EPSON

1.5 station printer

TM-U925

Specification

STANDARD	
REV. NO.	A
Notes	

SEIKO EPSON CORPORATION

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REVISION SHEET

Be sure to check the contents before utilizing the specification. This specification has the history shown below.

Revisions			Design Section			Sheet Rev. No.					
Rev.	**Document**	**Date**	**WRT**	**CHK**	**APL**	**Sheet**	**Rev.**	**Sheet**	**Rev.**	**Sheet**	**Rev.**
A	ENACTMENT					I	A	18	A	42	A
						II	A	19	A	43	A
						III	A	20	A	44	A
						IV	A	21	A	45	A
						V	A	22	A	46	A
								23	A	47	A
								24	A	48	A
						1	A	25	A	49	A
						2	A	26	A	50	A
						3	A	27	A	51	A
						4	A	28	A	52	A
						5	A	29	A	53	A
						6	A	30	A	54	A
						7	A	31	A	55	A
						8	A	32	A	56	A
						9	A	33	A	57	A
						10	A	34	A	58	A
						11	A	35	A	59	A
						12	A	36	A	60	A
						13	B	37	A	61	A
						14	A	38	A	62	A
						15	A	39	A	63	A
						16	A	40	A	64	A
						17	A	41	A	65	A

TITLE	Front Part							
	Cover	Rev. Sheet	Scope	General Features	Table of Contents	Contents	Appendix	Total
TM-U925 Specification (STANDARD)	1	2	-	1	4	120	10	138

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Rev.	Document	Date	WRT	CHK	APL	Sheet	Rev.	Sheet	Rev.	Sheet	Rev.
A	ENACTMENT					66	A	90	A	114	A
						67	A	91	A	115	A
						68	A	92	A	116	A
						69	A	93	A	117	A
						70	A	94	A	118	A
						71	A	95	A	119	A
						72	A	96	A	120	A
						73	A	97	A		
						74	A	98	A	App.1	A
						75	A	99	A	App.2	A
						76	A	100	A	App.3	A
						77	A	101	A	App.4	A
						78	A	102	A	App.5	A
						79	A	103	A	App.6	A
						80	A	104	A	App.7	A
						81	A	105	A	App.8	A
						82	A	106	A	App.9	A
						83	A	107	A	App.10	A
						84	A	108	A		
						85	A	109	A		
						86	A	110	A		
						87	A	111	A		
						88	A	112	A		
						89	A	113	A		

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CAUTION

1) This specification shall apply only to the product(s) identified herein.
2) This specification may be modified by SEIKO EPSON CORPORATION without any notice. It is necessary for "the customer" to inquire from SEIKO EPSON CORPORATION for the latest specification.
3) No part of this specification shall be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, for any purpose without the express written permission of SEIKO EPSON CORPORATION.

GENERAL FEATURES

The TM-U925 is a high-quality POS printer that can print on slip paper and a paper roll.

The printer has the following features:

- Wide slip paper capability (maximum characters per line: 88 with 7 × 9 font).
- Interface connector within the printer's external dimensions.
- High throughput using bidirectional, minimum distance printing.
- Precision paper feeding at 1/144 inch.
- Selectable receive buffer size (32 bytes or 2K bytes).
- Slip ejection sensor.
- Command protocol based on the ESC/POS™ standard.
- Automatic Status Back (ASB) function that automatically transmits changes in the printer status.
- EPSON intelligent module connection (An intelligent module for connection to the printer is under development).
- EPSON customer display series connection.
- Optional Magnetic Ink Character Recognition (MICR) reader that enables the printer to perform consecutive reading and processing of MICR characters and printing endorsements.

TABLE OF CONTENTS

1. GENERAL SPECIFICATIONS

1.1 Printing Specifications

1) Printing method: Impact dot matrix
2) Head wire configuration: 9-pin vertical line, wire pitch 1/72 inch
3) Head wire diameter: 0.29 mm (.01")
4) Printing directions: Bidirectional, minimum distance printing
5) Printing speed: Refer to Table 1.2.1
6) Characters per line: Refer to Table 1.2.1
7) Characters per inch: Refer to Table 1.2.1
8) Print mode: Refer to Table 1.1.1

Table 1.1.1 Print Mode

Print mode	Printing speed *1	Print head Energizing time	Paper Roll		Slip Paper	
			Default status	Switching *2	Default status	Switching *2
Normal	High	Normal	Depends on DIP SW 2-4	Possible	--	Possible
Low speed	Low	Normal		Possible	--	Possible
Copy mode	Low	Copy (long)	--	Possible	Selected	Possible

NOTES: *1. The printer automatically goes to low-speed mode during bit image printing, regardless of the type.

*2. The print mode can be changed using the **GS E** command.

1.2 Character Specifications

1) Number of characters:
Alphanumeric characters: 95
International characters: 32
Extended graphics: 128 × 8 pages (including space pages)

2) Character structure:
9 × 9 3-dot spacing (in half-dot units)
7 × 9 2-dot spacing (in half-dot units)
Larger spacing can be set by using the **ESC SP** command.

3) Character size: Refer to Table 1.2.1

Table 1.2.1 Characters Data and Size

Character Structure (Horizontal × vertical)	Character Spacing (half dots)	Characters Per Inch (CPI)	Characters Per Second (CPS) (Carriage speed)		Characters Per Line (CPL)		Character Size (units: mm) Width × Height
			High speed	Low speed	Roll Paper	Slip Paper	
9 × 9	3 dots	12.5	233	200	30	66	1.6×3.1 (.06"×.12")
7 × 9	2 dots	16.7	311	267	40	88	1.3×3.1 (.05"×.12")

1.3 Ribbon

1) Type: Exclusive ribbon cassette

2) Ribbon cassette specifications:
   Part number: ERC-31
   Color: Purple
   Ribbon life (*): 7,000,000 characters
   (*): when one character consists of 18 dots.

3) Ribbon cassette overall dimensions: (refer to Figure 1.3.1)

(All the numeric values are typical.)

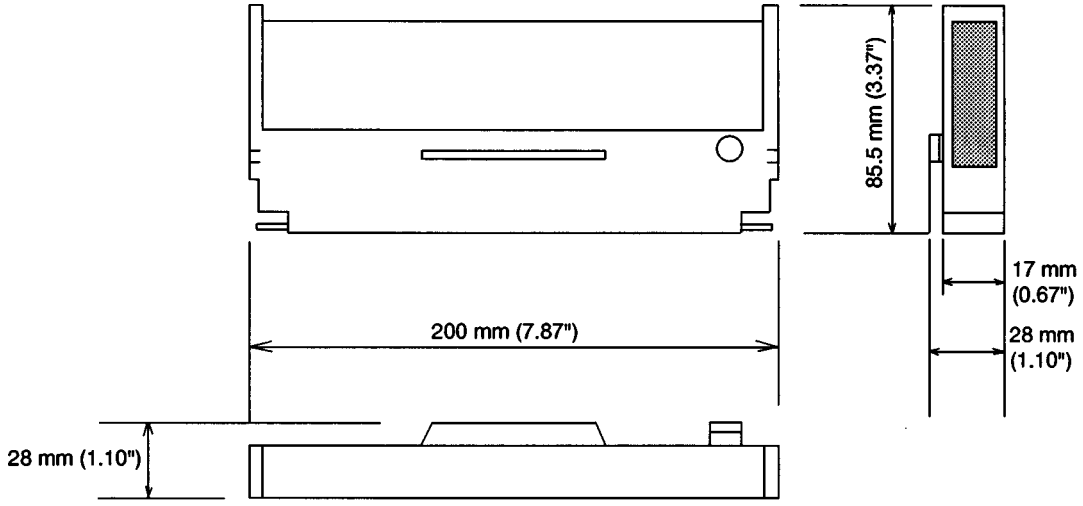


Figure 1.3.1 Ribbon Cassette Overall Dimensions

1.4 Stamp

Paper roll side only (controlled by the **ESC o** command)

1) Recommended stamp: Fuji Copian CSP-2042C

2) Recommended ink: Fuji Copian Super Ink (purple)

3) Printable area dimensions (W × H):
42 mm × 20 mm (1.65" × 0.79")

4) Stamp overall dimensions: Refer to Figure 1.4.1.

NOTE: The stamp mechanism is a factory option. The stamp set should be supplied by the user.

(All the numeric values are typical.)

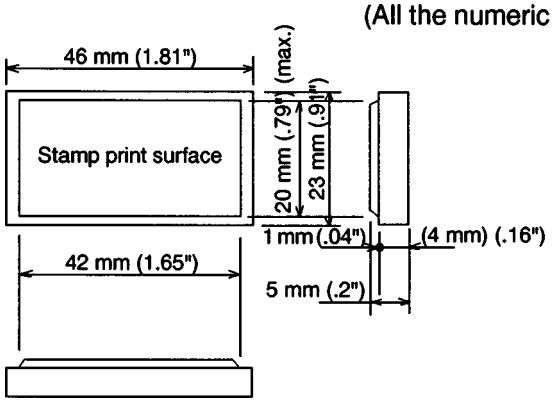


Figure 1.4.1 Stamp Overall Dimensions

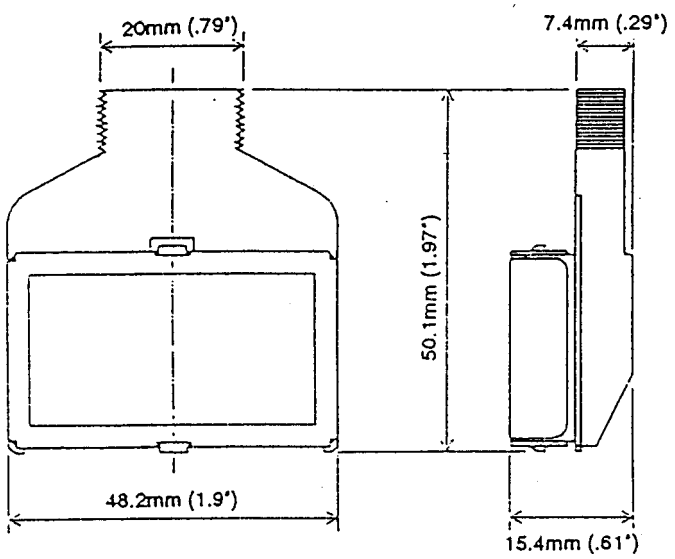


Figure 1.4.2 Stamp Set Overall Dimensions

1.5 Auto-cutter

Full cut/partial cut:	Controlled by the **ESC i** and **ESC m** commands.

1.6 Paper Roll Supply Device

1) Supply method:	Paper roll drop-in loading
2) Near-end sensor	
a) Detection method:	Microswitch
b) Paper roll spool:	Inside diameter of 10 mm (0.39") or more
c) Near-end adjustment:	Adjusting screw (refer to Appendix D, *Adjusting the Paper Roll Near-End Sensor Location*)

1.7 Paper

1) Paper feed method: Friction feed

2) Paper feed pitch: Default 1/6 inch
Can be set in units of 1/144 inch by the **ESC 3** and **ESC J** commands.

3) Paper feed speed: Approximately 60.3 ms/line (1/6 inch feeding)
Approximately 3.4 inches/second (continuous feeding)

4) Paper size:

a) Paper roll (single-ply)

① Quality: High

② Size: Width: 69.5 mm ± 0.5 mm (2.74" ± .02")
Maximum outside diameter: 83 mm (3.27")

③ Thickness: 0.06 to 0.09 mm (.0024 to .0035")

④ Weight: 52.3 to 64.0 g/m^2 (13.9 to 17 lbs) (JIS P8124)
(45 to 55 Kg (20.41 to 24.94 lbs)/1000 sheets/788 mm × 1091 mm (31.02" × 42.95"))

⑤ Paper roll spool inside diameter:
10 mm (0.39") or more

b) Slip paper

① Paper type:
- Normal paper
- Carbon copy paper
- Pressure sensitive paper

② Total thickness: 0.09 to 0.36 mm (.0035 to .0141") (Refer to b)-⑤ below)

③ Size (W × L): 70 mm × 70 mm to 210 mm × 297 mm (A4 size)
(2.76" × 2.76" to 8.27" × 11.69")

④ Ambient temperature and copy capability

Copy capability is greatly influenced by the ambient temperature, so printing must be performed under the conditions described in Table 2.6.1.

Table 2.6.1 Number of Copies and Ambient Temperature

Number of copies	Ambient temperature (print mode)
Original + 4 copies	Approximately 20° to 40°C (68° to 104°F) (copy mode)
Original + 1 to 3 copies	5° to 40°C (41° to 104°F) (copy mode)

⑤ Copy capability and paper thickness:

- Normal paper (single-ply): 0.09 to 0.2 mm (.0035 to .0079")
- Carbon copy paper combination:
  5 sheets maximum
  (original + 4 copies, at 20° to 40°C (68° to 104°F))

Backing paper:	0.06 to 0.15 mm (.0023 to .0059")
Copy and original:	0.04 to 0.07 mm (.0015 to 0028")
Carbon paper:	Approximately 0.035 mm (.0014")
Total thickness:	0.30 mm (.0118") or less (for any combination from a single original to an original + 3 copies)
	0.36 mm (.0141") or less (for any combination from a single original to an original + 4 copies)

- Pressure sensitive paper: 5 sheets maximum (original + 4 copies, at 20° to 40°C (68° to 104°F))

Backing paper:	0.06 to 0.15 mm (.0023 to .0059")
Copy and original:	0.06 to 0.075 mm (.0023 to .003")
Total thickness:	0.24 mm (.0094") or less (original to original + 3 copies)
	0.30 mm (.0118") or less (original + 4 copies)

NOTE: When using multi-ply paper that consists of an original and three copies, be sure to print with a 9 × 9 font. If a 7 × 9 font is used, some characters on some of the copies may not be readable.

c) Check paper (only when the printer is used with the MICR reader)

① Paper type:	Normal paper
② Total thickness:	0.09 to 0.2 mm (.0035 to .0079")
③ Size:	68 to 102 mm x 152 to 210 mm (2.68 to 4.02" × 2.98 to 8.27")
④ Weight:	70 to 90 kg paper

5) Notes on setting the print operation mode

- The **GS E** command sets print mode (printing speed and print head energizing time).
- When the power is turned on, normal mode is selected as the default. The printer automatically switches from normal mode to copy mode when slip paper is selected by **ESC c 0**.
- Refer to **ESC c 0** and **GS E**.

6) Notes on slip paper

- The slip paper must be flat, without curls or wrinkles, especially at the top edges. Otherwise, the paper may rub against the ribbon and become stained.
- There must be no glue on the bottom edge of the slip paper. The glue should preferably to be on the top edge. Choose slip paper carefully when the glue is on the right or left edge, since paper feeding and insertion are affected by gluing conditions (e.g., glue quality, method, and length) and glue location (refer to Figure 1.7.1). Be especially careful when the slip paper is wide and has the glue on the right or left edge, since skewing may occur.
- Since the slip insertion sensor uses a photosensor, do not use paper that has holes at the sensor position or is translucent (refer to Figure 1.7.2).

- Since the slip ejection sensor uses a reflective photosensor, do not use paper that has holes or dark portions with low reflection (less than 40%) at the sensor position (refer to Figure 1.7.3).
- Be sure to perform slip printing with a paper roll loaded to avoid incorrect paper feeding due to paper jams.
- Use thinner paper (N30 or equivalent) between the top and bottom sheets of multi-ply paper. If thick paper is used, copy capability is lowered.

7) Notes on using the MICR reader (only when the printer is used with MICR)

- Be sure to perform personal check printing with a paper roll loaded. If MICR reading and/or printing is performed without a paper roll, the check cannot be fed correctly or may be damaged due to paper jams.
- The personal checks must be flat, without curls, folds, or wrinkles (especially at the edges). Otherwise, the check may rub against the ribbon and become stained.
- Do not insert checks with staples. This may cause paper jams, MICR reading errors, and damage to the MICR head.
- Let go of the check as soon as the printer starts feeding it. Otherwise, the paper is not fed straight, causing paper jams and MICR reading errors.

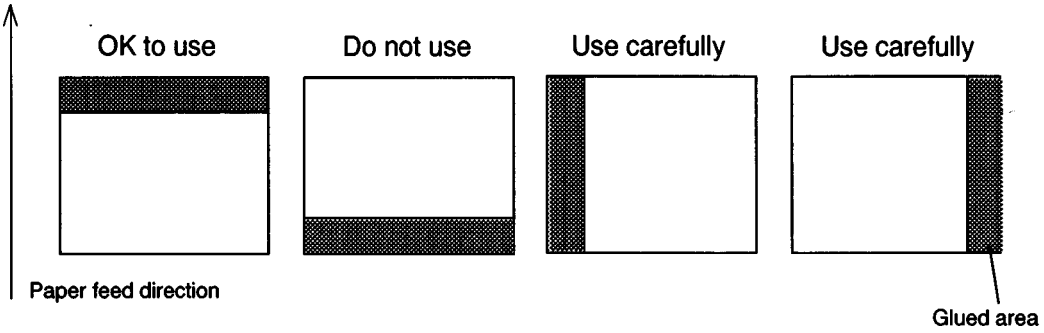


Figure 1.7.1 Slip Paper Glued Area

(All the numeric values are typical.)

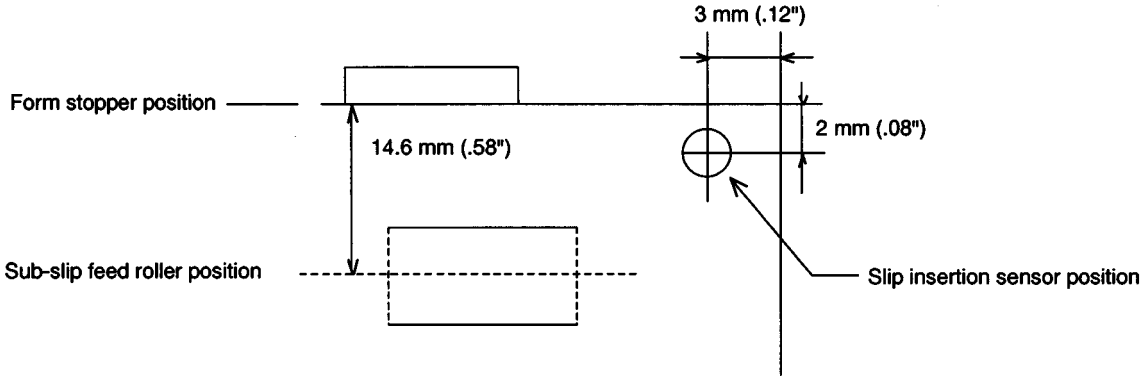


Figure 1.7.2 Slip Insertion Sensor Position

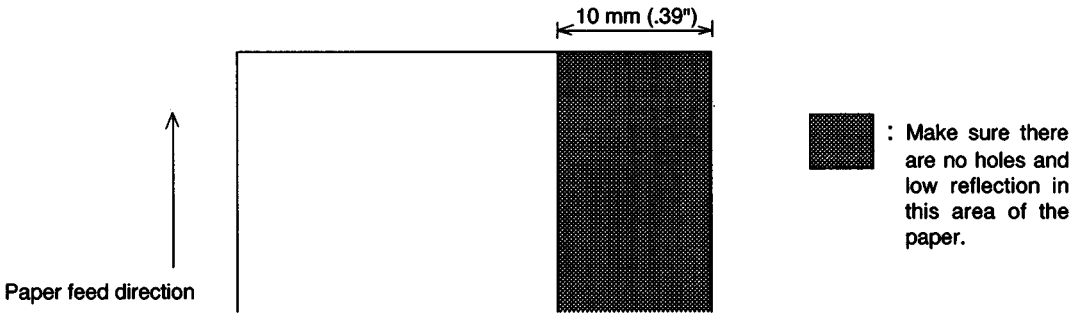


Figure 1.7.3 Paper Holes and Low Reflection Prohibited Area

1.8 Printable Area

1) Paper roll

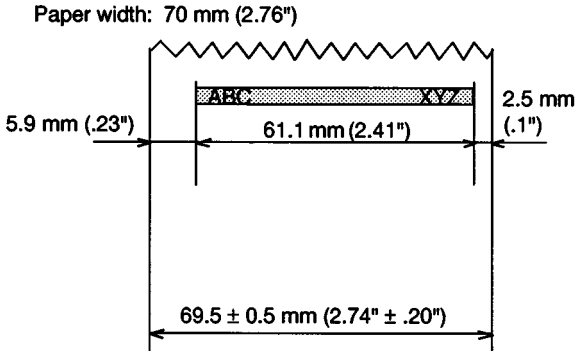


Figure 1.8.1 Paper Roll Printable Area

2) Slip paper

(All the numeric values are typical.)

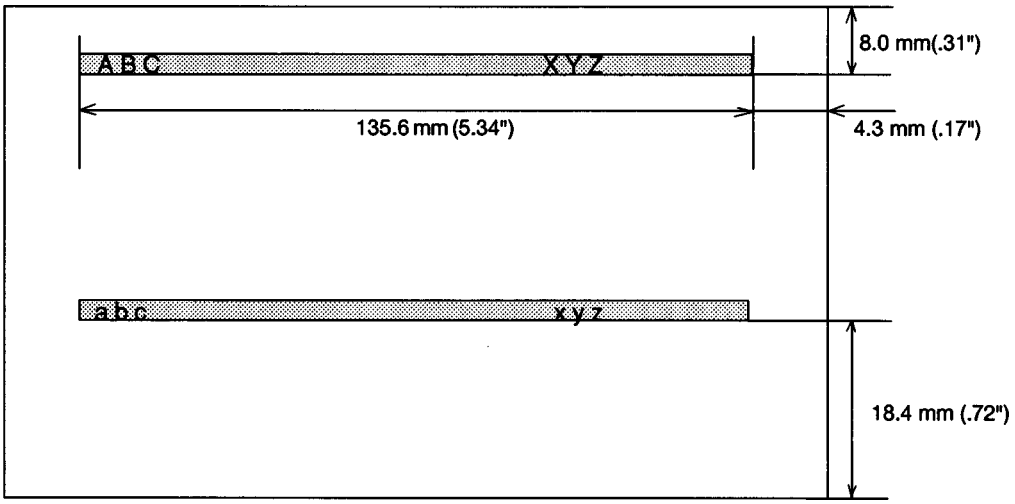


Figure 1.8.2 Slip Paper Printable Area

Printing U.S.A. personal checks (lengthwise printing)

1) Width: 68 to 77 mm (2.68 to 3.03")
2) Thickness: 0.09 to 0.2 mm (.0035 to .0079")
3) Lengthwise printing (on the back)

Printing within the printable area shown in Figure 1.9.4 is possible, but pay attention to the following points:

① Since only one roller is used, paper fed per step is calculated as 0.1771 mm (.0007"). Distance from the top of the slip to the printing position is 8.7 mm (0.34" = A) (calculated value).

