64	Auto recoverable error occurs.
7	Off	00	0	Not used. Fixed to Off.

Bit 3: If these errors occur due to paper jams or the like, it is possible to recover by correcting the cause of the error and executing **DLE ENQ n**($1 \le n \le 2$).
If an error due to a circuit failure (e.g. wire break) occurs, it is impossible to recover.

Bit 6: When printing is stopped due to high print head temperature until the print head temperature drops sufficiently or when the paper roll cover is open during printing, bit 6 is O

n = 4 : Continuous paper sensor status.

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

[Reference] **DLE ENQ, GS a, GS r**

DLE ENQ n

[Name] Real-time request to printer.

[Format]

ASCII	DLE	ENQ	n
Hex	10	05	n
Decimal	16	5	n

[Range] $1 \le n \le 2$

[Description] Responds to a request from the host computer. N specifies the requests as follows:

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

[Notes]

- This command is effective only when an auto-cutter error occurs.
- The printer starts processing data upon receiving this command.
- This command is executed even when the printer is off-line, the receive buffer is full, or there is an error status with a serial interface model. With a parallel interface model, this command can not be executed when the printer is busy. This command is executed even when the printer is off-line or there is an error status when DIP switch 2-1 is on with a parallel interface model.
- The status is also transmitted whenever the data sequence of <10>H<05>H<n>(1¡ Â¡ Â2) is received.

  Example:

  In **ESC * m nL nH dk**, d1 = <10>H, d2 = <05>H, d3 = <01>H
- This command should not be contained within another command that consists of two or more bytes.

  Example:

  If you attempt to transmit **ESC 3** n to the printer, but DET (DSR for the host computer) goes to MARK before n is transmitted, and **DLE ENQ 2** interrupts before n is received, the code <10>H for **DLE ENQ 2** is processed as the code for **ESC 3** <10>H.
- **DLE ENQ 2** enables the printer to recover from an error after clearing the data in the receive buffer and the print buffer. The printer retains the settings (by **ESC !, ESC 3**, etc.) that were in effect when the error occurred. The printer can be initialized completely by using this command and **ESC** @. This command is enabled only for errors that have the possibility of recovery, except for print head temperature error.
- When the printer is disabled with ESC = (Select peripheral device), the error recovery functions (**DLE ENQ 1** and **DLE ENQ 2**) are enabled, and the other functions are disabled.

[Reference] **DLE EOT**

ESC FF

[Name] Print data in page mode

[Format]

ASCII	ESC	FF
Hex	1B	0C
Decimal	27	12

[Description] In page mode, prints all buffered data in the printing area collectively.

[Notes] This command is enabled only in page mode.

After printing, the printer does not clear the buffered data, setting values for **ESC T** and **ESC W**, and the position for buffering character data.

[Reference] **FF, ESC L, ESC S**

ESC SP n

[Name] Set right-side character spacing.

[Format]

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

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

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

[Notes]

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

[Default] n = 0

[Reference] **GS P**

ESC ! n

[Name] Select print modes.

[Format]

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

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

[Description] Selects print mode(s) using n as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A (12 × 24)
	On	01	1	Character font B (9 × 17)
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	Off	00	0	Emphasized mode not selected.
	On	08	8	Emphasized mode selected.
4	Off	00	0	Double-height mode not selected.
	On	10	16	Double-height mode selected.
5	Off	00	0	Double-width mode not selected.

	On	20	32	Double-width mode selected.
6	-	-	-	Undefined.
7	Off	00	0	Underline mode not selected.
	On	80	128	Underline mode selected.

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

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

ESC $ nL nH

[Name] Set absolute print position.

[Format]

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

[Range] 0 ≤ nL ≤ 255
0 ≤ nH ≤ 255

[Description] Set the distance from the beginning of the line to the position at which subsequent characters are to be printed.
- The distance from the beginning of the line to the print position is [(nL + nH x 256) x (vertical or horizontal motion unit)] inches.

[Notes]
- Settings outside the specified printable area are ignored.
- The horizontal and vertical motion unit are specified by **GS P**.
- The **GS P** command can change the horizontal (and vertical) motion unit.
  However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.
- In standard mode, the horizontal motion unit (x) is used.
- In page mode, horizontal or vertical motion unit differs depending on the starting position of the printable area as follows:
  1 When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit (x) is used.
  2 When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit(y) is used.

[Reference] **ESC \, GS $, GS \, GS P**

ESC % n

[Name] Select/Cancel user-defined character set.

[Format]

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

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

[Description] Selects or cancels the user-defined character set.

- When the LSB of n is 0, the user-defined character set is canceled.
- When the LSB of n is 1, the user-defined character set is selected.

[Notes]

- When the user-defined character set is canceled, the internal character set is automatically selected.
- n is available only for the least significant bit.

[Default] n = 0

[Reference] **ESC &, ESC ?**

ESC & y c1 c2 [x1 d1...d(y ´ x1)]...[xk d1...d(y ´ xk)]

[Name] Define user-defined characters.

[Format]

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

$32 \le c1 \le c2 \le 126$

$0 \le x \le 12$ Font A (12×24)

$0 \le x \le 9$ Font B (9×17)

$0 \le d1 \ldots d(y \times xk) \le 255$

[Description] Defines user-defined characters.

- y specifies the number of bytes in the vertical direction.
- c1 specifies the beginning character code for the definition, and c2 specifies the final code.
- x specifies the number of dots in the horizontal direction.

[Notes]

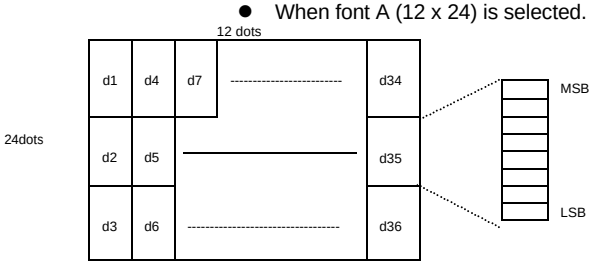
- The allowable character code range is from ASCII code <20>H to <7E>H (95characters).
- It is possible to define multiple characters for consecutive character codes.
  If only one character is desired, use c1 = c2.
- d is the dot data for the characters. The dot pattern is in the horizontal direction from the left side. Any remaining dots on the right side are blank.
- The data to define a user-defined character is ($y \times x$) bytes.
- Set a corresponding bit to 1 to print a dot or to 0 not to print a dot.
- This command can define different user-defined character patterns by each fonts. To select a font, use **ESC !**
- A user-defined character and a downloaded bit image cannot be defined simultaneously. When this command is executed, the downloaded bit image is cleared.
- The user-defined character definition is cleared when:
  - ç**ESC** @ is executed.
  - è**ESC ?** is executed.
  - é**FS q** is executed.
  - ê**GS *** is executed.
  - ëThe printer is reset or the power is turned off.
- When the user-defined characters are defined in font B (9 x 17), only the most significant bit of the 3rd byte of data in vertical direction is effective.

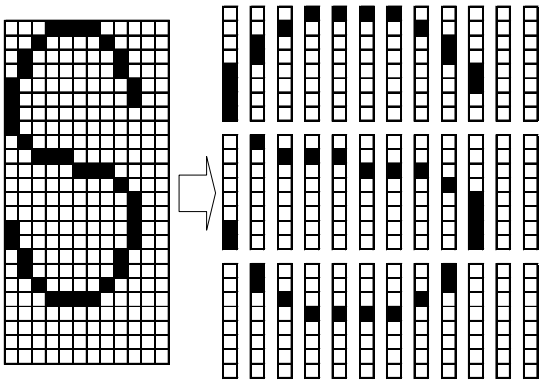
[Default] The internal character set

[Reference] **ESC %**, **ESC ?**

[Example]

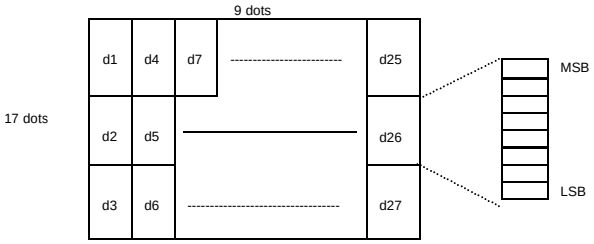
- When font A (12 x 24) is selected.

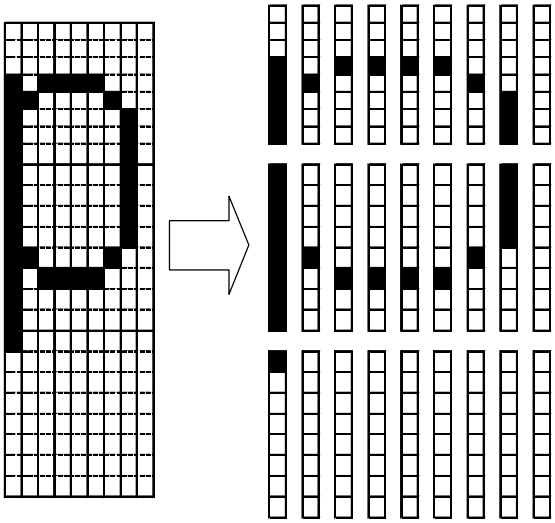




d1=<0F>H d4 =<30>H d7 = <40>H....
d2=<03>H d5 =<80>H d8 = <40>H....
d3=<00>H d6 =<00>H d9 = <20>H....

- When font B (9 x 17) is selected.





d1=<0F>H d4 =<30>H d7 = <40>H… .
d2=<03>H d5 =<80>H d8 = <40>H… .
d3=<00>H d6 =<00>H d9 = <20>H… .

ESC * m nL nH d1…dk

[Name] Select bit-image mode.

