



SLP720RT SERIES
THERMAL PRINTER
TECHNICAL REFERENCE

Rev.02

Seiko Instruments Inc.

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PREFACE

This technical reference describes SLP720RT SERIES THERMAL PRINTER (hereinafter referred to as "printer").

See "SLP720RT SERIES Thermal Printer USER'S GUIDE" for operation.

[Product name]

SLP720RT-xK2Fx1

(1)

(2)

(3)

(1) : Series	SLP720RT series
(2) : Interface	U: USB E: Ethernet + USB W: Wireless LAN
(3) : Country/Region	U: USA, Canada E: EU, EFTA, UK, Turkey J: Japan 1: Unspecified (other than Wireless LAN model)

The printer complies with EU RoHS Directive (2011/65/EU).

Follow "2.1 PRINTER SPECIFICATIONS" about the input rating of SLP720RT when the power is supplied from customer's device.

When a power supply other than the AC adapter of specified accessories is used, the customer must take action to comply with the safety and EMC regulations of the country of use.

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- This chapter describes basic terms that are frequently used in this manual.

CHAPTER 2 : SPECIFICATIONS

- This chapter describes specifications of the printer and the thermal paper.

CHAPTER 3 : INTERFACE

- This chapter describes specifications of each interface.

CHAPTER 4 : FUNCTION SETTINGS

- This chapter describes Function Settings and test print.

CHAPTER 5 : LED INDICATION AND SWITCH FUNCTIONS

- This chapter describes the LED indication of printer status and the functions of switches.

CHAPTER 6 : COMMAND FUNCTIONS

- This chapter describes the function of commands supported by the printer.

CHAPTER 7 : INITIALIZATION

- This chapter describes the initialization process.

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CHAPTER 1

TERMS USED IN THIS MANUAL

This chapter describes the terms used in this manual.

- **INPUT BUFFER AND LINE BUFFER**

When the data (character codes and commands) is sent to the SLP720RT (hereinafter referred to as "printer") from the host devices, the data is stored in the printer input buffer. The input buffer has a capacity of 4096 bytes. Then, the printer retrieves the data which is stored in the input buffer. When the data is character code, the data is mapped to the line buffer. Normal commands are executed immediately when the data is retrieved from the input buffer. On the other hand, realtime commands are executed when the data is stored in the input buffer from the host.

The data capacity of the line buffer is 1 line. When the line buffer is flooded with the capacity of character codes for 1 line, the characters falling into the character codes are printed.

The printer repeats this operation to print all the character code.

The relation between the input buffer and line buffer is illustrated in Figure 1-1.

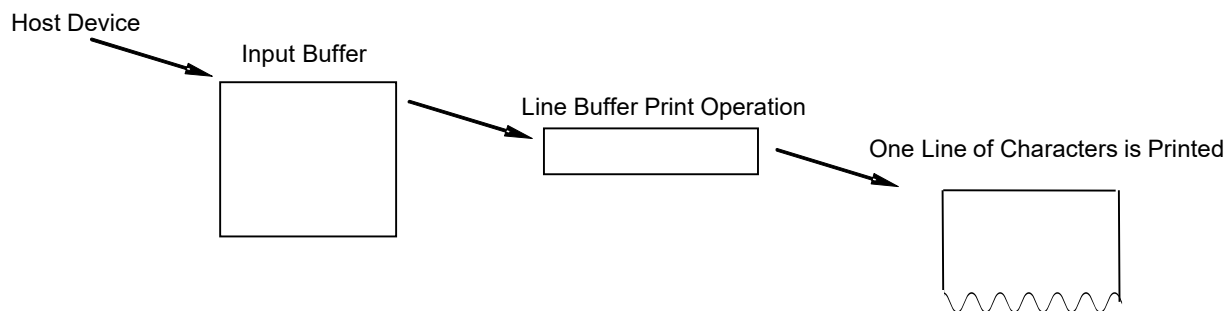


Figure 1-1 Relation Between Input Buffer and Line Buffer

- **Line Spacing**

Line spacing is the space between the lines of printed characters (see Figure 1-2).

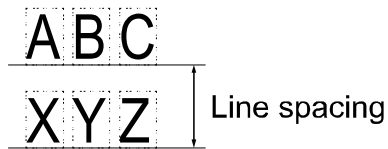


Figure 1-2 Line Spacing

The printer is a line printer, therefore, a paper feed step is necessary before printing characters or bit images. For the line feed with printing, the paper is fed for the height of characters or bit images even the line feed amount is set smaller than for the height of the characters or bit images. For the printing with underlines, the printer feeds the paper with the line spacing added 3 dot-lines to the character height.

For the printing without underlines, the paper is fed for the specified line feed amount.

- **Space Between Lines**

Space between lines is the space between two adjacent lines (see Figure 1-3).

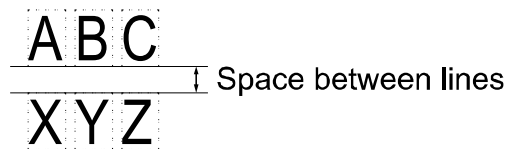


Figure 1-3 Space Between Lines

- **Character Spacing**

Character spacing is the space area adding to between each character in the horizontal direction (see Figure 1-4).

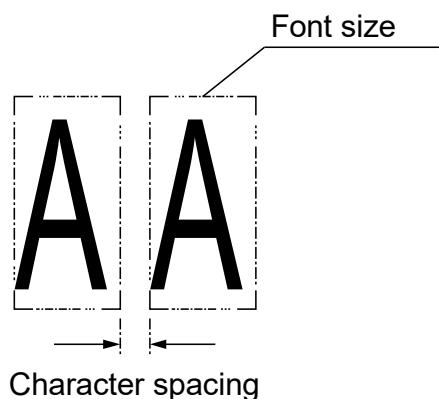


Figure 1-4 Character Spacing

- **Line**

The word "line" in this manual indicates a line of characters printed on thermal paper.

For example, the sentence "the printer feeds paper 1 line" indicates that the printer feeds paper a line of characters.

- **Dot-Line**

The word "dot-line" in this manual indicates an area of 1 dot in the vertical direction of thermal paper.

For example, the sentence "the printer feeds paper by 1 dot-line" indicates that the printer feeds paper by the space of 1 dot.

- **Notation in the Technical Reference**

Hexadecimal: the symbol 'H' indicating hexadecimal is added at the end of a number.

Example: 0AH

Character: a character is enclosed with single quotation marks.

Example: 'G'

CHAPTER 2 SPECIFICATIONS

2.1 PRINTER SPECIFICATIONS

Table 2-1 Printer Specifications

(1/3)

Item		Specifications	
		Paper Width 58 mm*1	Paper Width 40 mm*1
Printing method		Thermal printing	
Dot density		8 dots/mm	
Number of effective dots max.		432 dots	288 dots
Paper width max. / Printing width max.		58 mm / 54 mm	40 mm / 36 mm
Operating environment	Temperature	5°C to 45°C (41°F to 113°F)	
	Relative humidity	10 %RH to 90 %RH (non-condensing)	
Storage environment	Temperature	-20°C to 60°C (-4°F to 140°F)	
	Relative humidity	10 %RH to 90 %RH (non-condensing)	
Printing speed max.		200 mm/s*2	
Paper-feed pitch		0.125 mm	
Dimensions (excluding projections)		W 90 mm × D 200 mm × H 141 mm	
Mass		Approx. 1100 g (excluding thermal paper)	
Input voltage		DC24.0 V ±10%	
Mounting type		Front eject : floor installation	
Communication system	USB	Ver. 2.0 Full speed (12 Mbps)	
	Ethernet	10BASE-T, 100BASE-TX	
	Wireless LAN	IEEE802.11b/g/n, IEEE802.11a/n	

Item		Specifications	
		Paper Width 58 mm ^{*1}	Paper Width 40 mm ^{*1}
Character size (H × W)	1-byte character font A	24 dots × 12 dots	
	1-byte character font B	16 dots × 8 dots	
	2-byte character font A	24 dots × 24 dots	
	2-byte character font B	16 dots × 16 dots	
Character type	1-byte character	USA, Standard Europe (Code Page437) Katakana Multilingual (Code Page850) Portuguese (Code Page860) Canadian-French (Code Page863) Nordic (Code Page865) Turkish (Code Page857) Greek (Code Page737) Latin (Code Page1252) Russian (Code Page866) Eastern Europe (Code Page852) Euro (Code Page858) Cyrillic (Code Page855) Arabic (Code Page864) ^{*3} Central European (Code Page1250) Cyrillic (Code Page1251) Greek (Code Page1253) Turkish (Code Page1254) User-defined character set Downloaded character, Optional font	
	2-byte character	Kanji (JIS 1st and 2nd levels, special characters, NEC special characters, NEC selection of IBM extended characters, IBM extended characters), user-defined character	
Number of characters per line max.	1-byte character font A	36	24
	1-byte character font B	54	36
	2-byte character font A	18	12
	2-byte character font B	27	18
Barcode	Barcode	UPC-A, UPC-E, JAN13 (EAN13), JAN8 (EAN8), ITF, CODABAR, CODE39, CODE93, CODE128, GS1 Databar Omni-directional, GS1 Databar Truncated, GS1 Databar Limited, GS1 Databar Expanded	
	Two-dimensional barcode	QR Code (Model 2), PDF417, MaxiCode, Data Matrix, GS1 Databar Stacked, GS1 Databar Stacked Omni-directional, GS1 Databar Expanded Stacked	
Print mode		Standard mode	
Input buffer		4096 bytes	
Autocutter	Paper cutting type	Full cut Partial cut (a tab left at the center)	

Item			Specifications		
			Paper Width 58 mm ^{*1}	Paper Width 40 mm ^{*1}	
LED			3 color LED		
Operation switch			POWER Switch, FEED Switch		
Reliability ^{*4}	Abrasion resistance	Thermal head	Receipt	100 km or more	
			SLP Label	15 km or more	
			Linerless label	75 km or more	
		Platen	Receipt	100 km or more	
			SLP Label	15 km or more	
			Linerless label	50 km or more	53 km or more
	Activation pulse resistance		200 million pulses or more		
	Cutting paper	Receipt	1 million cut or more ^{*5}		
		SLP Label	0.3 million cut or more ^{*5}		
		Linerless label	1 million cut or more ^{*5}		
MTBF/MCBF		360000 hours / 60 million lines			

*1: Select the paper width by MS4-4 (Paper Width Selection).

*2: Condition: our specified AC adapter (PW-H2415-W1), function settings are default setting, printing 1-byte character font A 'K' for all digits, ambient temperature 25°C (77°F) or more. However, it may change depending on the connecting time and the printer settings.

*3: Font B cannot be used when this character set is selected.

*4: Except when specific dots are printed continuously. Reliance is a value at average print rate 12.5%, print density 100%, ambient temperature 25°C (77°F), and using specified thermal paper.

*5: Cut operation environment is a value at ambient temperature 25°C (77°F) and using specified thermal paper indicated in Table 2-4.

2.1.1 Sale Destinations

Sale destinations for the printer and the specified accessories are listed below.

Table 2-2 Sale Destinations

Country/ Region*1	SLP720RT			AC Adapter	AC Cable
	USB model	Ethernet + USB model	Wireless LAN model		
Japan	SLP720RT-UK2F11-17	SLP720RT-EK2F11-07	SLP720RT-WK2FJ1-07	PW-H2415-W1	CB-JP08-20A
EU EFTA Turkey	SLP720RT-UK2F11-15	SLP720RT-EK2F11-05	SLP720RT-WK2FE1-05		CB-CE05-20A
UK	SLP720RT-UK2F11-19	SLP720RT-EK2F11-09	SLP720RT-WK2FE1-09		CB-UK04-20A
USA Canada	SLP720RT-UK2F11-13	SLP720RT-EK2F11-03	SLP720RT-WK2FU1-03		CB-US06-20A
Brazil			-		*2

*1: Ask your SII sales representative if the product can be used in countries or regions other than those listed above.

*2: Use the AC cable of 2.0 meters long that complies with safety standards in Brazil.

2.1.2 Precautions for Use

- When the two-dimensional barcode or ladder barcode is printed at high speed, the accuracy of reading the barcode is reduced. In that case, print after switching the print speed to Middle. Use Memory Switch or "Set Print Speed" command (GS 's') to change the print speed.
- When the thin lines such as ruler lines are printed, configure it with 2 dots or more. By configuring it with 1 dot only, the printed lines may be hard to see.
- Always use the printer within the shadowed range shown in the graph below for the relation between temperature and humidity.

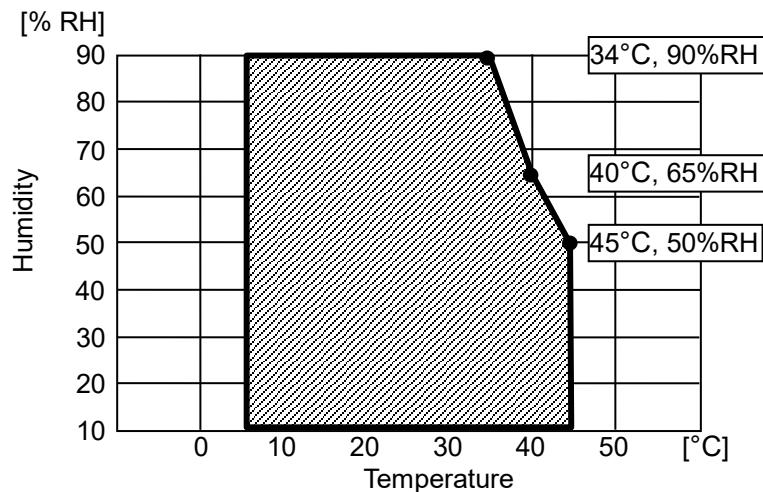


Figure 2-1 Operating Temperature and Humidity Range

- When handling the printer, be aware of static electricity. If the static electricity is discharged, this can cause USB communication failure. If this problem occurs, unplug the plug of the USB cable that is connected to the printer and wait a few seconds before connecting again.
- When the printer is left unused for a long period of time, white powder appear to the surface of platen. (This is the powder that an ingredient of thermal paper recrystallized.) When the powder appears to the platen, wipe the platen with ethanol and use the printer after ethanol has dried completely. Pay attention not to adhere the ethanol on any parts other than the platen. When it adheres, wipe it off immediately.
- When printing at high print rate under a low temperature or high humidity environment, steam may be generated from thermal paper. This may cause the thermal paper to be contaminated, or condensation may occur on the printer.
Stop printing when water drops are produced on the thermal head. The water drops causes galvanic corrosion of the thermal head. If condensation occurs, do not apply current until dewdrops disappear.
- Install the printer on the smooth surface although the rubber feet are the type of adhering to the printer installation surface. When the printer is installed on the uneven surface, it may move during operation, or its surfaces may peel.
- When the printer is moved from the installation site, hold the printer tightly with both hands, then lift it upward slowly to leave the rubber feet from the installation surface. Lifting it rapidly or moving horizontally may peel the entire rubber feet, peel their surfaces, or damage the outer case.
- Paper feeding may be confused a few dot-lines when printing is started or when printing and paper feeding are resumed from a pause state. When printing bit images and so on, always feed the thermal paper for at least 8 dot-lines at the start of printing, and print without interrupting.

- Do not stop the printer as it is after printing barcode or image whose print rate is high. Paper feed difficulty may be caused because the thermal paper surface and the thermal head may stick together. To prevent from the occurrence of the paper feed difficulty, feed the thermal paper after printing.
- For other precautions, see "2 SAFETY PRECAUTIONS" and "3 OPERATING PRECAUTIONS" in "SLP720RT SERIES Thermal Printer USER'S GUIDE".

2.1.3 Dimensions

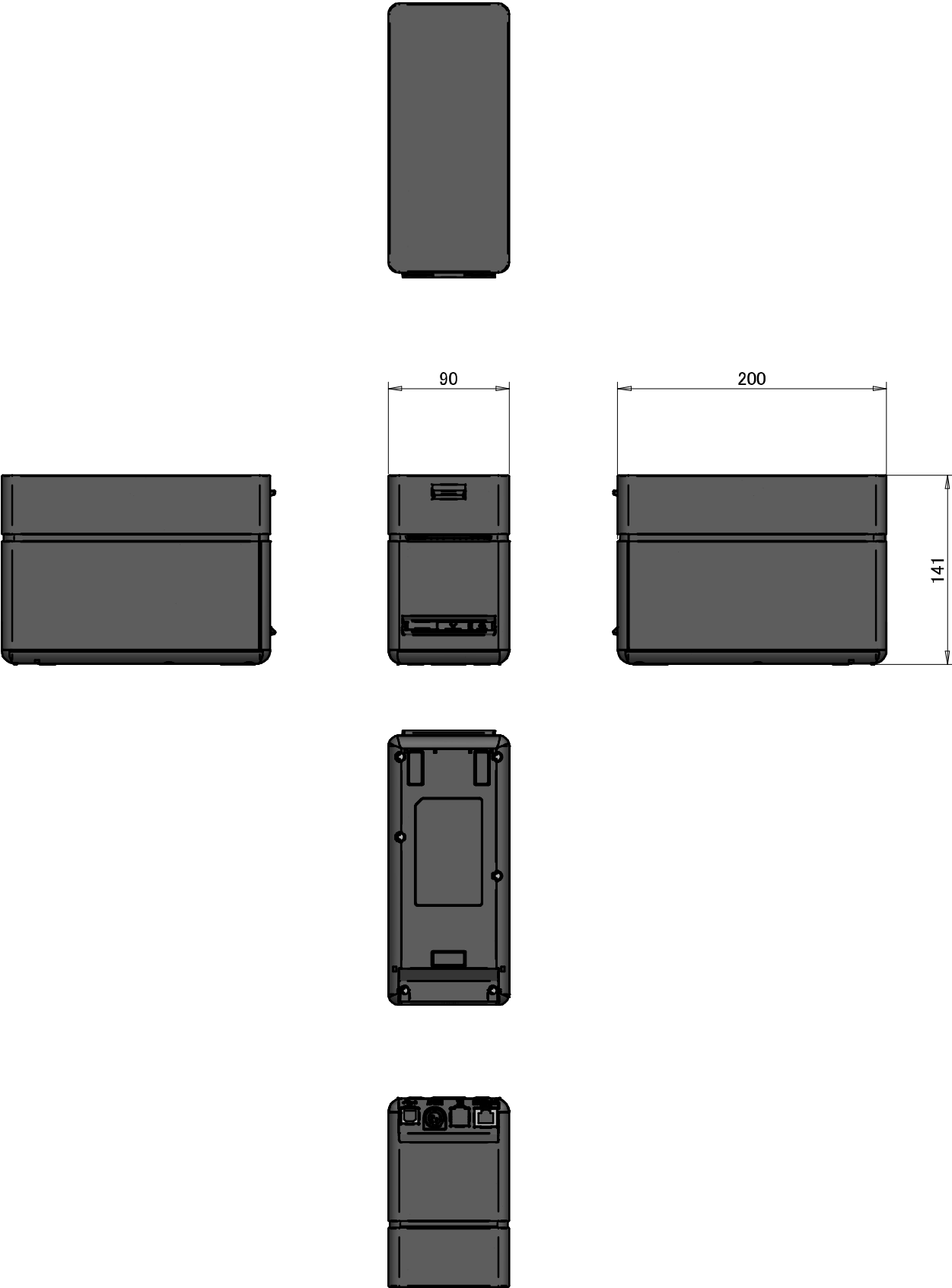


Figure 2-2 SLP720RT Dimensions

- Installation position

The paper ejection direction of this printer is for front eject only.

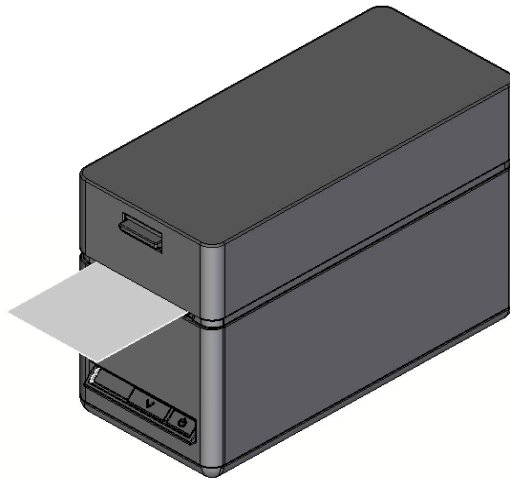
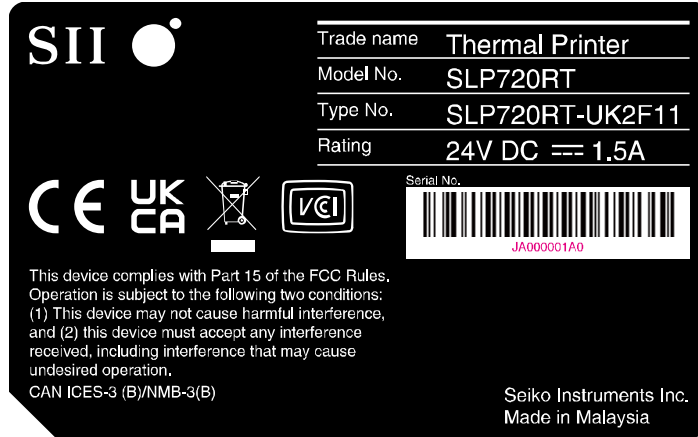


Figure 2-3 SLP720RT Installation Position

2.1.4 Label

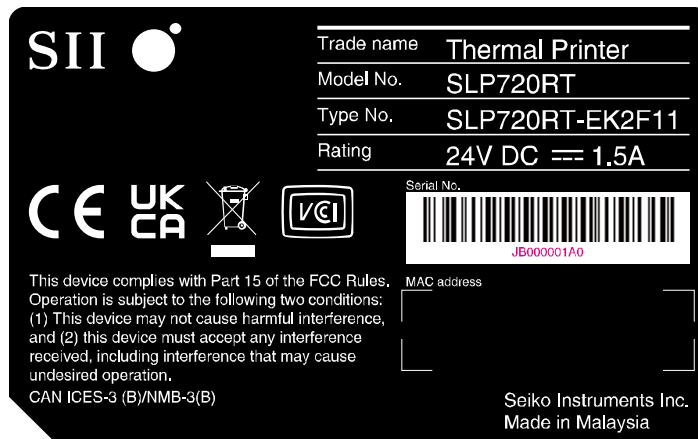
(1) USB Model

SLP720RT-UK2F11



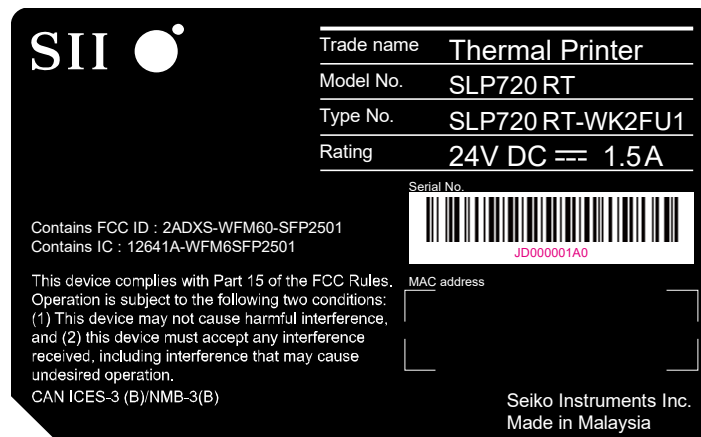
(2) Ethernet + USB Model

SLP720RT-EK2F11



(3) Wireless LAN Model

SLP720RT-WK2FU1



SLP720RT-WK2FE1



SLP720RT-WK2FJ1



2.2 THERMAL PAPER SPECIFICATIONS

Table 2-3 Thermal Paper Specifications

Item		Specifications
Paper type		Paper roll
Paper width max.		58 ⁰ _{.1} mm
Paper roll outside diameter max.		102 mm
Paper roll width max.		59 mm
Paper tube outer diameter min.	Receipt	12 mm
	SLP Label	29.4 mm
	Linerless label	25.4 mm
Printing surface		Outside

- (NOTE)**
- Do not use the paper roll whose end is glued, taped and folded.
 - Do not use the paper roll whose core is deformed.
 - Do not use the paper roll whose core is protruded from the paper end.
 - Do not store the paper roll in high-temperature and humidity environment.

Table 2-4 Specified Thermal Paper Model

Paper Type	Model	Manufacturer	Paper Width [mm]	
Receipt	TP50KR-2Y	Nippon Paper	58	
	TF60KS-E			
	PD160R	Oji Paper		
Linerless label	MS2141602GO	MAXStick		58
	MS2141702GOPLUSD			
	MS214170PLUSD-B			
	MS214170PLUSD-C			
	MS214170PLUSD-P			
	MS214170PLUSD			
	MS214170X2			
	MS11732270X2HRHT	40		
	Linerless label	9023-1823	Iconex	58
		9023-2242		
		9016-3257		
9023-1233		40		
9023-1873				
9023-2150				
Linerless label	BT format 58mm x 4in dia roll	StickeyPOS	58	
	BTX format 58mm x 4in dia roll			

Paper Type	Model	Manufacturer	Paper Width [mm]
Linerless label	BT format 40mm x 4in dia roll	StickeyPOS	40
	BTX format 40mm x 4in dia roll		
SLP Label*	-	-	-

*: Ask your SII sales representative when there are any questions.

(NOTE)

- **Set MS7-1 to 8 (Thermal Paper Selection) according to the thermal paper used.**
- **Do not use any thermal paper other than the specified thermal paper.**
- **Do not use 2-ply thermal paper and perforated thermal paper.**
- **When different thermal paper from the specified one is used, the printing quality or specified life of the thermal head would not be guaranteed.**

2.2.1 Receipt

(1) Print Area

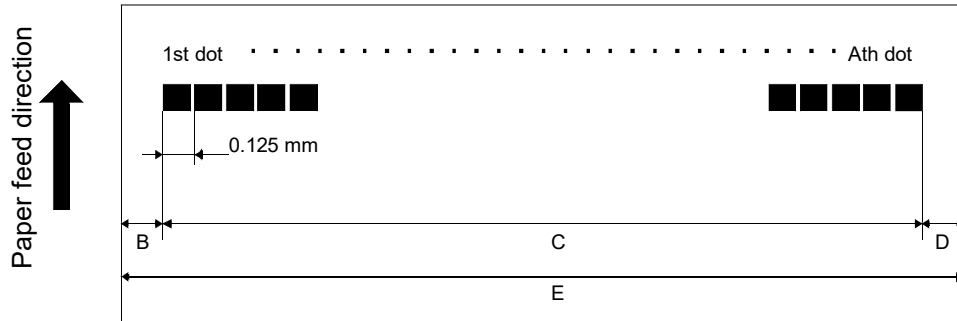


Figure 2-4 Print Area

Table 2-5 Print Area Specifications

Symbol	Name	Specifications	
		Paper Width: 40 mm	Paper Width: 58 mm
A	Printable dots per line	288 dots	432 dots
B	Left margin	2 ±1 mm	2 ±1 mm
C	Print area	36 ±0.3 mm	54 ±0.3 mm
D	Right margin	2 ±1 mm	2 ±1 mm
E	Paper width	40 ⁰ ₋₁ mm	58 ⁰ ₋₁ mm

2.2.2 Linerless Label (Marked Paper)

(1) Print Area and Mark Sensor Specifications

Back side (non-printing side)

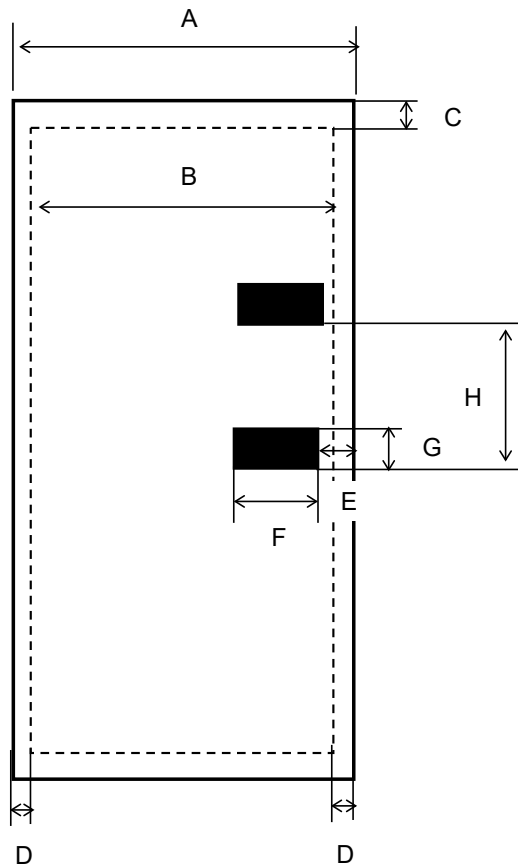


Figure 2-5 Print Area and Mark Sensor Position

NOTE ·The detection accuracy of the mark sensor is ± 1 mm.
(When MS12 (Mark Detection Threshold Value) has been set to the settings at the factory).

Table 2-6 Print Area and Mark Sensor Position Specifications

Symbol	Item	Dimension
A	Paper width	40_{-1}^0 to 58_{-1}^0 mm
B	Print area	36 to 54 mm
C	Upper edge of the label - Upper edge of the print area	4 mm or more
D	Left and right edges of the label - Left and right edges of the print area	2 mm or more
E	Mark position	0 mm
F	Mark width	10 to 14.5 mm
G	Mark length	2 to 5 mm
H	Distance between marks	25.4 ± 0.5 mm
-	Cut position – Mark sensor position	Approx. 26.2 mm
-	Print start position - Mark sensor position	Approx. 13.7 mm
-	Cut position – Print start position	Approx. 12.5 mm
-	Mark reflectivity	6% or less

(2) How to Use Linerless Label

- (a) Set MS7 (Thermal Paper Selection) to "Linerless label".
- (b) When using the marked linerless label, set MS1-3 (Mark Mode Selection) to "Enable".
- (c) Load the marked linerless label, and press the FEED Switch once to perform form feed (paper feed until mark detection).
The linerless label is automatically cut in the predetermined position.
- (d) To minimize the margins, feed the paper backward for 68 dots by the "Print and Feed Backward" command (ESC 'j 'n).
- (e) Print the first sheet.
- (f) After that, perform form feed by the "Marked Paper Form Feed (Form Feed to Cut Position)" command (GS FF).
Approximately 58 dots from the lower edge of the mark is fed in the forward direction when the settings of MS8 to 9 (Mark Position Correction) have been set at the factory.
- (g) Cut the linerless label.

The process has been completed for printing 1 sheet.
To go on to print the second sheet, return to (d).

2.2.3 SLP Label

(1) Print Area and Mark Sensor Specifications

Back side (non-printing side)

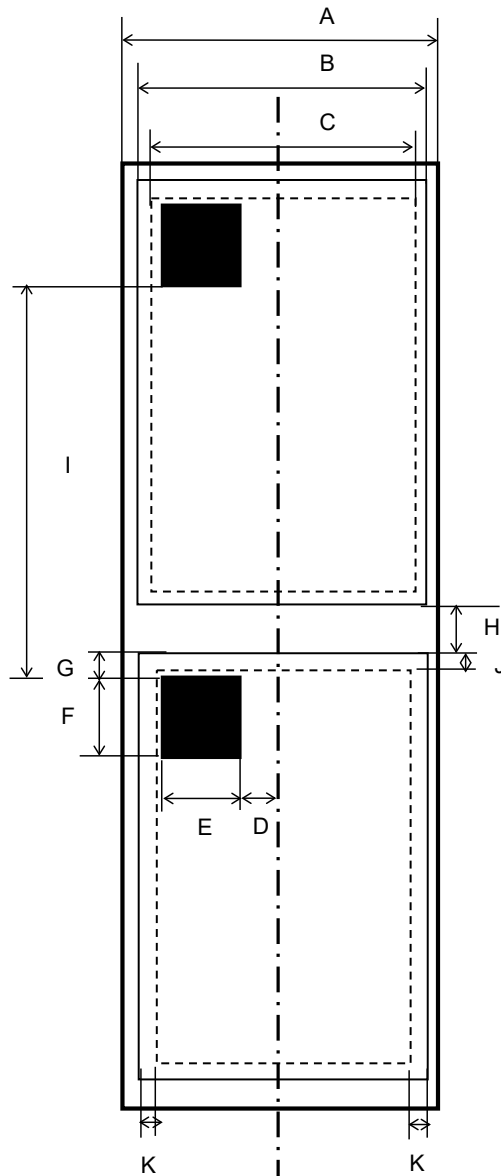


Figure 2-6 Print Area and Mark Sensor Position

NOTE ·The detection accuracy of the mark sensor is ± 1 mm.
(When MS12 (Mark Detection Threshold Value) has been set to the settings at the factory).

Table 2-7 Print Area and Mark Sensor Position Specifications

Symbol	Item	Dimension
A	Peeling paper width	31_{-1}^0 to 58_{-1}^0 mm
B	Label width	10 to 54 mm
C	Print area	8 to 50 mm
D	Mark position	0 to 4 mm
E	Mark width	15 mm
F	Mark length	13.3 ± 0.3 mm
G	Upper edge of the label – Upper edge of the mark	2.5 ± 0.3 mm
H	Distance between labels (Gap length)	4.2 ± 0.3 mm
I	Distance between marks	300 mm or less
J	Upper edge of the label – Upper edge of the print area	2 mm or more
K	Left and right edges of the label - Left and right edges of the print area	2 mm or more
-	Cut position – Mark sensor position	Approx. 26.3 mm
-	Print start position – Mark sensor position	Approx. 13.8 mm
-	Cut position – Print start position	Approx. 12.5 mm
-	Mark reflectivity	6% or less
-	F + G	16.425 mm or less
-	F + G + H	19.05 mm or more

(2) How to Use SLP Label

- (h) Set MS7 (Thermal Paper Selection) to "SLP Label".
- (i) Set MS1-3 (Mark Mode Selection) to "Enable".
- (j) Load the SLP Label, and press the FEED Switch once to perform form feed (paper feed until mark detection).
The linerless label is automatically cut in the predetermined position.
- (k) To minimize the margins, feed the paper backward for 68 dots by the "Print and Feed Backward" command (ESC 'j 'n).
- (l) Print the first sheet.
- (m) After that, perform form feed by the "Marked Paper Form Feed (Form Feed to Cut Position)" command (GS FF).
Approximately 58 dots from the lower edge of the mark is fed in the forward direction when the settings of MS8 to 9 (Mark Position Correction) have been set at the factory.
- (n) Cut the SLP Label.

The process has been completed for printing 1 sheet.
To go on to print the second sheet, return to (d).

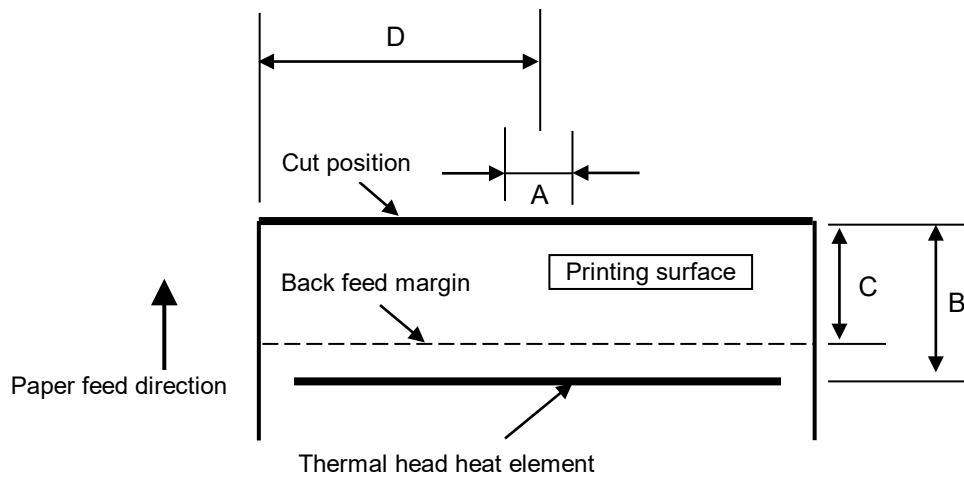
2.3 CUTTER SPECIFICATIONS

(1) Cutter Specifications

Table 2-8 Cutter Specifications

Item	Specifications
Paper cutting method	Slide cutting
Cutting frequency	1 cut / 2 sec max.

