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EPSON

One-Station Printer

TM-U210 series

Specification

STANDARD	
Rev. No.	M
Notes	

Copied Date	
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REVISION SHEET

The table below indicates which pages in this specification have been revised.
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Revisions		Design Section			Sheet Rev. No.					
Rev.	Document	WRT	CHK	APL	Sheet	Rev.	Sheet	Rev.	Sheet	Rev.
A	Enactment	N.Asai	N.Asai	K.Itoh	I	L	17	L	41	L
B	Change	N.Asai	N.Asai	K.Itoh	II	L	18	L	42	L
C	Change	Kawakami	N.Asai	N.Asai	III	L	19	L	43	L
D	Change	Kawakami	N.Asai	K.Itoh	IV	L	20	L	44	L
E	Change	N.Asai	N.Asai	R.Kanai	V	L	21	L	45	L
F	Change	I.Nakayama	--	R.Kanai	VI	L	22	L	46	L
G	Change	I.Nakayama	N.Asai	R.Kanai			23	L	47	L
H	Change	I.Nakayama	N.Asai	R.Kanai			24	L	48	L
I	Change	Y.Matsumoto	--	R.Kanai	1	L	25	L	49	L
J	Change	Y.Matsumoto	--	R.Kanai	2	L	26	L	50	L
K	Change	T.Inakoshi	--	Y.Ito	3	L	27	L	51	L
L	Change	T.Inakoshi	--	Y.Ito	4	L	28	L	52	L
M	Change				5	L	29	L	53	L
					6	L	30	L	54	L
					7	L	31	L	55	L
					8	L	32	L	56	L
					9	M	33	L	57	L
					10	M	34	L	58	L
					11	L	35	L	59	L
					12	L	36	L	60	L
					13	L	37	L	61	L
					14	L	38	L	62	L
					15	L	39	L	63	L
					16	L	40	L	64	L

TITLE	Front Part							
	Cover	Rev. Sheet	Scope	General Description	Table of Contents	Contents	Appendix	Total
TM-U210 series Specification (STANDARD)	1	6	-	3	3	103	11	127

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Revisions		Design Section			Sheet Rev. No.					
Rev.	Document	WRT	CHK	APL	Sheet	Rev.	Sheet	Rev.	Sheet	Rev.
A	Enactment				65	L	89	L	App.8	L
B	Change				66	L	90	L	App.9	L
C	Change				67	L	91	L	App.10	L
D	Change				68	L	92	L	App.11	L
E	Change				69	L	93	L		
F	Change				70	L	94	L		
G	Change				71	L	95	L		
H	Change				72	L	96	L		
I	Change				73	L	97	L		
J	Change				74	L	98	L		
K	Change				75	L	99	L		
L	Change				76	L	100	L		
M	Change				77	L	101	L		
					78	L	102	L		
					79	L	103	L		
					80	L				
					81	L				
					82	L	App.1	L		
					83	L	App.2	L		
					84	L	App.3	L		
					85	L	App.4	L		
					86	L	App.5	L		
					87	L	App.6	L		
					88	L	App.7	L		

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REVISION SHEET

REV.	SHEET	CHANGED CONTENTS
B		The major change for this revision is the addition of bidirectional parallel interface. See below for detail.
	all sheets	Sheet title TM-U200D → TM-200D/PD (Change)
	II	Application Applies to TM-U200D.→ Applies to TM-U200D (RS-232 serial interface specification) or to TM-U200PD (IEEE 1284 bidirectional parallel interface specification). (Change)
	IV ~ VI	Table of contents (Change)
	6	When one original and two copies...slightly curl. (Addition)
	15 ~ 20	2.1.2 IEEE 1284 bidirectional parallel interface (Addition)
	21	2.2 Connectors Figure 2.2.2 (Addition)
	24	3.1.2 Command list ESC c 3 command (Addition)
	25	GS V command
	46	DIP switch settings for parallel interface (Addition)
	63	CR command details (Addition)
	82	ESC c 3 command details (Addition)
	91	GS V command (Addition)
	104	6.5 Ignored Command The parallel... ESC c 6 n (Addition)
	App.12 ~ App.29	APPENDIX G Bidirectiond Parallel Interface (Addition)
C		Major change of this revision is the addition of the color printing specifications.

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REV.	SHEET	CHANGED CONTENTS
E	I	General Description (Change) This specification ..... interface specification
	8	1.10 Reliability (Change) 1) Life ..... of 7.5 million lines.
	45 - 48	3.3.3 DIP Switches Addition of the print head type. (Change)
F	I	The applied models for this specification are changed.
	VI	This page was left blank afle to the deletion of Appendix G.
	5	1.4 Roll Paper Supply Unit Note: .....by glue ... → .....by tape or glue ... 1.5 Paper Specifications Glued types cannot ..... → Glued types such as tape cannot ... “Number of copies:” is added.
	6	(b) Copying capability “Affected model types” are added
	7	1.9 Electrical Specifications Europe (U.K) 240V±10% → 230V±10%
	7	1.11 Reliability 1) Life Print color switching and autocutter are added.
	19	2.1.1.9 1) .....100 bytes ... → ..... 99 bytes ...
	24	3.1 Commands ESC c 3 .....[(Only for parallel interface model)] is newly added. GS V .....[(Only for autocutter equipped model)] is deleted.
	45	Table 3.3.3 and Table 3.3.6 *1: ..... (Fixed to OFF) is deleted.
	49	Table 3.5.2 Auto cutter error (only for ... model) → Auto cutter error.
	50	Table 3.5.3 Pulse width unit is moved to below.
	54–56	4. Case specifications ‘Inch’ unit is added to all dimensions.
	57	5.1 Standard Accessories Europe (U.K.) 240V → 230V
	58	5.2 Options • External power supply PS-150 → AC adapter PS-170 5.3 Interface Board [RS-485..... (Option)] is newly added

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REV.	SHEET	CHANGED CONTENTS
F	65	DLE EOT n [Reference] ..... [3.5.1 Error types] is newly added.
	67	ESC SP n [Description] ..... [$n \times$ (1/160)] inches → [$n \times$ 0.159 mm {1/160 inches}].
	78	ESC T *n* and ESC K [$n \times$ (1/144)] inches → [$n \times$ 0.176 mm {1/144 inches}]
	85	ESC e *n* 48/144 inch → 8.467 mm {48/144 inches}
	86	ESC r *n* [Notes] [•This command ..... printing model] is newly added.
	91	GS V and GS V *m n* [Description] ... [$n \times$(1/144 inches)] → [$n \times$ 0.176 mm {1/144 inches}] and partial cut.
	92	GS a *n* [Reference] .....[3.5.1 Error types] is newly added.
	App.2	Figure A-1. (TM-U200B/PB only) → (Type B only)
	App.5	Appendix B Section 1.5 “Paper Specifications” → Section 1.4 “Roll Paper Supply Unit”
	App12 –App.29	Appendix G All descriptions are deleted.
G	21	2.2 Connectors Figure 2.2.1, Figure 2.2.2, and Figure 2.2.3 Change of the figures for power supply connector.
H	All	• All page numbers are re-numbered. • Descriptions for model type A/AM are added.
I	All	• "Confidential" is written on the header of all pages. • Descriptions for a multilingual supporting model of the type AM are added.

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REVISION SHEET

REV.	SHEET	CHANGED CONTENTS
J	All	All pages are renumbered.
	I	Nondisclosure Agreement → Confidentiality Agreement
	IV	Table of Contents are changed due to the reason below: Section 2.3.10 (Newly added) 6.3 Exception processing (Deleted)
	7,8	1.11 Applicable Standards All descriptions are changed.
	36	3.2.10 Page 19 (Newly added)
	37-46	3.2.11 and 3.2.20 are renumbered.
	62	6.3 Exception processing (Deleted)
	63	6.4 → 6.3 (renumbered)
	88	ESC t n n=19 (Newly added)
K	IV	Table of Contents 3.3.3 DIP Switches (for type B/D) → 3.3.3 <Intentionally left blank> 3.3.4 DIP Switches (for type A/AM) → 3.3.4 DIP Switches
	19	2.1.2.6 (Changed)
	20	Table 2.1.5, Model type and pin 31 (Deleted)
	47,48,49	3.3.3 DIP switches (for type B/D) (Deleted) 3.3.4 ... (For type A/AM) (Deleted) Table 3.3.7 and 3.3.9, Off position of switch No.2, type A → Type A, B, D, and type AM → type AM, BM, DM Table 3.3.8, Function of switch No.3, Undefined → For internal use only (*1), *1: ... 2-3 .... (Added)
L	All	Model name TM-U200 series → TM-U210 series Type A, AM → Type A (ANK supporting model, multilingual supporting model) Type B, BM → Type B (ANK supporting model, multilingual supporting model) Type D, DM → Type D (ANK supporting model, multilingual supporting model) All pages are renumbered.
	V	Table of contents (changed)
	15	• When pin 6 (DSR) is used. (for type B/D, DSW2-3: ON, for type A/AM, DSW2-7: ON) → (deleted) • When pin 25 (INIT) is used. (for type B/D, DSW2-4: ON, for type A/AM, DSW2-8: ON) → (deleted)
	52	Table 3.5.3 Unrecoverable Errors R/W error (added)
	App.12	APPENDIX F (deleted)
M	9, 10	1.11 EMI and Safety Standards Applied Europe: CE marking EN50082-1 → EN55024

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General Description

This specification applies to the TM-U210 series.

Model type		Two-color printing	Autocutter installed	Take-up device installed	Printing characters	Interface
A	ANK supporting model (*1)	Yes	Yes	Yes	ANK	Serial / Parallel
	Multilingual supporting model (*2)	Yes	Yes	Yes	ANK + Multilingual characters	Serial / Parallel
B	ANK supporting model (*1)	Yes	Yes	--	ANK	Serial / Parallel
	Multilingual supporting model (*2)	Yes	Yes	--	ANK + Multilingual characters	Serial / Parallel
D	ANK supporting model (*1)	Yes or No (single)	--	--	ANK	Serial / Parallel
	Multilingual supporting model (*2)	Yes	--	--	ANK + Multilingual characters	Serial / Parallel

NOTES *1: ANK = alphanumeric characters

*2: Multilingual characters means that the printer can print with Japanese Kanji, Chinese Kanji, Taiwanese Kanji, or Thai characters.

Features

This printer was developed on the basis of the hild performance/casr design concept.

This printer, is a one-station printer that is light, and offers excellent reliability, The design of this printer also emphasizes the satisfichon of the user needs.

- Compact and lightweight
- High-speed printing through logic seeking control
- Excellent reliability and long life due to adoption of a stepping motor both for moving the carriage and for paper feeding
- Flexible paper feed pitch setting permits printing in accordance with any user-defined format
- Conforms with ESC/POS®; excellent universality of control
- Built-in drawer-kick interface provides capability to drive two drawers
- Selectable character fonts (7×9, 9×9)
- Semi-automatic paper loading capability
- AC adapter provides a compact power supply
- Automatic status back (ASB) function that automatically transmits changes in printer status.
- Two-color printing (black and red) (2-color print version only)
- Built-in autocutter (for TM-U210 type A, type B)
- Takeup device installed (for TM-U210 type A)

These and other features make this printer highly suitable for the POS one-station printer market.

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TABLE OF CONTENTS

I. BASIC SPECIFICATIONS

1.1 Printing Specifications

(1) Printing method
Serial impact dot-matrix

(2) Head wire configuration
9-pin serial configuration

(3) Printing directions
Bi-directional printing (logical seeking)

(4) Printing speed
Approx. 3.5 lps (40 column, 16 cpi)
Approx. 6.4 lps (16 column, 16 cpi)
(Excludes data transfer and processing time)
(lps: lines per second)

NOTES:
1. If the printing duty ratio is too high, the operation of the print head is stopped by the duty limit. In such circumstances, the printing speeds shown above cannot be guaranteed.
2. When select red-color or 2-color (black/red) combination printing, the printing speed goes down compared to black-color printing. It is caused by the switching operation in the printer.

(5) Characters per line
Refer to Table 1.2.1.

(6) Characters per inch
Refer to Table 1.2.1.

(7) Printing duty ratio
Refer to Appendix A.

(8) Two-color printing (2-color print version only):
Black and red colors are selectable.

1.2 Character Specifications

(1) Character types
Alphanumerics (95 characters)
Graphics (128 × 8 character tables; 11 tables for the multilingual supporting model)
International characters (32 characters)
The multilingual supporting model supports printing with one of the following characters:

① Japanese Kanji (Two-pass printing font)
JIS (JIS X0208-1990) Level 1, Level 2
② Chinese Kanji (Two-pass printing font)
7580 (GB2312)
③ Taiwanese Kanji (Two-pass printing font)
13494 (Big 5)
④ Thai character (3-pass printing font)
128 characters × 7 pages (133 character types)

(2) Character configuration

7 × 9

9 × 9

16 × 16 (for the multilingual supporting model)

Thai characters: 7 × 27 (for the multilingual supporting model)
9 × 27 (for the multilingual supporting model)

(3) Character dimensions

Refer to Table 1.2.1 (cpl: characters per line) (cpi: characters per inch)

Table 1.2.1 Character Dimensions, Characters Per Inch, Characters Per Line

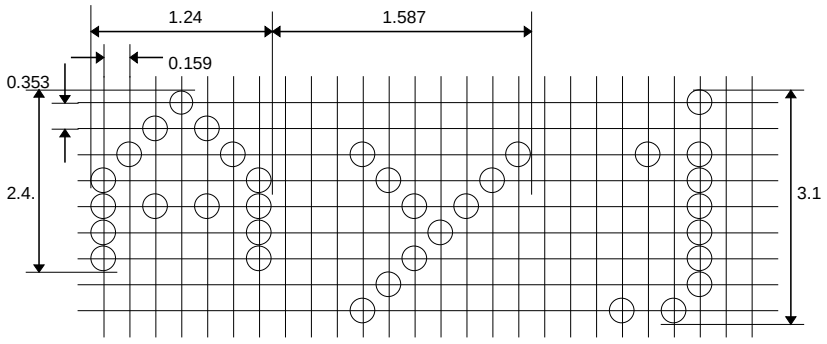
Character configuration		Character dimensions	Dot spacing between	Characters per line	Characters per inch
Horiz. × Vert.	Character type	W x H (mm)	characters	(cpl)	(cpi)
7 × 9	ANK	1.2 × 3.1	3 Half-dots	40	16
	Graphics	1.7 × 3.1	0	40	16
9 × 9	ANK	1.6 × 3.1	3 Half-dots	33	13.3
	Graphics	2.0 × 3.1	0	33	13.3
7 × 9	ANK	1.2 × 3.1	2 Half-dots	42	17.8
	Graphics	1.6 × 3.1	0	42	17.8
9 × 9	ANK	1.6 × 3.1	2 Half-dots	35	14.5
	Graphics	1.9 × 3.1	0	35	14.5
16 × 16	Kanji	2.7 × 2.7	0	25	9.5
			2	22 (*1)	8.9
7 × 27	Thai characters	1.2 × 9.5	3 Half-dots	40	16
9 × 27	Thai characters	1.6 × 9.5	3 Half-dots	33	13.3
7 × 27	Thai characters	1.2 × 9.5	2 Half-dots	42	17.8
9 × 27	Thai characters	1.6 × 9.5	2 Half-dots	35	14.5

(*1): Changeable by software command (default value is 22V.)

NOTE: The default font is 7 × 9, the dot spacing between characters for 3 half-dots or 2 half-dots can be set by changing the DIP switch settings.

ANK alphanumeric characters

Example: 7 × 9 font (with three-dot spacing)



[Units: mm]

Figure. 1.2.1 7 × 9 Font

1.3 Ribbon Cassette

(1) Special ribbon cassettes

Model No.	Color	Ribbon life (*1)
ERC-38 (P)	Purple	4 million characters (with continuous printing at 25°C {77°F})
ERC-38 (B)	Black	3 million characters (with continuous printing at 25°C {77°F})
ERC-38(B/R)	Black/Red	Black: 1.5 million characters (with continuous printing at 25°C) Red: 750,000 characters (with continuous printing at 25°C {77°F})

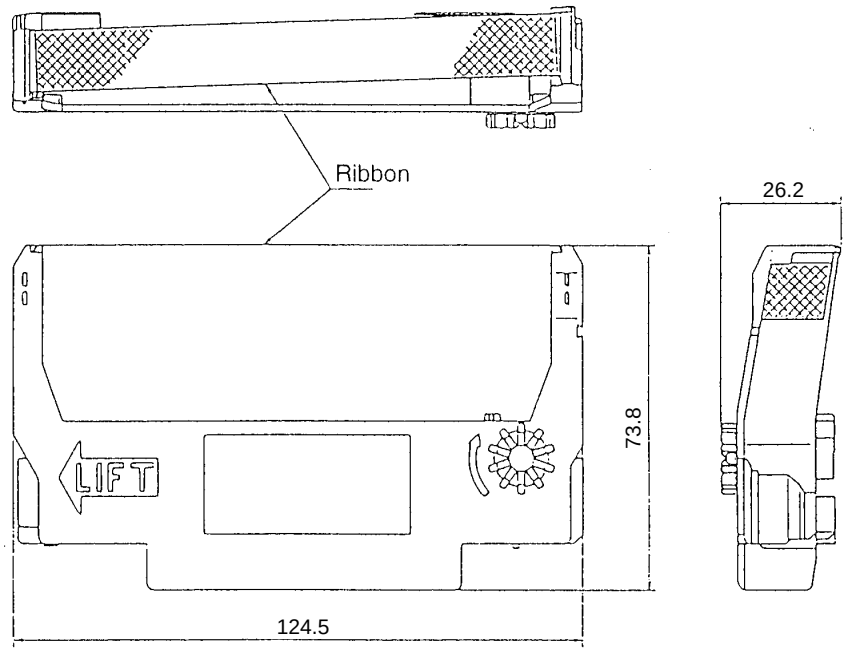
*1: The ribbon life is based on the following conditions:

- Character font: 7 x 9 font (with descenders)
- Printing pattern: ASCII 96-character rolling pattern

  Refer to the printing example for the printing pattern (Appendix Figure A-1 for ERC-38(P)/(B), Figure A-2 for ERC-38(B/R).)

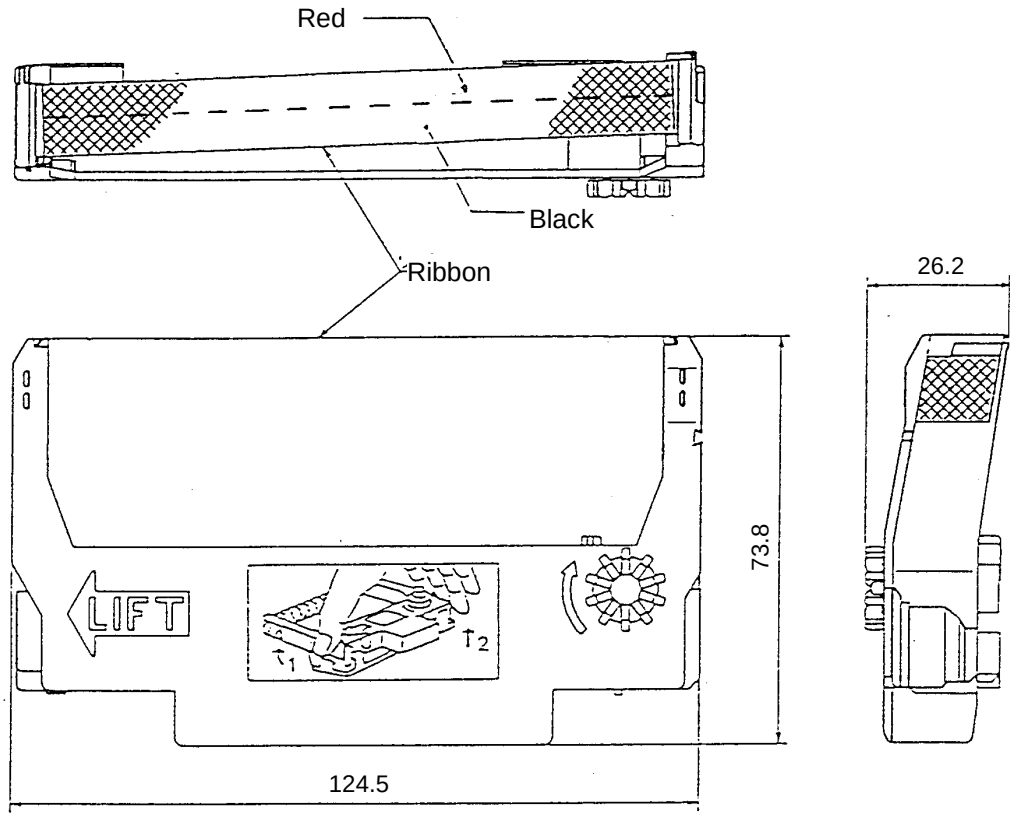
  25°C

(2) External view of ribbon cassette: Refer to Figure. 1.3.1.



