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EPSON

1.5 station ink-jet printer

TM-J8000

Specification

STANDARD	
Rev. No.	E
Notes	

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SEIKO EPSON CORPORATION

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REVISION SHEET

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Revisions		Design Section			Sheet Rev. No.						
Rev.	Document	WRT	CHK	APL	Sheet	Rev.	Sheet	Rev.	Sheet	Rev.	
A	Enactment	Furuhata	--	Kanai	I	E	18	E	42	E	
B	Change	Nakayama	--	Koike	II	E	19	E	43	E	
C	Change	Nakayama	--	Koike	III	E	20	E	44	E	
D	Change	Nakayama	Teradaira	Koike	IV	E	21	E	45	E	
E	Change				V	E	22	E	46	E	
					VI	E	23	E	47	E	
							24	E	48	E	
					1	E	25	E	49	E	
					2	E	26	E	50	E	
					3	E	27	E	51	E	
					4	E	28	E	52	E	
					5	E	29	E	53	E	
					6	E	30	E	54	E	
					7	E	31	E	55	E	
					8	E	32	E	56	E	
					9	E	33	E	57	E	
					10	E	34	E	58	E	
					11	E	35	E	59	E	
					12	E	36	E	60	E	
					13	E	37	E	61	E	
					14	E	38	E	62	E	
					15	E	39	E	63	E	
					16	E	40	E	64	E	
					17	E	41	E	65	E	
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				Cover	Rev. Sheet	Scope	General Features	Table of Contents			
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Rev.	Document	WRT	CHK	APL	Sheet	Rev.	Sheet	Rev.	Sheet	Rev.	
A	Enactment				66	E	90	E	App.1	E	
B	Change				67	E	91	E	App.2	E	
C	Change				68	E	92	E	App.3	E	
D	Change				69	E	93	E	App.4	E	
E	Change				70	E	94	E	App.5	E	
					71	E	95	E	App.6	E	
					72	E	96	E	App.7	E	
					73	E	97	E	App.8	E	
					74	E	98	E	App.9	E	
					75	E	99	E	App.10	E	
					76	E	100	E	App.11	E	
					77	E	101	E	App.12	E	
					78	E	102	E			
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					80	E	104	E			
					81	E					
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					83	E					
					84	E					
					85	E					
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					88	E					
					89	E					
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REVISION SHEET

REV.	SHEET	CHANGED CONTENTS
B	II	GENERAL DESCRIPTION OCX driver are included. → OCX driver are available.
	1	1.1.1 Printing Specifications Table 1.1.2, Multilingual printing is added.
	2	Table 1.1.4 Head Control Method is added. Table 1.1.4 Ink Cartridge Specification → Table 1.1.5
	8	Figure 1.1.6 Dimensions are changed. 55.91 → 55.71, 56.71 → 57.21
	9	1.4.4 Reliability 5) MCBF 12 million lines → 15 million lines
	10	1.4.5 Environmental Conditions Figure 1.1.7 Shadowed range is corrected. 4) Vibration resistance: No external operate normally. is deleted.
	11	When the printer head cleaning is deleted.
	14	Note of Table 2.1.1 • When the remaining to 26 bytes. → • When the DIP switch to 256 bytes.
	25	*1: • When the remaining to 26 bytes → • When the DIP switch to 256 bytes.
	47	Table 3.3.4 Interlocking operation with IM → Setting for interlocking operation with IM Notes: • The power switch setting is added • The setting for interlocking is added.
	48	Table 3.3.6 Interlocking operation with IM → Setting for interlocking operation with IM Notes: • The power switch setting is added • The setting for interlocking is added.
	49	Blink pattern POWER LED End of power-off sequence is added.
	67	DLE EOT NUL <i>n</i> [Description] <i>n</i> =1 Transmit ink status → Transmit slip paper status Bit 2: Paper not present → Paper present Paper present → Paper not present
	70	DLE DC4 <i>n a b</i> (when <i>n</i> = 2) Power off → Power-off sequence
	100	GS <i>r n</i> Paper sensor status [A] (<i>n</i> = 1, 49): Hex 01 → 03, Decimal 1 → 3 Hex 04 → 0C, Decimal 4 → 12
App.2	APPENDIX A 12) is added.	
App.11	APPENDIX G Power off → Power-off sequence Notes are added.	
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REVISION SHEET

REV.	SHEET	CHANGED CONTENTS
C	1	1.1.1 Printing Specifications 1) Printing method Serial impact dot matrix → Serial ink-jet dot matrix
D	V	Table of Contents Addition of ESC F n
	32	3.1 Command List Addition of ESC F n
	76	6.2 Control Commands Addition of ESC F n
	85	6.2 Control Commands Addition of Range and Description for GS (B $a = 0, 67 b = 45$ (when $a = 7$)
	95	6.2 Control Commands Addition of Range and Description for GS a n In the table, bit 3 is newly defined.
E	All	All pages are renumbered due to addition of the description
	1, 2	Tables are changed due to addition of the extended font A. Table 1.1.1, Table 1.1.2, and Table 1.1.3
	3	1.1.2 Character specifications Table 1.1.5 (added) 1.1.3 Ink cartridge Table 1.1.5 → Table 1.1.6
	21	2.1.2.5 Data Receiving Timing Correction of the description.
	46	3.2.11 Extended font A (added)
	79	ESC M $n = 97$ [Notes] (added)
	90	GS E [Notes] (added)
	App.2, App.3	12) a) and b), 13) (added)
<p>TITLE</p> <p style="text-align: center;">TM-J8000 Specification (STANDARD)</p>		

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GENERAL DESCRIPTION

1) This specification applies to the TM-J8000 series printer.

2) Features

TM-J8000 is a high-end ink-jet POS printer that can print on receipt (paper roll) and slip paper. The printer has the following features:

- Low acoustic noise
 - Performance with an excellent low acoustic noise suitable for exclusive restaurants
- High speed printer on normal paper
 - For paper roll, approximately 15 lps (lines per second)
 - For slip paper, approximately 3 ppm (pages per minute) for A4 size paper
- High printing quality
 - Using a multi-nozzle high density ink jet head (128 nozzles / 360 dpi), high printing quality, such as for bar code, is performed. (dpi: dots per 25.4 mm {1"})
- Easy to operate
 - Using a clamshell mechanism, the operator can load a paper roll easily.
 - Using a functional unit assembly, maintenance can be performed easily.
 - It is easy to see and operate switches, because of the icons on the control panel.
 - One touch plug-in with a built-in universal power supply.
- Bar code printing
 - Supports major bar code system, such as UPC-A, CODE39 or CODE128.
- Interface
 - Selectable bidirectional parallel interface (which performs at a high data transfer rate), RS-232, or RS-485.
- Connecting and interlocking with EPSON peripheral devices
 - Possible to connect the EPSON customer display series (available only on a serial interface model) and interlock with IM-5x5.
- Ink cartridge
 - Has a large-sized off-carriage ink cartridge, long life performance (approximately 12 million characters) and low running cost (with a continuous printing with Font B).
- Receive buffer
 - 45 or 4K bytes are selectable.
- Control command
 - Compatible with the ESC / POS®.
- Wide format printing
 - Possible to print a wide range of paper format from a personal check (approximately 70 mm) to US letter (216 mm) with 36 through 130 columns for font A.
- Auto cutter
 - Excellent cutting quality, long life (guaranteed to 2 million cuts) with a circular cutting method.
- Sensors for paper roll
 - Paper-end sensor and paper near-end sensor are standard.
- Printer driver
 - OXC driver and Windows Driver are available.

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GS (D <i>p</i> L <i>p</i> H <i>m</i> [<i>a</i> 1 <i>b</i> 1]...[<i>a</i> <i>k</i> <i>b</i> <i>k</i>]	88
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 APPENCIX C: INSTALLING OR REPLACING THE PAPER ROLL App.5
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 APPENDIX F: NOTES ON USING THE DRAWER KICK-OUT CONNECTOR App.11
 APPENDIX G: NOTES ON TURNING THE PRINTER'S POWER OFF App.12

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1. GENERAL SPECIFICATIONS**1.1 Printing Specifications****1.1.1 Printing Specifications**

- 1) Printing method: Serial ink-jet dot matrix
 2) Printing density: 360 dpi × 360 dpi (dpi: dots per 25.4 mm {1"})
 3) Printing direction: Bidirectional (logic seeking)
 4) Paper feeding method: Friction feed method
 5) Printing speed: Refer to Table 1.1.1
 6) Characters spacing: Refer to Table 1.1.2
 7) Characters per line: Refer to Table 1.1.3
 8) Head control method: Fine / Economy (Refer to Table 1.1.4)

Table 1.1.1 Printing Speed

Slip						
Head control method	Font A 65 cpl	Font B 80 cpl	Extended font A 40 cpl	Font A 130 cpl	Font B 158 cpl	Extended font A 79 cpl
Fine	6.8 lps	10.0 lps	6.8 lps	4.2 lps	6.2 lps	4.2 lps
Economy	7.8 lps	11.3 lps	--	4.9 lps	7.3 lps	--

Receipt (Paper roll)						
Head control method	Font A 20 cpl	Font B 25 cpl	Extended font A 12 cpl	Font A 42 cpl	Font B 51 cpl	Extended font A 25 cpl
Fine	11.8 lps	16.9 lps	11.8 lps	9.0 lps	13.1 lps	9.0 lps
Economy	12.6 lps	18.1 lps	--	10.1 lps	14.7 lps	--

(lps: lines per second) (cpl: characters per line)

NOTES: 1. Each value of the printing speed is measured in the following conditions:

- With no cleaning operation such as a flushing
- Continuous printing
- Left justification
- Via parallel interface
- Without any attributes for fonts

2. Printing speed may be slower depending on the data transmission speed and the combination of control commands.

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Table 1.1.2 Character Spacing, Character Size

	Font A (Default)	Font B	Extend font A
Font type	Sans serif	Sans serif	OCR-B
	22 × 48	18 × 36	36 × 48
Character spacing	16.4 cpi	20 cpi	10 cpi
Character size	1.48 mm × 3.32 mm	1.20 mm × 2.47 mm	2.47 mm × 3.32 mm
Multiline printing	Possible to print two lines simultaneously	Possible to print three lines simultaneously	Possible to print two lines simultaneously

(cpi: characters per 25.4 mm {1"})

Table 1.1.3 Character Per Line

Font A (Default)		Font B		Extended font A	
Receipt	Slip (68–215.9 mm)	Receipt	Slip (68–215.9 mm)	Receipt	Slip (68–215.9 mm)
42 characters	38–130 characters	51 characters	46–158 characters	25 characters	23–79 characters

Table 1.1.4 Head Control Method

Head control method	Economy (default)	Fine
Description	Printing mode that thins out the printing data horizontally so that ink is saved and the printing speed is increased.	Printing mode that printing data are reproduced faithfully.

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1.1.2 Character Specifications

- 1) Number of characters: Refer to Table 1.1.5.
- 2) Character structure: Refer to Table 1.1.2.
- 3) Character types: Refer to Table 1.1.2.

Table 1.1.5 Number of Characters

	Font A / Font B	Extended font A
Alphanumeric characters	95	16
International characters	32	--
Extended graphics	128 × 9 pages (including two space pages)	--

1.1.3 Ink cartridge

- 1) Type: Exclusive ink cartridge
- 2) Specifications: Refer to Table 1.1.6.
- 3) Overall dimensions: Refer to the specification of the ink cartridge SJIC1.

Table 1.1.6 Ink Cartridge Specification

Name	Ink cartridge SJIC1
Weight (*1)	Approximately 250 g
Dimensions	39.1 mm (W) × 139.6 mm (D) × 100.2 mm (H)
Case color	Transparent black
Ink color	Black
Maximum number of printable characters	Approximately 12,000,000 characters (*2)
Effective period	Within two years after production

NOTES: *1 The weight indicates the gross weight of the ink cartridge, with labels, not including the individual outer box.

*2 The maximum number of printable characters are measured with Font B (economy) using the EPSON standard printing patterns.

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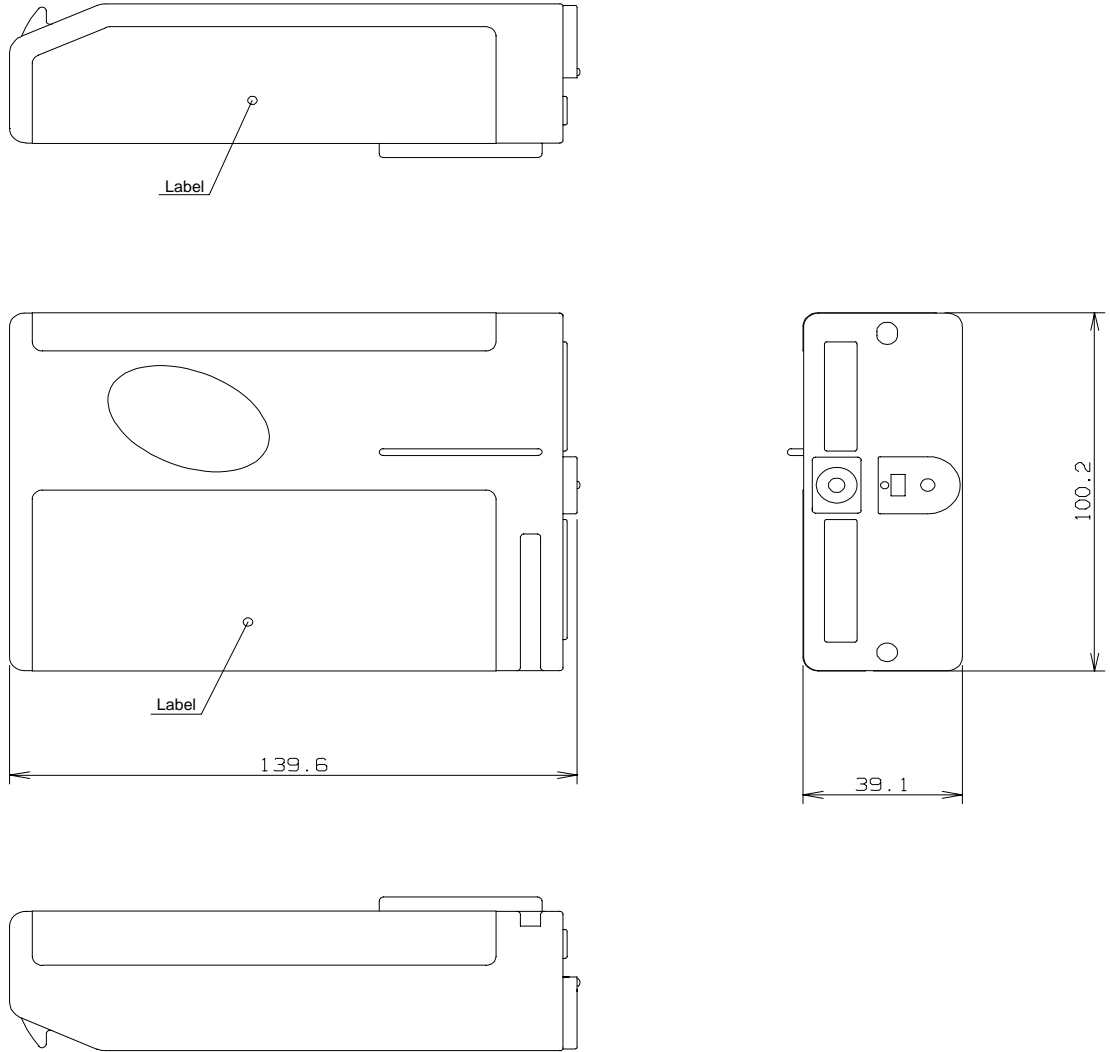


Figure 1.1.1 Ink Cartridge Overall Dimensions

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1.2 Receipt Section**1.2.1 Auto Cutter**

- 1) Cutting method: Circular cut method
- 2) Cutting type: Cutting with one point left uncut (called "Full cut") .

1.2.2 Paper Roll Supply Device

- 1) Supply method: Easy-to-load clamshell mechanism
- 2) Paper roll end sensor: Microswitch
- 3) Near-end sensor: Microswitch
- 4) Paper roll spool diameter: Inside: 10 mm or more
- 5) Near-end remaining adjustment mechanism: Adjustable with an adjusting screw (Refer to Appendix E)

1.2.3 Paper Feeding Mechanism

- 1) Paper feeding method: Function feed method
- 2) Minimum paper feeding pitch: Possible to set 0.141 mm {1/180 inches} minimum
- 3) Paper feeding speed: 35.3 ms/l when the paper feeding pitch is set to 4.23 mm {1/6 inches} 120 mm/s (approximately 4.7 inches/s, 28.3 lps) when continuous paper feeding is performed.

1.2.4 Paper Roll Specification

- 1) Paper type: Normal quality paper (possible to use only single-ply sheet)
- 2) Form: Paper roll
- 3) Paper width: 76 ± 0.5 mm
- 4) Paper thickness: 0.06 – 0.09 mm
- 5) Paper weight: 52.3 – 64.0 g/m² (JIS P8124)
- 6) Spool diameter: Inside: 10 mm or more
- 7) Paper roll diameter: Outside: 83 mm or less

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1.2.5 Printable Area

1) Printable area

Refer to Figure 1.1.2.

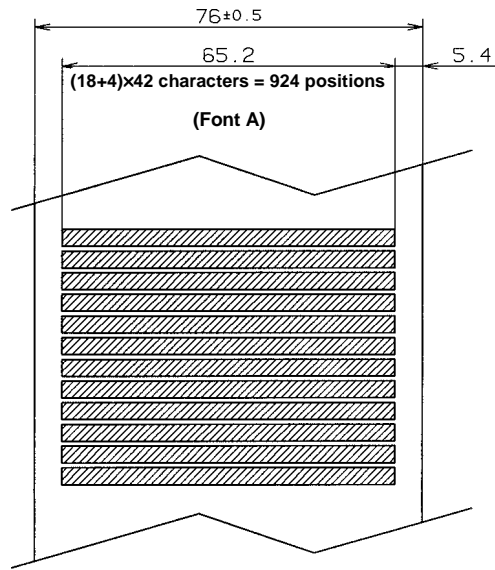
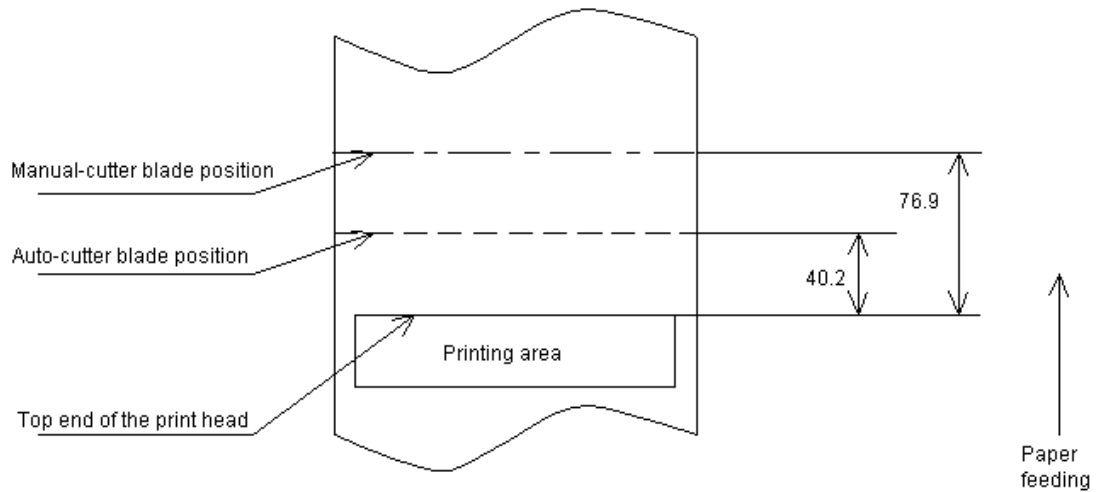


Figure 1.1.2 Printable Area

1.2.6 Printing and Cutting Positions



[Unit: mm, All the numeric values are typical.]

Figure 1.1.3 Printing and Cutting Positions

NOTE: Numeric values used here are typical values; the values may vary slightly as a result of paper slack or variations in the paper. Take this note into account when setting the cutting position of the auto-cutter.

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1.3 Slip Section

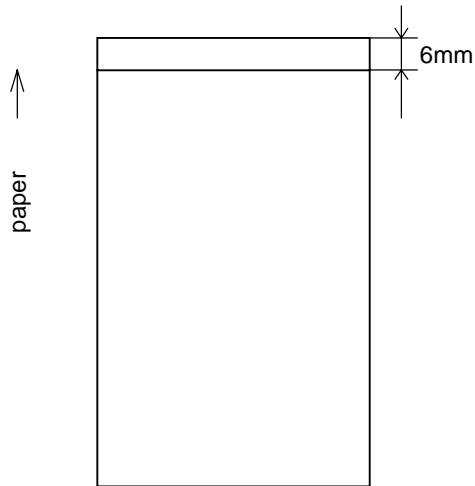
1.3.1 Paper Feeding mechanism

- 1) Paper feeding method: Friction feed method
- 2) Minimum paper feeding pitch: Possible to set 0.141 mm {1/180 inches} minimum
- 3) Paper feeding speed: 35.3 ms/l when the paper feeding pitch is set to 4.23 mm {1/6 inches}
120 mm/s (approximately 4.7 inches/s, 28.3 lps) when continuous paper feeding is performed.