(2) Cut Position



Symbol	Item	Dimension	
A	Remaining part of partial cut	Approx. 1.5 mm	
B	Distance from cut position to thermal head heat element	Approx. 12.5 mm	
C	Distance from cut position to backward feed margin	Approx. 8.5 mm	
D	Distance from paper edge (1st dot side) to partial cut position	Paper width: 40 mm	Approx. 20 mm
		Paper width: 58 mm	Approx. 29 mm

Figure 2-7 Cut Position

(3) Precautions for Using Cutter

Pulling the thermal paper strongly after partial cut may result in uneven pitch because stress is applied to the platen. Feed the thermal paper approx. 1 mm before starting next printing.

Do not cut the thermal paper over maximum cutting frequency because the cutter may damage the cutter.

Leaving the printer for a long time with the state of the cutting completed may cause paper jam at the next printing. Execute paper feed or print 2 mm or more after cutting operation.

2.4 POWER SUPPLY SPECIFICATIONS

(1) Power Supply Connector Specifications

Printer side connector: TCS7960-5320177 (HOSIDEN) equivalent
 Cable side connector: TCP8927-631167 (HOSIDEN) equivalent

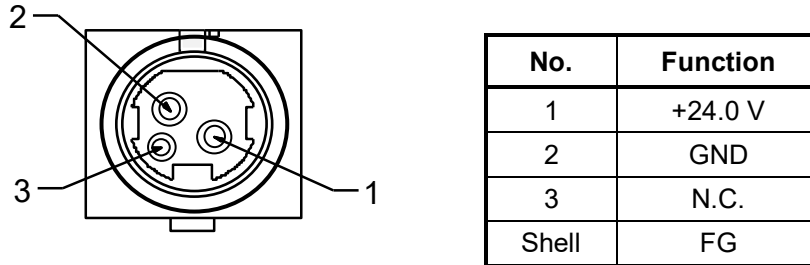


Figure 2-8 Power Supply Connector (View from Joint Surface)

(NOTE) Insert the DC plug into the power connector on the printer correctly. When the DC plug is inserted forcibly in wrong direction, damage may be caused.

(2) Power Supply Specifications

Table 2-9 Power Supply Specifications

Item	Specifications
Power supply voltage	DC21.6 to 26.4 V
Current consumption	
Standby	Approx. 36 mA avg.
Printing (print rate 25%)	Approx. 4.8 A max.
Printing (print rate 100%)	Approx. 5.7 A max.

(3) Specified AC Adapter Specifications (PW-H2415-W1)

Table 2-10 Specified AC Adapter Specifications (PW-H2415-W1)

Item	Specifications
Model identifier	PW-H2415-W1
Input voltage	AC100 to 240 V
Input AC frequency	50/60 Hz
Output voltage	DC24.0 V
Output current	1.5 A
Output power	36.0 W
Average active efficiency	87.40% min.
Efficiency at low load (10%)	77.40% min.
No load power consumption	0.15 W max.
Dimensions	W 54 mm × D 120.8 mm × H 33.7 mm*
Mass	Approx. 266 g

*: The cable part is excluded.

2.5 COMMUNICATION CABLE SPECIFICATIONS

2.5.1 Specified USB Cable Specifications

Table 2-11 Specified USB Cable Specifications

Item		Specifications
Product name		IFC-U02-2
Use		USB cable
Color		Black
Cable	Length	Approx. 1800 mm
	Outside diameter	Approx. ϕ 4.0 mm
Plug C1	Type	Series "A" plug
Plug C2	Type	Series "B" plug

Table 2-12 Connection Cable for Specified USB Cable

Plug C1	Plug C2
1	1
2	2
3	3
4	4
SHELL	SHELL

CHAPTER 3 INTERFACE

This chapter describes the specifications of each interface required for connecting host devices with the printer.

The amount of the input buffer in the printer is 4096 bytes.
The amount of the output buffer is 4096 bytes.

3.1 USB MODEL

3.1.1 USB Interface

(1) General Specifications

Table 3-1 General Specifications of USB Interface

Item	Specifications
USB version	Ver. 2.0 Printer device class 1.1
Communication speed	Full speed (12 Mbps)
Communication protocol	Bulk transfer

(2) Pin Assignment

Table 3-2 Pin Assignment of USB Interface

Terminal No.	Terminal Name	Input/Output Direction	Function
1	Vbus	-	USB power supply
2	D-	Input/Output	USB data
3	D+	Input/Output	USB data
4	GND	-	Signal ground
Shell	FG	-	Frame ground

(NOTE) Use a USB cable that conforms to the Full speed if a cable is prepared separately.

(3) Connector

Printer side connector: UBB-4R-D14T-4D(LF)(SN) (JST) or equivalent (Series B)

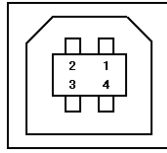


Figure 3-1 Connector

(4) Data Reception

USB data reception uses a bulk-out transfer method.

Data is received during printing. However, since printing is prioritized, the NAK response may be returned even when there is free space in the input buffer.

When the input buffer usage becomes 3840 bytes or more (the remaining capacity becomes 256 bytes or less), the NAK response continues. When the data process is proceeded, and the input buffer usage becomes 3712 bytes or less (the remaining capacity becomes 384 bytes or more), data reception resumes.

The maximum number of bytes that can be received with 1 packet is 64 bytes. Data is also received on error.

(5) Data Transmission

USB data transmission uses a bulk-in transfer method.

The response data is stored temporarily in the output buffer, and it is sent in response to the bulk-in packet request from the host device. When the bulk-in packet request is received while no response data exists, zero-length packet is sent.

The maximum number of bytes that can be transmitted with 1 packet is 64 bytes.

(6) iSerialNumber

USB iSerialNumber can be set.

To set iSerialNumber, there are the following 2 ways:

(a) When the USB Device Class is set to "Printer Class"

To set iSerialNumber, there are the following 2 ways:

- Using the Communication Setting Utility
Use the Communication Settings Utility.
For details, see "SII Communication Setting Utility for Windows User's Guide" for SLP720RT series.

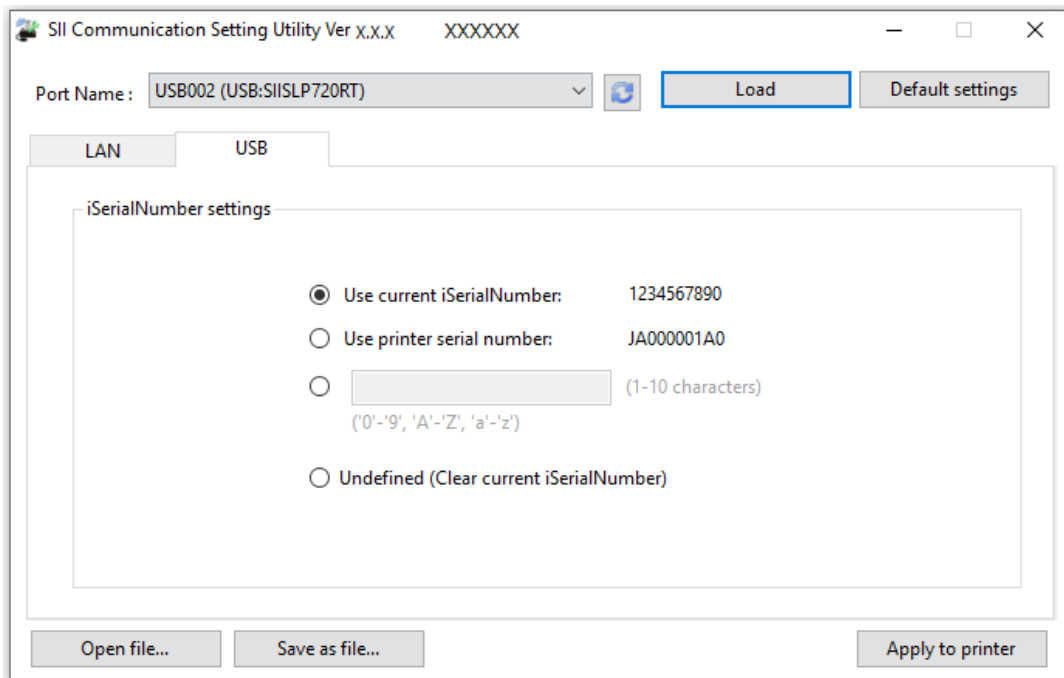


Figure 3-2 Screen of [USB] Tab in SII Communication Settings Utility for Windows

- Using the command
See the "Set iSerialNumber" command ("6.4.9 Auxiliary Functions", DC2 'u' 0, DC2 'u' 1).
- (b) When the USB Device Class is set to "Vender Class"
- To set iSerialNumber, there is the following way:
- Using the command
See the "Set iSerialNumber" command ("6.4.9 Auxiliary Functions", DC2 'u' 0, DC2 'u' 1).

(NOTE)

- iSerialNumber is not initially set.
- When multiple printers use the same iSerialNumber, do not connect the printers to the host at the same time.
- iSerialNumber must be set only when the printer is installed.
- iSerialNumber can input 1-byte alphanumeric characters only.

3.2 ETHERNET + USB MODEL

3.2.1 Ethernet Interface

(1) General Specifications

Table 3-3 General Specifications of Ethernet Interface

Item	Specifications
Communication standards	10BASE-T, 100BASE-TX
Communication protocol	
Basic protocol	IPv4, ARP, ICMP, UDP, TCP
Print protocol	LPR, TCP Socket Port

(2) Pin Assignment

Table 3-4 Pin Assignment of Ethernet Interface

Terminal No.	Terminal Name	Input/Output Direction	Function
1	TXP	Input/Output	Transmission+
2	TXN	Input/Output	Transmission-
3	RXP	Input/Output	Reception+
4	N.C.	-	-
5	N.C.	-	-
6	RXN	Input/Output	Reception-
7	N.C.	-	-
8	N.C.	-	-

(NOTE) Use a cable that conforms to the category 5 or higher.

(3) Connector

Printer side connector: RJLTC-202TA (TAIMAG) or equivalent (RJ-45)

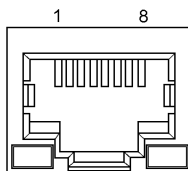


Figure 3-3 Connector

Push the LAN cable into the LAN connector until it clicks.

(NOTE)

- Do not insert a modular cable, and a general public line to the **10BASE-T/100BASE-TX LAN connector**.
- Be sure to connect the aerially wired LAN cable outside to this product via **surge-proof devices**. Otherwise, induced lightning may damage devices.

(4) LED

Indications of each LED installed on both sides in the bottom of the connector mean the following:

Table 3-5 Network Communication System

Indication	LED (Yellow)
100 Mbps	On
10 Mbps	Off

Table 3-6 Network Status Indication

Indication	LED (Green)
Connected	On
Disconnected	Off
Data transferred	Blink

(5) Initialization of Communication Settings

It is possible to restore to the communication settings at the factory by the switch operation. See "(2) How to Set the Function Using the Switches" in "4.1.1 Changing Memory Switch".

(6) Protocol

Basic communication protocol

IPv4, ARP, ICMP, UDP, TCP

Print communication protocol

LPR: Transfers print data.

Table 3-7 Print Communication Protocol (LPR)

Port No.	515
Maximum number of concurrent connections	8 (It changes depending on the connection situation of other protocols such as TCP Socket Port.)
Number of printable connections	1 (Other users wait the completion of printing.)
Timeout	Approx. 5 minutes (This value is changeable.)

TCP Socket Port: Transfers print data and printer status through the bidirectional direct socket communication.

Table 3-8 Print Communication Protocol (TCP Socket Port)

Port type	Direct print TCP communication port
Port No.	9100
Port communication direction	Bidirectional
Maximum number of concurrent connections	14 (It changes depending on the connection situation of other protocols such as LPR.)
Number of printable connections	1 (Other users wait the completion of printing.)
Timeout	Approx. 5 minutes (This value is changeable.)

Protocol for getting and setting the status: Gets and changes the printer status and network parameters on the specified Web page using the HTTP protocol.

Table 3-9 Protocol for Getting and Setting Status

Port No.	80
HTTP version	HTTP/1.1

Protocol for monitoring settings: Monitors and sets settings using the SNMP protocol.

Table 3-10 Protocol for Monitoring Settings

SNMP version	SNMPV2
Server port No.	161
Trap transmission port No.	162
Trap destination	One IP address can be set (the initial status is not set)
Enabled PDU	Get Request, Get Next Request, Get Response, Set Request
Community name	Public
Enabled MIB	Part of MIB-II (RFC1213)

Protocol for Firmware update: Upgrades the firmware of the LAN module using the TFTP protocol.

Table 3-11 Protocol for F/W Update

Transfer request port No.	69
Maximum number of concurrent connections	1

3.2.2 USB Interface

The USB interface specifications are the same as those of the Bluetooth model. See "3.1.1 USB Interface" for details.

3.3 WIRELESS LAN MODEL

3.3.1 Wireless LAN Interface

(1) General Specifications

Table 3-12 General Specifications of Wireless LAN Interface

Item		Specifications
Communication Standards		IEEE802.11b/g/n, IEEE802.11a/n
Mode		Client, Simple AP
Certification/ encryption	Security	None, WEP, WPA-PSK, WPA2-PSK, WPA-Enterprise*, WPA2-Enterprise*
	EAP*	EAP-TTLS*, PEAP*
Communication protocol		
Basic communication protocol		IPv4, ARP, ICMP, UDP, TCP, DHCP
Print communication protocol		LPR, TCP Socket Port

*: For Client mode only

(2) Protocol

- Basic communication protocol
IPv4, ARP, ICMP, UDP, TCP, DHCP
- Print communication protocol
LPR: Transfers print data.

Table 3-13 LPR Specifications

Port No.	515
Maximum number of concurrent connections	5
Number of printable connections	1 (Other users need to wait for the completion of printing.)
Timeout	Approx. 5 minutes (This value is changeable.)

TCP Socket Port: Transfers print data and printer status through the bidirectional direct socket communication.

Table 3-14 Specifications of TCP Socket Port

Port type	Direct print TCP communication port
Port No.	9100
Port communication direction	Bidirectional
Maximum number of concurrent connections	1
Number of printable connections	1 (Other users need to wait for the completion of printing.)
Timeout	Approx. 5 minutes (This value is changeable.)

Protocol for getting and setting the status: Gets the printer status and network parameters using the HTTP protocol and changes them on the dedicated Web page.

Table 3-15 Specifications of HTTP Protocol

Port No.	80
HTTP version	HTTP/1.1

Protocol for controlling the settings: Controls the settings using the SNMP protocol.

Table 3-16 Specifications of SNMP Protocol

SNMP version	SNMPV2
Server port No.	161
Trap transmission port No.	162
Trap destination	1 IP address can be set (Not set initially.)
Enabled PDU	Get Request, Get Next Request, Get Response, Set Request
Community name	Public
Enabled MIB	Part of MIB-II (RFC1213)

(3) MAC Address

The MAC address can be confirmed by the following ways.

- Confirmation by test print
The printer prints Wireless LAN information on the test print, and the MAC address can be confirmed in the result.
See "4.3 Test Print" for details.
- Label attached on the printer
The MAC address of the printer can be confirmed in the label attached to the bottom of the printer. In the label, a barcode (CODE128) of the MAC address is also printed, so that the address can be read with a barcode reader.
In the barcode, 12 digit number of the MAC address is recorded in AB:CD:EF:01:23:45 format. ("AB:CD:EF:01:23:45" is a virtual address. In addition, ":" is not displayed when the address is read with a barcode reader.)
- Confirmation through Web browser
Using Web browser, the MAC address can be confirmed on [Wireless] screen.
See "2.1.1 Wireless" in "SLP720RT WIRELESS LAN INTERFACE TECHNICAL REFERENCE" for details.

CHAPTER 4

FUNCTION SETTINGS

4.1 FUNCTION SETTING METHOD

In the printer, initial states of selectable items such as communication system after power on and thermal paper type can be preset. Preset these functions before using the printer. Details for settings of the software switches are described below.

The function settings are allocated to memory switches (hereinafter referred to as "MS") that are stored in the FLASH memory. These are enabled until they are rewritten.

The function settings can be set using MS1 to 40. Do not rewrite MS2 to 3, 14, and 18 to 40 since they are reserved for the system. The values shown in the shaded cell (in bold) in the tables is set at the factory.

<p>(NOTE) Be sure to configure the setting or the value as instructed when "Fixed" is stated in the table. Otherwise, the printer may not work correctly or may crash.</p>

4.1.1 Changing Memory Switch

(1) Change Procedures

There are following ways to change the MS.

- Using the utility
 - For Windows
Call the memory switch setting utility from the printer driver property.
For details, see "SII Printer Setting Utility for Windows User's Guide" for SLP720RT series.

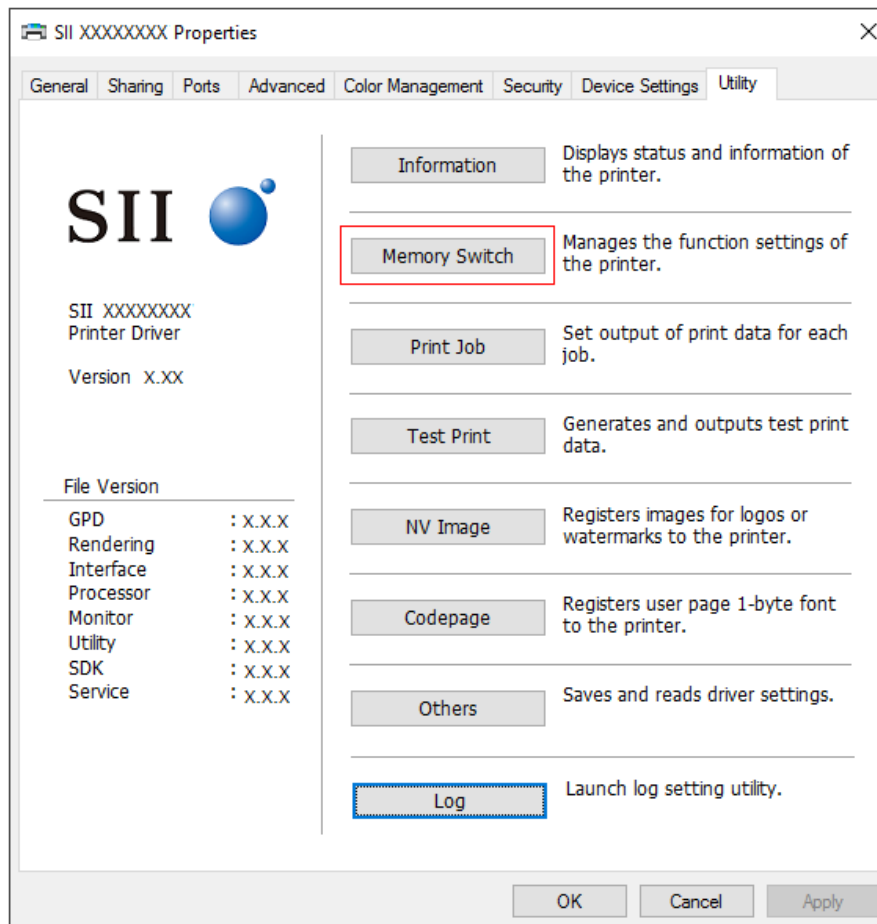


Figure 4-1 Properties of Printer Driver

- For iOS
Using the iOS app "SII Printer Utility" provided by App Store
- For Android
Using the Android app "SII Printer Utility" provided by Google Play
- Using the "Change Function Settings" command (DC2 'k', DC2 'w')
See DC2 'k', DC2 'w' in "6.4.9 Auxiliary Functions".
- Using switches
The MS can be changed manually using the printer's POWER Switch and FEED Switch.
The procedures are described in the following pages.

(2) How to Set the Function Using Switches

To set functions using the switches, follow the procedures below.

1. Load the thermal paper in the printer.
Ensure that no error occurs, and then turn off the printer.
2. Hold the FEED Switch down and press the POWER Switch, then release the POWER Switch.
Keep pressing the FEED Switch until the test print is completed.
3. A message of mode selection is printed as shown in Figure 4-2 when the test print has completed.
To enter Setting Mode, press the FEED Switch.

```
[Enter Setting Mode]
Enter Setting Mode: Feed SW
Exit: Power SW
```

Figure 4-2 Mode Selection Message

4. A message to select MS to set is printed as shown in Figure 4-3 when the printer enters Setting Mode.
Press the FEED Switch the number of times corresponding to the selected MS number, and then press the POWER Switch.

```
[MS Selection]
0 : Exit
1 : MS1
2 : MS4
3 : MS5
4 : MS6
5 : MS7
6 : MS13
7 : MS17
8 : I/F Setting
9 : International Character
10: Character Code Table
11: Default Setting
Press the FEED switch an equal
number of times to the selected number.
After that, press the POWER SW.
```

- For "8 : I/F Setting", the items to be set are different for each model.
- When pressing the FEED Switch once, "1 : MS1" is selected.
- When pressing the POWER Switch without pressing the FEED Switch, "0 : Exit" is selected.

Figure 4-3 MS Selection Message

HINT

- For "I/F Setting", the items to set are different for each interface.

- USB Interface

```
[Function selection of I/F Setting]
0 : Return to MS selection.
1 : USB Device Class
Press the FEED switch an equal
number of times to the selected number.
After that, press the POWER SW.
```

The USB Device Class can be changed.

- Ethernet Interface

```
[Function selection of I/F Setting]
0 : Return to MS selection.
1 : LAN Factory Default Setting
Press the FEED switch an equal
number of times to the selected number.
After that, press the POWER SW.
```

Communication settings can be initialized.

- Wireless LAN Interface

```
[Function selection of I/F Setting]
0 : Return to MS selection.
1 : WLAN Factory Default Setting
Press the FEED switch an equal
number of times to the selected number.
After that, press the POWER SW.
```

Communication settings can be changed.

5. A message to select the functions assigned to the MS is printed an example shown in Figure 4-4.
Press the FEED Switch the number of times corresponding to the selected function number, and then press the POWER Switch.

```
[Function selection of MS1]
0 : Return to MS selection.
1 : Taken Mode
2 : Mark Mode
3 : Standby LED
4 : Auto Activation by AC
5 : Power SW
Press the FEED switch an equal
number of times to the selected number.
After that, press the POWER SW.
```

- When pressing the FEED Switch 3 times, "3 : Standby LED" is selected.
- When pressing the POWER Switch without pressing the FEED Switch, "0 : Return to MS Selection" is selected.

**Figure 4-4 Function Selection Message
(Example: Selected MS1)**

6. A message to select the setting value of the selected function is printed as an example shown in Figure 4-5.
Press the FEED Switch the number of times corresponding to the selected setting value number, and then press the POWER Switch.

```
[Standby LED]
0 : Return to function selection.
1 : Aqua
2 : Green
3 : Off
4 : Blue
Press the FEED switch an equal
number of times to the selected number.
After that, press the POWER SW.
```

- When pressing the FEED Switch twice, "2 : Green" is selected.

**Figure 4-5 Setting Value Selection Message
(Example: Selected Standby LED)**

7. A message to confirm the selected setting values is printed in an example shown in Figure 4-6.

```
[Standby LED]
Set Green
Save setting : Feed SW
Discard setting : Power SW
```

**Figure 4-6 Setting Value Confirmation Message
(Example: Selected Green)**

To save the setting value to the memory, press the FEED Switch. Figure 4-3 is printed.

To discard the selected item, press the POWER Switch. A message of function selection is printed in an example shown in Figure 4-4. If "0 : Return to MS Selection" is selected here, function selection is not performed, and Figure 4-3 is printed.

To continue to set functions, return to 4.

8. To exit Setting Mode, select "0 : Exit" shown in Figure 4-3.
The test print and Figure 4-2 printing start again, so verify the function settings whether they are properly reflected.

4.2 FUNCTION SETTINGS (MS)

Details of each function are described below. The values shown in the shaded cell (in bold) in the tables is set at the factory.

**(NOTE) Be sure to set values as instructed when "Fixed" is stated in the table.
For reserved area, be sure to set the specified value. Otherwise, the printer may not work correctly or may crush. Reserved values may be changed.**

1. General Setting 1 (MS1)

Sets the printer.

- Taken Mode Selection (MS1-2)
Enables or disables the paper removal detection after cutting.
When Taken Mode is "Enable", the next printing starts after removing the previous paper remaining in the paper outlet.
When printing continuously on linerless label, set to "Enable".
When printing continuously on receipt or SLP Label, set to "Disable".
- Mark Mode Selection (MS1-3)
Enables or disables the mark detection.
- Standby LED Selection (MS1-4 to 5)
The LED color in standby mode can be selected.
- Auto Activation by AC Selection (MS1-7)
When this function is enabled, the printer is turned on by inserting the AC cable of the specified AC adapter into a socket.
- POWER Switch Function Selection (MS1-8)
Enables or disables the POWER Switch of the printer.

Table 4-1 General Setting 1 (MS1)

MS	Function	Value	
		0	1
1-1	Reserved	-	Fixed
1-2	Taken Mode Selection (Taken Mode)	Enable	Disable
1-3	Mark Mode Selection (Mark Mode)	Enable	Disable
1-4 to 5	Standby LED Selection (Standby LED)	See Table 4-2	
1-6	Reserved	-	Fixed
1-7	Auto Activation by AC Selection (Auto Activation by AC)	Disable	Enable
1-8	POWER Switch Function Selection (Power SW)	Disable	Enable

Table 4-2 Standby LED Selection (MS1-4 to 5)

MS1-5	MS1-4	Standby LED
0	0	Aqua
0	1	Green
1	0	Off
1	1	Blue

2. Reserved (MS2 to 3)
MS2 to 3 are all reserved. To write all 40 bytes, send FFH as values of MS2 to 3.

3. General Setting 4 (MS4)

Selects the printer drive method.

- Paper Width Selection (MS4-4)
The paper width to use can be selected.
- Paper Auto Detection Selection (MS4-6)
Enables or disables the paper auto detection.
When the paper auto detection is enabled, the printer feeds the paper forward or backward immediately after the power is turned on or when the paper is set. Then, the paper is automatically detected and the paper setting is changed.
Paper that can be automatically detected is SLP Label and Linerless label (marked paper).
Receipt and Linerless label (non-marked paper) are set as Linerless label.
The automatically detected paper settings are cleared by the power off or the reset command.
- Maximum Print Speed Selection (MS4-7 to 8)
The maximum printing speed can be selected in 2 levels.
High: Drives at the maximum print speed of 200 mm/s.
Middle: Decreases the maximum print speed for printing image to 100 mm/s to improve the print quality.
The printing of the image includes the following:
Raster bit image, NV graphics, downloaded bit image, bit image mode, barcode, two-dimensional barcode

The speed may be lower than the selected maximum speed due to environmental temperature, communication method, and so on.

Table 4-3 General Setting 4 (MS4)

MS	Function	Value	
		0	1
4-1 to 3	Reserved	-	Fixed
4-4	Paper Width Selection (Paper Width)	40 mm	58 mm
4-5	Reserved	-	Fixed
4-6	Paper Auto Detection Selection (Paper Auto Detection)	Enable	Disable
4-7 to 8	Maximum Print Speed Selection (Print Speed)	See Table 4-4	

Table 4-4 Maximum Print Speed Selection (MS4-7 to 8)

MS4-8	MS4-7	Maximum Print Speed Selection
0	0	Reserved
0	1	Middle
1	0	Reserved
1	1	High

4. General Setting 5 (MS5)

Sets various responses, data processing, and operations.

- Automatic Status Response Selection (MS5-1)
Enables or disables the automatic status response function.
- Initialized Response Selection (MS5-2)
Enables or disables the initialized response function.
- Data Discard Selection When Error Occurs (MS5-3)
Enables or disables data discarding on error or in the return-waiting state.
Enabling this function discards print data and the following commands when an error occurs or during the return-waiting state.
Target commands for discarding : paper feed commands, paper cut commands, execution response request command, print commands.

(NOTE) When the Data Discard Selection When Error Occurs is enabled and an error occurs during command processing, the command processing does not end until all the remaining data is received. When the data remains during command processing at the time of error occurrence, send all the remaining data before entering the next command.

- Data Discard Selection When Output Buffer Full Occurs (MS5-4)
Enables or disables the discard of the subsequent response data when the response data of the printer is not received by the host and exceeds the capacity of the output buffer in the printer (256 bytes).
When the host does not receive data from the printer, enable this setting.

(NOTE) When the response data from the printer is used by the host, and data discarding is enabled, the data may be missed when the output buffer is full. Therefore, the data must be received regularly.

- Initialization Performance Selection After Paper Setting (MS5-6 to 7)
When Initial cut is selected, the initialization operation is performed in the order of feeding paper approximately 20 mm and cutting the thermal paper, after paper setting.
When Stamp & Cut is selected, the initialization operation of "Stamp & Cut" command (GS 'Y') is performed after paper setting.
Even when Initial cut or Stamp & Cut is selected, Initial cut or Stamp & Cut operation is not performed when thermal paper is inserted at power on or reset.

(NOTE) In Stamp&cut, the print is stopped and the paper is cut in the middle of graphics printing, therefore the print result may degrade.

- Cutting Mode Selection After Paper Setting (MS5-8)
When Initialization Performance Selection After Paper Setting is enabled, whether to perform cutting operation by full cut or partial cut in the paper set initialization operation can be selected.

Table 4-5 General Setting 5 (MS5)

MS	Function	Value	
		0	1
5-1	Automatic Status Response Selection (Auto Status Back)	Enable	Disable
5-2	Initialized Response Selection (Init. Response)	Enable	Disable
5-3	Data Discard Selection When Error Occurs (Error Through)	Enable	Disable
5-4	Data Discard Selection When Output Buffer Full Occurs (Response Data Discarding)	Enable	Disable
5-5	Reserved	-	Fixed
5-6 to 7	Initialization Performance Selection After Paper Setting (Paper Set Handle)	See Table 4-6	
5-8	Cutting Mode Selection After Paper Setting (Cutting Method)	Partial cut (Partial)	Full cut (Full)

Table 4-6 Initialization Performance Selection After Paper Setting (MS5-6 to 7)

MS5-7	MS5-8	Initialization Performance Selection After Paper Setting
0	0	Disable
0	1	Stamp & Cut (Stamp&Cut)
1	0	Initial cut (Standard)
1	1	Disable

5. General Setting 6 (MS6)

- Print Density Selection (MS6-1 to 8)
The print density can be selected.

Table 4-7 General Setting 6 (MS6)

MS	Function	Value	
		0	1
6-1 to 8	Print Density Selection (Print Density)	See Table 4-8	

Table 4-8 Print Density Selection (MS6-1 to 8)

MS6-8	MS6-7	MS6-6	MS6-5	MS6-4	MS6-3	MS6-2	MS6-1	Print Density Selection
0	0	0	0	0	0	0	0	70%
0	0	0	0	0	0	0	1	75%
0	0	0	0	0	0	1	0	80%
0	0	0	0	0	0	1	1	85%
0	0	0	0	0	1	0	0	90%
0	0	0	0	0	1	0	1	95%
0	0	0	0	0	1	1	0	100%
0	0	0	0	0	1	1	1	105%
0	0	0	0	1	0	0	0	110%
0	0	0	0	1	0	0	1	115%
0	0	0	0	1	0	1	0	120%
0	0	0	0	1	0	1	1	125%
0	0	0	0	1	1	0	0	130%
Other than those above								Prohibition

(NOTE) Excessive printing energy may shorten the life of the thermal head or may cause a paper feed problem, so set the thermal paper selection and print density selection accurately. If the thermal paper to use is different from the one selected, or the print density selection is other than 100%, the reliability of the product specification may not be satisfied.

6. General Setting 7 (MS7)

- Thermal Paper Selection (MS7-1 to 8)
The thermal paper to use can be selected.

Table 4-9 General Setting 7 (MS7)

MS	Function	Value	
		0	1
7-1 to 8	Thermal Paper Selection (Thermal Paper)	See Table 4-10	

Table 4-10 Thermal Paper Selection (MS7-1 to 8)

MS7-8	MS7-7	MS7-6	MS7-5	MS7-4	MS7-3	MS7-2	MS7-1	Thermal Paper Selection
0	0	0	0	0	0	0	0	Receipt
0	0	0	0	0	0	0	1	Linerless label
0	0	0	0	0	0	1	0	SLP Label
Other than those above								Prohibition

(NOTE) Excessive printing energy may shorten the life of the thermal head or may cause a paper feed problem, so set the thermal paper selection and print density selection accurately. If the thermal paper to use is different from the one selected, or the print density selection is other than 100%, the reliability of the product specification may not be satisfied.

7. Mark Position Correction (MS8 to 9)

The length of the mark position correction can be set in 1 dot increments.

Table 4-11 Mark Position Correction (MS8 to 9)

MS	Function	Number of Bytes	Definition Range	Default Setting
8 to 9	Mark Position Correction	2 byte	-68 to 2400 (dot)	58

8. Mark Detection Maximum Feeding Length Setting (MS10 to 11)

The maximum paper feeding length during the mark detection can be set in mm. When the mark cannot be detected by feeding the paper the set length, paper feeding is stopped at the length.

Table 4-12 Mark Detection Maximum Feeding Length Setting (MS10 to 11)

MS	Function	Number of Bytes	Definition Range	Default Setting
10 to 11	Mark Detection Maximum Feeding Length Setting	2 byte	1 to 300 (mm)	190

9. Mark Detection Threshold Value (MS12)

The mark detection threshold value can be set within the range of 01H to FEH. When the mark (paper) sensor value is more than this value, it is judged as on the mark. When the value is decreased, it is set to the higher reflectivity, and when the value is increased, it is set to the lower reflectivity. Normally, use the default setting.

Table 4-13 Mark Detection Threshold Value (MS12)

MS	Function	Number of Bytes	Definition Range	Default Setting
12	Mark Detection Threshold Value	1 byte	01H to FEH	80H

10. Command Setting (MS13)

Selects the Kanji code system and 180° reverse function.

- Kanji Code System Selection (MS13-1)
The initial Kanji code system can be set to the JIS code or Shift-JIS code system.
- Realtime Command Selection (MS13-3)
Enables or disables the process of realtime command.
Realtime commands are ignored when Disable is selected.

The following realtime commands are affected by this setting:

- "Clear Buffer at Error" command (DC3 '(' 'c' 'l' 'r' ')')
- "Printer Reset" command (DC3 '(' 'r' 'e' 's' 'e' 't' DC3 'r' 'e' 's' 'e' 't' ')')
- "Send Status Data in Real Time" command (DEL EOT n)

(NOTE) When the image data contains the code line matching the code that constitutes a realtime command, use this setting to disable realtime commands.

Table 4-14 Command Setting (MS13)

MS	Function	Value	
		0	1
13-1	Kanji Code System Selection (Kanji Code)	Shift-JIS code	JIS code
13-2	Reserved	-	Fixed
13-3	Realtime Command Selection (Realtime Command)	Disable	Enable
13-4 to 8	Reserved	-	Fixed

11. Reserved (MS14)

MS14 is reserved. To write all 40 bytes, send F8H as a value of MS14.

12. International Character Setting (MS15)

A value corresponding to the international character set can be selected.

Table 4-15 International Character Set

n	Country	n	Country
0	USA	9	Norway
1	France	10	Denmark II
2	Germany	11	Spain II
3	United Kingdom	12	Latin America
4	Denmark I	13	Prohibition*
5	Sweden	14	Prohibition*
6	Italy	15	Prohibition*
7	Spain I	16	Prohibition*
8	Japan	17	Arabia

*1: The setting is ignored when the prohibition is selected.