[Units: mm]

Figure 1.3.1 External View of ERC-38 (P)/(B)



[Units: mm]

Figure 1.3.2 External View of ERC-38 (B/R)

NOTE: Malfunctions and other problems may arise if a ribbon other than the specified ribbon cassette is used. Seiko Epson does not warrant against problems arising from the use of ribbons other than the specified one.

1.4 Roll Paper Supply Unit

(1) Supply method
Drop-in method

(2) End detector
(a) Detection method — By mechanical microswitch
(b) Detection position — Positioned within the paper path for roll paper; detects the near end of the roll paper

(3) Near end detector (Optional)
(a) Detection method — By mechanical microswitch
(b) Inner diameter of paper roll core: 10.5 to 12.5 mm (Refer to Appendix B for details.)

Note: The standard version of this printer is not equipped with a mechanism that detects the amount of roll paper remaining (a near-end detector), paper rolls may jam if the paper roll core and paper are attached to each other by tape or glue may jam. Because of this, be sure the printer detects the amount of roll paper remaining with the optional near-end detector when the paper is attached in the core by tape or glue.

1.5 Paper Specifications

(1) Paper feeding method: Friction feed

(2) Paper feed interval: Initial setting: 1/6 inch
Can be set in units of 1/144th of an inch by command.

(3) Paper feed speed: Approx. 4.17 inches/second (25 lps)
(during continuous feeding)
(lps: lines per second)

(4) Paper dimensions

(a) Paper roll

Width	76 mm ± 0.5 mm {3" ± 0.02"}
Maximum diameter	83 mm {3.27"}
Core	When there is no near-end detector, always be sure to use a paper roll where the core and the paper are not glued together

①A Normal paper

Paper thickness	1 sheet 0.06 to 0.085 mm {0.0024 to 0.0033"}
Weight	52.3 to 64 g/m^2 {14 to 17 lb} (45 to 55 kg/1000 sheets/1091 x 788 mm)

②Pressure-sensitive paper

Number of copies	Original 1 sheet + up to two copy sheets (For type D only) Original 1 sheet + one copy sheet	
Thickness	0.05 to 0.08 mm {0.002 to 0.0031"} (thickness of one sheet); combined, total thickness must be 0.2 mm {0.008"} or less	
Recommended paper	Paper by Mitsubishi - Carbonless paper (blue)	
Top and middle sheets	N40Hi	(paper thickness: 0.06 mm {0.0024"}, weight: 47.2 g/m^2 {12.6 lb})
Bottom sheet	N60	(paper thickness: 0.08 mm {0.0031"}, weight: 68.0 g/m^2 {18 lb})

Note: When one original and two copies (a total of three sheets) are used in an operating environment of 34°C {93°F} and 90% humidity, the paper roll may slightly curl.

(b) Copying capability
The copying capability is affected by the ambient temperature, and is guaranteed for the temperature ranges shown in the table below.

Number of copies	Guaranteed temperature range	Affected model type
Original + two copies	10° ~ 40°C {50° ~ 164°F}	Type D
Original + one copy	5° ~ 50°C {41° ~ 122°F}	Type A/B/D

1.6 Takeup Device (For Type A)

A takeup device automatically takes the paper roll up in connection with a paper feed motor.

1.7 Autocuttor (For Type A/B)

Partial cut is executed by command.
Partial cut: Cutting with one point left uncut

1.8 Printing Area

(1) Roll paper

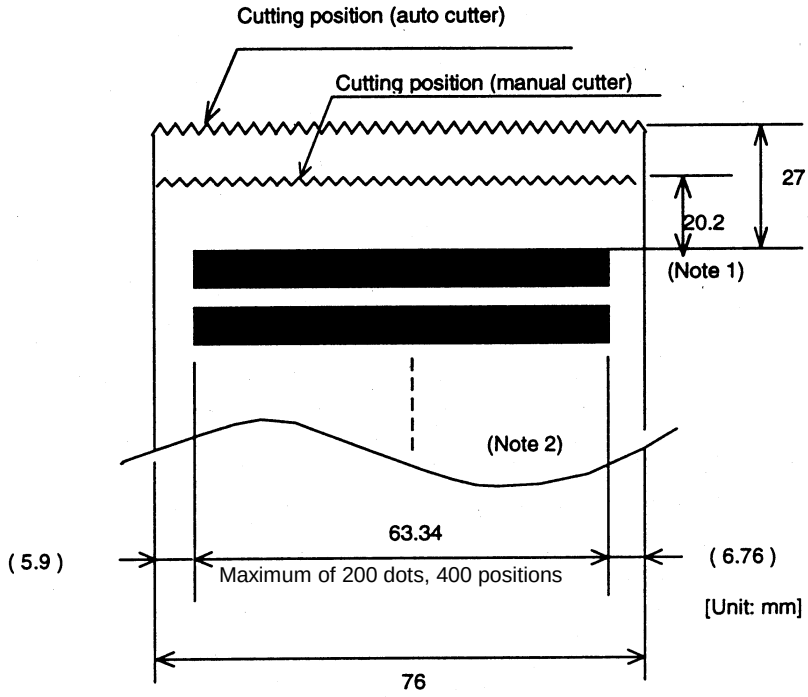


Figure 1.8.1 Printing Area

NOTES: 1. This dimension shows the distance from the manual cutter to the printing position.

2. The values shown for the printing area are the values calculated (between dot centers) according to the wire diameter (0.29 mm {0.0011”}).

1.9 Receive Buffer

Either approximately 1KB or 40 bytes can be selected by DIP switch (for all model types except multilingual supporting model)
Either 512KB or 40 bytes can be selected by DIP switch (for the multilingual supporting model).

1.10 Electrical Specifications

(1) Power supply operation

AC adapter included.

Select one of the following five types, depending on the specifications.

Settings and Shipment	Input Voltage Range	Model Name
Japan	100V ±10% 50/60 Hz	PA-6508
North America	120V ±10% 60 Hz	PB-6509
Europe (Germany)	230V ±10% 50 Hz	PB-6510
Europe (U.K)	230V ±10% 50 Hz	PA-6511
Australia	240V ±10% 50 Hz	PA-6513

(2) Printer power consumption (except for during drawer-kick operation)

While operating 43 W avg.
While in standby 6 W avg.

1.11 Applicable Standards

EMC is measured using SEIKO EPSON's AC Adapter.

Printer: Europe: CE Marking
Directive 89/336/EEC
EN55022 Class B
EN55024
IEC61000-4-2
IEC61000-4-3
IEC61000-4-4
IEC61000-4-5
IEC61000-4-6
IEC61000-4-11
Directive 90/384/EEC
EN45501
Safety: EN60950
North America: EMI: FCC/ICES-003 Class A
Safety: UL1950/CSA C22.2 No.950
Japan: EMC: VCCI Class A
Oceania: EMC: AS/NZS3548
Taiwan: EMC: Class B

Conditions of Acceptability

1) This component has been judged on the basis of the required spacing in the Standard for Information Technology equipment, Including Electrical Business Equipment, UL 1950 and CSA C22.2 No. 950, Sub-clause 2.9, which would cover the component itself if submitted for Listing.
2) This unit is intended to be supplied by a SELV circuit only.
3) The terminals and connectors have not been evaluated for field wiring.

Packaged AC Adapter:

Europe:	CE Marking Directive 89/336/EEC EN55022 Class B EN55024 IEC61000-4-2 IEC61000-4-3 IEC61000-4-4 IEC61000-4-5 IEC61000-4-6 IEC61000-4-11
	Safety: EN60950
North America:	Safety: UL1950/CSA C22.2 No.950
Japan:	Electrical Appliance and Material Control Law
Oceania:	Safety: AS3260

1.12 Reliability

(1) Life

Mechanism:	7,500,000 lines
Print head:	150 million characters (using an average of 2 dots/wire per character). (The printing pattern is based on Appendix A 1) Print Duty).
Print color switching:	Refer to Appendix A 1) Print Duty.
Autocutter:	800,000 cuts End of life is defined as the point at which the component reaches the beginning of the Wearout Period. Recommended paper must be used.

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

(3) MCBF 18,000,000 lines
This is an average failure interval based on failures relating to Wearout and Random Failures up to the life of 7.5 million lines.

1.13 Environmental Specifications

(1) Temperature

During operation: 0 to 50°C {41° to 122°F}. (At 34°C {93°F} or higher, there are humidity restrictions; refer to Figure 1.13.1.)

During storage: -10 to 50°C {14° to 122°F} (excludes paper and ribbon)

(2) Humidity

During operation: 10 to 90% (no condensation)

During storage: 10 to 90% (no condensation; excludes paper and ribbon)

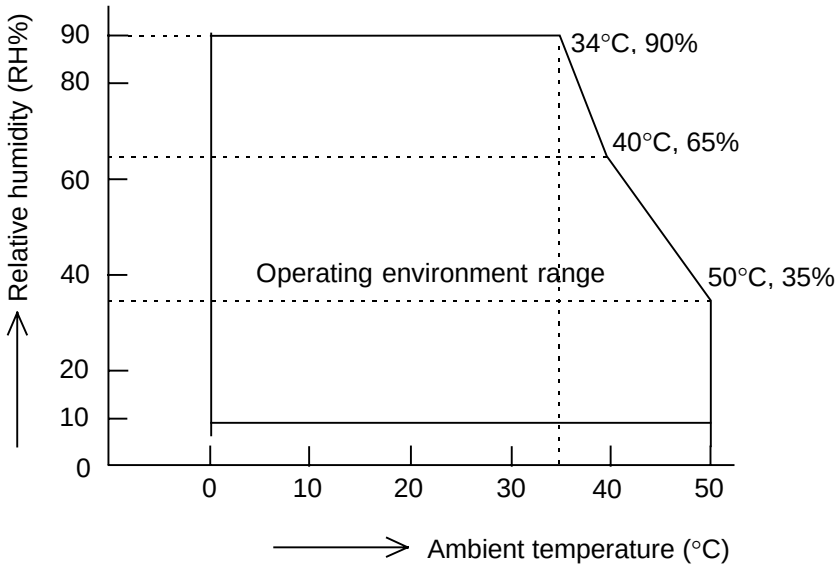


Figure 1.13.1 Operating Temperature and Humidity Range

(3) Vibration resistance

While packed:	Frequency	5 to 55 Hz
	Acceleration	Approximately 19.6 m/s^2 {2G}
	Sweep	10 minutes (half cycle)
	Time	One hour
	Directions	X, Y and Z

(4) Impact resistance

While packed:	Packaging:	Epson's standard packaging
	Height	60 cm {2 feet}
	Directions	1 corner, 3 edges, 6 sides
While not packed:		Height: 5 cm {2"}
	Directions	4 sides, supported on one side

1.14 Printer Installation Stance Position

Install the printer horizontally. Make sure that it does not tilt more than 15°.

The printer must also be installed so that it does not move or vibrate during paper cutting or the drawer kick-out operation.

Fastening tape is available as an option.

2. CONFIGURATION

2.1 Interface Specifications

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' / OFF
	SPACE = +3 to +15 V ... logic '0' / ON
Baud rate:	4800, 9600 bps (bps: bits per second)
Data word length:	7 or 8 bits
Parity:	None, even, odd
Stop bits:	1 or more (Data transmitted from the printer has 1 stop bit (fixed)
Connector:	D-SUB 25 (female) or equivalent

2.1.1.2 Online/Offline switching

The printer does not have an online/offline button. The printer goes online or offline under the following conditions:

<Conditions to go offline>

1) Between the time 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) During paper feeding using the FEED button.
4) Between the time when the printer stops printing due to a paper-end and when the online recovery wait time finishes after loading paper.
5) When an error has occurred.

<Conditions to go online>

1) Automatically after the time when the power is turned on (including reset using the interface) when the printer is ready to receive data.
2) Automatically after the self-test.
3) Automatically after the paper feeding is stopped by releasing the FEED button.
4) After the time when the paper loading is completed, using **GS z 0** command. The operation differs for each model type.

   For types B/D: (default: *t2* =0)

   After the time when the FEED button is pressed while the PAPER OUT LED is blinking after the paper loading is completed.

   For types A: (default: *t2* =1)

   Automatically the time when 0.5 seconds passed after the paper loading is completed.

2.1.1.3 Interface connector terminal assignments and signal functions

Table 2.1.1 Interface Pin Assignments and Functions

<table>
<tr><th>Pin No.</th><th>Signal Name</th><th>Signal Direction</th><th>Function</th></tr>
<tr><td>1</td><td>FG</td><td>–</td><td>Frame ground</td></tr>
<tr><td>2</td><td>TXD</td><td>Output</td><td>Transmit data</td></tr>
<tr><td>3</td><td>RXD</td><td>Input</td><td>Receive data</td></tr>
<tr><td>4</td><td>RTS</td><td>Output</td><td>Same as DTR signal (same as pin 20)</td></tr>
<tr><td>6</td><td>DSR</td><td>Input</td><td>Indicates whether the host can receive data. SPACE indicates that the host can receive data, and MARK indicates that the host cannot receive data. When DTR/DSR control is selected, the printer transmits data after checking this signal (except when data is sent by DLE EOT, 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 The printer is reset when the signal remains MARK for 1 ms or more.</td></tr>
<tr><td>7</td><td>SG</td><td>–</td><td>Signal ground</td></tr>
<tr><td>20</td><td>DTR</td><td>Output</td><td>1) When DTR/DSR control is selected, this signal indicates whether the printer is BUSY.
SPACE indicates that the printer is READY to receive data, and MARK indicates that the printer is BUSY.
DIP switch 1-8 switches conditions for BUSY.
The BUSY (MARK) condition is changed using DIP switch 1-8 as follows:
<table>
<tr><th colspan="2" rowspan="2">Printer Status</th><th colspan="2">Dip Switch 1-8 Status</th></tr>
<tr><th>ON</th><th>OFF</th></tr>
<tr><td rowspan="5">Off-line</td><td>1) The period from power-on (or initialization of the mechanism due to resetting through the interface) until 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) During paper feeding using the FEED button</td><td>----</td><td>BUSY</td></tr>
<tr><td>4) When the printer stops due to a paper-end (ESC c 4).</td><td>----</td><td>BUSY</td></tr>
<tr><td>5) During an error condition</td><td>----</td><td>BUSY</td></tr>
<tr><td colspan="2">6) When the receive buffer is full (*1)</td><td>BUSY</td><td>BUSY</td></tr>
</table>
2) When XON/XOFF control is selected, this signal indicates whether the printer is properly connected and is ready to receive data. SPACE indicates that the printer is properly connected and is ready to receive data. This signal is always SPACE except during the following periods:
• From power-on until the printer is ready to receive data.
• During the self-test.</td></tr>
<tr><td>25</td><td>INIT</td><td>Output</td><td>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.</td></tr>
</table>

∗1
- The period from when the remaining space in the receive buffer drops to 16 bytes until it increases to 32 bytes is called the “buffer full state.”
- Data received when the remaining space in the receive buffer is zero bytes is ignored.

2.1.1.4 XON/OFF transmission timing

When XON/OFF control is selected, the printer transmits XON or XOFF signals as follows. Transmit timing depends on the setting of DIP switch 1-8

Table 2.1.2 XON/XOFF Transmission Timing

Printer Status		DIP Switch 1-8 Status	
		ON	OFF
[XON transmission]	1) When the printer first goes online after power on or after resetting through the interface.	Transmission	Transmission
	2) When the receive buffer is released from the buffer-full state.	Transmission	Transmission
	3) When the printer status changes from offline to online.	----	Transmission
	4) When the printer recovers from an error through a command.	----	Transmission
[XOFF transmission]	5) When the receive buffer is full.	Transmission	Transmission
	6) When the printer status changes from online to offline.	----	Transmission

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.

2.1.1.5 Example serial interface connection

Host		Printer
TXD	----------	RXD
DSR	----------	DTR
CTS	----------	RTS
RXD	----------	TXD
DTR	----------	DSR
FG	----------	FG
SG	----------	SG

- When connecting the printer to a DCE (DCE: Data Circuit Terminating Equipment), set the handshaking so that the transmitted data can be received.
- Transmit data to the printer after turning on the power and initializing the printer.

2.1.1.6 Notes on setting DIP switch 1-8 to on

(1) The printer mechanism stops but does not become BUSY in the following cases:

- When an error occurs.
- When the printer stops printing due to a paper-end.
- When paper is fed using the feed button.

(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 online/offline 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:

Set the receive buffer to 1KB, and check the status with **GS r** for each line of printing transmitted. Make sure the data for printing each line does not cause the printer to enter the receive buffer-full state.

2.1.1.7 Notes on resetting the printer using the interface

The printer can be reset through the interface (pins 6 or 25) by changing the DIP switch settings accordingly (Refer to Table 2.1.3).

Table 2.1.3 Switching of the Reset Condition

Pin No.	DIP Switch	Reset Condition
Pin 6 (DSR)	DSW 2-7: ON	MARK input
Pin 25 (INIT)	DSW 2-8: ON	SPACE or TTL-HIGH level voltage signal input

To reset the printer, the conditions given below must be satisfied:

<DC characteristics>

Table 2.1.4 DC Characteristics of the Reset Condition

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

<AC characteristics>
Reset minimum pulse width: TRS 1 ms (minimum)

- When pin 6 (DSR) is used:

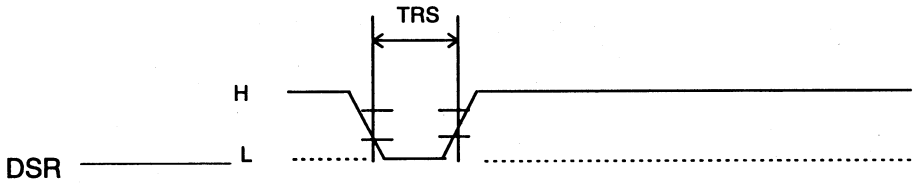


Figure 2.1.1 Interface Reset Signal (Pin 6)

- When pin 25 (INIT) is used:

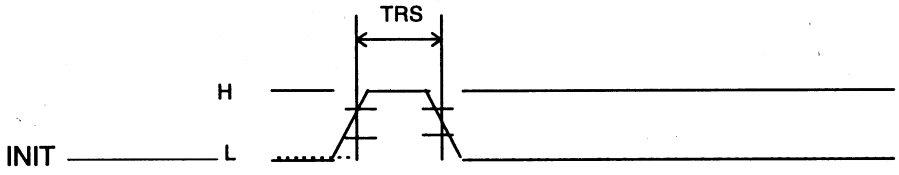


Figure 2.1.2 Interface Reset Signal (Pin 25)

NOTES: 1. Correct printer operation is not guaranteed unless the signals meet the above stated conditions. The above conditions must also be met when TTL signals are used to drive the DSR and INIT reset pins. Although a signal is input to pin 6 (DSR) at the TTL level, according to the DC characteristics described above, the operation is not guaranteed and pin 6 cannot be controlled.