1.3.2 Slip Paper Specifications

- 1) Slip paper (includes personal checks)
 - a) Paper type: Normal quality paper (possible to use only single-ply sheet)
 - b) Paper size: Width: 68 – 215.9 mm
Length: 68 – 297.0 mm
 - c) Paper thickness: 0.09 – 0.15 mm
 - d) Weight: 64 – 110 kg/m² (JIS P8124)
 - e) Reflection rate on reflective portion: Refer to Figure 1.1.4
 - f) Hole locations: Refer to Figure 1.1.5 for hole locations such as sprocket holes
- 2) Slip paper sensors
 - a) T.O.F. sensor: Detected by a reflective photo interrupter
 - b) B.O.F. sensor: Detected by a transparent photo interrupter
 - c) Slip insertion/ejection sensor: Detected by a reflective photo sensor
 - d) Paper width sensor: Detected by a reflective photo interrupter
- 3) Notes on using slip paper
 - a) The slip paper must be flat, without curls or wrinkles, especially at the top edges. Otherwise, the printing may be not aligned correctly.
 - b) Since the slip insertion/ejection sensor uses a reflective photo sensor, use paper that does not have black or dark portions (less than 15% infra-red reflection) or holes at the sensor positions (refer to Figure 1.1.5).

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
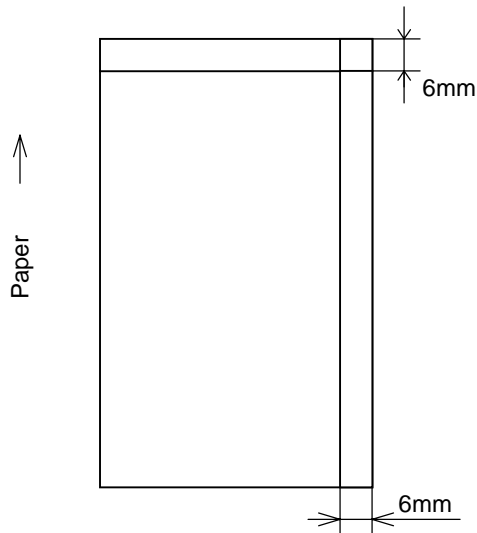
NOTE:  area where reflection rate for the back of paper should be not 15% or less.

Figure 1.1.4 Low Reflection Prohibited Area (including personal checks)




NOTE:  area where paper holes such as sprocket holes are prohibited.

Figure 1.1.5 Paper Holes Prohibited Area

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1.3.3 Printable Area

1) Printable area

Refer to Figure 1.1.6.

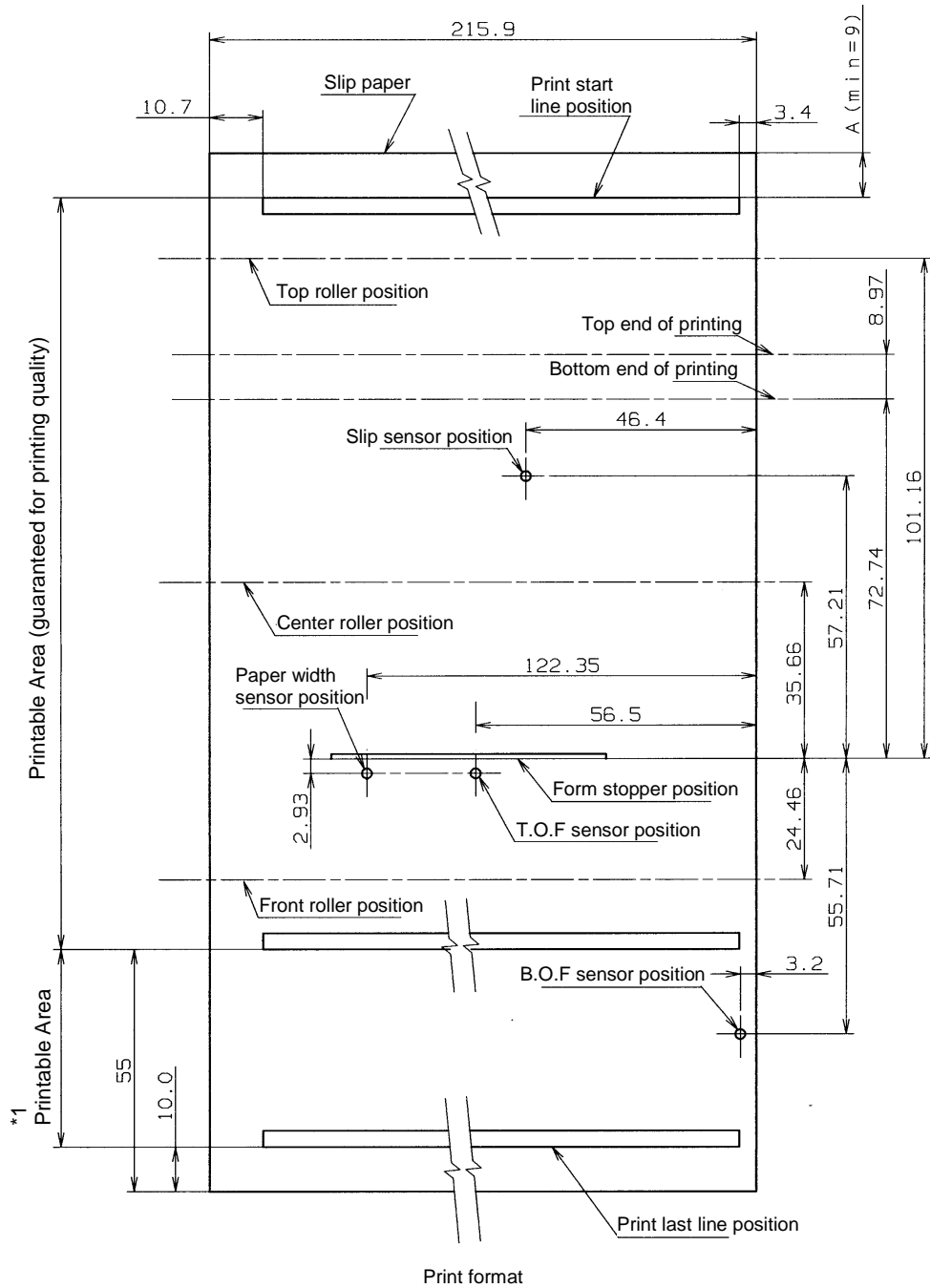


Figure 1.1.6 Printable Area for Slip Paper

Note: In the printable area marked with *1, the paper feeding pitch may remain at the set value.

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1.4 General Section (for both receipt and slip)

1.4.1 Internal Buffer

- 1) Receive buffer: Selectable as 45 or 4K bytes using the DIP switch.
- 2) User-defined buffer (both for user-defined characters and downloaded bit images):
 Receipt: 12K bytes
 Slip: 5K bytes
- 3) Macro buffer: 2K bytes

1.4.2 Electrical Characteristics

- 1) Supply voltage: AC85 V - 264.5 V (only for single phase)
 Universal power supply is built in.
- 2) Current consumption: 25 W (Operating)

1.4.3 EMI and Safety Standards Applied

- 1) Europe: CE marking: EN55022
 EN50082-1
 EN61000-3-2
 EN61000-3-3
 EN45501
 Safety standard: TÜV (EN60950)
- 2) North America: EMI: FCC class A / ICE-003
 Safety standards: UL1950-3rd
 C-UL
- 3) Japan: EMI: VCCI class A

1.4.4 Reliability

- 1) Printer mechanism life (when printing alphanumeric characters):
 Receipt section: 10,000,000 lines
 Slip section: 5,000,000 lines
 The printer is defined to have reached the end of its life when it reaches the beginning of the wearout period.
- 2) Print head life: 800 million dots / nozzle
- 3) Auto cutter life: 2,000,000 cuts
- 4) MTBF: 180,000 hours
 Failure is defined as Random Failure occurring during the time of the Random Failure Period.
- 5) MCBF: 29,000,000 lines
 This is an average failure interval based on failures relating to wearout and random failures up to the life of 15 million lines.

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1.4.5 Environmental Conditions

1) Temperature and Humidity:

- Printing: 10 to 35°C {50 to 95°F}, 20 - 80% RH (non-condensing)
(Area which is surrounded with a shadow in Figure 1.1.7.)
- Standby: 5 to 40°C {41 to 104°F}, 20 - 80% RH (non-condensing)
(Area which is drawn with a solid line in Figure 1.1.7.)
- Storage:
 - a) When packed (ink not filled)
-20 to 60°C {-4 to 140°F}, 5 - 85% RH (non-condensing)
(within 120 hours at -20°C {68°F} or 60°C {140°F})
 - b) When ink is filled
-20 to 40°C {-4 to 104°F}, 20 - 85% RH

2) Maximum absolute rated temperature: 70°C {158°F}
(The printer must be kept in 70°C {158°F} or less whenever it is operating or in storage.)

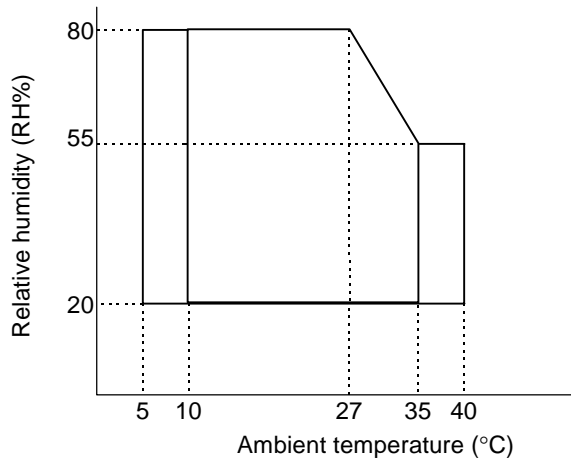


Figure 1.1.7 Operating Temperature and Humidity Range

- 3) Operating pressure: 700 - 1050 hPa
(approximately -20 m to 2000 m (-66 to 6562 feet) height above the sea level)
- 4) Vibration resistance:
 - When Packed:
 - Frequency: 5 to 55 Hz
 - Acceleration: Approximately 19.6 m/s² {2G}
 - Sweep: 10 minutes (half cycle)
 - Duration: 1 hour
 - Directions: x, y, and z
- 5) Impact resistance:
 - When Packed:
 - Package: EPSON standard package
 - Height: 50 cm
 - Directions: 1 corner, 3 edges, and 6 surfaces

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When unpacked: Height: 5 cm
Directions: Lift one edge and release it (for all 4 edges).
6) Acoustic noise: Operating: Approximately 49 dB (Bystander position)

1.4.6 Installation

The TM-J8000 printer must be installed horizontally.

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2. CONFIGURATION

2.1 Interface

2.1.1 RS-232 Serial Interface

2.1.1.1 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 Table 3.3.1)
The stop bit for the printer side is fixed to 1.

2.1.1.2 Switching between on-line and off-line

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

- 1) Between when the power is turned on (including reset using the interface) and when the printer is ready to receive data.
- 2) During the self-test.
- 3) When the cover is open (the cover for the paper sheet selected by **ESC c 0**).
- 4) During paper feeding using the paper feed switch.
- 5) When the printer stops printing due to a paper-end (only when the paper roll is not present).
- 6) When an error has occurred.
- 7) When a head cleaning is performed.
- 8) When an ink cartridge is removed, or during an ink cartridge is exchanged due to the ink end detection (ink cartridge is empty.).

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2.1.1.3 Interface connector terminal assignments and signal functions

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

Table 2.1.1 Printer Interface Connector Status and Signals

Pin No.	Signal name	Signal direction	Function																																
1	FG	—	Frame ground																																
2	TXD	Output	Transmit data																																
3	RXD	Input	Receive data																																
4	RTS	Output	DIP SW 2-2 OFF: Same as DTR signal (Pin 20) DIP SW 2-2 ON: Logical product of DTR signals of DM-D and TM (If both are SPACE, the printer can receive data (SPACE).)																																
6	DSR	Input	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 DLE EOT , 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.																																
7	SG	—	Signal ground																																
20	DTR	Output	<p>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 2-1 as follows (refer to Section 3.3.3):</p> <table border="1"> <thead> <tr> <th rowspan="2">Printer status</th> <th colspan="2">DIP SW 2-1 status</th> </tr> <tr> <th>ON</th> <th>OFF</th> </tr> </thead> <tbody> <tr> <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 switch.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>5. When the printer stops printing due to a paper-end. (only when the paper roll is not present)</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>6. When an error has occurred.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>7. When a head cleaning is performed.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>8. When an ink cartridge is removed, or while an ink cartridge is exchanged due to the ink end detection (ink cartridge is empty).</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>9. When the receive buffer becomes full.(*1)</td> <td>BUSY</td> <td>BUSY</td> </tr> </tbody> </table>	Printer status	DIP SW 2-1 status		ON	OFF	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.	BUSY	BUSY	2. During the self-test.	BUSY	BUSY	3. When the cover is open.	—	BUSY	4. During paper feeding using the paper feed switch.	—	BUSY	5. When the printer stops printing due to a paper-end. (only when the paper roll is not present)	—	BUSY	6. When an error has occurred.	—	BUSY	7. When a head cleaning is performed.	—	BUSY	8. When an ink cartridge is removed, or while an ink cartridge is exchanged due to the ink end detection (ink cartridge is empty).	—	BUSY	9. When the receive buffer becomes full.(*1)	BUSY	BUSY
Printer status	DIP SW 2-1 status																																		
	ON	OFF																																	
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.	BUSY	BUSY																																	
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4. During paper feeding using the paper feed switch.	—	BUSY																																	
5. When the printer stops printing due to a paper-end. (only when the paper roll is not present)	—	BUSY																																	
6. When an error has occurred.	—	BUSY																																	
7. When a head cleaning is performed.	—	BUSY																																	
8. When an ink cartridge is removed, or while an ink cartridge is exchanged due to the ink end detection (ink cartridge is empty).	—	BUSY																																	
9. When the receive buffer becomes full.(*1)	BUSY	BUSY																																	

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Table 2.1.1 Printer Interface Connector Status and Signals (Continued)

Pin No.	Signal name	Signal direction	Function
			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: <ul style="list-style-type: none"> • 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.

- NOTE: (*1)
- When the receive buffer capacity is specified to 45 bytes:
 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.
 - When the receive buffer capacity is specified to 4K bytes:
 When the remaining space in the receive buffer drops to 128 bytes, the printer status becomes "buffer full" and it remains "buffer full" until the space in the receive buffer increases to 256 bytes.
 - The printer ignores the data received when the remaining space in the receive buffer is 0 bytes.

2.1.1.4 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 SW2-1 setting.

Table 2.1.2 XON/XOFF Transmit Timing

	Printer status	DIP SW 2-1 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 <11>H and the XOFF code is <13>H.
 - 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.
 - When the DIP SW 2-1 is set to OFF, XON is not transmitted if the printer is in off-line state in case ②.

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2.1.1.5 Notes on setting DIP switch 2-1 to ON

- 1) The printer mechanism stops but does not become busy when: an error has occurred, 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 2-1 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** and **DLE 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 has occurred, **DLE EOT** and **DLE 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:

When the receive buffer becomes full while transmitting bit-image data, **DLE EOT** or **DLE ENQ** 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 **GS I** or **GS r** after transmitting each line of data and use the 4K byte receive buffer. Transmit one line of data so that the receive buffer does not become full.

2.1.1.6 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 k Ω (minimum)	

- AC characteristics:

Minimum reset pulse width: TRS 1 ms (minimum)

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

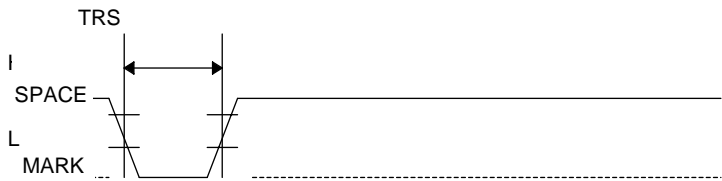


Figure 2.1.1 Minimum Reset Pulse Width (pin 6)

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



Figure 2.1.2 Minimum Reset Pulse Width (pin 25)

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

2.1.2 IEEE 1284 Bidirectional Parallel Interface (Parallel Interface Specifications)

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2.1.2.1 Compatibility Mode

(Data Transmission from Host to Printer: Centronics compatible)

(1) Specifications

- Data transmission: 8-bit Parallel
- Synchronization: Externally supplied nStrobe signals*
- Handshaking: nAck and Busy signals*
- Signal levels: TTL compatible
- Connector: ADS-B36BLFDR176 (HONDA) or equivalent (IEEE 1284 Type B)

Reverse communication (Printer Host): Nibble or Byte Mode

* n before the signal name indicates active LOW.

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(2) Switching between on-line and off-line

The printer is not equipped with any on-line/off-line switch. The printer is placed into off-line status in either of the following:

- 1) When the power is turned on or until the printer becomes ready for data transmission after it is initialized by the reset signal ($\bar{n}Init$) from the interface. *
- 2) During the self-test.
- 3) When the cover is open.
- 4) During paper feeding using the FORWARD/REVERSE button.
- 5) When the printer stops printing due to a paper-end (only when the paper roll is not present).
- 6) During macro executing standby status.
- 7) When a temporary abnormality occurs in the power supply voltage.
- 8) When an error has occurred.
- 9) When a head cleaning is performed.
- 10) When an ink cartridge is removed, or while an ink cartridge is exchanged due to the ink end detection (ink cartridge is empty).

2.1.2.2 Reverse Mode (Data Transmission from Printer to Host)

The STATUS data transmission from the printer to the host proceeds in the Nibble or Byte mode.

- Description

This mode allows data transmission from the asynchronous printer under the control of the host. Data transmissions in the Nibble Mode are made via the existing control lines in units of four bits (Nibble). In the Byte Mode, data transmissions proceed by making the eight-bits data lines bidirectional.

Both modes fail to proceed concurrently with the Compatibility Mode, thereby causing half duplex transmission.

* n before the signal name indicates active LOW.

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2.1.2.3 Interface Pin Assignments for Each Mode

Pin	Source	Compatibility Mode	Nibble Mode	Byte Mode
1	Host	nStrobe	HostClk	HostClk
2	Host/Ptr	Data0(LSB)	Data0(LSB)	Data0(LSB)
3	Host/Ptr	Data1	Data1	Data1
4	Host/Ptr	Data2	Data2	Data2
5	Host/Ptr	Data3	Data3	Data3
6	Host/Ptr	Data4	Data4	Data4
7	Host/Ptr	Data5	Data5	Data5
8	Host/Ptr	Data6	Data6	Data6
9	Host/Ptr	Data7(MSB)	Data7(MSB)	Data7(MSB)
10	Printer	nAck	PtrClk	PtrClk
11	Printer	Busy	PtrBusy/Data3, 7	PtrBusy
12	Printer	PErrror	AckDataReq/Data2, 6	AckDataReq
13	Printer	Select	Xflag/Data1, 5	Xflag
14	Hostr	nAutoFd	HostBusy	HostBusy
15		NC	ND	ND
16		GND	GND	GND
17		FG	FG	FG
18	Printer	Logic-H	Logic-H	Logic-H
19		GND	GND	GND
20		GND	GND	GND
21		GND	GND	GND
22		GND	GND	GND
23		GND	GND	GND
24		GND	GND	GND
25		GND	GND	GND
26		GND	GND	GND
27		GND	GND	GND
28		GND	GND	GND
29		GND	GND	GND
30		GND	GND	GND
31	Host	nInit	nInit	nInit
32	Printer	nFault	nDataAvail/Data0, 4	nDataAvail
33		GND	ND	ND
34	Printer	DK_STATUS	ND	ND
35	Printer	+5V	ND	ND
36	Host	nSelectIn	1284-Active	1284-Active

*NC: Not Connected
 ND: Not Defined

- NOTES: 1. A prefix "n" to signal names refers to "L" active signals. To the host provided with none of the signal lines listed above, two-way communication fails.
2. For interfacing, signal lines shall use twisted pair cables with the return sides connected to signal ground level.
3. Interfacing conditions shall all be based on the TTL level to meet the characteristics described below. In addition, both rise time and fall time of each signal shall be 0.5μs or less.
4. Data transmission shall not ignore the signals nAck or Busy. An attempt to transmit data with either signal, nAck or Busy, ignored can cause lost data. (Data transmissions to the printer shall be made after verifying the nAck signal or while the Busy signal is at the "L" level.)
5. Interface cables shall be below the maximum length and as short in length as possible.