When a number not assigned to the international character is set, USA is set. For the international character setting, see the "Set International Character" command (ESC 'R').

Table 4-16 International Character Setting (MS15)

MS	Function	Number of Bytes	Definition Range	Default Setting
15	International Character Setting (International Character)	1 byte	0 to 255	0

13. Character Code Table Setting (MS16)

A value corresponding to the character code table number can be set. The character code table number is the number shown in Table 4-17.

Table 4-17 Character Code Table

Character Code Table No.	Codepage
0	USA, Standard Europe (Code Page437)
1	Katakana
2	Multilingual (Code Page850)
3	Portuguese (Code Page860)
4	Canadian-French (Code Page863)
5	Nordic (Code Page865)
13	Turkish (Code Page857)
14	Greek (Code Page737)
16	Latin (Code Page1252)
17	Russian (Code Page866)
18	Eastern Europe (Code Page852)
19	Euro (Code Page858)
34	Cyrillic (Code Page855)
37	Arabic (Code Page864)
45	Central European (Code Page1250)
46	Cyrillic (Code Page1251)
47	Greek (Code Page1253)
48	Turkish (Code Page1254)
255	User Page

When a number not assigned to the character code table is set, the character code table number is set to 0 (Code Page437). For the character code table, see the "Set Codepage" command (ESC 't').

Table 4-18 Character Code Table Setting (MS16)

MS	Function	Number of Bytes	Definition Range	Default Setting
16	Character Code Table Setting (Character Code Table)	1 byte	0 to 255	0

14. General Setting 17 (MS17)

- Paper Saving Setting (MS17-1 to 2)

Space between lines and line spacing can be reduced without decreasing the size of character or graphic.

- Space between lines 0 dots: Space between lines and line spacing are decreased to 0 dots.
- Space between lines 2 dots: Space between lines and line spacing are decreased to 2 dots.
- Space between lines 4 dots: Space between lines and line spacing are decreased to 4 dots.
- Disable: No decrease.

(NOTE) Paper saving is not performed to blank lines contained in the graphics print data. This function is only valid for character printing.
When the following 2 conditions are met, the paper is fed only for the decreased dot-lines from the last printing position and is cut.
 • "Cut Paper" command (GS 'V') is transmitted.
 • Line feed or space between lines exists after the last printed line.

- Feed Backward Setting After Paper Cutting (MS17-3)

After paper cutting, before the command accompanying the next printing or paper feeding is executed, the paper is fed backward for 60 dots. The margin from the cut position to the print start position can be reduced up to about 2 mm.

The paper is not fed backward by partial cutting.

Table 4-19 General Setting 17 (MS17)

MS	Function	Value	
		0	1
17-1 to 2	Paper Saving Setting (Paper Saving)	See Table 4-20	
17-3	Feed Backward Setting After Paper Cutting (Backfeed After Cut)	Enable	Disable
17-4 to 8	Reserved	-	Fixed

Table 4-20 Paper Saving Setting (MS17-1 to 2)

MS17-2	MS17-1	Paper Saving Setting
0	0	Space Between Lines 0 dots
0	1	Space Between Lines 2 dots
1	0	Space Between Lines 4 dots
1	1	Disable

15. Reserved (MS18 to 40)

MS18 to 40 are all reserved. To write all 40 bytes, send FFH as values of MS18 to 40.

4.3 EASY PAPER SETTING

It is necessary to set the paper to be used. It can be easily set by following procedures.

1. With the printer turned on, operate the release lever to open the top cover.
2. Press the FEED Switch a number of times within 4 seconds according to the paper to be used in the table below.
3. The LED blinks once after 4 seconds. Then, close the top cover.

Thermal Paper	Mark Mode	Taken Mode	Number of Times to Press FEED Switch	Standby LED
Linerless label	Disable	Enable	3	Green
Linerless label	Enable	Enable	4	Green
SLP Label	Enable	Disable	5	Aqua
Receipt	Disable	Disable	6	Blue

4. The LED turns to the lighting of "Standby LED" color.

4.4 TEST PRINT

The printer can perform a test print.

In the test print, the firmware version, the MS setting values, etc. are printed.

1. Load thermal paper in the printer.
Ensure that no error occurs, and then turn off the printer.
2. Hold the FEED Switch down and press the POWER Switch, then release the POWER Switch.
Release the FEED Switch when the test print has been started.
3. After the test print, the printer cuts the thermal paper and returns to the print-ready status.

```
SLP series Interface
SLP720RT [ Ver X.XX ]
  DD,MMM,YYYY
Copyright (C):SII

* MS1 *
2) Taken Mode:Enable
3) Mark Mode:Disable
4-5) Standby LED:Green
7) Auto Activation by AC:Enable
8) Power SW:Enable

* MS4 *
4) Paper Width:58[mm]
6) Paper Auto Detection:Disable
7-8) Print Speed:High

* MS5 *
1) Auto Status Back:Enable
2) Init. Response:Enable
3) Error Through:Enable
4) Response Data Discarding:
  Disable
6-7) Paper Set Handle:
  Standard
8) Cutting Method:Full

* MS6 *
1-8) Print Density:100[%]

* MS7 *
1-8) Thermal Paper:
  Linerless label

* MS13 *
1) Kanji Code:
  JIS Code
3) Realtime Command:Enable

* MS17 *
1-2) Paper Saving:Disable
3) Backfeed After Cut:
  Enable

* Communication Type *
USB Communication
Control Model:SLP720RT
USB Device Class:Printer

* Font Information *
Character Code Table:
Code Page437
International Character:
USA

* Serial Number Information *
XXXXXXXXXX
```

Figure 4-7 Test Print Example (USB Model)

```

SLP series Interface
SLP720RT [ Ver X.XX ]
  DD.MMM.YYYY
Copyright (C):SII

* MS1 *
2) Taken Mode:Enable
3) Mark Mode:Disable
4-5) Standby LED:Green
7) Auto Activation by AC:Enable
8) Power SW:Enable

* MS4 *
4) Paper Width:58[mm]
6) Paper Auto Detection:Disable
7-8) Print Speed:High

* MS5 *
1) Auto Status Back:Enable
2) Init. Response:Enable
3) Error Through:Enable
4) Response Data Discarding:
  Disable
6-7) Paper Set Handle:
  Standard
8) Cutting Method:Full

* MS6 *
1-8) Print Density:100[%]

* MS7 *
1-8) Thermal Paper:
  Linerless label

* MS13 *
1) Kanji Code:
  JIS Code
3) Realtime Command:Enable

* MS17 *
1-2) Paper Saving:Disable
3) Backfeed After Cut:
  Enable

* Communication Type *
LAN Communication
MAC Address:  XX:XX:XX:XX:XX:XX
IP Address:   192.168.0.190
Subnet Mask:  255.255.255.0
GateWay Address: 0.0.0.0
DHCP Client:  Enable
Physical Layer: Auto Nego

* Font Information *
Character Code Table:
  Code Page437
International Character:
  USA

* Serial Number Information *
XXXXXXXXXX

```

Table 4-21 Ethernet Information

Item	Description
MAC Address	MAC Address
IP Address	IP Address
Subnet Mask	Subnet Mask
GateWay Address	Gateway Address
DHCP Client	Selected DHCP Client Mode
Physical Layer	Selected Communication Speed and Communication Mode

**Figure 4-8 Test Print Example
(Ethernet + USB Model)**

```

SLP series Interface
SLP720RT [ Ver X.XX ]
DD.MMM,YYYY
Copyright (C):SII

* MS1 *
2) Taken Mode:Enable
3) Mark Mode:Disable
4-5) Standby LED:Green
7) Auto Activation by AC:Enable
8) Power SW:Enable

* MS4 *
4) Paper Width:58[mm]
6) Paper Auto Detection:Disable
7-8) Print Speed:High

* MS5 *
1) Auto Status Back:Enable
2) Init. Response:Enable
3) Error Through:Enable
4) Response Data Discarding:
  Disable
6-7) Paper Set Handle:
  Standard
8) Cutting Method:Full

* MS6 *
1-8) Print Density:100[%]

* MS7 *
1-8) Thermal Paper:
  Linerless label

* MS13 *
1) Kanji Code:
  JIS Code
3) Realtime Command:Enable

* MS17 *
1-2) Paper Saving:Disable
3) Backfeed After Cut:
  Enable

* Communication Type *
* WLAN Communication *
Mode: Simple AP
Radio: 802.11b/g/n
Country: US
Channel: Auto
SSID: SII-Printer
Security: None
MAC Address: XX:XX:XX:XX:XX:XX
IP Address: 192.168.0.1
Subnet Mask: 255.255.255.0
Default GateWay: 0.0.0.0
Module Ver.: XX.XX

* Font Information *
Character Code Table:
Code Page437
International Character:
USA

* Serial Number Information *
XXXXXXXXXX

```

**Figure 4-9 Test Print Example
(Wireless LAN Model)**

Table 4-22 Wireless LAN Information

Item	Description
Mode	Selected Wireless LAN Operation Mode
Radio	Selected Wireless LAN Standard
Country	Corresponding country US: USA, Canada JP: Japan EU: EU, EFTA, UK, Turkey
Channel	Selected Channel
SSID	SSID Setting
Security	Selected Security
DHCP	Selected DHCP Client Mode (in Client Mode)
MAC Address	MAC Address
IP Address	IP Address*
Subnet Mask	Subnet Mask*
Default Gateway	Gateway Address*

*: When Client Mode is selected in the Mode, IP address, Subnet Mask and Gateway Address obtained from DHCP Server are printed. When the Power SW is pressed and canceled data queue, "---,---,---,---" is printed. In case of DHCP timeout, the Setting value is used and printed.

CHAPTER 5

LED INDICATION AND SWITCH FUNCTIONS

5.1 LED INDICATION OF PRINTER STATUS

The printer shows the printer status with a single LED.

The printer statuses are shown in Table 5-1.


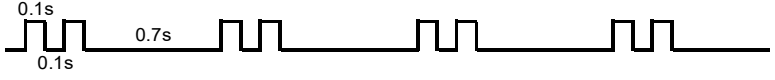

Table 5-1 Printer Status

Printer Status	LED (Color) ^{*1}	LED (Lighting Pattern)
Power off	-	Off
Power on (print-ready) / Connecting Wireless LAN communication	Green ^{*2}	On ^{*2}
Printing	Green	On
Waiting for test print	Green	Blink-2
Output buffer full	Green	Blink-1
Out-of-paper error	Lime yellow	Blink-1
Paper jam error while detecting mark	Lime yellow	Blink-3
Cover open error	Lime yellow	On
Hardware error	Red	On
Head temperature error	Purple	On
Voltage error	Purple	Blink-1
Cutter error	Purple	Blink-2
Not connected Wireless LAN communication	Blue	Blink-2
Paper removal waiting	Blue	Blink-3
Rewriting firmware	White	On
In function setting mode	White	On

*1: The color tone may vary depending on the individual difference of the products and the viewing angle.

*2: The value at the factory

Table 5-2 LED Blink Pattern

Status	Pattern
Blink-1	
Blink-2	
Blink-3	

5.2 ERROR AND RECOVERY PROCEDURE

When an error occurs, the printer stops printing operation. However, the data receiving is enabled. The table below shows errors and their recovery procedures.

Table 5-3 Error and Recovery Procedure

Error	Detail	Recovery Procedure	Priority ^{*1}
Return-waiting	The printer becomes this state after releasing the out-of-paper error, cover open error, cutter error, or voltage error.	The return-waiting state is released 1 second later, and the printer becomes print-ready state.	-
Output buffer full	Output buffer of the printer is full.	Read response data from the host device.	1
Paper removal waiting	Paper remains in the paper outlet after cutting the paper.	Remove the paper from the paper outlet.	2
Out-of-paper error	There is no thermal paper.	Open the top cover, load thermal paper, and then close the top cover.	3
Cover open error	The top cover is open.	Close the top cover.	4
Cutter error	Cut failure due to paper jam at cutting. ·Cutter work lock error (The cutter blade is stuck protruding out of home position ^{*2} .) ·Cutter home lock error (The cutter blade is stuck at home position ^{*2} .)	Open the top cover to remove the error cause and close the top cover, the printer automatically recovers. If the top cover is not open or the printer does not automatically recover, see "Cleaning Cutter Error" in the USER'S GUIDE.	5
Voltage error	The power voltage is out of the allowable range.	The printer automatically recovers when the voltage is returned to within the allowable range.	6
Head temperature error	Head temperature rises to 85°C (185°F) or higher.	The printer automatically recovers when head temperature becomes 80°C (176°F) or lower.	7
Hardware error	An abnormality occurs in the thermal head or the circuit board.	Recovery is not possible. Request for repair.	8

*1: This indicates the priority when multiple errors occur simultaneously. The bigger number indicates higher priority. For example, when "Cover open error" and "Out-of-paper error" occur simultaneously, the LED shows "Cover open error" which has the higher priority.

*2: The cutter blade operates starting from the home position (the blade is stored).

5.3 SWITCHES

There are 2 switches, the POWER Switch and the FEED Switch on the printer.

5.3.1 POWER Switch

The printer can be turned on/off by POWER Switch.

To turn on the printer, hold down the POWER Switch until the LED lights up.

To turn off the printer, hold down the POWER Switch until the LED turns off.

(NOTE) · Always use the POWER Switch to turn off the printer. When the printer is turned off by removing AC adapter, the memory may be damaged.

· For Ethernet + USB models, Ethernet communication is prioritized. (At the factory)

When using USB communication, switch with the following method.

When the printer status is "Power on (print-ready)", press the POWER Switch 3 times within 3 seconds.

5.3.2 FEED Switch

The thermal paper can be fed by FEED Switch.

The operation varies depending on the MS1-3 (Mark Mode Selection) setting.

- **MS1-3 (Mark Mode Selection) is set to Disable**

The printer feeds a small amount of thermal paper by pressing the FEED Switch once. The thermal paper is fed continuously by holding down the FEED Switch.

- **MS1-3 (Mark Mode Selection) is set to Enable**

By pressing the FEED Switch once, form feed (paper feed until mark detection) is performed.

When the printer cannot detect the mark after feeding the paper for the set length or when the thermal paper (non-marked) is used, the printer stops feeding at the set length. The maximum paper feeding length during the mark detection can be set with the MS or "Change Function Settings" command (DC2 'w').

(NOTE) When an error occurs, the printer does not feed the paper by the FEED Switch.

CHAPTER 6

COMMAND FUNCTIONS

6.1 CHARACTER CODES AND COMMANDS

The character code range and user-defined character codes differ between when Kanji mode is selected by the "Specify Kanji Mode" command (FS '&') after selecting JIS code system by the "Select Kanji Code System" command (FS 'C'), and when Shift-JIS code system is selected.

6.1.1 JIS Code System

In order to print 2-byte characters by JIS code system, select JIS code system by the "Select Kanji Code System" command (FS 'C'), and then specify 2 bytes character code after selecting Kanji mode by the "Specify Kanji Mode" command (FS '&').

The commands function as the character code of the 1-byte code system character, or either of the 1st byte and the 2nd byte of the 2-byte code system character.

When a command is entered with a character code of 2-byte code system character, the next data is always processed as the 1st byte. However, when the command is the "Cancel Kanji Mode" command (FS '.'), the next data is proceed as the character code of the 1-byte code system.

When the command is entered with the 2nd byte of character code in the 2-byte code system character, the data up to the 1st byte is ignored.

(1) Character codes of 1-byte code system character

00H to 1FH: The following codes are processed as commands. The other codes are ignored.
09H(HT), 0AH(LF), 0CH(FF), 10H(DLE), 12H(DC2), 13H(DC3), 18H(CAN),
1BH(ESC), 1CH(FS), 1DH(GS)

20H to 7EH: Character code

7FH: Ignored

80H to FEH: Character code

FFH: Depends on the character set.

For the Codepage 1250 to 1254 and the user-defined character, the code is processed as a character code.

For character sets other than above, the code is ignored.

(2) Character code of 2-byte code system character

2-byte character is specified with 2 bytes character code.

(a) The 1st byte

- 00H: 1-byte code system character area
Specify the character code of 1-byte code system character with the 2nd byte.
- 21H to 76H: 2-byte character area
- 77H: User-defined character area
- 78H to 7EH: 2-byte character area
- 93H to 97H: 2-byte character area

The codes other than above are ignored when they are not commands. The data to be received next is processed as the 1st byte.

(b) The 2nd byte

(When the 1st byte is 00H)

- 20H to 7EH: Processed as the 1-byte code system character.
- 80H to FEH: Processed as the 1-byte code system character.
- FFH: Depends on the character set.
For the Codepage 1250 to 1254 and the user-defined character, the code is processed as a 1-byte code system character.
For character sets other than above, the code is ignored with the 1st byte.

(When the 1st byte is other than 00H)

- 21H to 7EH: Processed as the 2nd byte of a 2-byte character.

The codes other than above are ignored with the 1st byte when they are not commands. The data to be received next is processed as the 1st byte.

The code within the 2-byte character area that are not defined in the JIS code system nor the special characters are processed as 2-byte spaces.

6.1.2 Shift-JIS Code System

When Shift-JIS code system is selected by the "Select Kanji Code System" command (FS 'C'), Kanji characters can be printed with 2 bytes character code without entering the "Specify Kanji Mode" command (FS '&').

The command functions in either case that the command is the 1-byte code system character or the 2nd byte of character code of the 2-byte code system character.

When the command is entered with the 2nd byte of character code in the 2-byte code system character, the 1st byte is ignored.

(1) Character codes of 1-byte code system character

00H to 1FH: The following codes are processed as commands. The other codes are ignored.
09H(HT), 0AH(LF), 0CH(FF), 10H(DLE), 12H(DC2), 13H(DC3), 18H(CAN),
1BH(ESC), 1CH(FS), 1DH(GS)

20H to 7EH: Character code

7FH: Ignored

80H to FEH: See (2).

FFH: Depends on the character set.
For the Codepage 1250 to 1254 and the user-defined character, the code is processed as a character code.
For character sets other than above, the code is ignored.

(2) Character codes of 2-byte code system character

2-byte character is specified with 2 bytes character code.

(a) The 1st byte

81H to 9FH: 2-byte character area

E0H to EBH: 2-byte character area

ECH: User-defined character area

EDH to EFH: 2-byte character area

FAH to FCH: 2-byte character area

The codes 80H to FEH other than above are processed as 1-byte code system characters.

(b) The 2nd byte

40H to 7EH: Processed as the 2nd byte of Shift-JIS code.

80H to FCH: Processed as the 2nd byte of Shift-JIS code.

The codes other than above are ignored with the 1st byte when they are not commands.

The codes not defined as Shift-JIS code system or special characters within the 2-byte character area are processed as 2-byte spaces.

6.2 FLASH MEMORY

Using the FLASH memory of the printer, the user-defined characters, downloaded characters, optional fonts, macro function, NV graphics function, downloaded bit image function, User page 1-byte fonts, and User page international characters are available. The FLASH memory consists of the following areas.

System area:	Stores data for controlling system.
Font area:	Stores font data such as Kanji.
User area:	Stores user-defined characters, downloaded characters, optional fonts, NV graphics, downloaded bit images, User page 1-byte fonts, User page international characters, and so on.

The system area can be rewritten by commands, such as "Change Function Settings" command (DC2 'k', DC2 'w') and "Save Maintenance Counter" command (GS 'g' '1').

The font area cannot be rewritten.

The user area can be rewritten by registration commands such as user-defined characters, downloaded characters, optional fonts, NV graphics function, downloaded bit image function, User page 1-byte fonts, User page international characters, and so on.

The memory capacity of the user area is 1048576 bytes. When using registration commands, it is necessary to confirm the remaining memory capacity beforehand. Read this section for the remaining memory capacity.

(1) Memory area

The printer has the function of memory allocation or release in order to change the uses for the memory in the user area and memory capacity to use.

Allocating the memory area means to divide the memory into the specified capacity (bytes) so as to be able to use exclusively for a certain function.

Releasing the area of memory means to disable the division of the memory that the certain functions have been using. The released memory area is not reused until the "Initialize User Area" command (DC2 'R') or "Defragment User Area" command (DC2 '* '1') is executed.

When using user-defined characters, downloaded characters, optional fonts, NV graphics function, downloaded bit image function, User page 1-byte fonts, and User page international characters, the remaining memory capacity should not be exceeded.

Moreover, the memory capacities for optional fonts, NV graphics function, and downloaded bit image function are limited to the values as follows. When using these functions, do not exceed the limits.

Font Size	Capacity (Bytes)
Optional font	65536
NV graphics (per key code)	917504
Downloaded bit image	65536

See the description of each command on how to calculate memory usage.

Table 6-1 Memory Area After Initialization

Use	Capacity (Bytes)
User-defined characters	9784
Downloaded characters	6184
Optional fonts	0
NV graphics	0
Downloaded bit images	0
User page 1-byte fonts	0
User page international characters	0

For user-defined characters and downloaded characters, the memory area is allocated at the factory and the initialization of the user area.

For optional fonts, NV graphics, downloaded bit images, User page 1-byte fonts, and User page international characters, the memory area has not been allocated at the factory and initialization of the user area, but the memory area is automatically allocated when entering commands.

When registering these, check beforehand that there is sufficient memory remaining capacity.

The remaining memory capacity can be confirmed by the "Send Remaining User Area" command (DC2 '*' '2').

This memory area can be released/allocated with a command, so the memory remaining capacity can be increased for registering other functions.

When the command is normal and the memory area has been allocated, the data is registered.

In the following cases, the data is not correctly registered.

- (a) When the command is not normal, that is, when the parameter is out of the definition range, the subsequent data is processed as normal data.
- (b) When the memory area is not allocated or the memory remaining capacity is not sufficient even though the command is normal, the operation is performed by each command as follows:
 - "Register User-Defined Character" command (FS '2')
Up to FS '2' is ignored, and the subsequent data is processed as normal data.
 - "Register Downloaded Character" command (ESC '&')
Up to ESC '&' is ignored, and the subsequent data is processed as normal data.
 - "Register Optional Font" command (DC2 'P')
Up to DC2 'P' s e y x is ignored, and the subsequent data is processed as normal data.
 - "Register Downloaded Bit Image" command (GS '*')
Up to GS '*' x y is ignored, and the subsequent data is processed as normal data.
 - "Register NV Graphics Data" command (GS '(' 'L', GS '8' 'L')
All data including the subsequent data is ignored.

(2) Memory control information

When allocating the area or registering to use each function, the memory control information is always added to the beginning of the allocated area. The number of bytes of memory control information depends on each function.

The number of bytes of memory control information for each function is listed in Table 6-2.

Table 6-2 Number of Bytes of Memory Control Information for Each Function

Function	Number of Bytes
User-defined character	8
Downloaded character	104
Optional font	12
NV graphics	14
Downloaded bit image	12
User page 1-byte font	74
User page international character	11

[Example]

The user-defined character has up to 94 characters for the area of $24 \times 3 = 72$ bytes and $16 \times 2 = 32$ bytes, and with 8 bytes of memory control information, the memory capacity to be used therefore becomes as shown below:

$$(72 + 32) \times 94 + 8 = 9784 \text{ bytes}$$

To calculate the remaining memory capacity, calculate it including the number of bytes of memory control information.

For the optional font, since the memory area is limited to 65536 bytes, the maximum number of bytes of the optional font that can be registered is as follows:

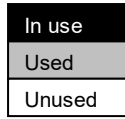
$$\text{Optional font} = 65536 - 12 = 65524 \text{ bytes}$$

(3) Memory management

1. Usage state of the user area in the FLASH memory

The user area in the FLASH memory has the following 3 usage states:

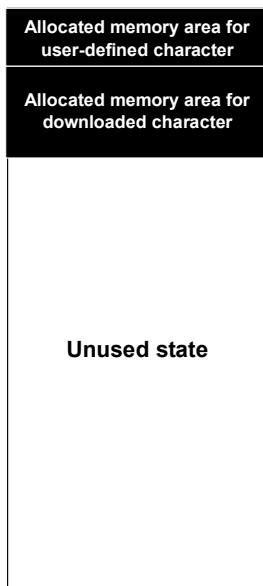
- In use state
- Used state (erasable)
- Unused state



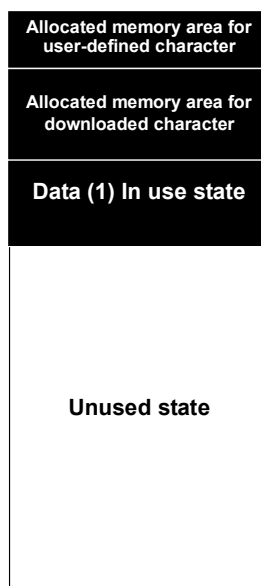
The memory area other than allocated for user-defined character and downloaded character is in "Unused state" at the factory.

When data is registered in the user area, the user area turns to "In use state" as described in the figure below. When the data in use state is released, the area turns to "Used state". This area cannot be reused as it is.

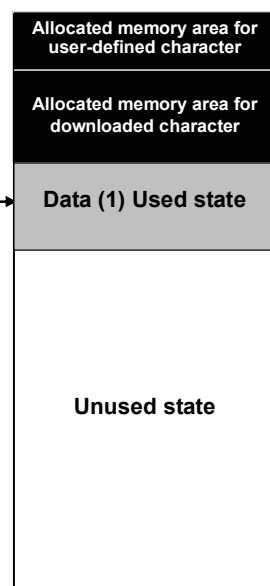
[1] State at the factory



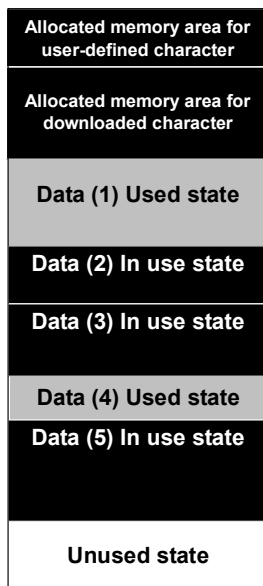
[2] State with data registered



[3] State with data released



[4] State with registration and release repeated



[5] State with "Defragment User Area" command (DC2 'x' '1') executed



"Data (1)" to "Data (5)" in the figure are the data other than User-defined character and downloaded character.

When data registration and release are repeated, the memory state turns to the [4] state in the figure. In order to use the "Used state" area again, execute the "Defragment User Area" command (DC2 '*' '1'). When the unused state area is less than the amount of data to be registered next time, issuing a registration command automatically executes the user area defragmentation. The [5] shows the memory state after defragmented.

To confirm the free space of the current memory, execute the "Send Remaining User Area" command (DC2 '*' '2').

The current memory capacity in an unused state is sent by the "Send Remaining User Area" command (DC2 '*' '2').

2. Precautions for rewriting, releasing and allocating in the FLASH memory area

When registering the registration commands (user-defined character, downloaded character, optional font, macro, NV graphics, downloaded bit image, User page 1-byte font, and User page international character), if data has already been registered in the area, the data to be newly registered is compared with the already registered data. When both data are equal, overwriting is not performed.

As for the remaining memory capacity, confirm it by the "Send Remaining User Area" command (DC2 '*' '2').

The FLASH memory can be rewritten approximately 100000 times. Execute the "Defragment User Area" command (DC2 '*' '1') after the free area of memory becomes low in order to effectively use the number of rewritable times.

Do not turn off the power during the execution of commands with writing or erasing to the FLASH memory.

If the power is turned off during the execution of the command, the data in the FLASH memory may be destructed and operational malfunction may occur. To confirm the termination, send the "Execution Response Request" command (DC2 'q') following such as the command and check the response code.

6.3 RESPONSE DATA

All of upper 4 bits in response data sent from the printer to the host device are identifiers. Table 6-7 shows the meanings to the identifiers.

Table 6-3 Response Identifiers

Identifier	Function
0xH	Start or end of multi-byte string
2xH to 7xH	ASCII characters
8xH	Execution response
9xH	Progress situation response
AxH	Status response, realtime status response
BxH	Initialized response
CxH	1st byte of automatic status response
DxH	2nd byte to 8th byte of automatic status response
ExH	Lower 4 bits of HEX code
FxH	Upper 4 bits of HEX code

The responses are sent in the following forms.

(1) Character string

The data is sent in the order of start code (02H), character string, and termination code (00H).

For example, when the character string 'SII' is sent from the printer:
02H, 53H, 49H, 49H, 00H

(2) HEX code

The data is sent in the order of start code (0EH), lower byte of HEX code, higher byte of HEX code, and termination code (00H).

For example, when 12H, 34H, and 56H are sent from the printer:
0EH, E2H, F1H, E4H, F3H, E6H, F5H, 00H

(3) Execution response

One byte data which is the logical sum of lower 4 bits of the parameter n input in the "Execution Response Request" command (DC2 'q') and 80H is sent.

e.g. Input n = 4:
84H

(4) Status response, realtime status response

The status byte specified by the "Send Status Data" command (GS 'r') or "Send Status Data in Real Time" command (DLE EOT) is sent in 1 byte.

Do not transmit the next data until the corresponding status is received after executing "Send Status Data in Real Time" command (DLE EOT).

In addition, do not send "Send Status Data in Real Time" command (DLE EOT) until all response data is retrieved when the response command other than "Send Status Data in Real Time" command (DLE EOT) is executed.

(5) Progress situation response

Various progress situations are sent with lower 4 bits at 16 steps.

(6) Initialized response

The printer sends 1 byte data to inform that initialization has completed.
And lower 4 bits shows the factor of the initialization.

B0H: Initialization by the power on or "Hardware Reset" command (DC2 '@')

B1H: Initialization by USB class request resetting or "Reset Download Mode" command ('@')

B2H: Initialization by the "Initialize Printer" command (ESC '@')

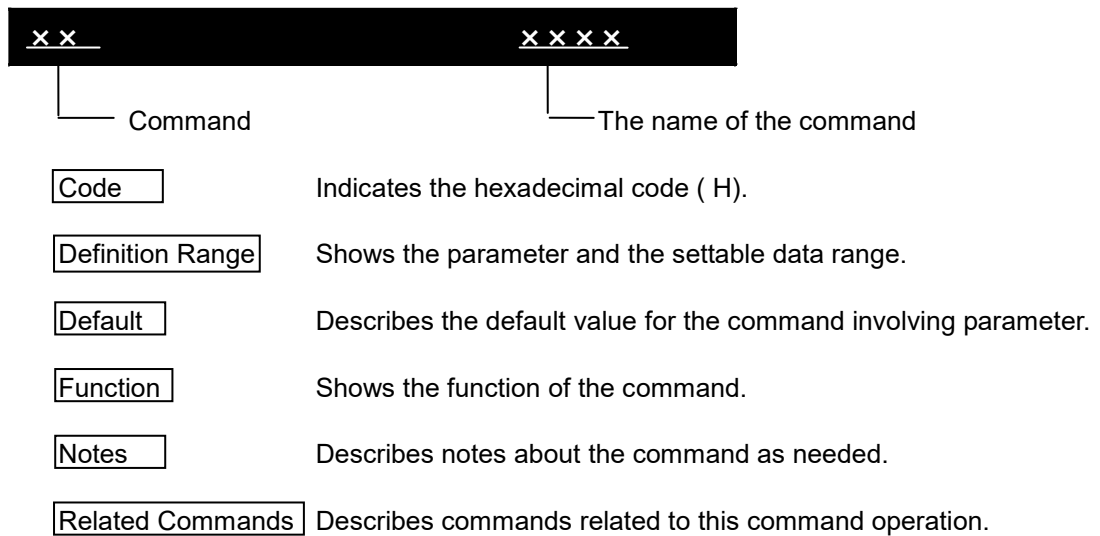
B3H: Initialization by the "Printer Reset" command (DC3 '(' 'r' 'e' 's' 'e' 't' DC3 'r' 'e' 's' 'e' 't' ' '))

(7) Automatic status response

When the automatic status response is enabled by the "Enable/Disable Automatic Status Back" command (GS 'a'), the printer sends the status in 8 bytes when the specified status bit changes. When the code CxH is sent from the printer as a response, treat the continuous 8 bytes including the response (except Xoff) as the status from the automatic status response function.

6.4 COMMAND DESCRIPTION

This chapter describes the commands in each function.



The meanings of the terms are described below.

- **Buffer full**
It signifies the line buffer is in a full state. In standard mode, when new data is input in the buffer full state, the printer performs printing and line feed of the data in the line buffer. The operation is the same as the "Line Feed" command (LF).
- **Beginning of line**
The beginning of the line signifies a state satisfying the following conditions:
 - No print data (including spaces and the portion skipped by the "Horizontal Tab" command (HT)) exists in the current line buffer.
 - The print position is not specified by the "Specify Absolute Position" command (ESC '\$') or "Specify Relative Position" command (ESC '\').
- **Printable area**
This area is X direction maximum width defined by paper width setting.
- **Print area**
This is a printing range set with the "Set Print Area Width" command (GS 'W'). The print area cannot be set beyond the printable area.
- **Ignore**
This is a state of discarding all codes including parameters and not doing anything.
- **Inch**
Unit of length. 1 inch = approx. 25.4 mm
- **LSB/MSB**
LSB represents the least significant bit and MSB represents the most significant bit.
- **Realtime command**
This is the command to execute the process at the time of data receiving.

6.4.1 Printing Command

LF

Line Feed

Code 0AH

Function Prints the data that is in the line buffer and inserts line feed based on the set line spacing.

Related Commands ESC '2', ESC '3'

CR

Carriage Return

Code 0DH

Function This command is ignored.

ESC 'J' n

Print and Feed Forward

Code 1BH 4AH n

Definition Range $0 \leq n \leq 255$

Function Feeds the paper arbitrarily by predefined length.
When there is data in the line buffer, the printer prints 1 line and then feeds the paper.
The paper feed length is $[n \times \text{basic calculation pitch}]$ inches.
The vertical basic calculation pitch (y) is used.

Notes After the command execution, the beginning of the line is the next print position.
This command does not affect the line spacing that has been set by the "Set 1/6 Inch Line Spacing" command (ESC '2') or "Set Line Spacing" command (ESC '3').
The basic calculation pitch is set by the "Set Basic Calculation Pitch" command (GS 'P').
When the calculation result has fractions, adjust with the minimum pitch of the printer, and round down the remainder.

Related Commands GS 'P'

ESC 'j' n

Print and Feed Backward

Code 1BH 6AH n

Definition Range $0 \leq n \leq 255$

Function Feeds the paper backward by predefined length.
When there is data in the line buffer, the printer prints 1 line and then feeds the paper backward.
The paper feed length is $[n \times \text{basic calculation pitch}]$ inches.
The vertical basic calculation pitch (y) is used.

Notes Following the command execution, the beginning of the line is the next print position.
This command does not affect the line spacing that has been set by the "Set 1/6 Inch Line Spacing" command (ESC '2') or "Set Line Spacing" command (ESC '3').
The basic calculation pitch is set by the "Set Basic Calculation Pitch" command (GS 'P').
When the calculation result is a fractional figure, it is compensated using the printer minimum pitch and the remainder is discarded.
When the paper feed length exceeds 68 dot-lines by the correction calculation with the basic calculation pitch, this command is ignored.

Related Commands GS 'P'

Code 1BH 64H n

Definition Range $0 \leq n \leq 255$

Function Feeds the paper by n lines.
The paper feed length is [n × the set line spacing].
When there is data in the line buffer, the printer prints 1 line and then feeds the paper.

Notes The beginning of the line is the next printing position.

6.4.2 Line Spacing

ESC '2'

Set 1/6 Inch Line Spacing

Code 1BH 32H

Function Specifies the line spacing per line as 1/6 inches (34 dots).

Notes This command is not affected by the basic calculation pitch.

Related Commands ESC '3'

ESC '3' n

Set Line Spacing

Code 1BH 33H n

Definition Range $0 \leq n \leq 255$

Default The line spacing corresponding to 1/6 inches (34 dots)

Function Sets the line spacing per line.
The line spacing is $[n \times \text{basic calculation pitch}]$ inches.