② The printable area is 180 dots (360 positions) from the right-side print starting position.

③ To print endorsements on the back in the specified area (within 1.5 inches from the top), set the print position for the last line so that it is printed 3 mm (.12") above the bottom of the printable area.

(All numeric values are typical.)

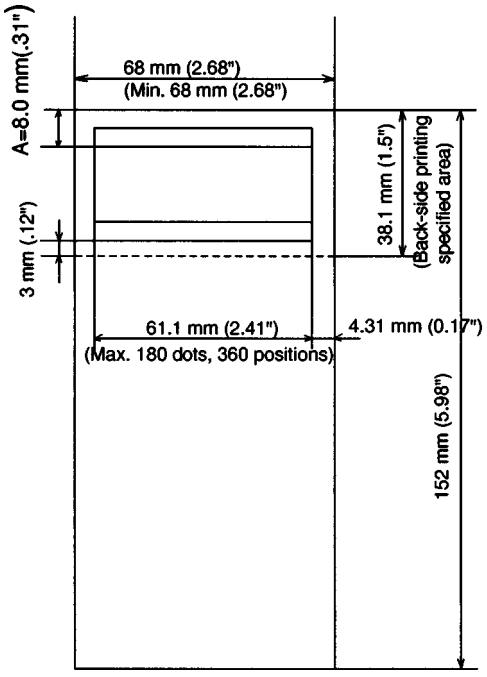
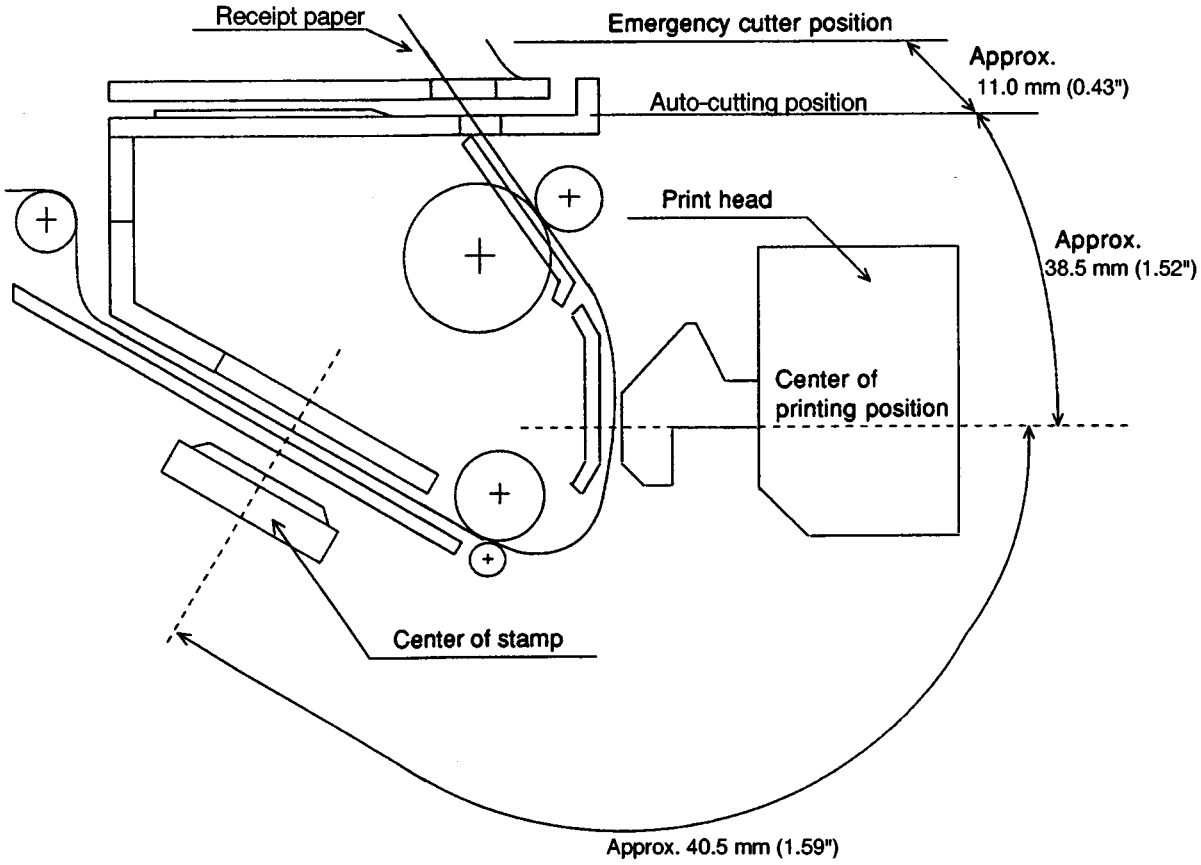


Figure 1.8.3 U.S.A. Personal Check Printable Area

1.9 Printing, Stamp, and Auto-cutter Positions



(All the numeric values are typical.)

Figure 1.9.1 Printing, Stamp, and Auto-cutter Positions

1) Distance from the auto-cutting position to the center of the printing position:
Approximately 38.5 mm (1.52")
2) Distance from the center of the stamp to the center of the printing position:
Approximately 40.5 mm (1.59")
3) Distance from the auto-cutting position to the emergency cutter position:
Approximately 11.0 mm (0.43")

NOTE: The dimensions in Figure 1.9.1 do not allow for paper slack. Therefore, take this into account when using the stamp or auto-cutter.

1.10 Receive Buffer

Selectable as 32 or 2K bytes using a DIP switch

1.11 Electrical Characteristics

1) Supply voltage: +24 VDC ± 10%

Ripple voltage: 300 mVpp or less
(only when the printer is used with the MICR reader)

2) Current consumption: Operating:

a) When feeding slip paper to the print starting position:

Mean - approximately 2.3 A, approximately 1.4 seconds

b) Printing:

Mean - approximately 1.8 A
(when printing alphanumeric characters for muximum number of printing on paper roll)

Peak - approximately 8.0 A

Standby: Mean - approximately 0.3 A

Operating MICR reader (when the printer is used with the MICR reader):
Mean - approximately 2.3 A
(Approximately 1.4 seconds)

1.12 EMI and Safety Standards Applied

1) Europe CE marking (printer with MICR reader: under application)

EN55022
EN50082-1
EN45501 (except for when connected to IM)

Safety standard: TÜV

2) North America

EMI: FCC Class A

Safety standards: UL1950-2TH-D3
C-UL

3) Japan: EMI: VCCI Class 1

1.13 Reliability (Refer to Appendix G)

1) Printer mechanism: Mean Cycle Between Failures (MCBF): 5,000,000 lines
(when performing auto-cutting and stamping once each for every 15 lines printed)
Life: 7,500,000 lines
(The printer is defined to have reached the end of its life when it cannot function properly because of the main parts (motors, solenoids, frames, shafts, etc.) wearing out.)
Print head life: 150 million characters
(when printing an average of 2 dots/wire per character)

2) MICR reader mechanism (only when the printer is used with the MICR reader):
MCBF: 160,000 passes
Life: 240,000 passes
(One pass: from reading characters to printing endorsements on a U.S.A. personal check (152 mm (5.98") long))
(The MICR reader is defined to have reached the end of its life when it cannot function properly because of the main parts (magnetic head, head holding roller, etc.) of wearing out.)

1.14 Environmental Conditions

1) Temperature:	Operating:	5° to 40°C (41° to 104°F)	
	Storage:	-10° to 50°C (14° to 122°F) (except for ribbon)	
2) Humidity:	Operating:	30% to 80%RH	
		(at 30°C (86°F) or more, the upper limit condition is 30°C, 80% or equivalent, with no condensation)	
	Storage:	30% to 90%RH	
		(with no condensation, except for ribbon)	
3) Vibration resistance:	When packed:	Frequency:	5 to 55 Hz
		Acceleration:	2 G
		Sweep:	5 minutes (half cycle)
		Duration:	1 hour
		Directions:	x, y, and z
	No external or internal damage should be found after the vibration test, and the unit should operate normally.		
4) Impact resistance:	When packed:	Package:	Epson standard package
		Height:	50 cm (19.69")
		Directions:	1 corner, 3 edges, and 6 surfaces
	No external or internal damage should be found after the drop test, and the unit should operate normally.		

When unpacked: Height: 5 cm (1.97")

Directions: Lift one edge and release it (for all 4 edges).

A printer that is not currently printing should not be damaged after it is dropped.

5) Acoustic noise: Operating: 63 dB or less (bystander position)
(Paper roll printing)

1.15 MICR Reader (only when the printer is used with the MICR reader)

1) Available fonts: E-13B, CMC7

2) Recognition rating: 98% or more (at 25°C)

Recognition rating is defined as follows:

$$\text{Recognition rating (\%)} = \frac{\text{Total number of checks - (number of sheets misread and those not identified)}}{\text{Total number of checks}} \times 100$$

- Check paper used for test is Epson standard check paper.
- Checks must be flat, without curls, folds, or wrinkles.

2. CONFIGURATION

2.1 Interface

2.1.1 RS-232C serial interface

1) Specifications

Data transmission:	Serial	
Synchronization:	Asynchronous	
Handshaking:	DTR/DSR or XON/XOFF control	
Signal levels:	MARK = -3 to -15 V:	Logic “1”
	SPACE = +3 to +15 V:	Logic “0”
Stop bits:	1 or more	
Connector (printer side):	Female DSUB-25 pin connector	

The data word length, baud rate, and parity depend on the DIP switch settings. (Refer to Section 3.3.3.)

2) Switching between on-line and off-line

The printer does not have an on-line/off-line switch. The printer goes off-line:

- Between the time when the power is turned on (including reset using the interface) and when the printer is ready to receive data.
- During the self-test.
- When the cover is open.
- During paper feeding using the paper feed switch.
- When the printer stops printing due to a paper-end (if enabled by **ESC c 4**).
- When an error occurs.

3) Interface connector terminal assignments and signal functions are described in Table 2.1.1.

Table 2.1.1 TM-U925 Printer Status and Signals

<table>
<tr><th>Pin number</th><th>Signal name</th><th>Signal direction</th><th>Function</th></tr>
<tr><td>1</td><td>FG</td><td>--</td><td>Frame ground</td></tr>
<tr><td>2</td><td>TXD</td><td>Output</td><td>Transmit data</td></tr>
<tr><td>3</td><td>RXD</td><td>Input</td><td>Receive data</td></tr>
<tr><td>4</td><td>RTS</td><td>Output</td><td>DIP SW 1-6 OFF: Same as DTR signal (Pin 20)
DIP SW 1-6 ON: Logical product of DTR signals of DM-D and TM (If both are SPACE, the printer can receive data (SPACE).)</td></tr>
<tr><td>6</td><td>DSR</td><td>Input</td><td>This signal indicates whether the host computer can receive data.
SPACE indicates that the host computer can receive data, and MARK indicates that the host computer cannot receive data.
When DTR/DSR control is selected, the printer transmits data after confirming this signal (except when transmitting data by GS ENQ, DLE ENQ, and GS a).
When XON/XOFF control is selected, the printer does not check this signal.
Changing the DIP switch setting enables this signal to be used as a reset signal for the printer (refer to Section 3.3.3).
The printer is reset when the signal remains MARK for 1 ms or more.</td></tr>
<tr><td>7</td><td>SG</td><td>--</td><td>Signal ground</td></tr>
<tr><td>20</td><td>DTR</td><td>Output</td><td>1) When DTR/DSR control is selected, this signal indicates whether the printer is busy. SPACE indicates that the printer is ready to receive data, and MARK indicates that the printer is busy. The busy condition can be changed by using DIP SW 2-5 as follows (refer to Section 3.3.3):
<table>
<tr><th colspan="2" rowspan="2">Printer status</th><th colspan="2">DIP SW 2-5 status</th></tr>
<tr><th>ON</th><th>OFF</th></tr>
<tr><td rowspan="6">Off-line</td><td>1. During the period from when the power is turned on (including resetting using the interface) to when the printer is ready to receive data.</td><td>BUSY</td><td>BUSY</td></tr>
<tr><td>2. During the self-test.</td><td>BUSY</td><td>BUSY</td></tr>
<tr><td>3. When the cover is open.</td><td>--</td><td>BUSY</td></tr>
<tr><td>4. During paper feeding using the PAPER FEED button.</td><td>--</td><td>BUSY</td></tr>
<tr><td>5. When the printer stops printing due to a paper-end.</td><td>--</td><td>BUSY</td></tr>
<tr><td>6. When an error has occurred.</td><td>--</td><td>BUSY</td></tr>
<tr><td></td><td>7. When the receive buffer becomes full.(*)</td><td></td><td>BUSY</td></tr>
</table></td></tr>
</table>

Table 2.1.1 TM-U925 Printer Status and Signals (continued)

Pin number	Signal name	Signal direction	Function
20	DTR	Output	2) When XON/XOFF control is selected: The signal indicates whether the printer is correctly connected and is ready to receive data. SPACE indicates that the printer is ready to receive data. The signal is always SPACE except in the following cases: ▫ During the period from when the power is turned on to when the printer is ready to receive data ▫ During the self-test
25	INIT	Input	Changing the DIP switch setting enables this signal to be used as a reset signal for the printer. The printer is reset when the signal remains SPACE for 1 ms or more.

NOTES: 1. When the remaining space in the receive buffer drops to 16 bytes, the printer status becomes "buffer full" and it remains "buffer full" until the space in the receive buffer increases to 26 bytes.

2. The printer ignores the data received when the remaining space in the receive buffer is 0 bytes.

4) XON/XOFF transmit timing

When XON/XOFF control is selected, the printer transmits XON or XOFF signals as follows. Transmit timing differs depending on the DIP SW2-5 setting.

Table 2.1.2 XON/XOFF Transmit Timing

	Printer status	DIP SW 2-5 status	
		ON	OFF
XON transmission	① When the printer goes on-line after turning on the power (or reset using interface)	Transmit	Transmit
	② When the receive buffer is released from the buffer full state	Transmit	Transmit
	③ When the printer switches from off-line to on-line	---	Transmit
	④ When the printer recovers from an error using the **DLE ENQ 1** or **DLE ENQ 2** commands	---	Transmit
XOFF Transmission	⑤ When the receive buffer becomes full	Transmit	Transmit
	⑥ When the printer switches from on-line to off-line	---	Transmit

NOTES:
- The XON code is 11H(17) and the XOFF code is 13H(19).
- In case ③, XON is not transmitted when the receive buffer is full.
- In case ⑥, XOFF is not transmitted when the receive buffer is full.

2.1.2 Notes on setting DIP switch 2-5 to ON

1) The printer mechanism stops but does not become busy when an error occurs, the cover is open, printing stops due to a paper-end, or paper is fed using the PAPER FEED button.
2) When setting DIP switch 2-5 to ON to enable handshaking with the printer, be sure to check the printer status using the **GS a** command and the ASB function. In this setting, the default value of n for **GS a** is 2. The printer automatically transmits the printer status, depending on on-line/off-line changes.
3) When using **DLE EOT, DLE ENQ**, and **GS ENQ**, be sure that the receive buffer does not become full.
   - When using a host that cannot transmit data when the printer is busy:
     If an error occurs, **DLE EOT, DLE ENQ,** and **GS ENQ** cannot be used when the printer is busy due to a receive buffer-full state.
   - When using a host that can transmit data when the printer is busy:
     If the receive buffer becomes full while transmitting bit-image data, a **DLE EOT, DLE ENQ**, or **GS ENQ** command used while sending the bit-image data is processed as bit-image data. The data transmitted when the receive buffer is full may be lost.

     Example: Check the printer status using **ESC v** or **ESC u** after transmitting each line of data and use the 2K byte receive buffer. Transmit one line of data so that the receive buffer does not become full.

2.1.3 Notes on resetting the printer using the interface

The printer can be reset using interface pins 6 and 25 by changing the DIP switch setting (refer to Section 3.3.3, DIP switch 2).

Table 2.1.3 Reset Switching

Signal Line	DIP Switch	Reset Condition
Pin 6 (DSR)	DSW 2-7: ON	MARK level input
Pin 25 (INIT)	DSW 2-8: ON	SPACE or TTL-HIGH level input

To reset the printer, the following requirements must be satisfied:

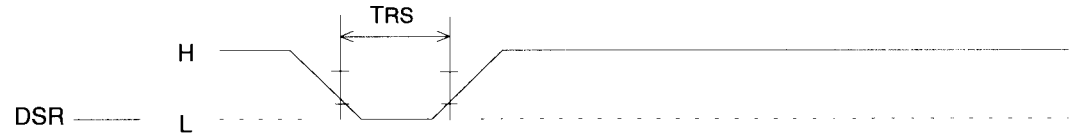
- DC characteristics:

Table 2.1.4 Reset DC Characteristics

		Pin 6 (DSR)	Pin 25 (INIT)
Input HIGH voltage	V_{IH}	+3 to +15 V	+2 to +15 V
Input LOW voltage	V_{IL}	-15 to + -3 V	-15 to + 0.8 V
Input HIGH current:	I_{IH}	5 mA (maximum)	1 mA (maximum)
Input LOW current:	I_{IL}	-5.3 mA (maximum)	-2 mA (maximum)
Input impedance:	R_{IN}	3 KΩ (minimum)	

- AC characteristics:
  Minimum reset pulse width: T_{RS} 1 ms (minimum)

- When using pin 6 (DSR) (DIP switch 2-7 is ON):



When using pin 25 (INIT) (DIP switch 2-8 is ON):

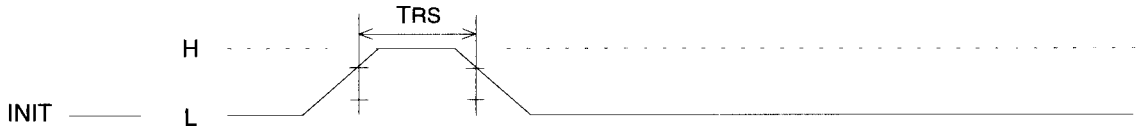


Figure 2.1.2 Minimum Reset Pulse Width (pin 25)

NOTES: 1. When a signal that does not satisfy the requirements above is input, printer operation is not guaranteed. When a signal is input to pin 25 (INIT) at the TTL level, the requirements above must also be satisfied. Although a signal is input to pin 6 (DSR) at the TTL level according to the DC characteristics described above, the operation is not guaranteed and pin 6 cannot be controlled.

2. When pin 6 (DSR) and pin 25 (INIT) are open, the printer is operating.

2.2 Connectors

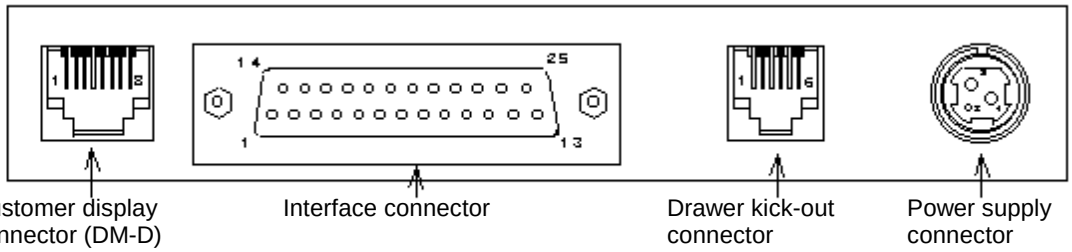


Figure 2.2.1 Connector Panel External Appearance

2.2.1 Interface connectors

Refer to Section 2.1, *Interface*

2.2.2 Power supply connector

This connector is used to connect the printer to an external power source.

1) Pin assignments: Refer to Table 2.2.1.

2) Model: Hosiden TCS7960-532010 or equivalent

Table 2.2.1 Power Supply Connector Pin Assignments

Pin Number	Signal Name
1	+24 VDC
2	GND
3	NC
Shell	Frame GND

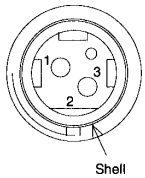


Figure 2.2.2 Power Supply Connector

2.2.3 Drawer kick-out connector (modular connector)

The pulse specified by **ESC p** is output to this connector. The host can confirm the status of the input signal by using the **DLE EOT, ESC u, GS r**, or **GS a** (Automatic Status Back) commands.

Refer to Appendix E, Notes on Using the Drawer Kick-out Connector.

1) Pin assignments: Refer to Table 2.2.2.

2) Connector model: Printer side: MOLEX 52065-6615 or equivalent
Host side: 6-pole, 6-pin (RJ12 telephone jack)

Table 2.2.2 Drawer Kick-out Connector Pin Assignments

Pin Number	Signal name	Direction
1	Frame GND	--
2	Drawer Kick-out driver signal 1	Output
3	Drawer open/close signal	Input
4	+24V	--
5	Drawer kick-out drive signal 2	Output
6	Signal GND	--

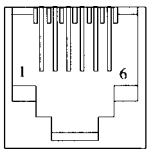


Figure 2.2.3 Drawer Kick-out Connector

3) Drawer Kick-out drive signal

Output signal: Output voltage: Approximately 24 V
Output current: 1 A or less

CAUTION: To avoid an overcurrent, the resistance of the drawer kick-out solenoid must be 24Ω or more.