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2.1.2.4 Electrical Characteristics

DC Characteristics (Except Logic-H, +5 V signals)

Characteristics	Symbol	Specifications		Conditions
		Min	Max	
Output HIGH voltage	VOH	*2.4 V	5.5 V	*IOH=0.32mA
Output LOW voltage	VOL	-0.5 V	*0.4 V	*IOL=-12mA
Output HIGH current	IOH	0.32 mA	-	VOH=2.4V
Output LOW current	IOL	-12 mA	-	VOL=0.4V
Input HIGH voltage	VIH	2.0 V	-	
Input LOW voltage	VIL	-	0.8 V	
Input HIGH current	VIH	-	-0.32 mA	VIH=2.0V
Input LOW current	VIL	-	12 mA	VIL=0.8V

Logic-H Signal Sender Characteristics

Characteristics	Symbol	Specifications		Conditions
		Min	Max	
Output HIGH voltage	VOH	3.0 V	5.5 V	
Output LOW voltage	VOL	-	2.0 V	While the power is OFF

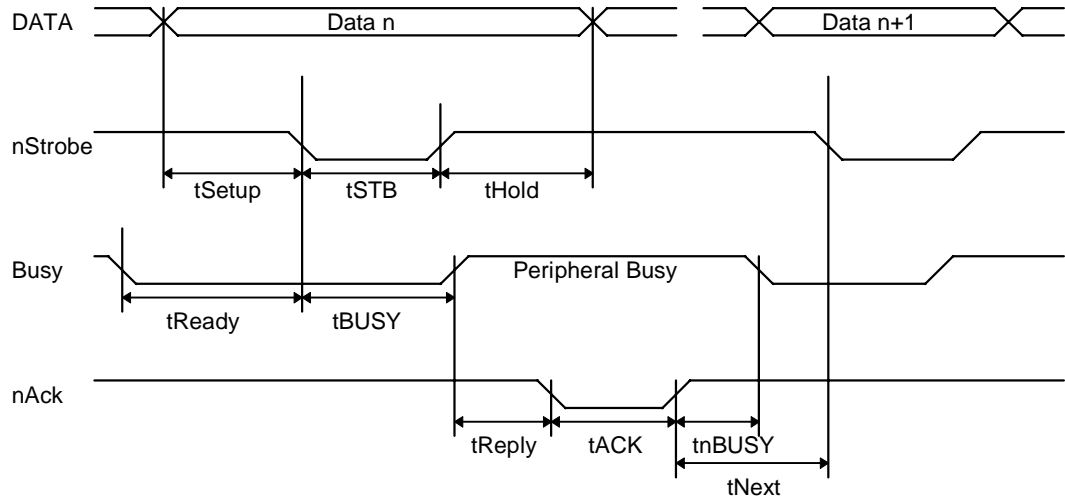
+5 V Signal Sender Characteristics

Characteristics	Symbol	Specifications		Conditions
		Min	Max	
Output HIGH voltage	VOH	*2.4 V	5.5 V	*IOH=0.32mA
Output LOW voltage	VOL	-	- **	While the power is OFF
Output HIGH current	IOH	-	0.32 mA	VOH=2.4V
Output LOW current	IOL	- **	-	While the power is OFF

** No guarantee is offered to VOL and IOL while the power is OFF.

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2.1.2.5 Data Receiving Timing (Compatibility Mode)



Characteristics	Symbol	Specifications	
		Minimum [ns]	Maximum [ns]
Data Hold Time (host)	tHold-1	750	--
Data Setup Time	tSetup	750	--
STROBE Pulse Width	tSTB	750	--
READY Cycle Idle Time	tReady	0	--
BUSY Output Delay Time	tBUSY	0	500
Data Processing Time	tReply	0	∞
ACKNLG Pulse Width	tACK	500	10μs
BUSY Release Time	tnBUSY	0	∞
ACK Cycle Idle Time	tNEXT	0	--

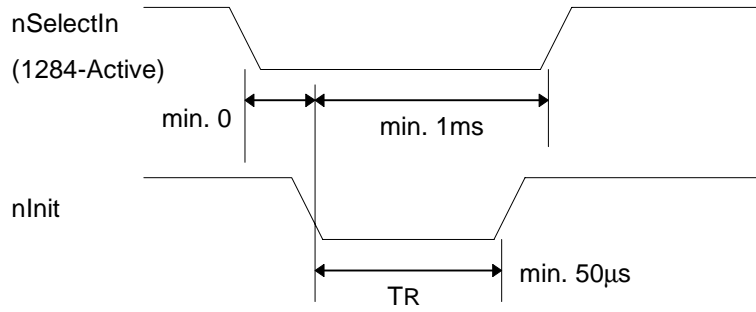
*The printer latches data at the nStrobe falling edge.

2.1.2.6 Notes on resetting the printer through the interface

When the printer is reset through the interface nInit signal (#31 pin) in compatibility mode, satisfy the following characteristics, however, note that the reset signal is ignored in Reverse Mode (#31 pin nSelectIn (1284-Active:"H")).

DC Characteristics
AC Characteristics

TTL level
Minimum reset pulse width TR: 50μs (minimum)



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2.1.2.7 Reception of status from the printer through the bidirectional parallel interface

In the bidirectional parallel interface specifications, the printer status transmission is available by using the two-way communication facility in the Nibble/Byte Modes in accordance with IEEE 1284.

In this case, different from in the RS-232 serial interface specifications, the real-time interruptions from the printer to the host are disabled and thus precautions must be taken for the following;

- 1) The allowable capacity of the printer internal buffer is 99 bytes (except ASB status). The status signals exceeding this capacity will be discarded. To prevent possible loss of status, the host shall be ready for data accept data (Reverse Mode).
- 2) When ASB is used, the host is preferably in the wait state for accepting data (Reverse Idle Mode). When this state is not available, the host shall enter the Reverse Mode to always monitor the presence of data.
- 3) When ASB is used, preference shall be given to the ASB status for transmission over the other status signals. Any accumulated ASB status signals left for transmission from the last to the newest ASB status transmission shall be transmitted together at a time as one ASB status, showing the presence of change, followed by the latest ASB status.

Example: In the normal (wait) state, the ASB status is configured as follows.

First Status	Second Status	Third Status	Fourth Status
0001 0000	0000 0000	0110 0000	0000 1111

When a sequence of operations have proceeded, the near end is detected and the printer cover is opened, then the printer cover is closed, the following pieces of data are accumulated.

	First Status	Second Status	Third Status	Fourth Status	
①	0001 0000	0000 0000	0110 0011	0000 1111	Near end detection
②	0011 1000	0000 0000	0110 0011	0000 1111	The printer cover is opened.
③	0001 0000	0000 0000	0110 0011	0000 1111	The printer cover is closed.

When the ASB status is received following this, a total of eight (8) bytes of ASB will be transmitted as follows.

Accumulated ASB (①+②+③)

	First Status	Second Status	Third Status	Fourth Status
Accumulated ASB(①+②+③)	0011 0000	0000 0000	0110 0011	0000 1111
+				
The latest ASB (③)	0001 0000	0000 0000	0110 0011	0000 1111
Fourth Status				

2.1.2.8 Notes on setting DIP switch 2-1 to ON

- 1) The printer mechanism stops but does not become BUSY in the following cases:
 - When an error occurs.
 - When the cover is open.
 - When the printer stops printing due to a paper end.
 - When paper is fed using the paper feed switch.

- 2) When handshaking with the printer while using this switch setting, make sure to monitor the printer with the **GS a** command and the ASB function.
 With this switch setting, the default value of the **GS a** command n is 2. This automatically transmits the printer status, depending on on-line/off-line changes.

- 3) When using the **DLE EOT** or **DLE ENQ** command, make sure that the receive buffer does not become full.
 - Notes on using a host that cannot transmit data when the printer is BUSY:
 If an error occurs when the receive buffer is full and the printer is BUSY, the **DLE EOT** and **DLE ENQ** commands cannot be used.

 - Notes on using a host that can transmit data when the printer is BUSY:
 If a **DLE EOT** or **DLE ENQ** command is used while sending bit-image data, and the receive buffer-full state is encountered during transmission of the data, the **DLE EOT** or **DLE ENQ** is processed as bit-image data.
 In addition, the data transmitted during the receive buffer-full state may be lost.

Example of use:

Set the receive buffer to 4K bytes, and check the status with **GS r** for each line of printing transmitted. Make sure that the data for printing each line does not cause the printer to enter the receive buffer-full state.

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2.1.3 RS-485 Serial Interface

(RS-485 serial interface specification is a dealer option.)

2.1.3.1 Specifications (RS-485 compatible)

- Data transmission: Serial
- Synchronization: Asynchronous
- Handshaking: DTR/DSR or XON/XOFF control
- Signal levels: 2.0 V to 5.0 V: Logic "1"
0.0 V to 0.8 V: Logic "0"
- Baud rates: 2400, 4800, 9600, 19200 bps (bps: bits per second)
- Parity settings: None, even, odd
- Stop bits: 1 or more
- Connector (printer side): Female D-SUB25 pin connector

NOTES: • The handshaking, data word length, baud rate, and parity depend on the DIP switch settings. (Refer to Section 3.3.3)
• Data transmitted from the printer has 1 stop bit (fixed).

DR1 > DR2 CS1 > CS2 indicates that:
Channel 1 is high.
Channel 2 is low.

DR1 < DR2 CS1 < CS2 indicates that:
Channel 2 is high.
Channel 1 is low.

Table 2.1.6 Signal Levels and Communication Control Functions

CS1	CS2	Function
H	L	Communication is available
L	H	Communication is not available

If the electric potential of CS1 is higher than that of CS2, the printer is ready for communication (the host is ready to receive data). If the electric potential of CS1 is lower than that of CS2, the printer is not ready for communication (the host is not ready to receive data).

Table 2.1.7 Signal Levels and Communication Control Functions

DR1	DR2	Function
H	L	Communication is available
L	H	Communication is not available

If the electric potential of DR1 is higher than that of DR2, the printer is ready for communication (the host is ready to receive data). If the electric potential of DR1 is lower than that of DR2, the printer is not ready for communication (the host is not ready to receive data).

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2.1.3.2 Switching between on-line and off-line

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

The printer goes off-line:

- 1) Between when the power is turned on (including reset using the interface) and when the printer is ready to receive data.
- 2) During the self-test.
- 3) When the cover is open.
- 4) During paper feeding using the FORWARD/REVERSE button.
- 5) When the printer stops printing due to paper-end (in cases when an empty paper supply is detected by either paper roll end detector or the paper roll near-end detector with a printing halt feature set enabled due to paper shortage by **ESC c 4**).
- 6) During macro executing standby status.
- 7) When a temporary abnormality occurs in the power supply voltage.
- 8) When an error has occurred.
- 9) When a head cleaning is performed.
- 10) When an ink cartridge is removed, or while an ink cartridge is exchanged due to the ink end detection (ink cartridge is empty).
- 11) When the receive buffer becomes full. (*1)

- *1:
- When the receive buffer capacity is specified to 45 bytes:
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.
 - When the receive buffer capacity is specified to 4K bytes:
When the remaining space in the receive buffer drops to 128 bytes, the printer status becomes "buffer full" and it remains "buffer full" until the space in the receive buffer increases to 256 bytes.
 - The printer ignores the data received when the remaining space in the receive buffer is 0 bytes.

Refer to 2.1.1, RS-232 Serial Interface, for notes on setting DIP switch 2-1 to ON.

2.1.3.3 Interface connector terminal assignments and signal functions

Table 2.1.5 Printer Connector Status and Signals

Pin Number	Signal name	Signal direction	Function
1	FG	--	Frame ground
2	SD1	Output	Transmit data
3	SD2	Output	Transmit data
4	RD1	Input	Receive data
5	RD2	Input	Receive data
7	SG	--	Signal ground
8	DR1	Output	When DTR/DRS is selected, this signal indicates whether the host computer is BUSY or READY.

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Table 2.1.5 Printer Connector Status and Signals (Continued)

Pin Number	Signal name	Signal direction	Function																																										
9	DR2	Output	<p>1) DR1>DR2 indicates that the printer is READY and DR1<DR2 indicates that the printer is BUSY. The BUSY condition can be changed depending on the off-line conditions set by the DIP switches (refer to Section 3.3.3). When the DTR/DSR control is selected, the printer becomes the BUSY state (DR1<DR2) under the following conditions.</p> <table border="1"> <thead> <tr> <th colspan="2">Printer status</th> <th colspan="2">DIP SW 2-1 status</th> </tr> <tr> <th colspan="2"></th> <th>ON</th> <th>OFF</th> </tr> </thead> <tbody> <tr> <td rowspan="11">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 switch.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>5. When the printer stops printing due to a paper-end. (only when the paper roll is not present)</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>6. During macro executing standby status.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>7. When a temporary abnormality occurs in the power supply voltage.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>8. When an error has occurred.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>9. When a head cleaning is performed.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>10. When an ink cartridge is removed, or while an ink cartridge is exchanged due to the ink end detection (ink cartridge is empty).</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>11. When the receive buffer becomes full. (*1)</td> <td>BUSY</td> <td>BUSY</td> </tr> </tbody> </table> <p>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 DR1>DR2 (READY) to indicate that the printer is ready to receive data. The signal is always DR1>DR2 except in the following cases:</p> <ul style="list-style-type: none"> • During the period from when the power is turned on to when the printer is ready to receive data • During the self-test <p>This signal indicates whether the host computer is BUSY or READY. CS1>CS2 indicates that the printer is READY and CS1<CS2 indicates that the printer is BUSY.</p>	Printer status		DIP SW 2-1 status				ON	OFF	Off-line	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.	BUSY	BUSY	2. During the self-test.	BUSY	BUSY	3. When the cover is open.	—	BUSY	4. During paper feeding using the paper feed switch.	—	BUSY	5. When the printer stops printing due to a paper-end. (only when the paper roll is not present)	—	BUSY	6. During macro executing standby status.	—	BUSY	7. When a temporary abnormality occurs in the power supply voltage.	—	BUSY	8. When an error has occurred.	—	BUSY	9. When a head cleaning is performed.	—	BUSY	10. When an ink cartridge is removed, or while an ink cartridge is exchanged due to the ink end detection (ink cartridge is empty).	—	BUSY	11. When the receive buffer becomes full. (*1)	BUSY	BUSY
Printer status		DIP SW 2-1 status																																											
		ON	OFF																																										
Off-line	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.	BUSY	BUSY																																										
	2. During the self-test.	BUSY	BUSY																																										
	3. When the cover is open.	—	BUSY																																										
	4. During paper feeding using the paper feed switch.	—	BUSY																																										
	5. When the printer stops printing due to a paper-end. (only when the paper roll is not present)	—	BUSY																																										
	6. During macro executing standby status.	—	BUSY																																										
	7. When a temporary abnormality occurs in the power supply voltage.	—	BUSY																																										
	8. When an error has occurred.	—	BUSY																																										
	9. When a head cleaning is performed.	—	BUSY																																										
	10. When an ink cartridge is removed, or while an ink cartridge is exchanged due to the ink end detection (ink cartridge is empty).	—	BUSY																																										
	11. When the receive buffer becomes full. (*1)	BUSY	BUSY																																										
10 11	CS1 CS2	Input	<p>1) When DTR>DSR is selected: The signal is checked and data is transmitted only when the host is ready to receive data (READY) (except for transmission by DLE EOT or GS a).</p> <p>2) When XON/XOFF control is selected: Transmits data regardless of the status of this signal.</p>																																										

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

2.1.3.4 XON/XOFF transmit timing

Refer to Section 2.1.1.4.

For the DIP switch settings of the off-line status, refer to Section 2.1.1.6.

2.1.3.5 Data format when using RS-485

Transmission data (8 bits, no parity)

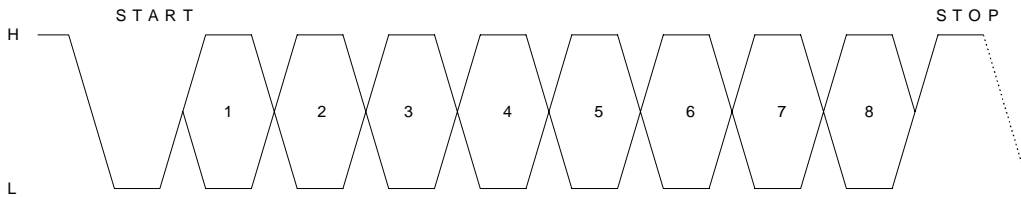


Figure 2.1.5 RS-485 Communication data format

"H" indicates

<Printer transmission data> SD1<SD2
<Printer reception data> RD1<RD2

"L" indicates:

<Printer transmission data> SD1<SD2
<Printer reception data> RD1<RD2

The transmission data is H = 1, L = 0

NOTE: This format is used when the UART for RS-232 is connected to the RS-485 driver.

Table 2.1.6 Printer Reception Data Level

DR1	DR2	Read data
H	L	Receiving data line is at the low level
L	H	Receiving data line is at the high level

Table 2.1.7 Printer Transmission Data Level

SD1	SD2	Send data
H	L	Sending data line is at the low level
L	H	Sending data line is at the high level

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2.2 Connectors

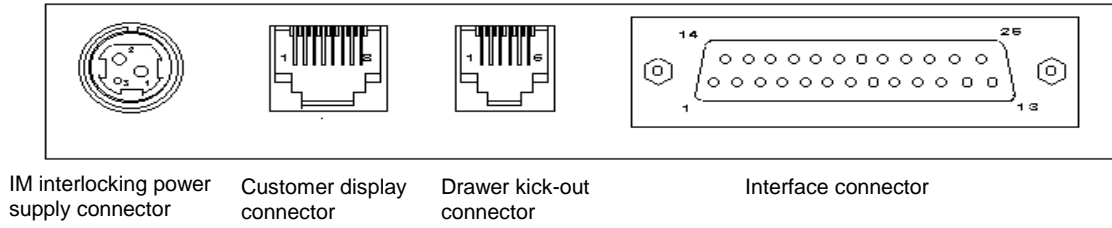


Figure 2.2.1 Serial Interface Connector Panel External Appearance

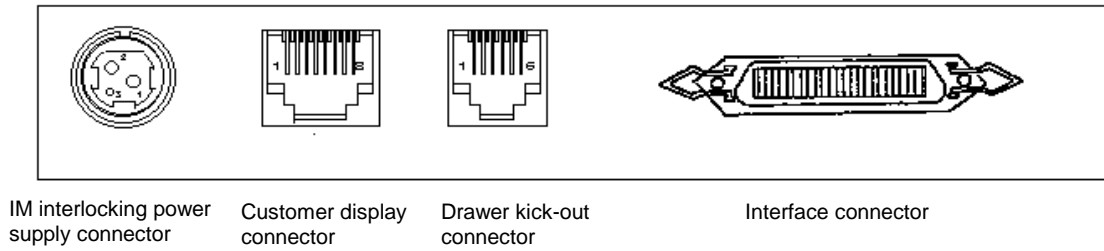


Figure 2.2.2 Parallel Interface Connector Panel External Appearance

2.2.1 Interface Connectors

Refer to Section 2.1, Interface.

2.2.2 IM Interlocking Connector

This connector is used to connect the printer to a power supply which is interlocking with an EPSON intelligent module:

- 1) Pin assignments: Refer to Table 2.2.1.
- 2) Connector model: 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

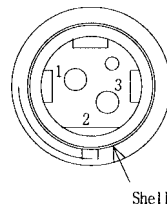


Figure 2.2.3 IM Interlocking Connector

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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**, **GS r**, or **GS a** (ASB) commands.

- 1) Pin assignments: Refer to Table 2.2.2
- 2) Connector model: Printer side: MOLEX 52065-6615 or equivalent
User side: 6-position 6-contact (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 drive signal 1	Output
3	Drawer open/close signal	Input
4	+24 V	—
5	Drawer kick-out drive signal 2	Output
6	Signal GND	—

+24 V is output through pin 4 when the power is turned on. However, pin 4 must be used only for the drawer.

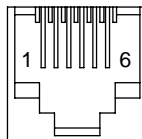


Figure 2.2.4 Drawer Kick-out Connector

3) Drawer kick-out drive signal

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

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

Output waveform: Outputs the waveforms in Figure 2.2.5 to the points A and B in Figure 2.2.6.

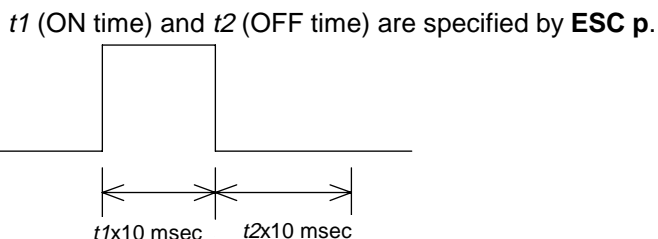


Figure 2.2.5 Drawer Kick-out Drive Signal Output Waveform

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4) Drawer open/close signal

Input signal level (connector pin 3): "L" = 0 to 0.8 V
 "H" = 2 to 5 V

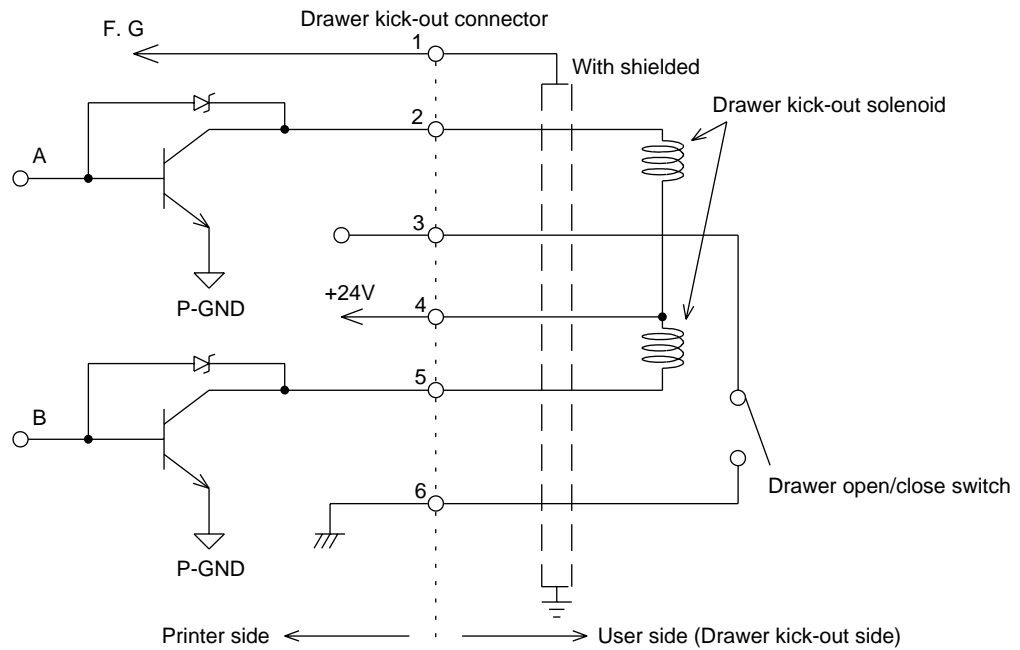


Figure 2.2.6 Drawer Kick-out Interface Circuitry

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

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2.2.4 Customer Display (DM-D) Connector (Available only for serial interface model)

1) Model:

Receptacle: MOLEX 52065-8845 or equivalent

2) Pin assignments:

Table 2.2.3 Customer Display Connector Pin Assignments

Pin Number	Signal Name	Direction
1	FG	—
2	N.C.	—
3	TXD	Output
4	DTR	Output
5	DSR	Input
6	SG	—
7	+24	—
8	PG	—

+24 V is always output through pin 7. The driving capability is 350 mA or less. Be sure not to use customer displays other than Seiko Epson DM-D series.