Notes The basic calculation pitch is set by the "Set Basic Calculation Pitch" command (GS 'P'). Moreover, once set, the line spacing is not changed even when the basic calculation pitch is changed by the "Set Basic Calculation Pitch" command (GS 'P'). When the calculation result has fractions, adjust with the minimum pitch of the printer, and round down the remainder.
The vertical basic calculation pitch (y) is used.

Related Commands ESC '2', GS 'P'

6.4.3 Character Set

ESC SP n Set Character Right Space

Code 1BH 20H n

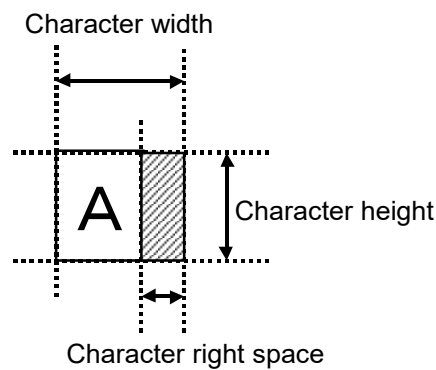
Definition Range $0 \leq n \leq 255$

Default n = 0

Function Sets the amount of character right space.
The amount of the right space is [n × basic calculation pitch] inches.

Notes This command does not affect 2-byte characters.
When the double width is specified, the right space becomes twice as much as the setting value.
The basic calculation pitch is set by the "Set Basic Calculation Pitch" command (GS 'P').
Moreover, once set, the right space is not changed even when the basic calculation pitch is changed by the "Set Basic Calculation Pitch" command (GS 'P').
When the calculation result has fractions, adjust with the minimum pitch of the printer, and round down the remainder.
The horizontal basic calculation pitch (x) is used.

Related Commands GS 'P'



ESC '! ' n Specify Print Mode

Code 1BH 21H n

Definition Range $0 \leq n \leq 255$

Default n = 0

Function Specifies the function of print mode in batch.

Bit	Function	Value	
		0	1
0	Character font	Font A selected (24 × 12)	Font B selected (16 × 8)
1	Undefined	-	-
2	Undefined	-	-
3	Bold printing	Cancel	Specify
4	Double height	Cancel	Specify
5	Double width	Cancel	Specify

Bit	Function	Value	
		0	1
6	Undefined	-	-
7	Underline	Cancel	Specify

Notes

When both double height and double width are specified, the character size is quadrupled. When characters with different vertical scale exist on the same line, the characters are enlarged with the bottom edges of the characters as a reference, and so the bottom edges are aligned. To enlarge the character horizontally, enlarge the character in the right direction with the left edge of the character as a reference.

Underline is applied to the entire character width including the right space of the character. However, no underline is applied to the portion skipped by the "Horizontal Tab" command (HT) and to 90° right rotated characters. The underline width is the thickness set by the "Set Underline" command (ESC '-') regardless of the character size. When the underline width is not set by the "Set Underline" command (ESC '-'), the underline width is to be 1 dot. This command does not affect 2-byte characters except bit 3 (bold printing).

The print modes can also be specified or canceled by commands other than this command. However, the command processed last is valid. For example, when bold printing is canceled by this command after specified by the "Set Bold Print" command (ESC 'E'), the bold printing specified by the "Set Bold Print" command (ESC 'E') is canceled.

Related Commands ESC '-', ESC 'E', ESC 'M', GS '!'

ESC 'M' n **Select Character Font**

Code 1BH 4DH n

Definition Range n = 0, 1, 48, 49

Default n = 0

Function Selects a character font.

n	Function
0, 48	Select font A (24 × 12)
1, 49	Select font B (16 × 8)

Notes The character font can also be selected by the "Specify Print Mode" command (ESC '!'), but the setting of the command processed last is valid.

Related Commands ESC '!'

GS '!' n **Specify Character Size**

Code 1DH 21H n

Definition Range 0 ≤ n ≤ 255
1 ≤ vertical scale ≤ 8, 1 ≤ horizontal scale ≤ 8

Default n = 0

Function Specifies a character size (vertical scale / horizontal scale).

Bit	Function	Value	
		Hexadecimal	Decimal
0 to 3	Vertical scale	See Table 1 [Vertical Scale].	
4 to 7	Horizontal scale	See Table 2 [Horizontal Scale].	

Table 1 Vertical Scale

Hexadecimal	Decimal	Scale
00H	0	× 1 (default)
01H	1	× 2 (double height)
02H	2	× 3
03H	3	× 4
04H	4	× 5
05H	5	× 6
06H	6	× 7
07H	7	× 8

Table 2 Horizontal Scale

Hexadecimal	Decimal	Scale
00H	0	× 1 (default)
10H	16	× 2 (double width)
20H	32	× 3
30H	48	× 4
40H	64	× 5
50H	80	× 6
60H	96	× 7
70H	112	× 8

Notes

The command is valid for all characters (including Kanji) except HRI characters. However, the scale of the optional font is up to double width or double height. Specifying the optional font in triple or larger size will result in printing in double size. When either the vertical scale or horizontal scale is out of the definition range, this command is ignored. The scale is applied with the paper feed direction as the vertical direction and the direction perpendicular to the paper feed as the horizontal direction. Therefore, when specifying 90° right rotated characters, the relationship between vertical and horizontal directions for characters becomes reverse.

Related Commands ESC '!', FS '!'

ESC '-' n Set Underline

Code 1BH 2DH n

Definition Range 0 ≤ n ≤ 2, 48 ≤ n ≤ 50

Default n = 0

Function Sets underline.

n	Function
0, 48	Cancel underline
1, 49	Specify 1-dot underline
2, 50	Specify 2-dot underline

Notes Underline is applied to the entire character width including the right space of the character. However, no underline is applied to the portion skipped by the "Horizontal Tab" command (HT) or others and to 90° right rotated characters.
When underline is canceled with $n = 0$, no underline is applied to the subsequent data, but the underline width set before canceling is retained. Moreover, underline is canceled ($n = 0$) in the initial state.
The underline width is constant as specified regardless of the character size.
This command does not affect 2-byte characters.
In addition to this command, underline can also be specified or canceled by the "Specify Print Mode" command (ESC '!'). However, the command processed last is valid. For example, when underline is canceled by this command after specified by the "Specify Print Mode" command (ESC '!'), the specification with the "Specify Print Mode" command (ESC '!') is canceled.

Related Commands ESC '!

ESC 'E' n

Set Bold Print

Code 1BH 45H n

Definition Range $0 \leq n \leq 255$

Default $n = 0$

Function Sets bold printing.
 $n = \langle \text{*****}0 \rangle B$: Bold printing is canceled.
 $n = \langle \text{*****}1 \rangle B$: Bold printing is specified.

Notes Only the LSB is valid for n .
This command affects both 1-byte characters and 2-byte characters.
However, the command does not affect optional fonts.

Related Commands ESC '!

ESC 'G' n

Set Double Strike Print

Code 1BH 47H n

Definition Range $0 \leq n \leq 255$

Default $n = 0$

Function Sets double strike printing.
 $n = \langle \text{*****}0 \rangle B$: Double strike printing is canceled.
 $n = \langle \text{*****}1 \rangle B$: Double strike printing is specified.

Notes Only the LSB is valid for n .
The print result of double strike printing is exactly the same as that of bold printing.
This command affects both 1-byte characters and 2-byte characters.
However, the command does not affect optional fonts.

Related Commands ESC 'E'

Code 1BH 56H n

Definition Range n = 0, 1, 48, 49

Default n = 0

Function Sets 90° character rotation to the right.

n	Function
0, 48	Cancel 90° character rotation to right
1, 49	Specify 90° character rotation to right

Notes Even when underlining is specified, underline is not applied to characters rotated 90° to the right.
When 90° right rotation is specified, the relation between horizontal and vertical enlargements to the character direction is opposite to the case when 90° right rotation is canceled.

Related Commands ESC '!', ESC '-', FS '!', FS '-'

Code 1BH 7BH n

Definition Range $0 \leq n \leq 255$

Default n = 0

Function Sets inversion (flip) printing.
n = <*****0>B: Inversion (flip) printing is canceled.
n = <*****1>B: Inversion (flip) printing is specified.

Notes Only the LSB is valid for n.
This command is valid only when input at the beginning of the line.
The inversion (flip) printing is to rotate the data of the line 180° and print.
This command affects both 1-byte characters and 2-byte characters.

Code 1DH 42H n

Definition Range $0 \leq n \leq 255$

Default n = 0

Function Sets reverse printing of characters.
n = <*****0>B: Reverse printing is canceled.
n = <*****1>B: Reverse printing is specified.

Notes Only the LSB is valid for n.
Internal characters and downloaded characters are affected by the reverse printing.
The right space of the character set by the "Set Character Right Space" command (ESC SP) is also affected by the reverse printing.
The reverse printing does not affect the followings:

Bit image (ESC '*')
 Downloaded bit image (GS '/')
 Barcode (GS 'k')
 HRI character (GS 'H')
 Portion skipped by Horizontal Tab (HT)
 Portion skipped by Specify Absolute Position (ESC '\$')
 Portion skipped by Specify Relative Position (ESC '\')

NV graphics (GS '(' 'L')
 Graphics Data Storage into Print Buffer (GS '(' 'L')
 Each two-dimensional barcode print (GS 'p')

This command does not affect spaces between lines.
 The specifications of bold printing and double strike printing are ignored. (The line width of a reverse print character is as same as that of a normal character.)
 The reverse printing takes precedence over underline. Therefore, even when underline is specified, no underline is applied to reverse print characters. However, the underline setting status does not change.
 This command affects both 1-byte characters and 2-byte characters.

ESC 'R' n **Set International Character**

Code 1BH 52H n

Definition Range 0 ≤ n ≤ 17

Default n = 0

Function Sets an international character from the following table.

n	Country	n	Country
0	USA	9	Norway
1	France	10	Denmark II
2	Germany	11	Spain II
3	United Kingdom	12	Latin America
4	Denmark I	13	Prohibition ^{*1}
5	Sweden	14	Prohibition ^{*1}
6	Italy	15	Prohibition ^{*1}
7	Spain I	16	Prohibition ^{*1}
8	Japan	17	Arabia

*1: When the prohibition is selected, the setting is ignored.

Related Commands See "A.2 International Character Set".

ESC 't' n **Set Codepage**

Code 1BH 74H n

Definition Range n = 0 to 5, 16, 18, 19, 37, 45 to 48, 255

Default Depends on the Function Settings.

Function Sets the page n in the character code table.

To select the User page, it is required to register the User page beforehand. Set the User page in the "Select Download Mode" command (DC2 DC2) and the "Rewrite 1-Byte Font" command ('S' 'W').

n	Codepage
0	USA, Standard Europe (Code Page437)
1	Katakana
2	Multilingual (Code Page850)
3	Portuguese (Code Page860)
4	Canadian-French (Code Page863)
5	Nordic (Code Page865)
13	Turkish (Code Page857)
14	Greek (Code Page737)
16	Latin (Code Page1252)
17	Russian (Code Page866)
18	Eastern Europe (Code Page852)
19	Euro (Code Page858)
34	Cyrillic (Code Page855)
37	Arabic (Code Page864)
45	Central European (Code Page1250)
46	Cyrillic (Code Page1251)
47	Greek (Code Page1253)
48	Turkish (Code Page1254)
255	User Page

Notes Code Page864 is printed in font A (24 × 12) regardless of character font selection.

Related Commands DC2 'w', DC2 'l'
See "A.2 International Character Set".

ESC 'y' a b c

Send 1-Byte Font ID

Code 1BH 79H a b c

Definition Range a = 0, 1
b = 255, 0 ≤ c ≤ 7

Function In response to the request of this command, the printer sends the information specified by c, the 1-byte font specified by a and b.
a:Font size
b:Page number
c: Information

The page number is the number registered in the "Rewrite 1-Byte Font" command ('S' 'W' a [d1]k1 b [d2]k2).

a	Font Size
0	24-dot font
1	16-dot font

c	Function	Response Format
0	Reserved	-
1	Reserved	-
2	Reserved	-
3	Checksum (2 bytes)	HEX code
4	Reserved	-
5	Reserved	-
6	ID (64 bytes)	Character string
7	Registered international character	Character string

When 7 is specified for c, the printer sends the abbreviation of the registered international character in a character string.

When 2 or more international characters are registered, the country names are separated by a ',' (comma).

The character strings sent according to the registration content are as shown below.

International Character	Response Character String
USA	US
France	FR
Germany	DE
United Kingdom	UK
Denmark I	DK1
Sweden	SE
Italy	IT
Spain I	ES
Japan	JP
Norway	NO
Denmark II	DK2
Spain II	ES2
Latin America	LA*
Arabia	AR*

Notes When the font specified by a and b is not registered, only the header and footer of the response format of the selected function are sent.

Related Commands See "6.3 RESPONSE DATA", "6.4.11 Download Mode".

Code 1BH 26H y s e [x [d]k]n

Definition Range
 y = 3 (Font A (24 × 12) selected)
 y = 2 (Font B (16 × 8) selected)
 20H ≤ s ≤ e ≤ 7EH
 0 ≤ x ≤ 12 (Font A (24 × 12) selected)
 0 ≤ x ≤ 8 (Font B (16 × 8) selected)
 0 ≤ d ≤ 255

Function Registers a downloaded character pattern to the specified character code.

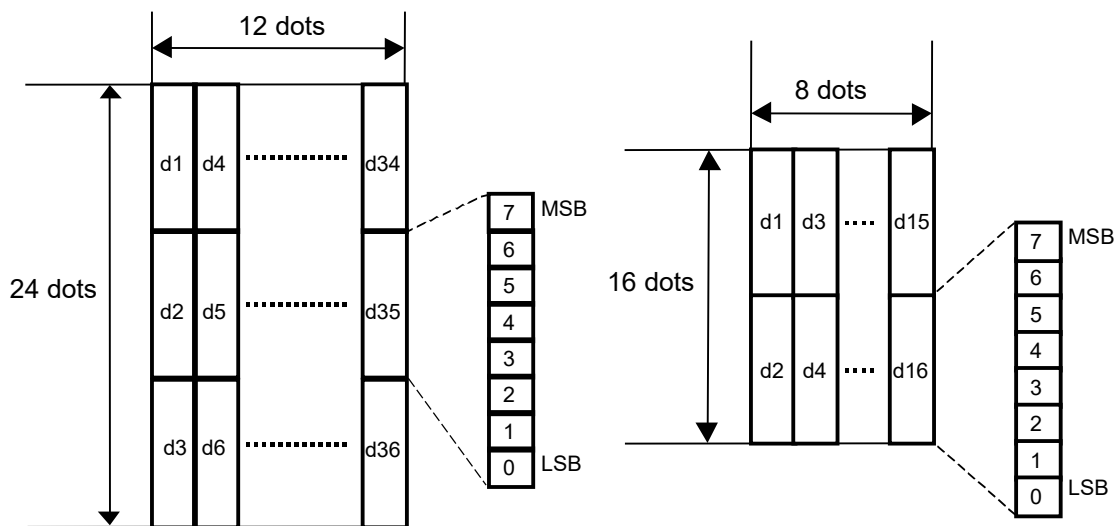
- y: Number of bytes in vertical direction
- s: Registration start character code
- e: Registration end character code
- x: Number of dots in horizontal direction to register
- d: Font data
- k: Number of data bytes for 1 character
- n: Number of characters to register

The downloaded character is not registered at the factory.

Notes

The registrable character codes are ASCII codes in the range of 20H to 7EH.
 Multiple continuous character codes can be registered in 1 registration. To register only 1 character, specify s = e.
 d is registration data and indicates the pattern of x dots in the horizontal direction from the left end. When x is less than the character configuration number of dots at this time, the remaining dots on the right side become spaces.
 The number of data bytes k necessary for registering 1 downloaded character is k = y × x bytes.
 The number of characters n to register is n = e - s + 1.
 In the registration data, the bits corresponding to dots to print are 1, and the bits corresponding to dots not to print are 0.
 The memory usage m is 6184 bytes (including the number of bytes of memory control information).

Related Commands ESC '%', ESC '?'



Code 1BH 25H n

Definition Range $0 \leq n \leq 255$

Default n = 0

Function Sets the downloaded character.
 n = <*****0>B: The downloaded character is canceled.
 n = <*****1>B: The downloaded character is specified.

Notes Only the LSB is valid for n.
 When the downloaded character is canceled, the internal character set is automatically specified.

Related Commands ESC '&', ESC '?'

Code 1BH 3FH n

Definition Range $20H \leq n \leq 7EH$

Function Releases the downloaded character of the specified code to make it undefined. After releasing, the printer prints the internal character.
 n: Character code to release registration pattern

Notes The downloaded character specified by the character code n is released. The character font selected by the "Specify Print Mode" command (ESC '!') is affected.
 When the specified character code is undefined, this command is ignored.

Related Commands ESC '&', ESC '%'

Code 12H 44H n

Definition Range $0 \leq n \leq 255$

Function Releases or allocates the downloaded character area.
 n = <*****0>B: The downloaded character area is released.
 n = <*****1>B: The downloaded character area is allocated.

Notes Only the LSB is valid for n.
 When the downloaded character area is released, the registered downloaded characters are deleted, and the downloaded character specification is canceled. Moreover, the "Register Downloaded Character" command (ESC '&') and the "Set Downloaded Character Set" command (ESC '%') are ignored.
 The downloaded character area is 6184 bytes.
 In order to allocate again the downloaded character area that has been released, 6184 bytes or more are necessary for the remaining memory capacity. When the remaining memory capacity is insufficient, the downloaded character area is not allocated, and this command is ignored.

Releasing the area cannot increase the remaining memory capacity. The area can be used again as the user area by the "Defragment User Area" command (DC2 '*' '1').

Code 12H 4FH n

Definition Range $0 \leq n \leq 255$

Default n = 0 (Optional font printing canceled)

Function Sets the optional font.
 n = <*****0>B: Optional font printing is canceled.
 n = <*****1>B: Optional font printing is specified.

Notes Only the LSB is valid for n.
 When the optional font printing is specified, and the character codes to print are registered as optional font, they are printed with the optional font.
 In printing, the optional font has priority over the downloaded character.

Code 12H 50H s e y x [d]k

Definition Range $20H \leq s \leq e \leq 7EH$
 $1 \leq y \leq 127, 1 \leq x \leq 127$

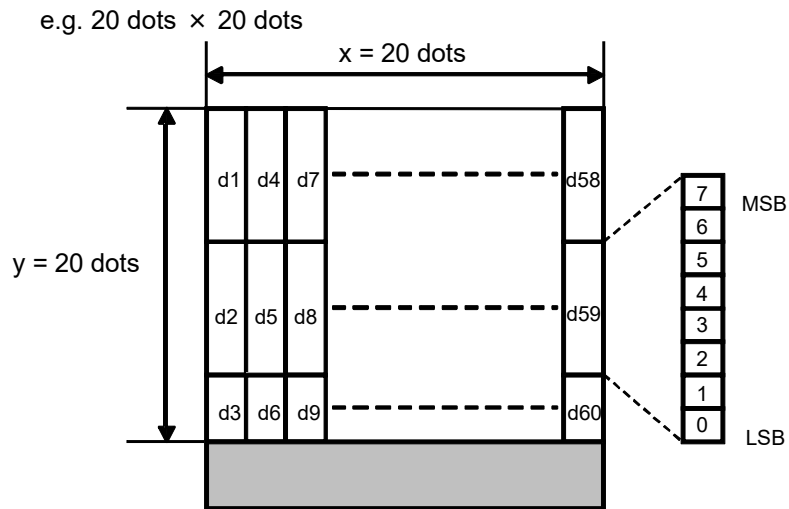
Function Allocates a memory area of optional font and registers the optional font.
 s: Registration start character code
 e: Registration end character code
 y: Number of vertical dots of optional font
 x: Number of horizontal dots of optional font
 d: Font data
 k: Total number of data bytes
 The optional font is not registered at the factory.

Notes When the optional font of the specified set is already registered, but the registration content is not the same, the area is allocated again to register the optional font.
 When y or x is out of the definition range, the subsequent data is processed as normal data.

The number of data bytes for 1 character is calculated by the formula below.
 $INT ((y + 7) / 8) \times x$ bytes

The total number of data bytes k is calculated by the formula below.
 $k = INT ((y + 7) / 8) \times x \times (e - s + 1)$

For the font data of 1 character, vertical 8 dots are input as 1 byte data in the order shown in the following figure. The following figure is the case of $x = y = 20$.



*The gray area is disregarded.

The calculating method for the memory usage m is different from the calculating method for the total number of data bytes k , because the font image is stored by the low scan method when registered in the memory.

The memory usage m is calculated by the formula below.

$$m = \text{INT}((x + 7) / 8) \times y \times (e - s + 1) + \text{Number of bytes of memory control information}$$

DC2 'Q'

Release Optional Font Area

Code 12H 51H

Function Releases the memory area of the registered optional fonts.
After releasing, the registered optional fonts are not printed.

Notes Releasing the area cannot increase the remaining memory capacity. The area can be used again as the user area by the "Defragment User Area" command (DC2 '*' '1').

6.4.4 Print Position

GS 'P' x y

Set Basic Calculation Pitch

Code 1DH 50H x y

Definition Range $0 \leq x \leq 255$
 $0 \leq y \leq 255$

Default x = 203, y = 203 (Minimum pitches of the printer)

Function Sets the basic calculation pitch in the horizontal direction to 1/x inches, and the basic calculation pitch in the vertical direction to 1/y inches.
x = 0 and/or y = 0: x and/or y returns to the default value.

Notes The horizontal direction means the direction perpendicular to paper feed, and the vertical direction means the paper feed direction.

The following parameters are used regardless of the character orientation (inversion (flip), 90° right rotated, etc.).

Commands that use x: ESC SP, ESC '\$', ESC '\', FS 'S', GS 'L', GS 'W'

Commands that use y: ESC '3', ESC 'J', ESC 'j', GS 'V'

Executing this command does not affect various settings that have been already set (line spacing, character spacing, etc.).

When the calculation result combined with other commands has fractions, adjust with the minimum pitch of the printer, and round down the remainder.

Related Commands ESC SP, ESC '\$', ESC '\', ESC '3', ESC 'J', ESC 'j', ESC 'W', FS 'S', GS '\$', GS '\', GS 'L', GS 'W', GS 'V'

HT

Horizontal Tab

Code 09H

Function Shifts the print position to the next horizontal tab position.

Notes This command is ignored when the next horizontal tab position is not set.
The print position is shifted to [print area width + 1] when the next horizontal tab position is beyond the print area.
The horizontal tab position is set by the "Set Horizontal Tab Position" command (ESC 'D').
The default of the horizontal tab position is every 8 characters of the character font in the initial state.
Upon reception of this command when the print position is at [print area width + 1], full print of the current line and horizontal tab processing from the beginning of the next line are executed.

Related Commands ESC 'D'

ESC 'D' [n]k NUL

Set Horizontal Tab Position

Code 1BH 44H [n]k 00H

Definition Range $1 \leq n \leq 255$, $0 \leq k \leq 32$

Default Every 8 characters of the character font in the initial state

Function Sets the horizontal tab position.
n: Number of characters from the left margin or beginning of the line to the setting position
k: Number of horizontal tab positions to be set

Notes The horizontal tab position is set as $[n \times \text{character width}]$ from the left margin or beginning of the line. The character width here means the entire character width including the right space of the character, and when the double width is specified, this width is doubled.
 This command cancels the horizontal tab positions already set.
 When $n = 8$ is set as the horizontal tab position, the next print position shifts to the 9th character by executing the "Horizontal Tab" command (HT).
 Up to 32 horizontal tabs can be set ($k = 32$).
 When the number of tabs exceeds this number, the subsequent data is processed as normal data. Input n that specifies the setting position in ascending order and end with 00H. When n is equal to or smaller than the preceding n , the setting process of horizontal tab position ends at the moment that n is input, and the subsequent data is processed as normal data.
 Canceling all horizontal tab positions is performed by the "Set Horizontal Tab Position" command (ESC 'D' [n]k NUL).
 When n exceeds the printable area of 1 line, the horizontal tab position is set at the number of printable characters per line + 1.
 Even when the character width is changed after setting the horizontal tab position, the set horizontal tab position remains unchanged.

Related Commands HT

ESC 'a' n Alignment

Code 1BH 61H n

Definition Range $0 \leq n \leq 2, 48 \leq n \leq 50$

Default $n = 0$

Function Aligns all print data on 1 line to the specified position.

n	Alignment
0, 48	Aligned left
1, 49	Centered
2, 50	Aligned right

Notes This command is valid only when input at the beginning of the line.
 Alignment is performed within the print area width being set. The portion skipped by the "Horizontal Tab" command (HT), "Specify Absolute Position" command (ESC '\$'), or "Specify Relative Position" command (ESC '\') is also aligned.

GS 'L' nl nh Set Left Margin

Code 1DH 4CH nl nh

Definition Range $0 \leq nl \leq 255, 0 \leq nh \leq 255$

Default $nl = 0, nh = 0$

Function Sets the left margin specified by nl and nh .
 The left margin is $[(nh \times 256 + nl) \times \text{basic calculation pitch}]$ inches.

Notes

This command is valid only when input at the beginning of the line.
 When a value that exceeds the printable area of 1 line is input, the maximum value of the printable area is set as the left margin.
 The basic calculation pitch is set by the "Set Basic Calculation Pitch" command (GS 'P').
 Moreover, once set, the left margin does not change even when the basic calculation pitch is changed by the "Set Basic Calculation Pitch" command (GS 'P').
 The basic calculation pitch in the horizontal direction (x) of "Set Basic Calculation Pitch" command (GS 'P') is used for calculating the left margin. Moreover, when the calculation result is a fractional figure, it is corrected using the minimum pitch of the printer, and the remainder is discarded.

When the set print area width is less than 1 character of the currently specified character type at character data mapping, the following processing is performed only for that line.

- (1) Within the printable area, the print area is extended to the right side up to the equivalent of 1 character of the specified character type.
- (2) When an area up to the equivalent of 1 character cannot be secured even when (1) is performed, the print area is extended to the left side. (The left margin is reduced.)

When the set print area width is less than the minimum width of 1 internal character (the width of the font size selected by character font selection) at mapping of the data other than characters (bit image, etc.), the following processing is performed only for that line.

- (1) Within the printable area, the print area is extended to the right side up to the equivalent of the minimum width of 1 internal character.
- (2) When an area up to the equivalent of 1 character cannot be secured even when (1) is performed, the print area is extended to the left side. (The left margin is reduced.)

Ruled line data set in the "6.4.10 Ruled Line" command is not shifted or masked due to the left margin setting. (The ruled line data is always valid for the printable area.)

Related Commands GS 'P', GS 'W'

GS 'W' nl nh**Set Print Area Width****Code**

1DH 57H nl nh

Definition Range

$0 \leq nl \leq 255, 0 \leq nh \leq 255$

Default

Printable area

Function

Sets the print area width specified by nl and nh.
 The print area width is $[(nh \times 256 + nl) \times \text{basic calculation pitch}]$ inches.

Notes

This command is valid only when input at the beginning of the line.
 When a value that exceeds the printable area of 1 line is input, the entire area excluding the left margin is set as the print area width.
 The basic calculation pitch is set by the "Set Basic Calculation Pitch" command (GS 'P').
 Moreover, once set, the print area width does not change even when the basic calculation pitch is changed by the "Set Basic Calculation Pitch" command (GS 'P').
 The basic calculation pitch in the horizontal direction (x) of "Set Basic Calculation Pitch" command (GS 'P') is used for calculating the print area width. Moreover, when the calculation result has fractions, adjust with the minimum pitch of the printer, and round down the remainder.

When the set print area width is less than 1 character of the currently specified character type at character data mapping, the following processing is performed only for that line.

- (1) Within the printable area, the print area is extended to the right side up to the equivalent of 1 character of the specified character type.
- (2) When an area up to the equivalent of 1 character cannot be secured even when (1) is performed, the print area is extended to the left side. (The left margin is reduced.)

When the set print area width is less than the minimum width of 1 internal character (the width of the font size selected by character font selection) at mapping of the data other than characters (bit image, etc.), the following processing is performed only for that line.

- (1) Within the printable area, the print area is extended to the right side up to the equivalent of the minimum width of 1 internal character.
- (2) When an area up to the equivalent of 1 character cannot be secured even when (1) is performed, the print area is extended to the left side. (The left margin is reduced.)

Ruled line data set in the "6.4.10 Ruled Line" command is not shifted or masked due to the print area width setting. (The ruled line data is always valid for the maximum value of the printable area.)

Related Commands GS 'L', GS 'P'

ESC '\$' nl nh

Specify Absolute Position

Code 1BH 24H nl nh

Definition Range $0 \leq nl \leq 255, 0 \leq nh \leq 255$

Function Specifies the print position based on the left margin position.
The next print position is $[(nh \times 256 + nl) \times \text{basic calculation pitch}]$ inches from the left margin position.

Notes Specifications beyond the print area are ignored.
The absolute print position is specified based on the beginning of the line.
The basic calculation pitch is set by the "Set Basic Calculation Pitch" command (GS 'P').
When the calculation result has fractions, adjust with the minimum pitch of the printer, and round down the remainder.
The basic calculation pitch in the horizontal direction (x) is used.

Related Commands ESC '\', GS 'P'

ESC '\' nl nh

Specify Relative Position

Code 1BH 5CH nl nh

Definition Range $0 \leq nl \leq 255, 0 \leq nh \leq 255$

Function Specifies the print position based on the current position.
The next print position is $[(nh \times 256 + nl) \times \text{basic calculation pitch}]$ inches from the current position.

Notes Specifications beyond the print area are ignored.
In relation to the character direction, specify a positive number to specify rightward from the current position and specify a negative number to specify leftward from the current position. Negative numbers are represented by 2's complement.
The basic calculation pitch is set by the "Set Basic Calculation Pitch" command (GS 'P').
When the calculation result has fractions, adjust with the minimum pitch of the printer, and round down the remainder.
The basic calculation pitch in the horizontal direction (x) is used.

Related Commands ESC '\$', GS 'P'

6.4.5 Image

ESC ^{1*1} m nl nh [d]k

Print Bit Image Mode

Code 1BH 2AH m nl nh [d]k

Definition Range m = 0, 1, 32, 33
 $0 \leq nl \leq 255, 0 \leq nh \leq 3, 0 \leq d \leq 255$

Function Stores a bit image of the number of dots specified by nl and nh in the line buffer in the mode specified by m.

m	Mode	Number of Vertical Dots	Vertical Dot Density	Horizontal Dot Density	Number of Data Dots (k)
0	8 dots single density	8	67 dpi	101 dpi	$nh \times 256 + nl$
1	8 dots double density	8	67 dpi	203 dpi	$nh \times 256 + nl$
32	24 dots single density	24	203 dpi	101 dpi	$(nh \times 256 + nl) \times 3$
33	24 dots double density	24	203 dpi	203 dpi	$(nh \times 256 + nl) \times 3$

This command only stores the bit image in the line buffer. The bit image is printed through a print command or 1 line full.

Notes When m is out of the definition range, the subsequent data is processed as normal data. nl and nh indicate the horizontal dots of the bit image to be printed, and the number of data dots is $[nh \times 256 + nl]$.

When bit image data exceeding the printable dots on 1 line is input, the excess data is discarded.

d indicates the bit image data. The bits that correspond to dots to print are 1, and the bits that correspond to dots not to print are 0. The data is input in the order in the figure below.

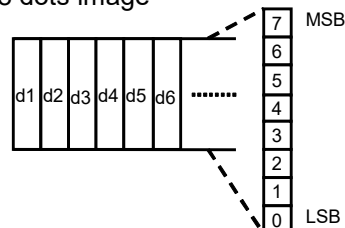
When the print area width set by the "Set Left Margin" command (GS 'L') or "Set Print Area Width" command (GS 'W') is less than the minimum width of 1 internal character (the width of the font size selected by character font selection), the following processing is performed only for that line.

- (1) Within the printable area, the print area is extended to the right side up to the equivalent of the minimum width of 1 internal character.
- (2) When an area up to the equivalent of 1 character cannot be secured even when (1) is performed, the print area is extended to the left side. (The left margin is reduced.)

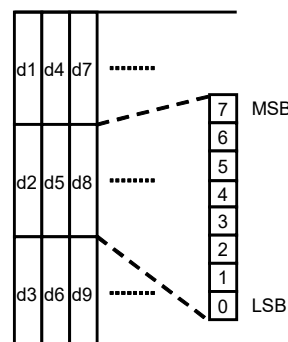
The printer returns to usual data processing after completion of processing the image data. The functions of print mode (bold printing, double strike printing, underline, character size, etc.) excluding inversion (flip) printing are not affected.

<Data input order>

8 dots image



24 dots image



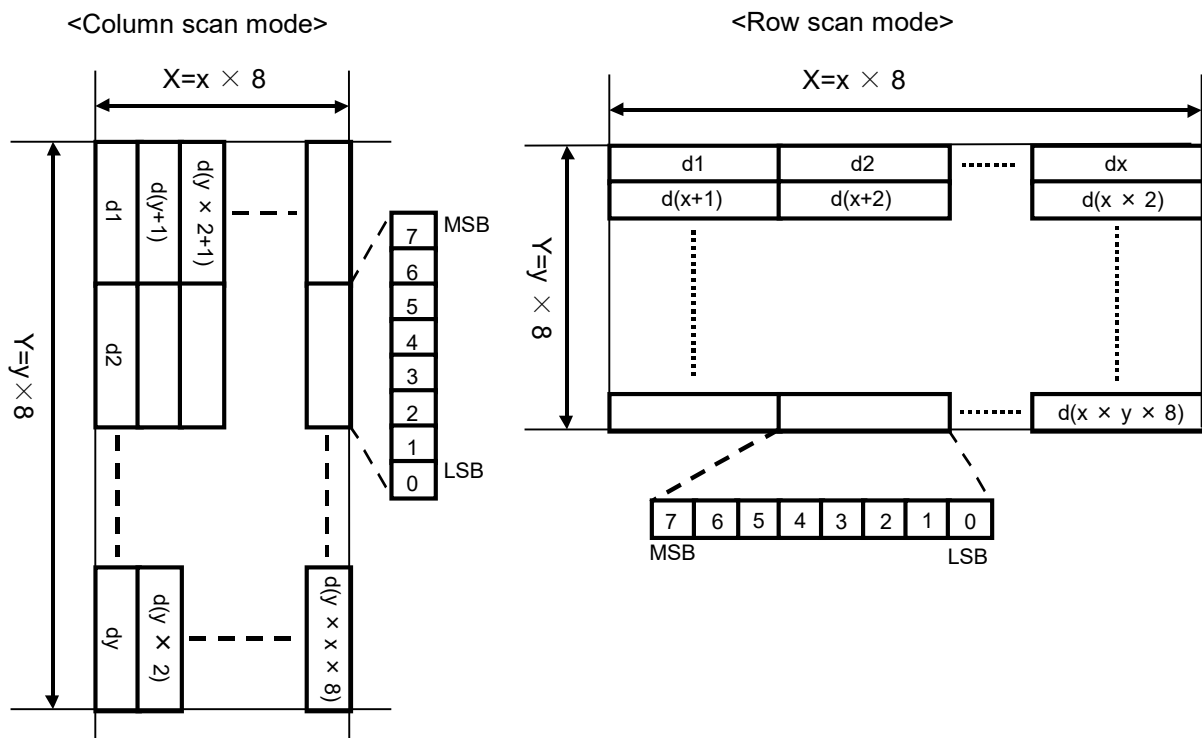
Code 1DH 2AH x y [d]k

Definition Range $1 \leq x \leq 255, 1 \leq y \leq 255, 0 \leq d \leq 255, 8 \leq k \leq 65524$
 (Deleted when $x = 0$ or $y = 0$)

Function Registers the downloaded bit image of dots specified by x and y.
 ($x \times 8$) specifies the number of dots in the horizontal direction.
 ($y \times 8$) specifies the number of dots in the vertical direction.
 The downloaded bit image is not registered at the factory.