Output waveform: Outputs the waveforms in Figure 2.2.4 to the points A and B in Figure 2.2.5.

t1 (ON time) and *t2* (OFF time) are specified by **ESC p**.

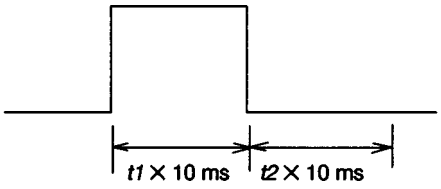


Figure 2.2.4 Drawer Kick-out Drive Signal Output Waveform

4) Drawer open/close signal

Input signal lever (connector pin 3): "L" = 0 to 0.8 V

"H" = 2 to 5 V

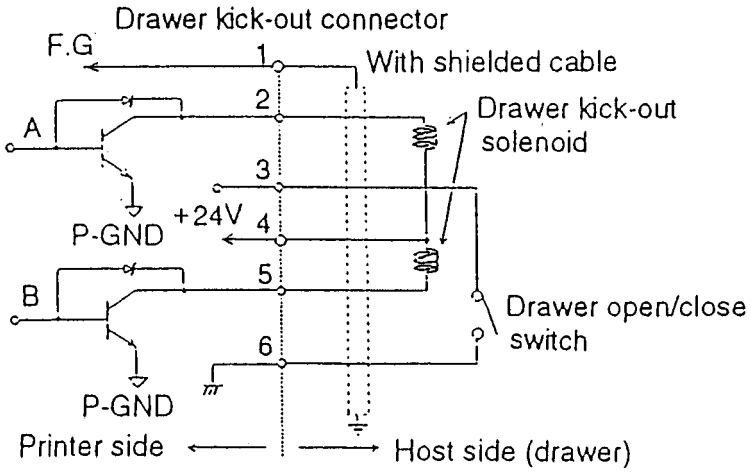


Figure 2.2.3 Drawer Circuitry

NOTES:
1. Use a shielded cable for the drawer connector cable.
2. Two driver transistors cannot be energized simultaneously.
3. The driver must not be energized continuously.
4. Be sure to use the printer power supply (connector pin 4) for the drawer power source.
5. The resistance of the drawer kick-out solenoid must not be less than that specified (24 Ω). Otherwise, an overcurrent could damage the solenoid.

2.2.4 Customer display connector (For RS-232 serial interface)

1) Connector model: MOLEX 52065-8845 or equivalent

2) Pin assignments

Table 2.2.3 DM-D Connector Pin Assignments

Pin Number	Signal name	Direction
1	FG	--
2	RXD	--
3	TXD	Output
4	DTR	Output
5	DSR	Input
6	SG	--
7	+24	--
8	PG	--

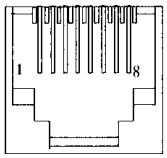


Figure 2.2.6 DM-D Connector

3. FUNCTION

3.1 Command List

Command	Name
LF	Print and line feed
FF	Print and eject cut sheet
CR	Carriage return
DLE EOT	Real-time transmission of status
DLE ENQ	Real-time request to printer
ESC SP	Set right-side character spacing
ESC !	Select print mode(s)
ESC $	Set absolute print position
ESC %	Select/cancel user-defined character set
ESC &	Define user-defined characters
ESC ∗	Select bit image mode
ESC –	Turn underline mode on/off
ESC 2	Select default line spacing
ESC 3	Set line spacing
ESC <	Return home
ESC =	Select peripheral device
ESC ?	Cancel user-defined characters
ESC @	Initialize printer
ESC C	Set cut sheet eject length
ESC E	Turn emphasized mode on/off
ESC G	Turn double-strike mode on/off
ESC J	Print and feed paper
ESC K	Print and reverse feed
ESC R	Select an international character set
ESC U	Turn unidirectional printing mode on/off
**ESC **	Set relative print position

Commands (continued)

Command	Name
ESC a	Select justification
ESC c 0	Select paper type(s) for printing
ESC c 1	Select paper type(s) for command settings
ESC c 4	Select paper sensor(s) to stop printing
ESC c 5	Enable/disable panel buttons
ESC d	Print and feed paper *n* lines
ESC e	Print and reverse feed *n* lines
ESC f	Set cut sheet waiting time
ESC i	Partial cut (one portion left uncut)
ESC m	Partial cut (Three portions left uncut)
ESC o	Stamp
ESC p	Generate pulse
ESC t	Select character code table
ESC u	Transmit peripheral device status
ESC v	Transmit paper sensor status
ESC {	Turn upside-down printing mode on/off
GS ENQ	Real-time printer status
GS *	Define downloaded bit image
GS /	Print downloaded bit image
GS E	Select print speed and head energizing time
GS I	Transmit printer ID
GS P	Set vertical and horizontal motion unit (*)
GS a	Enable/disable Automatic Status Back (ASB)
GS r	Transmit status

MICR command lists (when the printer is used with the MICR reader)

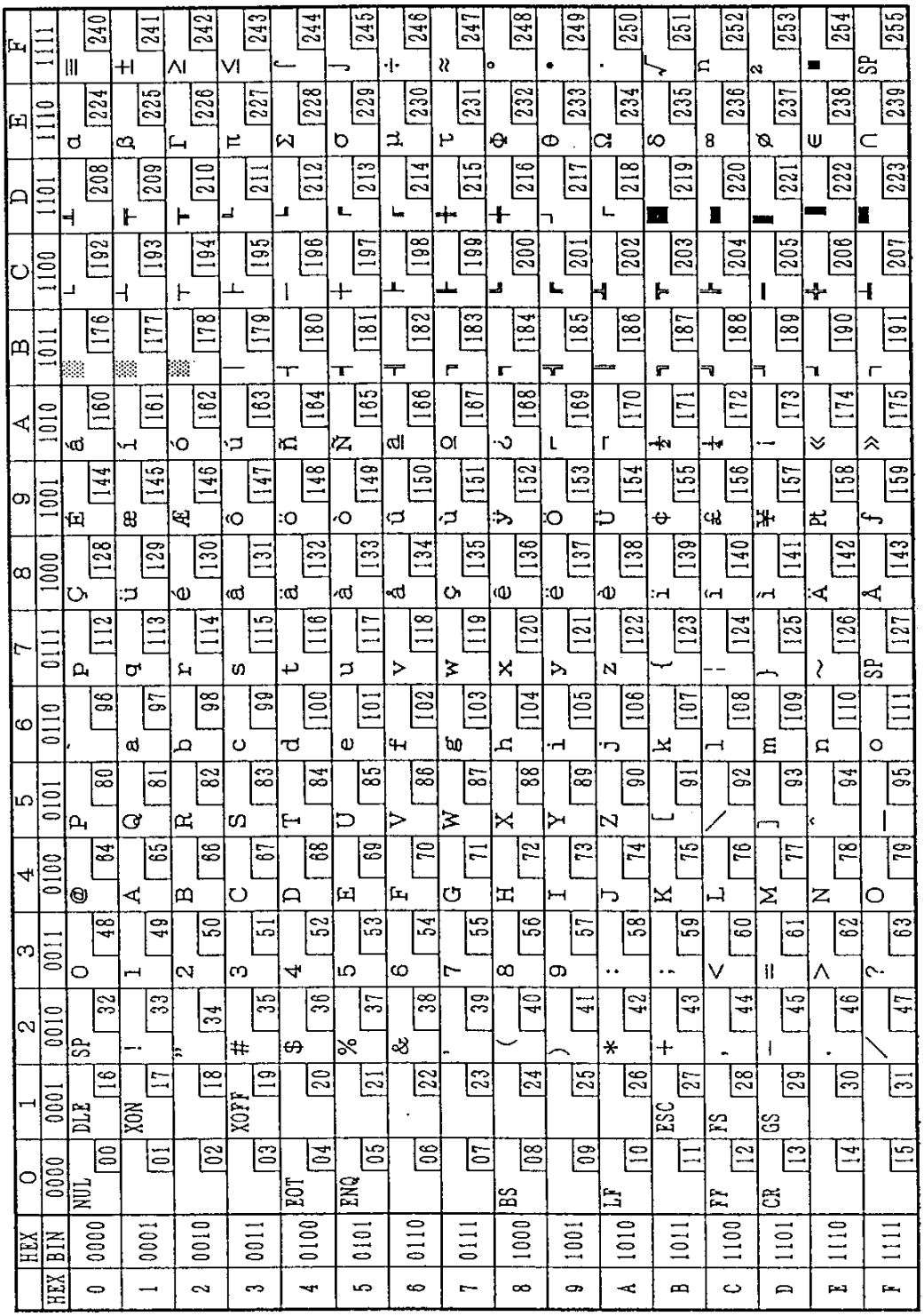
Command	Name
DLE EOT BS	Real-time transmit MICR status transmission
FS a 0	Read check paper
FS a 1	Load check paper to print starting position
FS a 2	Eject check paper
FS b	Request retransmission of check paper reading result
FS c	MICR mechanism cleaning

(*) NOTE:

The vertical and horizontal motion units are used to set the minimum pitch by software instead of by mechanical pitch. Using vertical and horizontal motion units minimizes dependence on the mechanical pitch for setting, (e.g., the paper feed amount and enables the printing position to be set in inches. (Refer to **GS P**))

3.2 Character Code Tables

3.2.1 Page 0 (PC437: U.S.A., Standard Europe) (International character set:U.S.A.)



HEX	BIN	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
HEX	BIN	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	NUL 00	DLE 16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	┴ 208	α 224	≡ 240
1	0001	01	XON 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▒ 177	┴ 193	┬ 209	ß 225	± 241
2	0010	02	18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	▒ 178	┬ 194	├ 210	Γ 226	≥ 242
3	0011	03	XOFF 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	└ 211	π 227	≤ 243
4	0100	EOT 04	20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	┌ 212	Σ 228	⌠ 244
5	0101	ENQ 05	21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	╡ 181	┼ 197	┐ 213	σ 229	⌡ 245
6	0110	06	22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	ª 166	╢ 182	├ 198	┌ 214	µ 230	÷ 246
7	0111	07	23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	1000	BS 08	24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	1001	09	25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	1011	ESC 11	27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	¢ 155	½ 171	╗ 187	╦ 203	▄ 219	δ 235	√ 251
C	1100	FS 12	28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▌ 220	∞ 236	n 252
D	1101	GS 13	29	- 45	= 61	M 77	] 93	m 109	} 125	ì 141	¥ 157	¡ 173	╜ 189	═ 205	▐ 221	ø 237	2 253
E	1110	14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	Pt 158	« 174	╛ 190	╬ 206	▀ 222	∈ 238	■ 254
F	1111	15	31	/ 47	? 63	O 79	_ 95	o 111	SP 127	Å 143	ƒ 159	» 175	┐ 191	╧ 207	▄ 223	∩ 239	SP 255

Notes:
- The character code tables show only character configurations. They do not show the actual print pattern.
- The BS and FS codes are available only when the printer is used with the MICR reader.

3.2.2 Page 1 (Katakana)

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

3.2.3 Page 2 (PC850: Multilingual)

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

3.2.4 Page 3 (PC860: Portuguese)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	0001	ü 129	À 145	í 161	▒ 177	┴ 193	╤ 209	ß 225	± 241
2	0010	é 130	È 146	ó 162	▒ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	0011	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	0100	ã 132	õ 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	0101	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	0110	Á 134	Ú 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	0111	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	1000	ê 136	Ì 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	1001	Ê 137	Õ 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	1010	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	1011	Í 139	¢ 155	½ 171	╗ 187	╦ 203	■ 219	δ 235	√ 251
C	1100	Ô 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
D	1101	ì 141	Ù 157	¡ 173	╜ 189	═ 205	▌ 221	ø 237	² 253
E	1110	Ã 142	₧ 158	« 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254
F	1111	Â 143	ó 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

3.2.5 Page 4 (PC863: Canadian-French)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	¦ 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	0001	ü 129	È 145	´ 161	▒ 177	┴ 193	╤ 209	β 225	± 241
2	0010	é 130	Ê 146	ó 162	▒ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	0011	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	0100	Â 132	Ë 148	¨ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	0101	à 133	Ï 149	¸ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	0110	¶ 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	0111	ç 135	ù 151	‗ 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	1000	ê 136	¤ 152	Î 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	1001	ë 137	Ô 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	1010	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	1011	ï 139	¢ 155	½ 171	╗ 187	╦ 203	■ 219	δ 235	√ 251
C	1100	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
D	1101	‗ 141	Ù 157	¾ 173	╜ 189	═ 205	▌ 221	ø 237	² 253
E	1110	À 142	Û 158	« 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254
F	1111	§ 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

3.2.6 Page 5 (PC865: Nordic)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	0001	ü 129	æ 145	í 161	▒ 177	┴ 193	╤ 209	ß 225	± 241
2	0010	é 130	Æ 146	ó 162	▒ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	0011	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	0100	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	0101	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	0110	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	0111	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	1000	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	1001	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	1010	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	1011	ï 139	ø 155	½ 171	╗ 187	╦ 203	■ 219	δ 235	√ 251
C	1100	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
D	1101	ì 141	Ø 157	¡ 173	╜ 189	═ 205	▌ 221	ø 237	² 253
E	1110	Ä 142	₧ 158	« 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254
F	1111	Å 143	ƒ 159	¤ 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

3.2.7 Page 254 (Space Page)

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

UD: undifined

3.2.8 Page 255 (Space Page)

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

UD: undifined

3.2.9 International character set

	Country Name	ASCII code HEX / DEC	23 35	24 36	40 64	5B 91	5C 92	5D 93	5E 94	60 96	7B 123	7C 124	7D 125	7E 126
0	U.S.A.		#	$	@	[	\	]	^	`	{	¦	}	~
1	France		#	$	à	°	ç	§	^	`	é	ù	è	¨
2	Germany		#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	England		£	$	@	[	\	]	^	`	{	¦	}	~
4	Denmark I		#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden		#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy		#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain		Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
8	Japan		#	$	@	[	¥	]	^	`	{	¦	}	~
9	Norway		#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denmark II		#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü

3.3 Switches and Buttons

3.3.1 Power button

The power button on the front of the printer turns the power on or off.

NOTE: Turn on the power only after connecting the power supply.

3.3.2 Panel buttons

Panel buttons are enabled or disabled by the **ESC c 5** command except for the power button. These buttons are inactive if they are disabled.

1) RECEIPT FEED BUTTON: Non-locking push button

[Function]
- If this button is pushed once and released, the printer feeds receipt paper for one line based on the line spacing set by **ESC 2** and **ESC 3**. If this button is held down, the printer feeds paper continuously.
- Paper is fed after the carriage is moved to the center of the paper roll.

[Note] The switch is enabled when the printer cover is open, regardless of the **ESC c 5** setting.

2) SLIP FEED button: Non-locking push button

[Function]
- If this button is pushed once and released, the printer feeds slip paper for one line based on the line spacing set by **ESC 2** and **ESC 3**. If this button is held down, the printer feeds paper continuously.
- Slip paper is fed after

[Note]
- This button is enabled when the printer cover is open, regardless of the **ESC c 5** setting.
- This button does not load the slip. The slip can be loaded only by selecting the slip with a command and waiting to insert the slip.

3.3.3 DIP switches

1) DIP switch 1: 8 switches

Table 3.3.1 DIP Switch 1

SW1	Function	ON	OFF
1	Data word length	7 bits	8 bits
2	Parity	Enabled	Disabled
3	Parity selection	Even	Odd
4	Transmission speed selection (Refer to Table 3.3.2.)		
5			
6	Connection of customer display (*)	Connected	Not connected
7	Data receive error	Ignored	Prints"?"
8	Handshaking	XON/XOFF	DTR/DSR

(*) Effective when a direct connection customer display is connected to the DM-D connector of the printer.

Table 3.3.2 Transmission Speed

Transmission Speed (BPS)	SW1-5	SW1-4
1200	ON	ON
2400	ON	OFF
4800	OFF	ON
9600	OFF	OFF

BPS: Bits Per Second

2) DIP switch 2: 8 switches

Table 3.3.3 DIP Switch 2

SW2	Function	ON	OFF
1	Auto line feed	Always enabled	Always disabled
2	Receive buffer	32 bytes	2048 bytes
3	Font selection (default)	9 × 9	7 × 9
4	Carriage speed (default for paper roll printing)	Low	High
5	Handshaking (BUSY condition)	Receive buffer-full	Off-line or receive buffer-full
6	Internal use	Fixed	--
7	I/F pin 6 reset signal	Enabled	Disabled
8	I/F pin 25 reset signal	Enabled	Disabled

NOTES: 1 When pin 6 of the interface connector is used for the reset signal, the printer is reset at MARK on the RS-232C level.

2 When pin 25 of the interface connector is used for the reset signal, the printer is reset at SPACE on the RS-232C level or at HIGH on the TTL level.

3 Changes in DIP switch settings (excluding switches 2-1, 2-7, and 2-8 I/F reset signals) are recognized only when the printer power is turned on or when the printer is reset by using the interface. If the DIP switch setting is changed after the printer power is turned on, the change does not take effect until the printer is turned on again or is reset.

4 If you turn on DIP switch 2-7 or 2-8 when the printer power is turned on, the printer may be reset, depending on the signal state. DIP switches should not be changed while the printer power is on.

3.4 Panel LED Indicators

3.4.1 Panel LED

1) Power supply (POWER) LED: Green

On: Power is stable.

Off: Power is not stable.

2) Receipt near-end (RECEIPT OUT) LED: Red

On: The receipt paper roll near-end or end is detected.

Off: There is sufficient paper on the receipt side (normal condition).

Blinking: Test printing standby state (refer to Section 3.5 - 3))

3) Error (ERROR) LED: Red

On: Off-line (except during paper feeding using the FEED buttons and during self test printing)

Off: Normal condition

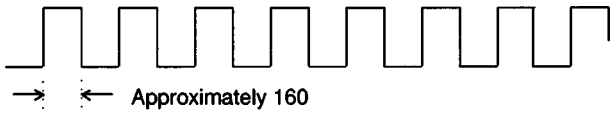
Blinking: Error (refer to Section 3.8, *Error Processing*)

5) Slip (SLIP) LED: Green

On: Slip mode

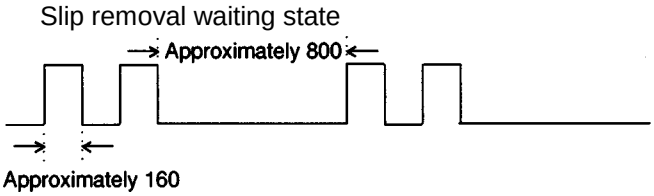
Off: Paper roll mode

Blinking: Slip insertion waiting state



[Units: msec]

Figure 3.4.1 Blinking Pattern in Slip Mode (slip insertion waiting state)



[Units: msec]

Figure 3.4.2 Blinking Pattern in Slip Mode (slip removal waiting state)

Blinking: Check waiting state (when the printer is used with the MICR reader)

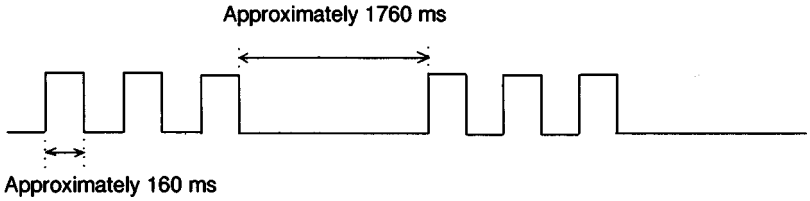


Figure 3.4.3 MICR Mode Blinking Pattern

3.5 Self-test

1) The printer has a self-test function that checks the following:
   - Control circuit functions
   - Printer mechanisms
   - Print quality
   - Control ROM version
   - DIP switch settings
   - MICR reader circuit function (when the printer is used with the MICR reader)

2) Starting the self-test

   a) Self-test on paper roll

      To start the self-test on a paper roll, hold down the RECEIPT FEED button and turn on the printer with the cover closed. The self-test prints the current printer status, which provides the following information:
      - Control ROM version
      - DIP switch settings
      - Setting values for internal uses
      - Results of the MICR reader circuit function check (when the printer is used with the MICR reader).

   b) Self-test on slip paper

      To start the self-test on slip paper, hold down the SLIP FEED button and turn on the printer with the cover closed. The printer enters the paper waiting state. Insert slip paper to begin printing the printer status.

3) Self-test standby state

   a) Self-test on paper roll

      After printing the current printer status, the printer prints the message "Self-test printing. Please press RECEIPT FEED button." The RECEIPT OUT LED indicators blinks, and the printer enters the test printing standby state. Press the RECEIPT FEED button to start test printing.

   b) Self-test on slip paper

      After printing the current printer status, the printer ejects the slip and waits for the next slip paper to be inserted.

4) Ending the self-test

   After a number of lines are printed, the printer indicates the end of the self-test by printing " *** completed *** ", performs initialization, and goes to normal mode.

3.6 Hexadecimal Dumping

1) Hexadecimal dumping function

This function prints the data transmitted from the host computer in hexadecimal numbers and in their corresponding characters.

2) Starting a hexadecimal dumping

Open the cover and turn on the power while pressing the RECEIPT FEED button, then close the cover. The printer first prints "Hexadecimal Dump" on the paper and then prints all data received thereafter in hexadecimal numbers and their corresponding characters, until the printer is turned off.

NOTES: 1. "." is printed if no printable ASCII character corresponds to the received.

2. During hexadecimal dumping, any commands other than **DLE EOT, DLE ENQ**, and **GS ENQ** do not function.

3) Ending hexadecimal dumping

You can stop the hexadecimal dump by turning the power off or resetting the printer after printing has finished.