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

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

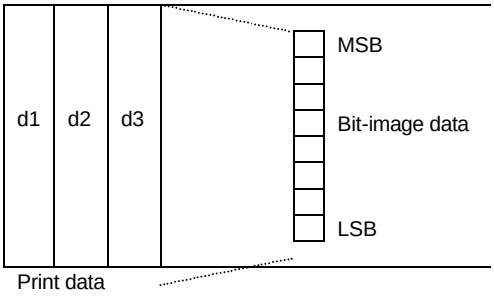
[Description] Selects a bit-image mode using m for the number of dots specified by nL and nH, as follows:

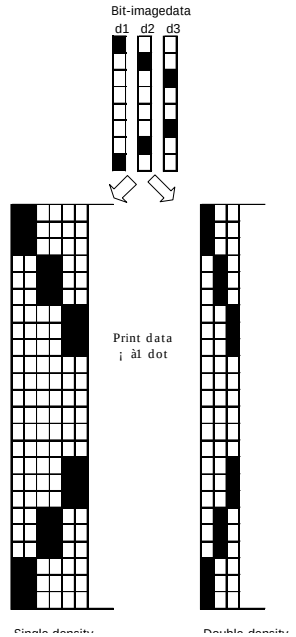
		Vertical direction		**Horizontal direction**	
m	**Mode**	**Number of Dots**	**Dot Density**	**Dot Density**	**Number of Data (k)**
0	8-dot single-density	8	60 DPI	90 DPI	nL + nH x 256
1	8-dot double-density	8	60 DPI	180 DPI	nL + nH x 256
32	24-dot single-density	24	180 DPI	90 DPI	(nL + nH x 256) x 3
33	24-dot double-density	24	180 DPI	180 DPI	(nL + nH x 256) x 3

[Notes]

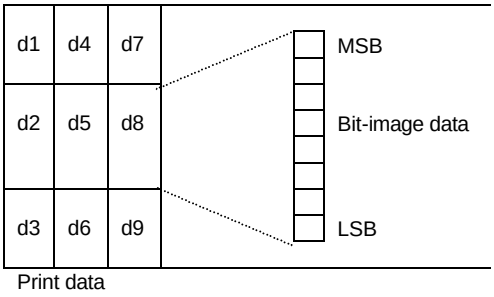
- If the values of m is out of the specified range, nL and data following are processed as normal data.
- The nL and nH indicate the number of dots of the bit image in the horizontal direction.
- The number of dots is calculated by nL + nH × 256.
- If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.
- d indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.
- If the width of the printing area set by **GS L** and **GS W** less than the width required by the data sent with the **ESC *** command, the following will be performed on the line in question (but the printing cannot exceed the maximum printable area):
  - ¨ çThe width of the printing area is extended to the right to accommodate the amount of data.
  - ¨ èIf step ¨ çdoes mot provide sufficient width for the data, the left margin is reduced to accommodate the data.
- After printing a bit image, the printer returns to normal data processing mode.
- This command is not affected by print modes (emphasized, double-strike, underline, character size or white/black reverse printing), except upside-down printing mode.
- The relationship between the image data and the dots to be printed is as follows:

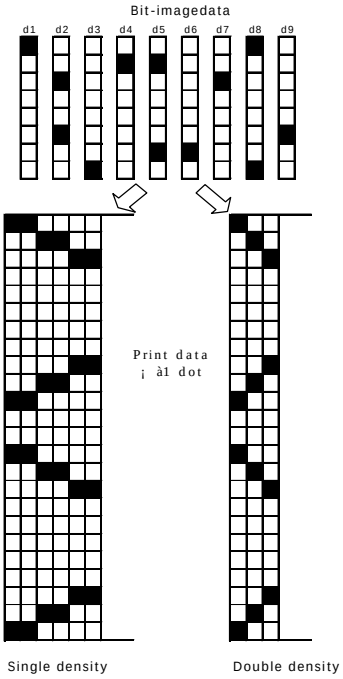
- When 8-dot bit image is selected:





- When 24-dot bit image is selected:





ESC - n

[Name] Turn underline mode on/off.

[Format]

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

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

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

n	Function
0, 48	Turns off underline mode.
1, 49	Turns on underline mode (1-dot thick).
2, 50	Turns on underline mode (2-dots thick).

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

[Default] n = 0

[Reference] **ESC !**

ESC 2

[Name] Select default line spacing.

[Format]

ASCII	ESC	2
Hex	1B	32
Decimal	27	50

[Description] Selects 1/6-inch line (approximately 4.23mm) spacing.

[Notes]
- The line spacing can be set independently in standard mode and in page mode.

[Reference] **ESC**

ESC 3 n

[Name] Set line spacing.

[Format]

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

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

[Description] Sets the line spacing to [n x vertical or horizontal motion unit] inches.

[Notes]
- The line spacing can be set independently in standard mode and in page mode.
- The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current line spacing.

- The GS P command can change the horizontal (and vertical) motion unit.
  However, the value cannot be less than the minimum vertical movement amount, and it must be in even units of the minimum vertical movement amount.
- In standard mode, the vertical motion unit (y) is used.
- In page mode, this command functions as follows, depending on the starting position of the printable area:
  - ¨ çWhen the starting position is set to the upper left or lower right of the printable area using **ESC T**, the vertical motion unit (y) is used.
  - ¨ èWhen the starting position is set to the upper right or lower left of the print able area using **ESC T**, the horizontal motion unit (x) is used.
- The maximum paper feed amount is 1016 mm (40 inches). Even if a paper feed amount of more than 1016 mm (40 inches) is set, the printer feeds the paper only 1016 mm (40 inches).

[Default] Line spacing equivalent to approximately 4.23mm (1/6 inches).
[Reference] **ESC 2, GS P**

ESC = n

[Name] Set peripheral device.
[Format]

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

[Range] 0 ≤ n ≤ 3
[Description] Selects device to which host computer sends data, using n as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer disabled.
	On	01	1	Printer disabled.
1-7	-	-	-	Undefined.

[Notes]
- When the printer is disabled, it ignores all data except for error-recovery commands (**DLE ENQ 1**, **DLE ENQ 2**) until it is enabled by this command.

[Default] n = 1
[Reference] **DLE ENQ**

ESC ? n

[Name] Cancel user-defined characters.
[Format]

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

[Range] 32 ≤ n ≤ 126
[Description] Cancels user-defined characters.
[Notes]
- This command cancels the pattern defined for the character code specified by n. After the user-defined characters is canceled, the corresponding pattern for the internal character is printed.
- This command deletes the pattern defined for the specified code in the font selected by **ESC !**.
- If a user-defined character has not been defined for the specified character code, the printer ignores this command.

[Reference] **ESC &, ESC %**

ESC @

[Name] Initialize printer.

[Format]

ASCII	ESC	@	
Hex	1B	40	
Decimal	27	64	

[Description] Clears the data in the print buffer and resets the printer mode to the mode that was in effect when the power was turned on.

[Notes]
- The DIP switch settings are not checked again.
- The data in the receive buffer is not cleared.
- The macro definition is not cleared.
- The NV bit image data is not cleared.

ESC D n1...nk NUL

[Name] Set horizontal tab positions.

[Format]

ASCII	ESC	D	n1...nk	NUL
Hex	1B	44	n1...nk	00
Decimal	27	68	n1...nk	0

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

[Description] Sets horizontal tab position.
- n specifies the column number for setting a horizontal tab position from the beginning of the line.
- k indicates the total number of horizontal tab positions to be set.

[Notes]
- The horizontal tab position is stored as a value of [character width x n] measured from the beginning of the line. The character width includes the right-side character spacing, and double-width characters are set with twice the width of normal characters.
- This command cancels the previous horizontal tab settings.
- When setting n = 8, the print position is moved to column 9 by sending **HT**.
- Up to 32 tab positions (k = 32) can be set. Data exceeding 32 tab positions is processed as normal data.
- Transmit [n]k in ascending order and place a NUL code 0 at the end.
- When [n]k is less than or equal to the preceding value [n]k-1, tab setting is finished and the following data is processed as normal data.
- **ESC D NUL** cancels all horizontal tab positions.
- The previously specified horizontal tab positions do not change, even if the character width changes.
- The character width is memorized for each standard and page mode.

[Default] The default tab positions are at intervals of 8 characters (columns 9, 17, 25,…) for font A (12 x 24).

[Reference] **HT**

ESC E n

[Name] Turn emphasized mode on/off.

[Format]

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

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

[Description] Turns emphasized mode on or off.
When the LSB is 0, emphasized mode is turned off.
When the LSB is 1, emphasized mode is turned on.

[Notes]
- Only the least significant bit of n is enabled.
- This command and **ESC !** turn on and off emphasized mode in the same way.
  Be careful when this command is used with **ESC !**.

[Default] n = 0

[Reference] **ESC !**

ESC G n

[Name] Turn on/off double-strike mode.

[Format]

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

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

[Description] Turns double-strike mode on or off.
- When the LSB is 0, double-strike mode is turned off.
- When the LSB is 1, double-strike mode is turned on.

[Notes]
- Only the lowest bit of n is enabled.
- Printer output is the same in double-strike mode and in emphasized mode.

[Default] n = 0

[Reference] **ESC E**

ESC J n

[Name] Print and feed paper.

[Format]

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

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

[Description] Prints the data in the print buffer and feeds the paper [n x vertical or horizontal motion unit] inches.

[Notes]
- After printing is completed, this command sets the print starting position to the beginning of the line.
- The paper feed amount set by this command does not affect the values set by **ESC 2** or **ESC 3**
- The horizontal and vertical motion unit are specified by **GS P**.
- The **GS P** command can change the vertical (and horizontal) motion unit.
  However, the value cannot be less than the minimum vertical movement amount, and it must be in even units of the minimum vertical movement amount.
- In standard mode, the printer uses the vertical motion unit (y).

- In page mode, this command functions as follows, depending on the starting position of the printable area:
  - ¨ çWhen the starting position is set to the upper left or lower right of the printable area using **ESC T**, the vertical motion unit (y) is used.
  - ¨ èWhen the starting position is set to the upper right or lower left of the print able area using **ESC T**, the horizontal motion unit (x) is used.
- The maximum line spacing is 1016mm (40 inches). When the setting value exceeds the maximum, it is converted to the maximum automatically.

[Reference] **GS P**

ESC L

[Name] Select page mode

[Format]

ASCII	ESC	L	
Hex	1B	4C	
Decimal	27	76	

[Description] Switches from standard mode to page mode.

[Notes]
- This command is enabled only when processed at the beginning of a line in standard mode.
- This command has no effect in page mode.
- After printing by **FF** is completed or by using **ESC S**, the printer returns to standard mode.
- This command sets the position where data is buffered to the position specified by **ESC T** within the printing area defined by **ESC W**.
- This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for page mode:
  - ¨ çSet right-side character spacing: **ESC SP**, **FS S**
  - ¨ èSelect default line spacing: **ESC 2**, **ESC 3**
- Only valve settings is possible for the following commands in page mode; these commands are not executed.
  - ¨ çTurn 90¡ ¢lockwise rotation mode on/off: **ESC V**
  - ¨ èSelect justification: **ESC a**
  - ¨ éTurn upside-down printing mode on/off: **ESC {**
  - ¨ êSet left margin: **GS L**
  - ¨ ëSet printable area width: **GS W**
- The following command is not available in page mode:
  - ¨ çPrint NV bit image: **FS p**
  - ¨ èDefine NV bit image: **FS q**
- The printer returns to standard mode when power is turned on, the printer is reset, or **ESC** @ is used.

[Reference] **FF**, **CAN**, **ESC FF**, **ESC S**, **ESC T**, **ESC W**, **GS $**, **GS **

ESC M n

[Name] Select character font.