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

2.1.2 IEEE 1284 Bidirectional Parallel Interface (Parallel Interface Specifications)

2.1.2.1 Specifications

Data transmission:	8-bit Parallel
Synchronization:	Externally supplied nStrobe signals
Handshaking:	nAck and Busy signals
Signal levels:	TTL compatible
Connector:	57RE-40360-830B (DDK) or equivalent (IEEE 1284 Type B)

Reverse communication (Printer Host): Nibble or Byte Mode

Note: The letter “n” in front of a signal name indicates active LOW.

2.1.2.2 Switching between online and offline

The printer is not equipped with any online/offline switch. The printer is placed in offline status in any of the following:

- When the power is turned on or until the printer becomes ready for data transmission after it is initialized by the reset signal (nInit) from the interface.
- In the process of self-test.
- In the process of paper feeding using the paper feed switch
- Between the time when the printer stops printing due to a paper-end and when the online recovery wait time finishes after loading paper (in cases when an empty paper supply is detected by either the paper roll end detector or the paper roll near-end detector with a printing halt feature set enabled due for low paper by **ESC c 4**).
- When an error has occurred.

2.1.2.3 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 (a Nibble). In the Byte Mode, data transmissions proceed by making the eight-bits data lines bidirectional.

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

2.1.2.4 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	PError	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

NOTES:
1. A prefix “n” to signal names refers to “L” active signals. To the host not provided with all the signal lines listed above, both-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 be all 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 the minimum length required and as short in length as possible.

*NC: Not Connected
ND: Not Defined

2.1.2.5 Electrical Characteristics

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

Characteristics	Symbol	Specifications		Conditions
		Min	Max	
Output HIGH voltage	V_{OH}	*2.4 V	5.5 V	*I_{OH}=0.32 mA
Output LOW voltage	V_{OL}	-0.5 V	*0.4 V	*I_{OL}=-12 mA
Output HIGH current	I_{OH}	0.32 V	-	V_{OH}=0.32 V
Output LOW current	I_{OL}	-12 V	-	V_{OL}=0.4 V
Input HIGH voltage	V_{IH}	2.0 V	-	
Input LOW voltage	V_{IL}	-	0.8 V	
Input HIGH current	V_{IH}	-	-0.32 mA	V_{IH}=2.0 V
Input LOW current	V_{IL}	-	12 mA	V_{IL}=0.8 V

Logic-H Signal Sender Characteristics

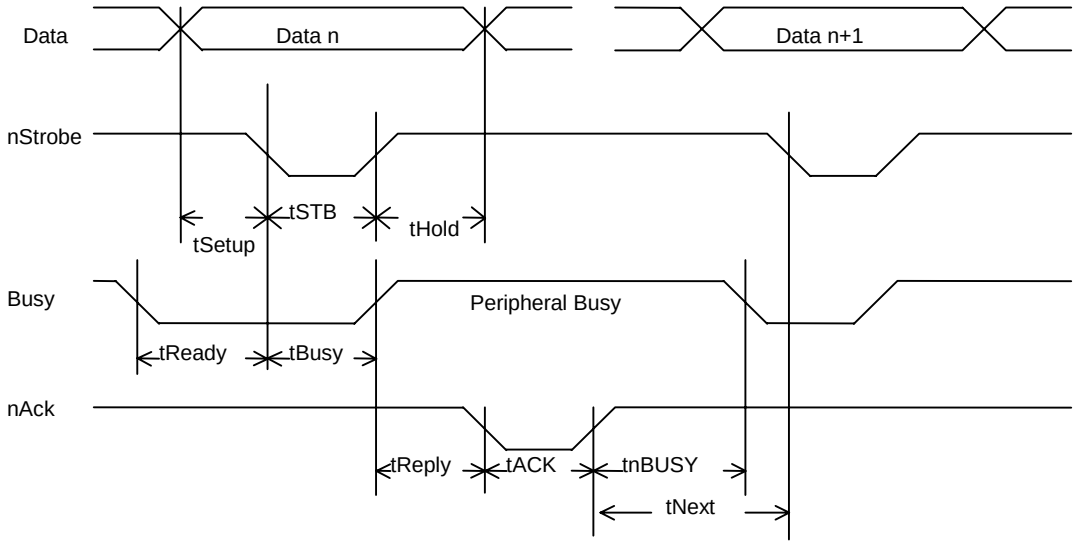
Characteristics	Symbol	Specifications		Conditions
		Min	Max	
Output HIGH voltage	V_{OH}	3.0 V	5.5 V	
Output LOW voltage	V_{OL}	-	2.0 V	While the power is OFF

+5 V Signal Sender Characteristics

Characteristics	Symbol	Specifications		Conditions
		Min	Max	
Output HIGH voltage	V_{OH}	*2.4 V	5.5 V	*IOH=0.32mA
Output LOW voltage	V_{OL}	-	- **	While the power is OFF
Output HIGH current	I_{OH}	-	0.32 mA	VOH=2.4V
Output LOW current	I_{OL}	- **	-	While the power is OFF

** No guarantee is offered to V_{OL} and I_{OL} while the power is OFF.

2.1.2.6 Data Receiving Timing (Compatibility Mode)



Characteristics	Symbol	Specifications	
		Min [ns]	Max [ns]
Data Hold Time (host)	tHold	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	10 μs
BUSY Release Time	tnBUSY	0	∞
ACK Cycle Idle Time	tNEXT	0	--

*The printer latches data at the nStrobe ↓ timing

Note: The letter “n” before a signal name indicates active LOW.

2.1.2.7 Notes on resetting the printer through the interface

The printer reset is available through the interface nInit signal (pin 31) by changing the DIP switch setting. (Refer to Table 2.1.5. DIP Switch settings for Printer Reset.)

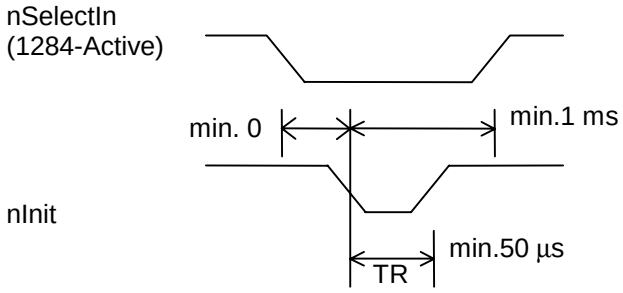
Table 2.1.5 DIP Switch Setting for Printer Reset

Signal Line	DIP Switch	Reset Condition
Pin 31 (nInt)	DSW 2-8: ON	TTL-LOW level input

The printer reset through the nInit signal is only available with the SelectIn(1284-Active) signal at LOW.

To enable the printer reset, the following signal timing shall be satisfied.

Minimum reset pulse width TR: 50 μs (min)



2.1.2.8 Notes on setting DIP switch 1-8 to ON

1) The printer mechanism stops but does not become busy when: an error has occurred, printing stops due to a paper-end, or paper is fed using the paper FEED switch.
2) When setting DIP switch 1-8 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 online/offline 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 r 1** or **GS r 49** after transmitting each line of data and use the 1KB (512 bytes for the multilingual supporting model) receive buffer. Transmit one line of data so that the receive buffer does not become full.

2.1.2.9 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 both-way communication facility in the Nibble/Byte Modes in accordance with the IEEE 1284.

In this case, as opposed to the RS-232 serial interface specifications, the real-time interruptions from the printer to the host are disabled, and thus, precautions must be taken to the following.

1) 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 acceptance (Reverse Mode).
2) When ASB is used, the host is preferably in the wait state for data acceptance (Reverse Idle Mode). When this state is not available, the host shall enter the Reverse Mode to constantly 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	0000 0000	0000 0000

When the following sequence of operations proceed, and the FEED button is pressed and released, the following pieces of data are accumulated.

	First Status	Second Status	Third Status	Fourth Status	
①	0001 0000	0000 0000	0000 0011	0000 0000	Near end detection
②	0101 1000	0000 0000	0000 0011	0000 0000	FEED button is pressed
③	0001 0000	0000 0000	0000 0011	0000 0000	FEED button is released

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)	0101 1000	0000 0000	0000 0011	0000 0000
+	First Status	Second Status	Third Status	Fourth Status
The latest ASB (③)	0001 0000	0000 0000	0000 0011	0000 0000
Fourth Status				

2.2 Connectors

2.2.1 Interface connectors

Refer to Section 2.1, Interface Specifications.

(1) RS-232 serial interface specification

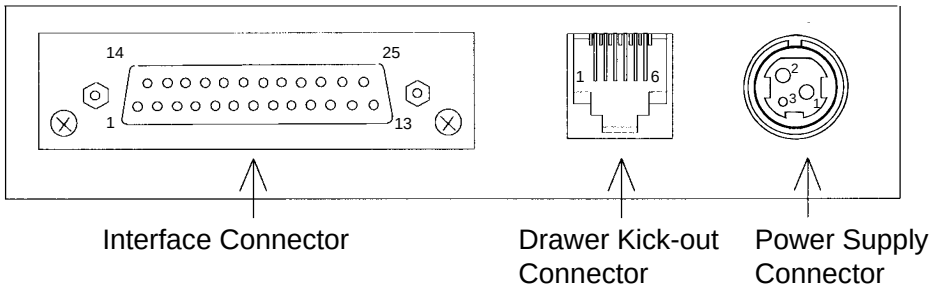


Figure 2.2.1 Serial Connector Panel Diagram

(2) IEEE 1284 Parallel interface specification

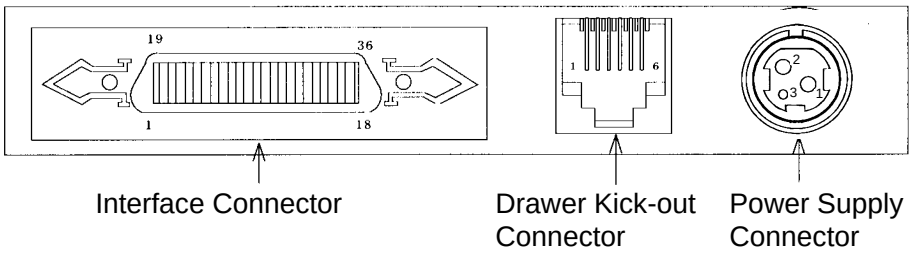


Figure 2.2.2 Parallel Connector Panel Diagram

2.2.2 Power supply connector

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

1) Pin assignments: Refer to Table 2.2.1.
2) Model (printer side): Hosiden TCS7960-532010 (or equivalent)
3) Model (host side): Hosiden TCP8927-631100 (or equivalent)
or TCP8927-531100 (or equivalent)

Table 2.2.1 Power Supply Connector Pin Assignments

Pin Number	Signal Name
1	+ Power source
2	GND
3	NC
Shell	FG

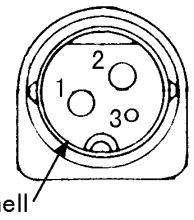


Figure 2.2.3 Power Supply Connector

NOTE: Be sure to ground the frame ground (FG) screw on the board at the bottom of the unit.

2.2.3 Drawer kick-out connector (modular connector)

The signal specified by the **ESC p** command is output to this connector. The host can confirm the input signal state by using the **DLE EOT**, **GS a**, and **GS r** commands.

1) Pin assignments

Table 2.2.2 Drawer Kick-out Connector Pin Assignments

Pin No.	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	--

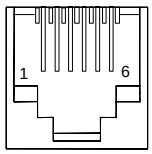


Figure 2.2.4 Drawer Kick-out Connector

2) Drawer kick-out drive signal

Output signal: Voltage: Approximately 24 V
Current: 1 A or less

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

Output waveform: Outputs the waveforms in Figure 2.2.5 to points A and B in Figure 2.2.6. (The **ESC p** command specifies ON time *t1* and OFF time *t2*.)

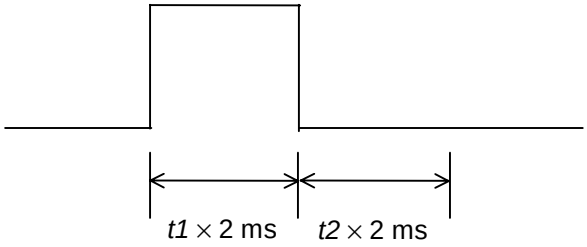
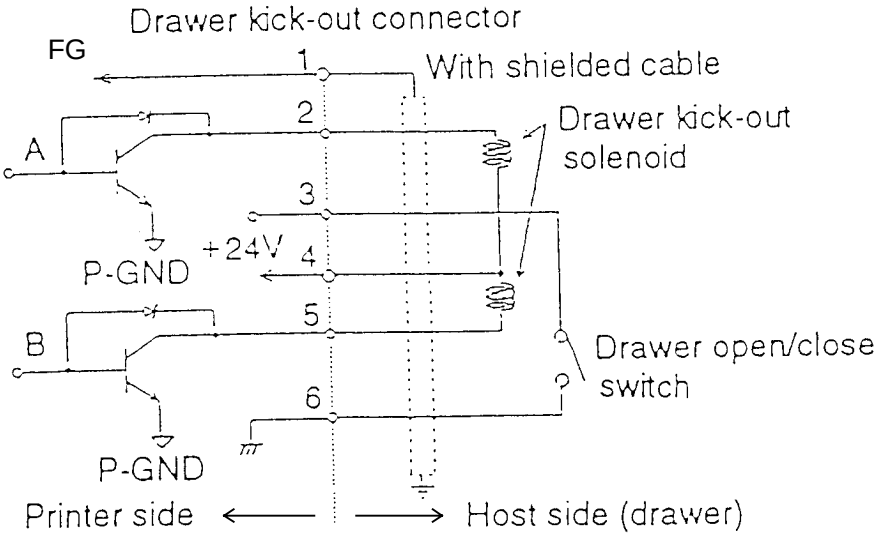


Figure 2.2.5 Drawer Kick-out Drive Signal

3) Drawer open/close signal



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

Figure 2.2.6 Drawer Circuitry

NOTES:
1. Two driver transistors cannot be driven simultaneously.
2. The drawer drive duty must be as shown below:

$$\frac{\text{On time}}{\text{(ON time + OFF time)}} \leq 0.2$$

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 that specified (24 Ω). Otherwise, an overcurrent could damage the solenoid.

3. FUNCTIONS

3.1 Commands

1) Commands list

Command	Name	Valid command when the reception buffer capacity is 40 bytes *2	Command Classification (*1)	
			Execution Command	Setting Command
HT	Horizontal tab	○	○	
LF	Print and line feed		○	
CR	Print and carriage return		○	
DLE EOT	Real-time status transmission		○	
DLE ENQ	Real-time request to printer		○	
ESC SP	Set right-side character spacing			○
ESC !	Select print mode(s)			○
ESC %	Select/cancel downloaded 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 character	○		○
ESC @	Initialize printer		○	○
ESC D	Set horizontal tab positions	○		○
ESC E	Turn emphasized mode on/off			○
ESC G	Turn double-strike mode on/off			○
ESC J	Feed paper and printing		○	
ESC K	Print and reverse feed		○	
ESC R	Select an international character set			○
ESC U	Turn unidirectional printing mode on/off			○
ESC a	Select justification			○
ESC c 3	Select paper sensor to output paper-end signal (only for parallel interface model)			○
ESC c 4	Select paper sensor(s) to stop printing			○
ESC c 5	Enable/disable panel buttons			○
ESC d	Printing and feed *n* lines		○	
ESC e	Print and reverse feed *n* lines		○	
ESC p	Generate pulse		○	
ESC r	Select print color (only for 2-color print model)			○

Command	Name	Valid command when the reception buffer capacity is 40 bytes *2	Command Classification(*1)	
			Execution Command	Setting Command
ESC t	Select character code table			O
ESC {	Turn upside-down printing mode on/off			O
GS (A	Execute test print		O	
GS I	Transmit printer ID		O	
GS V	Feed paper for cutting position		O	
GS a	Enable/disable Automatic Status Back		O	O
GS r	Transmit status		O	
GS z 0	Set on-line recovery wait time			O

*1: There are two major classifications for comand, as follows:

Execution command: Executes printer functions. Does not affect the following data.

Setting command: Sets the printer's operational conditions. The printer status is retained by flag, and the command affects the following data.

O marks in the table above show whether the command is an execution or setting command.

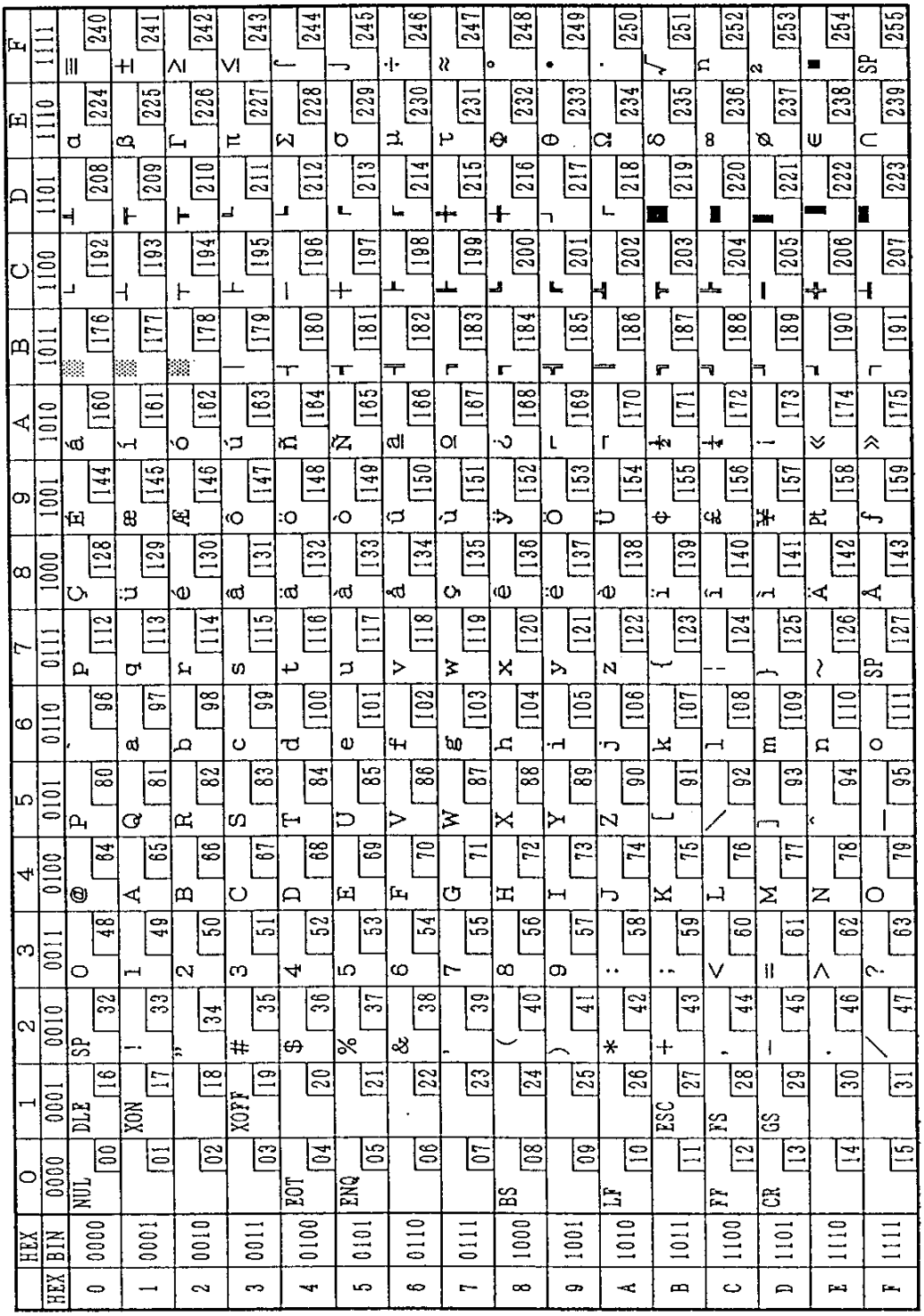
*2: Commands are effective only when the space in the receive buffer is set to 40 bytes (Setting by DIP switch 1-2 on).