<Example printing>

```
Hexadecimal Dump
1B   21   00   1B   26   02   40   40    :   . ! . . & . @ @
1B   25   01   1B   63   34   00   1B    :   . % . . c4 .     .
41   42   43    44   45   46   47   48   :   ABCDEFGH
```

3.7 Printing on Slip Paper

Use the following procedure to print on slip paper.

	User Operation	Printer Operation
1	Transmit **ESC c 0 4**.	Switches to slip mode and waits for slip paper to be loaded. The SLIP LED blinks. To cancel the slip waiting state, transmit **DLE ENQ 3**.
2	Insert slip paper.	Detects the slip paper, lights the SLIP LED indicator, and feeds the slip to the print starting position.
3	Transmit data and commands.	Prints data and feeds the slip.
4	Transmit **FF**.	After printing, ejects the slip. The SLIP LED continues blinking until the slip is removed.
5	Remove the slip.	Switches to 2-sheet mode and turns off the SLIP LED indicator.

NOTES:
1. Slip paper is ejected in the forward direction only.
2. Since the paper feed pitch is inaccurate immediately after the paper feed direction is changed, pay attention to the printing that follows and correct as necessary.
3. The mechanical structure allows paper to be fed only when the paper roll is loaded properly. Accordingly, the paper roll must be loaded onto both the receipt and journal sides before selecting slip paper by transmitting **ESC c 0**.
4. Slip paper should be inserted correctly by matching the top edge with the form stopper and the right side with the right side of the paper insert portion.
5. The slip waiting time and the interval from when slip is inserted to when the operation starts can be set using **ESC f**.
6. The slip waiting state is canceled using **DLE ENQ 3**.
7. After the slip is ejected, the SLIP LED lights and the printer does not proceed to the next operation until the slip paper is removed.
8. To check the slip status exactly, the ASB function should be used. (Refer to APPENDIX F, *Example Print Control for Slip Paper*.)
9. Remove ejected slip paper by pulling it upward. Do not pull out in the horizontal direction.
10. The remaining printing space for printing the following data on the slip can be checked using **GS r 3**.

3.8 Error Processing

3.8.1 Error types

1) Errors that automatically recovered

Table 3.8.1 Automatically Recovers Error

Error	Description	ERROR LED blinking pattern → ← Approx. 160msec	Recovery
Print head temperature error	The temperature of the print head is extremely high.		Recovers automatically when the print head cools

NOTE: A print head temperature error is not abnormality.

2) Errors that may be recovered

Table 3.8.2 Recoverable Errors

Error	Description	ERROR LED blinking pattern → ← Approx. 160msec	Recovery
Auto-cutter error	Auto-cutter does not work correctly.		Recovers by **DLE ENQ 1** or **DLE ENQ 2**.
Home position detection error	The home position cannot be detected due to a paper jam.		Recovers by **DLE ENQ 1** or **DLE ENQ 2**.
Carriage detection error	Carriage motor is in an abnormal condition due to a paper jams.		Recovers by **DLE ENQ 1** or **DLE ENQ 2**.
Slip ejection error	Slip cannot be ejected even if the specified amount of paper is fed.		Recovers by **DLE ENQ 1** or **DLE ENQ 2**.

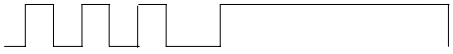
NOTES: 1. Recoverable errors are recovered by using **DLE ENQ 1** or **DLE ENQ 2**.

2. When the printer recovers from an error using **DLE ENQ 1** while slip paper is selected, the printer first ejects the slip, then loads paper. However, when the printer recovers from a slip ejection error, the printer only ejects the slip and does not load paper.

3. When the printer recovers from an error using **DLE ENQ 2** while slip paper is selected, the printer first ejects the slip, then goes to two-sheet mode.

3) Errors that cannot be recovered

Table 3.8.3 Unrecoverable Errors

Error	Description	ERROR LED blinking pattern → ← Approx. 160msec	Recovery
R/W error in memory or gate array	After R/W checking, the printer does not work correctly.		Impossible to recover.
High voltage error	The power supply voltage is extremely high. (*1)		Impossible to recover.
Low voltage error	The power supply voltage is extremely low. (*1)		Impossible to recover.
CPU execution error	The CPU executes an incorrect address.		Impossible to recover.
Drive circuit error	Error occurs in the mechanism drive circuit.		Impossible to recover.
Thermistor error	There is an abnormality in detecting the print head themperature or the print head rank cannot be read correctly.		Impossible to recover.

(*1) Refer to Appendix A.

NOTE: When any error shown above occurs, turn off the power as soon as possible.

3.8.2 Printer operation when an error occurs

The printer executes the following operations when detecting an error:

- Stops all printer operations.
- Goes off-line (when DIP switch 2-1 is OFF).
- Flashes the ERROR LED.

3.8.3 Data receive error

If one of the following errors occurs during serial interface communication, the printer prints "?" or ignores the data, depending on the setting of DIP switch 1-7.

- Parity error
- Framing error
- Overrun error

3.9 Paper Sensors

The printer has four paper sensors as follows:

- Paper roll near-end sensor
- Paper roll sensor
- Slip insertion sensor
- Slip ejection sensor

3.9.1 Sensors and LED indicators

1) Paper roll near-end sensors

The paper roll near-end sensor is located on the roll paper supply device. It detects the near-end of the paper roll by sensing the paper roll diameter. When the paper roll diameter becomes sufficiently small, the RECEIPT OUT indicator lights.

2) Paper roll sensors

The paper sensors is located in the paper path. It detects the presence of paper from the paper roll in the paper path, then loads paper from the roll. When there is no paper in the path (paper end status), the RECEIPT OUT LED indicator lights.

3) Slip insertion sensor

The slip insertion sensor is located in the slip paper path and detects the presence of slip paper in the paper path. The SLIP LED indicator lights accordingly.

4) Slip ejection sensor

The slip ejection sensor is located in the slip exit and detects the removal of the slip paper. The printer does not proceed to the next operation until the paper has been removed. (The SLIP LED indicator remains blinking.)

3.9.2 Sensors and printing

When the printer detects a paper near-end, it either stops or continues printing depending on the **ESC c 4** setting. The corresponding sensors are as follows:

- Paper roll near-end sensor
- Paper roll sensor
- Slip insertion sensor

The paper roll near-end and the paper roll sensors are enabled only in paper roll mode and the slip insertion sensor is enabled only in slip mode. However, the paper roll sensor is used for auto-loading and cannot be used for paper-end detection. The user should note that this sensor may not stop printing, even if it is selected by **ESC c 4**. Therefore, use the paper roll near-end sensor for detecting a paper roll end, and also use the paper roll sensor if necessary.

The printer behaves as follows in the paper-end state:

1) Paper roll mode

When printing stop is enabled, the printer automatically goes off-line when a paper-end is detected. To restart printing, load the paper and set the printer back on-line by closing the printer cover.

2) Slip mode

When printing stop is enabled, the printer detects a paper-end and prints data up to the end of the printable area, ejects the slip, and then waits for the slip to be removed. After the slip is removed, the printer enters the paper waiting state.

3.10 Printer Cover

3.10.1 Cover open button

When the cover open button (see Section 4.3, *External Appearance*) is pressed, the printer cover is opened. When the cover is closed, the cover open button is latched.

NOTE: Be sure to use the cover open button located on the front of the printer to open the printer cover.

3.10.2 Cover open sensor

The cover open sensor monitors the printer cover. When the sensor detects a cover-open, the printer automatically goes off-line after printing the current line. After the printer cover is opened, the printer moves the carriage to the home position at a low speed.

To get back on-line, close the printer cover.

NOTE: Because the printer mechanism is reinitialized after the printer cover is opened and closed, the cover must not be opened during printing to prevent an incorrect paper feed pitch.

3.11 Print Buffer-full Printing

When subsequent data is received after the printer processes one line of data in the print buffer, the printer automatically prints the processed line and feeds the paper by one line.

3.12 Loading the Paper Roll

If paper from the paper roll is inserted into the paper path with the printer cover open, the paper is detected by the paper sensor, and receipt and the paper is fed automatically by approximately 180 mm (7.09"). If the amount of paper fed automatically is insufficient, the user can feed additional paper by using the PAPER FEED button. The paper roll can also be loaded with the PAPER FEED button.

3.13 Paper Jam Removal

1) Around the print head

To remove jammed paper from the print head area, loosen the thumb screw on the right side of the print head cover and remove the print head cover.

CAUTION:
- Since the print head becomes very hot just after printing, remove jammed paper only after the print head cools sufficiently.
- The carriage moves to the specified position after the printer is reset or paper is fed. Do not touch the carriage.

2) Near the paper feed roller or cutter

To remove jammed paper from the paper feed roller or cutter, open the cutter unit by pushing it and the lock lever backward.

To close the cutter unit, push the lock lever forward while pushing the cutter unit down gently.

Pull in the cutter blade by rotating the cutter manual-operation gear in the direction of the arrow.

3) If the cutter unit is not completely closed, the printer cover cannot be completely closed.

4) Paper from the paper roll can be removed by pulling the paper out while pushing the release lever.

3.14 Reading MICR Characters and Printing Endorsements

(when the printer is used with the MICR reader)

Use the following procedure to read MICR characters:

	User Operation	Printer Operation
1	Transmit **FS a 0 <00>H**. (Transmit **DLE ENQ 3**.)	Mechanically switches to MICR mode and waits for a personal check to be loaded. The SLIP LED blinks. (when the check waiting state is canceled)
2	Insert a check.	Detects the check, lights the SLIP LED, and reads MICR characters. After reading, transmits the reading results.
3	(Transmit **FS a 0** <00>H.)	(Rereads the check and transmits the reading result.)
4	Transmit **FS a 1**.	Loads the check paper to the print starting position.
5	Transmit endorsement printing data.	Prints data and feeds paper.
6	Transmit **FF**.	After printing, ejects paper. The SLIP LED blinks until the check is removed.
7	Eject the check paper.	Switches to two sheet mode. The SLIP LED blinks.

NOTES:
1. A personal check is ejected in the forward direction only.
2. The paper roll must be loaded onto both the receipt and journal sides correctly before selecting MICR function by transmitting **FS a 0**. Otherwise, check paper is not fed properly.
3. The check waiting state is canceled using **DLE ENQ 3**.
4. After the personal check is ejected, the SLIP LED lights and the printer does not proceed to the next operation until the check is removed.
5. A personal check should be inserted by matching the top edge with the form stopper and the right side with the right side of the paper insert portion.
6. The check waiting time and the interval from when a check is inserted to when the operation starts can be set using **ESC f**.
7. To check the MICR function status exactly, **DLE EOT BS 1**. (Refer to APPENDIX H, *Example Read Control for MICR Characters*.)
8. Remove an ejected personal check by pulling it upward. Do not pull it out in the horizontal direction.

3.15 Cleaning the MICR Mechanism

(when the printer is used with MICR reader)

Foreign matter on the MICR mechanism can cause MICR reading errors. To clean the MICR mechanism, execute the cleaning command (**FS c**). Then insert cleaning paper the same way you insert check paper to clean the MICR head, roller, and paper path.

Cleaning period: Once per month or every 6000 passes

Example cleaning paper: KIC Products PRESAT brand check reader cleaning card or equivalent

Cleaning paper size: 63 mm (2.48") (W) × 152 mm (5.98") (H)

4. CASE SPECIFICATIONS

4.1 External Dimensions and Weight

Height: 193.7 mm (7.63")
Width: 251 mm (9.88")
Depth: 298 mm (11.73")
Weight: Approximately 5.6 kg (12.35 lbs)
(All the numeric values are typical.)

4.2 Color

EPSON standard gray

4.3 External Appearance

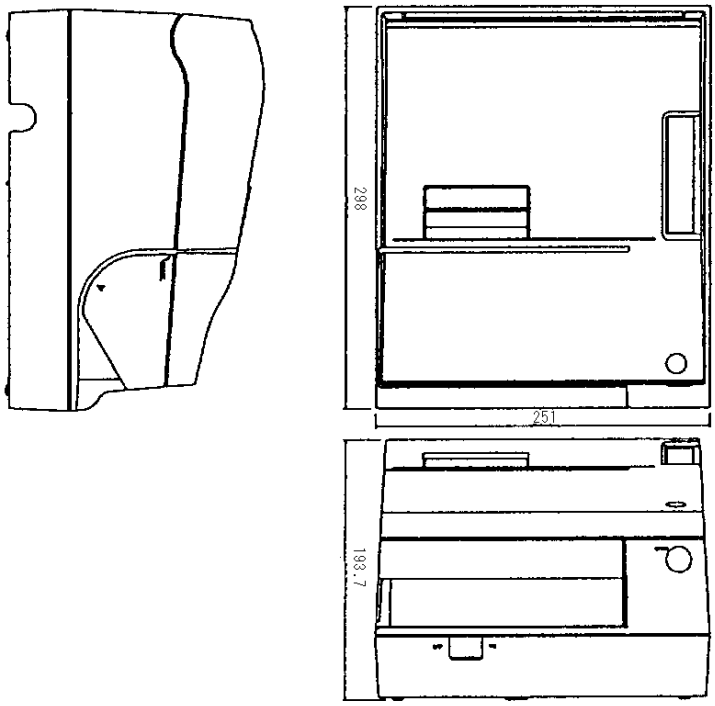


Figure 4.3.1 Printer External Appearance

4.4 Note

Do not apply excessive force to the printer case.

5. OPTIONS

5.1 Standard Accessories

- Paper roll (∅60 mm (2.36") × 1 rolls)
- Exclusive ribbon cassette ERC-31(P)
- Operator's Manual
- I/F fixing screw (hexagonal setscrew)
- Power switch cover
- Slip caution label

5.2 Options

- External power supply PS-150
- Stamp unit (factory-installed option)
- MICR reader (factory-installed option)

5.3 Customer Display

(1) Pass-through:

Customer displays DM-D202II and DM-D101II are sold separately from the printer.

(2) Direct connection between the printer and display:

Direct connection customer displays DM-D203, DM-D102 are sold separately from the printer.

6. COMMANDS

6.1 Command Notation

XXXX Command

[Name]	The name of the command.
[Format]	The code sequence. ASCII indicates the ASCII equivalents. Hex indicates the hexadecimal equivalents. Decimal indicates the decimal equivalents. [ ]*k* indicates the contents of the [ ] should be repeated *k* times.
[Range]	Gives the allowable ranges for the parameters.
[Description]	Describes the function of the command.
[Notes]	Provides important information on setting and using the printer command, if necessary.
[Default]	Gives the default values, if any, for the command parameters.
[Reference]	Lists related commands.
[Example]	Provides examples using the command. The numbers followed by H are hexadecimal. The numbers followed by B are binary. The numbers denoted by ( ) are decimal.

NOTE: Some of the command descriptions include the sentence “This command is enabled only when input at the beginning of a line.” The phrase “beginning of a line” assumes that the following conditions have been met:

1. Print data, including spaces, is not in the current print buffer.
2. The print position is not specified by the **ESC $** or **ESC ** command.

6.2 Control Commands

LF

[Name] Print and line feed

[Format]

ASCII	LF
Hex	0A
Decimal	10

[Description] Prints the data in the print buffer and feeds one line based on the current line spacing.

[Note] Sets the print starting position to the beginning of the line.

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

FF

[Name] Print and eject cut paper

[Format]

ASCII	FF
Hex	0C
Decimal	12

[Description] Prints the data in the print buffer and ejects the slip paper.

[Notes]

- This command is enabled only when slip paper is selected for printing.
- Paper ejection continues until the paper is completely ejected. When the slip ejection length has been set by **ESC C**, the specified length is ejected regardless of the slip ejection sensor.
- After the slip is ejected, the printer selects the default paper type specified by **ESC c 0**.
- The slip is ejected in the forward direction only.

[Reference] **ESC c 0, ESC C**

CR

[Name] Carriage return

[Format]

ASCII	CR
Hex	0D
Decimal	13

[Description] When auto line feed is enabled, this command functions in the same way as **LF**. When auto-line feed is disabled, this command prints the data in the print buffer and does not feed the paper.

[Note] Sets the print starting position to the beginning of the line.

[Reference] **LF**

DLE EOT *n*

[Name] Real-time status transmission

[Format]

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

[Range] $1 \le n \le 5$

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

n	Function
1	Transmit printer status
2	Transmit off-line factor status
3	Transmit error factor status
4	Transmit paper roll sensor status
5	Transmit slip paper status

[Notes]

- The status information to be transmitted is shown in the tables on the following pages.
- The printer starts processing data upon receiving this command.
- When transmitting status, the printer transmits only 1 byte without confirming the condition of the DSR signal.
- This command is executed even when the printer is off-line, when the receive buffer is full, or when an error occurs.
- The status is transmitted whenever the data sequence of 10H (16), 04H (4), *n*($1 \le n \le 5$) is received.

  Example:
  In **ESC ∗ *m* n_L n_H *[d]* n_L+256 × n_H**, *d1*=10H (16), *d2*=04H (4),*d3*=01H (1)
- This command should not be used within the data sequence of another command that consists of 2 or more bytes.

  Example:
  If you attempt to transmit **ESC 3 *n*** to the printer, but DTR (DSR for the host computer) goes to MARK before *n* is transmitted and then **DLE EOT 4** interrupts before *n* is received, the code 10H (16) for **DLE EOT 4** is processed as the code for **ESC 3** 10H (16) .
- This command is unavailable when using the **ESC =** (select peripheral device) to select the printer to be disabled.
- When Automatic Status Back (ASB) is enabled using the **GS a** command, the status transmitted by the **DLE EOT** command and the ASB status must be differentiated using the table in Appendix B, *Transmit Status Identification*.
- If the value of *n* is out of the specified range, the printer ignores this command.

n = 1: Printer status

Bit	On/Off	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	01	1	Not used. Fixed to On.
2	Off	00	0	Drawer kick-out signal is Low (pin 3)
	On	02	2	Drawer kick-out signal is High (pin 3)
3	Off	00	0	On-line.
	On	04	4	Off-line.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Undefined.
	On	20	32	Undefined.
6	Off	00	0	Undefined.
	On	40	64	Undefined.
7	Off	00	0	Not used. Fixed to Off.

n = 2: Off-line factor status

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

Bit 5: Is transmitted (printing stops) when printing stops due to the paper selected by **ESC c 0** and **ESC c 4** and due to paper sensor conditions.

n = 3: Error factor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	No mechanical error.
	On	04	4	Mechanical error occurs.
3	Off	00	0	No auto-cutter error.
	On	08	8	Auto-cutter error occurs.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurs.
6	Off	00	0	No print head temperature error.
	On	40	64	Print head temperature error occurs.
7	Off	00	0	Not used. Fixed to Off.

Bit 2: Mechanical errors include home position, carriage sensor, and slip ejection errors.

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

Bit 6: If the print head temperature becomes high, bit 6 is transmitted until the print head temperature drops sufficiently. The printer automatically recovers from this error.

n = 4: Paper roll sensor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	Paper roll near-end sensor. Paper adequate.
	On	04	4	Paper roll near-end is detected by the paper roll near-end sensor.
3	Off	00	0	Paper roll near-end sensor. Paper adequate.
	On	08	8	Paper roll near-end is detected by the paper roll near-end sensor.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Paper roll sensor. Paper adequate.
	On	20	32	Paper roll end is detected by the paper roll sensor.
6	Off	00	0	Paper roll sensor. Paper adequate.
	On	40	64	Paper roll end is detected by the paper roll sensor..
7	Off	00	0	Not used. Fixed to Off.

n = 5: Slip paper status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	Slip paper selected.
	On	04	4	Slip paper not selected.
3	Off	00	0	Does not wait for slip paper insertion.
	On	08	8	Waits for slip paper insertion.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Slip is detected by the slip insertion sensor.
	On	20	32	Slip is not detected by the slip insertion sensor.
6	Off	00	0	Slip is detected by the slip ejection sensor.
	On	40	64	Slip is not detected by the slip ejection sensor.
7	Off	00	0	Not used. Fixed to Off.

Bit 2:
- There may be a time lag between receiving the paper selection command (**ESC c 0**) and selecting the slip paper. During this period, bit 2 remains On.
- Remains Off (selected) until the slip is removed.

Bit 3: Becomes Off (slip insertion is not waiting) just before loading slip paper and after detecting it.

Bit 5 and 6:
Transmit the current status of the slip sensors.

[Reference] **DLE ENQ, ESC u, ESC v, GS ENQ, GS a, GS r**
Appendix B, *Transmit Status Identification*

DLE ENQ *n*

[Name] Real-time request to printer

[Format]

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

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

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

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

[Notes]

- The printer starts processing data upon receiving this command.
- This command is also executed when the printer is off-line, when the receive buffer is full, or when an error occurs.
- The status is also transmitted whenever the data sequence of 10H (16), 05H (5), *n* ($1 \leq n \leq 3$) is received.

  Example:

  In **ESC * *m* n_L n_H [*d*] $n_L+2565n_H$**, *d1*=10H (16), *d2*=05H (5), *d3*=01H (1)
- This command should not be contained within another command that consists of 2 or more bytes.

  Example:

  If you attempt to transmit **ESC 3 *n*** to the printer, but DTR (DSR for the host computer) goes to MARK before *n* is transmitted and, then **DLE ENQ 2** interrupts before *n* is received, the code 10H (16) for **DLE ENQ 2** is processed as the code for **ESC 3** 10H (16).
- **DLE ENQ 1** starts printing from the line where an error occurred. This command is enabled only for errors that have the possibility of recovery, except for a print head temperature error.
- When the printer recovers from an error using **DLE ENQ 1** and slip paper is selected, the printer ejects the slip completely and loads paper. However, the printer only ejects the slip and does not load paper when it recovers from a slip ejection error.
- **DLE ENQ 2** enables the printer to recover from an error after clearing the data in the receive and the print buffers. The printer retains the settings (by **ESC !**, **ESC 3**, etc.) that were in effect when the error occurred. The printer can be initialized completely by using this command and **ESC** @. This command is enabled only for errors that have the possibility of recovery, except for a print head temperature error.