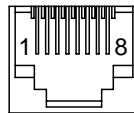


Figure 2.2.7 Customer Display (DM-D) Connector

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3. FUNCTIONS**3.1 Command List**

Command	Name
HT	Horizontal tab
LF	Print and line feed
FF	Print and eject cut sheet
CR	Print and carriage return
DLE EOT	Real-time status transmission
DLE EOT NUL	Real-time status transmission
DLE EOT BEL	Real-time status transmission for ink
DLE ENQ	Real-time request to printer
DLE DC4	(1) Generate pulse at real-time
	(2) Execute power off
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 D	Set horizontal tab positions
ESC E (*1)	Turn emphasized mode on/off
ESC F	Set/cancel slip paper reverse eject
ESC G (*1)	Turn double-strike mode on/off
ESC J	Print and feed paper
ESC M	Select character font
ESC R	Select an international character set

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Command	Name
ESC U	Turn unidirectional printing mode on/off
ESC \	Set relative print position
ESC a	Select justification
ESC c 0	Select paper type(s) for printing
ESC c 1	Select paper types for command settings
ESC c 3	Select paper sensor(s) to output paper-end signals
ESC c 4	Select paper sensor(s) to stop printing
ESC c 5	Enable/disable panel buttons
ESC d	Print and feed <i>n</i> lines
ESC f	Set cut sheet wait time
ESC p	General pulse
ESC t	Select character code table
ESC {	Turn upside-down printing mode on/off
FS p	Print NV bit image
FS q	Define NV bit image
GS !	Select character size
GS (B	Customize ASB-status bits
GS (D	Enable/disable real-time command
GS *	Define downloaded bit image
GS /	Print downloaded bit image
GS :	Start/end macro definition
GS B	Turn white/black reverse printing mode on/off
GS E	Select head control method
GS H	Select printing position of HRI characters
GS I	Transmit printer ID
GS L	Set left margin
GS P (*2)	Set horizontal and vertical motion units
GS Q 0	Print variable vertical size bit image
GS T	Set print position to the beginning of print line
GS V	Select cut mode and cut paper
GS W	Set printing area width
GS ^	Execute macro

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Confidential

Command	Name
GS a	Enable/disable Automatic Status Back (ASB)
GS f	Select font for HRI characters
GS h	Set bar code height
GS j	Enable/disable Automatic Status Back (ASB) for ink
GS k	Print bar code
GS r	Transmit status
GS v 0	Print raster bit image
GS w	Set bar code width

(*1): Printing result with **ESC E** or **ESC G** is the same, due to ink-jet printing characteristics; otherwise, ink on the double strike printing with **ESC G** may spread.

(*2): The horizontal and vertical motion units are used to set the minimum pitch by software instead of by mechanical pitch. Using the horizontal and vertical 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**.)

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3.2.2 Page 1 (Katakana)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	▬ 128	⊥ 144	SP 160	ー 176	タ 192	ミ 208	ニ 224	× 240
1	0001	▬ 129	⊥ 145	。 161	ア 177	チ 193	ム 209	ト 225	円 241
2	0010	▬ 130	⊥ 146	「 162	イ 178	ツ 194	メ 210	キ 226	年 242
3	0011	▬ 131	⊥ 147	」 163	ウ 179	テ 195	モ 211	コ 227	月 243
4	0100	▬ 132	▬ 148	、 164	エ 180	ト 196	ヤ 212	▲ 228	日 244
5	0101	▬ 133	▬ 149	・ 165	オ 181	ナ 197	ユ 213	▲ 229	時 245
6	0110	▬ 134	▬ 150	ヲ 166	カ 182	ニ 198	ヨ 214	▼ 230	分 246
7	0111	▬ 135	▬ 151	ア 167	キ 183	ヌ 199	ラ 215	▼ 231	秒 247
8	1000	▬ 136	▬ 152	イ 168	ク 184	ネ 200	リ 216	♠ 232	〒 248
9	1001	▬ 137	▬ 153	ウ 169	ケ 185	ノ 201	ル 217	♥ 233	市 249
A	1010	▬ 138	▬ 154	エ 170	コ 186	ハ 202	レ 218	♦ 234	区 250
B	1011	▬ 139	▬ 155	オ 171	サ 187	ヒ 203	ロ 219	♣ 235	町 251
C	1100	▬ 140	▬ 156	ヤ 172	シ 188	フ 204	ワ 220	● 236	村 252
D	1101	▬ 141	▬ 157	ユ 173	ス 189	ヘ 205	ン 221	○ 237	人 253
E	1110	▬ 142	▬ 158	ヨ 174	セ 190	ホ 206	・ 222	／ 238	☒ 254
F	1111	⊥ 143	⊥ 159	ッ 175	ソ 191	マ 207	・ 223	＼ 239	SP 255

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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	ø 208	Ó 224	— 240
1	0001	ü 129	æ 145	í 161	⌘ 177	± 193	Ð 209	β 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	â 134	û 150	ä 166	Â 182	ã 198	í 214	μ 230	÷ 246
7	0111	ç 135	ù 151	ó 167	À 183	Ã 199	î 215	þ 231	ˆ 247
8	1000	ê 136	ÿ 152	ı 168	© 184	⌘ 200	ï 216	ƒ 232	° 248
9	1001	ë 137	ÿ 153	® 169	¶ 185	⌘ 201	ƒ 217	Û 233	ˆ 249
A	1010	è 138	Û 154	¬ 170	¶ 186	± 202	⌘ 218	Û 234	· 250
B	1011	ï 139	ø 155	½ 171	¶ 187	⌘ 203	■ 219	Û 235	¹ 251
C	1100	î 140	£ 156	¼ 172	¶ 188	† 204	■ 220	ÿ 236	³ 252
D	1101	ì 141	Ø 157	ı 173	¢ 189	= 205	ı 221	ÿ 237	² 253
E	1110	Ä 142	× 158	« 174	¥ 190	† 206	î 222	■ 238	■ 254
F	1111	Å 143	f 159	» 175	⌘ 191	⌘ 207	■ 223	’ 239	SP 255

EPSON	TITLE	TM-J8000 Specification (STANDARD)	SHEET REVISION	NO.	
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3.2.4 Page 3 (PC860: Portuguese)

	HEX	8	9	A -	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	⌘ 176	⌘ 192	⌘ 208	α 224	≡ 240
1	0001	ü 129	À 145	í 161	⌘ 177	⌘ 193	⌘ 209	β 225	± 241
2	0010	é 130	È 146	ó 162	⌘ 178	⌘ 194	⌘ 210	Γ 226	≥ 242
3	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	ä 133	ö 149	Ñ 165	⌘ 181	⌘ 197	⌘ 213	σ 229	∫ 245
6	0110	Á 134	Ú 150	á 166	⌘ 182	⌘ 198	⌘ 214	μ 230	÷ 246
7	0111	ç 135	û 151	ó 167	⌘ 183	⌘ 199	⌘ 215	τ 231	≈ 247
8	1000	ê 136	Ï 152	ç 168	⌘ 184	⌘ 200	⌘ 216	Φ 232	° 248
9	1001	Ê 137	Ö 153	ò 169	⌘ 185	⌘ 201	⌘ 217	θ 233	• 249
A	1010	è 138	Û 154	⌘ 170	⌘ 186	⌘ 202	⌘ 218	Ω 234	• 250
B	1011	Í 139	Φ 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	Û 157	ì 173	⌘ 189	⌘ 205	⌘ 221	∅ 237	² 253
E	1110	Ã 142	Π 158	« 174	⌘ 190	⌘ 206	⌘ 222	€ 238	■ 254
F	1111	Â 143	Ó 159	» 175	⌘ 191	⌘ 207	⌘ 223	∩ 239	SP 255

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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	Ì 160	Ñ 176	Ò 192	Ó 208	Ô 224	Õ 240
1	0001	Ü 129	È 145	Í 161	Ë 177	Ô 193	Õ 209	Ö 225	× 241
2	0010	É 130	Ê 146	Ó 162	Ô 178	Õ 194	Ö 210	× 226	÷ 242
3	0011	Â 131	Ë 147	Ì 163	Í 179	Î 195	Ï 211	Ð 227	Ñ 243
4	0100	Â 132	Ë 148	Ì 164	Í 180	Î 196	Ï 212	Ð 228	Ñ 244
5	0101	À 133	Ë 149	Ì 165	Í 181	Î 197	Ï 213	Ð 229	Ñ 245
6	0110	Ë 134	Ü 150	Ý 166	Þ 182	Û 198	Ü 214	Ý 230	÷ 246
7	0111	Ç 135	Û 151	Ü 167	Þ 183	Û 199	Ü 215	Ý 231	÷ 247
8	1000	È 136	Ü 152	Ý 168	Þ 184	Û 200	Ü 216	Ý 232	÷ 248
9	1001	È 137	Û 153	Ü 169	Þ 185	Û 201	Ü 217	Ý 233	÷ 249
A	1010	È 138	Ü 154	Ü 170	Þ 186	Û 202	Ü 218	Ý 234	÷ 250
B	1011	Ë 139	Ü 155	½ 171	Û 187	Û 203	■ 219	δ 235	√ 251
C	1100	Ë 140	£ 156	¼ 172	Û 188	Û 204	■ 220	∞ 236	n 252
D	1101	= 141	Û 157	¾ 173	Û 189	= 205	■ 221	∅ 237	² 253
E	1110	À 142	Û 158	« 174	Û 190	Û 206	■ 222	∈ 238	■ 254
F	1111	§ 143	f 159	» 175	Û 191	Û 207	■ 223	∩ 239	SP 255

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3.2.6 Page 5 (PC865: Nordic)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	█ 176	┌ 192	└ 208	α 224	≡ 240
1	0001	ü 129	æ 145	í 161	█ 177	┐ 193	⌞ 209	β 225	± 241
2	0010	é 130	Æ 146	ó 162	█ 178	┘ 194	⌟ 210	Γ 226	≥ 242
3	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	ƒ 244
5	0101	à 133	ò 149	Ñ 165	┑ 181	┑ 197	┘ 213	σ 229	∫ 245
6	0110	å 134	û 150	ä 166	┑ 182	┑ 198	┘ 214	μ 230	÷ 246
7	0111	ç 135	ù 151	ó 167	┑ 183	┑ 199	┑ 215	τ 231	≈ 247
8	1000	ê 136	ÿ 152	ÿ 168	┑ 184	┌ 200	┑ 216	φ 232	° 248
9	1001	ë 137	Ö 153	┘ 169	┑ 185	┘ 201	┑ 217	θ 233	• 249
A	1010	è 138	Û 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	∞ 252
D	1101	ì 141	Ø 157	ı 173	┑ 189	= 205	█ 221	∅ 237	² 253
E	1110	Ä 142	Pt 158	« 174	┑ 190	┑ 206	█ 222	€ 238	█ 254
F	1111	Å 143	f 159	¤ 175	┑ 191	┐ 207	█ 223	∩ 239	SP 255

EPSON	TITLE	TM-J8000 Specification (STANDARD)	SHEET REVISION	NO.	
	E		NEXT 42	SHEET 41	

3.2.7 Page19 (PC858: Euro)

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

EPSON	TITLE	TM-J8000 Specification (STANDARD)	SHEET REVISION	NO.	
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3.2.8 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: Undefined.

EPSON	TITLE	SHEET REVISION	NO.	
	TM-J8000 Specification (STANDARD)	E	NEXT 44	SHEET 43

3.2.9 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: Undefined

EPSON	TITLE TM-J8000 Specification (STANDARD)	SHEET REVISION E	NO.	
			NEXT 45	SHEET 44

3.2.10 International Character Set

Country	HEX	ASCII code											
	DEC	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0 U.S.A.		#	\$	@	[\]	^	`	{		}	~
1 France		#	\$	à	°	ç	§	^	`	é	ù	è	¨
2 Germany		#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3 U.K.		#	\$	@	[\]	^	`	{		}	~
4 DenmarkI		#	\$	@	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		#	\$	@	í	Ñ	¿	^	`	¨	ñ	}	~
8 Japan		#	\$	@	[¥]	^	`	{		}	~
9 Norway		#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10 DenmarkII		#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü

3.2.11 Extended font A

Character	Code (HEX)
SP	20
+	2B
,	2C
–	2D
0	30
1	31
2	32
3	33
4	34
5	35
6	36
7	37
8	38
9	39
<	3C
>	3E

- Character codes in 20H through FFH except for above are spaces.

3.3 Switches**3.3.1 Power Switch (Primary Side)**

The primary power switch is located below the ink cartridge holder on the printer. Turn this switch off when the power supply must be stopped at once. When the printer won't be used for a long period, turn off this switch and then unplug the power cord.

NOTE: Turning off this switch stops the power immediately; therefore, the printer cannot perform any internal operations, such as capping the print head. Therefore, you should not turn off the primary switch first and leave it off.

3.3.2 Power Switch (Secondary Side)

The secondary power switch is located on the lower right hand side on the front of the printer. When the printer is used in normal operation, use this switch to turn the power supply to the printer on/off.

NOTE: Turning off the printer with the secondary switch allows the printer to cap the print head so that ink will not dry in the nozzles. Therefore, it is important not to turn off the primary switch without turning off the secondary switch first. The POWER light blinks while the heads are being capped and then goes off. When the POWER light goes off, turn off the secondary switch.

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			NEXT 47	SHEET 46

3.3.3 Power Switch Cover

A power switch cover option is available. Use this cover to avoid turning power off unexpectedly.

3.3.4 Power OFF Command

To control the printer's power on/off in situations when the power switch is covered, set the power switch fixing mode using a DIP switch and execute the power off command. (Refer to section of the power off command and the setting of the DIP switches in detail.)

3.3.5 Panel Switch

The panel switch of the printer is in two portions - on the upper side of the slip carriage cover on the front and underneath the carriage cover (cleaning switch).

The panel switch can be disabled with **ESC c 5** command. When it is disabled, all panel switches cannot function.

1) Paper roll feed switch (PAPER FEED SW) (Non-locking push switch)

[Function] The printer feeds paper based on the line spacing set by the **ESC 2** or **ESC 3** command. However, paper feeding using the paper roll feed switch cannot be performed under the following conditions:

- When the receipt carriage cover is opened.
- During cleaning.
- When the slip paper is selected.
- During self-test printing, pressing the paper feed switch stops the self test temporarily and pressing again and restarts the self test.
- When the paper roll feed switch has a defined function in a macro definition command.

2) Slip paper feed switch (SLIP FEED SW) (Non-locking push switch)

[Function] The printer feeds paper in the forward direction based on the line spacing set by the **ESC 2** or **ESC 3** command. However, the printer does not perform feeding paper if there is no paper. Paper feeding using the slip paper feed switch cannot be performed under the following conditions:

- When the slip carriage cover is opened.
- When the receipt carriage cover is opened.
- During cleaning.
- When the paper roll is selected.
- In a slip paper insertion waiting status.

The slip paper feed switch cannot load the slip paper. Loading paper, it is performed only when the slip paper is first selected by a command; then the printer waits the slip paper insertion.

3) Cleaning switch (CLEANING SW)

[Function] The printer performs its cleaning operation. Refer to Section 3.3.5.6, for cleaning.

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3.3.6 DIP Switches

3.3.6.1 Serial interface model

Table 3.3.1 DIP Switch 1

SW 1	Function	ON	OFF
1	Data reception error	Ignored	Prints “?”
2	Receive buffer capacity	45 bytes	4K bytes
3	Handshaking	XON/XOFF	DTR/DSR
4	Word length	7 bits	8 bits
5	Parity check	Yes	No
6	Parity selection	Even	Odd
7	Transmission speed selection		
8	Refer to Table 3.3.2		

Table 3.3.2 Transmission Speed

Transmission Speed (bps)	SW 1-7	SW 1-8
2400	ON	ON
4800	OFF	ON
9600	ON	OFF
19200	OFF	OFF

(bps: bits per second)

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Table 3.3.3 DIP Switch 2

SW 2	Function	ON	OFF
1	Handshaking (BUSY condition)	Receive buffer full	Offline Receive buffer full
2	Customer display (DM-D) connection	Connected	Not connected
3	Head rank switching	Rank B	Rank A
4	Power switch setting	Fixing mode	Normal
5	Setting for Interlocking operation with IM	Interlocking	Not interlocking
6	Internal use	--	Fixed to OFF
7	I/F pin 6 reset signal	Enabled	Disabled
8	I/F pin 25 reset signal	Enabled	Disabled

- NOTES:
- Changes in DIP switch settings (excluding switches 2-7 and 2-8, interface 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.
 - If DIP switch 2-7 or 2-8 is changed while 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.
 - The power switch setting is used when the primary power switch of the TM-J8000 is always turned on. (Refer to Appendix G for details.)
 - The setting for interlocking operating with the IM is used when the power source for the TM is supplied from the IM in interlocking between the TM and the IM. (In this connection, the power supply to the TM is switched with the power on/off control of the IM.)

3.3.6.2 Parallel interface model

Table 3.3.5 DIP Switch 1

SW 1	Function	ON	OFF
1	Auto line feed	Always enabled	Always disabled
2	Receive buffer capacity	45 bytes	4K bytes
3	Undefined	--	--
4	Undefined	--	--
5	Undefined	--	--
6	Undefined	--	--
7	Undefined	--	--
8	Undefined	--	--

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Table 3.3.6 DIP Switch 2

SW 1	Function	ON	OFF
1	Handshaking (BUSY condition)	Receive buffer full	Offline Receive buffer full
2	Internal use (Do not change settings)	---	Fixed to Off
3	Head rank switching	Rank B	Rank A
4	Power switch setting	Fixing mode	Normal
5	Setting for Interlocking operation with IM	Interlocking	Not interlocking
6	Reserved (Do not change settings)	--	Fixed to Off
7	Internal use (for serial interface)	--	Fixed to Off
8	I/F pin 31 reset signal (Do not change settings)	Fixed to On	--

- NOTES:
- Changes in DIP switch settings (excluding switch 2-8, interface reset signal) 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.
 - If the DIP switch 2-8 is turned on while 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.
 - The power switch setting is used when the primary power switch of the TM-J8000 is always turned on. (Refer to Appendix G for details.)
 - The setting for interlocking operating with the IM is used when the power source for the TM is supplied from the IM in interlocking between the TM and the IM. (In this connection, the power supply to the TM is switched with the power on/off control of the IM.)

3.4 Indicators

3.4.1 Panel LED Indicators

1) Power supply (POWER) LED: Green

On: Power is stable.

Off: Power is not stable.

Blinking: While some operation such as cleaning is executed.

2) Error (ERROR) LED: Red

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

Off: On-line

Blinking: Error (refer to Section 3.7, Error Processing)

3) Ink out (INK OUT) LED: Red

On: Ink end is detected or the ink cartridge is not installed.

Off: Ink is adequate in the ink cartridge.

Blinking: Ink near end is detected in the ink cartridge.

NOTE:

4) Paper roll end (PAPER OUT) LED: Red

On: The paper roll near end or paper end of the paper roll is detected.

Off: Paper roll is loaded.

Blinking: Self-test standby state or macro standby state when the macro execution command is used.

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5) Slip LED: Green

On: When slip paper is selected.

Off: When paper roll is selected.

Blinking: Slip insertion waiting state.

6) Error code 1, 2 (ERROR CODE) LED: Red

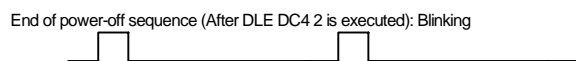
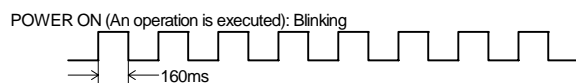
Off: No error (Normal condition)

Blinking: Error has occurred.

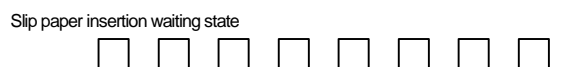
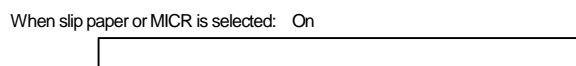
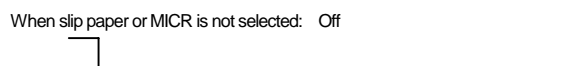
Error code 1 indicates a main category of error types, and Error code 2 indicates a sub category of error types.

Blink pattern

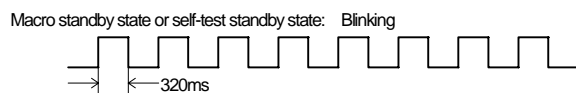
POWER LED: While an operation is executed.