Notes Downloaded bit image is a bit image which can be registered in the user area by this command and printed by the "Print Downloaded Bit Image" command (GS '/').
 The number of dots in horizontal direction is $x \times 8$ dots, and the number of dots in vertical direction is $y \times 8$ dots.
 d indicates the bit image data. The bits that correspond to dots to print are 1, and the bits that correspond to dots not to print are 0.
 Image data exceeding 65524 bytes cannot be registered.
 Whether to use column scan mode or row scan mode for transfer data can be selected by the "Select Bit Image Scan Method" command (DC2 'I').
 k indicates the number of data bytes. $k = y \times x \times 8$ bytes.
 The relation between the downloaded bit image and the print data is shown as follows.
 The memory usage m is calculated by the formula below.
 $m = \text{Number of data bytes} + \text{Number of bytes of memory control information}$
 When there is data in the line buffer, this command is ignored.

Related Commands GS '/'



(1)GS 'l' m
(2)GS 'l' m n

Print Downloaded Bit Image
Select Downloaded Bit Image

Code (1)1DH 2FH m
(2)1DH 2FH m n

Definition Range (1) $0 \leq m \leq 3, 48 \leq m \leq 51$
(2) $4 \leq m \leq 7, 52 \leq m \leq 55, 0 \leq n \leq 255$

Function Prints the registered downloaded bit image data in mode m.
When m is $4 \leq m \leq 7$ or $52 \leq m \leq 55$, the print start position in the horizontal direction of the downloaded bit image can be specified by n. (The print start position is specified at the position of $n \times 8$ dots from the left end of the paper.)

m	Function
0, 48	Normal mode printing
1, 49	Double width mode printing
2, 50	Double height mode printing
3, 51	Quadruple mode printing
4, 52	Normal mode selection
5, 53	Double width mode selection
6, 54	Double height mode selection
7, 55	Quadruple mode selection

Notes This command is ignored when the downloaded bit image data is not registered.
This command is valid only when there is no data in the line buffer.
The print modes (bold printing, double strike printing, underline, character size, etc.) excluding inversion (flip) printing have no effect. The inversion (flip) printing is invalid in the "Select Downloaded Bit Image" command (GS 'l').
When the size of the registered downloaded bit image data exceeds the print area, the excess data is not printed.

When the print area width set by the "Set Left Margin" command (GS 'L') or "Set Print Area Width" command (GS 'W') is less than the minimum width of 1 internal character (the width of the font size selected by character font selection), the following processing is performed only for that line.

- (1) Within the printable area, the print area is extended to the right side up to the equivalent of the minimum width of 1 internal character.
- (2) When an area up to the equivalent of 1 character cannot be secured even when (1) is performed, the print area is extended to the left side. (The left margin is reduced.)

When $0 \leq m \leq 3$ or $48 \leq m \leq 51$, printing starts as soon as the command is accepted.
When $4 \leq m \leq 7$ or $52 \leq m \leq 55$, the selected downloaded bit image is printed on the character printing portion and the space between lines. The image is also printed on the portion of paper feed by the "Print and n Lines Feed Forward" command (ESC 'J') or "Print and n Lines Feed Forward" command (ESC 'd').

When the downloaded bit image is selected, specifying m outside $4 \leq m \leq 7$ and $52 \leq m \leq 55$ cancels the downloaded bit image selection.

Related Commands GS '*'

Code 1DH 76H 30H m xL xH yL yH [d]k

Definition Range $0 \leq m \leq 3, 48 \leq m \leq 51, 64 \leq m \leq 67, 128 \leq m \leq 131, 192 \leq m \leq 195,$
 $0 \leq xL \leq 255, 0 \leq xH \leq 255$
 $0 \leq yL \leq 255, 0 \leq yH \leq 15, 0 \leq d \leq 255$
 $k = (xH \times 256 + xL) \times (yH \times 256 + yL)$ However, $k \neq 0$

Function Prints a raster format bit image in mode m.

m	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48, 64, 128, 192	Normal mode	203 dpi	203 dpi
1, 49, 65, 129, 193	Double width mode	203 dpi	101 dpi
2, 50, 66, 130, 194	Double height mode	101 dpi	203 dpi
3, 51, 67, 131, 195	Quadruple mode	101 dpi	101 dpi

xL and xH specify the number of horizontal data bytes of the bit image as $(xH \times 256 + xL)$ bytes. yL and yH specify the number of vertical data bits of the bit image as $(yH \times 256 + yL)$ bits.

When $128 \leq m \leq 131$ or $192 \leq m \leq 195$ is set, the received bit image data is mapped on the memory, and then the image is printed collectively.

When $64 \leq m \leq 67$ or $192 \leq m \leq 195$ is set, the received bit image data is treated as compressed data and printed after uncompressing.

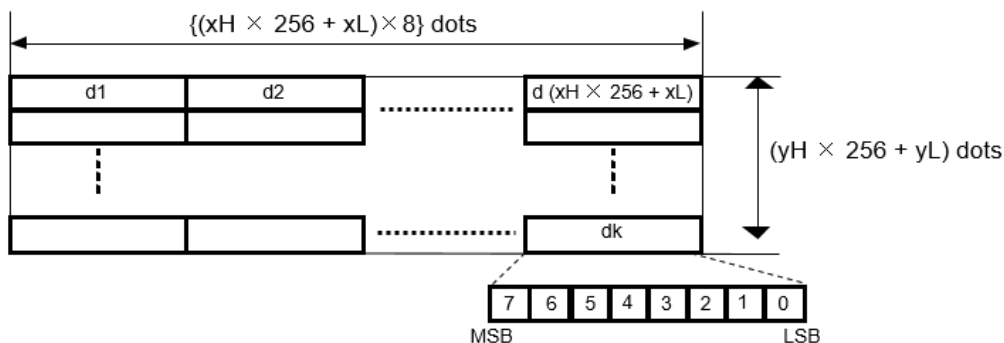
Notes This command is valid only when there is no print data in the line buffer. All functions of print mode (character size, bold printing, double strike printing, inversion (flip) printing, underline, reverse printing, etc.) are not affected on raster bit images.

When the print area width set by the "Set Left Margin" command (GS 'L') or "Set Print Area Width" command (GS 'W') is less than the minimum width, the print area width is extended to the minimum width only for that line. The minimum width is 1 dot regardless of the mode. The data outside of the printable area is discarded in dots.

The print start position of the raster bit image can be freely specified by the "Horizontal Tab" command (HT), "Specify Absolute Position" command (ESC '\$'), "Specify Relative Position" command (ESC '\'), or "Set Left Margin" command (GS 'L').

The setting of the "Alignment" command (ESC 'a') is valid for raster bit images as well.

When $0 \leq m \leq 3, 48 \leq m \leq 51,$ or $128 \leq m \leq 131$ is set, the bits that correspond to dots to print are 1, and the bits that correspond to dots not to print are 0 in the bit image data d.



When $64 \leq m \leq 67$ or $192 \leq m \leq 195$ is set, the bit image data is input in an RLE (Run Length Encoding) compression data format positioning MSB on the left.

The data of 1 dot-line is defined by the following format.

[n [d]n]: Compressed data of 1 dot-line
 n = Number of compressed data bytes of 1 dot-line
 d = Compressed data 1 byte

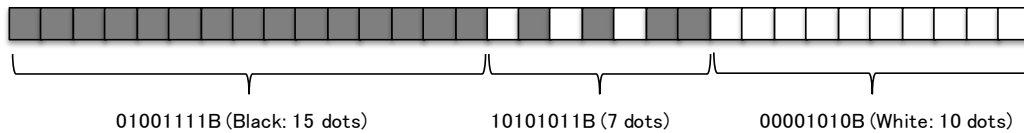
When the bit 7 of d is 0, the bits 6 to 0 indicate as follows:

Bit 6: Color (0 = white / 1 = black)

Bit 5 to 0: Number of continuous dots

When the bit 7 of d is 1, the bits 6 to 0 directly indicate the image data of 7 dots.

For example, when 1 dot-line is an image as below, the bit image data is 03H 4FH ABH 0AH.



Depending on the data before compression, the size of the compressed data may be larger than before compression. In that case, the compressed data takes longer to transfer.

When using this command, reduced printing speed, for example due to the communication speed may cause poor print quality or abnormal noise. Therefore, use this command in the environment where printing can be performed maintaining the print speed above a certain speed regardless of the communication speed.

DC2 'l' n

Select Bit Image Scan Method

Code 12H 49H n

Definition Range $0 \leq n \leq 255$

Default n = 0 (Column scan)

Function Specifies whether to transfer bit image registration with column scan or row scan data.
 n = <*****0>B: Column scan is specified.
 n = <*****1>B: Row scan is specified.

Notes Only the LSB is valid for n.

The command affected by this setting is as follows:
 Register Downloaded Bit Image (GS '*')

DC2 '=' n

Select Image LSB/MSB

Code 12H 3DH n

Definition Range $0 \leq n \leq 255$

Default n = 1

Function When the row scan method is selected as the bit image scan method, the command selects whether the left edge of the print image is the LSB or MSB of the bit image data.
 n = <*****0>B: The LSB is the left edge or top.
 n = <*****1>B: The MSB is the left edge or top.

Notes Only the LSB is valid for n.

The commands affected by this setting are as follows:

Register NV Graphics Data
(1)GS '(' 'L' pL pH '0' fn '0' kc1 kc2 b xL xH yL yH '1' [d]k
(2)GS '8' 'L' p1 p2 p3 p4 '0' fn '0' kc1 kc2 b xL xH yL yH '1' [d]k
Store Graphics Data in Print Buffer
(1) GS '(' 'L' pL pH '0' fn '0' bx by '1' xL xH yL yH [d]k
(2) GS '8' 'L' p1 p2 p3 p4 '0' fn '0' bx by '1' xL xH yL yH [d]k
Register Downloaded Bit Image (GS '*')
Print Raster Bit Image (GS 'v' '0')
Write Ruled Line Image (DC3 'v')
Fill Ruled Line Pattern (DC3 'F')

When $64 \leq m \leq 67$ or $192 \leq m \leq 195$ is set in the "Print Raster Bit Image" command (GS 'v'), only the internal flag operation of the printer is executed.

When this command is input while the column scan is selected, only the internal flag operation of the printer is executed.

Related Commands DC2 'I'

GS '(' 'L' pL pH '0' fn Send NV Graphics Memory Capacity

Code 1DH 28H 4CH pL pH 30H fn

Definition Range pL = 2, pH = 0
fn = 0, 48

Function In response to the request of this command, the printer sends the number of bytes of total capacity in NV graphics area by 4 bytes in a HEX code format.
The number of data bytes to be sent is 2 bytes of header and footer + $4 \times 2 = 10$ bytes.
pL, pH: Number of bytes of the following parameter
fn: Function selection number

Notes The NV graphics memory capacity means the maximum value available for NV graphics in the user area. This value varies depending on the usage of the user area by other commands.

Related Commands GS '(' 'L', GS '8' 'L'
See "6.3 RESPONSE DATA".

GS '(' 'L' pL pH '0' fn Send NV Graphics Memory Remaining Capacity

Code 1DH 28H 4CH pL pH 30H fn

Definition Range pL = 2, pH = 0
fn = 3, 51

Function In response to the request of this command, the printer sends the number of bytes of remaining capacity in NV graphics area by 4 bytes in a HEX code format.
The number of data bytes to be sent is 2 bytes of header and footer + $4 \times 2 = 10$ bytes.
pL, pH: Number of bytes of the following parameter
fn: Function selection number

Notes The memory capacity of the unused area excluding the released area is sent by HEX code.
The value to be sent is the same as that of the "Send Remaining User Area" command.

Related Commands GS '(' 'L', GS '8' 'L', DC2 '*' '1', DC2 '*' '2'
See "6.3 RESPONSE DATA".

Code 1DH 28H 4CH pL pH 30H fn 4BH 43H

Definition Range pL = 4, pH = 0
fn = 64

Function In response to the request of this command, the printer sends the key code list of the registered NV graphics by character string.

pL, pH: Number of bytes of the following parameter

fn: Function selection number

Notes When 40 or more key codes are registered, the data is divided to the upper limit of 40 key codes and sent. The 1st character of the response shows the status of the data that follows.

Response Data	Status
40H	No following data exists
41H	Following data exists

The printer performs the following operations according to the transmission data from the host device after sending the character string once.

Transmission Data	Operation
06H	Preceding status 40H: Terminates processing Preceding status 41H: Sends next data group
15H	Resends preceding data group
18H	Even when continuing data exists, the processing is aborted and terminated.

The printer does not return to normal processing until the processing is terminated or suspended by the operations above.

Related Commands GS '('L', GS '8' 'L'
See "6.3 RESPONSE DATA".

Code 1DH 28H 4CH pL pH 30H fn 43H 4CH 52H

Definition Range pL = 5, pH = 0
fn = 65

Function Deletes all NV graphics data in batch.

pL, pH: Number of bytes of the following parameter

fn: Function selection number

Notes This command is valid only when there is no print data in the line buffer.
Deleting the graphics data cannot increase the remaining memory capacity. The area can be used again as the user area by the "Defragment User Area" command (DC2 '*' '1').

Related Commands GS '('L', GS '8' 'L'

Code 1DH 28H 4CH pL pH 30H fn kc1 kc2

Definition Range pL = 4, pH = 0
fn = 66
 $32 \leq kc1 \leq 126$, $32 \leq kc2 \leq 126$

Function Deletes the NV graphics data specified by key code.
pL, pH: Number of bytes of the following parameter
fn: Function selection number
kc1, kc2: Key code

Notes When the NV graphics data is not registered in the specified key code, this command is ignored.
This command is valid only when there is no print data in the line buffer.
Deleting the graphics data cannot increase the remaining memory capacity. The area can be used again as the user area by the "Defragment User Area" command (DC2 '*' '1').

Related Commands GS '(' 'L', GS '8' 'L'

Code 1DH 28H 4CH pL pH 30H fn kc1 kc2 x y

Definition Range pL = 6, pH = 0
fn = 69
 $32 \leq kc1 \leq 126$, $32 \leq kc2 \leq 126$
x = 1, 2
y = 1, 2

Function Prints the NV graphics data specified by key code in x times the width and y times the height.
pL, pH: Number of bytes of the following parameter
fn: Function selection number
kc1, kc2: Key code
x: Horizontal scale
y: Vertical scale

Notes When the NV graphics data is not registered in the specified key code, this command is ignored.
This command is valid only when there is no print data in the line buffer.
The print modes (bold printing, double strike printing, underline, character size, etc.) excluding the inversion (flip) printing have no effect.

When the print area width set by the "Set Left Margin" command (GS 'L') or "Set Print Area Width" command (GS 'W') is less than the minimum width of 1 internal character (the width of the font size selected by character font selection), the following processing is performed only for that line.

- (1) Within the printable area, the print area is extended to the right side up to the equivalent of the minimum width of 1 internal character.
- (2) When an area up to the equivalent of 1 character cannot be secured even when (1) is performed, the print area is extended to the left side. (The left margin is reduced.)

Related Commands GS '(' 'L', GS '8' 'L'

Code 1DH 28H 4CH pL pH 30H fn kc1 kc2 x y z

Definition Range pL = 7, pH = 0
fn = 70
 $32 \leq kc1 \leq 126$, $32 \leq kc2 \leq 126$
x = 1, 2
y = 1, 2
 $0 \leq z \leq 255$

Function Selects the NV graphics data specified by key code with x times the width and y times the height. The print start position in the horizontal direction of the graphics data can be specified by z. (The print start position is specified at the position of $z \times 8$ dots from the left edge of the paper.)

pL, pH: Number of bytes of the following parameter
fn: Function selection number
kc1, kc2: Key code
x: Horizontal scale
y: Vertical scale
z: Horizontal print start position

Notes When the NV graphics data is not registered in the specified key code, this command is ignored.

Multiple NV graphics cannot be selected. The last selected graphics is valid.
This command is valid only when there is no print data in the line buffer.

Related Commands GS '(' 'L', GS '8' 'L'

(1)GS '(' 'L' pL pH '0' fn '0' kc1 kc2 b xL xH yL yH '1' [d]k

(2)GS '8' 'L' p1 p2 p3 p4 '0' fn '0' kc1 kc2 b xL xH yL yH '1' [d]k

Register NV Graphics Data

Code (1)1DH 28H 4CH pL pH 30H fn 30H kc1 kc2 b xL xH yL yH 31H [d]k
(2)1DH 38H 4CH p1 p2 p3 p4 30H fn 30H kc1 kc2 b xL xH yL yH 31H [d]k

Definition Range For (1) : $12 \leq (pH \times 256 + pL) \leq 65535$
For (2) : $12 \leq (p4 \times 16777216 + p3 \times 65536 + p2 \times 256 + p1) \leq 917501$
fn = 67
 $32 \leq kc1 \leq 126$, $32 \leq kc2 \leq 126$, b = 1
 $1 \leq (xH \times 256 + xL) \leq 8192$
 $1 \leq (yH \times 256 + yL) \leq 2304$
 $0 \leq d \leq 255$, $k = (\text{int}((xH \times 256 + xL) / 8) \times (yH \times 256 + yL))$

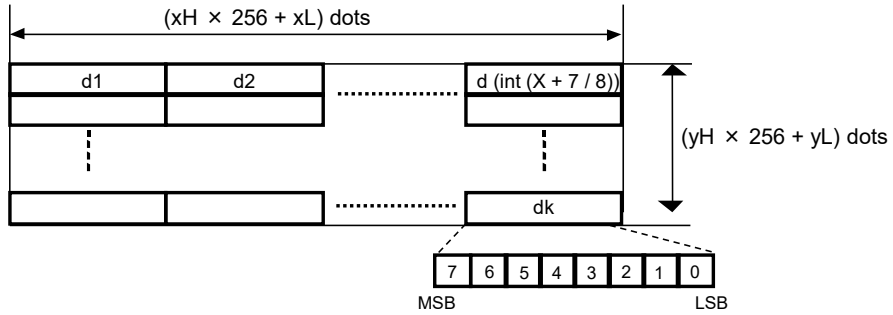
Function Registers the NV graphics data corresponding to key code kc1 and kc2. When the key code is different, more than one data can be registered within the memory capacity.

pL, pH or p1, p2, p3, p4: Number of bytes of the following parameter
fn: Function selection number
b: Fixed value
xL, xH: Horizontal size of registered data, $(xH \times 256 + xL)$ dots
yL, yH: Vertical size of registered data, $(yH \times 256 + yL)$ dots
d: Registered data
k: Number of image data bytes

The NV graphics is not registered at the factory.

Notes

By this command, the number of data bytes + memory control information bytes is used in the user area of the FLASH memory.
When the remaining capacity of the user area is less than the memory usage m , this command is ignored.
This command is valid only when there is no print data in the line buffer.
The memory usage m is calculated by the formula below.
 $m = \text{Number of data bytes} + \text{Number of bytes of memory control information}$



Related Commands

GS '(' 'L'

6.4.6 Barcode

GS 'H' n

Select HRI Character Print Position

Code 1DH 48H n

Definition Range $0 \leq n \leq 3, 48 \leq n \leq 51$

Default n = 0

Function Selects the HRI character print position at barcode printing.

n	Print Position
0, 48	Not printed
1, 49	Over barcode
2, 50	Under barcode
3, 51	Over and under barcode (both)

Notes HRI is an acronym that stands for Human Readable Interpretation. The HRI character is printed in the font selected by the "Select HRI Character Font" command (GS 'f').

Related Commands GS 'f', GS 'k', ESC 'M'

GS 'f' n

Select HRI Character Font

Code 1DH 66H n

Definition Range n = 0, 1, 48, 49

Default n = 0

Function Selects the HRI character font at barcode printing.

n	Font
0, 48	Font A (24 × 12)
1, 49	Font B (16 × 8)

Notes HRI is an acronym that stands for Human Readable Interpretation. The HRI character is printed at the position specified by the "Select HRI Character Print Position" command (GS 'H'). The HRI character is printed on the basis of the position that is lowered by the specified character's height under the base line of the barcode printing.

Related Commands GS 'H'

Code 1DH 68H n

Definition Range $1 \leq n \leq 255$

Default n = 162

Function Sets the barcode height to n dots.

Notes When the value less than the GS1 Databar standard is specified, it is automatically adjusted to the minimum height of each GS1 Databar.

Related Commands GS 'k'

Code 1DH 77H n

Definition Range $2 \leq n \leq 6$

Default n = 3

Function Sets the barcode width in dots.

n	Multilevel Barcode Module Width (mm)	Binary Level Barcode Narrow Element (mm)
2	0.250	0.250 (2 dots)
3	0.375	0.375 (3 dots)
4	0.500	0.500 (4 dots)
5	0.625	0.625 (5 dots)
6	0.750	0.750 (6 dots)

Notes Multilevel barcode refers to the following barcode systems:
UPC-A, UPC-E, JAN13 (EAN13), JAN8 (EAN8), CODE93, CODE128,
JAN13 (EAN13) add-on, GS1 Databar Omni-directional, GS1 Databar Truncated,
GS1 Databar Limited, GS1 Databar Expanded

Binary level barcode refers to the following barcode systems:
CODE39, ITF, CODABAR

The wide element of the binary level barcode varies depending on the setting of the barcode N:W ratio.

Set 3 or greater to n when the bars are parallel to the thermal paper feed direction. When 2 is set to n, the reading accuracy may degrade.

Related Commands GS 'k', DC2 ':'

Code 12H 3AH n

Definition Range $0 \leq n \leq 2$

Default n = 1

Function Changes the barcode N:W ratio (Narrow width : Wide width).

n	N:W
0	1:2
1	1:2.5
2	1:3

The width of the element is determined as follows depending on the barcode width setting.

Narrow Element (mm)	Wide Element (mm)		
	N:W = 1:2	N:W = 1:2.5	N:W = 1:3
0.250 (2 dots)	0.500 (4 dots)	0.625 (5 dots)	0.750 (6 dots)
0.375 (3 dots)	0.750 (6 dots)	1.000 (8 dots)	1.125 (9 dots)
0.500 (4 dots)	1.000 (8 dots)	1.250 (10 dots)	1.500 (12 dots)
0.625 (5 dots)	1.250 (10 dots)	1.625 (13 dots)	1.875 (15 dots)
0.750 (6 dots)	1.500 (12 dots)	1.875 (15 dots)	2.250 (18 dots)

Notes Some barcode readers may not read the barcode depending on the setting of the narrow width and the setting value of this command. Fully evaluate with your barcode reader before use.

Related Commands GS 'w'

Code

- (1) 1DH 6BH m [d]k 00H ($0 \leq m \leq 6$)
- (2) 1DH 6BH m n [d]n ($65 \leq m \leq 73, 75 \leq m \leq 78$)
- (3) 1DH 6BH m [d]k 00H [d2]s 00H (m = 22)
- (4) 1DH 6BH m n [d]n s [d2]s (m = 87)

Definition Range

- (1) $0 \leq m \leq 6, 32 \leq d \leq 126, 1 \leq k \leq 150$
- (2)-1 $65 \leq m \leq 73, 1 \leq n \leq 150, 0 \leq d \leq 127$
- (2)-2 $75 \leq m \leq 77, n = 13, 48 \leq d \leq 57$
- (2)-3 $m = 78, 2 \leq n \leq 255, 32 \leq d \leq 34, 37 \leq d \leq 63, 65 \leq d \leq 90, d = 95, 97 \leq d \leq 123$
- (3) $m = 22, 32 \leq d \leq 126, 1 \leq k \leq 150, s = 2, 5, 48 \leq d2 \leq 57$
- (4) $m = 87, 1 \leq n \leq 150, 0 \leq d \leq 127, s = 2, 5, 48 \leq d2 \leq 57$

Function Selects the barcode system and prints the barcode.

m	Barcode System	Number of Barcode Data Bytes	Remarks
0	UPC-A	$11 \leq k \leq 12$	Same barcode system as m = 65
1	UPC-E	$11 \leq k \leq 12$	Same barcode system as m = 66
2	JAN13 (EAN13)	$12 \leq k \leq 13$	Same barcode system as m = 67
3	JAN8 (EAN8)	$7 \leq k \leq 8$	Same barcode system as m = 68
4	CODE39	Variable	Same barcode system as m = 69
5	ITF	Variable (always even number)	Same barcode system as m = 70
6	CODABAR	Variable	Same barcode system as m = 71
22	JAN13 (EAN13) add-on	Add-on 2: $12 \leq k \leq 13, s = 2$	Same barcode system as m = 87
		Add-on 5: $12 \leq k \leq 13, s = 5$	
65	UPC-A	$11 \leq n \leq 12$	Same barcode system as m = 0
66	UPC-E	$11 \leq n \leq 12$	Same barcode system as m = 1
67	JAN13 (EAN13)	$12 \leq n \leq 13$	Same barcode system as m = 2
68	JAN8 (EAN8)	$7 \leq n \leq 8$	Same barcode system as m = 3
69	CODE39	Variable	Same barcode system as m = 4
70	ITF	Variable (always even number)	Same barcode system as m = 5
71	CODABAR	Variable	Same barcode system as m = 6
72	CODE93	Variable	
73	CODE128	Variable	
75	GS1 Databar Omni-directional	$n = 13$	
76	GS1 Databar Truncated	$n = 13$	
77	GS1 Databar Limited	$n = 13$	
78	GS1 Databar Expanded	$2 \leq n \leq 255$	
87	JAN13 (EAN13) add-on	Add-on 2: $12 \leq n \leq 13, s = 2$	Same barcode system as m = 22
		Add-on 5: $12 \leq n \leq 13, s = 5$	

Notes The command configuration, code, definition range, and a part of notes differ depending on the value of m.

The barcode system selected for $0 \leq m \leq 6$ is the same as $65 \leq m \leq 71$, and the barcode system selected for $m = 22$ is the same as $m = 87$, and the print result is also the same.

d and d2 indicate the character to be printed. In each barcode system, when d or d2 is a character code that cannot be printed, the barcode is printed until then, and the subsequent data is processed as normal data. s indicates the number of added symbol data bytes.

When UPC-A barcode data and UPC-E barcode data with 12 bytes including the check digit are specified, the 12th byte is ignored and the check digit is automatically calculated by the printer.

When JAN13 (EAN13) barcode data with 13 bytes including the check digit are specified, the 13th byte is ignored and the check digit is automatically calculated by the printer.

When JAN8 (EAN8) barcode data with 8 bytes including the check digit are specified, the 8th byte is ignored and the check digit is automatically calculated by the printer.

When GS1 Databar Omni-directional, GS1 Databar Truncated, or GS1 Databar Limited is specified, '01' at the beginning is automatically added by the printer. And the check digit is automatically calculated by the printer.

Paper feed length is equivalent to the barcode height (including HRI character when HRI character printing is specified) regardless of the line spacing set by the "Set 1/6 Inch Line Spacing" command (ESC '2'), "Set Line Spacing" command (ESC '3') and so on.

Quiet zones are not secured. Set the quiet zone in accordance with the standard of each barcode system.

When the horizontal direction exceeds the print area of 1 line, only paper feed is performed without printing barcode.

This command is valid only when there is no data in the line buffer. When data exists in the line buffer, the data after m is processed as normal data. Moreover, after the operation of the barcode is completed, the beginning of the line is the next print position.

The print modes (bold printing, double strike printing, underline, character size, etc.) excluding inversion (flip) printing have no effect.

[(1) In the case of GS 'k' m [d]k NUL]

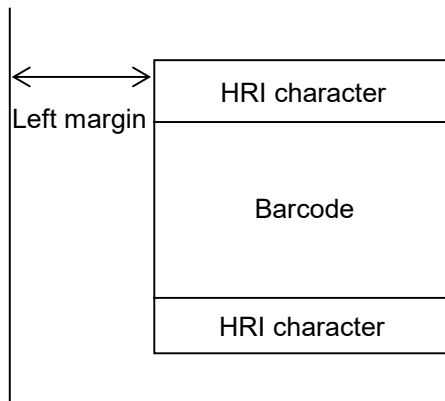
This command ends with NUL code.

k indicates the number of barcode data bytes. When a barcode system with fixed number of bytes is selected, make sure that k matches that number of characters. When the number of bytes is insufficient, the data is processed up to the NUL code. Moreover, when the number of bytes is excessive, the data is processed for fixed length and excess data is processed as normal data.

Make sure that the number of bytes for ITF barcode of m = 5 is an even number. If the number of bytes is an odd number, the last data is ignored.

[(2) In the case of GS 'k' m n [d]n]

n indicates the number of data bytes, and n bytes are processed as barcode data from the next data. If n is out of the definition range, or if the number of bytes is an odd number when ITF barcode of m = 70 is selected, command processing is terminated, and the subsequent data is processed as normal data.



UPC-A: Enter 11 characters using numbers from '0' to '9'. Alternatively, enter additional 1 check digit.

The check digit is automatically calculated inside the printer as well.

UPC-E: Enter 11 characters using numbers from '0' to '9'. Alternatively, enter additional 1 check digit.

The check digit is automatically calculated inside the printer as well.

The following data can be input:

When the original code is 0 - ABCDE - VWXYZ

1 . 0 - ABCDE - 0000Z (Z is 5 to 9)

2 . 0 - ABCD0 - 0000Z

3 . 0 - ABC00 - 000YZ (C is 3 to 9)

4 . 0 - ABC00 - 00XYZ (C is 0 to 2)

JAN13 (EAN13):

Enter 12 characters using numbers from '0' to '9'. Alternatively, enter additional 1 check digit.
The check digit is automatically calculated inside the printer as well.

JAN8 (EAN8):

Enter 7 characters using numbers from '0' to '9'. Alternatively, enter additional 1 check digit.
The check digit is automatically calculated inside the printer as well.

CODE39: Enter any number of characters using ' ', '\$', '%', '+', '-', ':', '/', '0' to '9', and 'A' to 'Z'.

ITF: Enter any even number of characters using numbers from '0' to '9'.

CODABAR: Enter 1 start character of 'A' to 'D', any number of characters using '0' to '9', '+', ':', '/', ':', '\$', '-', and 1 stop character of 'A' to 'D'.

CODE93: Input any data from 00H to 2EH. Multiple data can be input. Input 2FH or more lastly.

CODE93 Code Set

Input	Data	Input	Data	Input	Data
00H	0	10H	G	20H	W
01H	1	11H	H	21H	X
02H	2	12H	I	22H	Y
03H	3	13H	J	23H	Z
04H	4	14H	K	24H	-
05H	5	15H	L	25H	.
06H	6	16H	M	26H	SP
07H	7	17H	N	27H	\$
08H	8	18H	O	28H	/
09H	9	19H	P	29H	+
0AH	A	1AH	Q	2AH	%
0BH	B	1BH	R	2BH	[S1]
0CH	C	1CH	S	2CH	[S2]
0DH	D	1DH	T	2DH	[S3]
0EH	E	1EH	U	2EH	[S4]
0FH	F	1FH	V		

CODE128: There are the following 2 types of data input format.
The start code determines which type of data input format has been selected.

(1) Input the start code of 67H, 68H, or 69H shown in the table of CODE128 Code Set.

Then input any data from 00H to 66H. Multiple data can be input.

(2) Input the start code (START A, START B, or START C) of the code set to be selected shown in the table of CODE128 Special Code. Then input the data in the respective formats.

Code Set A	Data from 00H to 5FH can be input.
Code Set B	Data from 20H to 7FH can be input.
Code Set C	Data from 00H(00) to 63H(99) can be input.

As for the data corresponding to the special code, input it in 2 characters according to the table of CODE128 Special Code.

CODE128 Code Set

Input	Data			Input	Data			Input	Data		
	CodeSet A	CodeSet B	CodeSet C		CodeSet A	CodeSet B	CodeSet C		CodeSet A	CodeSet B	CodeSet C
00H	SP	SP	00	24H	D	D	36	48H	BS	h	72
01H	!	!	01	25H	E	E	37	49H	HT	i	73
02H	"	"	02	26H	F	F	38	4AH	LF	j	74
03H	#	#	03	27H	G	G	39	4BH	VT	k	75
04H	\$	\$	04	28H	H	H	40	4CH	FF	l	76
05H	%	%	05	29H	I	I	41	4DH	CR	m	77
06H	&	&	06	2AH	J	J	42	4EH	SO	n	78
07H	'	'	07	2BH	K	K	43	4FH	SI	o	79
08H	(	(	08	2CH	L	L	44	50H	DLE	p	80
09H	)	)	09	2DH	M	M	45	51H	DC1	q	81
0AH	*	*	10	2EH	N	N	46	52H	DC2	r	82
0BH	+	+	11	2FH	O	O	47	53H	DC3	s	83
0CH	,	,	12	30H	P	P	48	54H	DC4	t	84
0DH	-	-	13	31H	Q	Q	49	55H	NAK	u	85
0EH	.	.	14	32H	R	R	50	56H	SYN	v	86
0FH	/	/	15	33H	S	S	51	57H	ETB	w	87
10H	0	0	16	34H	T	T	52	58H	CAN	x	88
11H	1	1	17	35H	U	U	53	59H	EM	y	89
12H	2	2	18	36H	V	V	54	5AH	SUB	z	90
13H	3	3	19	37H	W	W	55	5BH	ESC	{	91
14H	4	4	20	38H	X	X	56	5CH	FS	|	92
15H	5	5	21	39H	Y	Y	57	5DH	GS	}	93
16H	6	6	22	3AH	Z	Z	58	5EH	RS	~	94
17H	7	7	23	3BH	[	[	59	5FH	US	DEL	95
18H	8	8	24	3CH	\	\	60	60H	FNC3	FNC3	96
19H	9	9	25	3DH	]	]	61	61H	FNC2	FNC2	97
1AH	:	:	26	3EH	^	^	62	62H	SHIFT	SHIFT	98
1BH	;	;	27	3FH			63	63H	CODE C	CODE C	99
1CH	<	<	28	40H	NUL	`	64	64H	CODE B	FNC4	CODE B
1DH	=	=	29	41H	SOH	a	65	65H	FNC4	CODE A	CODE A
1EH	>	>	30	42H	STX	b	66	66H	FNC1	FNC1	FNC 1
1FH	?	?	31	43H	ETX	c	67				
20H	@	@	32	44H	EOT	d	68	67H		START A	
21H	A	A	33	45H	ENQ	e	69	68H		START B	
22H	B	B	34	46H	ACK	f	70	69H		START C	
23H	C	C	35	47H	BEL	g	71				

CODE128 Special Code

Input		Data		
Code	ASCII	CodeSet A	CodeSet B	CodeSet C
7B41H	{A	START A	CODE A	CODE A
7B42H	{B	CODE B	START B	CODE B
7B43H	{C	CODE C	CODE C	START C
7B31H	{1	FNC1	FNC1	FNC1
7B32H	{2	FNC2	FNC2	-
7B33H	{3	FNC3	FNC3	-
7B34H	{4	FNC4	FNC4	-
7B53H	{S	SHIFT	SHIFT	-
7B7BH	{{	-	{'	-

GS1 Databar Omni-directional, GS1 Databar Truncated, GS1 Databar Limited:
 Enter 13 characters using numbers from '0' to '9'.
 '01' at the beginning is automatically added, and the check digit is automatically
 calculated by the printer.

GS1 Databar Expanded:

Enter any number of characters using ' ', '!', '"', '%', '&', "'", '(', ')', '*', '+', ',', '-', '.', '/', ':', ';', '<', '=', '>', '?', '_ ', '0' to '9', 'A' to 'Z', and 'a' to 'z'. Enter '{1' for FNC1.

Related Commands GS 'H', GS 'f', GS 'h', GS 'W'

6.4.7 Two-dimensional Barcode

GS 'n' n

Set Nominal Narrow Element Width

Code 1DH 6EH n

Definition Range $2 \leq n \leq 8$ (number of dots)

Default n = 3

Function Sets the nominal narrow element width.

Related Commands GS 'p'

GS 'o' n

Set PDF Module Height

Code 1DH 6FH n

Definition Range $2 \leq n \leq 127$

Default n = 10

Function Sets the PDF module height in dots.

Notes When the module height is set too low, some barcode readers may not be able to read the barcode.
The minimum height should be 3 dots or more in normal use.