2) Commands that are effective for TM-U200 type
Japanese Kanji model / Chinese Kanji model / Taiwanese Kanji model only

Command	Name	Valid command when the reception buffer capacity is 40 bytes *2	Command Classification (*1)	
			Execution Command	Setting Command
FS !	Set print mode(s) for Kanji characters			O
FS &	Select Kanji character mode			O
FS –	Turn underline mode on/off for Kanji characters			O
FS .	Cancel Kanji character mode			O
FS 2	Define user-defined Kanji characters	O		O
FS ?	Cancel user-defined Kanji characters	O		O
FS C	Select Kanji character code system			O
FS S	Set left-and right-side Kanji character spacing			O
FS W	Turn quadruple-size mode on/off for Kanji characters			O

3.2 Character Code Tables

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



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

NOTE: The actual print patterns differ from those in the above charactor code.

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	ー 128	丄 144	SP 160	ー 176	タ 192	ミ 208	二 224	× 240
1	0001	▬ 129	丅 145	。 161	ア 177	チ 193	ム 209	卜 225	円 241
2	0010	▬ 130	丬 146	「 162	イ 178	ツ 194	メ 210	丰 226	年 242
3	0011	▬ 131	卜 147	」 163	ウ 179	テ 195	モ 211	刊 227	月 243
4	0100	■ 132	一 148	、 164	エ 180	ト 196	ヤ 212	◢ 228	日 244
5	0101	■ 133	一 149	・ 165	オ 181	ナ 197	ユ 213	◣ 229	時 245
6	0110	■ 134	丨 150	ヲ 166	カ 182	ニ 198	ヨ 214	◥ 230	分 246
7	0111	■ 135	丨 151	ァ 167	キ 183	ヌ 199	ラ 215	◤ 231	秒 247
8	1000	▌ 136	「 152	ィ 168	ク 184	ネ 200	リ 216	♠ 232	〒 248
9	1001	▌ 137	冂 153	ゥ 169	ケ 185	ノ 201	ル 217	♥ 233	市 249
A	1010	▌ 138	乚 154	ェ 170	コ 186	ハ 202	レ 218	✦ 234	区 250
B	1011	▌ 139	亅 155	ォ 171	サ 187	ヒ 203	ロ 219	♣ 235	町 251
C	1100	▌ 140	亻 156	ャ 172	シ 188	フ 204	ワ 220	● 236	村 252
D	1101	▌ 141	冫 157	ュ 173	ス 189	ヘ 205	ン 221	○ 237	人 253
E	1110	▌ 142	乀 158	ョ 174	セ 190	ホ 206	゜ 222	／ 238	▒ 254
F	1111	┼ 143	丿 159	ッ 175	ソ 191	マ 207	゛ 223	＼ 239	SP 255

3.2.3 Page 2 (PC850: Multilingual)

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

3.2.4 Page 3 (PC860: Portuguese)

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

3.2.5 Page 4 (PC863: Canadian-French)

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

3.2.6 Page 5 (PC865: Nordic)

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

3.2.7 Page 6 (Hiragana) (Available on Japanese Kanji model)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	磯 128	本 144	SP 160	ー 176	た 192	み 208	過 224	換 240
1	0001	129	145	。 161	あ 177	ち 193	む 209	225	241
2	0010	除 130	荷 146	「 162	い 178	つ 194	め 210	足 226	攻 242
3	0011	131	147	」 163	う 179	て 195	も 211	227	243
4	0100	定 132	特 148	、 164	え 180	と 196	や 212	利 228	産 244
5	0101	133	149	・ 165	お 181	な 197	ゆ 213	229	245
6	0110	信 134	越 150	を 166	か 182	に 198	よ 214	用 230	打 246
7	0111	135	151	ぁ 167	き 183	ぬ 199	ら 215	231	247
8	1000	緑 136	他 152	ぃ 168	く 184	ね 200	り 216	移 232	納 248
9	1001	137	153	ぅ 169	け 185	の 201	る 217	233	249
A	1010	科 138	社 154	ぇ 170	こ 186	は 202	れ 218	下 234	変 250
B	1011	139	155	ぉ 171	さ 187	ひ 203	ろ 219	235	251
C	1100	目 140	瓶 156	ゃ 172	し 188	ふ 204	わ 220	加 236	誂 252
D	1101	141	157	ゅ 173	す 189	へ 205	ん 221	237	253
E	1110	々 142	奉 158	ょ 174	せ 190	ほ 206	゛ 222	解 238	件 254
F	1111	143	159	っ 175	そ 191	ま 207	゜ 223	239	255

3.2.8 Page 7 (One-pass printing Kanji characters) (Available on Japanese Kanji model)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	日 128	会 144	水 160	受 176	点 192	課 208	買 224	非 240
1	0001	129	145	161	177	193	209	225	241
2	0010	扱 130	客 146	木 162	前 178	中 194	証 210	号 226	承 242
3	0011	131	147	163	179	195	211	227	243
4	0100	外 132	券 148	土 164	残 180	内 196	組 212	有 228	送 244
5	0101	133	149	165	181	197	213	229	245
6	0110	額 134	回 150	振 166	止 182	部 198	店 214	期 230	246
7	0111	135	151	167	183	199	215	231	247
8	1000	割 136	在 152	数 168	純 184	別 200	認 216	限 232	棄 248
9	1001	137	153	169	185	201	217	233	249
A	1010	検 138	算 154	精 170	替 186	戻 202	廃 218	頭 234	累 250
B	1011	139	155	171	187	203	219	235	251
C	1100	高 140	上 156	銭 172	代 188	門 204	両 220	差 236	違 252
D	1101	141	157	173	189	205	221	237	253
E	1110	価 142	火 158	総 174	値 190	料 206	効 222	括 238	番 254
F	1111	143	159	175	191	207	223	239	255

3.2.9 Page 8 (One-pass printing Kanji characters) (Available on Japanese Kanji model)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	訂 128	計 144	払 160	売 176	名 192	次 208	万 224	室 240
1	0001	129	145	161	177	193	209	225	241
2	0010	正 130	小 146	掛 162	取 178	個 194	不 210	責 226	商 242
3	0011	131	147	163	179	195	211	227	243
4	0100	品 132	金 148	入 164	係 180	領 196	枚 212	終 228	人 244
5	0101	133	149	165	181	197	213	229	245
6	0110	円 134	現 150	貸 166	未 182	収 198	誤 214	了 230	大 246
7	0111	135	151	167	183	199	215	231	247
8	1000	種 136	釣 152	出 168	消 184	予 200	休 216	免 232	安 248
9	1001	137	153	169	185	201	217	233	249
A	1010	担 138	預 154	支 170	費 186	約 202	契 218	伝 234	仕 250
B	1011	139	155	171	187	203	219	235	251
C	1100	当 140	税 156	単 172	年 188	込 204	開 220	自 236	控 252
D	1101	141	157	173	189	205	221	237	253
E	1110	合 142	引 158	返 174	月 190	明 206	閉 222	設 238	基 254
F	1111	143	159	175	191	207	223	239	255

3.2.10 Page 19 (PC858:Euro)

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

Confidential

3.2.11 Page 20 (Thai character code 42)

	8	9	A	B	C	D	E	F
0	┌	๐		ฒ	ย	เ	◌่	◌ิ๊
1	┐	๑	ก	ณ	ร	แ	◌้	◌ิ๋
2	└	๒	ข	ด	ฤ	โ	◌๊	◌ิ์
3	┘	๓	ค	ต	ล	ใ	◌๋	◌ี่
4	│	๔	ฆ	ถ	ว	ไ	◌์	◌ี้
5	─	๕	ง	ท	ศ	ๆ	·	◌ี๊
6	├	๖	จ	ธ	ษ	ฯ	◌ํ่	◌ี๋
7	┤	๗	ฉ	น	ส	◌ุ	◌ํ้	◌ึ่
8	┴	๘	ช	บ	ห	◌ู	◌ํ๊	◌ึ้
9	┬	๙	ซ	ป	ฬ	◌ิ	◌ํ๋	◌ึ๊
A	┼	ฃ	ฌ	ผ	อ	◌ี	◌ั่	◌ึ๋
B	█	ฅ	ญ	ฝ	ฮ	◌ึ	◌ั้	◌ื่
C	←	◌็	ฎ	พ	ะ	◌ื	◌ั๊	◌ื้
D	↑	๑	ฏ	ฟ	ฦ	◌ั	◌ั๋	◌ื๊
E	→	ๆ	ฐ	ภ	า	◌ํ	◌ิ่	◌ื๋
F	↓	เ	ฑ	ม	ำ	◌็	◌ิ้	

3.2.12 Page 21 (Thai character code 11)

	8	9	A	B	C	D	E	F
0	◌ั	◌็	เ	๓	ภ	ะ	๏	๐
1	◌ั	◌่	ก	ฑ	ม	◌ๅ	แ	๑
2	◌ิ	◌้	ข	ฒ	ย	า	๐	๒
3	◌ิ	◌๊	ฃ	ณ	ร	ำ	ใ	๓
4	◌ุ	◌๋	ค	ด	ฤ	◌ๆ	ไ	๔
5	◌ุ	◌์	ฅ	ต	ล	◌ฯ	า	๕
6	◌ู	◌ํ	ฆ	ถ	ฦ	◌๎	ๆ	๖
7	◌ู	◌๎	ง	ท	ว	◌๏	๗	๗
8	◌ฺ	◌็	จ	ธ	ศ	◌๐	๘	๘
9	◌ฺ	◌่	ฉ	น	ษ	◌๑	๙	๙
A	◌ฺ	◌้	ช	บ	ส	◌๒	๚	๚
B	◌ฺ	◌๊	ซ	ป	ห	◌๓	๛	๛
C	◌ฺ	◌๋	ฌ	ผ	ฬ	◌๔	๜	๜
D	◌ฺ	◌์	ญ	ฝ	อ	◌๕	๝	๑
E	◌ฺ	◌ํ	ฎ	พ	ฮ	◌๖	๞	๑
F	◌ฺ	◌๎	ฏ	ฟ	ฯ	◌๗	๟	

3.2.13 Page 22 (Thai character code 13)

	8	9	A	B	C	D	E	F
0		ี่		ฐ	ภ	ะ	เ	๐
1	ั่	ี้	ก	ฑ	ม	ั	แ	๑
2	ั้	ี๊	ข	ฒ	ย	า	โ	๒
3	ั๊	ี๋	ฃ	ณ	ร	ำ	ใ	๓
4	ั๋		ค	ด	ฤ	ิ	ไ	๔
5		ึ่	ฅ	ต	ล	ี	ๅ	๕
6	ํ่	ึ้	ฆ	ถ	ฦ	ึ	ๆ	๖
7	ํ้	ึ๊	ง	ท	ว	ื	็	๗
8	ํ๊	ึ๋	จ	ธ	ศ	ุ	่	๘
9	ํ๋		ฉ	น	ษ	ู	้	๙
A		ื่	ช	บ	ส	ฺ	๊	๚
B	ิ่	ื้	ซ	ป	ห	[illegible]	๋	๛
C	ิ้	ื๊	ฌ	ผ	ฬ	[illegible]	์	←
D	ิ๊	ื๋	ญ	ฝ	อ	[illegible]	ํ	↑
E	ิ๋		ฎ	พ	ฮ	เ	๎	→
F	ิ์		ฏ	ฟ	ฯ	฿	๏	↓

3.2.14 Page 23 (Thai character code 14)

	8	9	A	B	C	D	E	F
0	┌	๎		ฐ	ภ	ะ	เ	๐
1	┐	๑	ก	ฑ	ม	ั	แ	๑
2	└	ั่	ข	ฒ	ย	า	โ	๒
3	┘	ั้	ฃ	ณ	ร	ำ	ใ	๓
4	│	ั๊	ค	ด	ฤ	ิ	ไ	๔
5	─	ั๋	ฅ	ต	ล	ี	ๅ	๕
6	├	ิ่	ฆ	ถ	ฦ	ึ	ๆ	๖
7	┤	ิ้	ง	ท	ว	ื	็	๗
8	┴	ิ๊	จ	ธ	ศ	ุ	่	๘
9	┬	ิ๋	ฉ	น	ษ	ู	้	๙
A	┼	ิ์	ช	บ	ส	ฺ	๊	๚
B	█	ี่	ซ	ป	ห	ึ่	๋	ื่
C	ํ่	ี้	ฌ	ผ	ฬ	ึ้	์	ื้
D	ํ้	ี๊	ญ	ฝ	อ	ึ๊	ํ	ื๊
E	ํ๊	ี๋	ฎ	พ	ฮ	ึ๋	๎	ื๋
F	ํ๋	เ	ฏ	ฟ	ฯ	฿	๏	๛

3.2.15 Page 24 (Thai character code 16)

	8	9	A	B	C	D	E	F
0	ร	โ		ฐ	ภ	ะ	เ	๐
1	ฯ	ใ	ก	ฑ	ม	ั	แ	๑
2	ล	ๅ	ข	ฒ	ย	า	็	๒
3	ฦ	ะ	ฃ	ณ	ร	ำ	๑	๓
4	ๅ	ั	ค	ด	ฤ	ิ	่	๔
5	–	า	ฅ	ต	ล	ี	้	๕
6	ๅ	ำ	ฆ	ถ	ฦ	ึ	๊	๖
7	ๅ	ิ	ง	ท	ว	ื	๋	๗
8	ๅ	ี	จ	ธ	ศ	ุ	์	๘
9	ๅ	ึ	ฉ	น	ษ	ู	๎	๙
A	ๅ	ื	ช	บ	ส	ฺ	๓	๚
B	ๅ	ุ	ซ	ป	ห	฿	+	๛
C	←	ู	ฌ	ผ	ฬ	เ	ๅ	เ
D	↑	ฺ	ญ	ฝ	อ	แ	๏	แ
E	→	ๅ	ฎ	พ	ฮ	โ	ๆ	โ
F	↓	ๅ	ฏ	ฟ	ฯ	ใ	๐	

3.2.16 Page 25 (Thai character code 17)

	8	9	A	B	C	D	E	F
0	ั่	ึ่		ฐ	ภ	ะ	เ	๐
1	ั้	ึ้	ก	ฑ	ม	ั	แ	๑
2	ั๊	ึ๊	ข	ฒ	ย	า	โ	๒
3	ั๋	ึ๋	ฃ	ณ	ร	ำ	ใ	๓
4	ิ่	ิ์	ค	ด	ฤ	ิ	ไ	๔
5	ิ้	│	ฅ	ต	ล	ี	ๅ	๕
6	ิ๊	─	ฆ	ถ	ฦ	ึ	ๆ	๖
7	ิ๋	┼	ง	ท	ว	ื	็	๗
8	ี่	┌	จ	ธ	ศ	ุ	่	๘
9	ี้	┐	ฉ	น	ษ	ู	้	๙
A	ี๊	└	ช	บ	ส	ฺ	๊	๚
B	ี๋	┘	ซ	ป	ห	็	๋	๛
C	ื่	├	ฌ	ผ	ฬ	ั	์	←
D	ื้	┬	ญ	ฝ	อ	๎	ํ	↑
E	ื๊	┤	ฎ	พ	ฮ	เ	๎	→
F	ื๋	┴	ฏ	ฟ	ฯ	฿	๏	↓

Confidential

3.2.17 Page 26 (Thai character code 18)

	8	9	A	B	C	D	E	F
0	┌	◌ั		ฐ	ภ	ะ	เ	๐
1	┐	◌ํ	ก	ฑ	ม	◌ั	แ	๑
2	└	◌ั่	ข	ฒ	ย	า	โ	๒
3	┘	◌ั้	ฃ	ณ	ร	ำ	ใ	๓
4	│	◌ั๊	ค	ด	ฤ	◌ิ	ไ	๔
5	─	◌ั๋	ฅ	ต	ล	◌ี	ๅ	๕
6	├	◌ึ่	ฆ	ถ	ฦ	◌ึ	ๆ	๖
7	┤	◌ึ้	ง	ท	ว	◌ื	◌็	๗
8	┴	◌ึ๊	จ	ธ	ศ	◌ุ	◌่	๘
9	┬	◌ึ๋	ฉ	น	ษ	◌ู	◌้	๙
A	┼	◌ึ์	ช	บ	ส	◌ฺ	◌๊	๚
B	█	◌ื่	ซ	ป	ห	◌ิ่	◌๋	◌ี่
C	←	◌ื้	ฌ	ผ	ฬ	◌ิ้	◌์	◌ี้
D	↑	◌ื๊	ญ	ฝ	อ	◌ิ๊	◌ํ	◌ี๊
E	→	◌ื๋	ฎ	พ	ฮ	◌ิ๋	◌๎	◌ี๋
F	↓	◌ฺ	ฏ	ฟ	ฯ	฿	๏	

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

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

3.2.20 International character sets

Country	ASCII code (Hex)											
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U.S.A	#	$	@	[	¥	]	^	`	{	|	}	~
France	#	$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
U.K.	£	$	@	[	¥	]	^	`	{	|	}	~
Denmark I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	$	@	°	¥	é	^	ù	à	ò	è	ì
Spain I	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
Japan	#	$	@	[	¥	]	^	`	{	|	}	~
Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Spain II (*)	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
Latin America (*)	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
Korea (*)	#	$	@	[	₩	]	^	`	{	|	}	~

(*) These character sets are not supported in the single-color printing model of the type D.

3.3 Switches and Buttons

3.3.1 Power switch

The power switch (rocker switch) is on the lower right front of the printer and turns the power on or off.

3.3.2 Panel buttons

FEED button

[Type] Non-locking push button
The **ESC c 5** command enables or disables the panel button. When disabled, the FEED button will not function. However, when loading roll paper, if the paper loading wait time has been set with **GS z 0**, the paper FEED button can be used to feed the paper forward within the set time. If the FEED button is pressed while the printer is in the on-line recovery wait state, the printer goes back online. (For details, refer to command **GS z 0**.) The default settings differ for each model type.

[Function] Feeds paper based the line feed amount set by the **ESC 2** and **ESC 3** commands.