- When the printer recovers from an error using **DEL ENQ 2** with slip paper selected, the printer ejects the slip completely and goes into paper roll mode. Therefore, when printing on slip paper is to be continued, select slip mode again using **ESC c 0 4** after the slip is ejected.
- **DLE ENQ 3** is ignored except when the printer is in the slip waiting state. Therefore, be sure to use **DLE EOT 5** to check whether slip paper is selected and the printer is in the slip waiting state before executing **DLE ENQ 3**. After the printer is released from the slip waiting state, the paper roll is selected.
- When the slip waiting status is canceled by **DLE ENQ 3**, the receive and print buffers are cleared.
- When the printer is disabled with **ESC =** (select peripheral device), the error recovery functions (**DLE ENQ 1** and **DLE ENQ 2**) are enabled, and the other functions are disabled.
- If the value of *n* is out of the specified range, this command is ignored.

[Reference] **DLE EOT**
Appendix B: Transmit Status Identification

[Notes when the printer is used with the MICR reader]

- When the printer recovers from an error using **DLE ENQ 1** and the MICR function is selected using **FS a 0**, the printer clears the print buffer, ejects the slip completely, and goes to paper roll mode. Therefore, when personal check reading is to be continued, select the MICR function again using **FS a 0**.
- When the printer recovers from an error using **DEL ENQ 2** and the MICR function selected using **FS a**, the printer clears the receive and print buffers, ejects the slip completely, and goes into paper roll mode. Therefore, when personal check reading is to be continued, select the MICR function again using **FS a 0**.
- **DLE ENQ 3** is ignored, except when the printer is in the slip or personal check waiting state. Therefore, be sure to confirm that slip paper is selected and the printer is in the slip waiting state using **DLE EOT 5** before executing **DLE ENQ 3**. Or, be sure to confirm whether the MICR function is selected and the printer is in the personal check waiting state using **DLE EOT BS 1**. After the printer is released from the slip or personal check waiting state, paper roll is selected.
- When the slip or personal check waiting state is canceled by **DLE ENQ 3**, the receive and print buffers are cleared.
- This command is ignored while the printer transmits MICR reading results.

[Reference when the printer is used with the MICR reader]

DLE EOT BS

ESC SP *n*

[Name] Set right-side character spacing

[Format]

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

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

[Description] Sets the right-side character spacing using the fundamental calculation pitch.

- The right-side character spacing is [*n* × (horizontal or vertical motion unit)] inches.

[Notes]

- The right-side character spacing for double-width mode is twice the normal value.
- If the value of *n* is out of the specified range, this command is ignored.

[Default] *n* = 0

[Reference] **GS P**

ESC ! *n*

[Name] Select print mode(s)

[Format]

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

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

[Description] Selects print mode(s)

Each bit of *n* is used as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	9 × 9 font selected.
	On	01	1	7 × 9 font selected.
1	Off	00	0	Undefined.
	On	02	2	Undefined.
2	Off	00	0	Undefined.
	On	04	4	Undefined.
3	Off	00	0	Emphasized mode not selected.
	On	08	8	Emphasized mode selected.
4	Off	00	0	Double-height mode not selected.
	On	10	16	Double-height mode selected.
5	Off	00	0	Double-width mode not selected.
	On	20	32	Double-width mode selected.
6	Off	00	0	Undefined.
	On	40	64	Undefined.
7	Off	00	0	Underline mode not selected.
	On	80	128	Underline mode selected.

[Notes]

- When both double-height and double-width modes are selected, quadruple-size characters are printed.
- Bidirectional printing may cause printing position misalignment between the upper and lower halves of the characters during double-height enlarged printing. Therefore, select unidirectional printing (using **ESC U**) for double-height enlarged printing.
- If you select underline mode, some printed characters may be difficult to read, because the underline overlaps the lowest dots in the characters.

[Default] *n* = 0 or 1 depending on the DIP switch setting.

[Reference] **ESC E, ESC –**

ESC $ *nL nH*

[Name]	Set absolute print position				
[Format]	ASCII	ESC	$	*nL*	*nH*
	Hex	1B	24	*nL*	*nH*
	Decimal	27	36	*nL*	*nH*
[Range]	$0 \leq nL \leq 255$ $0 \leq nH \leq 255$				
[Description]	Sets the distance from the beginning of the line to the position at which subsequent characters are to be printed The distance (inches) from the beginning of the line is calculated by the formula [$(nL + nH \times 256) \times$ (horizontal or vertical motion unit)] inches.				
[Note]	Any value that falls outside the printable area is ignored.				
[Reference]	**ESC \ , GS P**				

ESC % *n*

[Name]	Select/cancel user-defined character set			
[Format]	ASCII	ESC	%	*n*
	Hex	1B	25	*n*
	Decimal	27	37	*n*
[Range]	$0 \leq n \leq 255$			
[Description]	Selects or cancels the user-defined character set			
	When the LSB of *n* is 0, the user-defined character set is canceled and the internal character set is selected.			
	When the LSB of *n* is 1, the user-defined character set is selected.			
[Note]	The user-defined character and the down-loaded bit image cannot be defined simultaneously.			
[Default]	*n* = 0			
[Reference]	**ESC &**			

ESC & *y c1 c2 [X [d] y × x] c2 - c1 + 1*

[Name] Define user-defined characters

[Format]

ASCII	ESC	&	*y*	*c1*	*c2*	*[x d1 ... d(y × x)] c2 - c1 + 1*
Decimal	1B	26	*y*	*c1*	*c2*	*[x d1 ... d(y × x)] c2 - c1 + 1*
Hex	27	38	*y*	*c1*	*c2*	*[x d1 ... d(y × x)] c2 - c1 + 1*

[Range] $y = 2$
$32 \le c1 \le c2 \le 126$
$0 \le x \le 12$ (9 × 9 font)
$0 \le x \le 9$ (7 × 9 font)
$0 \le d1 \ldots dy \times x \le 255$

[Description] Defines user-defined characters for the specified character code.

- *y* specifies the number of bytes in the vertical direction.
- *c1* specifies the beginning character code for the definition, and *c2* specifies the final code. If only one character is defined, *c1* equals *c2*.
- The allowable character code range is from decimal code 32 to 126. The maximum number of user-defined characters differs depending on the receive buffer capacity as follows (refer to DIP switch 2-2 in Table 3.3.3.):

Receive Buffer Capacity	Maximum Number of User-defined Characters
2K bytes	23
32 bytes	71

- When the maximum number of user-defined characters is defined, it is possible to redefine user-defined characters for the defined character codes, but not for new character codes.
- *x* specifies the number of dots in the horizontal direction.
- *d* is the dot data for the characters. The dot pattern is in the horizontal direction from the left side. Any remaining dots on the right side are blank.
- After user-defined characters are defined, they are available until: another definition is made; **ESC** @ or **GS** * is executed; the printer is reset; or the power is turned off.

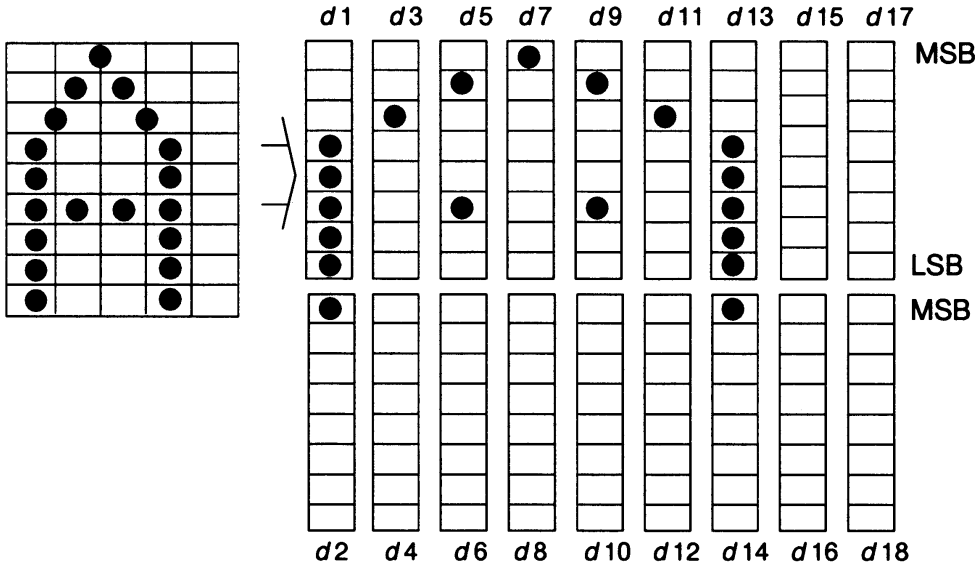
[Notes]
- Horizontally adjacent dots cannot be printed.
- Only the top bit in the secondary data bytes in the vertical direction is valid.
- If the values of *y*, *c1* ,*c2*, or *x* are out of the specified range, the printer ignores this command and processes the following data as normal data.
- A user-defined character and a downloaded bit-image cannot be defined simultaneously. When this command is executed, the downloaded bit image is cleared.

[Default] The internal character set

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

[Example]

7 × 9 font when the dot pattern for code 20H (32) is defined as shown below:



When the dot pattern for code 20H is defined as shown above.

	ESC	&	*y*	*c*1	*c*2	*x*	*d*1	*d*2	*d*3	*d*4	*d*5	*d*6	*d*7	*d*8	*d*9	*d*10	*d*11	*d*12	*d*13	*d*14
Code (Hexadecimal)	1B	26	02	20	20	07	1F	80	20	00	44	00	80	00	44	00	20	00	1F	80

The corresponding bit is 1 when printing and 0 when not printing.

ESC ∗ *m* n_L n_H [*d*] n_L + 256 × n_H

[Name] Select bit-image mode

[Format]

ASCII	ESC	∗	*m*	n_L	n_H	[*d*] n_L + 256 × n_H
Hex	1B	2A	*m*	n_L	n_H	[*d*] n_L + 256 × n_H
Decimal	27	42	*m*	n_L	n_H	[*d*] n_L + 256 × n_H

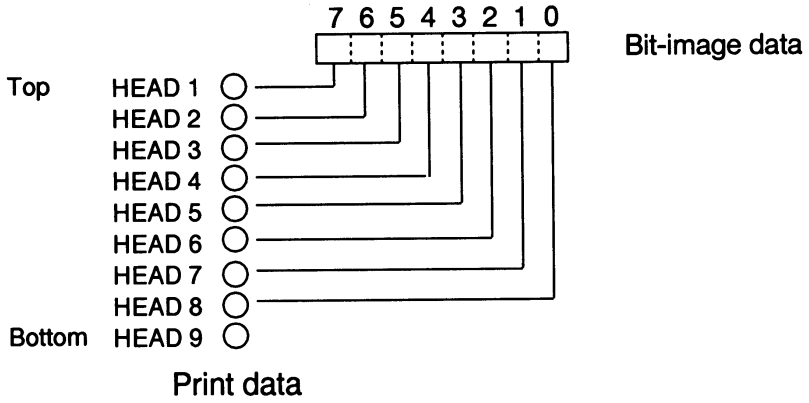
[Range] $m = 0, 1$
$0 \le n_L \le 255$
$0 \le n_H \le 3$
$0 \le d \le 255$

[Description] Selects a bit-image mode using m and the number of dots using n_L and n_H.

- Divide the number of dots to be printed by 256. The integer answer is n_H and the remainder is n_L. Therefore, the number of dots in the horizontal direction is calculated by n_L + 256 × n_H.
- If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored. When the first data transmitted exceeds one line, the printer prints the data from the beginning of the next line.
- *d* indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.
- The bit-image modes selectable by *m* are as follows:

m	Number of Vertical Dots	Horizontal Direction		Maximum Number of Dots	
		Dot Density	Adjacent Dot	Paper Roll	Slip
0	8	Single density	Permitted	180	400
1	8	Double density	Prohibited	360	800

[Notes]
- If the value of m is out of the specified range, the data following n_L (n_L is included) is processed as normal data.
- After printing a bit-image, the printer returns to normal data processing mode.
- The relationship between the image data and the dots to be printed is as follows:



ESC – *n*

[Name] Turn underline mode on/off

[Format]

ASCII	ESC	–	*n*
Hex	1B	2D	*n*
Decimal	27	45	*n*

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

[Description] Turns underline mode on/off.

n = 0 or 48: turns off underline mode.
n = 1 or 49: turns on underline mode.

[Notes]
- This command and **ESC !** turn underline mode on or off in the same way.
- If the value of *n* is out of the specified range, the printer ignores this command.

[Default] *n* = 0

[Reference] **ESC !**

ESC 2

[Name] Select 1/6-inch line spacing

[Format]

ASCII	ESC	2
Hex	1B	32
Decimal	27	50

[Description] Selects 1/6-inch line spacing

[Note] This command is available only for the paper type(s) selected by **ESC c 1**.

[Reference] **ESC c 1**

ESC 3 *n*

[Name] Set line spacing

[Format]

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

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

[Description] Sets the line spacing to [$n \times$ (vertical motion unit)] inches.

[Note] This command is available only for the paper type(s) selected by **ESC c 1**.

[Default] $n = 24$ (1/6 inch)

[Reference] **ESC c 1, GS P**

ESC <

[Name] Return home

[Format]

ASCII	ESC	<
Hex	1B	3C
Decimal	27	60

[Description] Moves the print head to the left-most position, then moves it to the right-most position.

[Notes]
- The left-most end is detected by the home position sensor.
- Since the home position is detected when this command is executed, the printing position may shift.

ESC = *n*

[Name] Select peripheral device

[Format]

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

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

[Description] Selects the device to which the host computer sends data.

- Each bit of *n* is used as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer disabled.
	On	01	1	Printer enabled.
1	Off	00	0	Customer display disabled.
	On	02	2	Customer display enabled.
2	Off	00	0	Undefined.
	On	04	4	Undefined.
3	Off	00	0	Undefined.
	On	08	8	Undefined.
4	Off	00	0	Undefined.
	On	10	16	Undefined.
5	Off	00	0	Undefined.
	On	20	32	Undefined.
6	Off	00	0	Undefined.
	On	40	64	Undefined.
7	Off	00	0	Undefined.
	On	80	128	Undefined.

[Notes]

- When the printer is disabled, it ignores transmitted data (except for **DLE ENQ 1** and **DLE ENQ 2**) until the printer is enabled by this command.
- Even if the printer is disabled, it may go off-line due to manual printer operation (refer to Section 2.1.1 - 2).

[Default]

- When turning on the printer:

Direct Connection Customer Display Status	*n*
Customer display is connected (*1)	2
Customer display is not connected (*1)	1

- When executing **ESC** @:

  The default values set by **ESC** @ are as follows, depending on the value set by **ESC =** just before processing **ESC** @ and on the setting of DIP switch 1-6:

Direct Connection Customer Display Status		*n*		
Default Value to be Set		1	2	3
After **ESC** @ Processing	When customer display is connected (*1)	1	2(*2)	2
	When customer display is not connected (*1)	1	2(*2)	1

(*1) Depending on the setting of DIP switch 1-6.

(*2) The printer is disabled and it does not process **ESC** @; therefore, the **ESC =** setting is not changed.

[Reference] Section 3.3.3, *DIP switches*

ESC ? *n*

[Name] Cancel user-defined characters

[Format]

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

[Range] $32 \leq n \leq 126$

[Description] Cancels the specified user-defined characters.

[Notes]
- This command deletes the defined pattern for the character code specified by *n* in the selected font.
- After defined pattern is deleted, the printer prints the same pattern for the internal characters.
- The printer ignores this command when the value of *n* is out of the specified range and when the specified character code is not defined.

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

ESC @

[Name] Initialize printer

[Format]

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

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

[Notes]
- The DIP switches are not checked again.
- The data in the receive buffer is unchanged.
- When this command is executed in slip paper mode, the printer ejects the slip and switches from slip mode to paper roll mode.

ESC C *n*

[Name] Set slip paper eject length

[Format]

ASCII	ESC	C	*n*
Hex	1B	43	*n*
Decimal	27	67	*n*

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

[Description] Sets the eject length for slip paper to *n* lines.

[Notes]
- When $n = 0$, the eject length setting for slip paper is canceled.
- The specified eject length does not change even if the line spacing changes.
- The maximum eject length that can be set is 40 inches. If the specified amount exceeds 40 inches, the eject length is automatically set to 40 inches.

[Default] $n = 0$

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

ESC E *n*

[Name] Turn emphasized mode on/off

[Format]

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

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

[Description] Turns emphasized mode on or off.

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

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

[Default] *n* = 0

[Reference] **ESC !**

ESC G *n*

[Name] Turn double-strike mode on/off

[Format]

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

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

[Description] Turns double-strike mode on or off.

When the LSB of *n* is 0, turns off double-strike mode.
When the LSB of *n* is 1, turns on double-strike mode.

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

[Default] *n* = 0

[Reference] **ESC E**

ESC J *n*

[Name]	Print and feed paper			
[Format]	ASCII	ESC	J	*n*
	Hex	1B	4A	*n*
	Decimal	27	74	*n*
[Range]	$0 \leq n \leq 255$			
[Description]	Prints the data in the print buffer and feeds the paper [$n \times$ (vertical motion unit)] inches.			
[Notes]	• Sets the print starting position to the beginning of the line.			
	• The maximum paper feed amount is 40 inches. If the specified amount exceeds 40 inches, the paper feed amount is automatically set to 40 inches.			
[Reference]	**GS P**			

ESC K *n*

[Name] Print and reverse feed

[Format]

ASCII	ESC	K	*n*
Hex	1B	4B	*n*
Decimal	27	75	*n*

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

[Description] Prints the data in the print buffer and feeds the paper [$n \times$ (vertical motion unit)] inches in the reverse direction.

[Notes]

- Sets the print starting position to the beginning of the line.
- This command must not be executed more than two times consecutively.
- If *n* is out of the specified range or if the paper feed amount exceeds 1/6 inch, the printer prints the data and does not feed the paper.
- If paper gets out of the slip sensor during slip printing, the printer prints the data and does not feed the paper.
- Paper feeding in the reverse direction causes the following problems:
  ① Paper feed pitch is incorrect.
  ② Printer noise is louder than normal.
  ③ The paper may rub against the ribbon and become stained.

[Reference] **GS P**

ESC R *n*

[Name] Select an international character set

[Format]

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

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

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

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

[Note] If the value of *n* is out of the specified range, the printer ignores this command.

[Default] *n* = 0

[Reference] Section 3.2, *Character Code Tables*

ESC U *n*

[Name] Turn unidirectional printing mode on/off

[Format]

ASCII	ESC	U	*n*
Hex	1B	55	*n*
Decimal	27	85	*n*

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

[Description] Turns unidirectional printing mode on or off.

When the LSB of *n* is 0, turns on unidirectional printing mode.

When the LSB of *n* is 1, turns off unidirectional printing mode and turns on bidirectional printing mode.

[Notes]
- When unidirectional printing mode is turned on, the printer prints from left to right.
- To avoid horizontal printing misalignment, unidirectional printing mode should be used.
- Only the lowest bit of *n* is enabled.

[Default] *n* = 0

ESC \ n_L n_H

[Name] Set relative print position

[Format]

ASCII	ESC	\	n_L	n_H
Hex	1B	5C	n_L	n_H
Decimal	27	92	n_L	n_H

[Range] $0 \leq n_L \leq 255$
$0 \leq n_H \leq 255$

[Description] Sets the print starting position based on the current position.

[Notes]
- A positive number specifies movement to the right and a negative number specifies movement to the left.
- Use the supplement of *N* for setting *N* pitch movement to the left:
  - *N* pitch = 65536 - *N*
- The print starting position is [(n_L + $n_H \times 256$) x (horizontal motion unit)] inches calculated from the current position.
- Any value that falls outside the printable area is ignored.

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

ESC a *n*

[Name] Select justification

[Format]

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

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

[Description] Aligns all the data in one line to the specified position.

n selects the justification as follows:

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

[Notes]
- This command is enabled only when input at the beginning of a line.
- Spaces set by **ESC $** and **ESC ** are all justified.
- If the value of *n* is out of the specified range, the printer ignores this command.

[Default] *n* = 0

[Example]

Left justification

```
ABC
ABCD
ABCDE
```

Centering

```
 ABC
ABCD
ABCDE
```

Right justification

```
  ABC
 ABCD
ABCDE
```

ESC c 0 *n*

[Name] Select paper type(s) for printing

[Format]

ASCII	ESC	c	0	*n*
Hex	1B	63	30	*n*
Decimal	27	99	48	*n*

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

[Description] Selects the type of paper for printing, using *n* as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll disabled.
	On	01	1	Paper roll enabled.
1	Off	00	0	Paper roll disabled.
	On	02	2	Paper roll enabled.
2	Off	00	0	Slip paper disabled.
	On	04	4	Slip paper enabled.
3	Off	00	0	Undefined.
	On	08	8	Undefined.
4	Off	00	0	Undefined.
	On	10	16	Undefined.
5	Off	00	0	Undefined.
	On	20	32	Undefined.
6	Off	00	0	Undefined.
	On	40	64	Undefined.
7	Off	00	0	Undefined
	On	80	128	Undefined.

[Notes]

- This command is available only when input at the beginning of a line.
- Slip paper and the paper roll cannot be selected simultaneously.
- When this command is input, the printer executes the following:
  ① If the paper roll is selected, a previously selected slip is canceled and ejected.
  ② If a slip was previously selected and is selected again, no operation is executed.
  ③ If the paper roll was previously selected and then slip paper is selected, the printer waits for the slip paper to be loaded.
- If the value of *n* is out of the specified range, the printer ignores this command.
- When either bit 0 or 1 is on, the paper roll is selected.