GS 'p' 0 m2 e r c nl nh [d]k

Print PDF417

Code 1DH 70H 00H m2 e r c nl nh [d]k

Definition Range

- $0 \leq m2 \leq 255$
- $0 \leq e \leq 8$
- $r = 0, 3 \leq r \leq 90$
- $c = 0, 1 \leq c \leq 30$
- $0 \leq d \leq 255$
- $0 \leq nl \leq 255, 0 \leq nh \leq 255$
- $1 \leq k (= nh \times 256 + nl) \leq 499$

Function Prints PDF417 on the basis of the specified contents.
m2 = <*****0>B: PDF417 is in normal mode.
m2 = <*****1>B: PDF417 is in simple mode (Micro PDF is not supported).
e: Error correction level
r: Number of rows (0 is automatically set)
c: Number of columns in the data area (0 is automatically set)
nl, nh: Number of data bytes
d: Data
k: Number of data bytes specified by nl and nh

Notes Only the LSB is valid for m2.
Quiet zones are not secured. Set the quiet zone in accordance with the standard of each barcode system.

Related Commands GS 'n', GS 'o'

Code 12H 3BH n

Definition Range $2 \leq n \leq 16$

Default n = 6

Function Specifies the module size of QR Code, Data Matrix, GS1 Databar Stacked, GS1 Databar Stacked Omni-directional, and GS1 Databar Expanded Stacked.
n: Number of dots for 1 side of the module size

Related Commands GS 'p' 1, GS 'p' 2, GS 'p' 4

Code 1DH 70H 01H model e v mode nl nh [d]k

Definition Range
 model = 02H
 e = 4CH, 4DH, 51H, 48H
 v = 0, $1 \leq v \leq 18$
 mode = 4EH, 41H, 42H, 4BH, 4DH
 $1 \leq k (= nh \times 256 + nl) \leq 1725$

Function Prints QR Code data on the basis of the specified contents.
 model: Model
 e: Error correction level
 'L'(4CH), 'M'(4DH), 'Q'(51H), 'H'(48H)
 v: Version
 v = 0: The version is automatically selected (depending on the number of input data bytes).
 $1 \leq v \leq 18$: The version is fixed.
 mode: Mode of data

mode	Hexadecimal	Mode of data
N	4E	Numerical mode
A	41	Alphanumeric mode
B	42	8-bit byte mode
K	4B	Kanji mode
M	4D	Mixed mode

nl, nh: Number of data bytes
 d: QR Code input data
 When using 2-byte code (such as Kanji and Hiragana), use Shift-JIS.
 k: Number of data bytes specified by nl and nh

Notes When any value out of the definition range is specified, this command is ignored, and the subsequent data is processed as normal data.
 The maximum value should be 1725 bytes or less depending on the model, the mode, and the error correction level. When any data exceeding the maximum value is specified, the data is discarded.
 When the horizontal width of QR Code exceeds the print area, this command is ignored.
 When there is data in the line buffer, this command is ignored.
 Alignment and inversion (flip) printing are valid.
 Quiet zones are not secured. Set the quiet zone in accordance with the standard of each barcode system.

Related Commands ESC 'a', ESC '{

GS 'p' 2 ecc row col nl nh [d]k

Print Data Matrix

Code 1DH 70H 02H ecc row col nl nh [d]k

Definition Range ecc = 00H
row = 0, $8 \leq \text{row} \leq 144$
col = 0, $10 \leq \text{col} \leq 144$
 $1 \leq k (= \text{nh} \times 256 + \text{nl}) \leq 3116$

Function Prints a Data Matrix code on the basis of the specified contents.
ecc: 00H (ECC200) (for future extensional function)
row: Number of modules in the vertical direction
When '0' is specified, this is defined automatically.
col: Number of modules in the horizontal direction
When '0' is specified, this is defined automatically.
nl, nh: Number of data bytes
d: Barcode data
k: Number of data bytes specified by nl and nh

Notes When any value other than the number of vertical and horizontal modules available in ECC200 is specified, this command is ignored.
When k is out of the definition range, the subsequent data is processed as normal data.
The maximum value varies depending on the number of modules in the vertical and horizontal directions and the data to be stored. When any data exceeding the maximum value is specified, the data is discarded.
When the barcode size exceeds the print area, this command is ignored.
When there is data in the line buffer, this command is ignored.
Alignment and inversion (flip) printing are valid.
Quiet zones are not secured. Set the quiet zone in accordance with the standard of each barcode system.
The Structured Append is not supported.

Only the following combinations of the number of modules in the vertical direction ('row') and the horizontal direction ('col') are valid.

Squares ('row' × 'col')

10 × 10, 12 × 12, 14 × 14, 16 × 16, 18 × 18, 20 × 20, 22 × 22, 24 × 24, 26 × 26,
32 × 32, 36 × 36, 40 × 40, 44 × 44, 48 × 48, 52 × 52, 64 × 64, 72 × 72, 80 × 80,
88 × 88, 96 × 96, 104 × 104, 120 × 120, 132 × 132, 144 × 144

Rectangles ('row' × 'col')

8 × 18, 8 × 32, 12 × 26, 12 × 36, 16 × 36, 16 × 48

Related Commands ESC 'a', ESC '{

Code	1DH 70H 03H 02H sc cc pc n [d]k	(mode 2)
	1DH 70H 03H 03H sc cc pc n [d]k	(mode 3)
	1DH 70H 03H 04H m [d]k	(mode 4)
	1DH 70H 03H 05H m [d]k	(mode 5)

Definition Range $1 \leq n \leq 126, 1 \leq m \leq 138$

Function Prints MaxiCode data on the basis of the specified contents.

sc: Service class
 In mode 2 and mode 3, specify sc in 3-digit numerals.

cc: Country code
 In mode 2 and mode 3, specify cc in 3-digit numerals.

pc: Postal code
 In mode 2, specify the postal code in 9-digit numerals. In order to specify less than 9 digits, specify data other than numerals for the remaining digits.
 In mode 3, specify the postal code in 6 alphanumeric characters. When the postal code is less than 6 characters, specify space for the remainder.

n, m: Number of data bytes

d: Barcode data

k: Number of data bytes specified by n or m

Notes When n or m is out of the definition range, the subsequent data is processed as normal data. Moreover, the maximum data value will be less than the maximum value of n or m depending on the mode, and when any data exceeding the maximum value is specified, the whole command is discarded.

 When the barcode size exceeds the print area, this command is ignored.

 When there is data in the line buffer, this command is ignored.

 Alignment and inversion (flip) printing are valid.

 The print size of the barcode is fixed in vertical 199 dots × horizontal 209 dots.

 Quiet zones are not secured. Set the quiet zone in accordance with the standard of each barcode system.

 The Structured Append is not supported.

Related Commands ESC 'a', ESC '{'

Code 1DH 70H 04H 00H n [d]n

Definition Range $n = 13, 48 \leq d \leq 57$

Function Prints GS1 Databar Stacked data on the basis of the specified contents.

n: Number of data bytes

d: Input data of GS1 Databar
 Enter 13 characters using numbers from '0' to '9'.
 '01' at the beginning is automatically added, and the check digit is automatically calculated by the printer.

Notes When any value out of the definition range is specified, this command is ignored, and the subsequent data is processed as normal data.

 When the horizontal width of GS1 Databar exceeds the print area, this command is ignored.

 When there is data in the line buffer, this command is ignored.

 Alignment and inversion (flip) printing are valid.

Related Commands ESC 'a', ESC '{'

Code 1DH 70H 04H 01H h n [d]n

Definition Range $33 \leq h \leq 255$, $n = 13$, $48 \leq d \leq 57$

Function Prints GS1 Databar Stacked Omni-directional data on the basis of the specified contents.
 n: Number of data bytes
 h: Height of GS1 Databar Stacked Omni-directional in modules
 d: Input data of GS1 Databar
 Enter 13 characters using numbers from '0' to '9'.
 '01' at the beginning is automatically added, and the check digit is automatically calculated by the printer.

Notes When any value out of the definition range is specified, this command is ignored, and the subsequent data is processed as normal data.
 When the horizontal width of GS1 Databar exceeds the print area, this command is ignored.

When there is data in the line buffer, this command is ignored.
 Alignment and inversion (flip) printing are valid.

Related Commands ESC 'a', ESC '{'

Code 1DH 70H 04H 02H s n [d]n

Definition Range $2 \leq s \leq 20$ (even number only), $1 \leq n \leq 255$

Function Prints GS1 Databar Expanded Stacked on the basis of the specified contents.
 n: Number of data bytes
 s: Number of segments (Even number from 2 to 20)
 d: Input data of GS1 Databar
 Enter any number of characters using ' ', '!', '"', '%', '&', "'", '(', ')', '*', '+', ',', '-', '.', '/', ':', ';', '<', '=', '>', '?', '_ ', '0' to '9', 'A' to 'Z', and 'a' to 'z'. Enter '{1' for FNC1.

Notes When any value out of the definition range is specified, this command is ignored, and the subsequent data is processed as normal data.
 When the horizontal width of GS1 Databar exceeds the print area, this command is ignored.

When there is data in the line buffer, this command is ignored.
 Alignment and inversion (flip) printing are valid.

Related Commands ESC 'a', ESC '{'

6.4.8 Kanji

FS '&'

Specify Kanji Mode

Code 1CH 26H

Function Specifies the Kanji mode.

Notes When the Kanji code system is the Shift-JIS code system, inputting this command executes only the internal flag operation of the printer. In this case, printing is not affected.
The Kanji code is processed in order of the 1st byte and the 2nd byte.

Related Commands FS '.', FS 'C'

FS '.'

Cancel Kanji Mode

Code 1CH 2EH

Function Cancels the Kanji mode.

Notes When the Kanji code system is the Shift-JIS code system, inputting this command executes only the internal flag operation of the printer. In this case, printing is not affected.

Related Commands FS '&', FS 'C'

FS '! n

Specify Kanji Print Mode

Code 1CH 21H n

Definition Range $0 \leq n \leq 255$

Default n = 0

Function Specifies Kanji print modes in batch.

Bit	Function	Value	
		0	1
0	Kanji font	Font A (24 × 24)	Font B (16 × 16)
1	Undefined	-	-
2	Double width	Cancel	Specify
3	Double height	Cancel	Specify
4	Undefined	-	-
5	Undefined	-	-
6	Undefined	-	-
7	Underline	Cancel	Specify

Notes When both double height and double width are specified, the character size is quadrupled.
When characters with different vertical scale exist on the same line, the characters are enlarged with the bottom edges of the characters as a reference, and so the bottom edges are aligned.
When the character is enlarged horizontally, the character is enlarged in the right direction with the left edge of the character as a reference.

Underline is applied to the entire character width including the right and left spaces of the character. However, no underline is applied to the portion skipped by the "Horizontal Tab" command (HT) or others and to 90° right rotated characters.

The underline width is the thickness set by the "Set Kanji Underline" command (FS '-') regardless of the character size.

When the underline width is not set by the "Set Kanji Underline" command (FS '-'), the width is 1 dot.

Print mode can also be specified or canceled by commands other than this command.

However, the command processed last is valid. For example, when double height and double width are canceled by this command after quadrupled character is specified by the "Set Kanji Quadruple-Size" command (FS 'W'), the quadrupled character specified by the "Set Kanji Quadruple-Size" command (FS 'W') is canceled.

Related Commands FS '-', FS 'W', DC2 '!', GS '!'

FS '-' n

Set Kanji Underline

Code 1CH 2DH n

Definition Range $0 \leq n \leq 2, 48 \leq n \leq 50$

Default n = 0

Function Sets Kanji underline.

n	Function
0, 48	Cancel Kanji underline
1, 49	Specify 1-dot Kanji underline
2, 50	Specify 2-dot Kanji underline

Notes

Underline is applied to the entire character width including the left and right spaces of the character. However, no underline is applied to the portion skipped by the "Horizontal Tab" command (HT) or others and to 90° right rotated characters.

When Kanji underline is canceled with n = 0, underline is not applied to the subsequent Kanji data, but the underline width set before canceling is retained.

The Kanji underline width is constant as specified regardless of the character size.

In addition to this command, Kanji underline can also be specified or canceled by the "Specify Kanji Print Mode" command (FS '!'). However, the command processed last is valid. For example, when Kanji underline is canceled by this command after specified by the "Specify Kanji Print Mode" command (FS '!'), the Kanji underline specified by the "Specify Kanji Print Mode" command (FS '!') is canceled.

Related Commands FS '!'

Code 1CH 43H n

Definition Range n = 0, 1, 48, 49

Default MS13-1 (Kanji Code System Selection) is JIS code: n = 0
MS13-1 (Kanji Code System Selection) is Shift-JIS code: n = 1

Function Selects the Kanji code system.

n	Function
0, 48	JIS code system
1, 49	Shift-JIS code system

Notes The Kanji codes valid in the JIS code system are as follows:
The 1st byte: 21H to 7EH and 93H to 97H
The 2nd byte: 21H to 7EH

The Kanji codes valid in the Shift-JIS code system are as follows:
The 1st byte: 81H to 9FH, E0H to EFH, and FAH to FCH
The 2nd byte: 40H to 7EH and 80H to FCH

Code 1CH 53H n1 n2

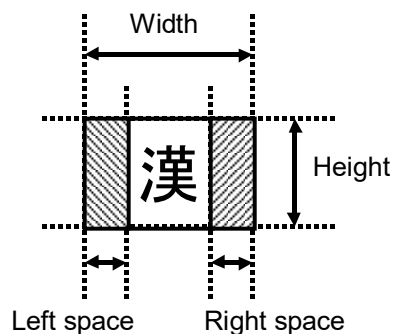
Definition Range $0 \leq n1 \leq 255, 0 \leq n2 \leq 255$

Default n1 = 0, n2 = 0

Function Sets the left space (n1) and the right space (n2) of Kanji.
The left space is [n1 × basic calculation pitch] inches, and the right space is [n2 × basic calculation pitch] inches.

Notes When double width is specified, the right and left spaces double from the setting amount.
The basic calculation pitch is set by the "Set Basic Calculation Pitch" command (GS 'P').
Moreover, once set, the Kanji spacing is not changed even when the basic calculation pitch is changed by the "Set Basic Calculation Pitch" command (GS 'P').
When the calculation result by the "Set Basic Calculation Pitch" command (GS 'P') has fractions, adjust with the minimum pitch of the printer, and round down the remainder.
The horizontal basic calculation pitch (x) is used.

Related Commands GS 'P'



Code 1CH 57H n

Definition Range $0 \leq n \leq 255$

Default n = 0

Function Sets the quadrupled character of Kanji.
 n = <*****0>B: The quadrupled character is canceled.
 n = <*****1>B: The quadrupled character is specified.

Notes Only the LSB is valid for n.
 Quadrupled characters are the characters for which double height and double width are specified simultaneously.
 When the quadrupled character is canceled using this command, the printer prints characters of normal size after the next character.
 When characters with different vertical scale exist on the same line, the characters are enlarged with the bottom edges of the characters as a reference, and so the bottom edges are aligned.
 When the character is enlarged horizontally, the character is enlarged in the right direction with the left edge of the character as a reference.
 In addition to this command, the quadrupled character can also be specified or canceled by simultaneously specifying double width and double height in the "Specify Kanji Print Mode" command (FS '!'). However, the command processed last is valid. For example, when the quadrupled character is canceled by this command after double height and double width are specified by the "Specify Kanji Print Mode" command (FS '!'), the specification in the "Specify Kanji Print Mode" command (FS '!') is canceled.

Related Commands FS '!'

Code 12H 2EH n

Definition Range n = 0, 1, 48, 49

Default n = 0

Function Selects Kanji font.

n	Function
0, 48	Select font A (24 × 24)
1, 49	Select font B (16 × 16)

Notes The Kanji font can also be selected by the "Specify Kanji Print Mode" command (FS '!'), but the command processed command last is valid.

Related Commands FS '!'

Code 1CH 49H a b c

Definition Range a = 0
b = 0
0 ≤ c ≤ 5

Function In response to the request of this command, the printer sends the information specified by c, the 2-byte font specified by a and b.
a: Font size
b: Font type number
c: Information

c	Function	Response Format
0	Language	Character string
1	Standard	Character string
2	Company name	Character string
3	Checksum (4 bytes)	HEX code
4	Data size	HEX code
5	ROM ID	HEX code

Notes When a or b is out of the definition range, only the header and footer of the response format of the selected function are sent.

Related Commands See "6.3 RESPONSE DATA".

Code 1CH 32H c1 c2 [d]k

Definition Range The definition range differs depending on the Kanji code system.

When JIS code system is specified:

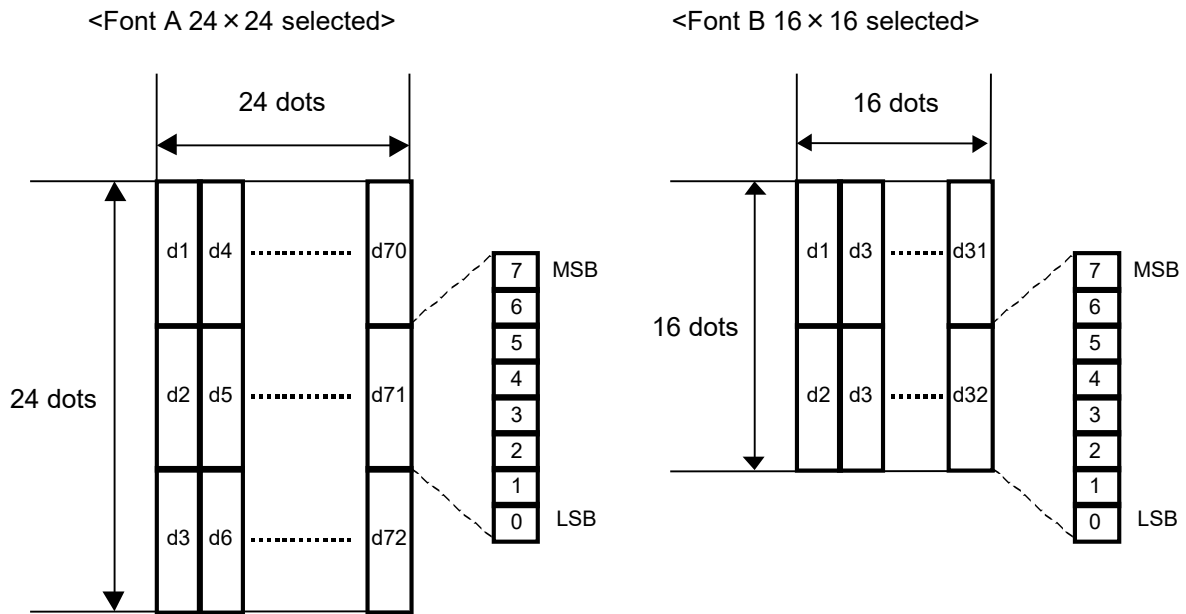
c1 = 77H
21H ≤ c2 ≤ 7EH
0 ≤ d ≤ 255

When Shift-JIS code system is specified:

c1 = ECH
40H ≤ c2 ≤ 7EH , 80H ≤ c2 ≤ 9EH
0 ≤ d ≤ 255

k = 72 (when font A 24 × 24 is selected)
k = 32 (when font B 16 × 16 is selected)

Function Registers the user-defined character pattern of Kanji to the character code specified by c1 and c2.
When the character code in which the user-defined character has already been registered is specified, the character is overwritten.
The user-defined character is not registered at the factory.



Notes c1 and c2 indicate the Kanji code for registering user-defined characters; c1 is the 1st byte and c2 is the 2nd byte.
d indicates the registration data. The bits that correspond to dots to print are 1, and the bits that correspond to dots not to print are 0.
k indicates the number of registration data bytes. The data bytes differs depending on the selected font size.
The memory usage m (including the amount of memory control information) is 9784 bytes.

Related Commands FS 'C'

DC2 'G' n Release/Allocate User-Defined Character Area

Code 12H 47H n

Definition Range 0 ≤ n ≤ 255

Function Releases or allocates the user-defined character area.
n = <*****0>B: The user-defined character area is released.
n = <*****1>B: The user-defined character area is allocated.

Notes Only the LSB is valid for n.
User-defined characters are not printed when the user-defined character area is released. The user-defined character area is 9784 bytes. Releasing the user-defined character area cannot increase the remaining memory capacity.
The area can be used again as the user area by the "Defragment User Area" command (DC2 '**' '1').
To allocate again the user-defined character area once released, 9784 bytes or more is required for the remaining memory capacity. When the remaining memory capacity is insufficient, the user-defined character area is not allocated, and this command is ignored.

6.4.9 Auxiliary Functions

ESC '@' Initialize Printer

Code 1BH 40H

Function Clears the data in the line buffer and initializes the settings.

Notes The information of the Function Settings is not re-read. The data in the input buffer is retained.

Related Commands See "CHAPTER 7 INITIALIZATION".

DC2 '@' Hardware Reset

Code 12H 40H

Function Performs hardware reset.

Notes Performs the same operation as when the power is turned on.
When this command is executed during printing, printing is stopped, and reset is performed.

GS FF Marked Paper Form Feed (Feed Paper to Cut Position)

Code 1DH 0CH

Function Feeds the paper to the cut position after detecting the mark.
The paper feed length is set to the setting values of MS8 to 9 (Mark Position Correction).

Notes This command is valid only when the marked paper is selected.
In addition, this command is valid only when it is input at the beginning of the line. Otherwise, it is ignored.
Executing this command at the print start position does not feed the paper to the next print start position.

GS '<' Marked Paper Form Feed (Feed Paper to Print Start Position)

Code 1DH 3CH

Function Detects the mark after initialization and feeds the paper to the print start position.
The paper feed length is set to the setting values of MS8 to 9 (Mark Position Correction).

Notes This command is valid only when the marked paper is selected.
When this command is executed at the print start position, the printer feeds the paper to the print start position after detecting the next mark.

GS 'A' m n Correct Marked Paper Form Feed

Code 1DH 41H m n

Definition Range $0 \leq m \leq 3, 48 \leq m \leq 51$
 $0 \leq n \leq 255$

Function Corrects the marked paper form feed position with the correction amount in relation to the initial position.

m: Paper feed / Memory writing selection

m	Paper Feed / Memory Writing Selection
0, 48	Forward
1, 49	Backward
2, 50	Forward, writing to the FLASH memory
3, 51	Backward, writing to the FLASH memory

n: Correction amount

The absolute position is [$n \times$ basic calculation pitch] inches.

The vertical basic calculation pitch (y) is used for calculating the correction amount.

Notes

This command is valid only when the marked paper is selected.

This command is executed only when it is input immediately after the marked paper form feed operation (FF, GS FF, GS '<', the FEED Switch operation, etc.). It is ignored when not input immediately after the form feed operation.

It is not possible to perform form feed to the position where the upper edge of the next mark goes beyond the mark sensor. When a correction amount exceeding the upper edge of the mark is set, the form feed position is the position where the sensor detects the lower edge of the mark.

When correction paper feed is performed, it is not possible to specify a smaller correction amount than the one set in MS8 to 9 (Mark Position Correction). In this case, it is the correction amount set in MS8 to 9. When a larger correction amount than the one set in MS8 to 9 is specified, the correction amount specified by this command is used.

The basic calculation pitch is set with the "Set Basic Calculation Pitch" command (GS 'P'). The vertical basic calculation pitch (y) of "Set Basic Calculation Pitch" command (GS 'P') is used for calculating the correction amount. Moreover, when the calculation result is a fractional figure, it is compensated using the printer's minimum pitch, and the remainder is discarded. Paper feed is performed for correction during execution of this command. The paper feed length depends on the set correction amount.

When writing to the FLASH memory is selected, the printer writes the number of corrected dot-lines to MS8 to 9 (Mark Position Correction). If the number of corrected dot-lines exceeds 2400 dot-lines in the forward and 68 dot-lines in the backward, the length of the mark position correction will be the maximum dot-line for each.

The printer is initialized after writing to the FLASH memory is completed.

When the form feed position is corrected, set the length from the paper edge to the print start position with a top margin of 4 mm or more. The print start position for marked paper may vary depending on the temperature, humidity or other conditions. When the length is set with insufficient margin, there may be a portion that is not printed due to changes of the print start position, or paper jam may occur.

In addition, set to the position that the next mark does not reach the sensor.

Related Commands FF, GS FF, GS '<', GS 'P'

GS 'C' '0' n m

Set Counter Print Mode

Code 1DH 43H 30H n m

Definition Range $0 \leq n \leq 5$
 $0 \leq m \leq 2, 48 \leq m \leq 50$

Default n = 0, m = 0

Function Sets print mode of consecutive counter.

- n: Number of digits to print
 n = 0: Only the actual number of digits of the counter value is printed.
 At this time, the value of m does not affect the operation.
 n ≠ 0: The number of digits to print is set.
- m: Print position of the consecutive counter within the set number of digits

m	Print Position	Processing for Counter Value Lower Than Set Digits
0, 48	Aligned right	Add space(s) to left side
1, 49	Aligned right	Add '0' to left side
2, 50	Aligned left	Add space(s) to right side

Notes When the number of digits of the counter value is larger than the number of digits set in n, the lower n digits of the counter value are printed.
 When n or m is out of the definition range, this command is ignored, and the setting value does not change.

Related Commands GS 'C' '1', GS 'C' '2', GS 'c'

GS 'C' '1' aL aH bL bH n r Set Count Mode

Code 1DH 43H 31H aL aH bL bH n r

Definition Range $0 \leq aL \leq 255$, $0 \leq aH \leq 255$
 $0 \leq bL \leq 255$, $0 \leq bH \leq 255$
 $0 \leq n \leq 255$
 $0 \leq r \leq 255$

Default aL = 1, aH = 0, bL = 255, bH = 255, n = 1, r = 1

Function Sets the count mode of the consecutive counter.
 n: Step magnitude during count-up or count-down
 r: Number of repetitions with the counter value fixed

Notes [aH × 256 + aL < bH × 256 + bL and n ≠ 0 and r ≠ 0]: The count-up mode is set.
 [aH × 256 + aL > bH × 256 + bL and n ≠ 0 and r ≠ 0]: The count-down mode is set.
 [aH × 256 + aL = bH × 256 + bL or n = 0 or r = 0]: Count stop is set.

- For the count-up mode setting:
 [aH × 256 + aL] is the minimum counter value, and [bH × 256 + bL] is the maximum counter value. When the counter exceeds the maximum value, count-up from the minimum value starts again.
- For the count-down mode setting:
 [aH × 256 + aL] is the maximum counter value, and [bH × 256 + bL] is the minimum counter value. When the counter is smaller than the minimum value, count-down from the maximum value starts again.

Related Commands GS 'C' '0', GS 'C' '2', GS 'c'

GS 'C' '2' n1 nh Set Counter Value

Code 1DH 43H 32H n1 nh

Definition Range $0 \leq n1 \leq 255$, $0 \leq nh \leq 255$

Default n1 = 1, nh = 0

Function Sets the consecutive counter value.

- Notes** nl and nh indicate the consecutive counter value, and the counter value is $[nh \times 256 + nl]$.
- For the count-up mode setting:
When the counter value set with this command falls outside the counter range set with "Set Count Mode" command (GS 'C' '1'), the counter value is forcibly changed to the minimum value by execution of the "Print Counter " command (GS 'c').
 - For the count-down mode setting:
When the counter value set with this command falls outside the counter range set with "Set Count Mode" command (GS 'C' '1'), the counter value is forcibly changed to the maximum value by execution of the "Print Counter " command (GS 'c').

Related Commands GS 'C' '0', GS 'C' '1', GS 'c'

GS 'c'

Print Counter

Code 1DH 63H

Function Sets the consecutive counter value in the line buffer and updates the counter.

Notes After setting the current consecutive counter value as print data (character string) in the line buffer, the counter is updated according to the set count mode. The counter value set in the line buffer is printed through a print command or buffer full.

When the counter value is to be set in the line buffer and the value is out of the maximum or the minimum range, the value is set in the line buffer after resetting; the value is reset to the minimum if the count-up mode is set, or the value is reset to the maximum if the count-down mode is set.

When the updated counter value exceeds the range of the maximum value and the minimum value, the counter is reset to the minimum when the count-up mode is set, or to the maximum when the count-down mode is set.

Related Commands GS 'C' '0', GS 'C' '1', GS 'C' '2'

GS 'l' n

Send Printer ID

Code 1DH 49H n

Definition Range $1 \leq n \leq 3$, $49 \leq n \leq 51$, $65 \leq n \leq 67$, $97 \leq n \leq 100$

Function In response to the request of this command, the printer sends the specified printer ID.

n	Printer ID Type	Specifications	Response Format
1, 49	Printer model ID	25H	HEX code
2, 50	Type ID	See Table [Type ID].	HEX code
3, 51	ROM version ID	Depends on ROM version.	HEX code
65	Firmware version (main)	x.xx.xx	Character string
66	Manufacturer	Seiko Instruments Inc.	Character string
67	Model name	See Table [Model name].	Character string
97	Firmware version (boot)	x.xx.xx	Character string
98	Firmware checksum (boot)	2 bytes checksum	HEX code
99	Firmware checksum (main)	2 bytes checksum	HEX code
100	Firmware checksum (main + boot)	2 bytes checksum	HEX code

Table [Type ID]

Bit	Information	Value	
		0	1
0	Paper width selection	40 mm	58 mm
1	Reserved	Fixed to 1	
2	Reserved	Fixed to 0	
3	Undefined	Fixed to 0	
4	Reserved	No	Yes
5	Reserved	No	Yes
6	Undefined	Fixed to 0	
7	Undefined	Fixed to 0	

Table [Model name]

Model name	Value
SLP720RT	SII SLP720RT Series.

Notes

The printer ID is sent according to the response format.

The printer ID is transmitted at the time of retrieving this command from the input buffer. A delay may occur in the slot from command reception to printer ID transmission depending on the input buffer state.

ROM version ID is needed when the firmware of the printer is uploaded.

Related Commands

See "6.3 RESPONSE DATA".

(1)GS 'V' m**(2)GS 'V' m n****Cut Paper****Code**

(1)1DH 56H m
(2)1DH 56H m n

Definition Range

(1)m = 0, 1, 48, 49
(2)m = 65, 66, 0 ≤ n ≤ 255

Function

Feeds the thermal paper to the specified paper cut position and cuts the paper at the position.

m	Function
0, 48	Full cut
1, 49	Partial cut
65	Paper feed to cut position + [n × basic calculation pitch] and full cut
66	Paper feed to cut position + [n × basic calculation pitch] and partial cut

Notes

The command configuration, code, definition range, and some notes differ depending on the value of m.

This command is valid only when input at the beginning of the line.

[(1) GS 'V' m]

Cuts the thermal paper with the specified cutting method.

[(2) GS 'V' m n]

n=0: The thermal paper is fed to the cut position and cut at the position.

n≠0: The thermal paper is fed [n × basic calculation pitch] beyond the cut position and cut. The basic calculation pitch is set by the "Set Basic Calculation Pitch" command (GS 'P'). The vertical basic calculation pitch (y) is used for the paper feed length. Moreover, when the calculation result is a fractional figure, it is corrected using the minimum pitch of the printer, and the remainder is discarded.

When the Function Setting MS17-3 (Feed Backward Setting After Paper Cutting) is enabled and the Function Setting MS1-3 (Mark Mode Selection) is disabled, after this command and before the next print or paper feed command is executed, the thermal paper is fed backward automatically to minimize the margin.

Related Commands DC2 'w', DC2 'l'

ESC i

Full cut

Code 1BH 69H

Function Cuts the thermal paper by full cutting.

Notes This command is valid only when input at the beginning of the line.

ESC m

Partial cut

Code 1BH 6DH

Function Cuts the thermal paper by partial cutting.

Notes This command is valid only when input at the beginning of the line.

GS 'Y' n

Stamp & Cut

Code 1DH 59H n

Definition Range 0 ≤ n ≤ 255

Function Prints the NV graphics registered with the key code '0' '0' at the center within the set printable area width, and then cuts the thermal paper.

n = <*****0>B: The thermal paper is cut by full cutting.

n = <*****1>B: The thermal paper is cut by partial cutting.

Notes Only the LSB is valid for n.
The command is valid even when input in the middle of the line.
The following operations are performed according to the height of the NV graphics registered with the key code '0' '0'.

NV Graphics Height	Operation
7.5 mm or less	2 mm paper feeding NV graphics printing Paper cutting 2 mm paper feeding
7.625 to 9.375 mm	2 mm paper feeding NV graphics printing by 7.5 mm Paper cutting Remaining NV graphics printing (9.5 mm - NV graphics height) paper feeding

NV Graphics Height	Operation
9.5 mm or more	2 mm paper feeding NV graphic printing by 7.5 mm Paper cutting Remaining NV graphics printing

When the NV graphics with key code '0' '0' is not registered, the initial cut is performed. Stamp & Cut performs stopping and cutting in the middle of NV graphics printing, so that the printing may be disturbed.

GS 'g' '0' m nl nh Initialize Maintenance Counter

Code 1DH 67H 30H m nl nh

Definition Range m = 0
nh × 256 + nl = 20, 21, 50, 70

Function Sets the value of the specified resettable maintenance counter to 0. The maintenance counter saved in the FLASH memory is also set to 0. nl and nh specify the maintenance number as [nh × 256 + nl].

nh × 256 + nl		Counter Type
Hexadecimal	Decimal	
14H	20	Number of paper feed lines (unit: 100 dot-lines)
15H	21	Number of thermal head activation times (unit: 100 dot-lines)
32H	50	Number of autocutter drive times
46H	70	Drive time of printer (unit: minute)

Notes Note that frequent use of this command will shorten the life of the FLASH memory. The FLASH memory can be rewritten approximately 100000 times.
The printer may turn to BUSY state while writing data to the FLASH memory with this command processing. Do not transmit data from the host since the printer stops data receiving while in BUSY state.
Do not turn off the power while executing this command.

Related Commands GS 'g' '1', GS 'g' '2'

GS 'g' '1' m Save Maintenance Counter

Code 1DH 67H 31H m

Definition Range m = 0

Function Saves all maintenance counter values in the FLASH memory.

Notes The number of paper feed lines and the number of thermal head activation times are saved at a value of 1/100.
The maintenance counter is automatically saved at 2-minute intervals without using this command.
Note that frequent use of this command will shorten the life of the FLASH memory. The FLASH memory can be rewritten approximately 100000 times.
Do not turn off the power while executing this command.

Related Commands GS 'g' '0', GS 'g' '2'

Code 1DH 67H 32H m nl nh

Definition Range m = 0
nh × 256 + nl = 20, 21, 50, 70, 148, 149, 178, 198

Function In response to the request of this command, the printer sends the maintenance counter value. nl and nh specify the maintenance number as [nh × 256 + nl].

nh × 256 + nl		Counter Type
Hexadecimal	Decimal	
14H	20	Number of paper feed lines (unit: 100 dot-lines)
15H	21	Number of thermal head activation times (unit: 100 dot-lines)
32H	50	Number of autocutter drive times
46H	70	Drive time of printer (unit: minute)
94H	148	Number of paper feed lines (integrated value) (unit: 100 dot-lines)
95H	149	Number of thermal head activation times (integrated value) (unit: 100 dot-lines)
B2H	178	Number of autocutter drive times (integrated value)
C6H	198	Drive time of printer (integrated value) (unit: minute)

Notes The maintenance counter value is sent by 4 bytes in a HEX code format.
The number of data bytes to be sent is 2 bytes of header and footer + 4 × 2 = 10 bytes.
The number of thermal head activation times is not counted for the paper feed with the FEED Switch. The number is counted for the paper feed with printing action, or the paper feed by the "Line Feed" command (LF), the page print command, and so on.

Related Commands GS 'g' '0', GS 'g' '1', GS 'a'

Code 12H 2AH 31H n

Definition Range 0 ≤ n ≤ 255

Function Defragments the user area (FLASH memory), and allocates the free area of memory.
n = <*****0>B: The printer defragments the user area without progress response.
n = <*****1>B: The printer defragments the user area with progress response.