[Format]

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

[Range] n = 0, 1, 48, 49

[Description] Selects character fonts.

n	Function
0, 48	Character font A (12 x 24) selected.
1, 49	Character font B (9 x 17) selected.

ESC R n

[Name] Select an international character set.

[Format]

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

[Range] $0 \le n \le 10$

[Description] Selects an international character set n from the following table.

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

[Default] n =0

[Reference] 3.2.8 International Character Set

ESC S

[Name] Select standard mode

[Format]

ASCII	ESC	S
Hex	1B	53
Decimal	27	83

[Description] Switches from page mode to standard mode.

[Notes]

- This command is effective only in page mode.
- Data buffered in page mode are cleared.
- This command sets the print position to the beginning of the line.
- The printing area set by **ESC W** are initialized.
- This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for standard mode:
  - ¨ çSet right-side character spacing: **ESC SP, FS S**
  - ¨ èSelect default line spacing: **ESC 2, ESC 3**
- The following commands are enabled only to set in standard mode.
  - ¨ çSet printing area in page mode: **ESC W**
  - ¨ èSelect print direction in page mode: **ESC T**
- The following commands are ignored in standard mode.
  - ¨ çSet absolute vertical print position in page mode: **GS $**
  - ¨ èSet relative vertical print position in page mode: **GS **
- Standard mode is selected automatically when power is turned on, the printer is reset, or command **ESC** @ is used.

[Reference] **FF, ESC FF, ESC L**

ESC T n

[Name] Select print direction in page mode

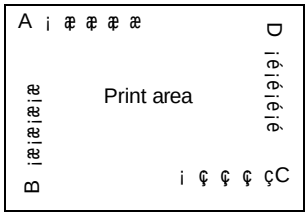
[Format]

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

[Range] 0 ¡ Â¡ Ê
48 ¡ Â¡ Ê51

[Description] Selects the print direction and starting position in page mode.
n specifies the print direction and starting position as follows:

n	Print Direction	Starting Position
0, 48	Left to right	Upper left (A in the figure)
1, 49	Bottom to top	Lower left (B in the figure)
2, 50	Right to left	Lower right (C in the figure)
3, 51	Top to bottom	Upper right (D in the figure)



[Notes]

- When the command is input in standard mode, the printer executes only internal flag operation. This command odes not affect printing in standard mode.
- This command sets the position where data is buffered within the printing area set by **ESC W**.
- Parameters for horizontal or vertical motion units (X or y) differ as follows, depending on the starting position of the printing area:
  - If the starting position is the upper left or lower right of the printing area, data is buffered in the direction perpendicular to the paper feed direction:
    Commands using horizontal motion units:**ESC SP, ESC $, ESC **
    Commands using vertical motion units : **ESC 3, ESC J, GS $, GS **
  - If the starting position is the upper right or lower left of the printing area, data is buffered in the paper feed direction:
    Commands using horizontal motion units:**ESC 3, ESC J, GS $, GS **
    Commands using vertical motion units: **ESC SP, ESC $, ESC **

[Default] n = 0

[Reference] **ESC $, ESC L, ESC W, ESC\, GS $, GS P, GS **

ESC V n

[Name] Turn 90¡ Êlockwise rotation mode on/off.

[Format]

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

[Range] $0 \le n \le 1$, $48 \le n \le 49$

[Description] Turns 90¡ Êlockwise rotation mode on/off
n is used as follows:

n	Function
0,48	Turn off 90¡ Êlockwise rotation mode
1,49	Turns on 90¡ Êlockwise rotation mode

Forward->>

[Notes]
- This command affects printing in standard mode. However, the setting is always effective.
- When underline mode is turned on, the printer does not underline 90¡ Æclockwise-rotated.
- Double-width and double-height commands in 90¡ Rotation mode enlarge characters in the opposite directions as from double-height and double-width commands in normal mode.

[Default] n = 0

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

ESC W xL xH yL yH dxL dxH dyL dyH

[Name] Set printing area in page mode

[Format]

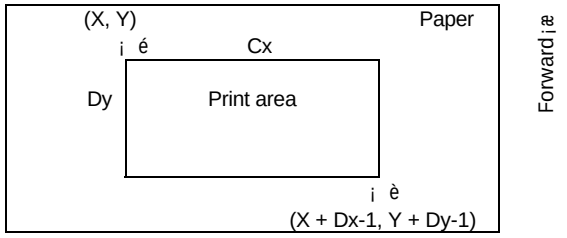
ASCII	ESC	W	xL	xH	yL	yH	dxL	dxH	dyL	dyH
Hex	1B	57	xL	xH	yL	yH	dxL	dxH	dyL	dyH
Decimal	27	87	xL	xH	yL	yH	dxL	dxH	dyL	dyH

[Range] 0 ≤ xL, xH, yL, yH, dxL, dxH, dyL, dyH ≤255(except dxL=dxH=0 or dyL =dyH=0)

[Description]
- The horizontal starting position, vertical staring position, printing area width, and printing area height are defined as x0, y0, dx (inch), respectively.
  x0 = [(xL + xH x 256)] x (horizontal motion unit)]
  y0 = [(yL + yH x 256)] x (vertical motion unit)]
  dx = [(dxL + dxH x 256)] x (horizontal motion unit)]
  dy = [(dyL + dyH x 256)] x (horizontal motion unit)]
  The printing area is set as shown in the figure below.

[Notes]
- If this command is input in standard mode, the printer executes only internal flag operation, This command does not affect printing in standard mode.
- If the horizontal or vertical starting position is set outside the printable area, the printer stops command processing and processes the following data as normal data.
- If the printing area width or height is set to 0, the printer stops command processing and processes the following data as normal data.
- This command sets the position where data is buffered to the position specified by **ESC T** within the printing area.
- If (horizontal starting position +printing area width) exceeds the printable area, the printing area width is automatically set to (horizontal printable area-horizontal starting position).
- If (vertical starting position + printing area height) exceeds the printable area, the printing area height is automatically set to (vertical printable area – vertical starting position).
- The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current printing area.
- The **GS P** command can change the horizontal (and vertical) motion unit.
  However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of minimum horizontal movement amount.
- Use the horizontal motion unit (x) for setting the horizontal starting position and printing area width, and use the vertical motion unit (y) for setting the vertical starting position and printing area height.

- When the horizontal starting position, vertical starting position, printing area width, and printing area height are defined as X, Y, Dx, and Dy respectively, the printing area is set as shown in the figure below.



- This printable area for this printer is approximately 72.249 mm (512/180 inches) in the horizontal direction and approximately 117.263 mm(1662/360 inches) in the vertical direction.

[Default] Xl = xH = yL = yH = 0
dxL = 0, dxH = 2, dyL = 126, dyH = 6
[Reference] **CAN, ESC L, ESC T, GS P**

ESC \ nL nH

[Name] Set relative print position.

[Format]

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

[Range] 0 ≤ nL ≤ 255
0 ≤ nH ≤ 255

[Description] Set the print starting position based on the current position by using the horizontal or vertical motion unit.
- This command sets the distance from the current position to [(nL + nH × 256) x horizontal or vertical motion unit]

[Notes]
- Any setting that exceeds the printable area is ignored.
- When pitch N is specified to the right:
  nL + nH x 256 = N
  When pitch N is specified to the left (the negative direction), use the complement of 65536.
- The print starting position moves from the current position to [N x horizontal or vertical motion unit]
- The horizontal and vertical motion unit are specified by **GS P**.
- The **GS P** command can change the horizontal (and vertical) motion unit.
  However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.
- In standard mode, the horizontal motion unit is used.
- In page mode, the horizontal or vertical motion unit differs as follows, depending on the starting point of the printing area:
  ¨ çWhen the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit (x) is used.

¨ éWhen the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit (y) is used.

[Reference] **ESC $, GS P**

ESC a n

[Name] Select justification.

[Format]

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

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

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

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

[Notes]
- The command is enabled only when processed at the beginning of the line in standard mode.
- If this command is input in page mode, the printer performs only internal flag operations.
- This command has no effect in page mode.
- This command executes justification in the printing area.
- This command justifies the space area according to **HT, ESC $** or **ESC **

[Default] n =0

[Example]

Left justification

```
ABC
ABCD
ABCDE
```

Centering

```
 ABC
 ABCD
ABCDE
```

Right justification

```
  ABC
 ABCD
ABCDE
```

ESC c 3 n

[Name] Select paper sensor(s) to output paper end signals.

[Format]

ASCII	ESC	c	3	n
Hex	1B	63	33	n
Decimal	27	99	51	n

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

[Description] Selects the paper sensor(s) to output paper end signals.
- Each bit of n is used as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll near-end sensor disabled.
	On	01	1	Paper roll near-end sensor enabled.
1	Off	00	0	Paper roll near-end sensor disabled.
	On	02	2	Paper roll near-end sensor enabled.
2	Off	00	0	Paper roll end sensor disabled.

	On	04	4	Paper roll end sensor enabled.
3	Off	00	0	Paper roll end sensor disabled.
	On	08	8	Paper roll end sensor enabled.
4 – 7	-	-	-	Undefined.

[Notes]
- It is possible to select multiple sensors to output signals. Then, if any of the sensors detects a paper end, the paper end signal is output.
- The command is available only with a parallel interface and is ignored with a serial interface.
- Sensor is switched when executing this command. The paper end signal switching be delayed depending on the receive buffer state.
- If either bit 0 or bit 1 is on, the paper roll near-end sensor is selected as the paper sensor outputting paper-end signals.
- If either bit 2 or bit 3 is on, the paper roll end sensor is selected as the paper sensor outputting paper-end signals.
- When all the sensors are disabled, the paper end signal always outputs a paper present status.

[Default] n = 15

ESC c 4 n

[Name] Select paper sensor(s) to stop printing.

[Format]

ASCII	ESC	c	4	n
Hex	1B	63	34	n
Decimal	27	99	52	n

[Range] 0 ≤ n ≤ 255

[Description] Selects the paper sensor(s) used to stop printing when a paper-end is detected, using n as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	paper roll end sensor disabled.
	On	01	1	Paper roll end sensor enabled.
1	Off	00	0	Paper roll end sensor disabled.
	On	02	2	Paper roll end sensor enabled.
2-7	-	-	-	Undefined.

[Notes]
- When a paper sensor is enabled with this command, printing is stopped only when the corresponding paper is selected for printing.
- When a paper-end is detected by the paper roll sensor, the printer goes off-line after printing stops.
- When either bit 0 or 1 is on, the printer selects the paper roll near-end sensor for the paper sensor to stop printing.

[Default] n = 0

ESC c 5 n

[Name] Enable/Disable panel buttons.