3.3.3 DIP switches

1) RS-232 serial interface model

Table 3.3.1 DIP Switch 1

Switch No.	Function	ON	OFF	Default Settings		
				A	B	D
1	Data reception error	Ignored	Prints "?"	Off		
2	Receive buffer capacity	40 bytes	ANK model: 1000 bytes Multilingual model: 512 bytes			
3	Handshaking	XON/XOFF	DTR/DSR			
4	Word length	7 bit	8 bit			
5	Parity check	Yes	No			
6	Parity selection	Even	Odd			
7	Baud rate selection	4800 bps	9600 bps			
8	BUSY condition	•Receive buffer-full	•Offline •Receive buffer-full			

Table 3.3.2 DIP Switch 2

Switch No.	Function	ON	OFF	Default Settings		
				A	B	D
1	Selects number of characters per line (cpl) 7×9 font / 9×9 font	42 cpl / 35 cpl	40 cpl / 33 cpl	Off		
2	For internal use only (*1) (Autocutter)	Enabled	Disabled	On		Off
3	For internal use only (*1) (Interface synchronization)	Asynchronous	Synchronous with clock	Off		
4	Undefined	--	--	Off		
5	For internal use only (*1) (Semi-autoloading)	For type A	For type B/D	On	Off	
6	For internal use only (*1) (Flash memory rewriting)	Enabled	Disabled	Off		
7	Pin 6 reset signal	Used	Not used	Off		
8	Pin 25 reset signal	Used	Not used			

*1 : Do not change the settings of DIP switches 2-2, 2-3, 2-5, and 2-6.

2) Parallel interface model

Table 3.3.3 DIP Switch 1

Switch No.	Function	ON	OFF	Default Settings		
				A	B	D
1	Auto line feed	Enabled	Disabled	Off		
2	Receive buffer	40 bytes	ANK model: 1000 bytes Multilingual model: 512 bytes			
3 - 7	Undefined	--	--			
8	Busy condition	•Receive buffer-full	•Offline •Receive buffer-full			

Table 3.3.4 DIP Switch 2

Switch No.	Function	ON	OFF	Default Settings		
				A	B	D
1	Selects number of characters per line (cpl) 7×9 font / 9×9 font	42 cpl / 35 cpl	40 cpl / 33 cpl	Off		
2	For internal use only (*1) (Autocutter)	Enabled	Disabled	On		Off
3	For internal use only (*1) (Interface synchronization)	Asynchronous	Synchronous with clock	Off		
4	Undefined	--	--	Off		
5	For internal use only (*1) (Semi-autoloading)	For type A	For type B/D	On	Off	
6	For internal use only (*1) (Flash memory rewriting)	Enabled	Disabled	Off		
7	Undefined	--	--	Off		
8	Pin 31 reset signal	Used	Not used	On		

*1 : Do not change the settings of DIP switches 2-2, 2-3, 2-5, and 2-6.

3.4 Panel LED Indicators

3.4.1 Panel LED indicators

(1) Power supply (POWER) LED: Green

ON: Power supply is stable.

OFF: Power supply is not stable.

(2) Paper roll near-end (PAPER OUT) LED: Red

ON: Near-end or end of paper roll is detected. (*1)

OFF: Adequate paper remains on the paper roll (normal condition).

Blinking: Waiting for recavery to online status after automatic paper feeding. Or for restarting test printing on paper roll.

*1: A near-end detector is optionally installed. A printer which does not have the detector always indicates the normal condition.

(3) Error (ERROR) LED: Red

ON: Offline (except during paper feeding using the FEED button and during the self-test).

Blinking: Error state. (See Section 3.5, Error Processing)

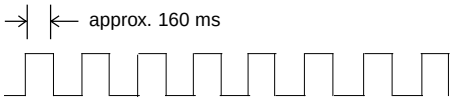
OFF: Normal operation.

3.5 Error Processing

3.5.1 Error types

1) Error that is automatically recovered

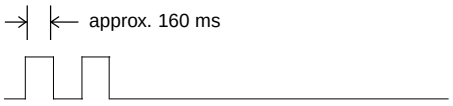
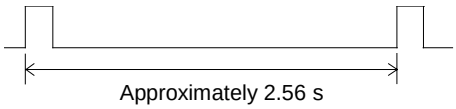
Table 3.5.1 Automatically Recoverable Error

Error	Description	ERROR LED blinking pattern	Recovery
Print head temperature error (*)	Print head temperature is extremely high.		Automatically recovers when the print head temperature falls.

(*) A print head temperature error is not abnormal.

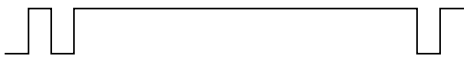
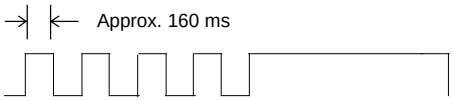
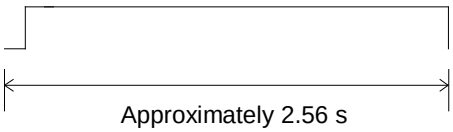
2) Errors that may be recovered via commands

Table 3.5.2 Command-recoverable Errors

Error	Description	ERROR LED blinking pattern	Recovery
Home position detection error (mechanical error)	Home position cannot be detected due to a paper jam or other problem.		Recovers using **DLE ENQ 2.**
Autocutter error (for type B and type A)	Abnormality in the auto cutter.		Recovers using **DLE ENQ 2.**

3) Errors that cannot be recovered

Table 3.5.3 Unrecoverable Errors

Error	Description	ERROR LED blinking pattern	Recovery
R/W error in memory	After R/W checking, the printer does not work correctly.		Impossible to recover.
CPU execution error	CPU executes incorrect address.		Impossible to recover.
High voltage error	Power voltage is extremely high.		Impossible to recover.
Low voltage error	Power voltage is extremely low.		Impossible to recover.
Print head temperature detection circuit error	Abnormality in the mechanism or circuit connection. Or abnormality in the print head temperature.		Impossible to recover.

NOTE: If an error that cannot be recovered occurs, turn off the power as soon as possible.

3.5.2 Operation when an error is detected

The printer executes the following operations when detecting an error:

<Serial interface model>

- Stops all mechanical operations.
- Sets the DTR signal to MARK.
- Blinks the ERROR LED
- Transmits XOFF if XON/XOFF control is selected.

<Parallel interface model>

- Stops all mechanical operations.
- Sets the Busy signal to HIGH.
- Blinks the ERROR LED.
- Sets the nFault signal to LOW.

3.5.3 Data reception error

If any of the following data reception errors occur during serial interface communication, the printer prints " ? " or ignores the data, according to the setting of DIP switch 1-1.

- Parity error
- Framing error
- Overrun error

3.6 Self-test

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

- Control circuit functions
- Printer mechanism
- Print quality
- Control ROM version
- DIP switch settings

(2) Self-test on paper roll

[Starting the self-test]

To start the self-test on a paper roll, hold down the FEED button and turn on the printer with the cover closed. The printer then prints the current printer status, which provides the following information:

- Control ROM version
- DIP switch settings

[Self-test standby state]

After printing the current printer status, the printer prints the message "Self-test printing. Press FEED button". The PAPER OUT LED blinks, and the printer enters the test printing standby state.
Press the feed button in this state to start test printing.

(3) Ending the self-test

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

3.7 Hexadecimal Dum

(1) Hexadecimal dump function

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

(2) Starting hexadecimal dumping

Turn the printer power off and set DIP switch 1-2 to on to select 40 bytes for the receive buffer capacity. Then, turn on the power while pressing the FEED button. Before finishing the initialization of the printer, release the FEED button, then press the FEED button again. The printer first prints "Hexadecimal Dump" on the paper roll, and prints the data received thereafter in hexadecimal numbers and their corresponding characters. The hexadecimal dump is also executed with the **GS (A** command.

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

2. During the hexadecimal dump, all commands except **DLE EOT** and **DLE ENQ** are disabled.

3. Insufficient print data to fill the last line can be printed by setting the printer offline.

(3) Ending hexadecimal dump

End the hexadecimal dump by turning off the power, by pressing the FEED button three times, or by resetting the printer after printing completes.

< Example printing >

```
Hexadecimal Dump
To terminate hexadecimal dump,
press FEED button three times.



1B 40 1B 21 30 41 42 43   :  .@.!0ABC
44 45 46 47 0A            :  DEFG.

          *** completed ***
```

3.8 Paper Detectors

The printer has the following paper detectors:

- Paper roll end detector
- Paper roll near-end detector (Optional)

3.8.1 Detectors and LED indicators

(1) Roll paper end detector

This detector is located in the roll paper path. This detector detects paper out. When the paper out is detected, the PAPER OUT LED lights.

(2) Paper roll near-end detector (optional)

This sensor is installed on the paper roll supply device. It detects a paper near-end by monitoring the paper roll diameter. The PAPER OUT LED lights when the paper roll diameter becomes sufficiently small.

3.8.2 Detectors and printing

When the printer detects a paper-end, it stops or continues printing, depending on the **ESC c 4** command setting. The roll paper detector always halts printing when there is no paper.

3.9 Buffer-full Printing

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

3.10 Loading the Paper Roll (Refer to 6.3, Command Descriptions, GS z 0 t1 t2)

3.10.1 For type B/D

Make sure to load the paper roll correctly according to the description on the caution label which is attached inside the printer cover.
After you insert the paper in the paper entrance, the printer loads the paper automatically; then close the cover. Confirm that the PAPER OUT LED is flashing, and then press the FEED button. The PAPER OUT LED stops flashing and the printer goes back on-line, ready to print. When you close the printer cover and press the FEED button, the PAPER OUT LED turns off and the printer goes to online status.

3.10.2 For type A

Make sure to load the paper roll correctly according to the description on the caution label attached inside of the printer.
After you insert the paper in the paper entrance, the printer loads the paper automatically; then insert the tip of the journal paper in the slit in the spool of the take up unit and cut the receipt with a manual cutter.
When closing the autocutter unit and the printer cover after loading the paper, the printer goes to online status automatically.

4. CASE SPECIFICATIONS

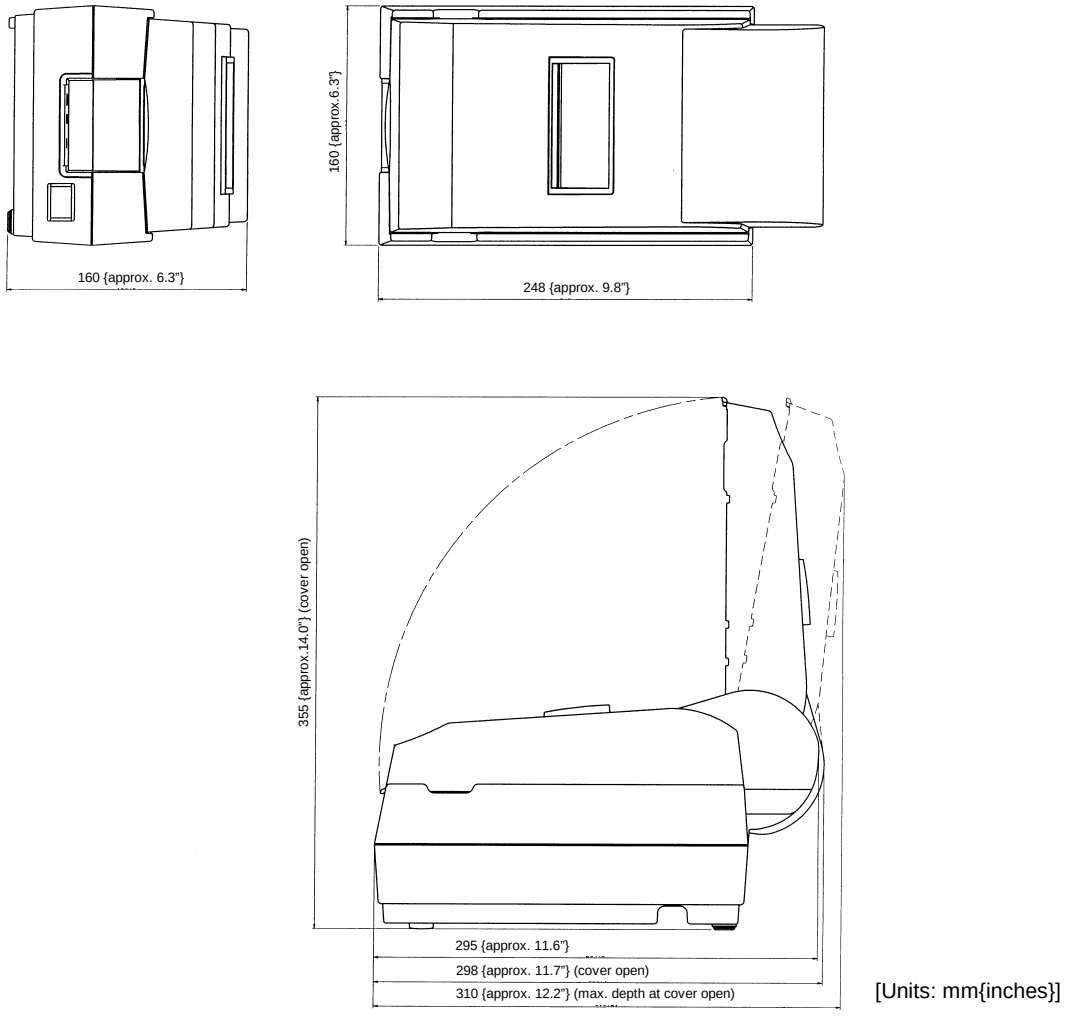
4.1 External Dimensions and Mass

Model type	External Dimensions			Mass
	Width	Height	Depth	
A	160 mm {approximately 6.3”}	160 mm {approximately 6.3”}	295 mm {approximately 11.6”}	Approximately 2.5 kg
B	160 mm {approximately 6.3”}	150 mm {approximately 5.9”}	248 mm {approximately 9.8”}	Approximately 2.5 kg
D	160 mm {approximately 6.3”}	133 mm {approximately 5.2”}	248 mm {approximately 9.8”}	Approximately 2.2 kg

4.2 Color

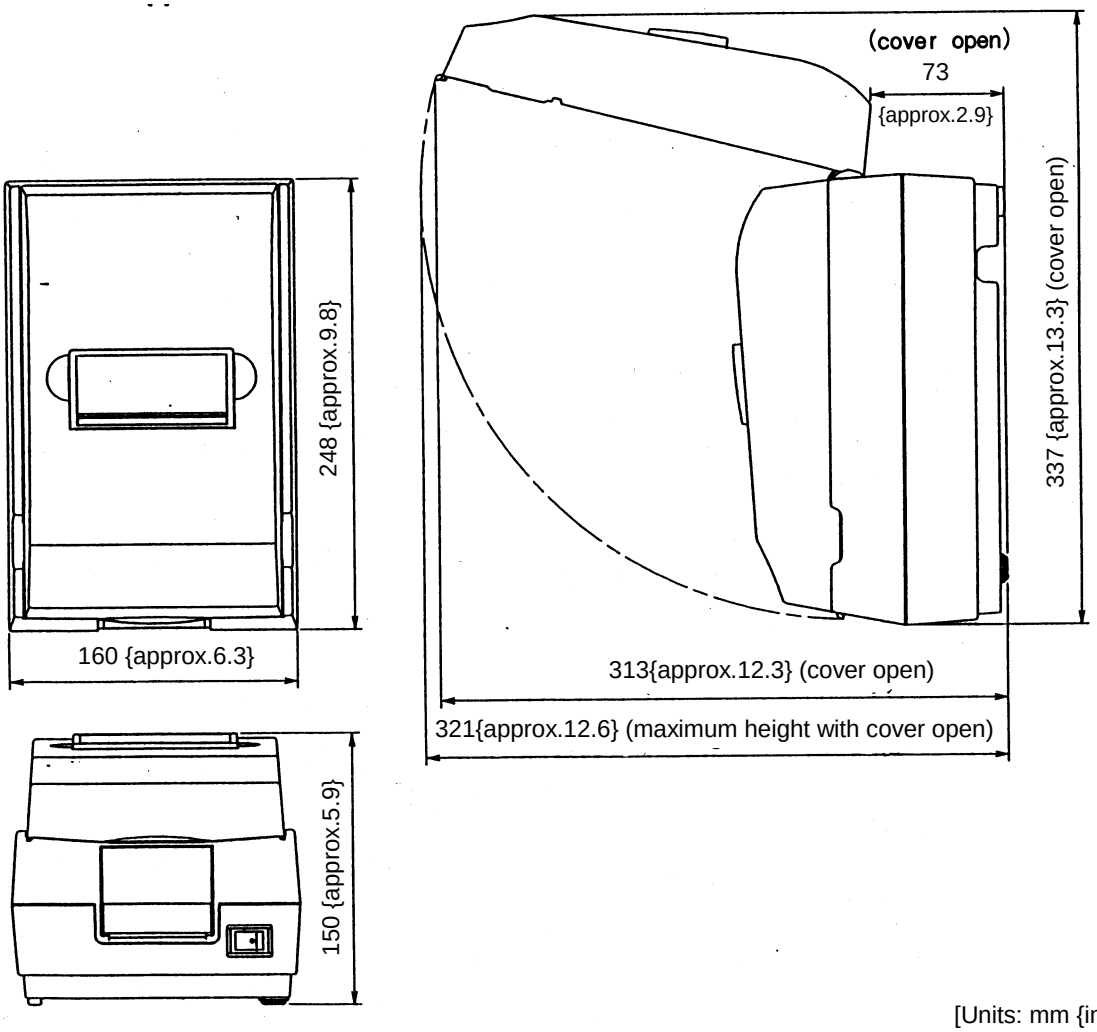
Epson standard color

4.3 External Appearance



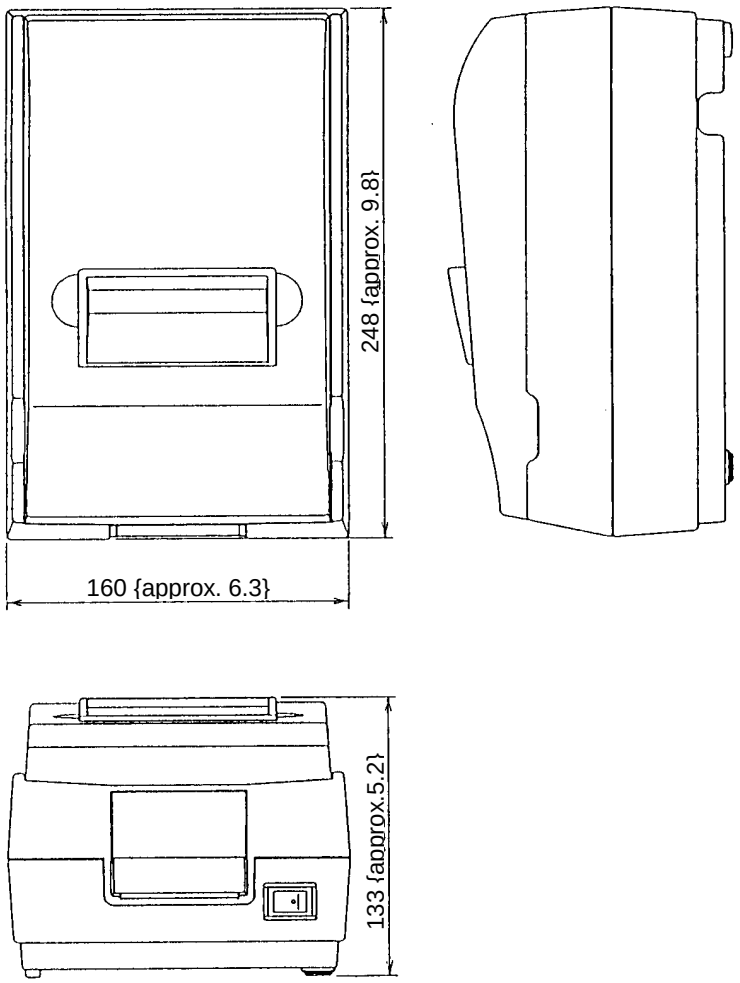
[Units: mm{inches}]

Figure 4.3.1 External Appearance (Type A)



[Units: mm {inch}]

Figure 4.3.2 External Appearance (Type B)



[Units: mm {inches}]

Figure 4.3.3 External Appearance (Type D)

5. ACCESSORIES AND OPTIONS

5.1 Standard Accessories

Exclusive ribbon cassette (ERC-38 (P) or ERC-38(B/R))
Paper roll
Operator's manual
AC adapter (Refer to Table 5.1.1 for settings at shipment)

Table 5.1.1 Settings at Shipment

Settings at Shipment	Voltage	AC Adapter Model Name
Japan	100 V	PA-6508
North America	120 V	PB-6509
Europe (Germany)	230 V	PB-6510
Europe (U.K)	230 V	PA-6511
Australia	240 V	PA-6513

5.1.1 External appearance and mass of the AC adapter

1) Overall dimensions

Type / Symbol	PA type	PB type
A	75 {2.95"}	80 {3.15"}
B	61 {2.40"}	68 {2.68"}
C	110 {4.33"}	125 {4.92"}
D	135 {5.32"}	146 {5.75"}

[Units: mm]

2) Mass

PA type	PB type
1.25 (2.76 lb)	1.35 {2.98 lb}

[Units: kg]

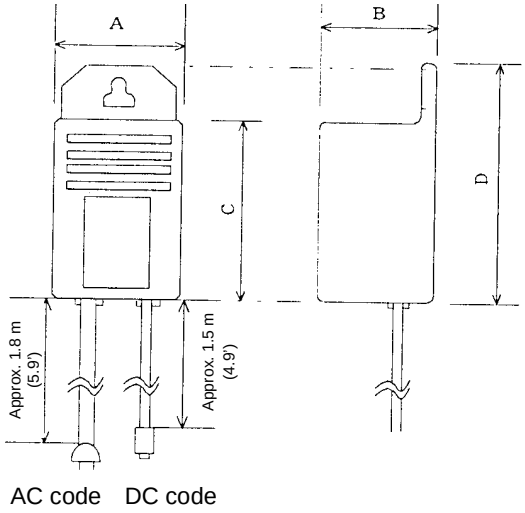
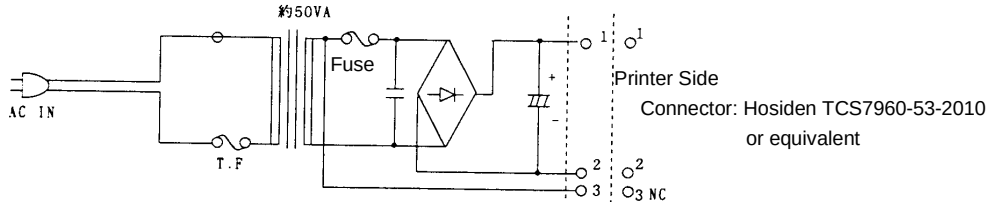


Figure 5.1.1 External Appearance of the AC adapter



The figure above shows the configuration of the AC adapter. Please handle it carefully.