Notes In the user area, releasing the area or deleting data cannot increase the remaining memory capacity. The area can be used again as the user area by this command.
When n = 1, the printer sends the progress situation during execution of this command. The proportion of the remaining amount of data movement in the user area is sent as progress situation response. Note that the value of progress situation is a reference. The processing time of 1 data movement varies depending on the amount of data registered in the user area.
The FLASH memory can be rewritten approximately 100000 times. Execute this command after the free area of memory becomes low in order to effectively use the number of rewritable times.

Related Commands See "6.3 RESPONSE DATA".

Code 12H 2AH 32H

Function In response to the request of this command, the printer sends the remaining memory capacity of the user area (FLASH memory) by 4 bytes in a HEX code format.
The number of data bytes to be sent is 2 bytes of header and footer + $4 \times 2 = 10$ bytes.

Notes The memory capacity of the unused area excluding the released area is sent by HEX code.

Related Commands See "6.3 RESPONSE DATA".

Code 12H 2AH 36H

Function In response to the request of this command, the printer sends the remaining memory capacity after defragmenting the user area by 4 bytes in a HEX code format.
The number of data bytes to be sent is 2 bytes of header and footer + $4 \times 2 = 10$ bytes.

Notes This command does not defrag the user area.
The memory capacity of the unused area including the released area is sent by HEX code.

Related Commands See "6.3 RESPONSE DATA".

Code 12H 52H n

Definition Range n = 1

Function Initializes the user area (FLASH memory).

Notes All user-defined characters, downloaded characters, optional fonts, downloaded bit images, NV graphics, User page 1-byte fonts, and User page international characters are cleared and returned to the initial state. (The area for user-defined characters and downloaded characters are allocated.)
The Function Settings and the maintenance counter are not initialized.
When n is out of the definition range, this command is ignored.

Code 12H 6BH f [d]k 00H

Definition Range f = 0, 128
0 ≤ d ≤ 255
k = 40

Function Sets all MS in a batch.
Sets the following function. The setting value is valid from when the command is executed.
f = 00H: Does not write to the system area of the FLASH memory at the same time as setting.
f = 80H: Writes to the system area of the FLASH memory at the same time as setting.

Specify the total 40 bytes of MS1 to 40 continuously.

Notes Do not set f = FFH. The printer may not work properly.
 The printer is initialized after execution of this command.
 However, initialization operation of the cutter is not performed.
 Do not turn off the power while executing this command.
 See "Chapter 4 Function Settings" for each content of MS.

Related Commands DC2 'w'

DC2 'w' f [d]k NUL Change Function Settings

Code 12H 77H f [d]k 00H

Definition Range $0 \leq d \leq 255$
 $0 \leq f \leq 255$ (See the following functions.)
 $k = 40$ (f = 00H, f = 80H), $k = 1$ (other than left value)

Function Sets the MS.
 The MSB of f has the meaning below.
 f = 00H: Does not write to the system area of the FLASH memory at the same time as setting.
 f = 80H: Writes to the system area of the FLASH memory at the same time as setting.

MS	f		Function
All MS	00H	80H	40 Bytes All Writing
1	01H	81H	General Setting 1
2	02H	82H	(Reserved)
3	03H	83H	(Reserved)
4	04H	84H	General Setting 4
5	05H	85H	General Setting 5
6	06H	86H	General Setting 6
7	07H	87H	General Setting 7
8, 9	08H, 09H	88H, 89H	Mark Position Correction
10, 11	0AH, 0BH	8AH, 8BH	Mark Detection Maximum Feeding Length Setting
12	0CH	8CH	Mark Detection Threshold Value
13	0DH	8DH	Command Setting
14	0EH	8EH	(Reserved)
15	0FH	8FH	International Character Setting
16	10H	90H	Character Code Table Setting
17	11H	91H	General Setting 17
18 to 38	12H to 26H	92H to A6H	(Reserved)
39	-	A7H	(Reserved)
40	-	A8H	(Reserved)
-	7FH	FFH	(Prohibited)

Notes The printer is initialized after execution of this command.
 However, initialization operation of the cutter is not performed.
 Do not turn off the power while executing this command.
 Execute software reset or hardware reset to enable the setting.
 See "Chapter 4 Function Settings" for details of each function.

Code 12H 6CH n

Definition Range n = 0

Function In response to the request of this command, the printer sends the MS setting.

Notes Sends the values of all MS currently set.
See "Chapter 4 Function Settings" for the meaning of MS.

The response is sent by 40 bytes in a HEX code format.
The number of data bytes to be sent is 2 bytes of header and footer + 40 × 2 = 82 bytes.

Related Commands DC2 'w'
See "6.3 RESPONSE DATA".

Code 12H 71H n

Definition Range 0 ≤ n ≤ 255

Function At the moment that this command has been processed, the printer sends the specified response code.

Notes Specify the response code by n. The low order 4 bits are valid for n. The code to be sent is the code from 80H to 8FH, which is the logical sum of the low order 4 bits of the specified n and 80H.

The printer has an input buffer of 4096 bytes, and input and execution of command/data are not synchronized. Therefore, the command execution completion cannot be confirmed from outside. This command enables the completion of command execution to be confirmed from outside. To confirm the end of the command, input this command following those commands. The response to this command is sent after the command input immediately before is ended.

Related Commands See "6.3 RESPONSE DATA".

Code 12H 74H

Function Performs a test print.

Notes All setting values by commands are initialized.
The line buffer is cleared when the test print is executed.

Code 1BH 63H 34H n

Definition Range 0 ≤ n ≤ 255

Default n = 0

Function This command has no meaning for the printer. This command is ignored.

Code 1BH 63H 35H n

Definition Range $0 \leq n \leq 255$

Default n = 0

Function Enables or disables the panel switch (FEED Switch).
 n = <*****0>B: The panel switch is enabled.
 n = <*****1>B: The panel switch is disabled.

Notes Only the LSB is valid for n.
 This command affects the FEED Switch operation.

Related Commands GS '^'

Code 1DH 72H n

Definition Range $0 \leq n \leq 11$

Function In response to the request of this command, the printer sends the specified status data.

(NOTE) Reserved values in the following tables may be changed.

Printer Status 1 (n = 0)

Bit	Function	Value	
		0	1
0	Voltage error	No	Yes
1	Hardware error	No	Yes
2	Head temperature error	No	Yes
3	Cutter error	No	Yes
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Printer Status 2 (n = 1)

Bit	Function	Value	
		0	1
0	Out-of-paper error	No	Yes
1	Reserved	Fixed to 0	
2	Paper jam error while detecting mark	No	Yes
3	Cover open error	No	Yes
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Printer Status 3 (n = 2)

Bit	Function	Value	
		0	1
0	FEED Switch status	OFF	ON
1	Reserved	Fixed to 0	
2	Paper feed status	Stop	Operating
3	Return-waiting status	No	Yes
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Option Sensor Status (n = 3)

Bit	Function	Value	
		0	1
0	Reserved	Fixed to 0	
1	Taken sensor status	Paper removed	Paper removal waiting
2	Reserved	Fixed to 1	
3	Reserved	Fixed to 0	
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Printer Status 4 (n = 4)

Bit	Function	Value	
		0	1
0	Rewriting FLASH memory*1	No	Yes
1	Reserved	Fixed to 0	
2	Reserved	Fixed to 0	
3	Reserved	Fixed to 1	
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

*1: The value is 1 (Yes) during writing to and deleting from the FLASH memory.

Reserved (n = 5 to 7)

Bit	Function	Value	
		0	1
0	Reserved	Fixed to 1	
1	Reserved	Fixed to 1	
2	Reserved	Fixed to 1	
3	Reserved	Fixed to 1	
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Paper Sensor Status (n = 8)

Bit	Function	Value	
		0	1
0	Cover open sensor	Closed	Open
1	Out-of-paper sensor	Yes	No
2	Reserved	Fixed to 1	
3	Reserved	Fixed to 0	
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Cutter Status (n = 9)

Bit	Function	Value	
		0	1
0	Cutter work lock error	No	Yes
1	Cutter home lock error	No	Yes
2	Cutter error history	No	Yes
3	Autocutter driving	Stop	Driving
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Reserved (n = 10 to 11)

Bit	Function	Value	
		0	1
0	Reserved	Fixed to 0	
1	Reserved	Fixed to 0	
2	Reserved	Fixed to 0	
3	Reserved	Fixed to 0	
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Notes A delay may occur between command reception and status transmission depending on the input buffer state because this command is executed at the time of retrieving from the input buffer.

Related Commands GS 'a'
See "6.3 RESPONSE DATA".

GS 'a' n Enable/Disable Automatic Status Back

Code 1DH 61H n

Definition Range $0 \leq n \leq 255$

Default MS5-1 (Automatic Status Response Selection) is disabled: n = 00H
MS5-1 (Automatic Status Response Selection) is enabled: n = FFH

Function Selects the status items to be sent by ASB (Automatic Status Back).

Bit	Function	Value	
		0	1
0	Printer status 1	Disable	Enable
1	Printer status 2	Disable	Enable
2	Printer status 3	Disable	Enable
3	Option sensor status	Disable	Enable
4	Printer status 4	Disable	Enable
5	Reserved	-	-
6	Reserved	-	-
7	Reserved	-	-

Notes

When any one of the status items is enabled, the status data at the time of executing this command is sent. After that, the status data is sent each time the state of the enabled status item changes. At this time, since each status item shows the current state, the state may change even with the status item for which ASB is not enabled.

When all status items are disabled, the ASB function becomes disabled.

When the ASB function is enabled in the initial state, the status at the first time that the printer communication becomes available after turning on the power is sent.

The 8-byte status is always continuous except for Xoff code.

Because this command is executed when retrieved from the input buffer, a delay may occur between command reception and status transmission depending on the input buffer status.

The status data is sent only to the interface currently selected.

When the cable is connected, the status data is sent right after connecting.

The high order 4 bits of all bytes are identifiers to distinguish from other responses. For the identifier, the 1st byte is CxH (1100xxxx), and the 2nd byte to the 8th byte are DxH (1101xxxx).

When the code CxH is sent from the printer as a response, treat the continuous 8 bytes including the response (except Xoff) as the status from the ASB function.

(NOTE) Reserved values in the following tables may be changed.

(1) The 1st Byte (Printer Status 1)

Bit	Function	Value	
		0	1
0	Voltage error	No	Yes
1	Hardware error	No	Yes
2	Head temperature error	No	Yes
3	Cutter error	No	Yes
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 0	
6	Identifier	Fixed to 1	
7	Identifier	Fixed to 1	

(2) The 2nd Byte (Printer Status 2)

Bit	Function	Value	
		0	1
0	Out-of-paper error	No	Yes
1	Reserved	Fixed to 0	
2	Paper jam error while detecting mark	No	Yes
3	Cover open error	No	Yes
4	Identifier	Fixed to 1	
5	Identifier	Fixed to 0	
6	Identifier	Fixed to 1	
7	Identifier	Fixed to 1	

(3) The 3rd Byte (Printer Status 3)

Bit	Function	Value	
		0	1
0	FEED Switch status	OFF	ON
1	Reserved	Fixed to 0	
2	Paper feed status	Stop	Operating
3	Return-waiting status	No	Yes
4	Identifier	Fixed to 1	
5	Identifier	Fixed to 0	
6	Identifier	Fixed to 1	
7	Identifier	Fixed to 1	

(4) The 4th Byte (Option Sensor Status)

Bit	Function	Value	
		0	1
0	Reserved	Fixed to 0	
1	Taken sensor status	Paper removed	Paper removal waiting
2	Reserved	Fixed to 1	
3	Reserved	Fixed to 0	
4	Identifier	Fixed to 1	
5	Identifier	Fixed to 0	
6	Identifier	Fixed to 1	
7	Identifier	Fixed to 1	

(5) The 5th Byte (Printer Status 4)

Bit	Function	Value	
		0	1
0	Rewriting FLASH memory*1	No	Yes
1	Reserved	Fixed to 0	
2	Reserved	Fixed to 0	
3	Reserved	Fixed to 1	
4	Identifier	Fixed to 1	
5	Identifier	Fixed to 0	
6	Identifier	Fixed to 1	
7	Identifier	Fixed to 1	

*1: The value is 1 (Yes) during writing to and deleting from the FLASH memory.

(6) The 6th Byte to the 8th Byte (Reserved)

Bit	Function	Value	
		0	1
0	Reserved	Fixed to 1	
1	Reserved	Fixed to 1	
2	Reserved	Fixed to 1	
3	Reserved	Fixed to 1	
4	Identifier	Fixed to 1	
5	Identifier	Fixed to 0	
6	Identifier	Fixed to 1	
7	Identifier	Fixed to 1	

Related Commands GS 'r', DC2 'w', DC2 'l'
See "6.3 RESPONSE DATA".

DC2 '0' 'c' n

Send Error History

Code 12H 30H 63H n

Definition Range $0 \leq n \leq 255$

Function The printer records an error as a history when it occurs.
In response to the request of this command, the printer sends the error history by HEX code.

Specify the target history number by n.

When the specified history number does not contain data, 00H data is sent.

Executing this command stops collecting the error history.

To resume collecting error history, specify again the data of history number that has been once specified, or read data of n = 255.

The data sent in the error history is as follows:

The 1st to 4th byte: Elapse time (seconds) after turning on the power

The 5th to 12th byte: Response value of automatic status response

Notes The number of data bytes to be sent is 2 bytes of header and footer + $12 \times 2 = 26$ bytes.

Related Commands See "6.3 RESPONSE DATA".

DC3 ('c' 'l' 'r' ') Clear Buffer at Error

Code 13H 28H 63H 6CH 72H 29H

Function The printer clears the input buffer and the line buffer upon receiving this command and returns from parameter waiting.

Notes This is a realtime command.
This command is executed only at an error.
This command is executed only when Data Discard Selection When Error Occurs is enabled. The operation of this command differs depending on the Function Setting MS13-3 (Realtime Command Selection).

- When the Function Setting MS13-3 (Realtime Command Selection) is enabled:
This command is valid.
Notes when using a realtime command:
The user should note that the same behavior as this command occurs when the code line matching the code that comprises this command is received. For example, graphics data contains such code line.
- When the Function Setting MS13-3 (Realtime Command Selection) is disabled:
This command is invalid.

DC3 ('r' 'e' 's' 'e' 't' DC3 'r' 'e' 's' 'e' 't' ') Printer Reset

Code 13H 28H 72H 65H 73H 65H 74H 13H 72H 65H 73H 65H 74H 29H

Function Resets the printer.
Performs the same operation as when the power is turned on. (For USB connection, communication is not disconnected, but the buffer is cleared.)

Notes This is a realtime command.
The operation of this command differs depending on the Function Setting MS13-3 (Realtime Command Selection).

- When the Function Setting MS13-3 (Realtime Command Selection) is enabled:
This command is valid.
After sending this command, do not send any data until the initialization is completed by the reset.
Notes when using a realtime command:
The user should note that the same behavior as this command occurs when the code line matching the code that comprises this command is received. For example, graphics data contains such code line.
- When the Function Setting MS13-3 (Realtime Command Selection) is disabled:
This command is invalid.

Code 12H 7EH n

Definition Range $70 \leq n \leq 130$

Function Sets the print density.

Notes The print density can be adjusted by setting the energy applied to the thermal head in the range of 70% to 130% of the rated energy. However, if the print density that exceeds the rating (100%) is set, the thermal head life may not be satisfied.

When n is out of the definition range, this command is ignored, and the setting value does not change.

The initial state can be selected from 70% to 130% using the Function Setting MS6-1 to 8 (Print Density Selection).

Excessive printing energy may shorten the life of the thermal head or may cause a paper feed problem, so set the thermal paper selection and print density selection accurately. If the thermal paper to use is different from the one selected, or the print density selection is other than 100%, the reliability of the product specification may not be satisfied.

Code 1DH 73H n

Definition Range $0 \leq n \leq 3$

Function Sets the print speed.

n	Speed Setting
0	High
1	Middle
2	Reserved
3	Reserved

High: Drives at the maximum print speed of 200 mm/s.

Middle: Decreases the maximum print speed for printing image to 100 mm/s to improve the print quality. Printing of image includes the following:
Raster bit image, NV graphics, downloaded bit image, bit image mode, barcode, two-dimensional barcode

Notes The speed may be lower than the selected maximum speed due to environmental temperature, communication method, and so on.

The initial state can be selected using the Function Setting MS4-7 (Maximum Print Speed Selection).

Code 1DH 4FH

Function Performs power off processing after the value of the maintenance counter is saved and the interface goes offline. No data is processed after this command is executed.

Notes To return to the printable state, the POWER Switch should be turned on again.

Code 12H 75H 00H

Function Sets the printer's serial number to iSerialNumber.

Notes It may break the FLASH memory when this command is frequently used.
Use this command only when the printer is installed, and do not use the command in normal operation.

Code 12H 75H 01H [d]k 00H

Definition Range d: 1-byte alphanumeric character
 $1 \leq k \leq 10$

Function Sets any character string to iSerialNumber.
The character string can be set with 1 to 10 characters.
'0' to '9' (30H to 39H), 'A' to 'Z' (41H to 5AH) and 'a' to 'z' (61H to 7AH) can be specified for d.

Notes When multiple printers use the same iSerialNumber, do not connect the printers to the host at the same time.
Do not set characters other than 1-byte characters.
It may break the FLASH memory when this command is frequently used.
Use this command only when the printer is installed, and do not use the command in normal operation.

Code 16H 1BH 49H 46H 57H 4CH p1 p2 p3 p4 fn n

Definition Range p1 = 2, p2 = 0, p3 = 0, p4 = 0
fn = 0
See "Function" below for n.

Function In response to the request of this command, the printer sends the setting value of each item of Wireless LAN.
Specify the item number to send for n.
The setting items, the numbers of response bytes, and the response forms are as shown in the following table. When n is out of the definition range, this command is ignored.

n	Item	Number of Response Bytes	Response Format
0	MAC Address	14	HEX code
1	Country	4	HEX code
16	IP Address value	10	HEX code
17	Subnet Mask value	10	HEX code
18	Gateway Address value	10	HEX code
32	Wireless LAN Standard	4	HEX code
33	Channel	4	HEX code
34	Client / Simple AP	4	HEX code
35	SSID	2 to 34	Character string

n	Item	Number of Response Bytes	Response Format
36	Security	4	HEX code
37	WEP encryption key	4	HEX code
64	IP Address	10	HEX code
65	Subnet Mask	10	HEX code
66	Gateway Address	10	HEX code
67	DHCP Enable/Disable	4	HEX code
68	DHCP Timeout	6	HEX code
70	Receive Timeout	6	HEX code

MAC Address

Sends 6-byte address by 14 bytes in a HEX code format.

Country

Sends 1 byte of the following setting value by 4 bytes in a HEX code format.

Setting Value	Country
1	USA, Canada
2	Japan
3	EU, EFTA, UK, Turkey

IP Address value

Sends the 4-byte IP address actually used in the communication by 10 bytes in a HEX code format. To retrieve the IP address set in the printer, use "IP Address" with n = 64.

Subnet Mask value

Sends the 4-byte subnet mask actually used in the communication by 10 bytes in a HEX code format. To retrieve the subnet mask set in the printer, use "Subnet Mask" with n = 65.

Gateway Address value

Sends the 4-byte gateway address actually used in the communication by 10 bytes in a HEX code format. To retrieve the gateway address set in the printer, use "Gateway Address" with n = 66.

The printer sends the IP address, the subnet mask and the gateway address actually used (for example, the address retrieved from the DHCP server when the printer is a DHCP client) for IP Address value, Subnet Mask value, and Gateway Address value.

Wireless LAN Standard

Sends 1 byte of 1 when IEEE802.11b/g/n is selected, or 1 byte of 2 when IEEE802.11a/n is selected, by 4 bytes in a HEX code format.

Channel

Sends 1 byte of any of the following channel numbers by 4 bytes in a HEX code format.

1 to 11, 12^{*1}, 13^{*1}, 36, 40, 44, 48

*1: Only for use in Japan, EU, EFTA, and UK.

When the channel is set to Auto, the printer sends 0 by 4 bytes in a HEX code format.

Client / Simple AP

Sends 1 byte of 0 when Client Mode is selected, or 1 byte of 1 when Simple AP Mode is selected, by 4 bytes in a HEX code format.

SSID

Sends 0 to 32-byte character code of SSID by 2 to 34 bytes in a character string format.

Security

Sends 1 byte of the following setting value by 4 bytes in a HEX code format.

Setting Value	Selected Security
0	None
8	WEP
9	WPA PSK(TKIP)
10	WPA PSK(AES)
11	WPA2 PSK(TKIP)
12	WPA2 PSK(AES)
13	WPA Enterprise PEAP
14	WPA Enterprise TTLS
15	WPA2 Enterprise PEAP
16	WPA2 Enterprise TTLS

WEP encryption key

Sends 1 byte of the key number 1 to 4 by 4 bytes in a HEX code format.

IP Address

Sends the 4-byte IP address set in the printer by 10 bytes in a HEX code format.

Subnet Mask

Sends the 4-byte subnet mask set in the printer by 10 bytes in a HEX code format.

Gateway Address

Sends the 4-byte gateway address set in the printer by 10 bytes in a HEX code format.

DHCP Enable/Disable

Sends 1 byte of 0 when DHCP is disabled, or 1 byte of 1 when DHCP is enabled, by 4 bytes in a HEX code format.

DHCP Timeout

Sends 2-byte timeout period 1 to 300 (seconds) by 6 bytes in a HEX code format.

Receive Timeout

Sends 2-byte timeout period 60 to 300 (seconds) by 6 bytes in a HEX code format.

Notes

This command is valid only for the Wireless LAN model. It is ignored in other models.

Code 16H 1BH 43H 4DH 57H 4CH p1 p2 p3 p4 fn n [d]k

Definition Range $p4 \times 16777216 + p3 \times 65536 + p2 \times 256 + p1 = 2 + k$
 $fn = 1$
 See "Function" below for n, d, and k.

Function Performs the various settings of Wireless LAN.
 Specify the item number to set for n. The value of k (p1 to p4) available for specifying is determined by the setting item. The values of n and k available for specifying are listed in the following table. When n or k is out of the definition range, this command is ignored.

n	Item	k
32	Wireless LAN Standard	1
33	Channel	1
34	Client / Simple AP	1
35	SSID	0 to 32
36	Security	1
37	WEP encryption key selection	1
64	IP Address	4
65	Subnet Mask	4
66	Gateway Address	4
67	DHCP Enable/Disable	1
68	DHCP Timeout	2
70	Receive Timeout	2
128	WEP encryption key setting	1, 6, 11, 14, 27
129	Encryption key	0, 8 to 64
130	User name	0 to 16
131	Password	0 to 16
132	Root certificate	0 to 32768
255	Default Setting	0

Wireless LAN Standard

Specify d = 0 when disabling the Wireless LAN function, d = 1 when selecting IEEE802.11b/g/n, or d = 2 when selecting IEEE802.11a/n.

When d is not within $0 \leq d \leq 2$, this command is ignored.

At the factory, this setting is IEEE802.11b/g/n.

Channel

Specify d = 0 when setting to Auto, or specify one of the following channel numbers for d when specifying the channel number.

1 to 11, 12^{*1}, 13^{*1}, 36, 40, 44, 48

^{*1}: Only for use in Japan, EU, EFTA, and UK.

When d is other than above, this command is ignored.

At the factory, this setting is Auto.

Client / Simple AP

Specify d = 0 when selecting Client or d = 1 when selecting Simple AP.

When d is not within $0 \leq d \leq 1$, this command is ignored.

At the factory, this setting is Simple AP.

SSID

Specify SSID in [d]k with 0 to 32-byte character string.

The ASCII printable characters (except "'(60H) and '\$'(24H)) can be specified for d.

When d is other than above, this command is ignored.

At the factory, this setting is "SII-Printer".

Security

Specify the following values for d.

When d is other than the following values, this command is ignored.

At the factory, this setting is None.

d	Selected security
0	None
8	WEP
9	WPA PSK(TKIP)
10	WPA PSK(AES)
11	WPA2 PSK(TKIP)
12	WPA2 PSK(AES)
13	WPA Enterprise PEAP
14	WPA Enterprise TTLS
15	WPA2 Enterprise PEAP
16	WPA2 Enterprise TTLS

WEP encryption key selection

Select the key number 1 to 4 for d.

Specify when Security is set to WEP 40bit or WEP 128bit.

When d is not within $1 \leq d \leq 4$, this command is ignored.

At the factory, this setting is 1.

IP Address

Specify the 4-byte address from higher byte in order from d1 to d4.

At the factory, this setting is 192.168.0.1.

Subnet Mask

Specify the 4-byte subnet mask from higher byte in order from d1 to d4.

At the factory, this setting is 255.255.255.0.

Gateway Address

Specify the 4-byte address from higher byte in order from d1 to d4.

At the factory, this setting is 0.0.0.0.

DHCP Enable/Disable

Specify $d = 0$ when disabling DHCP or $d = 1$ when enabling it.

It is valid only when in Client mode.

Selecting DHCP Disable in this command disables the DHCP client function, and the printer operates with the values set for "IP Address", "Subnet Mask", and "Gateway Address".

Selecting DHCP Enable in this command enables the DHCP client function, and the printer operates with the IP address, the subnet mask or gateway address retrieved from the DHCP server.

When d is not within $0 \leq d \leq 1$, this command is ignored.

At the factory, the setting is the DHCP enabled.

DHCP Timeout

Specify the timeout period 1 to 300 (seconds) in d1 and d2 (Timeout period = $d2 \times 256 + d1$).

When d is not within $1 \leq d2 \times 256 + d1 \leq 300$, this command is ignored.

At the factory, this setting is 11 seconds.

Receive Timeout

Specify the timeout period 60 to 300 (seconds) in d1 and d2 (Timeout period = $d2 \times 256 + d1$).

When d is not within $60 \leq d2 \times 256 + d1 \leq 300$, this command is ignored.

At the factory, this setting is 300 seconds.

WEP encryption key setting

Specify the key number 1 to 4 for d1.

When Security is set to WEP 40bit and specifying a character string to the WEP encryption key, specify 5-byte character string in d2 to d6 ($k = 6$). When specifying a HEX string to the WEP encryption key, specify 10-byte HEX string in d2 to d11 ($k = 11$).

When Security is set to WEP 40bit and specifying a character string to the WEP encryption key, specify 13-byte character string in d2 to d14 ($k = 14$). When specifying a HEX string to the WEP encryption key, specify 26-byte HEX string in d2 to d27 ($k = 27$).

When canceling the WEP encryption key registration, do not specify d2 or later ($k = 1$).

The ASCII printable characters (except ''(60H) and '\$'(24H)) can be specified for the WEP encryption key.

When [d]k is not within the range above, this command is ignored.

At the factory, no WEP encryption key is registered.

Encryption key

Specify the encryption key in [d]k.

When specifying a character string to the encryption key, specify 8 to 63-byte character string in [d]k ($8 \leq k \leq 63$).

When specifying a HEX string to the encryption key, specify 64-byte HEX string in [d]k ($k = 64$).

When canceling the encryption key registration, do not specify d ($k = 0$).

The ASCII printable characters can be specified for the encryption key.

When [d]k is not within the range above, this command is ignored.

At the factory, no encryption key is registered.

User name

Specify the user name in [d]k with 0 to 16 bytes.

The ASCII printable characters can be specified for the user name.

When [d]k is not within the range above, this command is ignored.

At the factory, no user name is registered.

Password

Specify the password in [d]k with 0 to 16 bytes.

The ASCII printable characters can be specified for the password.

When [d]k is not within the range above, this command is ignored.

At the factory, no password is registered.

Root certificate

Specify the root certificate in [d]k with 0 to 32768 bytes ($0 \leq d \leq 255$).

When k is not within $0 \leq k \leq 32768$, this command is ignored.

At the factory, no root certificate is registered.

When n = 255 is specified, the above settings are restored at the factory.

The above settings are saved in the FLASH memory.

After setting, turn on the power again or execute hardware reset to reflect the settings.

Notes

For p1 to p4, specify the number of bytes after fn in 32-bit value (0 to $2^{32}-1$). From the lower byte to higher byte of the 32-bit value are specified in order from p1 to p4. For example, when $k = 32768$, $2 + k = 32770 = 00008002H$, and then $p1 = 02H$, $p2 = 80H$, $p3 = 00H$ and $p4 = 00H$. d1 to dn indicate the 1st byte, the 2nd byte, and the nth byte of [d]k respectively.

This command is valid only for Wireless LAN model. It is ignored in other models.

Code 10H 04H n

Definition Range $0 \leq n \leq 11$

Function In response to the request of this command, the printer sends the specified status data.

(NOTE) Reserved values in the following tables may be changed.

Printer Status 1 (n = 0)

Bit	Function	Value	
		0	1
0	Voltage error	No	Yes
1	Hardware error	No	Yes
2	Head temperature error	No	Yes
3	Cutter error	No	Yes
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Printer Status 2 (n = 1)

Bit	Function	Value	
		0	1
0	Out-of-paper error	No	Yes
1	Reserved	Fixed to 0	
2	Reserved	Fixed to 0	
3	Cover open error	No	Yes
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Printer Status 3 (n = 2)

Bit	Function	Value	
		0	1
0	FEED Switch status	OFF	ON
1	Reserved	Fixed to 0	
2	Paper feed status	Stop	Operating
3	Return-waiting status	No	Yes
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Option Sensor Status (n = 3)

Bit	Function	Value	
		0	1
0	Reserved	Fixed to 0	
1	Taken sensor status	Paper removed	Paper removal waiting
2	Reserved	Fixed to 1	
3	Reserved	Fixed to 0	
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Printer Status 4 (n = 4)

Bit	Function	Value	
		0	1
0	Rewriting FLASH memory*1	No	Yes
1	Reserved	Fixed to 0	
2	Reserved	Fixed to 0	
3	Reserved	Fixed to 1	
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

*1: The value is 1 (Yes) during writing to and deleting from the FLASH memory.

Reserved (n = 5 to 7)

Bit	Function	Value	
		0	1
0	Reserved	Fixed to 1	
1	Reserved	Fixed to 1	
2	Reserved	Fixed to 1	
3	Reserved	Fixed to 1	
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Paper Sensor Status (n = 8)

Bit	Function	Value	
		0	1
0	Cover open sensor	Closed	Open
1	Out-of-paper sensor	Yes	No
2	Reserved	Fixed to 1	
3	Reserved	Fixed to 0	
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Cutter Status (n = 9)

Bit	Function	Value	
		0	1
0	Cutter work lock error	No	Yes
1	Cutter home lock error	No	Yes
2	Cutter error history	No	Yes
3	Autocutter driving	Stop	Driving
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Reserved (n = 10 to 11)

Bit	Function	Value	
		0	1
0	Reserved	Fixed to 0	
1	Reserved	Fixed to 0	
2	Reserved	Fixed to 0	
3	Reserved	Fixed to 0	
4	Identifier	Fixed to 0	
5	Identifier	Fixed to 1	
6	Identifier	Fixed to 0	
7	Identifier	Fixed to 1	

Notes

This is a realtime command.

The operation of this command differs depending on the Function Setting MS13-3 (Realtime Command Selection).

- When the Function Setting MS13-3 (Realtime Command Selection) is enabled:

This command is valid.

Notes when using a realtime command:

The user should note that the same behavior as this command occurs when the code line matching the code that comprises this command is received. For example, graphics data contains such code line.

- When the Function Setting MS13-3 (Realtime Command Selection) is disabled:

This command is invalid.

Do not transmit the next data until the corresponding status is received after executing this command.

Do not send this command until all response data is retrieved when the response command other than this command is executed.

6.4.10 Ruled Line

DC3 '# n

Select Ruled Line Overlapping Mode

Code 13H 23H n

Definition Range $0 \leq n \leq 255$

Default Ruled line OR overlapping mode

Function Specifies OR or XOR for the overlapping mode of ruled line with character and image data.
n = <*****0>B: The OR overlapping mode is specified.
n = <*****1>B: The XOR overlapping mode is specified.

Notes Only the LSB is valid for n.
When the OR overlapping mode is specified, the part where dots exist either in the ruled line or in the image and character is printed out in black.
XOR shows exclusive OR. When the XOR overlapping mode is specified, the part where the ruled line is overlapped with the image and character is printed out in white, and the non-overlapped part is printed out in black.

DC3 '('

Specify Ruled Line Command

Code 13H 28H

Function After receiving this command, the printer accepts ruled line commands without DC3 code until it receives 29H.

Notes All commands other than ruled line commands are ignored.

DC3 '+'

Set Ruled Line ON

Code 13H 2BH

Default Ruled line OFF

Function Sets the ruled line to ON.

Notes This command is valid until the "Set Ruled Line OFF" command (DC3 '-') is executed.
The dots whose bit of the selected ruled line buffer is 1 are printed out.
The ruled line data of the printable area width is always printed.

Related Commands DC3 '-', ESC '#'

DC3 '-'

Set Ruled Line OFF

Code 13H 2DH

Default Ruled line OFF

Function Sets the ruled line to OFF.

Notes After this command, ruled line is not printed.

Related Commands DC3 '+'

DC3 'A'**Select Ruled Line A**

Code 13H 41H

Default Ruled line buffer A selected

Function Selects ruled line buffer A.

Notes Following this, ruled line data is set for the ruled line buffer A, and the image of the ruled line buffer A is printed out.
After using this command, the setting or printing for the ruled line buffer only applies to the ruled line buffer A.

Related Commands DC3 'B'

DC3 'B'**Select Ruled Line B**

Code 13H 42H

Default Ruled line buffer A selected

Function Selects ruled line buffer B.

Notes Following this, ruled line data is set for the ruled line buffer B, and the image of the ruled line buffer B is printed out.
After using this command, the setting or printing for the ruled line buffer only applies to the ruled line buffer B.

Related Commands DC3 'A'

DC3 'C'**Clear Ruled Line Buffer**

Code 13H 43H

Default All data of both ruled line buffer A and B cleared

Function Clears all bits of the selected ruled line buffer to 0.

DC3 'D' nl nh**Set Ruled Line (Unit: Dot)**

Code 13H 44H nl nh

Definition Range $0 \leq nl \leq 255, 0 \leq nh \leq 255$

Default All ruled lines cleared

Function Sets the bit of the $[nh \times 256 + nl]$ th dot of the selected ruled line buffer to 1.

Notes The position of the dot is counted by regarding the dot on the left edge of the screen as position 0.
The specification exceeding the printable area is ignored.
The specified data by this command is added on the selected ruled line buffer.

Code 13H 46H n1 n2

Definition Range $0 \leq n1 \leq 255, 0 \leq n2 \leq 255$

Default All ruled lines cleared

Function Fills the selected ruled line buffer with 2 bytes of data specified by n1 and n2.

Notes The ruled line buffer is filled with a repetitive pattern of 16-dot image in which n1 is 8 dots on the left side and n2 is 8 dots on the right side.
The correspondence of each bit and dots of n1 and n2 can be changed by the "Select Image LSB/MSB" command (DC2 '='). (In the initial state, MSB is on the left side.)
The specification exceeding the printable area is ignored.
The specified data by this command is overwritten on the entire area of the selected ruled line buffer.

Related Commands DC2 '='

Code 13H 4CH ml mh nl nh

Definition Range $0 \leq ml \leq 255, 0 \leq mh \leq 255$
 $0 \leq nl \leq 255, 0 \leq nh \leq 255$

Default All ruled lines cleared

Function Sets the bits in the range from the $[mh \times 256 + ml]$ th dot to the $[nh \times 256 + nl]$ th dot of the selected ruled line buffer to 1.

Notes The position of the dot is counted by regarding the dot on the left edge of the screen as position 0.
The specification exceeding the printable area is ignored.
The specified data by this command is overwritten on the specified area of the selected ruled line buffer.

Code 13H 50H

Function Prints the image of the selected ruled line buffer in 1 dot-line when ruled line is ON.