[Format]

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

[Range] 0 ≤ n ≤ 255

[Description] Enables or disables the panel buttons.
- When the LSB is 0, the panel buttons are enabled.
- When the LSB is 1, the panel buttons are disabled.

[Notes]
- Only the lowest bit of n is valid.
- When the panel buttons are disabled, none of them are usable when the printer cover is closed.
- In this printer, the panel buttons are the FEED button.
- In the macro ready mode, the FEED button are enabled regardless of the settings of this command; however, the paper cannot be fed by using these buttons.

[Default] n = 0

ESC d n

[Name] Print and feed n lines.

[Format]

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

[Range] 0 ≤ n ≤ 255

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

[Notes]
- This command sets the print starting position to the beginning of the line.
- This command does not affect the line spacing set by **ESC 2** or **ESC 3**.
- The maximum paper feed amount is 1016 mm (40 inches). If the paper feed amount(nx line spacing) of more than 1016 mm(40 inches) is specified, the printer feeds the paper only 1016 mm(40 inches).

[Reference] **ESC 2, ESC 3**

ESC p m t1 t2

[Name] Generate pulse.

[Format]

ASCII	ESC	p	m	t1	t2
Hex	1B	70	m	t1	t2
Decimal	27	112	m	t1	t2

[Range] m = 0, 1, 48, 49
0 ≤ t1 ≤ 255, 0 ≤ t2 ≤ 255

[Description] Outputs the pulse specified by t1 & t2 to connector pin m as follows:

m	Connector pin
0,48	Drawer kick-out connector pin 2
1,49	Drawer kick-out connector pin 5

[Notes]
- The pulse ON time is [t1 x 2 ms] and the OFF time is [t2 x 2 ms].
- If t2 < t1, the OFF time is [t1 x 2 ms]

[Reference] Section 2.2.3, Drawer kick-out connector, Appendix F

ESC t n

[Name] Select character code table.

[Format]

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

[Range] 0 ≤ n ≤ 5, n = 255

[Description] Selects a page n from the character code table.

n	Page
0	0 (PC437 [U.S.A., standard Europe])
1	1 (Katakana)
2	2 (PC850 [Multilingual])
3	3 (PC860 [Portuguese])

4	4 (PC863 [Canadian-French])
5	5 (PC865 [Nordic])
19	19(PC858[EURO]
255	Space page

[Default] n = 0

ESC { n

[Name] Turn on/off upside-down printing mode.

[Format]

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

[Range] 0 ≤ n ≤ 255

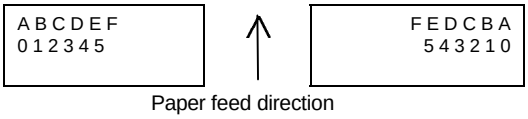
[Description] Turns upside-down printing mode on or off.

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

[Notes]
- Only the lowest bit of n is valid.
- This command is enabled only when processed at the beginning of a line in standard mode.
- When this command is input in page mode, the printer performs only internal flag operations.
- This command does not affect printing in page mode.
- In upside-down printing mode, the printer rotates the line to be printed by 180¡ and then prints it.

[Default] n = 0

[Example]



Paper feed direction

FS p n m

[Name] Print NV bit image

[Format]

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

[Description] Prints a NV bit image n using the mode specified by m.

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

- n is the number of the NV bit image (defined using the **FS q** command).
- m specifies the bit image mode.

[Detail]
- NV bit image means a bit image which is defined in a non-volatile memory by **FS q** and printed by **FS p**.

- This command is not effective when the specified NV bit image has not been defined.
- In standard mode, this command is effective only when there is no data in the print buffer.
- In page mode, this commend is not effective.
- This command is not affected by print modes (emphasized, double-strike, underline, character size, white/black reverse printing, or 90¡ Æotated characters, etc.), except upside-down printing mode.
- If the printing area width set by **GS L** and **GS W** for the NV bit image is less than one vertical line, the following processing is performed only on the line in question, However, in NV bit image mode, one vertical line means 1 dot in normal mode (m=0, 48) and in double-height mode(m=2, 50), and it means 2 dots in double-width mode (m=1, 49) and in quadruple mode (m=3, 51).
  - ¨ çThe printing area width is extended to the right in NV bit image mode up to one line vertically. In this case, printing does not exceed the printable area.
  - ¨ èIf the printing area width cannot be extended by one line vertically, the left margin is reduced to accommodate one line vertically.
- If the downloaded bit-image to be printed exceeds one line, the excess data is not printed.
- This command feeds dots (for the height n of the NV bit-image) in normal and double-width modes, and (for the height n x 2 of the NV bit-image) in double-height and quadruple modes, regardless of the line spacing specified by **ESC 2** or **ESC 3**.
- After printing the bit image, this command sets the print position to the beginning of the line and processes the data that follows as normal data.

[References] **ESC *, FS q, GS /, GS v 0**

FS q n [xL xH yL yH d1…dk]1…[xL xH yL yH d1…dk]n

[Name] Define NV bit image

[Format]

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

[Range] $1 \le n \le 255$
$0 \le xL \le 255$
$0 \le xH \le 3$(when $1 \le (xL + xH \times 256) \le 1023$
$0 \le yL \le 3$(when $1 \le (yL + yH \times 256) \le 288$
$1 \le d \le 255$
$k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$
Total defined data area = 2M bits (256K bytes)

[Description] Define the NV bit image specified by n.
- n specifies the number of the defined NV bit image.
- xL, xH specifies (xL + xH x 256) x 8 dots in the horizontal direction for the NV bit image you are defining.
- yL, yH specifies (yL + yH x 256) x 8 dots in the vertical direction for the NV bit image you are defining.

[Notes]
- Frequent write command execution may cause damage the NV memory. Therefore, it is recommended to write the NV memory 10 times or less a day.

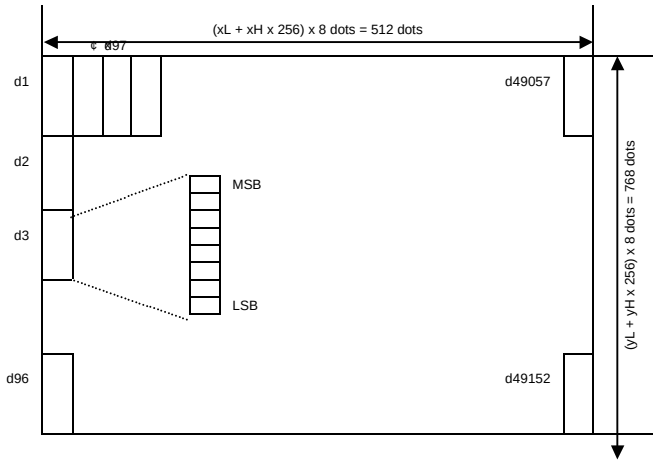
- The printer performs a hardware reset after the procedure to place the image into the NV memory. Therefore, user-defined characters, downloaded bit images, and macros should be defined only after completing this command.
  The printer clears the receive and print buffers and resets the mode to the mode that was in effect at power on. At this time, DIP switch settings are checked again.
- This command cancels all NV bit images that have already been defined by this command. The printer can not redefine only one of several data

  definitions previously defined. In this case, all data needs to be sent again.
- From the beginning of the processing of this command till the finish of hardware reset, mechanical operations (including initializing the position of the printer head when the cover is open, paper feeding by using the FEED button, etc.) cannot be performed.
- During processing this command, the printer is in BUSY when writing the data to the user NV memory and stops receiving data. Therefore it is prohibitted to transmit the data including the real-time commands during the execution of this command.
- NV bit image means a bit image which is defined in a non-volatile memory by **FS q** and printed by **FS p**.
- In standard mode, this command is effective only when processed at the beginning of the line.
- In page mode, this command is not effective.
- This command is effective when 7 bytes <FS~yH> is processed as a normal value.
- When the amount of data exceeds the capacity left in the range defined by xL, xH, yL, yH the printer processes xL, xH, yL, yH out of the defined range.
- In the first group of NV bit images, when any of the parameters xL, xH, yL, yH is out of the definition range, this command is disabled.
- In groups of NV bit images other than the first one, when the printer processes xL, xH, yL, yH out of the defined range, it stops processing this command and starts writing into the NV images. At this time, NV bit images that haven't been defined are disabled (undefined), but any NV bit images before that are enabled.
- The d indicates the definition data. In data (d) a 1 bit specifies a dot to be printed and a 0 bit specifies a dot not to be printed.
- This command defines n as the number of a NV bit image. Numbers rise in order from NV bit image 01H. Therefore, the first data group [xL xH yL yH d1…dk] is NV bit image 01H. Therefore, the first data group [xL xH yL yH d1…dk] is NV bit image n. The total agrees with the number of NV bit images specified by command **FS p**.
- A definition data of a NV bit image consists of group [xL xH yL yH d1…dk]. Therefore, when only one NV bit image is defined n=1, the printer processes a data group [xL xH yL yH d1…dk] once. The printer uses ([data : (xL + xH x256) x (yL + yH x 256) x 8] + [header : 4]) bytes of NV memory.
- The definition area in this printer is a maximum of 2M bits (256K bytes). This command can define several NV bit images, but cannot define a bit image data whose total capacity [bit image data + header] exceeds 2M bytes (256K bytes).
- The printer is busy immediately before writing into NV memory, regardless of the setting of DIP switch 2-1.

- The printer does not transmit ASB status and perform status detection during processing of this command even when ASB is specified.
- When this command is received during macro definition, the printer ends macro definition, and begins performing this command.
- Once a NV bit image is defined, it is mot erased by performing **Esc** @, reset, and power off.
- This command performs only definition of a NV bit image and does not perform printing of the NV bit image is performed by the **FS p** command.

[Reference] **FS p**

[Example] When xL = 64, xH = 0, yL = 96, yH =0



GS ! n

[Name] Select character size.

[Format]

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

[Range] 0 ≤ n ≤ 255
(1 ≤ vertical number of times ≤ 8, 1 ≤ horizontal number of times ≤ 8)

[Description] Selects the character height using bits 0 to 2 and selects the character width using bits 4 to 7, as following:

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

Table 1
Character Width Selection

Hex	Decimal	Width
00	0	1(normal)
10	16	2(double-width)
20	32	3
30	48	4

Table 2
Character Height Selection

Hex	Decimal	Height
00	0	1(normal)
01	1	2(double-height)
02	2	3
03	3	4

40	64	5
50	80	6
60	96	7
70	112	8

04	4	5
05	5	6
06	6	7
07	7	8

[Notes]
- This command is all characters (alphanumeric and Kanji) effective except for HRI characters.
- If n is outside of the defined range, this command is ignored.
- In standard mode, the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction. However, when character orientation changes in 90¡ Æclockwise-rotation mode, the relationship between vertical and horizontal directions is reversed.
- In page mode, vertical and horizontal directions are based on the character orientation.
- When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.
- The **ESC !** command can also turn double-width and double-height modes on or off. However, the setting of the last received command is effective.