NOTES 1: The two AC adapters differ in external appearance and in whether they connect to connector terminal 3 of the DC cord. In the TM-U200, connector terminal 3 of the DC cord is not used. When designing the system, be sure to allow enough space to install either AC adapter. (The PB type is larger than the PA type.)

2: Cautions regarding the connection of this AC adapter to EPSON customer displays:
- Never use with the DM-D101 or the DM-D202.
- It is possible to use the DM-101 II or the DM-202 II.

Figure 5.1.2 Internal Circuitry of the AC Adapter

5.2 Options

- Paper roll near-end detector (available optionally at dealer)
- AC adapter PS-170 (sold separately)
- Printer fastening tape (Model No. DF-10)

5.3 Interface Board

- IEEE 1284 compatible interface board (Bidirectional parallel: option)
- RS-232 compatible interface board (option)
- RS-485 compatible interface board (option)

6. Commands

6.1 Command Notation

XXXX

[Name]	The name of the command.
[Format]	The code sequence.
[Range]	Gives the allowable ranges for the arguments.
[Description]	Describes the command's function.
[Notes]	Provides important information on setting and using the printer command, if necessary. Items marked with ∗ indicate "important notice."
[Default]	Gives the default values,(if any) for the command arguments.
[Reference]	Lists related commands.
[Example]	Gives examples of how to use the command.

ASCII indicates the ASCII equivalents.

Hex indicates the hexadecimal equivalents.

Decimal indicates the decimal equivalents.

[ ]*k* indicates the contents of the [ ] should be repeated *k* times.

6.2 Explanation of Terms

(1) Reception buffer

The reception buffer is a buffer that stores, as is, the data received from the host (the reception data). The reception data is stored in the reception buffer temporarily, and is then processed sequentially.

(2) Print buffer

The print buffer is a buffer that stores the image data to be printed.

(3) Print buffer full

This is the state where the print buffer is full. If new print data is input while the print buffer is full, the data in the print buffer is printed out and a line feed is executed. This is the same operation as the **LF** operation.

(4) Start of line

The start of line state satisfies the following conditions:

- There is no print data (including spaces and portions of data skipped due to **HT**) currently in the print buffer.

(5) Printable area

The maximum range within which printing is possible under the printer specifications. The printable area for this printer is 400/160 inches.

(6) Ignore

The state in which all codes, including parameters, are read in and discarded, and nothing happens.

(7) Invalid

The state in which the command portion of codes is read in and discarded, while the parameter portion of codes is treated as normal data.

(8) Inch

A unit of length. One inch is 25.4 mm.

(9) MSB

Most Significant Bit

(10) LSB

Least Significant Bit

6.3 Command Descriptions

HT

[Name] Horizontal tab

[Format]

ASCII	HT
Hex	09
Decimal	10

[Description] Moves the print position to the next horizontal tab position.

[Notes]

- This command is valid only when the receive buffer capacity is 40 bytes (when DIP switch 1-2 is on).
- This command is ignored unless the next horizontal tab position has been set.
- If the next horizontal tab position is outside the printing area, the printing position shifts to "printing area width + 1."
- Horizontal tab positions are set with **ESC D**.
- The default tab positions are at intervals of 8 characters (columns 9, 17, 25.) for font B (7×9).

[Reference] **ESC D**

LF

[Name] Print and line feed

[Format]

ASCII	LF
Hex	0A
Decimal	10

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

[Note] This command sets the print position to the beginning of the line.

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

CR

[Name] Print and carriage return

[Format]

ASCII	CR
Hex	0D
Decimal	13

[Description] ① For the serial interface model

- This command prints the data in the print buffer and does not feed the paper.

② For the parallel interface model

- When auto-line feed is enabled, this command functions in the same way as **LF**. When auto-line feed is disabled, this command is disregarded.

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

[Reference] **LF**

DLE EOT *n*

[Name] Real-time status transmission

[Format]

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

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

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

n = 1: Transmit printer status

n = 2: Transmit offline status

n = 3: Transmit error status

n = 4: Transmit paper roll sensor status

[Notes]

∗ The status is transmitted whenever the data sequence <10>H<04>H<*n*> ($1 \le n \le 4$) is received. For example,
In **ESC ∗ *m nL nH [d] nL+256nH***, *d1*=<10>H, *d2*=<04>H, *d3*=<1>H

∗ This command should not be used within the data sequence of another command that consists of 2 or more bytes. For example,
If you attempt to transmit **ESC 3 *n*** to the printer, but DTR (DSR for the host computer) goes to MARK before n is transmitted and then **DLE EOT 3** interrupts before n is received, the code <10>H for **DLE EOT 3** is processed as the code for **ESC 3** <10>H.

- The printer executes this command upon receiving it.
- When transmitting status, the printer transmits only 1 byte without confirming the condition of the DSR signal.
- This command is executed even when the printer is offline, the receive buffer is full, or there is an error status with serial interface mode.
- With parallel interface mode, this command cannot be executed when the printer is busy. This command is executed even when the printer is offline or there is an error status when DIP switch 1-8 is on with parallel interface mode.

- When Auto Status Back (ASB) is enabled using the **GS a** command, the status transmitted by the **DLE EOT** command and the ASB status must be differentiated by using the table in Appendix E.
- This command is effective even if the printer is not selected by set peripheral device command, **ESC =**.

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 kick-out signal is LOW (connector pin 3)
	On	04	4	Drawer kick-out signal is HIGH (connector pin 3)
3	Off	00	0	On-line.
	On	08	8	Off-line.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Not waiting for online recovery
	On	20	32	Waiting for online recovery
6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

n = 2: Off-line status

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

Bit 5: On (printing stops due to paper-end) when printing stops due to paper-end detected by the paper-end sensor or the paper near-end enabled by using the **ESC c 4**.

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 occurred.
3	Off	00	0	No autocutter error.
	On	08	8	Autocutter error occurs.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Unrecoverable error.
	On	20	32	Recoverable error.
6	Off	00	0	Automatic recover error.
	On	40	64	No automatic recover error.
7	Off	00	0	Not used. Fixed to Off.

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

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

n = 4: 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 near-end sensor. Paper adequate.
	On	0C	12	Paper near-end is detected by the paper near-end sensor.
4	On	10	16	Not used. Fixed to On
5,6	Off	00	0	Paper end sensor. Paper adequate.
	On	60	96	Paper end is detected by the paper end sensor.
7	Off	00	0	Not used. Fixed to Off.

Bits 2 and 3: The "paper roll near end" detector is an option; on units that do not have this option, bits 2 and 3 are "0" (paper adequate).

[Reference] **DLE ENQ, GS a, GS r**, 3.5.1, Error types, Appendix E

DLE ENQ *n*

[Name] Real-time request to printer

[Format]

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

[Range] *n* = 0, *n* = 2

[Description] The printer responds to a request from the host specified by *n*.

n = 0: Recovers to online state.
n = 2: Recovers from an error after clearing the receive and print buffers.

[Notes]

∗ The status is also transmitted whenever the data sequence of <10>H<05>H<*n*> *n* = 2 is received. For example,

In **ESC ∗ *m* n_L n_H [*d*] n_L+256n_H**, *d1*=<10>H, *d2*=<05>H, *d3*=<1>H

∗ This command should not be used within the data sequence of another command that consists of two or more bytes. For example,

If you attempt to transmit **ESC 3 *n*** to the printer, but DTR (DSR for the host computer) goes to MARK before *n* is transmitted, and **DLE ENQ 2** interrupts before *n* is received, the code <10>H for **DLE ENQ 2** is processed as the code for **ESC 3** <10>H.

- When the printer is offline because printing was stopped due to a lack of paper, this command *n* = 0 is valid from the point when paper is loaded until the printer goes online again (the "waiting for on-line recovery" state), while in other cases requests are ignored.
- This command *n* = 2 is valid only when a mechanical error or an autocutter error has occurred.
- The printer executes this command upon receiving it.
- This command is executed even when the receive buffer is full with a serial interface model. With a parallel interface model, this command cannot be executed when the printer is busy.
- **DLE ENQ 2** enables the printer to recover from an error after clearing the data in the receive buffer and the print buffer. The printer retains the settings (by **ESC !, ESC 3**, etc.) in effect when the error occurred. The printer can be initialized completely by using this command and **ESC** @. This command is enabled only for errors that have the possibility of recovery, except for print head temperature errors.
- This command is effective even if the printer is not selected by set peripheral device command, **ESC =**.

[Reference] **DLE EOT, GS z 0**

ESC SP *n*

[Name] Set right-side character spacing

[Format]

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

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

[Description] Sets the character spacing for the right side of the character to [$n \times 0.159$ mm {1/160 inches}] .

[Notes]
- The right-side character spacing for double-width mode is twice the normal value.

[Default] $n = 0$

ESC ! *n*

[Name] Select print mode(s)

[Format]

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

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

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

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A (9 × 9) selected.
	On	01	1	Character font B (7 × 9) 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.

[Notes]
- When both double-height and double-width modes are selected, quadruple size characters are printed.
- Underlining is added to the entire width of each character, including the space to the right of a character, but is not added to portions of lines that were skipped by means of an **HT**.
- The underline setting by this command does not affect the Kanji character printing.

[Default] *n* = 1

[Reference] **ESC E, ESC –**

ESC % *n*

[Name] Select/cancel user-defined character set

[Format]

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

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

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

When the Least Significant Bit (LSB) is 0, the user-defined character set is canceled and the internal character set is enabled.

When the LSB is 1, the user-defined character set is selected.

[Notes]
- This command is valid only when the receive buffer capacity is 40 bytes (when DIP switch 1-2 is on).
- Only the least significant bit of *n* is valid.
- When the downloaded character set has been released, the internal character set is specified automatically.

[Default] *n* = 0

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

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

[Name] Define user-defined characters

[Format]

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

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

[Description] Defines user-defined characters.

- *y* specifies the number of bytes in the vertical direction.
- *c1* specifies the beginning character code for the definition, and *c2* specifies the final code. When only one character is desired, use *c1 = c2*.
- *x* specifies the number of dots in the horizontal direction.

[Notes]
- This command is valid only when the receive buffer capacity is 40 bytes (when DIP switch 1-2 is on).
- The range of definable character codes extends from 20H to 7EH among the ASCII codes.
- Consecutive character codes for multiple characters can be defined in one definition. When specifying only one character, specify *c1 = c2.*
- "*d*" is definition data that indicates the pattern for "*x*" dots in the horizontal direction starting from the left edge. If "*x*" does not satisfy the number of dots in the character configuration pattern, the remaining dots on the right are spaces.
- The number of bytes required to download a character definition for one character is "*y*" × "*x*."
- In the definition data, a "1" represents a dot that is to be printed, and a "0" represents a dot that is not to be printed.
- Independent downloaded character definitions are possible for each font. The font is selected by the **ESC !** command.
- The defined downloaded characters are cleared in the following circumstances:
  1) When **ESC** @ is executed.
  2) When deleted by **ESC ?.**
  3) When the printer is reset or turned off.
- The maximum number of characters that can be defined is 19 (8 for the multilingual supporting model).

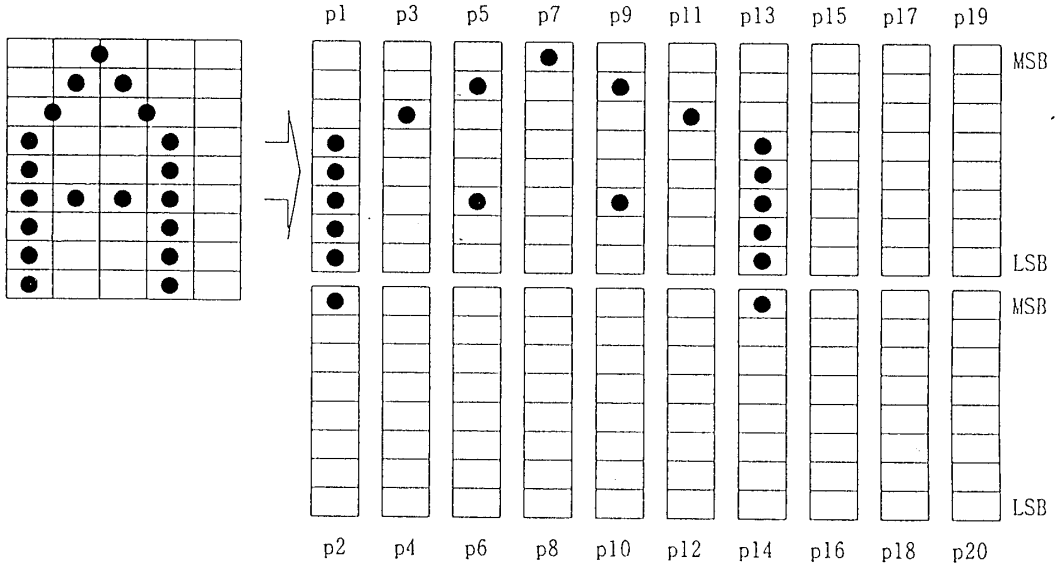
- If downloaded characters equal to the number of characters that can be defined have already been downloaded, redefinition of the defined ASCII codes is possible, but definition of new ASCII codes is not possible.

[Default] The internal character set

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

[Example]

7 x 9 font when the dot pattern for code 20H is defined as shown below.



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

	ESC	&	y	c1	c2	X	p1	p2	p3	d4	p5	p6	p7	p8	p9	p10	p11	p12	p13	p14
Code	1B	26	02	20	20	07	1F	80	20	00	44	00	80	00	44	00	20	00	1F	80

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

ESC ∗ *m 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
$0 \le n_L \le 255$
$0 \le n_H \le 3$
$0 \le d \le 255$

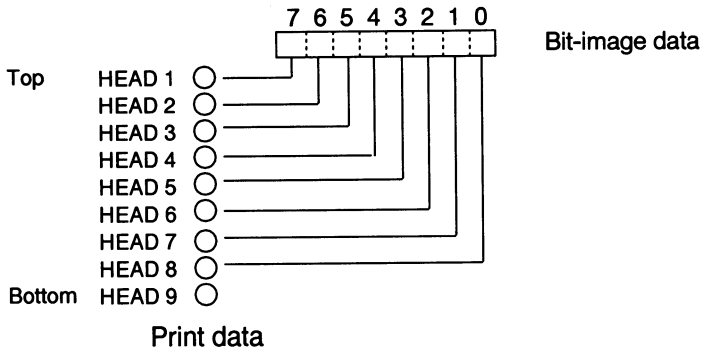
[Description] Selects a bit-image mode using *m* for the number of dots specified by n_L and n_H

- Divide the number of dots to be printed by 256. The interger answer is n_H and the remainder is n_L. Therefore, the number of dots in the horizontal direction is calculated by $n_L + 256 \times n_H$.
- If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.
- d indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.
- The bit-image modes selectable by *m* are as follows.

		Horizontal Direction		
m	No. of Vertical Dots	Dot Density	Adjacent Dot	Maximum number of dots
0	8	Single Density	Permitted	200
1	8	Double Density	Prohibited	400

[Notes]
- If the values of *m and nH* are out of the specified range, the data following is processed as normal data.
- After printing a bit image, the printer returns to normal data processing mode.

• The relationship between the image data and the dots to be printed is as follows.



ESC – *n*

[Name] Turn underline mode on/off

[Format]

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

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

[Description] Turns underline mode on or off,

- When *n* = 0 or 48, underline mode is turned off.
- When *n* = 1 or 49, underline mode is turned on.

[Notes]
- Underlines can be printed for all characters, but not for the space set by **HT**.
- This command and **ESC !** turn underline mode on or off in the same way.
- If *n* is out of the specified range, this command is ignored.
- The underline setting by this command does not affect the Kanji character printing.

[Default] *n* = 0

[Reference] **ESC !**

ESC 2

[Name] Select default line spacing

[Format]

ASCII	ESC	2
Hex	1B	32
Decimal	27	50

[Description] Selects default (1/6-inch) line spacing.

[Reference] **ESC 3**

ESC 3 *n*

[Name] Set line spacing

[Format]

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

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

[Description] Sets the line spacing to [$n \times 0.176$ mm {1/144 inches}].

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

[Reference] **ESC 2**

ESC <

[Name] Return home

[Format]

ASCII	ESC	<
Hex	1B	3C
Decimal	27	60

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

[Notes]

- The print head first moves to the left-most position, then to the right-most position, and then to the left-most position again.
- The left-most end is detected by the home position sensor.
- Since the home position is detected when this command is executed, the printing position may shift after this command is executed.

ESC = *n*

[Name] Select device

[Format]

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

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

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

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer disabled.
	On	01	1	Printer enabled.
1	Off	00	0	Customer display disabled.
	On	02	2	Customer display enabled.
2	-	-	-	Undefined
3	-	-	-	Undefined
4	-	-	-	Undefined
5	-	-	-	Undefined
6	-	-	-	Undefined
7	-	-	-	Undefined

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

[Default] *n* = 1

[Reference] **DLE EOT**, **DLE ENQ**

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.