Notes When there is data in the line buffer, the data is printed and the thermal paper is fed for length of space between lines, then the ruled line is printed in 1 dot-line. The ruled line is also printed on printed characters and spaces between lines.
When ruled line is OFF, no ruled line is printed, and the paper is fed by 1 dot-line.
Configure the ruled line by 2 dots or more. 1 dot ruled line may be hard to see.

Code 13H 70H nl nh

Definition Range $0 \leq nl \leq 255$, $0 \leq nh \leq 255$
 $0 \leq nh \times 256 + nl \leq 65535$

Function Prints the image of the selected ruled line buffer in the defined $[nh \times 256 + nl]$ dot-lines when ruled line is ON.

Notes When there is data in the line buffer, the data is printed and the thermal paper is fed for length of space between lines, then the ruled line is printed in $[nh \times 256 + nl]$ dot-lines. The ruled line is also printed on printed characters and spaces between lines.
 When ruled line is OFF, no ruled line is printed, and the paper is fed by $[nh \times 256 + nl]$ dot-lines.

Code 13H 76H nl nh [d]k

Definition Range $0 \leq d \leq 255$
 $1 \leq nh \times 256 + nl \leq (\text{Maximum page length})$

Default All ruled lines cleared (d is all 0)

Function Writes image data of $[nh \times 256 + nl]$ bytes from the 0th byte of the selected ruled line buffer. d indicates image data.
 The number of data bytes is $k = nh \times 256 + nl$.

Notes For the image data, input data equivalent to 1 dot-line.
 The correspondence of each bit and dots of the image data can be changed by the "Select Image LSB/MSB" command (DC2 '='). (In the initial state, MSB is on the left side.)
 When the specification exceeds the printable area, the data within the print area is retrieved, and the subsequent data is processed as normal data.
 The specified data by this command is overwritten on the specified area of the selected ruled line buffer.

Related Commands DC2 '='

6.4.11 Download Mode

DC2 DC2

Select Download Mode

Code 12H 12H

Function Switches to download mode.

To return from download mode to print mode, execute the "Reset Download Mode" command ('@').

In the download mode, only the commands listed below are valid.

Reset Download Mode ('@')

Rewrite 1-Byte Font ('S' 'W')

Register 1-Byte Font International Character ('S' 'R')

Delete 1-Byte Font ('S' 'C')

Notes The POWER Switch and FEED Switch operation are disabled during the download mode.

'@'

Reset Download Mode

Code 40H

Function Performs a software reset.

Notes This command is valid only during the download mode.

If this command is executed after the printer switches to download mode even during printing, the printing is interrupted and reset.

'S' 'W' a [d1]k1 b [d2]k2

Rewrite 1-Byte Font

Code 53H 57H a [d1]k1 b [d2]k2

Definition Range

- a = 255
- $32 \leq d1 \leq 126$
- k1 = 64
- b = 0, 1
- $0 \leq d2 \leq 255$
- k2 = 10752 (b = 0)
- k2 = 3584 (b = 1)

Function Registers 1-byte font data to the User page of the character code table specified by information a and b.

d1 is ID data for identifying a font to be registered.

Register with any character string of 64-bytes.

This command requires the number of data bytes + memory control information bytes in the user area of the FLASH memory.

The font data registered with this command can be used by specifying n to 255 with the "Set Codepage" command (ESC 't' n). The data is assigned in the order from 20H to FFH and requires 224 characters. The character assigned for 7FH cannot be used.

At the factory, the 1-byte font by this command is not registered.

d1: ID data

k1: Number of ID data bytes

b: Font size

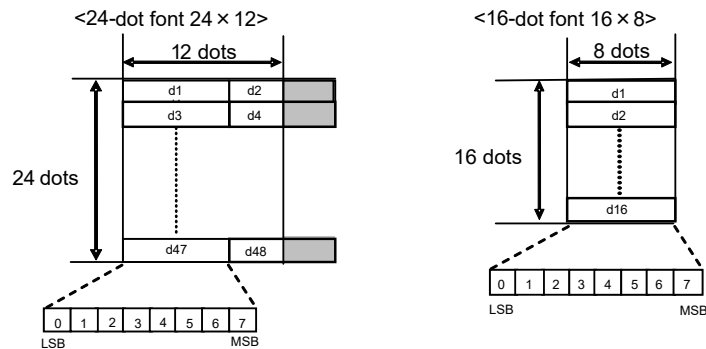
d2: Font data

k2: Number of font data bytes

b	Font Size	Number of Font Data Bytes (k2)
0	24-dot font	10752 byte
1	16-dot font	3584 byte

Font data format

<1-byte character>



Notes This command is valid only in download mode.

The memory usage m is calculated by the formula below.

$$m = \text{Number of data bytes} + \text{Number of bytes of memory control information}$$

Related Commands ESC 't'

'S' 'R' a b c [d]k

Register 1-Byte Font International Character

Code 53H 52H a b c [d]k

Definition Range

- a = 255
- b = 0, 1
- $0 \leq c \leq 17$
- $0 \leq d \leq 255$
- k = 576 (b = 0)
- k = 192 (b = 1)

Function Registers the international character of 1-byte font registered by the "Rewrite 1-Byte Font" command.

b : Font size
c : Country number
d : Font data
k : Number of font data bytes

This command requires the number of data bytes + memory control information bytes in the user area of the FLASH memory.

The font data registered by this command can be used by selecting the country registered by the "Set International Character" command (ESC 'R' n) while specifying n to 255 with the "Set Codepage" command (ESC 't'). The data is assigned in the order of 23H, 24H, 40H, 5BH, 5CH, 5DH, 5EH, 60H, 7BH, 7CH, 7DH and 7EH, and requires 12 characters.

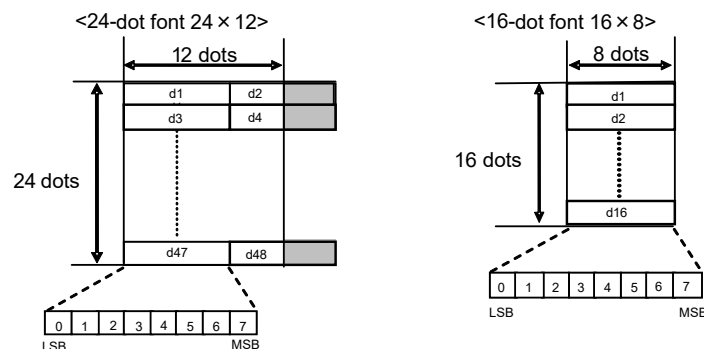
At the factory, the 1-byte font international character by this command is not registered.

b	Font Size	Number of Font Data Bytes (k)
0	24-dot font	576 byte
1	16-dot font	192 byte

c	Country	c	Country
0	USA	9	Norway
1	France	10	Denmark II
2	Germany	11	Spain II
3	United Kingdom	12	Latin America
4	Denmark I	13	Prohibition
5	Sweden	14	Prohibition
6	Italy	15	Prohibition
7	Spain I	16	Prohibition
8	Japan	17	Arabia

Font data format

<1-byte character>



Notes

This command is valid only in download mode.
When the 1-byte font of the specified page has not been registered, this command is ignored.

The memory usage m is calculated by the formula below.

$$m = \text{Number of data bytes} + \text{Number of bytes of memory control information}$$

Related Commands

ESC 't', ESC 'R'

'S' 'C' n

Delete 1-Byte Font

Code

53H 43H n

Definition Range

n = 255

Function

Deletes 1-byte font data in the page specified by n.

Notes

This command is valid only in download mode.
The 24-dot font, the 16-dot font, the 24-dot font international character, and the 16-dot font international character in the page specified by n are all deleted.

6.5 COMMAND LIST

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	DC2 'O' n Set Optional Font.....	6-25
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	GS 'L' nl nh Set Left Margin.....	6-28
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	GS '(' 'L' pL pH '0' fn 'K' 'C' Send Registered NV Graphics Key Code List.....	6-37
	GS '(' 'L' pL pH '0' fn 'C' 'L' 'R' Delete NV Graphics Data in Batch.....	6-37

GS '(' 'L' pL pH '0' fn kc1 kc2	Delete Specified NV Graphics Data	6-38
GS '(' 'L' pL pH '0' fn kc1 kc2 x y	Print Specified NV Graphics Data	6-38
GS '(' 'L' pL pH '0' fn kc1 kc2 x y z	Select Specified NV Graphics Data.....	6-39
(1)GS '(' 'L' pL pH '0' fn '0' kc1 kc2 b xL xH yL yH '1' [d]k		
(2)GS '8' 'L' p1 p2 p3 p4 '0' fn '0' kc1 kc2 b xL xH yL yH '1' [d]k	Register NV Graphics Data.....	6-39
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GS 'C' '2' nl nh	Set Counter Value	6-62
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GS 'l' n	Send Printer ID.....	6-63
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(2)GS 'V' m n	Cut Paper.....	6-64
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DC2 'w' f [d]k NUL	Change Function Settings.....	6-69
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CHAPTER 7

INITIALIZATION

7.1 INITIALIZATION

There are the following processes for initialization:

- (1) Initialization of settings
 - "Initialize Printer" command (ESC '@')
- (2) Initialization with software resetting
 - Resetting of USB class request
 - "Reset Download Mode" command ('@')
 - "Printer Reset" command (DC3 ('r' 'e' 's' 'e' 't' DC3 'r' 'e' 's' 'e' 't' ' '))
- (3) Initialization with hardware resetting
 - "Hardware Reset" command (DC2 '@')
 - Power on with the POWER Switch

7.2 INITIALIZATION OF SETTINGS

The items shown in Table 7-1 are initialized by the commands below.

- "Initialize Printer" command (ESC '@')

Table 7-1 Setting Value After Initialization

Item	Setting Value	Command
Character right space amount	0	ESC SP
Bold printing	Cancel	ESC '!', ESC 'E'
Double strike printing	Cancel	ESC 'G'
Underline	Cancel	ESC '!', ESC '-'
90° right rotation	Cancel	ESC 'V'
Inversion (flip) printing	Cancel	ESC '{'
Character font	Font A (24×12)	ESC '!', ESC 'M'
Double height	Cancel	ESC '!', FS '!', FS 'W'
Double width	Cancel	ESC '!', FS '!', FS 'W'
Reverse printing	Cancel	GS 'B'
International character	Depends on Function Settings	ESC 'R'
Character code table	Depends on Function Settings	ESC 't'
Kanji mode	Cancel	FS '&', FS '!'
Kanji font	Font A (24 × 24)	FS '!', DC2 '!'
Kanji underline	Cancel	FS '!', FS '-'
Kanji code system	Depends on Function Settings	FS 'C'
Kanji space amount	Right = 0, Left = 0	FS 'S'
Line spacing	1/6 inches	ESC '2', ESC '3'
Horizontal tab position	Every 8 characters	ESC 'D'
Alignment	Aligned left	ESC 'a'
Counter print mode	Number of digit = 0, Aligned right	GS 'C' '0'
Count mode	Count-up	GS 'C' '1'
Counter range	1 to 65535	GS 'C' '1'
Counter value	1	GS 'C' '2'
Counter step	1	GS 'C' '1'
Number of repetitions	1	GS 'C' '1'
HRI character print position	Not printed	GS 'H'
HRI character font	Font A (24×12)	GS 'f'
Barcode print direction	No rotation	GS 'j'
Barcode height	162 dots	GS 'h'
Barcode width	0.375 mm 0.375 mm / 1.000 mm	GS 'w'
Barcode N:W ratio	1:2.5	DC2 '!'
Nominal narrow element width	3 dots	GS 'n'
PDF module height	10 dots	GS 'o'
Module size of two-dimensional barcode	6 dots	DC2 '!', GS '(' 'k'

Item	Setting Value	Command
Left margin	0 (beginning of line)	GS 'L'
Printing area	Printable area	GS 'W'
Basic calculation pitch	x direction: 1/203 inches y direction: 1/203 inches	GS 'P'
Downloaded bit image selection	Cancel	GS '/'
NV graphics selection	Cancel	GS '(' 'L'
Image LSB/MSB	MSB	DC2 '='
Bit image scan method	Column scan method	DC2 'I'
Ruled line	OFF	DC3 '+', DC3 '-'
Ruled line buffer	Clear	DC3 'C'
Ruled line overlapping	OR	DC3 '#'
Downloaded character specification	Cancel	ESC '%'
Optional font selection	Cancel	DC2 'O'

7.3 INITIALIZATION WITH SOFTWARE RESETTING

Initialization is performed by the following commands or operation.

- Resetting of USB class request (Valid only by printer driver)
- "Reset Download Mode" command ('@') (Valid only in download mode)
- "Printer Reset" command (DC3 ('r' 'e' 's' 'e' 't' DC3 'r' 'e' 's' 'e' 't' ' '))

This initialization initializes the items in Table 7-2 in addition to the items in "7.2 INITIALIZATION OF SETTINGS".

Table 7-2 Setting Value After Initialized with Software Resetting

Item	Setting Value	Command
Input buffer	Clear	-
Output buffer	Clear	-
Function Settings	Depends on Function Settings	DC2 'k', DC2 'w'
Panel switch enable/disable	Enabled	ESC 'c' '5'
Automatic status back enable/disable	Depends on Function Settings	GS 'a'
Print density	Depends on Function Settings	DC2 '~'
Print speed	Depends on Function Settings	GS 's'

7.4 INITIALIZATION WITH HARDWARE RESETTING

Initialization is performed by the following commands or operation.

- "Hardware Reset" command (DC2 '@')
- Power on with the POWER Switch

This initialization initializes the items in "7.3 INITIALIZATION WITH SOFTWARE RESETTING". Also, all interfaces are initialized. When the interfaces are initialized, the communications are disconnected.

APPENDIX A
CHARACTER SETS (CHARACTER CODE TABLE)

A.1 CHARACTER CODE TABLES (CODEPAGE)

The codepage when the international character setting is set to USA is shown below.
 The printing result of a specific character code differs depending on the international character set to be set.
 For specific character codes, see "A.2 INTERNATIONAL CHARACTER SET".

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	"	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	Ç	ü	é	â	ä	à	ç	ê	ë	è	ï	î	ì	Ä	Å	
90	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	φ	£	¥	ℙ	ƒ
A0	á	í	ó	ú	ñ	Ñ	à	ó	¿	¬	½	¼	¡	«	»	
B0	☐	☐	☐	|	†	‡	||	π	¶	||	||	π	||	||	||	||
C0	L	⊥	T	└	├	┌	┐	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥
D0	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥
E0	α	β	Γ	π	Σ	σ	μ	τ	φ	θ	Ω	δ	∞	φ	ε	∩
F0	≡	±	≥	≤	|	J	÷	≈	°	•	•	√	n	²	■	

Figure A-1 USA, Standard Europe (Code Page437)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	+
90	┌	└	┌	└	┌	└	┌	└	┌	└	┌	└	┌	└	┌	└
A0	。	「	」	、	・	ヲ	ア	イ	ウ	エ	オ	ヤ	ユ	ヨ	ツ	
B0	-	ア	イ	ウ	エ	オ	カ	キ	ク	ケ	コ	サ	シ	ス	セ	ソ
C0	タ	チ	ツ	テ	ト	ナ	ニ	ヌ	ネ	ノ	ハ	ヒ	フ	ヘ	ホ	マ
D0	ミ	ム	メ	モ	ヤ	ユ	ヨ	ラ	リ	ル	レ	ロ	ワ	ン	ゝ	。
E0	=	ト	キ	ト	▲	▲	▼	▼	♠	♥	♦	♣	●	○	/	\
F0	X	円	年	月	日	時	分	秒	〒	市	区	町	村	人	■	

Figure A-2 Katakana

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	Ç	ü	é	â	ä	à	â	ç	ê	ë	è	ï	î	Ë	Å	
90	É	æ	Æ	ô	ö	ò	û	ü	ÿ	Ö	Ü	ø	£	Ø	×	f
A0	á	í	ó	ú	ñ	Ñ	á	ó	¿	®	¬	½	¼	¡	«	»
B0	☼	☼	☼	|	┌	└	┌	└	┌	└	┌	└	┌	└	┌	└
C0	┌	└	┌	└	┌	└	┌	└	┌	└	┌	└	┌	└	┌	└
D0	ð	Ð	Ê	Ë	È	Í	Î	Ï	┌	└	┌	└	┌	└	┌	└
E0	ó	ß	ô	ò	õ	μ	þ	þ	ú	û	ü	ý	ÿ	-	'	
F0	-	±	=	¾	¶	§	÷	,	°	·	·	·	·	·	·	■

Figure A-3 Multilingual (Code Page850)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	Ç	ü	é	â	ã	à	Á	ç	ê	Ê	è	Í	Ô	ì	Ã	Â
90	É	À	È	ô	õ	ò	Ú	ù	Ì	Õ	Ü	φ	£	Ù	Þ	Ó
A0	á	í	ó	ú	ñ	Ñ	ã	õ	ç	ò	½	¼	¾	«	»	
B0	☐	☐	☐	|	|	|	||	||	||	||	||	||	||	||	||	||
C0	L	L	T	T	-	T	T	L	L	L	L	L	L	L	L	L
D0	L	T	T	L	L	F	T	T	T	T	T	T	T	T	T	T
E0	α	β	Γ	π	Σ	σ	μ	τ	φ	θ	Ω	δ	∞	φ	ε	Π
F0	≡	±	≥	≤	|	J	÷	≈	°	•	•	√	n	2	■	

Figure A-4 Portuguese (Code Page860)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	Ç	ü	é	â	À	à	¶	ç	ê	ë	è	ï	î	≡	À	§
90	É	È	Ê	ô	Ë	Ï	Û	ù	∞	Ô	Ü	φ	£	Ù	Û	f
A0	|	'	ó	ú	·	·	·	·	·	·	·	·	·	·	·	·
B0	☐	☐	☐	|	|	|	||	||	||	||	||	||	||	||	||	||
C0	L	L	T	T	-	T	T	L	L	L	L	L	L	L	L	L
D0	L	T	T	L	L	F	T	T	T	T	T	T	T	T	T	T
E0	α	β	Γ	π	Σ	σ	μ	τ	φ	θ	Ω	δ	∞	φ	ε	Π
F0	≡	±	≥	≤	|	J	÷	≈	°	•	•	√	n	2	■	

Figure A-5 Canadian-French (Code Page863)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	Ç	ü	é	â	ä	à	â	ç	ê	ë	è	ï	î	ï	Ä	Å
90	É	æ	Æ	ô	ö	ò	ô	ù	ÿ	Ö	Ü	ø	£	Ø	Pt	f
A0	á	í	ó	ú	ñ	Ñ	ä	ö	ı	ı	½	¼	ı	«	»	α
B0	☐	☐	☐	|	|	|	|	|	|	|	|	|	|	|	|	|
C0	L	L	T	|	|	|	|	|	|	|	|	|	|	|	|	|
D0	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥
E0	α	β	Γ	π	Σ	σ	μ	τ	φ	θ	Ω	δ	∞	φ	ε	Π
F0	≡	±	≥	≤	|	J	÷	≈	°	•	•	√	n	²	■	

Figure A-6 Nordic (Code Page865)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	Ç	ü	é	â	ä	à	â	ç	ê	ë	è	ï	î	ï	Ä	Å
90	É	æ	Æ	ô	ö	ò	ô	ù	ı	Ö	Ü	ø	£	Ø	Ş	ş
A0	á	í	ó	ú	ñ	Ñ	Ğ	ğ	ı	ı	½	¼	ı	«	»	
B0	☐	☐	☐	|	|	|	|	|	|	|	|	|	|	|	|	|
C0	L	L	T	|	|	|	|	|	|	|	|	|	|	|	|	|
D0	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥
E0	ó	β	ô	ò	õ	õ	μ	×	ú	ú	ú	ı	ı	ı	ı	ı
F0	-	±	¾	¶	§	÷	,	°	°	°	°	°	°	°	°	°

Figure A-7 Turkish (Code Page857)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	"	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	A	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M	N	Ξ	O	Π
90	P	Σ	T	Υ	Φ	X	Ψ	Ω	α	β	γ	δ	ε	ζ	η	θ
A0	ι	κ	λ	μ	ν	ξ	ο	π	ρ	σ	ς	τ	υ	φ	χ	ψ
B0	⋄	⋄	⋄	|	†	‡	§	¶	⌘	⌘	⌘	⌘	⌘	⌘	⌘	⌘
C0	L	⊥	T	†	-	†	†	†	†	†	†	†	†	†	†	†
D0	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥
E0	ω	ά	έ	ή	ϊ	ί	ό	ύ	ϋ	ώ	Ά	Έ	Ή	Ί	Ό	Υ
F0	Ω	±	≥	≤	İ	ÿ	÷	≈	°	•	•	√	n	²	■	

Figure A-8 Greek (Code Page737)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	"	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	€	,	;	“	”	•	-	-	~	™	š	<	€	ž		
90											š	>	œ	ž	ÿ	
A0	ı	ϕ	£	α	¥	|	§	•	©	ª	«	¬	-	®	-	
B0	°	±	²	³	´	μ	¶	·	¹	º	»	¼	½	¾	¿	
C0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

Figure A-9 Latin (Code Page1252)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
90	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
A0	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
B0	▒	▒	▒	|	|	|	|	|	|	|	|	|	|	|	|	|
C0	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣
D0	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	■	■	■	■	■	■
E0	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я
F0	Ё	ё	Є	е	İ	ı	ÿ	ÿ	°	•	•	√	№	α	■	■

Figure A-10 Russian (Code Page866)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	Ç	ü	é	â	ä	û	ć	ç	ł	ë	Ö	ö	î	ž	Ä	Ć
90	É	Í	í	ô	ö	Ĺ	ĺ	Ś	ś	Ö	Ü	ř	ř	Ł	×	č
A0	á	í	ó	ú	Ą	ą	Ž	ž	Ę	ę	ˆ	ž	Č	š	«	»
B0	▒	▒	▒	|	|	Á	Â	Ě	Š	|	|	|	|	Ž	ž	ˆ
C0	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣
D0	đ	Đ	Ď	Ě	ď	Ň	í	î	ě	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ
E0	Ó	β	Ô	Ń	ń	ň	Š	š	Ř	Ú	ř	Ú	ý	Ý	ˆ	ˆ
F0	-	”	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ

Figure A-11 Eastern Europe (Code Page852)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	Ç	ü	é	â	ä	à	â	ç	ê	ë	è	ï	î	ì	Ä	Å
90	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	Ø	×	f
A0	á	í	ó	ú	ñ	Ñ	ä	ö	¿	®	¬	½	¼	¡	«	»
B0	☼	☼	☼	|	|	Á	Â	Ã	©	||	||	¶	¶	¥	₱	₱
C0	L	L	T	|	-	+	ã	Ã	ℓ	ℓ	ℓ	ℓ	ℓ	=	ℓ	α
D0	đ	Đ	Ê	Ë	È	€	Í	Î	Ï	Ј	Г	■	■	ı	İ	■
E0	ó	β	ô	ò	õ	õ	μ	ρ	ρ	ú	ú	ù	ý	Ý	-	'
F0	-	±	=	¾	¶	§	÷	,	°	…	.	1	3	2	■	

Figure A-12 Euro (Code Page858)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	ђ	Ђ	ѓ	Ѓ	ё	Ё	є	Є	ѕ	Ѕ	і	І	ї	Ї	ј	Ј
90	љ	Љ	њ	Њ	ћ	Ћ	ќ	Ќ	џ	Џ	џ	џ	џ	џ	џ	џ
A0	а	А	б	Б	в	В	г	Г	д	Д	е	Е	ф	Ф	г	Г
B0	☼	☼	☼	|	|	x	X	и	И	||	||	¶	¶	Й	Й	₱
C0	L	L	T	|	-	+	к	К	ℓ	ℓ	ℓ	ℓ	ℓ	=	ℓ	α
D0	л	Л	м	М	н	Н	о	О	п	П	Ј	Г	■	■	П	Я
E0	я	Р	с	С	т	Т	у	У	ж	Ж	в	В	ь	Ь	№	
F0	-	ы	Ы	з	З	ш	Ш	э	Э	щ	Щ	ч	Ч	§	■	

Figure A-13 Cyrillic (Code Page855)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	°	•	•	√	☼	-	|	+	+	+	+	+	+	+	+	+
90	β	∞	φ	±	½	¼	≈	«	»	لأ	لأ			لا	لا	
A0	-	آ	£	α	أ	€	ل	ب	ت	ث	ج	ح	خ	ح	خ	
B0	•	١	٢	٣	٤	٥	٦	٧	٨	٩	ف	؛	س	ش	ص	؟
C0	¢	ء	آ	أ	ؤ	ع	ث	ا	ب	ة	ث	ث	ج	ح	خ	د
D0	ذ	ر	ز	س	ش	ص	ض	ط	ظ	ع	غ	ا	ر	÷	×	ع
E0	-	ف	ق	ك	ل	م	ن	ه	و	ي	ض	ع	غ	غ	غ	م
F0	-	”	ن	ه	ه	ي	غ	ي	ق	ل	ل	ل	ل	ل	ل	■

Figure A-14 Arabic (Code Page864)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	€	;	“	”	•	-	-	™	š	<	š	ř	ž	ž		
90	˘	˘	ł	α	À	ı	Š	•	@	Ş	«	ı	-	@	ž	
A0	°	±	ł	´	µ	¶	•	ą	ş	»	ł	”	ł	ž		
C0	Ř	Á	Â	Ă	Ä	Á	Ć	Ç	Č	É	Ě	Ě	Ě	Í	Î	Ď
D0	Đ	Ń	Ň	Ó	Ô	Ö	×	Ř	Ů	Ú	Ú	Ú	Ú	Ý	Ť	ß
E0	ř	á	â	ă	ä	á	ć	ç	č	é	ě	ě	ě	í	î	ď
F0	đ	ń	ň	ó	ô	ö	÷	ř	ů	ú	ú	ú	ú	ý	ť	·

Figure A-15 Central European (Code Page1250)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	Ђ	Ѓ	;	ѓ	„	…	†	‡	€	‰	Љ	<	Њ	ќ	ћ	џ
90	ђ	‘	;	“	”	•	-	-	™	љ	>	њ	ќ	ћ	џ	
A0	Ў	Ў	Ј	а	Г	І	§	Ё	©	Є	«	¬	-	®	İ	
B0	°	±	І	і	г	μ	¶	·	ё	№	є	»	ј	ѕ	ѕ	і
C0	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
D0	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
E0	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
F0	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я

Figure A-16 Cyrillic (Code Page1251)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	€	‘	;	ƒ	„	…	†	‡	‰	<						
90	‘	;	“	”	•	-	-	™	>							
A0	“	À	£	α	¥	ı	§	¨	©	à	«	¬	-	®	-	
B0	°	±	²	³	´	μ	¶	·	ε	η	ι	»	ó	½	Υ	Ω
C0	ί	Α	Β	Γ	Δ	Ε	Ζ	Η	Θ	Ι	Κ	Λ	Μ	Ν	Ξ	Ο
D0	Π	Ρ		Σ	Τ	Υ	Φ	Χ	Ψ	Ω	İ	ÿ	ά	έ	ή	ί
E0	ύ	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ	ο
F0	π	ρ	ς	σ	τ	υ	φ	χ	ψ	ω	ï	ÿ	ό	ύ	ώ	

Figure A-17 Greek (Code Page1253)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20	!	”	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	€	‘	’	“	”	•	-	-	~	™	š	<	Œ			
90											š	>	œ			ÿ
A0	ı	ϕ	£	¤	¥	|	§	¨	©	ª	«	¬	-	®	¯	
B0	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0	Ğ	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	İ	Ş	ß
E0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0	ğ	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ı	ş	ÿ

Figure A-18 Turkish (Code Page1254)

A.2 INTERNATIONAL CHARACTER SET

The printing result of a specific character code differs depending on the international character set to be set. Specific character codes and their printing results are shown below.

	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U.S.A.	#	\$	@	[	\	\]	^	`	{	|	}	~
France	#	\$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
U.K.	£	\$	@	[	\	\]	^	`	{	|	}	~
Denmark I	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	α	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	\$	@	°	\	é	^	ù	à	ò	è	ì
Spain I	₧	\$	@	ı	Ñ	¿	^	`	¨	ñ	}	~
Japan	#	\$	@	[	¥	]	^	`	{	|	}	~
Norway	#	α	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark II	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Spain II	#	\$	á	ı	Ñ	¿	é	`	í	ñ	ó	ú
Latin America	#	\$	á	ı	Ñ	¿	é	ü	í	ñ	ó	ú
Arabia	#	\$	@	[	\	\]	^	`	{	|	}	~

Figure A-19 International Character Set

A.3 2-BYTE CHARACTERS

Kanji defined in the JIS 1st and 2nd levels in 1997, NEC selection of IBM extended characters, and IBM extended characters can be printed.

In addition, special characters and NEC special characters are assigned to the Kanji code of the non-Kanji area.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
2820		—	|	┌	┐	└	┘	┌	┐	└	┘	┌	┐	└	┘	
2830	┌	┐	└	┘	┌	┐	└	┘	┌	┐	└	┘	┌	┐	└	┘
2840	┌	┐	└	┘	┌	┐	└	┘	┌	┐	└	┘	┌	┐	└	┘
2850	"	'''	:	⊕	⊖	〒	≈	≅	≇	≈	⊜	⊝	⊞			
2860																
2870																

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
2920		`	°	'	·	|	あ	い	う	え	お	や	ゆ	よ	つ	わ
2930	ア	イ	ウ	エ	オ	ヤ	ユ	ヨ	ツ	ワ	カ	ケ				
2940	||	∫	=	—	:	:	||				)	∩	∪	┌	┐
2950	∩	∪	∧	∨	∧	∨	┌	┐	└	┘	┌	┐	└	┘		
2960																
2970																

Figure A-20 Special Character Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
2D20	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	
2D30	⑯	⑰	⑱	⑲	⑳	I	II	III	IV	V	VI	VII	VIII	IX	X	
2D40	ミリ	キロ	センチ	メートル	グラム	トン	リットル	リットル	リットル	リットル	リットル	リットル	リットル	リットル	リットル	リットル
2D50	mm	cm	km	mg	kg	cc	m ²									平
2D60	"	"	No.	K.K.	TEL	上	中	下	左	右	(株)	(有)	(代)	明	証	囀
2D70	≡	≡	∫	∫	Σ	√	⊥	∠	┌	┐	∩	∪				

Figure A-21 NEC Special Character Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
7920		纒	襲	鏌	銓	葩	倍	炆	豈	精	銀	鼻	彌	丨	仡	任
7930	僂	仔	但	必	佞	侑	侑	侑	俚	侯	倭	倭	倭	倭	倭	倭
7940	僂	倭	倭	兇	倭	侑	侑	侑	侑	侑	倭	倭	倭	倭	倭	倭
7950	邵	倭	倭	兇	倭	侑	侑	侑	侑	倭	倭	倭	倭	倭	倭	倭
7960	塚	增	增	增	增	增	增	增	增	增	增	增	增	增	增	增
7970	岵	岵	岵	岵	岵	岵	岵	岵	岵	岵	岵	岵	岵	岵	岵	岵

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
7A20		忒	愬	悅	愬	愬	愬	愬	愬	愬	愬	愬	愬	愬	愬	愬
7A30	揔	揔	揔	揔	揔	揔	揔	揔	揔	揔	揔	揔	揔	揔	揔	揔
7A40	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘
7A50	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘	擘
7A60	洄	洄	洄	洄	洄	洄	洄	洄	洄	洄	洄	洄	洄	洄	洄	洄
7A70	濱	濱	濱	濱	濱	濱	濱	濱	濱	濱	濱	濱	濱	濱	濱	濱

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
7B20		玃	玃	玃	玃	玃	玃	玃	玃	玃	玃	玃	玃	玃	玃	玃
7B30	瑤	瑤	瑤	瑤	瑤	瑤	瑤	瑤	瑤	瑤	瑤	瑤	瑤	瑤	瑤	瑤
7B40	礫	礫	礫	礫	礫	礫	礫	礫	礫	礫	礫	礫	礫	礫	礫	礫
7B50	絳	絳	絳	絳	絳	絳	絳	絳	絳	絳	絳	絳	絳	絳	絳	絳
7B60	董	董	董	董	董	董	董	董	董	董	董	董	董	董	董	董
7B70	諱	諱	諱	諱	諱	諱	諱	諱	諱	諱	諱	諱	諱	諱	諱	諱

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
7C20		釗	釗	釗	釗	釗	釗	釗	釗	釗	釗	釗	釗	釗	釗	釗
7C30	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞
7C40	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞	鉞
7C50	陽	陽	陽	陽	陽	陽	陽	陽	陽	陽	陽	陽	陽	陽	陽	陽
7C60	醇	醇	醇	醇	醇	醇	醇	醇	醇	醇	醇	醇	醇	醇	醇	醇
7C70		i	ii	iii	iv	v	vi	vii	viii	ix	x	┌	|	'	"	

Figure A-22 NEC Selection of IBM Extended Character Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
9320		i	ii	iii	iv	v	vi	vii	viii	ix	x	|	||	|||	IV	V
9330	VI	VII	VIII	IX	X	一	丨	'	"	(櫛)	No.	TEL	:	纒	嬰	鎡
9340	銓	葩	倍	炆	昱	精	銀	鼻	彌	丨	仡	任	公	仔	但	秘
9350	佞	侑	侑	侑	侑	侑	侑	侑	侑	侑	侑	侑	侑	侑	侑	侑
9360	癩	宜	洽	侑	侑	侑	侑	侑	侑	侑	侑	侑	侑	侑	侑	侑
9370	雙	吃	味	咩	哿	喆	至	坦	坩	垆	埙	塔	塚	增	墟	

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
9420		叟	叟	翕	翕	翕	翕	翕	翕	翕	窠	甯	寘	寬	奈	岑
9430	崧	崧	崧	崧	崧	崧	崧	崧	崧	崧	窠	甯	寘	寬	奈	岑
9440	愬	愬	愬	愬	愬	愬	愬	愬	愬	愬	窠	甯	寘	寬	奈	岑
9450	昀	昀	昀	昀	昀	昀	昀	昀	昀	昀	窠	甯	寘	寬	奈	岑
9460	曹	脞	脞	脞	脞	脞	脞	脞	脞	脞	窠	甯	寘	寬	奈	岑
9470	橫	穉	穉	穉	穉	穉	穉	穉	穉	穉	窠	甯	寘	寬	奈	岑

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
9520		涖	涖	涖	涖	涖	涖	涖	涖	涖	涖	涖	涖	涖	涖	涖
9530	瀆	瀆	瀆	瀆	瀆	瀆	瀆	瀆	瀆	瀆	瀆	瀆	瀆	瀆	瀆	瀆
9540	獮	獮	獮	獮	獮	獮	獮	獮	獮	獮	獮	獮	獮	獮	獮	獮
9550	峻	皂	皜	皜	皜	皜	皜	皜	皜	皜	皜	皜	皜	皜	皜	皜
9560	祥	禔	福	禎	竝	竝	竝	竝	竝	竝	竝	竝	竝	竝	竝	竝
9570	罇	羨	羽	茁	芋	茂	菇	萃	藁	蒹	蒹	蒹	蒹	蒹	蒹	蒹

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
9620		蘊	姓	螭	袞	訖	神	詹	誦	閭	諛	諸	諶	諛	諛	諛
9630	賴	贇	趕	趕	軋	返	逸	違	郎	都	鄉	鄧	鈞	劍	鈞	鈞
9640	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇
9650	鉸	鉸	鉸	鉸	鉸	鉸	鉸	鉸	鉸	鉸	鉸	鉸	鉸	鉸	鉸	鉸
9660	鏐	鏐	鏐	鏐	鏐	鏐	鏐	鏐	鏐	鏐	鏐	鏐	鏐	鏐	鏐	鏐
9670	靈	靈	靈	靈	靈	靈	靈	靈	靈	靈	靈	靈	靈	靈	靈	靈

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
9720		駢	紛	魴	魴	魴	魴	魴	鵬	鵠	鶴	鷓	鷓	鷓	鷓	鷓
9730																
9740																
9750																
9760																
9770																

Figure A-23 IBM Extended Character Set