[Default] *n* = 3

ESC c 1 *n*

[Name] Select paper type(s) for command settings

[Format]

ASCII	ESC	c	1	*n*
Hex	1B	63	31	*n*
Decimal	27	99	49	*n*

[Range] $1 \le n \le 7$

[Description] Selects paper type(s) for use with the following command setting:

- Set line spacing: **ESC 2** and **ESC 3**.
- Each bit of *n* is used as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll disabled.
	On	01	1	Paper roll enabled.
1	Off	00	0	Paper roll disabled.
	On	02	2	Paper roll enabled.
2	Off	00	0	Slip paper disabled.
	On	04	4	Slip paper enabled.
3	Off	00	0	Undefined.
	On	08	8	Undefined.
4	Off	00	0	Undefined.
	On	10	16	Undefined.
5	Off	00	0	Undefined.
	On	20	32	Undefined.
6	Off	00	0	Undefined.
	On	40	64	Undefined.
7	Off	00	0	Undefined
	On	80	128	Undefined.

[Notes]

- If the value of *n* is out of the specified range, the printer ignores this command.
- When either bit 0 or 1 is on, the paper roll is selected.

[Default] *n* = 7

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

ESC c 4 *n*

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

[Format]

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

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

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

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll near-end sensor disabled.
	On	01	1	Paper roll near-end sensor enabled.
1	Off	00	0	Paper roll near-end sensor disabled.
	On	02	2	Paper roll near-end sensor enabled.
2	Off	00	0	Paper roll sensor disabled.
	On	04	4	Paper roll sensor enabled.
3	Off	00	0	Paper roll sensor disabled.
	On	08	8	Paper roll sensor enabled.
4	Off	00	0	Slip insertion sensor disabled.
	On	10	16	Slip insertion sensor enabled.
5	Off	00	0	Slip ejection sensor disabled.
	On	20	32	Slip ejection sensor enabled.
6	Off	00	0	Undefined.
	On	40	64	Undefined.
7	Off	00	0	Undefined
	On	80	128	Undefined.

[Notes]

- When a paper sensor is enabled with this command, printing is stopped only when the corresponding paper is selected for printing.
- It is possible to select multiple sensors to stop printing. Then if any sensor detects a paper-end, the printer stops printing.
- When a paper-end is detected, printing is stopped after printing the current line and feeding the paper.
- When a paper-end is detected by the paper roll sensor, the printer goes off-line after printing stops.
- When the slip insertion sensor detects a paper-end, the printer ejects the paper after printing as much data as possible and enters the paper waiting state.

[Default] *n* = 12

ESC c 5 *n*

[Name] Enable/disable panel buttons

[Format]

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

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

[Description] Enables or disables all of the panel buttons.

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

[Notes]
- Only the lowest bit of *n* is valid.
- When the panel buttons are disabled, no buttons on the panel are usable. Therefore, paper can be fed with the panel buttons only when the printer cover is open.

[Default] *n* = 0

ESC d *n*

[Name] Print and feed paper n lines

[Format]

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

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

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

[Notes]
- This command sets the print starting position to the beginning of the line.
- The maximum paper feed amount is 40 inches. If the specified amount exceeds 40 inches, the paper feed amount is automatically set to 40 inches.

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

ESC e *n*

[Name] Print and reverse feed n lines

[Format]

ASCII	ESC	e	*n*
Hex	1B	65	*n*
Decimal	27	101	*n*

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

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

[Notes]

- This command sets the print starting position to the beginning of the line.
- If the value of *n* is out of the specified range or if the *n* line feed amount exceeds 1/6 inch, the printer prints the data and does not feed the paper.
- If slip paper gets out of the slip sensor during printing, the printer prints the data and does not feed the paper.
- Paper feeding in the reverse direction causes the following problems:
  ① Paper feed pitch is incorrect.
  ② Printer noise is louder than normal.
  ③ The paper may rub against the ribbon and become stained.

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

ESC f *t1 t2*

[Name] Set slip paper waiting time

[Format]

ASCII	ESC	f	*t1*	*t2*
Hex	1B	66	*t1*	*t2*
Decimal	27	102	*t1*	*t2*

[Range] $0 \le t1 \le 15$
$0 \le t2 \le 64$

[Description] Sets the time that the printer waits for slip paper to be inserted and the time from insertion of the slip to the start of printing.

- *t1* specifies the wait time for slip paper to be inserted.
- *t2* specifies the time from insertion of the slip to the start of printing.
- This command sets the slip paper wait time to [*t1* × 1] minutes. If slip paper is not inserted within this time, the printer cancels slip paper mode and selects the default paper type for **ESC c 0**.
- When *t1* is set to 0, the printer waits until slip paper is inserted.
- The printer starts operation [*t2* × 0.1] seconds after detecting a slip.

[Notes]

- When either *t1* or *t2* is out of the specified range, this command is ignored and the previously set value is not changed.
- Using **DLE ENQ 3** cancels the slip waiting state. The data in the receive buffer and the print buffer are cleared in this time.
- For the following notes, assume that **ESC c 4** is set to stop printing when the absence of slip paper is detected:
- If the printer is in a paper-end and enters the slip waiting state by feeding a slip with the SLIP FEED button, there is no limit on the slip waiting time if the printer is not at the beginning of a line.
- If the printer is in a paper-end and enters the slip waiting state by attempting to print double-height characters on the last line of the slip, there is no limit on the slip waiting time.
- When the slip waiting time is set using this command and when printing stops because paper-end is enabled by using **ESC c 4 *n***, it is desirable to print on the remaining slip paper while checking the slip status by using **GS r 3**.

[Default] *t1* = 0, *t2* = 10

ESC i

[Name] Partial cut (one portion uncut)

[Format]

ASCII	ESC	i
Hex	1B	69
Decimal	27	105

[Description] Executes a partial cut of the paper roll, with one portion left uncut.

[Notes]
- This command is enabled only when input at the beginning of a line.
- This command is enabled only when the paper roll is selected for printing by **ESC c 0**.

[Reference] **ESC m**

ESC m

[Name] Partial cut (three portions uncut)

[Format]

ASCII	ESC	m
Hex	1B	6D
Decimal	27	109

[Description] Executes a partial cut of the paper roll, with three portions left uncut.

[Notes]
- This command is enabled only when input at the beginning of a line.
- This command is enabled only when the paper roll is selected for printing by **ESC c 0**.

[Reference] **ESC i**

ESC o

[Name] Stamp

[Format]

ASCII	ESC	o
Hex	1B	6F
Decimal	27	111

[Description] Executes stamp printing on the paper roll.

[Notes]
- This command is enabled only when input at the beginning of a line.
- This command is enabled only when the paper roll is selected for printing by **ESC c 0**.

ESC p m *t1 t2*

[Name] Generate pulse

[Format]

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

[Range] $m = 0, 1, 48, 49$
$0 \le t1 \le 255$
$0 \le t2 \le 255$

[Description] Outputs the pulse specified by *t1* and *t2* to connector pin *m*.

The value of *m* determines the output pin as follows:

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

The ON time is *t1* × 10 ms and the OFF time is *t2* × 10 ms.

[Notes]
- When *t2* < *t1*, the printer processes *t2* as *t1*.
- If the value of m is out of the specified range, the printer ignores this command and processes *t1* and *t2* as normal data.

[Reference] Section 2.2.3, *Drawer kick-out connector*

ESC t *n*

[Name] Select character code table

[Format]

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

[Range] $0 \le n \le 5$, $254 \le n \le 255$

[Description] Selects a page *n* from the character code tables, as follows:

n	Character Code Table
0	PC437 (U.S.A., Standard Europe)
1	Katakana
2	PC850 (Multilingual)
3	PC860 (Portuguese)
4	PC863 (Canadian-French)
5	PC865 (Nordic)
254	Space page
255	Space page

[Note] If the value of *n* is out of the specified range, the printer ignores this command.

[Default] *n* = 0

[Reference] Section 3.2, *Character Code Tables*; Appendix C, *Configuring the Space Page*

ESC u *n*

[Name] Transmit peripheral device status

[Format]

ASCII	ESC	u	*n*
Hex	1B	75	*n*
Decimal	27	117	*n*

[Range] *n* = 0, 48

[Description] Transmits one status byte for a peripheral device to the connector pin selected by *n*.

The value of *n* is set as follows:

n	Connector Pin
0, 48	Drawer kick-out connector pin 3

[Notes]

- When the connector is not used, the value of bit 0 is always 1.
- When DTR/DSR control is selected, the printer transmits only 1 byte after confirming that the host is ready to receive data (DSR signal is SPACE). If the host computer is not ready to receive data (DSR signal is MARK), the printer waits until the host is ready. When XON/XOFF control is selected, the printer transmits only 1 byte without checking the DSR signal.
- Since this command is executed when the data is buffered, there may be a time lag between command reception and status transmission, depending on the receive buffer status.
- When Auto Status Back (ASB) is enabled using **GS a**, the status transmitted by **ESC u** and the ASB status must be differentiated, using the table in Appendix B, Transmit Status Identification.
- If the value of *n* is out of the specified range, the printer ignores this command.
- The status to be transmitted is shown in the table below.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Drawer kick-out connector pin 3 signal is Low.
	On	01	1	Drawer kick-out connector pin 3 signal is High.
1	Off	00	0	Undefined.
	On	02	2	Undefined.
2	Off	00	0	Slip paper disabled.
	On	04	4	Slip paper enabled.
3	Off	00	0	Undefined.
	On	08	8	Undefined.
4	Off	00	0	Not used. Fixed to Off.
5	Off	00	0	Undefined.
	On	20	32	Undefined.
6	Off	00	0	Undefined.
	On	40	64	Undefined.
7	Off	00	0	Not used. Fixed to Off.

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

Section 2.2.3, *Drawer kick-out connector*; Appendix B, *Transmit Status Identification*

ESC v

[Name] Transmit paper sensor status

[Format]

ASCII	ESC	v
Hex	1B	76
Decimal	27	118

[Description] Transmits 1 status byte for a paper sensor.

[Notes]

- When DTR/DSR control is selected, the printer transmits only 1 byte after confirming that the host is ready to receive data (DSR signal is SPACE). If the host computer is not ready to receive data (DSR signal is MARK), the printer waits until the host is ready. When XON/XOFF control is selected, the printer transmits only 1 byte without checking the DSR signal.
- The 1-byte status data is transmitted after printing and paper feeding operation completely stop (transmit timing differs from **ESC u**, **GS I**, and **GS r**).
- Since this command is executed when the data is buffered, there may be a time lag between command reception and status transmission, depending on the receive buffer status.
- When Auto Status Back (ASB) is enabled using **GS a**, the status transmitted by **ESC v** and the ASB status must be differentiated, using the table in Appendix B, *Transmit Status Identification*.
- The status to be transmitted is shown in the table below:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll near-end sensor. Paper adequate.
	On	01	1	Paper roll near-end is detected by the paper roll near-end sensor.
1	Off	00	0	Paper roll near-end sensor. Paper adequate.
	On	02	2	Paper roll near-end is detected by the paper roll near-end sensor.
2	Off	00	0	Paper roll sensor. Paper adequate.
	On	04	4	Paper roll end is detected by the paper roll sensor.
3	Off	00	0	Paper roll sensor. Paper adequate.
	On	08	8	Paper roll end is detected by the paper roll sensor.
4	Off	00	0	Not used. Fixed to Off.
5	Off	00	0	Slip is detected by the slip insertion sensor.
	On	20	32	Slip is not detected by the slip insertion sensor.
6	Off	00	0	Slip is detected by the slip ejection sensor.
	On	40	64	Slip is not detected by the slip ejection sensor.
7	Off	00	0	Not used. Fixed to Off.

[Reference] **DLE EOT, GS ENQ, GS a, GS r**
Appendix B, *Transmit Status Identification*

ESC { *n*

[Name] Turns upside-down printing mode on/off

[Format]

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

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

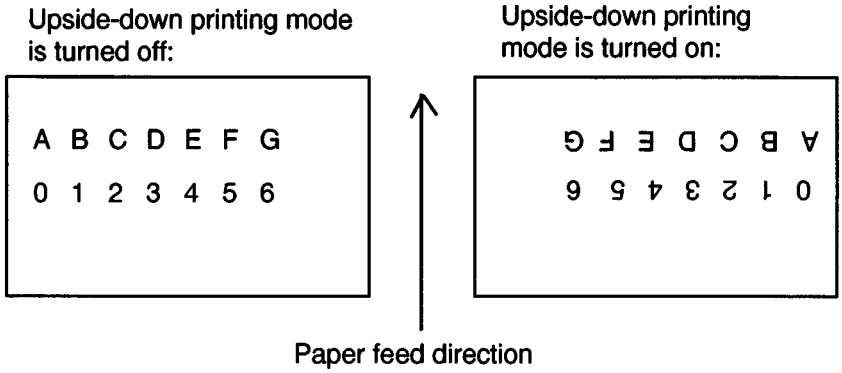
[Description] Turns upside-down printing mode on or off.

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

[Notes]
- Only the lowest bit of *n* is effective.
- In upside-down printing mode, the printer rotates the line to be printed by 180° and then prints it.
- This command is enabled only when input at the beginning of a line.

[Default] *n* = 0

[Example]



GS ENQ

[Name] Real-time printer status transmission

[Format]

ASCII	GS	ENQ
Hex	1D	05
Decimal	29	5

[Description] Transmits status of the printer in real time.

[Notes]

- The printer transmits only 1 byte without checking the DSR signal.
- This command is also enabled in the off-line state, in the receive buffer-full state, and in an error state.
- The printer status is transmitted whenever the data sequence of 1DH (29), 05H (5) is received.

  Example:

  In **ESC p m t1 t2**: *t1* = 1DH (29), *t2* = 05H (5)
  In **ESC ∗ *m nL nH [d]* nL + 256** × ***nH***: *d1* = 1DH (29), *d2* = 05H (5)
- This command should not be used within the data sequence of another command that consists of two or more bytes.

  Example:

  If you attempt to transmit **ESC 3 *n*** to the printer, be sure to transmit n before transmitting **GS ENQ** regardless of the condition of the DTR signal (DSR for the host computer). If **GS ENQ** interrupts before n is received, *n* is processed as 1DH (29).
- This command should not be used with handshaking of 7-bit data word length and XON/XOFF control. Otherwise, the status transmitted using this command cannot be differentiated from the XON/XOFF codes.
- When Auto Status Back (ASB) is enabled using **GS a**, the status transmitted by **GS ENQ** and the ASB status must be differentiated, using the table in Appendix B, *Transmit Status Identification*.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll near-end sensor. Paper adequate.
	On	01	1	Paper roll near-end sensor: Paper near end.
1	Off	00	0	Paper roll near-end sensor. Paper adequate.
	On	02	2	Paper roll near-end sensor: Paper near end.
2	Off	00	0	Cover is closed.
	On	04	4	Cover is open.
3	Off	00	0	On-line.
	On	08	8	Off-line.
4	Off	00	0	Drawer kick-out connector pin 3 signal is Low.
	On	10	16	Drawer kick-out connector pin 3 signal is High.
5	Off	00	0	Slip is detected by the slip insertion sensor.
	On	20	32	Slip is not detected by the slip insertion sensor.
6	Off	00	0	No error has occurred.
	On	40	64	Error has occurred.
7	Off	00	0	Not used. Fixed to Off.

Bit 3: Becomes On when the printer is off-line due to a paper-end stop or cover-open.

Bit 6: Becomes On when an error has occurred due to auto-cutting, home position detection, carriage detection, slip ejection detection, or print head high temperature error.

[Reference] **DLE EOT, ESC u, ESC v, GS a, GS r**

Appendix B, *Transmit Status Identification*

GS * *x y [d] x × y* × 8

[Name] Define downloaded bit-image

[Format]

ASCII	GS	*	*x*	*y*	*[d] x × y* × 8
Hex	1D	2A	*x*	*y*	*[d] x × y* × 8
Decimal	29	42	*x*	*y*	*[d] x × y* × 8

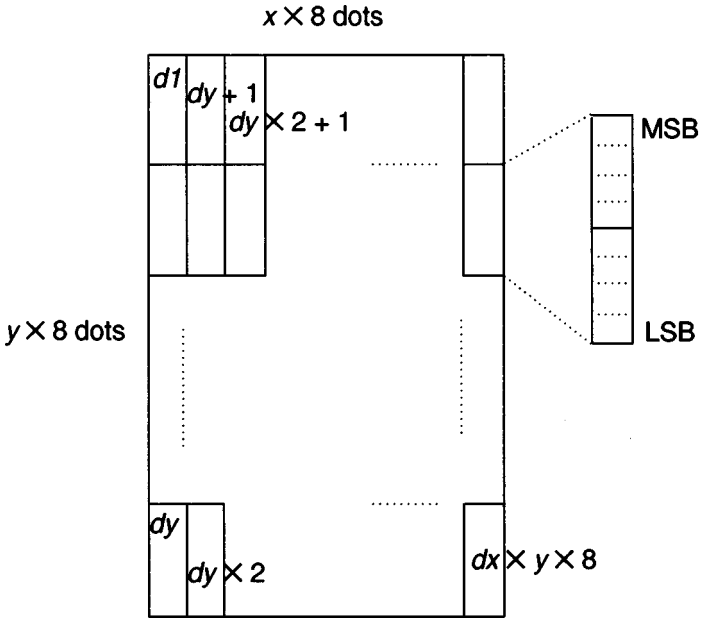
[Range]
$1 \le x \le 255$
$1 \le y \le 255$
$x \times y \le 155$ (when receive buffer is 2K bytes)
$x \times y \le 404$ (when receive buffer is 32 bytes)

[Description] Defines a downloaded bit image using the dots specified by *x* and *y*.

- *x* indicates the number of dots in the horizontal direction.
- *y* indicates the number of dots in the vertical direction.

[Notes]

- The number of dots is $x \times 8$ in the horizontal direction and $y \times 8$ in the vertical direction.
- *d* indicates the bit-image data. Set a corresponding bit to 1 to print a dot or 0 to not print a dot.
- After a downloaded bit image is defined, it is available until: another definition is made; **ESC** @ or **ESC &** is executed; the printer is reset; or the power is turned off.
- A user-defined character and a downloaded bit-image cannot be defined simultaneously. When this command is executed, the user-defined character is cleared.
- The relationship between the bit-image data and the specified dots is shown in the figure below.



[Reference] **GS /**

GS / *m*

[Name] Print downloaded bit image

[Format]

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

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

[Description] Prints a defined downloaded bit image in mode *m*.

The modes selectable by *m* are as follows:

m	Print Mode	Horizontal Direction		Number of Horizontal Dots	
		Dot Density	Adjacent dots	Paper Roll	Slip
0, 48	Double width	Single density	Permitted	180	400
1, 49	Normal	Double density	Prohibited	260	800

[Notes]

- If data exists in the print buffer, the printer ignores this command.
- If a downloaded bit image has not been defined, the printer ignores this command.
- If a downloaded bit image exceeds one line, the excess data is not printed.
- A user-defined character and a downloaded bit image cannot be defined for the same character code.
- If the value of *m* is out of the specified range, the printer ignores this command.

[Reference] **GS ***

GS E *n*

[Name] Select print speed and head energizing time

[Format]

ASCII	GS	E	*n*
Hex	1D	45	*n*
Decimal	29	69	*n*

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

[Description] Selects the printing speed and print head energizing time (print mode), using *n* as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Head energizing time (copy).
	On	01	1	Head energizing time (normal).
1	Off	00	0	Undefined.
	On	02	2	Undefined.
2	Off	00	0	Undefined.
	On	04	4	Undefined.
3	Off	00	0	Undefined.
	On	08	8	Undefined.
4	Off	00	0	High printing speed.
	On	10	16	Low printing speed.
5	Off	00	0	Not used.
	On	20	32	Not used.
6	Off	00	0	Not used.
	On	40	64	Not used.
7	Off	00	0	Not used.
	On	80	128	Not used.

[Notes]

- This command is available only when input at the beginning of a line.
- The printer processes *n* = <***0***0>B as *n* = <***0***1>B.
- The setting is for paper selected by **ESC c 0**.

n	Speed	Head	Mode	Default value	
				Paper Roll	Slip
1	High	Normal	Normal	Selectable by DIP switch	
16	Low	Copy	Copy		Default
17	Low	Normal	Low	Selectable by DIP switch	

[Default] Paper roll: *n* = 1 or 17, depending on the DIP switch
Slip: *n* = 16

[Reference] **ESC c 0**

GS I *n*

[Name] Transmit printer ID

[Format]

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

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

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

n	Printer ID	Specifications	ID (hexadecimal)
1, 49	Model ID	TM-U925	0CH
2, 50	Type ID	Refer to the table below	
3, 51	ROM version ID	ROM version	See the Notes below.

[Notes]

- When DTR/DSR control is selected, the printer transmits only 1 byte after confirming that the host is ready to receive data (DSR signal is SPACE). If the host computer is not ready to receive data (DSR signal is MARK), the printer waits until the host is ready. When XON/XOFF control is selected, the printer transmits only 1 byte without confirming the condition of the DSR signal.
- Since the printer ID is transmitted when the data is buffered, there may be a time lag between command reception and status, depending on the receive buffer status.
- The ROM version may be changed.
- When Auto Status Back (ASB) is enabled using **GS a**, the status transmitted by **GS I** and the ASB status must be differentiated using the table in Appendix B, *Transmit Status Identification*.
- When *n* is out of the specified range, this command is ignored.

n = 2 Type ID:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Two-byte character code Off (fixed).
1	On	01	2	Auto cutter enabled (fixed).
2	Off	00	0	Paper roll sensor. Paper adequate.
	On	04	4	Paper roll end is detected by the paper roll sensor.
4	Off	00	0	Not used. Fixed to Off.
5	Off	00	0	Slip is detected by the slip insertion sensor.
	On	20	32	Slip is not detected by the slip insertion sensor.
6	Off	00	0	Slip is detected by the slip ejection sensor.
	On	40	64	Slip is not detected by the slip ejection sensor.
7	Off	00	0	Not used. Fixed to Off.