[Notes]
- This command is valid only when the receive buffer capacity is 40 bytes (when DIP switch 1-2 is on).
- This command cancels the pattern defined for the character code specified by *n* After the user-defined characters is canceled, the corresponding pattern for the internal character is printed.
- This command deletes the defined pattern for the specified code in the character font selected by the "**ESC !**" command.
- If a user-defined character has not been defined for the specified character code, the printer ignores this command.

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

ESC @

[Name] Initialize printer

[Format]

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

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

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

ESC D *n*1... *nk NUL*

[Name] Set horizontal tab positions

[Format]

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

[Range] $1 \leq n \leq 255$

$0 \leq k \leq 32$

[Description] Sets horizontal tab positions.

- *n* specifies the column number (counted from the beginning of the line) for setting a horizontal tab position.
- *k* indicates the total number of horizontal tab positions to be set.

[Notes]
- This command is valid only when the receive buffer capacity is 40 bytes (when DIP switch 1-2 is on).
- The tab position is set at [character width x *n*] from the beginning of the line. The character width includes the right-side space of the character, and is twice the normal value when double-width is specified.
- This command deletes horizontal tab positions that have already been set.
- When "*n* = 8" has been set for the horizontal tab position, the printing position moves to the ninth digit when **HT** is executed.
- Up to 32 tab positions can be set. Data exceeding 32 tab positions is processed as normal data.
- Input <*n*>k in ascending order and place a NUL code <00>H at the end. When <*n*>k is less than or equal to the preceding value <*n*>*k*-1, tab setting is finished and the following data is processed as normal data.
- **ESC D *NUL*** cancels all horizontal tabl positions.
- The previously specified horizontal tab positions do not change, even if the character width changes.

[Default] The default tab positions are at intervals of 8 characters (columns 9, 17, 25, ...) for font B (7×9).

[Reference] **HT**

ESC E *n*

[Name] Turn emphasized mode on/off

[Format]

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

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

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

[Notes]
- 2-pass printing is slower in emphasized mode.
- Only the lowest bit of *n* is enabled.
- The printer does not emphasize bit-images.
- This command and **ESC !** turn on and off emphasized mode in the same way. The last received command becomes effective.
- Printer output is the same in double-strike (**ESC G**) and in emphasized.
- This command affects the alphanumeric and Kanji character printing.

[Default] *n* = 0

[Reference] **ESC !, ESC G**

ESC G *n*

[Name] Turn double-strike mode on/off

[Format]

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

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

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

[Notes]
- 2-pass printing is slower in double-strike mode.
- Only the lowest bit of *n* is enabled.
- The printer does not double-strike bit-images.
- Printer output is the same in double-strike and in emphasized (**ESC E**).
- This command affects the alphanumeric and Kanji character printing.

[Default] *n* = 0

[Reference] **ESC E**

ESC J *n*

[Name] Print and feed paper

[Format]

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

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

[Description] Prints the data in the print buffer and feeds the paper [$n \times 0.176$ mm {1/144 inches}] .

[Notes]
- After printing is completed, this command sets the print starting position to the beginning of the line.
- This command has no effect on the line feed amount set by the **ESC 2** command or the **ESC 3** command.

[Reference] **ESC K**

ESC K *n*

[Name] Print and reverse feed

[Format]

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

[Range] $0 \leq n \leq 48$

[Description] Prints the data in the print buffer and feeds the paper [$n \times 0.176$ mm {1/144 inches}] in the reverse direction

[Notes]
- This command must not be issued continuously more than two times.
- Reverse direction paper feeding causes the following problems:
  1) Paper feed pitch is incorrect.
  2) Printer noise is louder than normal.
  3) The paper may rub against the ribbon and become dirty.
- If *n* is out of the specified range, the printer prints the data and does not feed the paper.

[Reference] **ESC J**

ESC R *n*

[Name] Select an international character set

[Format]

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

[Range] $0 \le n \le 13$

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

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

(*) These character sets are not supported in the single-color printing model of the type D printer.

[Default] *n* = 0

[Reference] Section 3.2.20, Character Code Tables

ESC U *n*

[Name] Turn unidirectional printing mode on/off

[Format]

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

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

[Description] Turns unidirectional printing mode on or off

When the LSB of *n* is 0, turn off unidirectional printing mode. (Turn bidirectional printing mode on.)

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

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

[Default] *n* = 0

ESC a *n*

[Name] Select justification

[Format]

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

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

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

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

[Notes]
- The command is enabled only when input at the beginning of the line.
- A portion of data skipped by means of **HT** is also target data for the justification function.

[Default] *n* = 0

[Example]

Left justification

```
ABC
ABCD
ABCDE
```

Centering

```
 ABC
 ABCD
ABCDE
```

Right justification

```
  ABC
 ABCD
ABCDE
```

ESC c 3 *n*

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

[Format]

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

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

[Description] Selects paper detector(s) to output paper end signals, using *n* as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll near end sensor disabled.
	On	01	1	Paper roll near end sensor enabled.
1	Off	00	0	Paper roll near end sensor disabled.
	On	02	2	Paper roll near end sensor enabled.
2	Off	00	0	Paper roll end detector disabled.
	On	04	4	Paper roll end detector enabled.
3	Off	00	0	Paper roll end detector disabled.
	On	08	8	Paper roll end detector enabled.
4	-	-	-	Undefined
5	-	-	-	Undefined
6	-	-	-	Undefined
7	-	-	-	Undefined

[Notes]
- This command is available only with parallel interface.
- It is possible to select multiple detectors to output signals. Then, if any of the detectors detect a paper end, the paper end signal is output.
- The detector is switched when executing this command. Because of this, the paper-out signal switching may delay depending on the receive buffer state.
- The paper near-end sensor is an option; therefore, if the sensor is not installed, the sensor always detects that paper is loaded, not near-end.

[Default] *n* = 15

ESC c 4 *n*

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

[Format]

ASCll	ESC	c	4	*n*
Hex	18	63	34	*n*
Decimal	27	99	52	*n*

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

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

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper roll near-end sensor disabled.
	On	01	1	Paper roll near-end sensor enabled.
1	Off	00	0	Paper roll near-end sensor disabled.
	On	02	2	Paper roll near-end sensor enabled.
2	-	-	-	Undefined
3	-	-	-	Undefined
4	-	-	-	Undefined
5	-	-	-	Undefined
6	-	-	-	Undefined
7	-	-	-	Undefined

[Notes]
- When a paper end is detected, printing stops after printing the current line and feeding the paper.
- The printer goes offline after printing stops.
- The paper roll near-end sensor is an option, therefore, if the paper roll near-end sensor is enabled by this command when the sensor is not installed, it does not stop printing.
- The paper roll near-end sensor is enabled when either bit 0 or 1 is 1.
- The paper roll end sensor is always used to make an effective to stop printing.

[Default] *n* = 0

ESC c 5 *n*

[Name] Enable/disable panel buttons

[Format]

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

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

[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]
- Only the least significant bit of *n* is valid.
- When the panel buttons are disabled, no buttons on the panel are usable. If "disabled" is set, the paper FEED button no longer functions. However, when loading roll paper, if the paper loading wait time has been set with **GS z 0**, the paper FEED button can be used to feed the paper forward within the set time.
- For this printer, "panel switch" refers to the FEED button.

[Default] *n* = 0

ESC d *n*

[Name] Print and feed *n* lines

[Format]

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

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

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

[Notes]
- This command sets the print starting position to the beginning of the line.
- The maximum paper feed amount is 40 inches. If the specified amount exceeds 40 inches, the paper feed amount is automatically set to 40 inches.
- This command has no effect on the line feed amount set by the **ESC 2** command or the **ESC 3** command.

[Reference] **ESC e**

ESC e *n*

[Name] Print and reverse feed *n* lines

[Format]

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

[Range] $0 \le n \le 2$

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

[Notes]
- This command must not be issued continuously more than two times.
- Reverse direction paper feeding causes the following problems:
  1) Paper feed pitch is incorrect.
  2) Printer noise is louder than normal.
  3) The paper may rub against the ribbon and become dirty.
- If *n* is out of the specified range (if the paper feed amount exceeds 8.467 mm {48/144 inches}), the printer prints the data and does not feed the paper.

[Reference] **ESC d**

ESC p *m t1 t2*

[Name] Generate pulse

[Format]

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

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

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

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

[Notes]
- The pulse ON time is [*t1* × 2] ms and the OFF time is [*t2* × 2] ms.
- When *t2* < *t1*, the printer processes *t1* × 2 ms.
- If *t2* is less than 50, *t2* is assumed to be equal to 50.

[Reference] Section 2.2.3, Drawer kick-out Connector, Appendix D

ESC r *n*

[Name] Select print color

[Format]

ASCII	ESC	r	*n*
Hex	1B	72	*n*
Decimal	27	114	*n*

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

[Description] Selects the print color.

n	Selected color
0, 48	Black
1, 49	Red

[Notes]
- Valid only when input at the beginning of a line.
- This command is effective only for the two-color printing model.

[Default] *n* = 0

ESC t *n*

[Name] Select character code table

[Format]

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

[Range] $0 \le n \le 8$, $19 \le n \le 26$, $n = 254, 255$

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

n	Page
0	PC437 [U.S.A., Standard Europe]
1	Katakana
2	PC850 [Multilingual]
3	PC860 [Portuguese]
4	PC863 [Canadian-French]
5	PC865 [Nordic]
6	Hiragana
7	One-pass printing Kanji characters
8	One-pass printing Kanji characters
19	PC858 [Euro]
20 (*)	Thai character code 42
21 (*)	Thai character code 11
22 (*)	Thai character code 13
23 (*)	Thai character code 14
24 (*)	Thai character code 16
25 (*)	Thai character code 17
26 (*)	Thai character code 18
254	Space page
255	Space page

Character code table (*n* = 6, 7, and 8) is available only on the Japanese Kanji supporting model.

(*): The character code table (*n* = 20 through 26 is available only on the Thai character supporting model.

[Default] *n* = 0

For Thai character supporting model: *n* = 20

[Reference] Section 3.2, Character Code Tables

ESC { *n*

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

[Format]

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

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

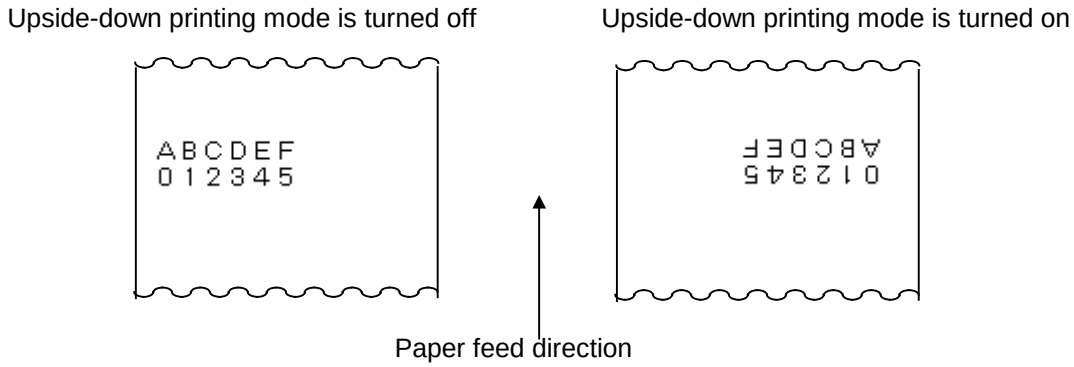
[Description] Turns upside-down printing mode on or off.

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

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

[Default] *n* = 0

[Example]



GS (A *pL pH n m*

[Name] Execute test print

[Format]

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

[Range] $(p_L+(p_H \times 256))=2$ (where $p_L=2$, $p_H=0$)
$0 \le n \le 2$, $48 \le n \le 50$
$1 \le m \le 3$, $49 \le m \le 51$

[Description]
- Executes a test print with a specified test pattern on the specified paper.
- *pL* and *pH* specifies the number of the parameter such as *n*, *m* to (*pL* + (*pH* × 256)) bytes.

  n specifies the paper to be tested.

n	Paper
0, 48	Basic sheet (paper roll)
1, 49 2, 50	Paper roll

  m specifies a test pattern.

m	Test pattern
1, 49	Hexadecimal dump
2, 50	Printer status print
3, 51	Rolling pattern print

[Description]
- When a hexadecimal dump is printed by this command, the data transmitted after the command may not be printed, because the printer clears the receive buffer. To avoid this, transmit data from the host after the printer prints the starting message of the hexadecimal dump.
- This command is enabled only when processed at the beginning of a line in standard mode.
- After the test print is finished, the printer resets itself automatically. Therefore, the already-defined data before this command is executed, such as user-defined characters, downloaded bit image, and macro, becomes undefined, and the receive buffer and print buffer are cleared, and each setting returns to the default value. The printer also re-reads the DIP switch settings.
- At the end of the test print, the printer cuts the paper, or ejects the cut sheet when the cut sheet is selected.
- The printer goes BUSY while this command is executed.

GS I *n*

[Name] Transmit printer ID

[Format]

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

[Range] $1 \le n \le 3$, $49 \le n \le 51$, $65 \le n \le 69$

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

n	Printer ID	Specification	ID (hexadecimal)
1, 49	Printer model ID	TM-U200 series	0D
2, 50	Type ID	See table below.	
3, 51	ROM version ID	ROM version	
65	Firmware version	Depends on firmware version.	
66	Manufacturer	EPSON	
67	Printer name	TM - U200	
68	Serial number	Depends on serial number.	
69	Supporting multilingual characters	Japan model: KANJI JAPANESE China model: CHINA GB2312 Taiwan model: TAIWAN BIG-5 Thai model: THAI 3 PASS	

n = 2, Type ID

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Two-byte character codes not supported.
	On	01	1	Two-byte character code supported.
1	Off	00	0	Autocutter not installed.
	On	02	2	Autocutter installed.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	Off	00	0	Not used. Fixed to Off.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

[Notes]

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

- When the printer ID transmission is specified with ($65 \leq n \leq 69$), the following contents are transmitted:

  Header: Hexadecimal = 5FH / Decimal = 95 (1 byte)
  Data: Printer information
  NUL: Hexadecimal = 00H / Decimal = 0 (1 byte)

  After the data is ready to be transmitted, the printer executes the following process.

  ① Changes READY to BUSY. If it is already BUSY, the printer changes nothing.

  ② Transmits [Header + Data + NUL].

  ③ Executes BUSY to READY. If it is already BUSY from any other cause, the printer changes nothing.

[Reference] Appendix E

① GS V *m*
② GS V *m n*

[Name] Feeds paper for cutting position.

[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 $m = 1, 49$ ② $m = 66$, $0 \leq n \leq 255$

[Description] Feeds paper for cutting position as follows:

m	Print mode
1, 49	Partial cut (one portion left uncut)
66	Feeds paper for (cutting position +[$n \times 0.176$ mm {1/144 inches}]), and partial cut.

[Notes]
- This command is effective only at the beginning of a line.
- Cutting position differs on each model.
  Type A/B: Position of the autocutter
  Type D: Position of the manual cutter

[Notes for ①]
- Type D model ignores this command.

[Notes for ②]
- When $n = 0$, the printer feeds the paper to the cutting position.
- When $n \neq 0$,the printer feeds the paper to (cutting position +[$n \times 0.176$ mm {1/144 inches}]).
- Type D model executes the paper feeding only, and does not execute paper cutting.

GS a *n*

[Name] Enable/Disable Automatic Status Back

[Format]

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

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

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

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

[Notes]

- Even if only one of the statuses is enabled, the status is sent when this command is executed. Subsequently, whenever the state of a valid status changes, that status is sent. In this case, because the current state is shown for each status, there is a possibility of a state change for a status for which ASB is not enabled.
- If all statuses are disabled, the Automatic Status Back (ASB) function is disabled.
- When transmitting a status, the printer transmits only four bytes without confirming the condition of the DSR signal.
- Four bytes of status data must be consecutive, except for the XOFF code.
- This command is executed when the data in the receive buffer is developed. Therefore, there may be a time lag between receiving this command and transmitting the status, depending on the receive buffer status.
- When the printer is disabled by **ESC =** (Select peripheral device), this command is disabled but ASB is not disabled.
- When using **DLE EOT, GS I,** or **GS r**, the status transmitted by this command, the ASB information, and the status transmitted by other commands must be differentiated by using the table in Appendix E.
- The status to be transmitted are as follows:

First byte (printer information)

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

Second byte (printer information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Not waiting for online recovery.
	On	01	1	Waiting for online recovery.
1	-	-	-	Undefined.
2	Off	00	0	No mechanical error.
	On	04	4	Mechanical error.
3	Off	00	0	No autocutter error.
	On	08	8	Autocutter error occurred.
4	Off	00	0	Not used. Fixed to Off.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error.
6	Off	00	0	No temporary abnormality of the print head temperature.
	On	40	64	Temporary abnormality of the print head temperature.
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 near-end sensor: paper adequate.
	On	(03)	(3)	Paper near-end sensor: paper near end.
2,3	Off	00	0	Paper end sensor: paper present.
	On	0C	12	Paper end sensor: no paper present.
4	Off	00	0	Not used. Fixed to Off.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

Bits 0 and 1: The "paper roll near end" sensor is an option; on units that do not have this sensor, the "paper roll near end" sensor always indicates that paper is present (bits 0 and 1 = 1), whether or not it actually is.

Fourth byte (paper sensor information)

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

[Default] *n* = 0 when DIP SW 1-8 is off, *n* = 2 when DIP SW 1-8 is on.

[Reference] **DLE EOT, GS r**, 3.5.1, Error types, Appendix E

GS r *n*

[Name] Transmit status

[Format]

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

[Range] $1 \le n \le 2$, $49 \le n \le 50$

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

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

[Notes]

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

Paper sensor status (*n* = 1,49)

Bit	Off/On	Hex	Decimal	Status for ASB
0,1	Off	00	0	Paper near-end sensor: paper present.
	On	(03)	(3)	Paper near-end sensor: paper near end.
2,3	Off	00	0	Paper end sensor: paper present.
	On	0C	12	Paper end sensor: no paper present.
4	Off	00	0	Not used. Fixed to Off.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

Bits 0 and 1: The "paper roll near end" sensor is an option; on units that do not have this sensor, the "paper roll near end" sensor always indicates that paper is present (bits 0 and 1 = 1), whether or not it actually is.

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

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

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

GS z 0 *t1 t2*

[Name] Setting of online recovery wait time

[Format]

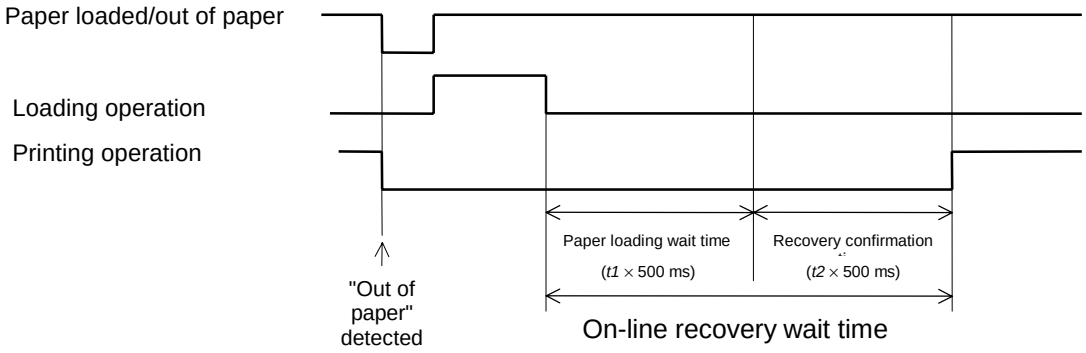
ASCII	GS	z	0	*t1*	*t2*
Hex	1D	7A	30	*t1*	*t2*
Decimal	29	122	48	*t1*	*t2*

[Range] $0 \le t1 \le 255$
$0 \le t2 \le 255$

[Function] Sets the paper loading wait time (from paper insertion to recovery confirmation state) to approximately (*t1* × 500 ms) and the recovery confirmation time (from end of the paper loading wait time to online recovery) to approximately (*t2* × 500 ms).