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

GS $ nL nH

[Name] Set absolute vertical print position in page mode

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

[Range] 0¡ ÂL¡ Â255, 0¡ ÂH¡ Â255

[Description]
- Sets the absolute vertical print starting position for buffer character data in page mode.
- This command sets the absolute print position to [(nL + nH x 256) x (vertical or horizontal motion unit)] inches.

[Notes]
- This command is effective only in page mode.
- If the [(nL + nH x 256) x (vertical or horizontal motion unit)] exceeds the specified printing area, this command is ignored.
- The horizontal starting buffer position does not move.
- The reference starting position is that specified by **ESC T**.
- This command operates as follows, depending on the starting position of the printing area specified by **ESC T:**
  - ¨ çWhen the starting position is set to the upper left or lower right, this command sets the absolute position in the vertical direction.
  - ¨ èWhen the starting position is set to the upper right or lower left, this command sets the absolute position in the horizontal direction.
- The horizontal and vertical motion unit are specified by **GS P**.
- The **GS P** command can change the horizontal and vertical motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

[Reference] **ESC $, ESC T, ESC W, ESC \, GS P, GS **

GS ✶ x y d1…d(x ´ y ´ 8)

[Name] Define downloaded bit image.

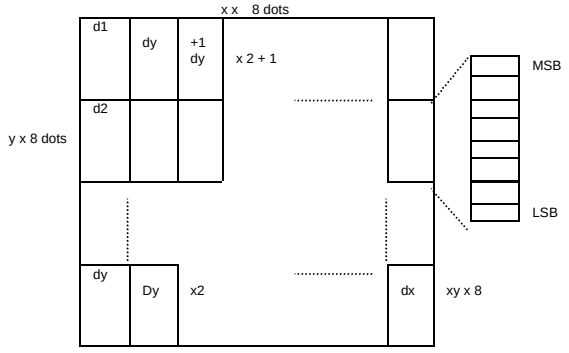
[Format]

ASCII	GS	✶	x	y	d1…d(x × y × 8)
Hex	1D	2A	x	y	d1…d(x × y × 8)
Decimal	29	42	x	y	d1…d(x × y × 8)

[Range] $1 \le x \le 255$
$1 \le y \le 48$
x x y ≤ 1536
$0 \le d \le 255$

[Description] Defines a downloaded bit image using the dots specified by x and y.
- x indicates the number of dots in the horizontal direction.
- y indicates the number of dots in the vertical direction.

[Notes]
- The number of dots in the horizontal direction is x × 8, in the vertical direction it is y x 8.
- If x × y is out of the specified range, this command is disabled.
- The d indicates bit-image data. Data (d) specifies a bit printed to 1 and not printed to 0.
- The downloaded bit image definition is cleared when:
  - ¨ ç**ESC @** is executed.
  - ¨ è**ESC &** is executed.
  - ¨ é**FS q** is executed.
  - ¨ êPrinter is reset or the power is turned off.
- The following figure shows the relationship between the downloaded bit image and the printed data.



[Reference] **GS /**

GS / m

[Name] Print downloaded bit image.

[Format]

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

[Range] 0¡ Ân¡ Â8, 48¡ Ân¡ Â51

[Description] Prints a downloaded bit image using the mode specified by m.
m selects a mode from the table below:

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

[Notes]

- This command is ignored if a downloaded bit image has not been defined.
- In standard mode, this command is effective only when there is no data in the print buffer.
- This command has no effect in the print modes (emphasized, double-strike, underline, character size, or white/black reverse printing), except for upside-down mode.
- If a downloaded bit image exceeds the printing area, the excess data is not printed.
- Refer to Figure 3.12.3 for the downloaded bit image development position in page mode.
- If the printing area width set by **GS L** and **GS W** is less than one line in vertical, the following processing is performed only on the line in question:
  - ç The printing area width is extended to the right up to the right up to one line in vertical. In this case, printing does not exceed the printable area.
  - è If the printing area width cannot be extended by one line in vertical, the left margin is reduced to accommodate one line in vertical.

[Reference] **GS ***

GS

[Name] Start/End macro definition.

[Format]

ASCII	GS	:
Hex	1D	3A
Decimal	29	58

[Description] Starts or ends macro definition.

[Notes]
- Macro definition starts when this command is received during normal operation.
  Macro definition ends when this command is received during macro definition.
- When **GS ^** is received during macro definition, the printer ends macro definition and clears the definition.
- Macro is not defined when the power is turned on.
- The defined contents of the macro are not cleared by **ESC** @. Therefore, **ESC** @ can be included in the contents of the macro definition.
- If the printer receives **GS :** again immediately after previously receiving **GS :** the printer remains in the macro undefined state.
- The contents of the macro can be defined up to 2048 bytes. If the macro definition exceed 2048 bytes, excess data is not stored.

[Reference] **GS ^**

GS B n

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

[Format]

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

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

[Description] Turns on or off white/black reverse printing mode.
- When the LSB is 0, white/black reverse printing mode is turned off.
- When the LSB is 1, white/black reverse printing mode is turned on.

[Notes]
- Only the lowest bit of n is valid.
- This command is available for built-in characters and user-defined characters.
- When white/black reverse printing mode is on, it also applied to character spacing set by **ESC SP**.
- This command does not affect bit image, use-defined bit image, bar code, HRI characters, and spacing skipped by **HT**, **ESC $**, and **ESC **.
- This command does not affect the space between lines.
- White/black reverse mode has a higher priority than underline mode. Even if underline mode is on, it is disabled (but not canceled) when white/black reverse mode is selected.

[Default] n = 0

GS H n

[Name] Select printing position of HRI characters.

[Format]

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

[Description] Selects the printing position of HRI characters when printing a bar code.
n selects the printing position as follows:

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

- HRI indicates Human Readable Interpretation.

[Notes]
- HRI characters are printed using the font specified by **GS f**.

[Default] n = 0

[Reference] **GS f, GS k**

GS I n

[Name] Transmit printer ID.

[Format]

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

[Range] $1 \le n \le 3$, $49 \le n \le 51$

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

n	Printer ID	Specification	ID (hexadecimal)
1, 49	Printer model ID	TM-T88¥ ±series	20
2, 50	Type ID	See table below.	
3, 51	ROM version ID	Depends on ROM version	

n=2, Type ID

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Two-byte character code not supported.
	On	01	1	Two-byte character code supported.
1	On	02	2	Auto-cutter equipped.
2	Off	00	0	No direct connection with customer display
3	Off	00	0	No MICR reader.
4	Off	00	0	Not used. Fixed to Off.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

[Notes]
- When DTR/DSR control is selected, the printer transmits only 1 byte after confirming that the host is ready to receive data (DSR signal is SPACE). If the host computer is not ready to receive data (DSR signal is MARK), the printer waits until the host is ready.
- When XON/XOFF control is selected, the printer transmits only 1 byte without confirming the condition of the DSR signal.

- The printer ID is transmitted when the data in the receive buffer is developed. Therefore, there may be a time lag between receiving this command and transmitting the status, depending on the receive buffer status.
- When Auto Status Back(ASB) is enabled using **GS a**, the status transmitted by **GS I** and the ASB status must be differentiated.

GS L nL nH

[Name] Set left margin.

[Format]

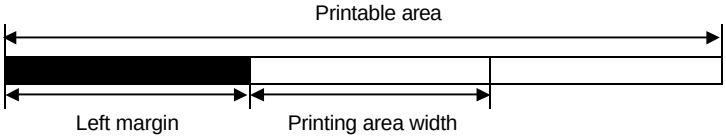
ASCII	GS	L	nL	nH
Hex	1D	4C	nL	nH
Decimal	29	76	nL	nH

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

$0 \le nH \le 255$

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

- The left margin is set to [(nL + nH × 256) x horizontal motion unit)] inches.



[Notes]

- This command is effective only processed at the beginning of the line in standard mode.
- If this command is input in page mode, the printer performs only internal flag operations.
- This command does not affect printing in page mode.
- If the setting exceeds the printable area, the maximum value of the printable area is used.
- The horizontal and vertical motion units are specified by **GS P**. Changing the horizontal and vertical motion unit does not affect the current left margin.
- The horizontal motion unit (x) is used for calculating the left margin. The calculated result is truncated to the minimum value of the mechanical pitch.

[Default] nL= 0, nH = 0

[Reference] **GS P, GS W**

GS P x y

[Name] Set horizontal and vertical motion units.

[Format]

ASCII	GS	P	x	y
Hex	1D	50	x	y
Decimal	29	80	x	y

[Range] 0 ≤ x ≤ 255
0 ≤ y ≤ 255

[Description] Sets the horizontal and vertical motion units to approximately 25.4/x mm { 1/x inch and } and approximately 25.4/y mm {1/y inches}, respectively. When x and y are set to 0, the default setting of each value is used

[Notes]
- The horizontal direction is perpendicular to the paper feed direction and the vertical direction is the paper feed direction.
- In standard mode, the following commands use x or y, regardless of character rotation (upside-down or 90¡ £clockwise rotation):
  - ✄ Command using x: **ESC SP**, **ESC $**, **ESC **, **GS L**, **GS W**
  - ✄ Command using y: **ESC 3**, **ESC J, ESC V**
- In page mode, the following command use x or y, depending on character orientation:
  - ✄ When the print starting position is set to the upper left or lower right of the printing area using ESC T (data is buffered in the direction perpendicular to the paper feed direction):
    Commands using x : **ESC SP**, **ESC $**, **ESC W, ESC \,FS S**
    Commands using y : **ESC 3, ESC J, ESC W, GS $, GS \, GS V**
  - ✄ When the print starting position is set to the upper right or lower left of the printing area using ESC T (data is buffered in the paper feed direction):
    Commands using x : **ESC 3, ESCJ, ESC W, GS $, GS **
    Commands using y : **ESC SP, ESC $, ESC W, ESC \, FS S, GS V**
- The command does not affect the previously specified values.
- The calculated result from combining this command with others is truncated to the minimum value of the mechanical pitch.

[Default] x = 180, y = 360

[Reference] **ESC SP, ESC $, ESC 3, ESC J, ESC W, ESC \, GS $, GS L, GS V, GSW, GS **

¨ çGS V m , ¨ èGS V m n

[Name] Select cut mode and cut paper.