SLIP LED



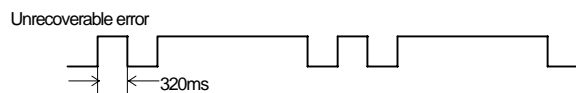
PAPER OUT LED



INK OUT LED

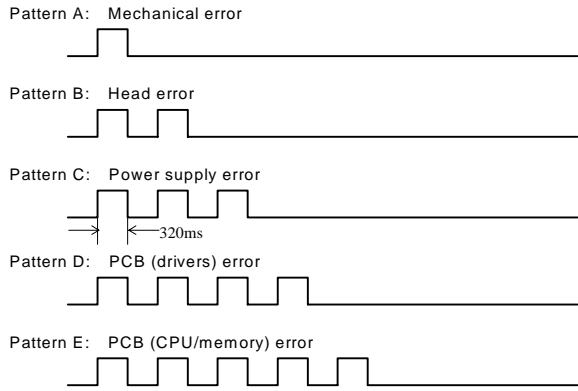


ERROR LED

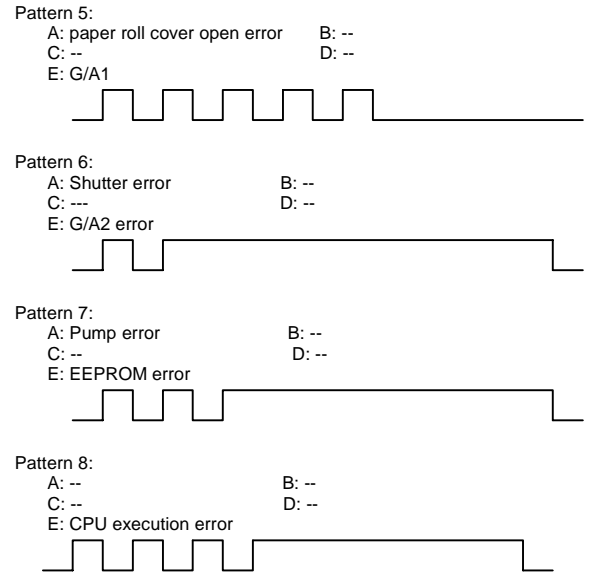
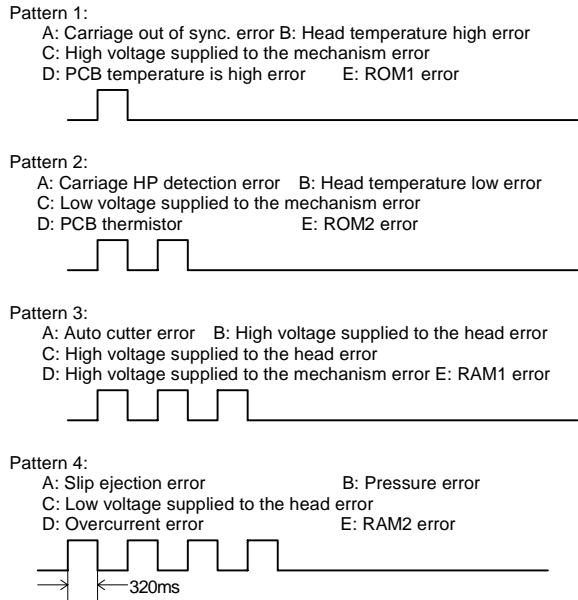


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ERROR CODE LED1



ERROR CODE LED2



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Confidential

The combination of the LED indicator pattern with ERROR CODE LED1 and 2 indicates the following errors:

		ERROR CODE LED1				
		A	B	C	D	E
		Mechanism	Head	Power supply	PCB (drivers)	PCB (CPU, memory)
ERROR CODE LED2	1	Carriage out of sync. error	Head temperature high	High voltage supplied to the mechanism	PCB temperature high	ROM1 error
	2	Carriage HP detection error	Head temperature low	Low voltage supplied to the mechanism	PCB thermistor error	ROM2 error
	3	Auto cutter error	High voltage supplied to the head	High voltage supplied to the head	High voltage supplied to the mechanism	RAM1 error
	4	Slip ejection error	Pressure error	Low voltage supplied to the head	Over current error	RAM2 error
	5	Paper roll cover open error	--	--	--	G/A1 error
	6	Shutter error	--	--	--	G/A2 error
	7	Pump error	--	--	--	EEPROM error
	8	--	--	--	--	CPU execution error

See previous sheet for a description of LED patterns.

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3.5 Self-test

1) The printer has a self-test function that checks the following:

- Control circuit functions
- Printer mechanisms
- Print quality
- Control software version
- DIP switch settings

2) Starting the self-test

a) Self-test on paper roll

To start the self-test on roll paper, hold down the paper roll feed switch and turn on the printer with the cover closed.

b) Self-test on slip paper

To start the self-test on slip paper, hold down the slip paper feed switch and turn on the printer with the cover closed. The printer enters the paper waiting state. Insert slip paper (A4 size or letter size) 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 PAPER OUT LED indicator blinks and the printer enters the test printing standby state. Press the paper roll feed switch (PAPER FEED SW) 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 sheet of slip paper to be inserted. Insert slip paper (A4 size or letter size) to start test printing.

4) Ending the self-test

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

The printer then is ready to print.

NOTE: Make sure to use A4 size or letter size paper for self test on slip paper.

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3.6 Hexadecimal Dumping

1) Hexadecimal dumping function

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

2) Starting hexadecimal dumping

Open the cover and turn the power on while pressing the paper feed button; then close the cover. The printer first prints "Hexadecimal Dump" on paper roll and prints the received print data in hexadecimal numbers and in its corresponding characters.

- NOTES:
- If no characters correspond to the data received, the printer prints ".".
 - During hexadecimal dumping, any commands other than **DLE EOT**, **DLE ENQ**, and **GS ENQ** do not function.

3) Ending hexadecimal dumping

Hexadecimal dumping ends by turning the power off, pressing the FEED button three times, or resetting the printer after printing has finished.

<Printing example>

Hexadecimal Dump																
1B	21	00	1B	26	02	40	40	:	.	!	.	.	&	.	@	@
1B	25	01	1B	63	34	00	1B	:	.	%	.	.	c	4	.	.
41	42	43	44	45	46	47	48	:	A	B	C	D	E	F	G	H

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3.7 Error Processing

3.7.1 Error types

1) Errors that automatically recover

Error type	Probable cause
Paper roll cover open error	Printing on the paper roll is not performed correctly due to a cover open.

2) Errors that have the possibly of recovery

Error type	Probable cause
Shutter error	Shutter HP (home position) detection is not performed correctly. Unexpected shutter operation is detected.
	Shutter HP (home position) detection is not performed correctly at a specified position.
Carriage HP detection error	Carriage HP (home position) detection is not performed correctly.
Carriage is out of sync. error	Carriage is detected to be out of sync.
Auto cutter error	Unexpected auto cutter operation is detected.
Slip ejection error	Paper end is not detected with a BOF or a TOF even though the slip paper is ejected more than the amount of minimum ejection.

3) Unrecoverable error

Error type
CPU execution error
ROM1 error
ROM2 error
RAM1 error
RAM2 error
Mechanism high voltage input error
Head high voltage input error
Mechanism low power voltage error
Mechanism high power voltage error
Head low power voltage error
Head high power voltage error
G/A1 error
G/A2 error
Over current error
Head low temperature error
Head high temperature error
PCB temperature error
EEPROM error
Pump error
Pressure error

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3.7.2 Operation when an error is detected

1) Errors that automatically recover

a) Operation when an error is detected

The printer stops printing and goes off line. If the printer is set to go off-line during an error by a condition of ASB transmission, the printer transmits the ASB.

In case of an error condition in which the carriage or ink system can operate, the printer locks the carriage and sets appropriate values to each port.

The error codes are displayed on ERROR CODE 1 and 2 LEDs.

b) Operation after an error is recovered.

When the cause of the error is removed, the printer recovers from the error and restarts printing from the line which was being printed when the error occurred.

2) Errors that have the possibility of recovery

a) Operation when an error is detected.

The printer stops all mechanical operations and goes to a safety state such as shutting off the power to the printer control.

If the busy condition for the interface happens when the receive buffer is full or when on-line, the interface goes BUSY.

If the printer is set to go off-line during error by a condition of ASB transmission, the printer transmits the ASB.

In case of an error condition in which the carriage or ink system can operate, the printer locks the carriage up and sets appropriate values to each port.

The error codes are displayed on ERROR CODE 1 and 2 LEDs.

b) Operation after an error is recovered.

The printer initializes the mechanism, then sets up to return the normal state.

If a mechanical error occurs again during recovery from error, the printer is in the error state again, not recovering the interface setting to the state when the first error occurred. If the printer status is changed between the first error and the second error, the printer transmits the ASB. If the printer status is not changed, the printer does not transmit the ASB again.

When the off-line cause still remains:

If the printer is set to go off-line during an error by a condition of ASB transmission, the printer transmits the ASB.

The printer remains off-line until the off-line cause is removed.

When the off-line cause is removed:

If the receive buffer is not full, the printer goes to the ready state for the interface.

If the printer is set to select the cause of becoming off-line or on-line, the printer transmits the ASB. (Online)

When the printer recovers from an error during printing, the printer restarts printing.

When the printer recovers from a buffer clear, the printer clears the print buffer and the receive buffer when the error recoverable command is executed.

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3) Unrecoverable error

a) Operation when an error is detected.

The printer shuts down the power to all mechanism systems immediately.

Then the printer resets all software settings related to the power system and sets appropriate values to each port.

If the busy condition for the interface occurs when the receive buffer is full or when on-line, the printer goes to the busy state.

If the printer is set to go off-line during an error by a condition of ASB transmission, the printer transmits the ASB.

In case of an error condition in which the carriage or ink system can operate, the printer locks the carriage and sets appropriate values to each port.

The error codes are displayed on ERROR CODE 1 and 2 LEDs.

b) Operation after an error is recovered.

Stop all operations and take a countermeasure to recover the error using to the error code table.

3.7.3 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

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3.8 Paper Sensors

The printer has 6 paper sensors, as follows:

Slip:

- TOF (Top of Form) sensor
- BOF (Bottom of Form) sensor
- Slip paper width sensor
- Slip paper insertion sensor

Receipt:

- Paper roll near-end sensor
- Paper roll end sensor

3.8.1 Sensors and LED Indicators

Receipt:

- Paper roll near-end sensor

The near-end sensor is located on the roll paper supply device on the receipt side. It detects the near-end of the paper roll by detecting the paper roll diameter. When it detects the near-end of the paper, the PAPER OUT LED indicator lights.

- Paper roll end sensor

The paper end sensor is located in the paper path on the receipt side. It detects the presence of paper from the paper roll in the paper path of the printer mechanism. When there is no paper in the paper path (paper end status), the PAPER OUT LED indicator lights.

Slip:

- TOF sensor

The TOF sensor is located in the slip paper path. It detects the presence of slip paper at the paper stopper position in the paper path.

- BOF sensor

The BOF sensor is located in the slip paper path. It detects whether the paper is set correctly and where the paper end is.

- Slip paper width sensor

The slip paper width sensor is located in the slip paper path. It detects the width of the slip paper and tells whether the actual paper insertion direction is the same as the direction that the host computer specifies.

- Slip paper insertion sensor

The slip paper insertion sensor is located in the slip paper path. It detects whether the slip paper is inserted or removed and prevents data loss or printing with no paper.

NOTE: The status of the slip paper insertion sensor cannot be detected by the host computer.

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3.8.2 Sensors and Printing

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

Receipt:

- Paper roll near-end sensor
- Paper roll end sensor

Slip:

- BOF sensor

NOTE:

The paper roll near-end sensor and the paper roll end sensor are enabled only when the paper roll is selected as the print sheet and the BOF sensor is enabled only when the slip is selected as the print sheet. However, since the paper roll end sensor is used for paper-end detection, the printer stops printing. Use the paper roll near-end sensor for detecting a roll paper end, and also use the paper roll end sensor, if necessary.

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

1) When receipt is selected

When printing stop is enabled, and the paper roll near-end sensor detects a paper near end, the printer automatically goes off line after printing the line being printed. To restart printing, load the paper and set the printer back on line by closing the printer cover. The printer starts initializing and continues printing the data stored in the print buffer.

2) When slip is selected

When the BOF sensor is selected for printing stop, the BOF sensor detects a paper-end and the printer prints data up to the end of the printable area, ejects the slip when all the next print data are transmitted, and then waits for the slip to be removed. After the slip is removed, the printer enters the paper insertion waiting state.

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3.9 Printer Cover Sensors and Cover Opening/Closing Operation

3.9.1 Slip Carriage Cover Open Sensor

The sensor detects opening/closing of the carriage cover. When a cover open is detected, the printer stops the carriage movement. The printer goes off line automatically and goes into the recovery error state and the error LED blinks.

The printer goes back on-line when the slip carriage cover is closed. Even if the cover is closed, the error LED still blinks. The printer can recover by sending an error recovery command from the host computer. If the printer continues printing, it starts printing the beginning of the line it was printing when the front cover was opened. In this case, printing position may shift; therefore, it is recommended to initialize the printer and resend the print data.

3.9.2 Paper Roll Carriage Cover Open Sensor

The cover-open sensor monitors the paper roll carriage cover. When the sensor detects a cover open, the printer stops printing immediately and automatically goes off line. The error LED (automatic recovery error) blinks when the cover is open. When the printer cover is closed, the error LED goes off and the printer goes on line and starts initializing automatically and begins printing at the beginning of the line it was printing when the cover was opened.

NOTE: Whether the cover is open or not does not affect the status reported by the paper roll end sensor.

3.9.3 Opening/Closing the Slip Carriage Cover

The carriage cover can be opened by pulling a tab on the right of the cover toward you. When closing the cover, push the cover backward.

When the carriage cover open is detected by the cover open sensor, the printer releases the print platen and stops carriage movement. If the front cover is opened during printing, data lines are stopped. Be sure not to open the carriage cover.

3.9.4 Opening/Closing the Paper Roll Carriage Cover

The carriage cover is located over the paper roll behind of the slip carriage cover. When the paper roll carriage open lever is pulled toward the front side, the receipt carriage cover is opened. When the cover is closed, the cover open lever is latched.

NOTE: If the paper roll carriage cover is opened during printing, the printer stops printing and the ERROR LED blinks. (Error that automatically recovers). When this error occurs, the carriage stops immediately, then returns to the home position at a high speed. When the cover is closed again, the printer begins printing at the line it was printing when the cover was opened.

3.10 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.

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3.11 Paper Jam Removal

3.11.1 Receipt

To remove jammed paper from the receipt section, open the receipt carriage cover by pushing the cover open button.

3.11.2 Slip

1) Around the print head

To remove jammed paper from the print head area, open the slip carriage cover.

2) Around the shutter

To remove jammed paper from the shutter area, open the carriage cover by moving the shutter driving gear (black), which is on the left-hand side, away from the center of the carriage moving range to an appropriate position.

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4. CASE SPECIFICATIONS

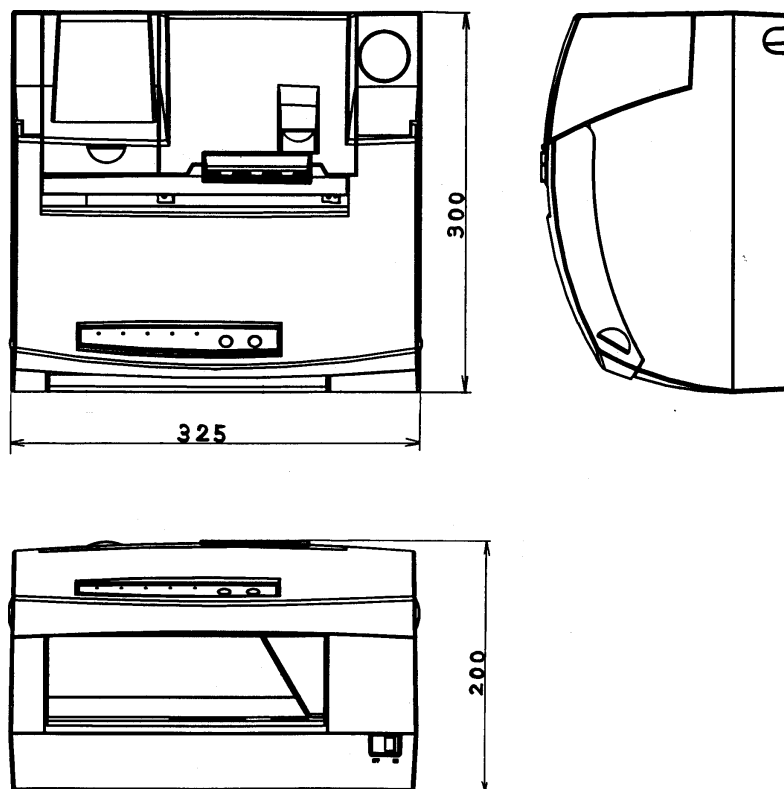
4.1 External Dimensions and Mass

Height: 200 mm
 Width: 325 mm
 Depth: 300 mm
 Mass: Approximately 9 kg
 [All numeric values are typical.]

4.2 Color

EPSON standard color (ECW)

4.3 External Appearance



[Unit: mm]

Figure 4.3.1 External Appearance

4.4 Note on Handling the Printer

Do not use excess force on the printer case.

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5. OPTIONS AND CONSUMABLES**5.1 Standard Accessories**

- Paper roll (diameter 60 mm) × 1 roll
- Exclusive ink cartridge (SJIC1)
- Operator's Manual
- I/F fixing screw (hexagonal millimeter screw) × 2
- Power switch cover (for primary side and secondary side)
- Slip caution seal

5.2 Peripherals Which Can Be Connected

- 1) EPSON customer display (Available only for serial interface model)
 - Direct connection DM-Dxx display module DM-D102-012, DM-D203-012
- 2) EPSON intelligent module
 - This printer can be interlocked with the IM-5x5 series.

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6. Commands

6.1 Command Notation

XXXX

[Name]	The name of the command.
[Format]	The code sequence. The numbers denoted by < >H are hexadecimal. [] <i>k</i> indicates the contents of the [] should be repeated <i>k</i> times.
[Range]	Gives the allowable ranges for the arguments.
[Default]	Gives the default values, if any, for the command parameters.
[Description]	Describes the function of the command.
[Notes]	Provides important information on setting and using the printer command, if necessary.

6.2 Control Commands

HT

[Name]	Horizontal tab
[Format]	ASCII HT Hex 09 Decimal 9
[Description]	Moves the print position to the next horizontal tab position.

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.

FF

[Name]	Print and eject cut sheet
[Format]	ASCII FF Hex 0C Decimal 12
[Description]	Prints the data in print buffer and ejects the slip paper.

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CR

[Name] Print and carriage return
 [Format] ASCII CR
 Hex 0D
 Decimal 13

[Description] When automatic line feed is enabled, this command functions the same as **LF**.
 When automatic line feed is disabled, this command is ignored. The automatic line feed is ignored with a serial interface model.

DLE EOT *n*

[Name] Real-time status transmission
 [Format] ASCII DLE EOT *n*
 Hex 10 04 *n*
 Decimal 16 4 *n*

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

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

<i>n</i>	Function
1	Transmit printer status
2	Transmit offline status
3	Transmit error status
4	Transmit paper roll sensor status
5	Transmit slip paper status

This printer transmits the following status in real time.

n = 1: Printer status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	Drawer open/close signal is LOW (connector pin 3).
	On	04	4	Drawer open/close signal is HIGH (connector pin 3).
3	Off	00	0	Online.
	On	08	8	Offline.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Not in online waiting status.
	On	20	32	During online waiting status.
6	Off	00	0	Paper feed switch is turned OFF.
	On	40	64	Paper feed switch is turned ON.
7	Off	00	0	Not used. Fixed to Off.

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n = 2: Off-line status

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

n = 3: Error status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	No mechanical error.
	On	04	4	Mechanical error has occurred.
3	Off	00	0	No autocutter error.
	On	08	8	Autocutter error has occurred.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error has occurred.
6	Off	00	0	No auto-recoverable error.
	On	40	64	Auto recoverable error has occurred.
7	Off	00	00	Not used. Fixed to Off.

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n = 4: Continuous paper sensor status

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

[Note]

- If print data includes the same character strings as this command, the printer performs the same operation specified by this command. Users must consider this.

Example: Bit image data might include the same data strings as this command.

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DLE EOT NUL *n*

[Name] Real-time status transmission
 [Format] ASCII DLE EOT NUL *n*
 Hex 10 04 00 *n*
 Decimal 16 4 0 *n*

[Range] *n* = 1

[Description] Transmits the status specified by *n* in real time.

<i>n</i>	Function
1	Transmit slip paper status

This printer transmits the following status in real time.

n = 1: 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 width sensor: Paper present.
	On	04	4	Slip paper width sensor: Paper not present.
3	--	--	--	Undefined.
4	On	10	16	Not used. Fixed to On.
5	--	--	--	Undefined.
6	--	--	--	Undefined.
7	Off	00	0	Not used. Fixed to off.

[Note]

- If print data includes the same character strings as this command, the printer performs the same operation specified by this command. Users must consider this.

Example: Bit image data might include the same data strings as this command.

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DLE EOT BEL *n*

[Name] Real-time status transmission for ink

[Format] ASCII DLE EOT BEL *n*
 Hex 10 04 07 *n*
 Decimal 16 4 7 *n*

[Range] *n* = 1

[Description] Transmits the ink status specified by *n* in real time.

<i>n</i>	Function
1	Transmit ink status

This printer transmits the following status in real time.

n = 1: Ink 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	Ink near-end sensor: Ink is adequate.
	On	04	4	Ink near-end sensor: Ink cartridge is empty. (ink end)
3	Off	00	0	No ink end.
	On	08	8	Ink cartridge is empty. (ink end)
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Ink cartridge sensor: Cartridge is present.
	On	20	32	Ink cartridge sensor: Cartridge is not present.
6	Off	00	0	Not in a cleaning operation.
	On	40	64	In a cleaning operation.
7	Off	00	0	Not used. Fixed to off.

[Note]

- If print data includes the same character strings as this command, the printer performs the same operation specified by this command. Users must consider this.

Example: Bit image data might include the same data strings as this command.

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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 requests as follows:

<i>n</i>	Request
0	Execute the same as when the paper feed switch is pressed once during a waiting status during the operation of the GS ^ command.
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

[Note] • If print data includes the same character strings as this command, the printer performs the same operation specified by this command. User must consider this.

Example: Bit image data might include the same data strings as this command.

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DLE DC4 *n m t* (when $n = 1$)

[Name] Generate pulse at real-time

[Format] ASCII DLE DC4 *n m t*
 Hex 10 14 *n m t*
 Decimal 16 20 *n m t*

[Range] $n = 1$
 $m = 0, 1$
 $1 \leq t \leq 8$

[Description] Outputs the pulse specified by *t* in real-time to the connector pin specified by *m* as follows:

<i>m</i>	Connector pin
0	Drawer kick-out connector pin 2.
1	Drawer kick-out connector pin 5.

The pulse ON time or OFF time is set to [*t* x 100ms].

- [Notes]
- If print data includes the same character string as this command, the printer performs the operation specified by this command. Users must consider this.
 Example: Bit image data might include the same data strings as this command.
 - This command can be enabled or disabled by the **GS (D** command.