[Reference] Section 3.3.3, *DIP switches*; Appendix B, *Transmit Status Identification*

GS P *x y*

[Name] Set vertical and horizontal motion unit

[Format]

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

[Range] $0 \le x \le 255$
$0 \le y \le 255$

[Description] Sets the vertical and horizontal motion units to 1/*x* and 1/*y* inches, respectively.

When *x* and *y* are set to 0, the default setting of each value is used.

[Notes]
- The current settings remain unchanged after this command is executed.
- The calculated result when using this command and the line spacing setting command is truncated to the minimum value of the mechanical pitch (horizontal: 1/150", vertical: 1/144").

[Default] *x* = 150, *y* = 144

[Reference] **ESC SP, ESC 3, ESC J, ESC K, ESC $, ESC **

[Example] When setting *n* = 48 in ESC 3 as a default, the amount of paper feeding is set to 48/144 (1/3 inches). When setting *x* = 0 and *y* = 240 in **GS P** and *n* = 48 in **ESC 3**, the amount of paper feeding is set to 48/240 (1/5 inch).

GS a *n*

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

[Format]

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

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

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

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Drawer kick-out connector pin 3 status disabled.
	On	01	1	Drawer kick-out connector pin 3 status enabled.
1	Off	00	0	On-line/off-line status disabled.
	On	02	2	On-line/off-line status enabled.
2	Off	00	0	Error status disabled.
	On	04	4	Error status enabled.
3	Off	00	0	Paper roll sensor status disabled.
	On	08	8	Paper roll sensor status enabled.
4	Off	00	0	Undefined.
	On	10	16	Undefined.
5	Off	00	0	Slip sensor and slip status disabled.
	On	20	32	Slip sensor and slip status enabled.
6	Off	00	0	Not used.
	On	40	64	Not used.
7	Off	00	0	Not used.
	On	80	128	Not used.

[Notes]

- If any of the status items in the above table are not selected, ASB is disabled.
- ASB is enabled if only one status item is selected. The printer automatically transmits a status of 4 bytes whenever the status changes.
- If ASB is enabled while processing this command, the current status is transmitted with no regulations.
- When transmitting a status, the printer transmits only 4 bytes without confirming the condition of the DSR signal.
- The 4 bytes of status data must be consecutive, except for the XOFF code.
- This command is executed when the data in the receive buffer is developed. Therefore, there may be a time lag between receiving this command and transmitting the first status, depending on the receive buffer status.
- When the printer is disabled by **ESC =** (select peripheral device), this command is disabled but the ASB that has been set is always enabled.
- When using **ESC u, ESC v, GS I, GS r, DLE EOT**, or **GS ENQ**, the status transmitted by this command, the ASB status, and the status transmitted by another commands must be differentiated, according to the procedure in Appendix B, *Transmit Status Identification*.

• The status information to be transmitted is as follows:

First byte (printer information):

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	Off	00	0	Not used. Fixed to Off.
2	Off	00	0	Drawer kick-out connector pin 3 signal is Low.
	On	04	4	Drawer kick-out connector pin 3 signal is High.
3	Off	00	0	On-line.
	On	08	8	Off-line.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Cover is closed.
	On	20	32	Cover is open.
6	Off	00	0	PAPER FEED button is not used.
	On	40	64	PAPER FEED button is used.
7	Off	00	0	Not used. Fixed to Off.

Second byte (error information):

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Undefined.
	On	01	1	Undefined.
1	Off	00	0	Undefined.
	On	02	2	Undefined.
2	Off	00	0	No mechanical error.
	On	04	4	Mechanical error.
3	Off	00	0	No auto-cutter error.
	On	08	8	Auto-cutter error.
4	On	10	16	Not used. Fixed to Off.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error.
6	Off	00	0	No print head error.
	On	40	64	Print head error.
7	Off	00	0	Not used. Fixed to Off.

Third byte (paper sensor information):

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll near-end sensor. Paper adequate.
	On	01	1	Paper roll near-end is detected by the paper roll sensor.
1	Off	00	0	Paper roll near-end sensor. Paper adequate.
	On	02	2	Paper roll near-end is detected by the paper roll sensor.
2	Off	00	0	Paper roll sensor. Paper adequate.
	On	04	4	Paper roll end is detected by the paper roll sensor.
3	Off	00	0	Paper roll sensor. Paper adequate.
	On	08	8	Paper roll end is detected by the paper roll sensor.
4	On	10	16	Not used. Fixed to Off.
5	Off	00	0	Slip is detected by the slip insertion sensor.
	On	20	32	Slip is not detected by the slip insertion sensor.
6	Off	00	0	Slip is detected by the slip ejection sensor.
	On	40	64	Slip is not detected by the slip ejection sensor.
7	Off	00	0	Not used. Fixed to Off.

Fourth byte (paper sensor information):

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Slip paper selected.
	On	01	1	Slip paper not selected.
1	Off	00	0	Slip printing possible.
	On	02	2	Slip printing not possible.
2	Off	00	0	Undefined.
	On	04	4	Undefined.
3	Off	00	0	Undefined.
	On	08	8	Undefined.
4	On	10	16	Not used. Fixed to Off.
5	Off	00	0	Undefined.
	On	20	32	Undefined.
6	Off	00	0	Undefined.
	On	40	64	Undefined.
7	Off	00	0	Not used. Fixed to Off.

Bit 1: Becomes 0 (possible to print) when paper loading has finished and is 1 when slip ejection is started or times out.

When slip paper is selected and the printer goes to the slip waiting state:
Bits 5 and 6 of the third byte are 1 (no paper).
Bits 0 and 1 of the fourth byte are 0 (selected) and 1 (impossible to print), respectively.

When slip paper is selected once, the printer goes to the slip ejection waiting status:
Bits 5 and 6 of the third byte are 1 (no paper) and 0 (paper present), respectively
Bits 0 and 1 of the fourth byte are 0 (selected) and 1 (impossible to print), respectively.

When printing stop due to a paper-end is disabled using **ESC c 4**, bit 1 of the fourth byte (slip status) does not become 1 (impossible to print) even when there is no remaining printing space on the slip. Use **ESC r 3** to check the remaining printing space on the slip.

[Default] *n* = 0 when DIP SW 2-5 is OFF, *n* = 2 when DIP SW 2-5 is ON

[Reference] **DLE EOT, ESC u, ESC v, GS ENQ, GS r**, Appendix B, Appendix F

GS r *n*

[Name] Transmit status

[Format]

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

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

[Description] Transmits the status specified by *n* as, follows:

n	Function
1, 49	Transmits paper sensor status (same as **ESC v**)
2, 50	Transmits drawer kick-out connector status (same as **ESC u 0**)
3, 51	Transmits slip paper status

[Notes]

- When DTR/DSR control is selected, the printer transmits only 1 byte after confirming that the host is ready to receive data (DSR signal is SPACE). If the host computer is not ready to receive data (DSR signal is MARK), the printer waits until the host is ready. When XON/XOFF control is selected, the printer transmits only 1 byte without confirming the condition of the DSR signal.
- Since this command is executed when the data is buffered, there may be a time lag between command reception and status transmission, depending on the receive buffer status.
- When Automatic Status Back (ASB) is enabled using **GS a**, the status transmitted by **GS r** and the ASB status must be differentiated using the table in Appendix B, *Transmit Status Identification*.
- If the value of *n* is out of the specified range, the printer ignores this command.
- The status types to be transmitted are shown below:

n = 1: Paper sensor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll near-end sensor. Paper adequate.
	On	01	1	Paper roll near-end is detected by the paper roll near-end sensor.
1	Off	00	0	Paper roll near-end sensor. Paper adequate.
	On	02	2	Paper roll near-end is detected by the paper roll near-end sensor.
2	Off	00	0	Paper roll sensor. Paper adequate.
	On	04	4	Paper roll end is detected by the paper roll sensor.
3	Off	00	0	Paper roll sensor. Paper adequate.
	On	08	8	Paper roll end is detected by the paper roll sensor.
4	On	10	16	Not used. Fixed to Off.
5	Off	00	0	Slip is detected by the slip insertion sensor.
	On	20	32	Slip is not detected by the slip insertion sensor.
6	Off	00	0	Slip is detected by the slip ejection sensor.
	On	40	64	Slip is not detected by the slip ejection sensor.
7	Off	00	0	Not used. Fixed to Off.

n = 2: Drawer kick-out connector status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Drawer kick-out connector pin 3 signal is Low.
	On	01	1	Drawer kick-out connector pin 3 signal is High.
1	Off	00	0	Undefined.
	On	02	2	Undefined.
2	Off	00	0	Undefined.
	On	04	4	Undefined.
3	Off	00	0	Undefined.
	On	08	8	Undefined.
4	On	10	16	Not used. Fixed to Off.
5	Off	00	0	Undefined.
	On	20	32	Undefined.
6	Off	00	0	Undefined.
	On	40	64	Undefined.
7	Off	00	0	Not used. Fixed to Off.

n = 3: Slip status

Value	Slip Status
00000000B	There is no printing area on the current slip or slip paper is not selected.
00000001B	It is possible to print one line excluding double-height characters on the current slip.
00000010B	It is possible to print one line including double-height characters on the current slip.
00000011B	It is possible to print one line or more.

* The user can confirm whether more printing space is available on the current slip by using **GS r 3**.
  - When more printing space is available in the current specified line spacing, the printer transmits 03H (3).
  - When only one line including double-height characters is available, the printer transmits 02H (2).
  - When only one line excluding double-height characters is available, the printer transmits 01H (1).
  - If no lines remain on the current slip, the printer transmits 00H (0). However, when printing stop by detecting paper-end is enabled, the printer ejects the slip and waits for the next slip to be inserted, but does not transmit 00H (0).

[Reference] **DLE EOT, ESC u, ESC v, GS ENQ, GS a**

Appendix B, *Transmit Status Identification*

6.3 Ignored Commands

The TM-U925 ignores the following commands:

ESC c 3 *n*

ESC c 6 *n*

6.4 MICR Control Commands (when the printer is used with the MICR reader)

DLE EOT BS *n*

[Name] Real-time MICR status transmission

[Format]

ASCII	DLE	EOT	BS	*n*
Hex	10	04	08	*n*
Decimal	16	4	8	*n*

[Range] *n* = 1

[Description] Transmits the selected MICR status specified by *n* in real time as follows:

n	Function
1	Transmits MICR status.

[Notes]

- The status information to be transmitted is shown in the tables on the following pages.
- The printer starts MICR status transmission when this command is buffered in the receive buffer.
- When transmitting status, the printer transmits only 1 byte without confirming the condition of the DSR signal.
- This command is executed even when the printer is off-line, the receive buffer is full, or an error occurs.
- The status is transmitted whenever the data sequence for **DLE EOT BS *n*** (*n* = 1) is received.

  Example:

  In **ESC ∗ *m nL nH* [*d*] *nL*+256 × *nH***, *d1*=10H (16), *d2*=04H (4), *d3*=08H (8), *d4* = 01H (1)
- This command should not be contained within another command that consists of 2 or more bytes.

  Example:

  If you attempt to transmit **ESC 3 *n*** to the printer, and then **DLE EOT BS 1** interrupts before *n* is received, the code 10H (16) for **DLE EOT BS 1** is processed as the code for **ESC 3** 10H (16).
- This command is unavailable when using **ESC =** (select peripheral device) to select the printer to be disabled.
- This command is unavailable during MICR reading result transmission (**FS a 0**, and **FS b**).
- When Automatic Status Back (ASB) is enabled using the **GS a** command, the status transmitted by the **DLE EOT BS** command and the ASB status must be differentiated using the table in Appendix B, *Transmit Status Identification*.
- If the value of *n* is out of the specified range, the printer ignores this command.

n = 1: MICR status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	MICR function selected.
	On	04	4	MICR function not selected.
3	Off	00	0	Waits for check paper or cleaning sheet.
	On	08	8	Does not wait for check paper or cleaning sheet.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Check paper is detected by the check insertion sensor.
	On	20	32	Check paper is not detected by the check insertion sensor.
6	Off	00	0	Check paper is detected by the check ejection sensor.
	On	40	64	Check paper is not detected by the check ejection sensor.
7	Off	00	0	Not used. Fixed to Off.

Bit 2:
- There may be a time lag between receiving **FS a 0** or **FS c** command and selecting MICR function. During this period, bit 2 remains On (not selected).
- Remains Off (selected) until the MICR function completes.

Bit 3:
- Becomes Off (not waiting) just before starting MICR character reading, or starting MICR mechanism cleaning, after detecting the personal check or cleaning sheet, respectively.

Bits 5 and 6: Transmit the current status of the paper sensors.

[Reference] **DLE ENQ, FS a 0, FS b, FS c**

Appendix B: *Transmit Status Identification*

FS a 0 *n*

[Name] Read check paper

[Format]

ASCII	FS	a	0	*n*
Hex	1C	61	30	*n*
Decimal	28	97	48	*n*

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

[Description] Selects the MICR function and reads MICR characters specified by *n* as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Readable fonts. Refer to the table below.
	On	01	1	
1	Off	00	0	
	On	02	2	
2	Off	00	0	Undefined.
	On	04	4	Undefined.
3	Off	00	0	Undefined.
	On	08	8	Undefined.
4	Off	00	0	Undefined.
	On	10	16	Undefined.
5	Off	00	0	Undefined.
	On	20	32	Undefined.
6	Off	00	0	Undefined.
	On	40	64	Undefined.
7	Off	00	0	Undefined.
	On	80	128	Undefined.

Readable Fonts

Bit 1	Bit 0	Font
0	0	E13B
0	1	CMC7
1	0	Undefined
1	1	Undefined

[Notes]

- This command is enabled only when input at the beginning of a line.
- Since this command is executed after being buffered, there may be a time lag between command reception and starting MICR reading.
- When an undefined font is selected, this command is ignored.
- If the MICR function is not selected while this command is processed, the printer enters the check paper waiting status. When slip paper is selected for printing, the printer ejects the current slip, then waits for the next slip to be loaded.
- The time specified by **ESC f** is effective. *t1* indicates the time from processing this command to inserting check paper, and *t2* indicates the time from detecting check paper to loading it.

- The check waiting status continues until check paper loading starts, the waiting state is canceled, the waiting time t1 set by **ESC f** elapses, the printer is reset, or the power is turned off.
- When rereading of MICR characters is possible with the MICR function selected while processing this command, the printer re-reads check paper.
- When rereading of MICR characters is impossible with the MICR function selected while processing this command, the printer ejects the check and ends the MICR function. In this case, bit 4 becomes On (rereading is impossible) and bit 2 becomes On (the MICR function is not selected).
- If the detected character cannot be identified with the font specified by n, the printer converts it to "?" and continues data processing. In this case, the printer ends reading normally.
- The following cases are abnormal ends:
  ① MICR characters cannot be detected.
  ② The check paper waiting state is canceled.
  ③ The wait time *t1* set by **ESC f** has elapsed while waiting for check paper to be loaded.
  ④ An error occurs during the period from the start of command processing to the end of the reading operation.
- When MICR reading ends normally, the printer transmits header + reading status + data + NUL to the host computer. In other cases, the printer transmits header + NUL to the host computer.
  ① Header = 5FH (95)
  ② Reading status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Readable fonts. Refer to the table below.
	On	01	1	
1	Off	00	0	
	On	02	2	
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	Off	00	0	Rereading possible.
	On	10	16	Rereading not possible.
5	Off	00	0	Reading result. Normal end.
	On	20	32	Reading result. Abnormal end.
6	On	40	64	Not used. Fixed to On.
7	Off	00	0	Not used. Fixed to Off.

Readable Fonts

Bit 1	Bit 0	Font
0	0	E13B
0	1	CMC7
1	0	Undefined
1	1	Undefined

- Bits 0 and 1: Identified character fonts.
  - Bit 4 becomes On (rereading is impossible) in the following cases:
    a. Bit 5 is On (abnormal end).
    b. Ejection of the current check paper is required to execute re-reading.
    c. The number of re-reads reaches the maximum. (The maximum depends on the reader model.)
    d. The MICR function is unselected.
  - When bit 5 is On (abnormal end), bit 4 is On (rereading is impossible). Either bit Off or On has no meaning.

  ① Read data is transmitted after being converted to ASCII codes.

  ② NUL = 00H (0)
- When DTR/DSR control is selected, the printer transmits data consecutively after confirming whether the host computer is ready to receive data (which is just before transmitting the header). When the host is not ready to receive data, the printer waits until the host is ready.
- When XON/XOFF control is selected, the printer transmits all data consecutively without confirming whether the host computer is ready to receive data. The data transmission must be consecutive, except for the XOFF code.
- The printer does not process commands during data transmission.
- The printer ignores real-time commands during data transmission.
- Even if the ASB function is selected, the ASB status is not sent during data transmission. Also, ASB status detection processing is not executed during data transmission.
- If the printer status (such as on-line/off-line) changes (except for receive buffer- full), the required processing (XON/XOFF transmission and DTR control) is executed after data transmission.
- Since the data and header after reading are required when retransmission is required by **FS b**, save them until the next **FS a 0** is executed, **ESC** @ is executed, the printer is reset, or the power is turned off.
- When reading ends correctly, the printer transmits [header ~ NUL] to the host computer but does not eject the check.
- When reading ends abnormally, the printer transmits [header ~ NUL] to the host computer, ejects the check, and then selects the default paper type for **ESC c 0**. At this time, the MICR function ends. (Bit 2 becomes 1, and the MICR function is not selected.)
- When bit 4 is Off (rereading is possible) and **FS a 0, FS a 1, FS a 2**, or **FS b** is received, the printer starts processing of each command.
- When bit 4 is Off (rereading is possible) and character codes other than **FS a 0**, **FS a 1**, **FS a 2**, or **FS b** (except for codes corresponding to read-time commands) are received, the printer ejects the check paper and selects the default paper type for **ESC c 0**. At this time, the ASB function ends. (Bit 4 becomes On (rereading is impossible) and bit 2 becomes On (the MICR function is not selected)).

- When bit 4 is On (rereading is impossible) and **FS a 1** is received, the printer loads check paper to the print starting position.
- When bit 4 is On (rereading is impossible) and codes other than **FS a 1** (except codes corresponding to read-time commands) are received, the printer ejects the check paper and selects the default paper type for **ESC c 0**. At this time, the ASB function ends. (Bit 4 becomes On (rereading is impossible) and bit 2 becomes On (the MICR function is not selected).)
- When a recoverable error occurs, it can be recovered by using **DLE ENQ 1** or **DLE ENQ 2**. After recovering from the error, the printer ejects the check paper and ends the MICR function. The printer ejects the check paper and selects the default paper type for **ESC c 0**. When **DLE ENQ 2** is used, the receive buffer is cleared.
- The transmit data consists of the following:

①E13B

	Character	Code		Character	Code		Character	Code
	SP	20H	0	0	30H	5	5	35H
	?	3FH	1	1	31H	6	6	36H
	T	54H	2	2	32H	7	7	37H
	A	41H	3	3	33H	8	8	38H
	0	4FH	4	4	34H	9	9	39H
	D	44H						

②CMC7

	Character	Code		Character	Code
			0	0	30H
	SP	20H	1	1	31H
	?	3FH	2	2	32H
			3	3	33H
	/	2FH	4	4	34H
	#	23H	5	5	35H
	=	3DH	6	6	36H
	>	3EH	7	7	37H
	^	5EH	8	8	38H
			9	9	39H

	Character	Code		Character	Code		Character	Code
A	A	41H	J	J	4AH	S	S	53H
B	B	42H	K	K	4BH	T	T	54H
C	C	43H	L	L	4CH	U	U	55H
D	D	44H	M	M	4DH	V	V	56H
E	E	45H	N	N	4EH	W	W	57H
F	F	46H	O	O	4FH	X	X	58H
G	G	47H	P	P	50H	Y	Y	59H
H	H	48H	Q	Q	51H	Z	Z	5AH
I	I	49H	R	R	52H			

[Reference] **DLE EOT BS, DLE ENQ, ESC f, FS b**
Appendix B: *Transmit Status Identification*

FS a 1 *n*

[Name] Load check paper to print starting position

[Format]

ASCII	FS	a	1	*n*
Hex	1C	61	31	*n*
Decimal	28	97	49	*n*

[Description] Loads check paper to the print starting position.

[Notes]
- Since this command is executed after being buffered in the receive buffer, there may be a time lag between receiving this command and starting MICR reading.
- This command is ignored unless MICR function is selected.
- After loading check paper to the print starting position, the printer cancels MICR function and selects slip paper automatically.

[Reference] **FS a 0**

FS a 2

[Name]	Eject check paper			
[Format]	ASCII	FS	a	2
	Hex	1C	61	32
	Decimal	28	97	50
[Description]	Ejects check paper.			
[Notes]	• Since this command is executed after being buffered in the receive buffer, there may be a time lag between command reception and starting paper ejection. • This command is ignored unless MICR function is selected. • After ejecting check paper, the printer cancels MICR function and selects the default paper for **ESC c 0** automatically.			
[Reference]	**ESC c 0**, **FS a 0**			

FS b

[Name] Request retransmission of check paper reading result

[Format]

ASCII	FS	b
Hex	1C	62
Decimal	28	98

[Description] Retransmits the previous check paper (MICR character) reading reaults.

[Notes]

- Since this command is executed after being buffered in the receive buffer, there may be a time lag between sending this command and starting MICR reading.
- When the previous MICR reading results are correct, the printer transmits header + reading status + identified character strings + NUL to the host computer. If it is abnormal, or when **FS a 0** is not executed, the printer transmits header + reading status + NUL to the host.
- When DTR/DSR control is selected, the printer transmits all data consecutively after confirming whether the host computer is ready to receive data . When the host is not ready to receive data, the printer waits until the host is ready.
- When XON/XOFF control is selected, the printer transmits all data consecutively without confirming whether the host computer is ready to receive data. The data transmission must be consecutive, except for the XOFF code.
- The printer transmits all data collectively without confirming whether the host computer is ready to receive data after transmitting header. To receive identification result correctly, 67 bytes or more space is required in the receive buffer.
- Refer to the **FS a 0** command description for header, reading status, and identified character strings.
- During identification result transmission, the printer ignores **DLE EOT *n***, **DLE EOT BS *n***, and **GS ENQ**. Also, the printer does not transmit ASB during reading and identification result tranmission. Therefore, the user cannot confirm changes in the printer status during these periods.
- It is possible to differentiate the reading results of MICR, ASB, and real-time status. Refer to Appendix B for data identifying method.