[Format]

¨ çASCII	GS	V	m		
Hex	1D	56	m		
Decimal	29	86	m		
¨ èASCII	GS	V	m	n	
Hex	1D	56	m	n	
Decimal	29	86	m	n	

[Range] ¨ çm = 1, 49
¨ èm = 66, 0 ≤ n ≤ 255

[Description] Selects a mode for cutting paper and executes paper cutting.
The value of m selects the mode as follows:

M	Print mode
0, 1, 49	Partial cut (one point left uncut)
66	Feeds paper (cutting position + [n × (vertical motion unit)]), and cuts the paper partially (one point left uncut).

[Notes for ¨ çand ¨ þ

- This command is effective only processed at the beginning of a line.

[Note for ¨ ÿ

- Only the partial cut is available; there is no full cut.

[Notes for ¨ þ

- When n = 0, the printer feeds the paper to the cutting position and cuts it.
- When n = 0, the printer feeds the paper to (cutting position + [n x vertical motion unit]) and cuts it.
- The horizontal and vertical motion unit are specified by **GS P**.
- The paper feed amount is calculated using the vertical motion unit (y). However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

GS W nL nH

[Name] Set printing area width.

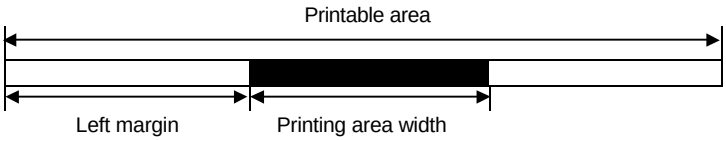
[Format]

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

[Range] 0 ≤ nL ≤ 255
0 ≤ nH ≤ 255

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

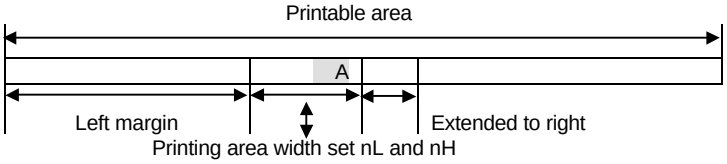
- The printing area width is set to [(nL + nH × 256) x horizontal motion unit)] inches.



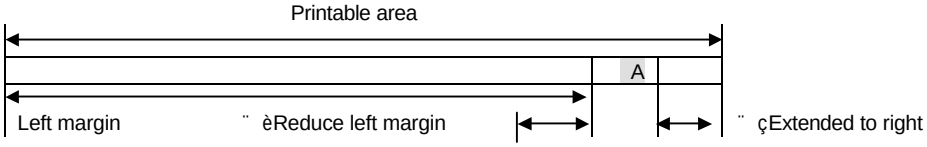
[Notes]

- This command is effective only processed at the beginning of the line.
- In page mode, the printer performs only internal flag operations.
- This command does not affect printing in page mode.
- If the [left margin + printing area width] exceeds the printable area, (printable area width – left margin) is used.
- The horizontal and vertical motion units are specified by **GS P**. Changing the horizontal and vertical motion units does not affect the current left margin.
- The horizontal motion unit (x) is used for calculating the printing area width.
  The calculated result is truncated to the minimum value of the mechanical pitch.
- If the width set for the printing area is less than the width of one character, when the character data is developed, the following processing is performed:

¨ çThe printing area width is extended to the right to accommodate one character.



¨ èIf the printing area width cannot be extended sufficiently, the left margin is reduced to accommodate one character.



¨ éIf the printing area width cannot be extended sufficiently, the right space is reduced.

- If the width set for the printing area is less than one line in vertical, the following processing is performed only on the line in question when data other than character data (e.g., bit image, user-defined bit image) is developed:
  - ¨ çThe printing area width is extended to the right to accommodate one line in vertical for the bit image within the printable area.
  - ¨ èIf the printing area width cannot be extended sufficiently, the left margin is reduced to accommodate one line in vertical.
- The commands which set the printing area width for bit image printing and its minimum widths are as follows:
  - Bit image (**ESC ***):
    Single density mode = 2 dots
    Double-density mode = 1 dot
  - Downloaded bit image (**GS *l***):
    Double width mode or Quadruple mode = 2 dots
    Normal mode or Double-height mode = 1 dot
  - NV bit image (**FS p**):
    Double width mode or Quadruple mode = 2 dots
    Normal mode or Double-height mode = 1 dot
  - Raster bit image (**GS r 0**)
    Double width mode or Quadruple mode = 2 dots
    Normal mode or Double-height mode = 1 dot

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

GS \ nL nH

[Name] Set relative vertical print position in page mode

[Format]

ASCII	GS	****	nL	nH
Hex	1D	5C	nL	nH
Decimal	29	92	nL	nH

[Range] $0 \le nL \le 255$
$0 \le nH \le 255$

[Description] Sets the relative vertical print starting position from the current position in page mode.

- This command sets the distance from the current position to [(nL + nH x 256) x vertical or horizontal motion unit] inches.

[Notes]

- This command is ignored unless page mode is selected.
- When pitch N is specified to the movement downward:
  nL + nH x 256 = N
  When pitch N is specified to the movement upward (the negative direction), use the complement of 65536.
  When bitch N is specified to the movement upward:
  nL + nH x 256 = 65536 – N
- Any setting that exceeds the specified printing area is ignored.
- This command function as follows, depending on the print starting position set by **ESC T**:
  - ç When the starting position is set to the upper left or lower right of the printing, the vertical motion unit (y) is used.
  - è When the starting position is set to the upper right or lower left of the printing area, the horizontal motion unit (x) is used.
- The horizontal and vertical motion unit are specified by **GS P**.
- The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

[Reference] **ESC $, ESC T, ESC W, ESC \, GS $, GS P**

GS ^ r t m

[Name] Execute macro.

[Format]

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

[Range] $0 \le r \le 255$
$0 \le t \le 255$
$m = 0, 1$

[Description] Executes a macro.

- r specifies the number of times to execute the macro.
- t specifies the waiting time for executing the macro.
- m specifies macro executing mode.
  When the LSB of m = 0
  The macro executes r times continuously at the interval specified by t.
  When the LSB of m = 1:
  After waiting for the period specified by t, the PAPER OUT LED indicators blink and the printer waits for the FEED button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats the operation r times.

[Notes]
- The waiting time is t × 100 ms for every macro execution.
- If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.
- If the macro is not defined or if r is 0, nothing is executed.
- When the macro is executed (m=1), paper always cannot be fed by using the FEED button.

[Reference] **GS :**

GS a n

[Name] Enable/Disable Automatic Status Back.

[Format]

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

[Range] 0 ≤ n ≤ 255

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

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Drawer kick-out connector pin 3 status disabled.
	On	01	1	Drawer kick-out connector pin 3 status enabled.
1	Off	00	0	On-line/off-line disabled.
	On	02	2	On-line/off-line enabled.
2	Off	00	0	Error status disabled.
	On	04	4	Error status enabled.
3	Off	00	0	Paper roll sensor status disabled.
	On	08	8	Paper roll sensor status enabled.
4-7	-	-	-	Undefined.

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

First byte(printer information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Not used. Fixed to Off.
1	Off	00	0	Not used. Fixed to Off.
2	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	04	4	Drawer kick-out connector pin 3 is HIGH.
3	Off	00	0	On-line.
	On	08	8	Off-line.
4	On	10	16	Not used. Fixed to On.
5	Off	0	0	Cover is closed.
	On	20	32	Cover is open.
6	Off	00	0	Paper is not being fed by the PAPER FEED button.
	On	40	64	Paper is being fed by the PAPER FEED button.
7	Off	00	0	Not used. Fixed to Off.

Second byte(error information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	-	-	-	Undefined.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	Off	00	0	No auto-cutter error.
	On	08	8	Auto cutter error.
4	Off	00	0	Not used. Fixed to Off.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error.
6	Off	00	0	No automatically recoverable error.
	On	40	64	Automatically recoverable error occurs
7	Off	00	0	Not used. Fixed to off.

Bit 3: If these errors occur due to paper jams or the like, it is possible to recover by correcting the cause of the error and executing **DLE ENQ n** (1 ¡ Ân ¡ Â2). If an error due to a circuit failure (e.g. wire break) occurs, it is impossible to recover.

Bit 6: When printing is stopped due to high print head temperature until the print head temperature drops sufficiently or when the paper roll cover is open during printing, bit 6 is On.

Third byte (paper sensor information)

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

Fourth byte (paper sensor information)

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

[Default] n = 0 when DIP SW 2-1 is off, n = 2 when DIP SW 2-1 is on.
[Reference] **DLE EOT, GS r**

GS b n

[Name] Turns smoothing mode on/off
[Format]

ASCII	GS	b	n
Hex	1D	62	n
Decimal	29	98	n

[Range] 0 ¡ Ân¡ Â255
[Description] Turns smoothing mode on or off.
When the LSB of n is 0, smoothing mode is turned off.
When the LSB of n is 1, smoothing mode is turned on.
[Notes]
- Only the lowest bit of n is valid.
- Smoothing mode is available for built-in, user- defined characters.
- Even if smoothing mode is turned on, smoothing is not performed when either of character width or character height is the normal size.

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

GS f n

[Name] Select font for Human Readable Interpretation(HRI) characters.
[Format]

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

[Range] n = 0, 1, 48, 49
[Description] Selects a font for the HRI characters used when printing a bar code. n selects a font from the following table:

n	Font
0, 48	Font A (12 × 24)
1, 49	Font B (9 × 17)

[Notes]
- HRI indicates Human Readable Interpretation.
- HRI characters are printed at the position specified by **GS H**.

[Default] n = 0
[Reference] **GS H, GS k**

GS h n

[Name] Set bar code height.

[Format]

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

[Range] 1 ≤ n ≤ 255

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

[Default] n = 162

[Reference] **GS k**

¨ çGS k m d1... dk NUL ¨ èGS k m n d1... dn

[Name] Print bar code.