DLE DC4 *n a b* (when $n = 2$)

[Name] Execute power-off sequence

[Format] ASCII DLE DC4 *n a b*
 Hex 10 14 *n a b*
 Decimal 16 20 *n a b*

[Range] $n = 2$
 $a = 1$
 $b = 8$

[Description] Executes the power-off sequence (The printer executes the software sequence, but the power is not cut.).

- Transmits the power off status (header + status + NUL) after finishing the power off process.

	Hex	Decimal
Header	3BH	59
Status	30H	48
NUL	00H	0

- [Notes]
- If print data includes the same character strings as this command, the printer performs the operation specified by this command. Users must consider this.
 Example: Bit image data might include the same data strings as this command.
 - This command can be enabled or disabled by the **GS (D** command.
 - The printer executes the power-off sequence within 10 seconds after receiving this command.
 - The power off status is transmitted to the host without checking the host status.

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ESC SP *n*

[Name]	Set right-side character spacing			
[Format]	ASCII	ESC	SP	<i>n</i>
	Hex	1B	20	<i>n</i>
	Decimal	27	32	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	$n = 0$			
[Description]	Sets the character spacing for the right side of the character to [$n \times$ horizontal or vertical motion units].			
[Notes]	<ul style="list-style-type: none"> The maximum right-side spacing is 17.992 mm {255/360 inches} . 			

ESC ! *n*

[Name]	Select print mode(s)			
[Format]	ASCII	ESC	!	<i>n</i>
	Hex	1B	21	<i>n</i>
	Decimal	27	33	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	$n = 0$			
[Description]	Specifies or cancels the selection of font, emphasized, double-height or double-width size.			
	<ul style="list-style-type: none"> <i>n</i> specifies the print mode(s) in the table below. 			

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A (22 × 48) selected.
	On	01	1	Character font B (18 × 36) selected.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	Off	00	0	Emphasized mode not selected.
	On	08	8	Emphasized mode selected.
4	Off	00	0	Double-height mode not selected.
	On	10	16	Double-height mode selected.
5	Off	00	0	Double-width mode not selected.
	On	20	32	Double-width mode selected.
6	-	-	-	Undefined.
7	Off	00	0	Underline mode not selected.
	On	80	128	Underline mode selected.

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ESC \$ *nL nH*

[Name]	Set absolute print position				
[Format]	ASCII	ESC	\$	<i>nL</i>	<i>nH</i>
	Hex	1B	24	<i>nL</i>	<i>nH</i>
	Decimal	27	36	<i>nL</i>	<i>nH</i>
[Range]	$0 \leq nL \leq 255$ $0 \leq nH \leq 255$				
[Description]	The distance from the beginning of the line to the print position is set to $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$ inches.				

ESC % *n*

[Name]	Select/cancel user-defined character set			
[Format]	ASCII	ESC	%	<i>n</i>
	Hex	1B	25	<i>n</i>
	Decimal	27	37	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	$n = 0$			
[Description]	Selects or cancels the user-defined character set. <ul style="list-style-type: none"> • When the LSB of <i>n</i> is 0, the user-defined character set is canceled. • When the LSB of <i>n</i> is 1, the user-defined character set is selected. 			

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

[Name]	Define user-defined characters					
[Format]	ASCII	ESC	&	<i>y</i>	<i>c1</i>	<i>c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]</i>
	Hex	1B	26	<i>y</i>	<i>c1</i>	<i>c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]</i>
	Decimal	27	38	<i>y</i>	<i>c1</i>	<i>c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]</i>
[Range]	$y = 6$ (for font A (22 × 48)) $y = 5$ (for font B (18 × 36)) $32 \leq c1 \leq c2 \leq 126$ $0 \leq x \leq 22$ (Font A (22 × 48)) $0 \leq x \leq 18$ (Font B (18 × 36)) $0 \leq d \leq 255$ $k = c2 - c1 + 1$					
[Description]	Defines user-defined characters to the character codes specified. <ul style="list-style-type: none"> • <i>y</i> specifies the number of bytes in the vertical direction. • <i>c1</i> specifies the beginning character code for the definition, and <i>c2</i> specifies the final code. • <i>x</i> specifies the number of dots in the horizontal direction. • <i>d</i> specifies the dot data for the characters. • <i>k</i> specifies the number of user-defined characters. 					

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ESC * m nL nH d1 ... dk

[Name] Select bit image mode

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

[Range] $m = 0, 1, 32, 33, 80, 81$
 $0 \leq nL \leq 255$
 $0 \leq nH \leq 12$, where $1 \leq (nL + nH \times 256) \leq 3327$
 $0 \leq d \leq 255$
 $k = nL + nH \times 256$ (when $m = 0, 1$)
 $k = (nL + nH \times 256) \times 3$ (when $m = 32, 33$)
 $k = (nL + nH \times 256) \times 6$ (when $m = 80, 81$)

[Description] Stores the bit image data in the print buffer.

- m specifies a bit image mode in the table below.

m	Mode	Vertical Direction		Horizontal Direction
		Number of Data	Dot Density	Dot Density
0	8-dot single-density	1 byte	60 dpi	180 dpi
1	8-dot double-density	1 byte	60 dpi	360 dpi
32	24-dot single-density	3 bytes	180 dpi	180 dpi
33	24-dot double-density	3 bytes	180 dpi	360 dpi
80	48-dot single-density	6 bytes	360 dpi	180 dpi
81	48-dot double-density	6 bytes	360 dpi	360 dpi

dpi: dots per 25.4 mm {1"}

- The nL and nH specify the number of dots of the bit image in the horizontal direction. The number of dots is calculated by $nL + nH \times 256$.
- d specifies the bit image data.
- k specifies the number of bit image data.

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ESC – n

[Name] Turn underline mode on/off

[Format]	ASCII	ESC	–	<i>n</i>
	Hex	1B	2D	<i>n</i>
	Decimal	27	45	<i>n</i>

[Range] $0 \leq n \leq 2, 48 \leq n \leq 50$ [Default] $n = 0$ [Description] Turns underline mode on or off, based on the following values of *n*:

<i>n</i>	Function
0, 48	Turns off underline mode
1, 49	Turns on underline mode
2, 50	

ESC 2

[Name] Select default line spacing

[Format]	ASCII	ESC	2
	Hex	1B	32
	Decimal	27	50

[Description] Selects the current line spacing to approximately 4.23 mm {1/6 inches}.

ESC 3 n

[Name] Set line spacing

[Format]	ASCII	ESC	3	<i>n</i>
	Hex	1B	33	<i>n</i>
	Decimal	27	51	<i>n</i>

[Range] $0 \leq n \leq 255$ [Default] $n = 60$ (approximately 4.23 mm {1/6 inches}).[Description] Sets the line spacing to [$n \times$ vertical or horizontal motion unit] inches.

- The maximum paper feed amount is 1016 mm {40 inches}.

ESC <

[Name] Return home

[Format]	ASCII	ESC	<
	Hex	1B	3C
	Decimal	27	60

[Description] Moves the print head to the standby position.

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ESC = n

[Name] Select peripheral device
 [Format] ASCII ESC = n
 Hex 1B 3D n
 Decimal 27 61 n
 [Range] $1 \leq n \leq 3$

[Default] Serial interface specification:

- When turning on the printer:

DIP switch SW2-2 status	<i>n</i>
OFF	1
ON	2

- When executing **ESC @**:

Peripheral device status		<i>n</i>		
Default Value to be Set		1	2	3
After ESC @ Processing	DIP switch SW2-2 is set to OFF	1	2	2
	DIP switch SW2-2 is set to ON	1	2	1

Parallel interface specification: $n = 1$

[Description] Selects device to which host computer sends data, using *n* as follows:

<i>n</i>	Function
1	Enable printer only.
2	Enable customer display only.
3	Enable printer and customer display.

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 user-defined characters which are specified with some character codes.
 • *n* specifies the character code for which the pattern defined is to be cancelled.

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 (except the macro definition) to the mode that was in effect when the power was turned on.

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ESC C *n*

[Name]	Set cut sheet eject length			
[Format]	ASCII	ESC	C	<i>n</i>
	Hex	1B	43	<i>n</i>
	Decimal	27	67	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	$n = 0$			
[Description]	Sets the eject length setting for slip paper to [$n \times$ (the current line spacing)].			
[Notes]	<ul style="list-style-type: none"> • When $n = 0$, the eject length setting for slip paper is cancelled. • The maximum eject length that can be set is 1016 mm {40 inches}. 			

ESC D *n1 ... nk NUL*

[Name]	Set horizontal tab positions				
[Format]	ASCII	ESC	D	<i>n1 ... nk</i>	<i>NUL</i>
	Hex	1B	44	<i>n1 ... nk</i>	<i>00</i>
	Decimal	27	68	<i>n1 ... nk</i>	<i>0</i>
[Range]	$1 \leq n \leq 255$				
	$0 \leq k \leq 32$				
[Default]	$n = 8, 16, 24, 32, 40, \dots, 232, 240, 248$ (for font A (22 × 48) in a standard character size width)				
[Description]	Sets horizontal tab positions.				
	<ul style="list-style-type: none"> • <i>n</i> specifies a horizontal tab position from the left margin to [$n \times$ (the current setting character width)]. • <i>k</i> indicates the total number of horizontal tab positions to be set. 				

ESC E *n*

[Name]	Turn emphasized mode on/off			
[Format]	ASCII	ESC	E	<i>n</i>
	Hex	1B	45	<i>n</i>
	Decimal	27	69	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	$n = 0$			
[Description]	Turns emphasized mode on or off.			
	<ul style="list-style-type: none"> • When the LSB of <i>n</i> is 0, emphasized mode is turned off. • When the LSB of <i>n</i> is 1, emphasized mode is turned on. 			

ESC F *n*

[Name]	Set/cancel slip paper reverse eject			
[Format]	ASCII	ESC	F	<i>n</i>
	Hex	1B	46	<i>n</i>
	Decimal	27	70	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	$n = 0$			
[Description]	Set or cancels reverse eject of slip paper.			
	<ul style="list-style-type: none"> • When the LSB of <i>n</i> is 0, cancels the slip paper reverse eject. • When the LSB of <i>n</i> is 1, sets the slip paper reverse eject. 			
[Notes]	If the printer is in the condition below, the paper is ejected in the forward direction regardless of the setting with <i>n</i> .			
	<ul style="list-style-type: none"> • When the paper is fed over approximately 60mm {856/360"} after the BOF sensor detects paper empty. 			

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ESC G *n*

[Name]	Turn double-strike mode on/off			
[Format]	ASCII	ESC	G	<i>n</i>
	Hex	1B	47	<i>n</i>
	Decimal	27	71	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	$n = 0$			
[Description]	Turns double-strike mode on or off. <ul style="list-style-type: none"> • When the LSB of <i>n</i> is 0, double-strike mode is turned off. • When the LSB of <i>n</i> is 1, double-strike mode is turned on. 			

ESC J *n*

[Name]	Print and feed paper			
[Format]	ASCII	ESC	J	<i>n</i>
	Hex	1B	4A	<i>n</i>
	Decimal	27	74	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Description]	Prints the data in the print buffer and feeds the paper [<i>n</i> × vertical or horizontal motion unit] inches. <ul style="list-style-type: none"> • The maximum paper feed amount is 1016 mm {40 inches}. 			

ESC M *n*

[Name]	Select character font											
[Format]	ASCII	ESC	M	<i>n</i>								
	Hex	1B	4D	<i>n</i>								
	Decimal	27	77	<i>n</i>								
[Range]	$n = 0, 1, 48, 49, 97$											
[Default]	$n = 0$											
[Description]	Selects character fonts.											
	<table border="1"> <thead> <tr> <th><i>N</i></th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0, 48</td> <td>Character font A (22 × 48) selected.</td> </tr> <tr> <td>1, 49</td> <td>Character font B (18 × 36) selected.</td> </tr> <tr> <td>97</td> <td>Extended font A (36 × 48) selected.</td> </tr> </tbody> </table>				<i>N</i>	Function	0, 48	Character font A (22 × 48) selected.	1, 49	Character font B (18 × 36) selected.	97	Extended font A (36 × 48) selected.
<i>N</i>	Function											
0, 48	Character font A (22 × 48) selected.											
1, 49	Character font B (18 × 36) selected.											
97	Extended font A (36 × 48) selected.											
[Notes]	<ul style="list-style-type: none"> • The only attribute that can be applied to the extended font A is upside down. • Extended font A is not downloadable. • When the extended font A is printed, select fine for the head control method at the beginning of line. If the extended font A is printed in economy mode, the print position may be misaligned. 											

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ESC R *n*

[Name] Select an international character set

[Format]	ASCII	ESC	R	<i>n</i>
	Hex	1B	52	<i>n</i>
	Decimal	27	82	<i>n</i>

[Range] $0 \leq n \leq 10$ [Default] $n = 0$ [Description] Selects an international character set *n* from the following table:

<i>n</i>	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

ESC U *n*

[Name] Turn unidirectional printing mode on/off

[Format]	ASCII	ESC	U	<i>n</i>
	Hex	1B	55	<i>n</i>
	Decimal	27	85	<i>n</i>

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

[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.

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ESC \ nL nH

[Name]	Set relative print position				
[Format]	ASCII	ESC	\	nL	nH
	Hex	1B	5C	nL	nH
	Decimal	27	92	nL	nH
[Range]	0 ≤ nL ≤ 255				
	0 ≤ nH ≤ 255				
[Description]	Sets the print starting position based on the current position to [(nL + nH × 256) × horizontal or vertical motion unit].				
	<ul style="list-style-type: none"> • When pitch <i>N</i> is specified to the right: $nL + nH \times 256 = N$ • When pitch <i>N</i> is specified to the left (the negative direction), use the complement of 65536: $nL + nH \times 256 = 65536 - N$ 				

ESC a n

[Name]	Select justification			
[Format]	ASCII	ESC	a	n
	Hex	1B	61	n
	Decimal	27	97	n
[Range]	0 ≤ n ≤ 2, 48 ≤ n ≤ 50			
[Default]	n = 0			
[Description]	Aligns all the data in one line to the specified position by <i>n</i> as follows:			

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

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 ≤ n ≤ 4				
[Default]	n = 3				
[Description]	Selects the type of paper for printing, using <i>n</i> as follows:				

n	Function
1, 2, 3	Enable paper roll.
4	Enable slip paper.

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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] $1 \leq n \leq 7$

[Default] $n = 7$

[Description] Selects the paper type(s), using n as follows:

n	Function
1, 2, 3	Enable paper roll.
4	Enable slip paper.
5, 6, 7	Enable paper roll and slip paper.

ESC c 3 n

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

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

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

[Default] $n = 15$

[Description] Selects the paper sensor(s) to output paper end signals when the specified sensor(s) defect(s) the paper end.

- Each bit of n is specifies the paper sensor(s) as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll near-end sensor disabled
	On	01	1	Paper roll near-end sensor enabled
1	Off	00	0	Paper roll near-end sensor disabled
	On	02	2	Paper roll near-end sensor enabled
2	Off	00	0	Paper roll end sensor disabled
	On	04	4	Paper roll end sensor enabled
3	Off	00	0	Paper roll end sensor disabled
	On	08	8	Paper roll end sensor enabled
4	Off	00	0	Slip TOF sensor disabled
	On	10	16	Slip TOF sensor enabled
5	Off	00	0	Slip BOF sensor disabled
	On	20	32	Slip BOF sensor enabled
6, 7	-	-	-	Undefined

[Notes] • This command is ignored with a serial interface model.

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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] $0 \leq n \leq 255$
- [Default] $n = 32$
- [Description] Selects the paper sensor(s) used to stop printing when a paper end is detected.

- n specifies the paper sensor(s) 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.
2-4	-	-	-	Undefined.
5	Off	00	0	BOF sensor disabled.
	On	20	32	BOF sensor enabled.
6-7	-	-	-	Undefined.

- [Notes]
 - The printer is stopped when the paper end is reached whether the BOF sensor is enabled or disabled; however, the bottom margin is different.

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] $0 \leq n \leq 255$
- [Default] $n = 0$
- [Description] Enables or disables 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]
 - The cleaning switch is not affected by the settings of this command.
 - When the cover is open, the paper roll FEED button and the slip FEED button are disabled regardless of the settings of this command.

ESC d n

- [Name] Print and feed 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.
- The maximum paper feed amount is 1016 mm {40 inches}.

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ESC f t1 t2

[Name] Set cut sheet wait time

[Format] ASCII ESC f t1 t2
 Hex 1B 66 t1 t2
 Decimal 27 102 t1 t2

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

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

[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 to $[t1 \times 1]$ minutes. When $t1$ is set to 0, the printer cancels the setting of the wait time.
- $t2$ specifies time from insertion of the slip to the start of printing to $[t2 \times 0.1]$ seconds.

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] $m = 0, 1, 48, 49$
 $0 \leq t1 \leq 255$
 $0 \leq t2 \leq 255$

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

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

- $t1$ specifies the pulse ON time to $[t1 \times 2 \text{ ms}]$.
- $t2$ specifies the pulse OFF time to $[t2 \times 2 \text{ ms}]$.

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ESC t n

[Name]	Select character code table			
[Format]	ASCII	ESC	t	<i>n</i>
	Hex	1B	74	<i>n</i>
	Decimal	27	116	<i>n</i>
[Range]	$0 \leq n \leq 5, n = 19, 254, 255$			
[Default]	$n = 0$			
[Description]	Selects a page <i>n</i> from the character code table.			

<i>n</i>	Selected Character Code
0	U.S.A., Standard Europe
1	Katakana
2	PC850 (Multilingual)
3	PC860 (Portuguese)
4	PC863 (Canadian-French)
5	PC865 (Nordic)
19	PC858
254	Space
255	Space

ESC { n

[Name]	Turn upside-down printing mode on/off			
[Format]	ASCII	ESC	{	<i>n</i>
	Hex	1B	7B	<i>n</i>
	Decimal	27	123	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	$n = 0$			
[Description]	Turns upside-down printing mode on or off.			
	<ul style="list-style-type: none"> • When the LSB of <i>n</i> is 0, upside-down printing mode is turned off. • When the LSB of <i>n</i> is 1, upside-down printing mode is turned on. 			

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FS p n m

[Name]	Print NV bit image				
[Format]	ASCII	FS	p	n	m
	Hex	1C	70	n	m
	Decimal	28	112	n	m
[Range]	$1 \leq n \leq 255$ $0 \leq m \leq 3, 48 \leq m \leq 51$				

[Description] Prints an NV bit image.

- *n* specifies the number of the NV bit image.
- *m* specifies the bit image mode.

<i>m</i>	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	360 dpi	360 dpi
1, 49	Double-width	360 dpi	180 dpi
2, 50	Double-height	180 dpi	360 dpi
3, 51	Quadruple	180 dpi	180 dpi

dpi: dots per 25.4 mm {1"}

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

[Name]	Define NV bit image				
[Format]	ASCII	FS	q	n	[xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n
	Hex	1C	71	n	[xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n
	Decimal	28	113	n	[xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n

[Range] $1 \leq n \leq 255$
 $0 \leq xL \leq 255$
 $0 \leq xH \leq 3$, where $1 \leq (xL + xH \times 256) \leq 1023$
 $0 \leq yL \leq 255$
 $0 \leq yH \leq 2$, where $1 \leq (yL + yH \times 256) \leq 767$
 $0 \leq d \leq 255$
 $k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$
 Total defined data area = 131072 bytes

[Description] Defines the NV bit image specified into the non-volatile memory.

- *n* specifies the number of the defined NV bit image.
- *xL*, *xH* specifies $(xL + xH \times 256) \times 8$ dots in the horizontal direction for the NV bit image.
- *yL*, *yH* specifies $(yL + yH \times 256) \times 8$ dots in the vertical direction for the NV bit image.
- *d* specifies the definition data of the NV bit image.
- *k* specifies the number of the defined NV bit image data.

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

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GS ! n

[Name] Select character size
 [Format] ASCII GS ! n
 Hex 1D 21 n
 Decimal 29 33 n
 [Range] $n = 0, 1, 16, 17$
 [Default] $n = 0$
 [Description] Selects character size, using n .

n	Character size	Enlarged to vertical direction	Enlarged to horizontal direction
0	Normal	1 time	1 time
1	Double-height	2 times	1 time
16	Double-width	1 time	2 times
17	Quadruple	2 times	2 times

GS (B pL pH m [$a1$ $b1$]...[ak bk])

[Name] Customize ASB status bits
 [Format] ASCII GS (B pL pH m [$a1$ $b1$]...[ak bk]
 Hex 1D 28 42 pL pH m [$a1$ $b1$]...[ak bk]
 Decimal 29 40 66 pL pH m [$a1$ $b1$]...[ak bk]
 [Range] $(pL + (pH \times 256)) = 2, 3, 5$
 $m = 97$
 $a = 0, 67, 69, 70$
 $b = 44$ (when $a = 69$), 45 (when $a = 67$), 54 (when $a = 70$)
 [Description] Changes the bit assignments of the ASB status bit. (Bit customization)

- pL, pH specifies $(pL \times (pH \times 256))$ for the number of bytes after pH (m and [$a1$ $b1$]...[ak bk])
- a specifies the bit of the ASB to be customized.
- b specifies the ASB status.
- The combinations of a and b which is able to be set are as follows:

a	b	Bit of ASB status	ASB status to be assigned
0	--	Cancels the setting of bit assignment	
67	45	Bit 3 of the fourth byte	Slip ejection waiting status
69	44	Bit 5 of the fourth byte	Slip insertion waiting status
70	54	Bit 6 of the fourth byte	Slip paper width sensor status

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GS (D pL pH m [a1 b1]...[ak bk]

[Name]	Enable/disable real-time command							
[Format]	ASCII	GS	(D	pL	pH	m	[a1 b1]...[ak bk]
	Hex	1D	28	44	pL	pH	m	[a1 b1]...[ak bk]
	Decimal	29	40	68	pL	pH	m	[a1 b1]...[ak bk]
[Range]	$3 \leq pL + (pH \times 256) \leq 65535$ ($0 \leq pL \leq 255, 0 \leq pH \leq 255$) $m = 20$ $a = 1, 2$ $b = 0, 1, 48, 49$							

[Default]

Real-time command to be affected	Default
DLE DC4 n m t: ($n = 1$) Generate pulse at real-time	Enabled
DLE DC4 n a b: ($n = 2$) Execute power off	Disabled

[Description] Specifies enable or disable of real-time command

- a specifies the real-time command.

a	Real-time command to be affected
1	DLE DC4 n m t: ($n = 1$) Generate pulse at real-time
2	DLE DC4 n a b: ($n = 2$) Execute power off

- b specifies enable or disable.

b	Function
0, 48	Disabled
1, 49	Enabled

GS * x y d1 ... d(x × y × 8)

[Name]	Define downloaded bit image						
[Format]	ASCII	GS	*	x	y	d1 ... d(x × y × 8)	
	Hex	1D	2A	x	y	d1 ... d(x × y × 8)	
	Decimal	29	42	x	y	d1 ... d(x × y × 8)	
[Range]	$1 \leq x \leq 255$ $1 \leq y \leq 255$, where $x \times y \leq 14784$ $0 \leq d \leq 255$						

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

- x specifies the number of dots in the horizontal direction to $x \times 8$ dots.
- y specifies the number of dots in the vertical direction to $y \times 8$ dots.
- d specifies bit image data.