[Reference] **DLE EOT BS, DLE EOT, FS a 0, GS ENQ**

Appendix B, *Transmit Status Identification*

FS c

[Name] MICR mechanism cleaning

[Format]

ASCII	FS	c
Hex	1C	63
Decimal	28	99

[Description] Cleans the MICR mechanism.

[Notes]

- This command is enabled only when input at the beginning of a line.
- Since this command is executed after being buffered, there may be a time lag between command reception and beginning head cleaning.
- When this command is executed, the printer enters cleaning sheet wait status.
- When this command is executed with slip paper selected, the printer ejects the slip and waits for the cleaning sheet to be loaded.
- The cleaning sheet waiting time is *t1* × 1 minutes, based on the **ESC f *t1 t2*** setting. The printer starts operating *t2* × 0.1 seconds after detecting a cleaning sheet.
- The printer waits for a cleaning sheet until the sheet is inserted, the cleaning sheet waiting status is canceled, the waiting time is over, or the power is turned off.
- During the cleaning sheet waiting period, the printer processes only real-time commands.
- The printer starts MICR head cleaning when a cleaning sheet is loaded.
- After cleaning the MICR head, the printer ejects the sheet and automatically selects the default paper type specified by **ESC c 0**.

[Reference] **ESC f**, **ESC c 0**

APPENDIX A: MISCELLANEOUS NOTES

1) Print duty

- When printing exceeds the allowable print duty cycle, the printer automatically senses the status and controls printing. In this case, the printing speed may slow temporarily. When print duty is lowered to normal, printing speed returns to normal.
- If printing stops due to excessive print duty, the ERROR LED indicator blinks as shown in Table 3.8.1.

2) Power supply

- The printer works correctly when the power supply voltage is within the range of 24 V ± 10% (21.6 V - 26.4 V). If the power supply voltage goes outside this range during the printing of one line, the printer stops. The printer restarts after the voltage returns to normal. In this case, the printing speed may be lowered, and the printing pitch may become incorrect. If the power supply voltage goes outside this range and the voltage continues for one second or more, it is considered a high- or low-voltage error and printing is not performed.
- When a high- or low-voltage error occurs, the ERROR LED indicator blinks in the pattern shown in Table 3.8.3.
- When a high- or low-voltage error occurs, turn the power supply off as soon as possible.

3) Other

- Because this printer uses plated steel, the cutting edges may be subject to rust.

APPENDIX B: TRANSMIT STATUS IDENTIFICATION

Because the specified status bits transmitted from the TM-U925 are fixed, the user can confirm the command to which the status belongs as shown in the following table:

Command & Function	Status Reply
ESC u	<0**0****>B
ESC v	<0**0****>B
GS I	<0**0****>B
GS r	<0**0****>B
XON	<00010001>B
XOFF	<00010011>B
DLE EOT 1 to **5**	<0**1**10>B
ASB (1st byte)	<0**1**00>B
ASB (2nd to 4th bytes)	<0**0****>B
GS ENQ	<1*******>B

When the printer is used with the MICR reader:

Command & Function	Status Reply
FS a 0, **FS b** (header)	<01011111>B
DLE EOT BS 1	<0**0****>B

After receiving the header for **FS a 0** or **FS b**, status identification by using ASB and real-time commands must not be executed until NUL (00H (0)) is received.

APPENDIX C: CONFIGURING THE SPACE PAGE

The space page is the character code table where character codes 80H to FFH are all undefined. This character code table is selected when n is set to 254 or 255 using the character code table selection command **ESC t *n***.

1) Space page top address

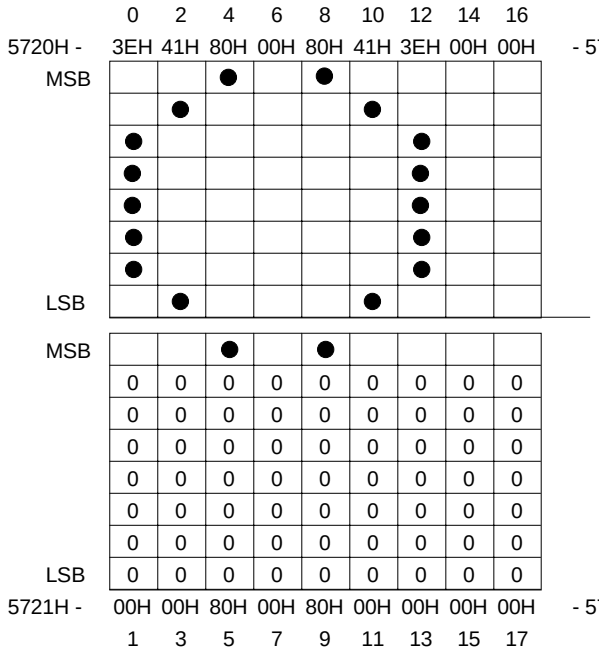
Page	Character table	Space page top address	
		7 × 9	9 × 9
254	Space page	5600H	5F00H
255	Space page	6B00H	7400H

2) Calculating the character data top address

The character data top address is calculated as follows:

- 7 × 9 font (graphics)
  Character data top address = space page top address + (character code - 80H) × 18
- 9 × 9 font (graphics)
  Character data top address = space page top address + (character code - 80H) × 24

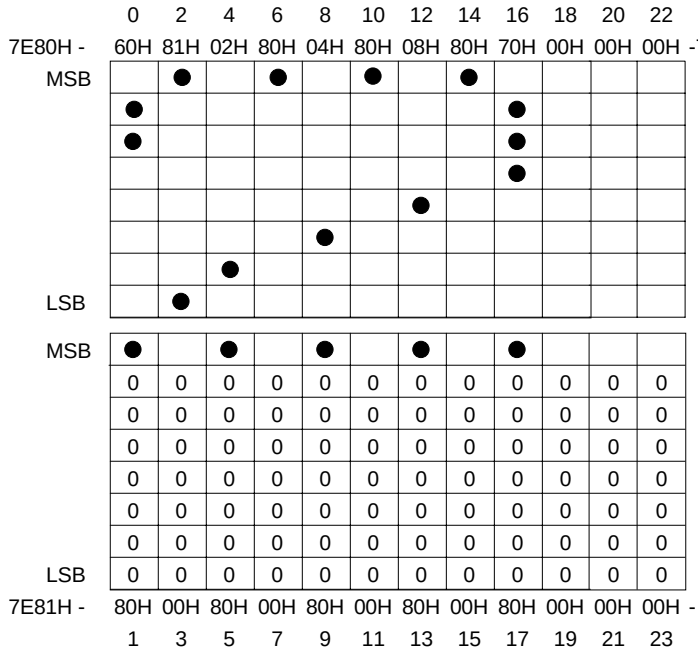
3) Example font data configuration



Character code 90H
Character data top address
5600H + (90H-80H) ×18 = 5720H

address	data	address	data
0:	5720H 3EH	1:	5721H 00H
2:	5722H 41H	3:	5723H 00H
4:	5724H 80H	5:	5725H 80H
6:	5726H 00H	7:	5727H 00H
8:	5728H 80H	9:	5729H 80H
10:	572AH 41H	11:	572BH 00H
12:	572CH 3EH	13:	572DH 00H
14:	572EH 00H	15:	572FH 00H
16:	F730H 00H	17:	5731H 00H

- 9 × 9 font (using character code F0H on page 255)

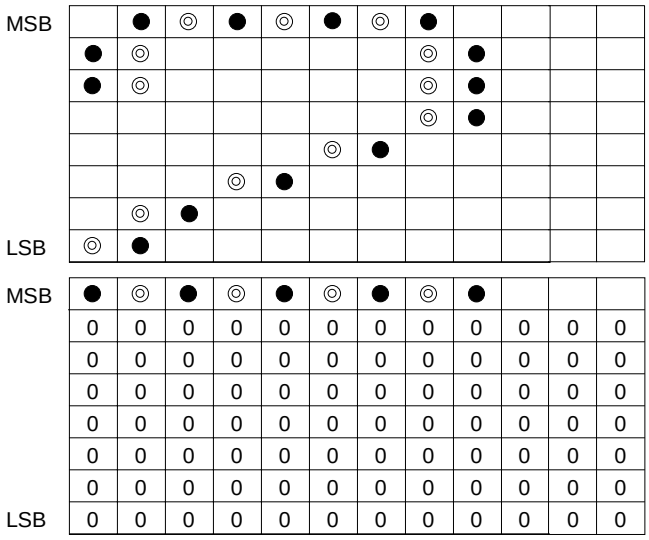


Character code F0H
Character data top address
7400H + (F0H-80H) ×24 = 7E80H

address	data		address	data
0:	7E80H	60H	1:	7E81H 80H
2:	7E82H	81H	3:	7E83H 00H
4:	7E84H	02H	5:	7E85H 80H
6:	7E86H	80H	7:	7E87H 00H
8:	7E88H	04H	9:	7E89H 80H
10:	7E8AH	80H	11:	7E8BH 00H
12:	7E8CH	08H	13:	7E8DH 80H
14:	7E8EH	80H	15:	7E8FH 00H
16:	7E90H	70H	17:	7E91H 80H
18:	7E92H	00H	19:	7E93H 00H
20:	7E94H	00H	21:	7E95H 00H
22:	7E96H	00H	22:	7E97H 00H

4) Notes

Do not use character patterns in which dots are horizontally adjacent.



The pattern shown above, in which ◎ and ● adjoin horizontally, is prohibited.

APPENDIX D: ADJUSTING THE PAPER ROLL NEAR-END SENSOR LOCATION

The remaining detectable amount of paper on the paper roll varies with the inside and outside diameters of the paper core . The minimum detectable amount of paper on the paper roll can be set using the following method:

1) The inside diameter (ϕd) of the paper spool should be 10mm (.394") or more.

2) Set the paper roll diameter A to obtain the corresponding adjustment position from the table below.

Diameter A	Adjustment position
Approx. 10mm (.39”)	#1
Approx. 8mm (.32”)	#2
Approx. 6mm (.24”)	#3
Approx. 4mm (.16”)	#4
Approx. 2mm (.079”)	#5

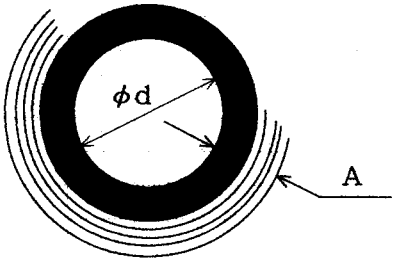


Figure D.1 Paper Roll Spool

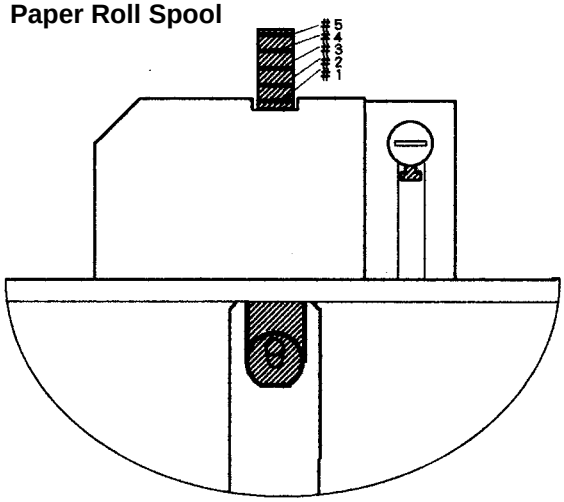


Figure D.2 Paper Roll Near-end Sensor

NOTES:
1. Since diameter A corresponding to the adjustment position in the table is calculated from standard measurements, there may be some variations depending on the printer.
2. If a paper roll with a red end mark at the paper end is used, the mark may cause the paper to stick together. If this occurs, diameter A differs from the values in the table.
3. Be sure that the adjustable slider operates smoothly after finishing the adjustment.
4. If the paper on the paper roll becomes loose due to the paper quality, the paper roll near-end sensor may operate incorrectly.

APPENDIX E: NOTES ON USING THE DRAWER KICK-OUT CONNECTOR

1) Drawer kick-out connector use conditions (refer to Section 2.2.3, Drawer kick-out connector)

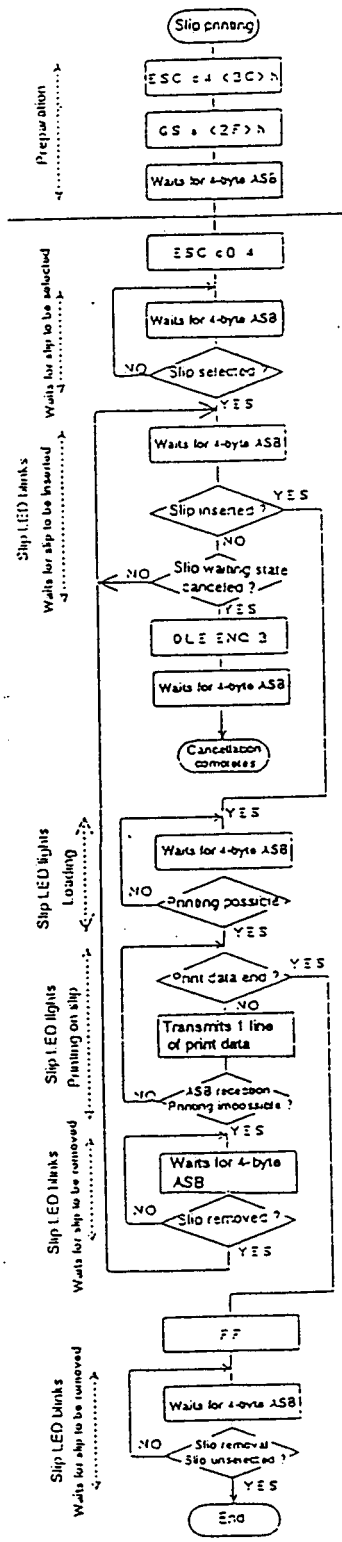
Because drawer specifications differ depending on the manufacturer and the part number, make sure that the specifications of the drawer to be used meet the following conditions before connecting it to the drawer kick-out connector. These conditions also apply to any other devices that use the drawer kick-out connector.

Any devices that do not satisfy all the following conditions must not be used.

[Conditions]

- A load must be provided between drawer kick-out connector pins 4 and 2 or between pins 4 and 5. (Operating the printer with incorrectly installed devices voids the warranty.)
- When the drawer open/close signal is used, a switch must be provided between drawer kick-out connector pins 3 and 6. (Connecting devices other than a drawer open/close switch voids the warranty.)
- The resistance of the load must be 24 Ω or more, or the input current must be 1 A or less. (If a device with a resistance of less than 24 Ω or an input current of over 1 A is used, the resulting overcurrent may damage the device.)
- Be sure to use drawer kick-out connector pin 4 (24 V power output) to drive the device. Never connect any other power supply to the drawer kick-out connector. (Connecting a power supply other than that specified voids the warranty.)

APPENDIX F: EXAMPLE PRINT CONTROL FOR SLIP PAPER



1) Enables printing stop due to slip paper-end

2) Enables ASB for all printer status changes

3) Receives ASB mentioned in 2) above.

4) Selects slip printing.

5) Waits for slip to be selected.
※
ASB: Waits for ASB4-0 (slip detector) to become 0 (paper present).

※: Bit 0 of the ASB 4th byte (the same rule applies correspondingly to the following)

6) Waits for slip to be inserted.
ASB: Waits for ASB3-5 (slip insertion detection) to become 0 (paper present).

7) If the user cancels the slip waiting state, transmit DLE ENQ 3.
If canceled, the printer switches to 2-sheet mode and transmits 4-byte ASB.
ASB: Waits for ASB4-0 (paper selected) to become 1 (unselected).

8) Waits for the slip to be loaded.
ASB: Waits for ASB4-1 (paper status) to become 0 (possible to print)

9) Transmits one line of data sat until there is no data to be transmitted.
In this case, ASB is transmitted when paper has run out.
ASB: ASB4-1 (slip status) becomes 1 (impossible to print).
After printing is finished, go to step 11).

10) Waits for the slip to be removed.
ASB: Waits for ASB3-5 (slip ejection detector) to become 1 (no paper)

11) Ejects the slip

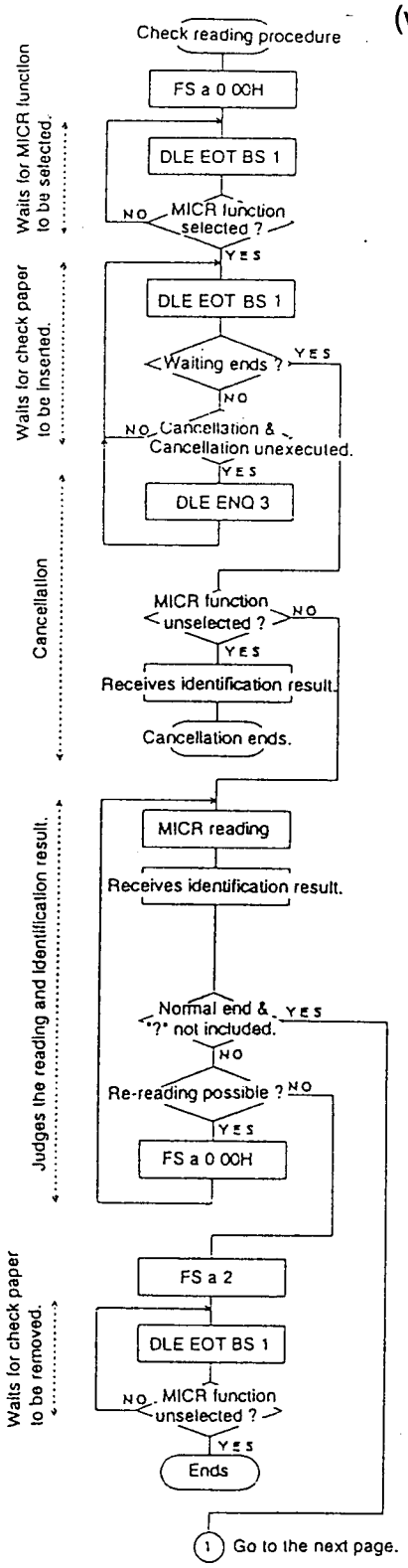
12) Waits for the slip to be removed.
ASB: ASB3-5 (slip ejection detector) becomes 1 (no paper)
Waits for ASB4-0 (slip selected) to become 1 (unselected).

APPENDIX G: DEFINITION OF RELIABILITY AS USED IN THIS SPECIFICATION

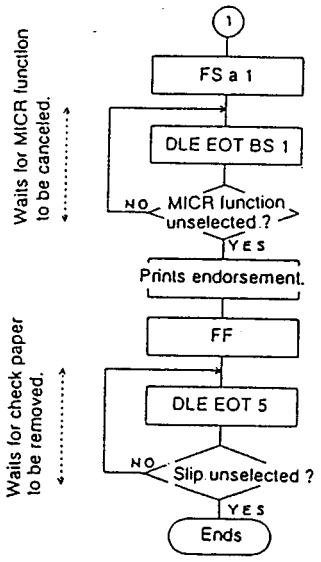
1. MCBF used in this specification means the Reliability Guarantee Period used internally by SEIKO EPSON CORPORATION. We estimate the average number of lines printed by a customer, and define the period determined by exponential distribution to be the Reliability Guarantee Period.
   The cumulative failure rate within this period is 30%.
2. Although a failure due to wearing out may occur within the Reliability Guarantee Period (depending on the product), SEIKO EPSON CORPORATION aims to design and manufacture products so that no failures occur within the Reliability Guarantee Period.
3. Product life in this specification means the average life.

APPENDIX H: EXAMPLE READ CONTROL FOR MICR CHARACTERS

(when the printer is used with the optional MICR reader)



1) Selects MICR function.
2) Waits for MICR function to be selected.
   Waits for bit 2 becomes 0.
3) Waits for check paper to be loaded.
   Waits for bit 3 becomes 0.
4) To cancel the check waiting state, transmit **DLE ENQ 3**.
5) Confirms the MICR function status (bit 2).
   If bit 2 is 0, MICR function is not canceled. Go to item 7).
6) Receives the identification result (header + reading status + NULL) when MICR function is canceled.
   Ends cancellation and goes to two sheet mode.
7) Receives the identification result.
   When reading ends normally: transmits header + reading status + identified character strings + NULL.
   When reading ends abnormally: transmits header + reading status + NULL. *
8) Judges the identification result.
   When the reading ends normally (bit 5 is 0) and the identified character strings does not include "?". Go to item 13).
9) Judges whether the re-reading is possible.
   When re-reading is possible (bit 4 is 0), executes re-reading by using **FS a 0**. Go to item 7).
10) Check paper is disabled.
    Ejects check paper by using **FS a 2**.
    If reading ends abnormally (bit 5 is 1), **FS a 2** is ignored.
11) Waits for the check paper to be removed.
    Waits for MICR function to be canceled (bit 2 is 1).
    Ends check reading procedure and goes to two sheet mode.



12) Loads check paper.
13) Waits for loading to end.
    Waits for MICR function to be canceled (bit 2 becomes 1).
14) Prints endorsement.
15) Ejects check paper.
16) Waits for the check paper to be removed.
    Ends check reading procedure and goes to two sheet mode.

FS a 0 00H Cancellation & Cancellation unexecuted.
DLE ENQ 3 MICR function unselected ? Receives identification result.
MICR function unselected ? MICR function unselected ?
Slip unselected ?
Judges the reading and identification result.