[Format]

¨ çASCII	GS	k	m	d1...dk	NUL	
Hex	1D	6B	m	d1...dk	00	
Decimal	29	107	m	d1...dk	0	
¨ èASCII	GS	k	m	n	d1... dn	
Hex	1D	6B	m	n	d1... dn	
Decimal	29	107	m	n	d1... dn	

[Range] ¨ ç0 ≤ m ≤ 6 (k and d depends on the bar code system used.)
¨ è65 ≤ m ≤ 73 (n and d depends on the bar code system used)

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

m		Bar Code System	Number of Characters	Remarks
¨ ç	0	UPC-A	11 ≤ k ≤ 12	48 ≤ d ≤ 57
	1	UPC-E	11 ≤ k ≤ 12	48 ≤ d ≤ 57
	2	JAN13(EAN13)	12 ≤ k ≤ 13	48 ≤ d ≤ 57
	3	JAN8(EAN8)	7 ≤ k ≤ 8	48 ≤ d ≤ 57
	4	CODE 39	1 ≤ k	48 ≤ d ≤ 57, 65 ≤ d ≤ 90,32, 36,37,43,45, 46,47
	5	ITF	1 ≤ k (even number)	48 ≤ d ≤ 57
	6	CODABAR	1 ≤ k	48 ≤ d ≤ 57, 65 ≤ d ≤ 68, 36,43,45,46,47, 58
¨ è	65	UPC-A	11 ≤ n ≤ 12	48 ≤ d ≤ 57
	66	UPC-E	11 ≤ n ≤ 12	48 ≤ d ≤ 57
	67	JAN13(EAN13)	12 ≤ n ≤ 13	48 ≤ d ≤ 57
	68	JAN8(EAN8)	7 ≤ n ≤ 8	48 ≤ d ≤ 57
	69	CODE 39	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 90,32, 36,37,43,45, 46,47 d1 = dk = 42 (1)
	70	ITF	1 ≤ n ≤ 255(even number)	48 ≤ d ≤ 57
	71	CODABAR	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 68, 36, 43,45,46,47, 58
	72	CODE93	1 ≤ n ≤ 255	0 ≤ d ≤ 127
	73	CODE128	2 ≤ n ≤ 255	0 ≤ d ≤ 127

[Notes for ¨ ç]

- This command ends with a NUL code.

- When the bar code system used is UPC-A or UPC-E, the printer prints the bar code data after receiving 12 bytes bar code data and processes the following data as normal data.
- When the bar code system used is JAN13(EAN 13), the printer prints the bar code after receiving 13 bytes bar code data and processes the following data as normal data.
- When the bar code system used is JAN8 (EAN8), the printer prints the bar code after receiving 8 bytes bar code data and processes the following data as normal data.
- The number of data for ITF bar code must be even numbers. When an odd number of data is input, the printer ignores the last received data.

[Notes for ¨]

- n indicates the number of bar code data, and the printer processes n bytes from the next character data as bar code data.
- If n is outside of the specified range, the printer stops command processing and processes the following data as normal data.

[Notes in standard mode]

- If d is outside of the specified range, the printer only feeds paper and processes the following data as normal data.
- If the horizontal size exceeds printing area, the printer only feeds the paper.
- This command feeds as much paper as is required to print the bar code, regardless of the line spacing specified by **ESC 2** or **ESC 3**.
- This command is enabled only when no data exists in the print buffer. When data exists in the print buffer, the printer processes the data following m as normal data.
- After printing bar code, this command sets the print position to the beginning of the line.
- This command is not affected by print modes (emphasized, double-strike, underline, character size, white/black reverse printing, or 90¡ Rotated character, etc.), except for upside-down printing mode.

[Notes in page mode]

- This command develops bar code data in the print buffer, but does not print it.
  After processing bar code data, this command moves the print position to the right side dot of the bar code.
- If d is out of the specified range, the printer stops command processing and processes the following data as normal data. In this case the data buffer position does not change.
- If bar code width exceeds the printing area, the printer does not print the bar code but moves the data buffer position to the left side out of the printing area.
- Refer to Figure 3.12.3 for bar code data buffer position.

When CODE93 (m=72) is used:

- The printer prints an HRI character(¡) as start character at the beginning of the HRI character string.
- The printer prints an HRI character(¡) as a stop character at the end of the HRI character string.
  The printer prints HRI characters (¡ an alphabetic character) as a control character (<00>H to <1f>H and <7F>H):

Control character			HRI character				HRI character
ASCII	Hex	Decimal		ASCII	Hex	Decimal	
NUL	00	0	¡ áU	DLE	10	16	¡ áP
SOH	01	1	¡ áA	DC1	11	17	¡ áQ
STX	02	2	¡ áB	DC2	12	18	¡ áR
ETX	03	3	¡ áC	DC3	13	19	¡ áS
EOT	04	4	¡ áD	DC4	14	20	¡ áT
ENQ	05	5	¡ áE	NAK	15	21	¡ áU
ACK	06	6	¡ áF	SYN	16	22	¡ áV
BEL	07	7	¡ áG	ETB	17	23	¡ áW
BS	08	8	¡ áH	CAN	18	24	¡ áX
HT	09	9	¡ áI	EM	19	25	¡ áY
LF	0A	10	¡ áJ	SUB	1A	26	¡ áZ
VT	0B	11	¡ áK	ESC	1B	27	¡ áA
FF	0C	12	¡ áL	FS	1C	28	¡ áB
CR	0D	13	¡ áM	GS	1D	29	¡ áC
SO	0E	14	¡ áN	RS	1E	30	¡ áD
SI	0F	15	¡ áO	US	1F	31	¡ áE
				DEL	7F	127	¡ áT

<Others> Be sure to keep spaces on both right and left sides of a bar code. (Spaces are different depending on the types of the bar code.)

[Reference] **GS H, GS f, GS h, GS W**

GS r n

[Name] Transmit status.

[Format]

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

[Range] n = 1, 2, 49, 50

[Description] Transmits the status specified by n as follows.

n	**Function**
1,49	Transmits paper sensor status.
2,50	Transmits drawer kick-out connector status.

[Notes]

- When using a serial interface
  When DTR/DSR control is selected, the printer transmits only 1 byte after confirming the host is ready to receive data (DSR signal is SPACE). If the host computer is not ready to receive data (DSR signal is MARK), the printer waits until the host is ready.
  When XON/XOFF control is selected, the printer transmits only 1 byte without confirming the condition of the DSR signal.
- This command is executed when the data in the receive buffer is developed.
  Therefore, there may be a time lag between receiving this command and transmitting the status, depending on the receive buffer status.
- When Auto Status Back (ASB) is enabled using **GS a**, the status transmitted by **GS r** and the ASB status must be differentiated using the table in Appendix G.

- The status types to be transmitted are shown below:

Paper sensor status (n = 1,49):

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

Bit 2 and 3: When the paper end sensor detects a paper end, the printer goes off-line and does not execute this command. Therefore, bits 2 and 3 do not transmit the status of paper end.

Drawer kick-out connector status (n = 2, 50):

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	01	1	Drawer kick-out connector pin 3 is HIGH.
1-3	-	-	-	Undefined.
4	Off	00	0	Not used. Fixed to Off.
5, 6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

[Reference] **DLE EOT, GS a**

GS v 0 m xL xH yL yH d1….dk

[Name] Print raster bit image

[Format]

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] $0 \le m \le 3, 48 \le m \le 51$
$0 \le xL \le 255$
$0 \le xH \le 255$
$0 \le yL \le 255$
$0 \le d \le 255$
$k = (xL + xH \times 256) \times (yL + yH \times 256) (k \neq 0)$

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

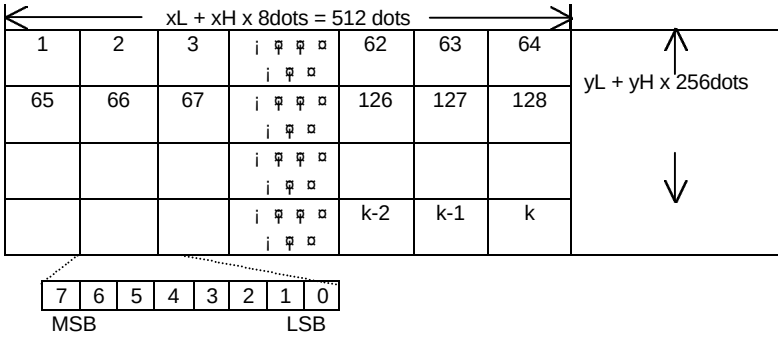
m	**Mode**	**Vertical Dot Density(DPI)**	**Horizontal Dot Density(DPI)**
0, 48	Normal	180 DPI	180 DPI
1, 49	Double-width	180 DPI	90 DPI
2, 50	Double-height	90 DPI	180 DPI
3, 51	Quadruple	90 DPI	90 DPI

- xL, xL, select the number of data bits(xL+xLx256) in the horizontal direction for the bit image.
- yL, yH, select the number of data bits (yL+yHx256) in the vertical direction for the bit image.

[Notes]

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

[Example] When xL + xH x 256 = 64



GS w n

[Name] Set bar code width.

[Format]

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

[Range] $2 \leq n \leq 6$

[Description] Set the horizontal size of the bar code.
n specifies the bar code width as follows.

n	Module width for multi-level bar code	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

- Multi-level bar codes are as follows:
  UPC-A, UPC-E, JAN13(EAN13), JAN8(EAN8), CODE93, CODE128.
- Binary-level bar codes are as follows.
  CODE39, ITF, CODABAR

[Default] n=3

[Reference] **GS k**

APPENDIX
A. MISCELLANEOUS NOTES

A.1 Notes on Printing and Paper Feeding

1) Because the SRP-350 series printer is a line printer, it automatically feeds paper after printing the data.
   Therefore, when the line spacing for one line is set to a smaller value than the print data, paper may be fed more than the set amount just to print the data.
   For example, when the line spacing for one line is set to 10 dots (10/180 inches) and only paper feeding is executed, paper is fed for 10 dots; however, if bit-image characters are printed, paper is fed for 24 dots. (Refer to Table A.1)
   When only rotated characters are printed on one line, paper feeding is executed as shown in Table A.1

Table A.1 Paper Feeding Amount

		Required Paper Feeding Amount(dots)
Normal Characters	Font A	24 x number of times enlarged in vertical
	Font B	17 x number of times enlarged in vertical
Rotated Characters	Font A	12 x number of times enlarged in vertical
	Font B	9 x number of times enlarged in vertical
Bit image (**ESC ***)		24

2) When the printer goes to the standby (data-waiting) state during printing, it temporarily stops printing and feeding paper. When data is transmitted and printing is executed, paper may shift 1 to 3 dots from the print starting position, which especially affects bit-image printing.
3) Interval of auto-cutting operation in the receipt section.
   For driving the auto cutter of the receipt section, take the interval as a minimum of 10 lines of printing or paper feeding(to prevent small pieces of cut paper from dropping into the auto cutter).

A.2 Notes on Printer Installation

- Connect the external power supply to the power supply connector of the printer. Then plug in the external power supply and turn it on if necessary. Be sure not to connect the external power supply with the wrong polarity. If it is connected incorrectly, the internal circuit fuse of the printer may be blown or the external power supply may be damaged.
- The power supply voltage is within the range of 24 V ¡ ¾7%. If the power supply voltage drops to the outside of the range above during printing. The printer stops printing and waits until the voltage returns to normal and then automatically begins printing again. Therefore, printing speed may slow, the print pitch may not be correct, and some dots in some character may not be printed.

A.3 Other notes

1) Printer mechanism handling
   - Do not pull the paper out when the cover is closed.
   - Because the thermal elements of the print head and driver IC are easy to break, do not touch them with any metal objects.
   - Since the areas around the print head become very hot during and just after printing, do not touch them.