[Note] • A downloaded bit image and a user-defined character cannot be defined simultaneously.

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GS / m

[Name] Print downloaded bit image
 [Format] ASCII GS / m
 Hex 1D 2F m
 Decimal 29 47 m
 [Range] $0 \leq m \leq 3, 48 \leq m \leq 51$
 [Description] Prints a downloaded bit image.

- *m* specifies a bit image mode.

<i>m</i>	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	360 dpi	360 dpi
1, 49	Double-width	360 dpi	180 dpi
2, 50	Double-height	180 dpi	360 dpi
3, 51	Quadruple	180 dpi	180 dpi

dpi: dots per 25.4 mm {1”}

GS :

[Name] Start/end macro definition
 [Format] ASCII GS :
 Hex 1D 3A
 Decimal 29 58
 [Description] Starts or ends macro definition.

- The contents of the macro can be defined up to 2048 bytes.

GS B n

[Name] Turn white/black reverse printing mode on/off
 [Format] ASCII GS B n
 Hex 1D 42 n
 Decimal 29 66 n
 [Range] $0 \leq n \leq 255$
 [Default] $n = 0$
 [Description] Turns white/black reverse printing mode on or off.

- When the LSB of *n* is 0, white/black reverse mode is turned off.
- When the LSB of *n* is 1, white/black reverse mode is turned on.

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GS E *n*

- [Name] Select head control method
- [Format] ASCII GS E *n*
 Hex 1D 45 *n*
 Decimal 29 69 *n*
- [Range] $n = 0, 20$
- [Default] $n = 0$
- [Description] Selects head control method to the current selected paper.

- *n* specifies the head control method from the table below.

<i>n</i>	Head Control Method
0	Economy
20	Fine

- [Notes]
- Bar code printing is always fine, regardless of the setting of this command.
 - When the extended font A is printed, select fine for the head control method at the beginning of line. If the extended font A is printed in economy mode, the print position may be misaligned.

GS H *n*

- [Name] Select printing position for HRI characters
- [Format] ASCII GS H *n*
 Hex 1D 48 *n*
 Decimal 29 72 *n*
- [Range] $0 \leq n \leq 3, 48 \leq n \leq 51$
- [Default] $n = 0$
- [Description] Selects the printing position of HRI (Human Readable Interpretation) characters when printing a bar code.

- *n* selects the execution of printing and the printing position as follows:

<i>n</i>	Execution of Printing	Printing position
0, 48	No	Not printed
1, 49	Yes	Above the bar code
2, 50	Yes	Below the bar code
3, 51	Yes	Both above and below the bar code

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GS I n

[Name]	Transmit printer ID			
[Format]	ASCII	GS	I	<i>n</i>
	Hex	1D	49	<i>n</i>
	Decimal	29	73	<i>n</i>
[Range]	$1 \leq n \leq 3, 49 \leq n \leq 51, 65 \leq n \leq 67$			
[Description]	Transmits the printer ID specified.			

- *n* specifies the types of the printer ID.

<i>n</i>	Printer ID type	ID
1, 49	Printer model ID	Hexadecimal: 23H Decimal: 35
2, 50	Type ID	See table below
3, 51	Firmware version ID	Depends on Firmware version
65	Firmware version	Depends on Firmware version
66	Manufacturer	EPSON
67	Printer name	TM-J8000

[Type ID]

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Two-byte character code not supported.
1	On	02	2	Auto-cutter equipped.
2	Off	00	0	DIP switch 2-2 is set to Off.
	On	04	4	DIP switch 2-2 is set to On.
3	Off	00	0	No MICR reader.
4	Off	00	0	Not used. Fixed to Off.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

- When the printer ID transmission is specified with ($66 \leq n \leq 67$), the following contents are transmitted:

Header: Hexadecimal = 5FH / Decimal = 95 (1 byte)

Data: Printer information

NUL: Hexadecimal = 00H / Decimal = 0 (1 byte)

GS L nL nH

[Name]	Set left margin				
[Format]	ASCII	GS	L	<i>nL</i>	<i>nH</i>
	Hex	1D	4C	<i>nL</i>	<i>nH</i>
	Decimal	29	76	<i>nL</i>	<i>nH</i>
[Range]	$0 \leq nL \leq 255$				
	$0 \leq nH \leq 255$				
[Default]	$nL = 0, nH = 0$				
[Description]	Sets the left margin to $[(nL + nH \times 256) \times \text{horizontal motion unit}]$ inches.				

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GS P x y

[Name]	Set horizontal and vertical motion units				
[Format]	ASCII	GS	P	x	y
	Hex	1D	50	x	y
	Decimal	29	80	x	y
[Range]	0 ≤ x ≤ 255 0 ≤ y ≤ 255				
[Default]	x = 360, y = 360				
[Description]	Sets the horizontal and vertical motion units to approximately 25.4/x mm {1/x inches} and approximately 25.4/y mm {1/y inches}, respectively.				
	<ul style="list-style-type: none"> When x and y are set to 0, the default setting of each value is used. 				

GS Q 0 m xL xH yL yH d1...dk

[Name]	Print variable vertical size bit image									
[Format]	ASCII	GS	Q	0	m	xL	xH	xL	yH	d1...dk
	Hex	1D	51	30	m	xL	xH	xL	yH	d1...dk
	Decimal	29	81	48	m	xL	xH	xL	yH	d1...dk
[Range]	0 ≤ m ≤ 3, 48 ≤ m ≤ 51 0 ≤ xL ≤ 255 0 ≤ xH ≤ 12, where 1 ≤ (xL + xH × 256) ≤ 3327 0 ≤ yL ≤ 16 yH = 0 0 ≤ d ≤ 255 k = (xL + xH × 256) × (yL + yH × 256)									
[Description]	Prints a variable vertical size bit image.									

- m specifies a mode of the bit image.

m	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	360 dpi	360 dpi
1, 49	Double-width	360 dpi	180 dpi
2, 50	Double-height	180 dpi	360 dpi
3, 51	Quadruple	180 dpi	180 dpi

dpi: dots per 25.4 mm {1"}

- xL, xH specifies (xL + xH × 256) dots in the horizontal direction for the bit image.
- yL, yH specifies (yL + yH × 256) × 8 dots in the vertical direction for the bit image.
- d specifies the definition data of the bit image.
- k specifies the number of the defined bit image data.

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GS T *n*

[Name] Set print position to the beginning of print line

[Format] ASCII GS T *n*
 Hex 1D 54 *n*
 Decimal 29 84 *n*

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

[Description] Sets the print position to the beginning of the print line.

- *n* specifies the data process method in the print buffer when this command is executed.

<i>n</i>	Function
0, 48	Set the print position after the data in the print buffer is deleted.
1, 49	Set the print position after the data in the print buffer is printed.

① GS V *m* ② GS V *m n*

[Name] Select cut mode and cut paper

[Format] ① ASCII GS V *m*
 Hex 1D 56 *m*
 Decimal 29 86 *m*
 ② ASCII GS V *m n*
 Hex 1D 56 *m n*
 Decimal 29 86 *m n*

[Range] ① $m = 0, 1, 48, 49$

② $m = 65, 66$

$0 \leq n \leq 255$

[Description] ① Cuts the paper completely.

② Feeds paper (cutting position + [$n \times$ vertical motion unit]), and cuts the paper completely.

- *n* specifies the paper feeding amount.

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GS W nL nH

[Name]	Set printing area width				
[Format]	ASCII	GS	W	nL	nH
	Hex	1D	57	nL	nH
	Decimal	29	87	nL	nH
[Range]	0 ≤ nL ≤ 255 0 ≤ nH ≤ 255				
[Default]	For paper roll: nL = 156, nH = 3 For slip paper: nL = 44, nH = 11				
[Description]	Sets the current printing area width to [(nL + nH × 256) × horizontal motion unit].				

GS ^ r t m

[Name]	Execute macro					
[Format]	ASCII	GS	^	r	t	m
	Hex	1D	5E	r	t	m
	Decimal	29	94	r	t	m
[Range]	0 ≤ r ≤ 255 0 ≤ t ≤ 255 m = 0, 1					
[Description]	Executes a macro. <ul style="list-style-type: none"> • r specifies the number of times to execute the macro. • t specifies the waiting time for executing the macro. • m specifies macro executing mode from the table below. 					

m	Function
0	Executes the macro r times continuously at the interval of [t × 100 ms].
1	After waiting for [t × 100 ms], blinks the LED indicator and waits for the FEED button to be pressed. After the button is pressed, executes the macro once. Then it repeats the operation r times.

GS a n

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

[Format] ASCII GS a n
 Hex 1D 61 n
 Decimal 29 97 n

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

[Default] $n = 0$ when DIP SW 2-1 is Off, $n = 2$ when DIP SW 2-1 is On.

[Description] Enables or disables ASB (Automatic Status Back) and specifies the status items to include.

- n specifies the status for ASB.

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Drawer kick-out connector pin 3 status disabled.
	On	01	1	Drawer kick-out connector pin 3 status enabled.
1	Off	00	0	Online/offline status disabled.
	On	02	2	Online/offline 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	-	-	-	Undefined.
5	Off	00	0	Slip paper sensor status disabled.
	On	20	32	Slip paper sensor status enabled.
6	Off	00	0	Panel switch status disabled.
	On	40	64	Panel switch status enabled.
7	-	-	-	Undefined.

- The status to be transmitted are the four bytes as follows:

First byte (printer information)

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

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Second byte (printer information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Not in online waiting status.
	On	01	1	During online waiting status.
1	Off	00	0	PAPER FEED switch is turned OFF.
	On	02	2	PAPER FEED switch is turned ON.
2	Off	00	0	No mechanical error.
	On	04	4	Mechanical error has occurred.
3	Off	00	0	No autocutter error.
	On	08	8	Auto cutter error occurred.
4	Off	00	0	Not used. Fixed to Off.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error has occurred.
6	Off	00	0	No automatically recoverable error.
	On	40	64	Automatically recoverable error has occurred.
7	Off	00	0	Not used. Fixed to Off.

Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for ASB
0, 1	Off	00	0	Paper roll near-end sensor: paper adequate.
	On	01	1	Paper roll near-end sensor: paper near end.
2, 3	Off	00	0	Paper roll end sensor: paper present.
	On	04	4	Paper roll end sensor: paper not present.
4	Off	00	0	Not used. Fixed to Off.
5	Off	00	0	TOF sensor: paper present.
	On	20	32	TOF sensor: paper not present.
6	Off	00	0	BOF sensor: paper present.
	On	40	64	BOF sensor: paper not present.
7	Off	00	0	Not used. Fixed to Off.

Fourth byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Slip is selected.
	On	01	1	Slip is not selected.
1	Off	00	0	Can print on slip.
	On	02	2	Cannot print on slip.
2, 3	-	-	-	Undefined.
4	Off	00	0	Not used. Fixed to Off.
5, 6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

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Bit 3 or 5 or 6 can be customized with the **GS (B** command. When the bit customization is executed, the fourth byte is changed as follows:

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Slip is selected.
	On	01	1	Slip is not selected.
1	Off	00	0	Can print on slip.
	On	02	2	Cannot print on slip.
2	--	--	--	Undefined.
3	Off	00	0	Does not wait for slip paper ejection.
	On	08	8	Waits for slip paper ejection.
4	Off	00	0	Not used. Fixed to Off.
5	Off	00	0	Does not wait for slip paper insertion.
	On	20	32	Waits for slip paper insertion.
6	Off	00	0	Slip paper width sensor: paper present.
	On	40	64	Slip paper width sensor: paper not present.
7	Off	00	0	Not used. Fixed to Off.

[Note] If any of the status items in the table above are enabled, the printer transmits the status when this command is executed. The printer automatically transmits the status whenever the enabled status item changes. The ASB is transmitted without confirming whether the host is ready to receive data.

GS f n

[Name] Select font for HRI characters
 [Format] ASCII GS f n
 Hex 1D 66 n
 Decimal 29 102 n
 [Range] n = 0, 1, 48, 49
 [Default] n = 0
 [Description] Selects a font for the HRI (Human Readable Interpretation) characters used when printing a bar code.

- n specifies the font of the HRI characters from the following table:

n	Font
0, 48	Font A (22 × 48)
1, 49	Font B (18 × 36)

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GS h n

[Name]	Select bar code height			
[Format]	ASCII	GS	h	<i>n</i>
	Hex	1D	68	<i>n</i>
	Decimal	29	104	<i>n</i>
[Range]	$1 \leq n \leq 255$			
[Default]	$n = 162$			
[Description]	Selects the height of the bar code to [$n \times 2$ dots].			

GS j n

[Name]	Enable/disable Automatic Status Back (ASB) for ink			
[Format]	ASCII	GS	j	<i>n</i>
	Hex	1D	6A	<i>n</i>
	Decimal	29	106	<i>n</i>
[Range]	$1 \leq n \leq 255$			
[Default]	$n =$ when DIP SW 2-1 is Off $n =$ when DIP SW 2-1 is On			
[Description]	Enables on disables the ASB (Automatic Status Back) for ink. <ul style="list-style-type: none"> n specifies the status for the ASB in the table below. 			

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disables the status for online/offline provided by the inking mechanism.
	On	01	1	Enables the status for online/offline provided by the inking mechanism.
1	Off	00	0	Disables the status for sensors for ink.
	On	02	2	Enables the status for sensors for ink.
2 - 7	-	-	-	Undefined.

- The printer transmits the following four ASB status items:
1) Header: Hexadecimal = 35H/Decimal =53

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2) Status A

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Ink near-end sensor: ink is adequate.
	On	01	1	Ink near-end sensor: ink is nearly gone.
1	Off	00	0	No ink end.
	On	02	2	Ink cartridge is empty (ink end)
2	Off	00	0	Ink cartridge sensor: Cartridge is present.
	On	04	4	Ink cartridge sensor: Cartridge is not present.
3, 4	-	-	-	Undefined.
5	Off	00	0	Not in a cleaning operation.
	On	20	32	In a cleaning operation.
6	On	40	64	Not used. Fixed to On.
7	Off	00	0	Not used. Fixed to Off.

3) Status B: Hexadecimal: 40H / Decimal = 64

4) NUL: Hexadecimal: 00H / Decimal = 0

[Note]

- If any of the status items in the table above are enabled, the printer transmits the status when this command is executed. The printer automatically transmits the status whenever the enabled status item changes. The ASB is transmitted without confirming whether the host is ready to receive data.

① GS k m d1...dk NUL ② GS k m n d1...dn

[Name]	Print bar code						
[Format]	①	ASCII	GS	k	m	d1...dk	NUL
		Hex	1D	6B	m	d1...dk	00
		Decimal	29	107	m	d1...dk	0
	②	ASCII	GS	k	m	n	d1...dn
		Hex	1D	6B	m	n	d1...dn
		Decimal	29	107	m	n	d1...dn
[Range]	①	0 ≤ m ≤ 6 (k and d depends on the bar code system used)					
	②	65 ≤ m ≤ 73 (n and d depends on the bar code system used)					

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[Description] ① Selects a bar code system and prints the bar code.

- *m* selects a bar code system.
- *d* specifies the bar code data.
- *k* specifies the number of bar code data to be printed.

<i>m</i>	Bar Code System	Number of Characters	Remarks
0	UPC-A	$11 \leq k \leq 12$	$48 \leq d \leq 57$
1	UPC-E	$11 \leq k \leq 12$	$48 \leq d \leq 57$
2	JAN13(EAN13)	$12 \leq k \leq 13$	$48 \leq d \leq 57$
3	JAN8(EAN8)	$7 \leq k \leq 8$	$48 \leq d \leq 57$
4	CODE39	$1 \leq k$	$48 \leq d \leq 57, 65 \leq d \leq 90,$ $d = 32, 36, 37, 42, 43, 45, 46, 47$
5	ITF	$1 \leq k$ (even number)	$48 \leq d \leq 57$
6	CODABAR(NW7)	$1 \leq k$	$48 \leq d \leq 57, 65 \leq d \leq 68,$ $d = 36, 43, 45, 46, 47, 58$

② Selects a bar code system and prints the bar code.

- *m* selects a bar code system.
- *n* specifies the number of bar code data to be printed.
- *d* specifies the bar code data.

<i>m</i>	Bar Code System	Number of Characters	Remarks
65	UPC-A	$11 \leq n \leq 12$	$48 \leq d \leq 57$
66	UPC-E	$11 \leq n \leq 12$	$48 \leq d \leq 57$
67	JAN13(EAN13)	$12 \leq n \leq 13$	$48 \leq d \leq 57$
68	JAN8(EAN8)	$7 \leq n \leq 8$	$48 \leq d \leq 57$
69	CODE39	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 90,$ $d = 32, 36, 37, 42, 43, 45, 46, 47$
70	ITF	$2 \leq n \leq 255$ (even number)	$48 \leq d \leq 57$
71	CODABAR(NW7)	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 68,$ $d = 36, 43, 45, 46, 47, 58$
72	CODE93	$1 \leq n \leq 255$	$0 \leq d \leq 127$
73	CODE128	$2 \leq n \leq 255$	$0 \leq d \leq 127$

- Consider that a quiet zone (left or right side space area according to bar code specifications) must be ensured for a bar code printing.
- When the bar code system used is UPC-A or UPC-E, the printer prints the bar code data after receiving 11 bytes of bar code data and adds a modular check character automatically.
- When the bar code system used is JAN13 (EAN13), the printer prints the bar code after receiving 12 bytes of bar code data and adds a modular check character automatically.
- When the bar code system used is JAN8 (EAN8), the printer prints the bar code after receiving 7 bytes of bar code data and adds a modular check character automatically.
- When the bar code system used is CODE93 or CODE128, the printer adds a check digit automatically.

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- The top of the bar code data string must be a code set selection character (any of CODE A, CODE B or CODE C) of CODE93 which selects the first code set.
- The top of the bar code data string must be a code set selection character (any of CODE A, CODE B or CODE C) of CODE 128 bar code which selects the first code set.
- Special characters are defined by combining two characters "{" and one character of CODE128 bar code. The ASCII character "{" is defined by transmitting "{" twice consecutively.

Specific character	Transmit data		
	ASCII	Hex	Decimal
FNC1	{1	7B, 31	123, 49
FNC2	{2	7B, 32	123, 50
FNC3	{3	7B, 33	123, 51
FNC4	{4	7B, 34	123, 52
CODE A	{A	7B, 41	123, 65
CODE B	{B	7B, 42	123, 66
CODE C	{C	7B, 43	123, 67
SHIFT	{S	7B, 53	123,83

Specific character	Transmit data		
	ASCII	Hex	Decimal
"{"	{{	7B, 7B	123, 123

- HRI characters for the shift characters (SHIFT) or code set selection (CODE A, CODE B, CODE C) of CODE 128 bar code are not printed.
- HRI characters for the function characters (FNC1, FNC2, FNC3, FNC4) or the control character (<00H> to (1F>H and <7F>H) of CODE128 are spaces.

GS r n

[Name] Transmit status
 [Format] ASCII GS r n
 Hex 1D 72 n
 Decimal 29 114 n

[Range] 1 ≤ n ≤ 5, 49 ≤ n ≤ 53

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

n	Function
1, 49	Transmits paper sensor status [A].
2, 50	Transmits drawer kick-out connector status.
3, 51	Transmits slip status.
4, 52	Transmits ink status.
5, 53	Transmits paper sensor status [B].

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- The status types to be transmitted are shown below:

Paper sensor status [A] ($n = 1, 49$):

Bit	Off/On	Hex	Decimal	Status for ASB
0, 1	Off	00	0	Paper roll near-end sensor: paper adequate.
	On	03	3	Paper roll near-end sensor: paper near end.
2, 3	Off	00	0	Paper roll end sensor: paper adequate.
	On	0C	12	Paper roll end sensor: paper near end.
4	Off	00	0	Not used. Fixed to Off.
5	Off	00	0	TOF sensor: paper present.
	On	20	32	TOF sensor: paper not present.
6	Off	00	0	BOF sensor: paper present.
	On	40	64	BOF sensor: paper not present.
7	Off	00	0	Not used. Fixed to Off.

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

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

Slip Status ($n = 3, 51$)

The remaining print area (the number of dots in the vertical direction for one character) is transmitted as values from the table below.