- Do not use the cover open button except when necessary.
- Do not touch the surface of the print head because dust and dirt can stick to the surface and damage the elements.
- Thermal paper containing Na^+, K^+, and CI ions can harm the print head thermal elements.
  Therefore, be sure to use only the specified paper.
- Label paper cannot be used.

2) Thermal paper handling

¨ çNotes on using thermal paper

Chemicals and oil on thermal paper may cause discoloration and faded printing.

Therefore, pay attention to the following:

a) Use water paste, starch paste, polyvinyl paste, or CMC paste when gluing thermal paper.

b) Volatile organic solvents such as alcohol, ester, and ketone can cause discoloration.

c) Some adhesive tapes may cause discoloration or faded printing.

d) If thermal paper touches anything which includes phthalic acid ester plasticizer for a long time, it can reduce the image formation ability of the paper and can cause the printed image to fade. Therefore, when storing thermal paper in a card case or sample notebook, be sure to use only products made from polyethylene, polypropylene, or polyester.

e) If thermal paper touches diazo copy paper immediately after copying, the printed surface may be discolored.

f) Thermal paper must not be stored with the printed surfaces against each other because the printing may be transferred between the surfaces.

g) If the surface of thermal paper is scratched with a hard metal object such as a nail, the paper may become discolored.

¨ èNotes on thermal paper storage

Since color development begins at 70¡ £C(158¡ £F), Thermal paper should be protected from high temperature, humidity, and light, both before and after printing.

a) Store paper away from high temperature and humidity.
   Do not store thermal paper near a heater or in enclosed places exposed to direct sunlight.

b) Avoid direct light.
   Extended exposure to direct light may cause discoloration or faded printing.

3) Others

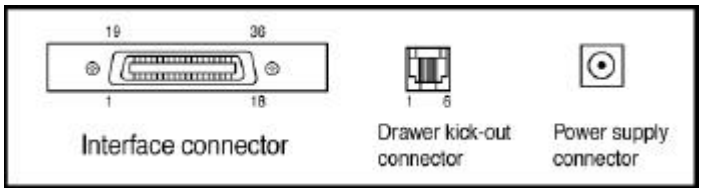
- Because this printer uses plated steel, the cutting edges may be subject to rust.
  However, this does not affect the printer performance.

B. Star Mode Command Summary

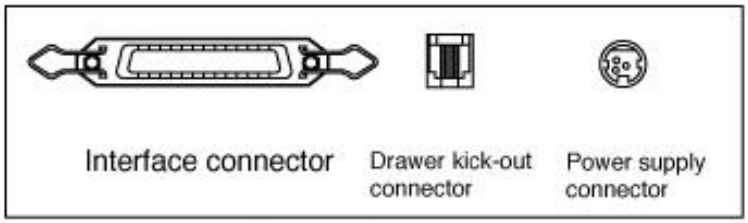
Control codes	Hexadecimal codes	Function
<ESC> ”R” n	1B 52 n	Select international character set
<ESC> <GS> t n	1B 1D 74n	Select character table
<ESC> ”/” “1” <ESC> ”/” <1>	1B 2F 31 1B 2F 01	Select slash zero
<ESC> ”/” “0” <ESC> ”/” <0>	1B 2F 30 1B 2F 00	Select normal zero
<ESC> “b” n1 n2 n3 n4 d1 … dk <RS>	1B 62 n1 n2 n3 n4 d1 … dk 1E	Select bar code printing
<ESC> ”M”	1B 4D	Select 12-dot pitch printing
<ESC> ”p”	1B 70	Select 14-dot pitch printing
<ESC> ”P”	1B 50	Select 15-dot pitch printing
<ESC> ”:”	1B 3A	Select 16-dot pitch printing
<ESC> <SP> n	1B 20 n	Set character spacing
<SO>	0E	Sets the printing magnified double in character width.
<DC4>	14	Resets the printing magnified in character width.
<ESC> “W” n	1B 57 n	Sets the magnification rate in character width.
<ESC> <SO>	1B 0E	Sets the printing magnified double in character height.
<ESC> <DC4>	1B 14	Resets the printing magnified in character height.
<ESC> “h” n	1B 68 n	Sets the magnification rate in character height.
<ESC> ”-“ “1” <ESC> ”-:” <1>	1B 2D 31 1B 2D 01	Select underlining
<ESC> “_” “1” <ESC> “_” <1>	1B 5F 31 1B 5F 01	Select overlining
<ESC> “4”	1B 34	Select highlight printing
<ESC> “5”	1B 35	Cancel highlight printing
<SI>	0F	Inverted printing
<DC2>	12	Cancel inverted printing
<ESC> “E”	1B 45	Select emphasized printing
<ESC> “F”	1B 46	Cancel emphasized printing
<ESC> “C” n	1B 43 n	Set page length in lines
<ESC> “C” <0> n	1B 43 00 n	Set page length in inches
<ESC> “N” n	1B 4E n	Set bottom margin
<ESC> “O”	1B 4F	Cancel bottom margin
<ESC> “I” n	1B 6C n	Set left margin
<ESC> “Q” n	1B 51 n	Set right margin
<LF>	0A	Line Feed
<ESC> “a” n	1B 61 n	Feed paper n lines
<FF>	0C	Form Feed
<HT>	09	Horizontal tab
Control codes	**Hexadecimal codes**	**Function**
<VT>	0B	Vertical tab
<ESC> “z” “1”	1B 7A 31	Set line spacing to 4 mm
<ESC> “0”	1B 30	Set line spacing to 3 mm
<ESC> “J” n	1B 4A n	One time n/4 mm feed
<ESC> “I” n	1B 49 n	One time n/8 mm feed
<ESC> “B” n1 n2…<0>	1B 42 n1 n2 … 00	Set vertical tab stops
<ESC> “D” n1 n2…<0>	1B 44 n1 n2 … 00	Set horizontal tab stops
<ESC> <GS> “A” n1 n2	1B 1D 41 n1 n2	Absolute position setting
<ESC> <GS> “R” n1 n2	1B 1D 52 n1 n2	Relative position setting
<ESC> <GS> “a” n	1B 1D 61 n	Alignment

<ESC> “K” n <0> m1 m2 …	1B 48 n 00 m1 m2	Print normal density graphics
<ESC> “L” n <0> m1 m2 …	1B 4C n1 n2 m1 m2	Print high density graphics
<ESC> “k” n <0> d1	1B 6B n 00 d1	Print fine density graphics
<ESC> “X” n1 n2	1B 58 n1 n2	Print fine density graphics
<ESC> <FS> “p” n m	1B 1C 70 n m	Print NV bit image
<ESC> “&” ”1” ”1” n m1 m2 … m48	1B 26 31 31 n m1 m2 … m48	Define download character
<ESC> “&” <1> <1> n m1 m2 … m48	1B 26 01 01 n m1 m2 … m48	
<ESC> “&” ”1” ”0” n	1B 26 31 30 n	Delete a download character
<ESC> “&” <1> <0> n	1B 26 01 00 n	
<ESC> “%” “1” <ESC> “%” <1>	1B 25 31 1B 25 01	Enable download character set
<ESC> “%” “0” <ESC> “%” <0>	1B 25 30 1B 25 00	Disable download character set
<ESC> <GS> “*” xy	1B 1D 2A 78 79	Definition of download bit image
<ESC> <GS> “/” m	1B 1D 2F 6D	Printing of download bit image
<ESC> <BEL> n1 n2	1B 07 n1 n2	Define drive pulse width for peripheral device #1.
<BEL>	07	Control peripheral device #1
<FS>	1C	Control peripheral device #1 immediately.
<EM>	19	Control peripheral device #2 immediately
<SUB>	1A	Control peripheral device #2 immediately
<ESC> “d” n	1B 64 n	Partial-cut command to the auto cutter.
<CAN>	18	Cancel last line & Initialize printer immediately
<DC3>	13	Deselect printer
<DC1>	11	Set select mode
<RS>	1E	Beep the buzzer
<ESC> “@”	1B 40	Initialize printer
<ENQ>	05	Enquiry (Status inquiry)
<EOT>	04	Near end status inquiry
<ESC> “?” <LF> <NUL>	1B 3F 0A 00	Reset printer hardware (Perform test print)
<ESC> “8” n1 n2	1B 38 n1 n2	Registers a logo pattern
<ESC> “9” n1 n2	1B 39 n1 n2	Prints a logo pattern

C.Connectors



SRP-350/SRP-350S CONNEOR
(Serial Interface)



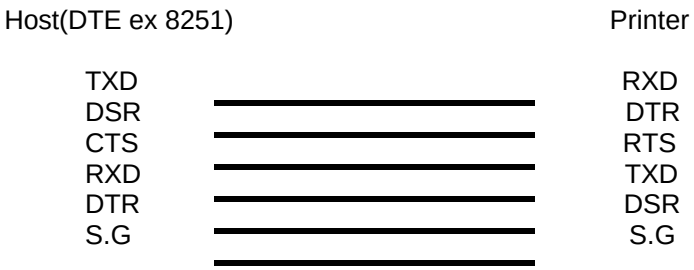
SRP-350P Connector
(Parallel Interface)

Interface Connector

Serial Interface

Pin No.	Signal name	Direction	Function
1	FG	-	Frame Ground
2	TxD	Output	Transmit Data
3	RxD	Input	Receive Data
4	RTS	Output	Request To Send
6	DSR	Input	Data Set Ready
7	SG	-	Signal Ground
20	DTR	Output	Data Terminal Ready

Serial Communication Interface(Example)



Drawer Connector

Pin No.	Signal name	Direction
1	Frame ground	-
2	Drawer kick- out drive signal 1	Output
3	Drawer open/close signal	Input
4	+24V	-
5	Drawer kick- out drive signal 2	Output
6	Signal ground	-

D.Specification

Printing method		Thermal line printing
Dot density		180 X 180 dpi (7dots/mm)
Printing width		72.192 mm
Paper width		79 ~ 80 mm
Characters per line (default)		42 (Font A) 56 (Font B)
Printing speed		35.5 lines/sec (1/6" Feed) 150 mm/sec
Receive Buffer Size		4K Bytes
NOTE : Printing speed may be slower, depending on the data transmission speed and the combination of control commands.		
Supply voltage	Input voltage	120/230 VAC
	Frequency	50/60 Hz
	Output voltage	+24 VDC
Environmental conditions	Temperature	5 ~ 45 ¡ É(Operating) -10 ~ 50 ¡ É(Storage)
	Humidity	30 ~ 80 % RH (Operating) 10 ~ 90 % RH (Storage)
MCBF	Mechanical Head Auto cutter	37,000,000 lines $1x10^8$ pulse (Approximately 100 Km) 500,000 cut

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