The number of remaining dots	Slip status		The number of remaining dots	Slip status	
	Hex	Decimal		Hex	Decimal
0 - 47	00	0	384 - 431	08	8
48 - 95	01	1	432 - 479	09	9
96 - 143	02	2	480 - 527	0A	10
144 - 191	03	3	528 - 575	0B	11
192 - 239	04	4	576 - 623	0C	12
240 - 287	05	5	624 - 671	0D	13
288 - 335	06	6	672 - 719	0E	14
336 - 383	07	7	720 or more	0F	15

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Ink status ($n = 4, 52$)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Ink near-end sensor: Ink is adequate.
	On	01	1	Ink near-end sensor: Ink cartridge is empty. (ink end)
1-3	-	-	-	Undefined.
4	Off	00	0	Not used. Fixed to Off.
5, 6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

Paper sensor status [B] ($n = 5, 53$)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Slip paper width sensor: paper present.
	On	01	1	Slip paper width sensor: paper not present.
1-3	-	-	-	Undefined.
4	Off	00	0	Not used. Fixed to Off.
5, 6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

GS v 0 m xL xH yL yH d1...dk

[Name] Print raster bit image

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

[Range] $0 \leq m \leq 3, 48 \leq m \leq 51$
 $0 \leq xL \leq 255$
 $0 \leq xH \leq 3, \text{ where } 1 \leq (xL + xH \times 256) \leq 1023$
 $0 \leq yL \leq 255$
 $0 \leq yH \leq 255, \text{ where } 1 \leq (yL + yH \times 256) \leq 65535$
 $0 \leq d \leq 255$
 $k = (xL + xH \times 256) \times (yL + yH \times 256)$

[Description] Selects a raster bit image mode.

- m specifies a mode of the bit image.

m	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	360 dpi	360 dpi
1, 49	Double-width	360 dpi	180 dpi
2, 50	Double-height	180 dpi	360 dpi
3, 51	Quadruple	180 dpi	180 dpi

dpi: dots per 25.4 mm {1"}

- xL, xH specifies $(xL + xH \times 256) \times 8$ dots in the horizontal direction for the bit image.
- yL, yH specifies $(yL + yH \times 256)$ dots in the vertical direction for the bit image.
- d specifies the definition data of the bit image.
- k specifies the number of the defined bit image data.

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GS w n

[Name] Set bar code width
 [Format] ASCII GS w n
 Hex 1D 77 n
 Decimal 29 119 n
 [Range] $2 \leq n \leq 6, 68 \leq n \leq 76$
 [Default] $n = 3$
 [Description] Set the horizontal size of the bar code, using n as follows:

n		Module Width (mm) for Multi-level Bar Code	Binary-level Bar Code	
			Thin element width (mm)	Thick element width (mm)
2	68	0.282	0.282	0.706
	69	0.353	0.353	0.882
3	70	0.423	0.423	1.129
	71	0.494	0.494	1.235
4	72	0.564	0.564	1.411
	73	0.635	0.635	1.588
5	74	0.706	0.706	1.834
	75	0.776	0.776	1.940
6	76	0.847	0.847	2.258

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

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			NEXT App.1	SHEET 104

APPENDIX A MISCELLANEOUS NOTES

- 1) Notes on using the ink cartridge
 - a) Keep the ink cartridge out of the reach of children.
 - b) Do not disassemble the cartridge. The ink can permanently stain clothing.
 - d) Do not refill the cartridge.
 - e) Be sure that the storage temperature stays between 0°C and 40°C {32°F and 104°F}.
 - f) Using any solvent based on alcohol, benzine, thinner, toluene, or ketone may damage plastic parts.
 - g) If the ink cartridge is left below -8°C {17.6°F}, the ink will freeze. If the ink has been at a temperature of -20°C {-4°F}, it will take about three hours at 25°C {77°F} before it becomes usable.
 - h) If water repellent paper such as an art paper, is used to print, the print may smear even though ink dries quickly. Use paper which does not cause this problem.
 - i) When you dispose of the cartridge, treat it as an industrial disposable material. If any law or regulation of your country or region applies to this material, be sure to follow the law or regulation.
 - j) Do not use the used ink cartridge as an ink discharging cartridge.
 - k) This is a genuine EPSON ink cartridge for EPSON TM-J8000 series printers. It is designed for high quality printing and long-term reliability of the printer. EPSON does not assume responsibility for problems resulting from using an unauthorized ink cartridge or refilling an ink cartridge.

- 2) Notes on using the auto-cutter
 - a) The emergency cutter on the exit part of the paper roll is only for cutting paper when paper is jammed, Make sure not to touch the cutter blade. Otherwise, you may be injured.
 - b) When the paper roll cover is opened, it is possible to touch the blades of the auto cutter. Make sure not to touch the cutter blade. Otherwise, you may be injured.
 - c) When the paper roll cover is opened, it is possible to touch the paper guide of the cutter unit, but be careful not to push on the guide because it can be bent. When there is a paper jam, open the paper roll cover and carefully remove the jammed paper by hand. Never pull the paper out and never use tools to remove it.

- 3) Notes on using slip paper and check paper
 - a) 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 dirty.

- 4) Notes on setting up the printer
 - a) The printer must be horizontal during operation.
 - b) Do not set the printer in a dusty place.
 - c) Protect the printer from impact. Otherwise, there may be printing problem.
 - d) Make sure that the cords or other foreign objects are not caught on the printer base when the printer is installed.

- 5) Note about rust on the cutting edge
 - a) Because this printer uses plated steel, the cutting edges are subject to rust. However, this does not affect the printer performance.

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			NEXT App.2	SHEET App.1

6) Notes on cleaning the print head

- a) The printer takes about two minutes for initial ink filling when the printer is first used. Never turn the printer off during an initial ink filling operation. The POWER LED blinks during an ink filling operation, then stays on when it is finished.
If the printer is turned off during the ink filling operation, it is necessary to perform this ink filling operation again. This will waste ink.
- b) During the initial ink filling operation, it is recommended that the interface cable to the host computer not be connected.
- c) Do not use the manual cleaning button unless there is a problem with print quality.
- d) When the POWER LED is blinking, the printer is in a cleaning or in an ink filling state. Do not open the printer cover or turn the printer off when the POWER LED is blinking.
- e) To operate the manual cleaning button, it is necessary to open the printer cover. However, after the cleaning button is pressed, close the printer cover as soon as possible.

7) Notes on the installing and removing an ink cartridge

- a) Do not install or remove an ink cartridge if not necessary. Otherwise, ink may be wasted, and the life of the ink cartridge may be reduced.
- b) When the ink cartridge is installed, make sure to push the ink cartridge lever until it stops.
- c) Because an ink supply needle is installed inside the ink cartridge holder, do not insert your fingers there.

8) Notes on transporting and maintaining the printer

- a) Before the printer is transported, turn off the secondary power switch. Then the POWER LED will start blinking. When the POWER LED stops blinking, turn off the primary (rear) power switch. Then remove the ink cartridge and the AC cable. Then pack the printer in the exclusive carton it was shipped in.
- b) Do not turn the printer upside down when the printer is transported.

9) Notes on setting the DIP switches

- a) When changing the DIP switch settings, set the printer on its left side (the side nearest the ink cartridge). Do not turn the printer upside down.

10) Notes on handling the power supply cover on the printer rear panel

- a) Do not open the power supply cover on the rear panel of the printer. This is a metal cover that encloses the printer's high voltage power supply.

11) Notes on the customer display connector

- a) Do not connect a telephone jack (RJ-11) or the drawer kickout connector plug to the customer display connector. Otherwise, the printer or the drawer may be damaged.

12) Notes on printing bar codes

- a) When bar code printing is executed, it is recommended to print in a single printing direction.
- b) The TM-J8000 does not support a ladder bar code print.
- c) Note that the recognition rate for bar code reading may be affected by different paper material, the characteristics of the bar code reader or others.

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13) Notes on printing the extended font A

- a) When the extended font A is printed, select fine for the head control method at the beginning of line. If the extended font A is printed in economy mode, the print position may be misaligned.
- b) Note that the recognition rate for OCR reading may be affected by different paper material, the characteristics of the OCR reader or others.

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			NEXT App.4	SHEET App.3

APPENDIX B CHANGING THE INK CARTRIDGE

- a) Check that the printer power is turned on. If the printer power is turned off, turn the printer power on, in the order of the primary switch (on the rear panel) first, then the secondary (on the front panel).
- b) Check that the INK OUT LED on the printer is on. If the INK OUT LED is blinking, the ink in the ink cartridge is almost gone.
- c) Open the ink cartridge cover.
- d) Pull back the ink cartridge lever.
- e) Lift out the used cartridge.
- f) Insert the new cartridge label-side up. Push the lever back toward the front of the printer, and close the cover.
- g) The printer will start the ink changing process automatically. It takes approximately one minute during which time the POWER LED blinks. During this operation, do not turn the printer power off. If the printer is turned off during the ink filling operation, it is necessary to perform this ink filling operation again. This will cause waste of ink.
- h) When the ink cartridge changing process is finished, the POWER LED stays on and the printer stands by for normal printing.

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			NEXT App.5	SHEET App.4

APPENDIX C INSTALLING OR RELACING THE PAPER ROLL

- a) Make sure that the printer is turned on. (If the power is not on, turn on the rear power switch first and then turn on the front power switch.)
- b) Open the paper roll cover.
- c) Insert a paper roll into the paper roll holder so that the paper comes off the roll from below.
- d) Hold on to the end of the paper and pull out a small amount. Then close the cover and tear off the extra paper by pulling it toward the front of the printer.

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			NEXT App.6	SHEET App.5

APPENDIX D: 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	Space page top address	
	22 × 48	18 × 36
254	57C00H	4F800H
255	5BE00H	53A00H

2) Calculating the character data top address

The character data top address is calculated as follows:

Character data top address = Space page top address + (character code - 80H) × 132

3) Example configuring the font data

- 22 × 48 font (in case of character code 90H on page 255)

Character data top address = BE00H + (90H - 80H) × 132 = 5C640H

	Address	Data		Address	Data		Address	Data
0:	5C640H	00H	1:	5C641H	00H	2:	5C642H	00H
3:	5C643H	00H	4:	5C644H	00H	5:	5C645H	00H
	:			:			:	
60:	5C67CH	07H	61:	5C67DH	00H	62:	5C67EH	03H
63:	5C67FH	F0H	64:	5C680H	00H	65:	5C681H	E0H
66:	5C682H	07H	67:	5C683H	00H	68:	5C684H	0FH
69:	5C685H	C0H	70:	5C686H	00H	71:	5C687H	E0H
72:	5C688H	03H	73:	5C689H	C0H	74:	5C68AH	7FH
75:	5C68BH	00H	76:	5C68CH	00H	77:	5C689H	E0H
	:			:			:	
120:	5C6B8H	00H	121:	5C6B9H	00H	122:	5C6BAH	00H
123:	5C6BBH	00H	124:	5C6BCH	00H	125:	5C6BDH	00H
126:	5C6BEH	00H	127:	5C6BFH	00H	128:	5C6C0H	00H
129:	5C6C1H	00H	130:	5C6C2H	00H	131:	5C6C3H	00H

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			NEXT App.7	SHEET App.6

Confidential

- 18 × 36 font (in case of character code F0H on page 254)

Character data top address = 4F800H + (F0H - 80H) × 132 = 531C0H

	Address	Data		Address	Data		Address	Data
0:	531C0H	00H	1:	531C1H	00H	2:	531C2H	00H
3:	531C3H	00H	4:	531C4H	00H	5:	531C5H	00H
	:			:			:	
42:	531EAH	1EH	43:	531EBH	00H	44:	531ECH	07H
45:	531EDH	E7H	46:	531EEH	00H	47:	531EFH	00H
48:	531F0H	1CH	49:	531F1H	00H	50:	531F2H	0FH
51:	531F3H	87H	52:	531F4H	00H	53:	531F5H	00H
54:	531F6H	1CH	55:	531F7H	00H	56:	531F8H	1FH
57:	531F9H	07H	58:	531FAH	00H	59:	531FBH	00H
	:			:			:	
105:	53229H	00H	106:	5322AH	00H	107:	5322BH	00H
108:	5322CH	00H	109:	5322DH	00H	110:	5322EH	00H
	:			:			:	
129:	53241H	00H	130:	53242H	00H	131:	53243H	00H

4) Notes

Do not define the dots located at or after the 18th dot from the left horizontally, and at or after the 36th dot from the top vertically. If you do so, they will not be printed.

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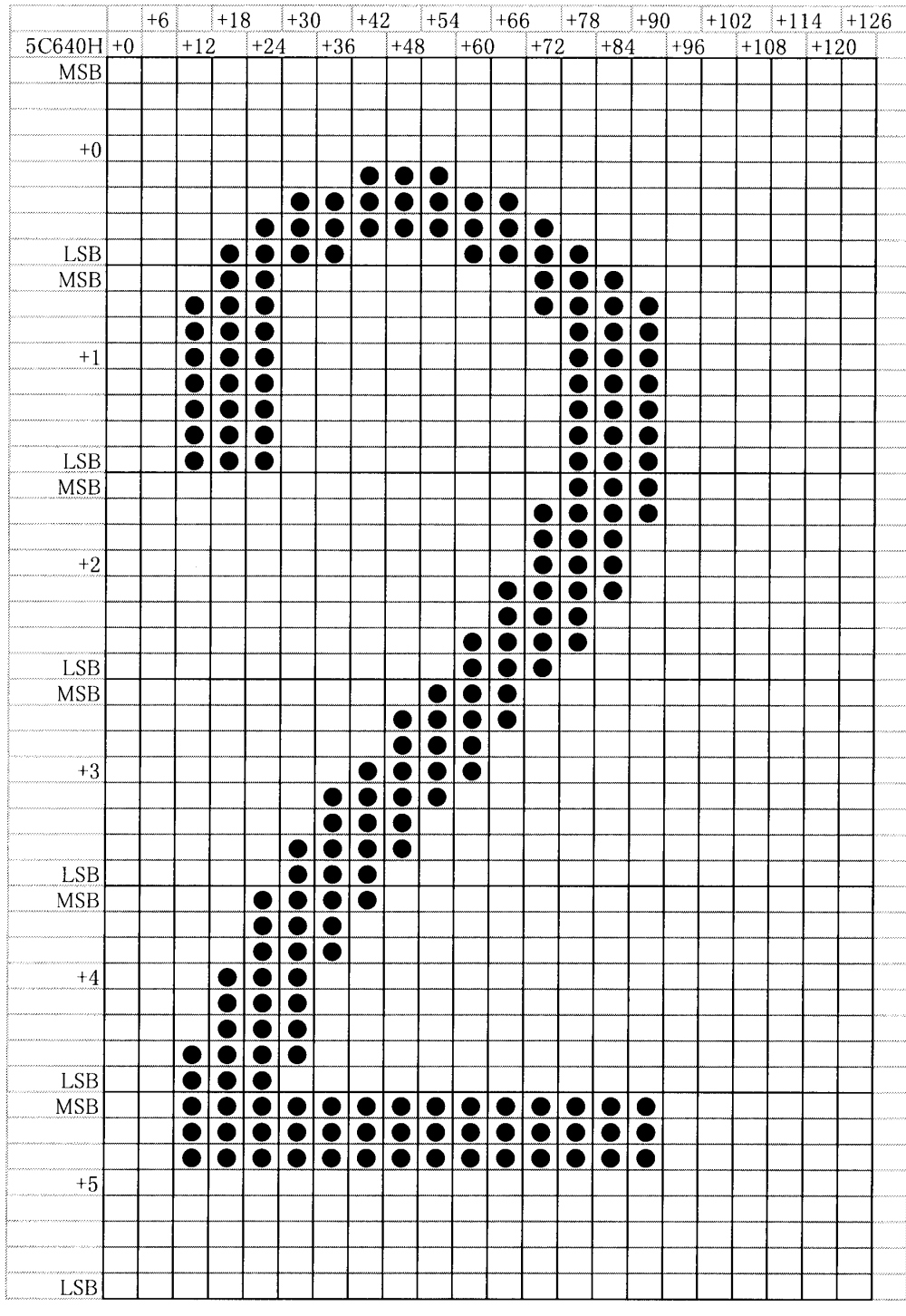


Figure D.1 22 × 48 Font

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	+6	+18	+30	+42	+54	+66	+78	+90	+102	+114	+126
531C0H +0											
MSB										0	0
										0	0
										0	0
+0				●	●	●	●	●			
			●	●	●	●	●	●			
		●	●	●	●	●	●	●			
LSB		●	●	●							
MSB	●	●	●	●							
	●	●	●								
+1	●	●	●								
LSB											
MSB											
+2											
LSB											
MSB											
+3											
LSB											
MSB											
+4	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
LSB	0	0	0	0	0	0	0	0	0	0	0
MSB	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
+5	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
LSB	0	0	0	0	0	0	0	0	0	0	0

Figure D.2 18 x 36 Font

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			NEXT App.10	SHEET App.9

APPENDIX E: 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 (*d) of the paper spool should be 10mm or more.
- 2) Set the paper roll diameter A to obtain the corresponding adjustment position from the table below.

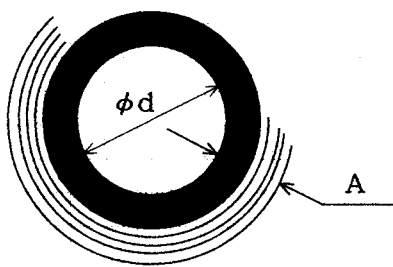


Table E.1

A	Adjustment position
Approx. 12mm	#1
Approx. 10mm	#2
Approx. 8mm	#3
Approx. 6mm	#4
Approx. 4mm	#5

Figure E.1

- NOTES:
1. Since diameter A corresponding to the adjustment position in the table is calculated values, 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 pull up. 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.

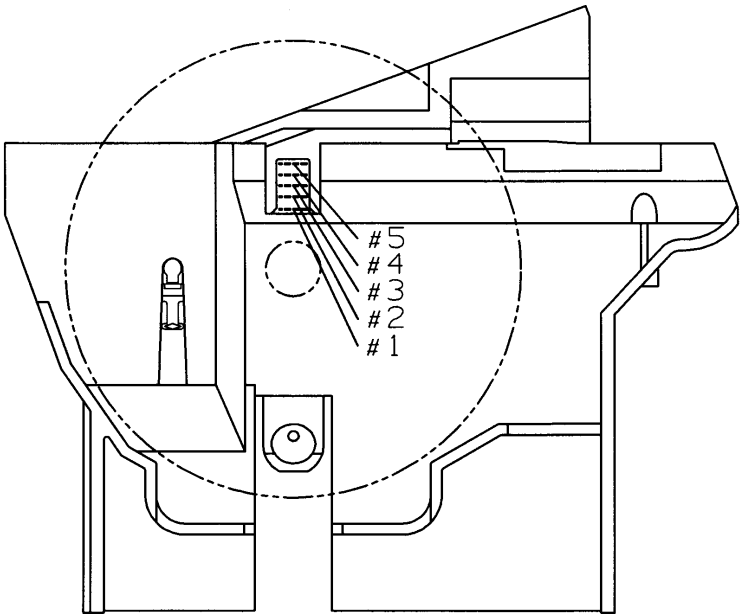


Figure E.2

EPSON	TITLE	SHEET REVISION	NO.	
	TM-J8000 Specification (STANDARD)	E	NEXT App.11	SHEET App.10

APPENDIX F: 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. (*1)
- When the drawer open/close signal is used, a switch must be provided between drawer kick-out connector pins 3 and 6. (*2)
- The resistance of the load must be 24 Ω or more, or the input current must be 1 A or less. (*3)
- 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. (*4)

NOTES: (*1) Operating the printer with incorrectly installed devices voids the warranty.

(*2) Connecting devices other than the drawer open/close switch voids the warranty.

(*3) 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.

(*4) Connecting power supply other than that specified voids the warranty.

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APPENDIX G: NOTES ON TURNING THE PRINTER'S POWER OFF

In order to maintain print quality, the print head must be capped before the printer is turned off. This is done when the secondary (front) power switch is turned off. Therefore, the secondary power switch should always be turned off first.

If the secondary power switch is covered by the attached power switch cover and the printer's power is turned off using the power switch (primary side) on the rear panel (or the AC power input is cut off to turn the printer off), make sure to execute the **DLE DC4** ($n = 2$) command first. Below is the description of how to turn the power off using the power switch (primary side) on the rear panel or cutting the AC power input.

G.1 Setting up the printer

Follow the procedure for setting the printer first.

- 1) Turn the printer's power off using the power switch (secondary side) on the front panel.
- 2) Wait until the power LED turns off.
- 3) Turn off the power switch (primary side) on the rear panel.
- 4) Open the DIP switch cover on the printer bottom, and turn DIP switch 2-4 on; then close the cover.
- 5) Turn the printer's power on using the power switch (secondary side) on the front panel.
- 6) Attach the power switch cover on the power switch (secondary side) on the front panel.

G.2 Power off control by the host

The following is an example of the printer power off process when the printer is turned off using **DLE DC4** ($n = 2$) command.

- 1) Transmits the following continuous procedure before the system is turned off.
 - ① Execute the last print command such as **LF, FF, ESC d**, etc.
 - ② Execute **GS (D pL pH m a b** ($pL=3, m = pH=0, m =20, a =2, b =1$)
 - ③ Execute **GS r n** ($n=1$)
- 2) Waits for the paper sensor status from the printer by the **GS r** command.
- 3) Transmits **DLE DC4 n a b** ($n=2, a =1, b =8$)
- 4) Waits for the power off status
 - The power off status is transmitted by the power-off sequence within 10 seconds after transmitting **DLE DC4 n a b**.
 - If the power off status is not checked, waits for 10 seconds or more after transmitting **DLE DC4 n a b**.
 - For the serial interface model, the printer status is transmitted regardless of the condition of the host.
 - For the parallel interface model, after transmitting **DLE DC4 n a b**, the printer is required to be ready for receiving data from the host.

NOTE: The printer executes the software sequence, but the power is not cut.

- 5) Turn the system power (the host and the printer) off.

To turn the printer power off, use the power switch (primary side) on the rear panel or the cut the AC power supply.

NOTE: Do not execute a reset to the printer until the printer power is turned off after transmitting **DLE DC4** ($n = 2$).

To turn the printer power on, use the power switch (primary side) on the rear panel.

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