- When *t1* = 0, the printer enters the recovery confirmation state as soon as the paper is inserted.
- When *t2* = 0, the recovery confirmation time is canceled.

[Notes]
- When the printer has gone offline because printing stopped due to a lack of paper, it re-enters online operation once the set times elapse after paper loading is completed.



- Approximately (*t1* × 500 ms) after the paper is inserted and loaded, the printer enters the recovery confirmation state. This interval is the paper loading wait time. In the paper loading wait state, pressing the paper FEED switch feeds the paper forward. In addition, in the paper loading wait state, recovery to the online status is possible only by executing **DLE ENQ 0**. After the paper loading wait time elapses, the printer enters the recovery confirmation state.
- If the paper is fed forward by pressing the paper FEED button during the paper loading wait time, the time during which the paper is being fed is not counted as part of the paper loading wait time.

- Approximately (*t2* × 500 ms) after the end of the paper loading wait time, the printer enters the online state. This interval is the recovery confirmation time. While the printer is in the recovery confirmation state, the PAPER OUT LED flashes. In the recovery confirmation state, it is possible to re-enter the online state by executing **DLE ENQ 0**, by allowing the recovery confirmation time to elapse, or by pressing the paper FEED button.
- The paper FEED button cannot be used to feed the paper forward during the recovery confirmation time.
- When *t2* = 0 and the PAPER OUT LED is flashing, re-entering the online state is possible by executing **DLE ENQ 0** or by pressing the paper FEED button.
- If the roll paper near end sensor is mounted, and "printing stop" is enabled for the roll paper "near end" sensor by the **ESC c 4** command, the printer begins waiting for paper to be loaded once the roll paper near end sensor and the roll paper detector both detect paper.
- If the roll paper detector detects the "out of paper" state while the printer is waiting for online recovery, the printer re-enters the roll paper insertion wait state.
- The printer begins waiting for paper to be loaded once the roll paper near end sensor detects paper.

[Default] For type A: *t1* = 0, *t2* = 1
For type B/D: *t1* = 6, *t2* = 0

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

FS ! *n*

[Name] Set print mode(s) for Kanji characters

[Format]

ASCII	FS	!	*n*
Hex	1C	21	*n*
Decimal	28	33	*n*

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

[Description] Sets the print mode for Kanji characters, using *n* as follows:

Bit	Off/On	Hex	Decimal	Status for ASB
0	-	-	-	Undefined.
1	-	-	-	Undefined.
2	Off	00	0	Double width mode disabled.
	On	04	4	Double width mode enabled.
3	Off	00	0	Double height mode disabled.
	On	08	8	Double height mode enabled.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	00	0	Underline mode disabled.
	On	80	128	Underline mode enabled.

[Notes]
- This command is valid only for the Japanese Kanji model, Chinese Kanji model, and Taiwanese Kanji model.
- When both double-width and double-height modes are set (including right- and left-side character spacing), quadruple-size characters are printed.
- The printer can underline all characters (including right- and left-side character spacing), but cannot underline the space set by **HT**.

[Default] *n* = 0

[Reference] **FS –, FS W**

FS &

[Name] Select Kanji character mode

[Format]

ASCII	FS	&
Hex	1C	26
Decimal	28	38

[Description] Selects Kanji character mode.

[Notes] For Japanese Kanji supporting model:

- This command is effective only when the JIS code system is selected.
- When Kanji character mode is selected, the printer processes each two-byte sequence as a Kanji character code.
- Kanji codes are processed in the order of the first byte and second byte.
- Kanji character mode is not selected when the power is turned on.
- Using **FS C**, the Kanji character code system is selected.

For Chinese/Taiwanese Kanji supporting model:

- When kanji character mode is selected, the printer checks whether the code is Kanji or not, then processes the first byte and the second byte, if the code is Kanji.
- Kanji codes are processed in the order of the first byte and second byte.
- Kanji character mode is selected when the power is turned on.

[Reference] **FS ., FS C**

FS – *n*

[Name] Turn underline mode on/off for Kanji characters

[Format]

ASCII	FS	–	*n*
Hex	1C	2D	*n*
Decimal	28	45	*n*

[Range] $0 \le n \le 1$

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

n	Function
0	Turns off underline mode for Kanji characters
1	Turns on underline mode for Kanji characters (1-dot thick)

[Notes]

- This command is valid only for the Japanese Kanji model, Chinese Kanji model, and Taiwanese Kanji model.
- The printer can underline all characters (including right- and left-side character spacing), but cannot underline the space set by **HT**.

[Default] *n* = 0

[Reference] **FS !**

FS .

[Name] Cancel Kanji character mode

[Format]

ASCII	FS	.
Hex	1C	2E
Decimal	28	46

[Description] Cancels Kanji character mode.

[Notes] For Japanese Kanji supporting model:

- This command is effective only when the JIS code system is selected.
- When Kanji character mode is not selected, all character codes are processed one byte at a time as ASCII code.
- Kanji character mode is not selected when the power is turned on.

For Chinese/Taiwanese Kanji supporting model:

- When Kanji character mode is not selected, all character codes are processed one byte at a time as ASCII code.
- Kanji character mode is selected when the power is turned on.

[Reference] **FS &, FS C**

FS 2 *c1 c2 d1...dk*

[Name] Define user-defined Kanji characters

[Format]

ASCII	FS	2	*c1*	*c2*	*d1...dk*
Hex	1C	32	*c1*	*c2*	*d1...dk*
Decimal	28	50	*c1*	*c2*	*d1...dk*

[Range] *c1* and *c2* indicate character codes for the defined characters. The range of values for *c1* and *c2* differ depending on the character code system used.

Model type	*c1*	*c2*
Japanese Kanji supporting model (JIS code system)	*c1* = 77H	21H ≤ *c2* ≤ 7EH
Japanese Kanji supporting model (SHIFT-JIS code system)	*c1* = ECH	40H ≤ *c2* ≤ 7EH 80H ≤ *c2* ≤ 9EH
Chinese Kanji supporting model	*c1* = FEH	A1H ≤ *c2* ≤ FEH
Taiwanese Kanji supporting model	*c1* = FEH	A1H ≤ *c2* ≤ FEH

$0 \le d \le 255$
$k = 32$

[Description]

- Defines user-defined Kanji characters for the character codes specified by *c1* and *c2*.

[Notes]

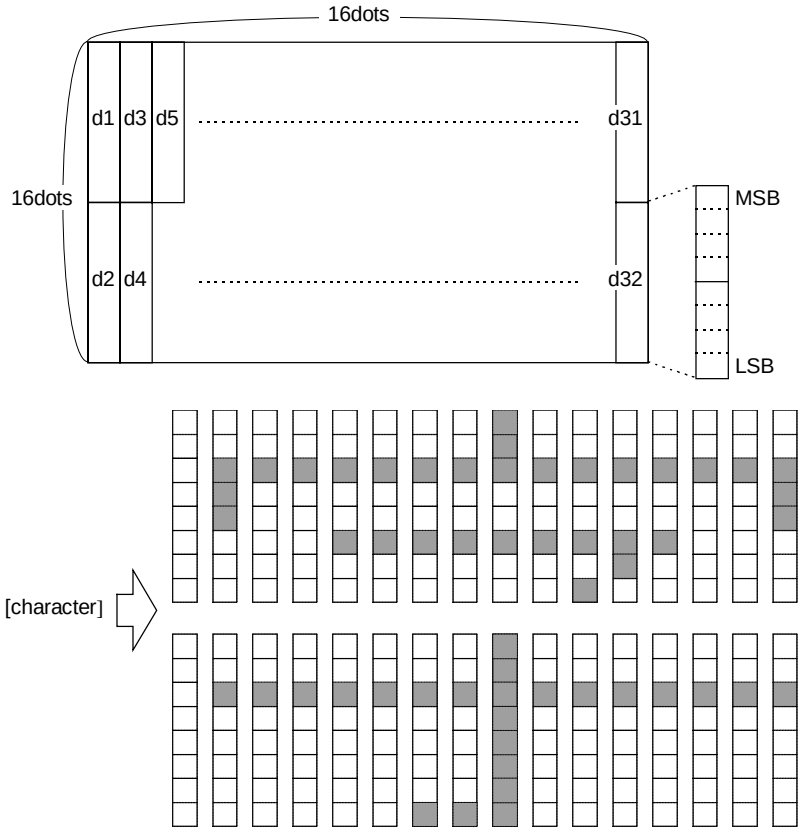
- This command is valid only when the receive buffer capacity is 40 bytes (when DIP switch 1-2 is on).
- This command is valid only for the Japanese Kanji model, Chinese Kanji model, and Taiwanese Kanji model.
- *c1* and *c2* indicate character codes for the defined characters. The range of values for *c1* and *c2* differ depending on the character code system used.

- The *d* is the dot data for the characters. The amount of data defined by *d* is 32 bytes, which consists of 2 bytes for vertically × 16 dots.
- When the user-defined characters are defined, it is possible to redefine the defined Kanji character codes but not to define new Kanji character codes.
- An example of the dot data for characters is shown below.
- After user-defined characters are defined, they are available until; another definition is made; **ESC @, FS ?** is executed; the printer is reset; or the power is turned off.

[Default] All spaces.

[Reference] **FS ?, FS C**

<Example>



The dot pattern for the JIS code <7721>H is defined as shown above.

	FS	2	c1	c2	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12
Code (Hex)	IC	32	77	21	00	00	38	20	20	20	20	20	24	20	24	20

d13	d14	d15	d16	d17	d18	d19	d20	d21	d22	d23	d24	d25	d26	d27	d28	d29
24	21	24	21	E4	FF	24	20	25	20	26	20	24	20	20	20	20

d30	d31	d32
20	38	20

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

FS ? *c1 c2*

[Name] Chancel user-defined Kanji characters

[Format]

ASCII	FS	?	*c1*	*c2*
Hex	1C	3F	*c1*	*c2*
Decimal	28	63	*c1*	*c2*

[Range] *c1* and *c2* indicate character codes for the defined characters. The range of values for *c1* and *c2* differ depending on the character code system used.

Model type	*c1*	*c2*
Japanese Kanji supporting model (JIS code system)	*c1* = 77H	21H ≤ *c2* ≤ 7EH
Japanese Kanji supporting model (SHIFT-JIS code system)	*c1* = ECH	40H ≤ *c2* ≤ 7EH 80H ≤ *c2* ≤ 9EH
Chinese Kanji supporting model	*c1* = FEH	A1H ≤ *c2* ≤ FEH
Taiwanese Kanji supporting model	*c1* = FEH	A1H ≤ *c2* ≤ FEH

[Description] Cancels user-defined characters.

[Notes]
- This command is valid only when the receive buffer capacity is 40 bytes (when DIP switch 1-2 is on).
- This command cancels the pattern defined for the Kanji character code specified by *c1* and *c2*. After the user-defined Kanji characters is canceled, the space character is printed.
- If a user-defined Kanji character has not been defined for the specified character code, the printer ignores this command.

[Reference] **FS 2, FS C**

FS C *n*

[Name] Select Kanji character code system

[Format]

ASCII	FS	C	*n*
Hex	1C	43	*n*
Decimal	28	67	*n*

[Range] *n* = 0, 1

[Description] Selects a Kanji character code system, based on the following values of *n*:

n	Kanji System
0	JIS code
1	SHIFT JIS code

[Notes]
- This command is effective only for the Japanese Kanji supporting model.
- In the JIS code system, the following codes are available:
  Primary byte: <21>H to <7E>H
  Secondary byte: <21>H to <7E>H
- In the SHIFT JIS code system, the following codes are available:
  Primary byte: <81>H to <9F>H and <E0>H to <EF>H
  Secondary byte: <40>H to <7E>H and <80>H to <FC>H

[Default] *n* = 0

FS S *n1 n2*

[Name] Set left- and right-side Kanji character spacing

[Format]

ASCII	FS	S	*n1*	*n2*
Hex	1C	53	*n1*	*n2*
Decimal	28	83	*n1*	*n2*

[Range] $0 \le n1 \le 32$
$0 \le n2 \le 32$

[Description] Sets left- and right-side Kanji character spacing *n1* and *n2*, respectively.

[Notes]
- This command is valid only for the Japanese Kanji model, Chinese Kanji model, and Taiwanese Kanji model.
- When double-width mode is set, the left- and right-side character spacing is twice the normal value.
- The Kanji character spacing is set in half-dot units.

[Default] *n1* = 0, *n2* = 0

FS W *n*

[Name] Turn quadruple-size mode on/off for Kanji characters

[Format]

ASCII	FS	W	*n*
Hex	1C	57	*n*
Decimal	28	87	*n*

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

[Description] Turns quadruple-size mode on or off for Kanji characters.
- When LSB of *n* is 0, quadruple-size mode for Kanji characters is turned off.
- When LSB of *n* is 1, quadruple-size mode for Kanji characters is turned on.

[Notes]
- This command is valid only for the Japanese Kanji model, Chinese Kanji model, and Taiwanese Kanji model.
- Only the lowest bit of *n* is valid.
- In quadruple-size mode, the printer prints the same size characters as when double-width and double-height modes are both turned on.

[Default] *n* = 0

[Reference] **FS !**

6.4 Ignored Commands

The serial interface model ignores the following commands:

ESC c 3 *n*

ESC c 6 *n*

The parallel interface model ignores the following commands:

ESC c 6 *n*

APPENDIX A: MISCELLANEOUS NOTES

1) Print duty

- When printing exceeds the allowable print duty cycle, the printer automatically detects the print head temperature rise, stops logic-seeking, and enters full-column print head movement operation. This stops the temperature rise by lowering print duty. If the print head temperature continues to rise, the printer stops the print head. In this case, the user should be aware that the printing speed may slow significantly.
- When printing is stopped due to high print head temperature, the ERROR LED blinks as shown in Table 3.5.1.
- When the head temperature error occurs, the printer goes offline. The printer automatically goes back online when the print head temperature falls.
- The upper limiting conditions on continuous printing are as follows. (An example test pattern is shown in Figure A-1 and Figure A-2.)

[Conditions]
- Maximum continuous printing time: 1 hour
- Ambient temperature: 25°C {77°F}
- Number of line feeds:
  Set the number of lines to be fed based on the following ratio:

  A: ratio between printed lines and fed lines

$$A \leq \frac{\text{15 lines or printing}}{\text{10 additional blank lines fed}}$$

- Print head duty:
  The number of print columns must be 20 or less in full-column print head movement operation.
- Print color selection:
  Do not switch the print color frequently. When a black-red-black or red-black-red color selection sequence is regarded as 1 switching, the user should perform switching according to the rate shown below.

  B: Print color switching rate

$$B \leq \frac{\text{2 switches}}{\text{15 lines of printing}}$$

2) Data transmission

Data should be transmitted after the printer power is turned on and initialize operation completes.

3) Manual cutter

The roll paper should be cut off after finishing paper feed. After cutting the roll paper, the paper should always be fed 6/144 inches before any subsequent print (to cancel the gear backlash).

4) Reverse paper feed

Normally, the printer can feed paper 1 line (including the gear backlash) in the reverse direction, when **ESC K** or **ESC e** is executed. However, do not reverse feed more than 48/144 inch (including the gear backlash).

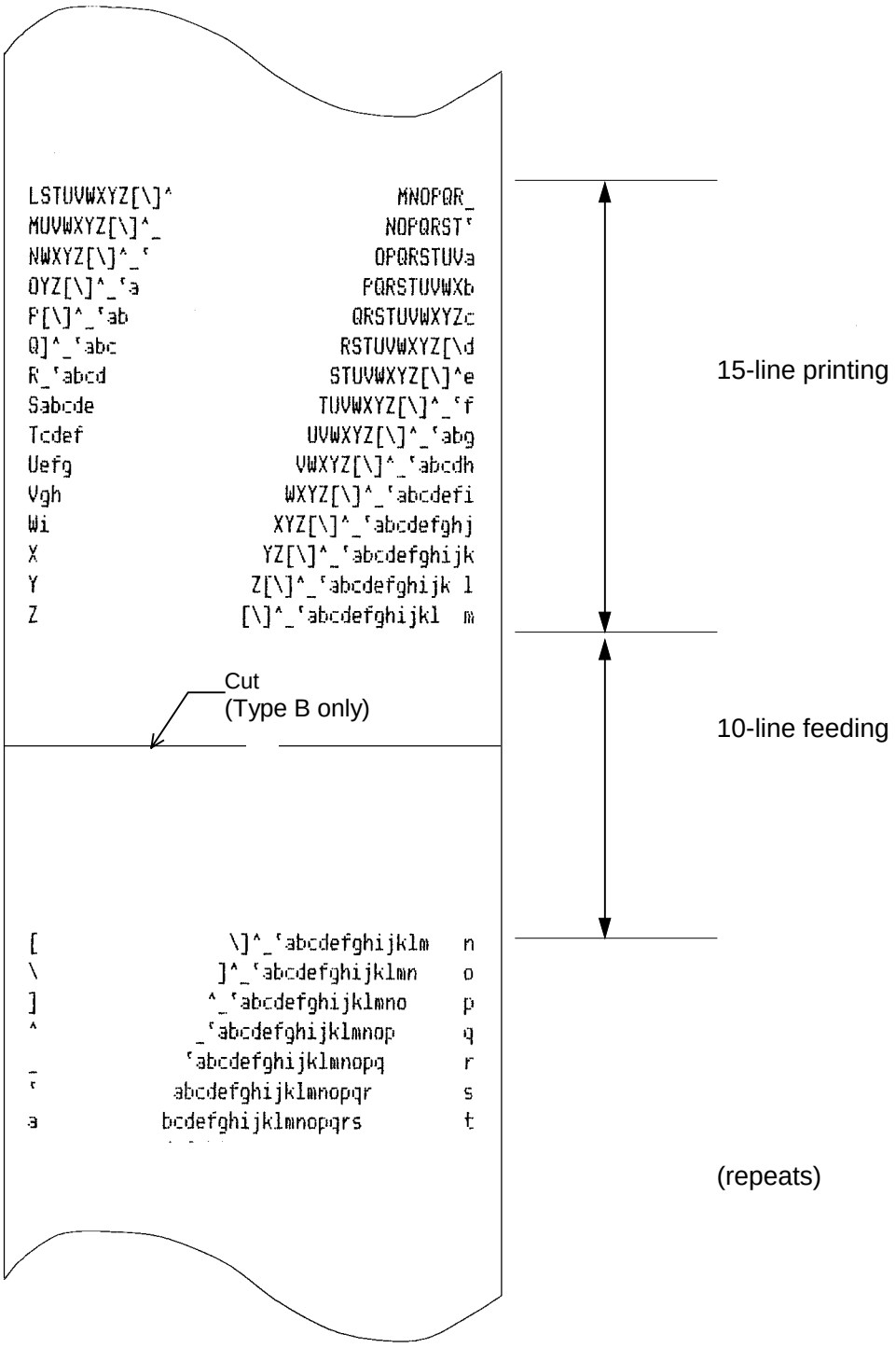


Figure A-1 Continuous Printing Test Pattern (Using the ERC-38(P)/(B))

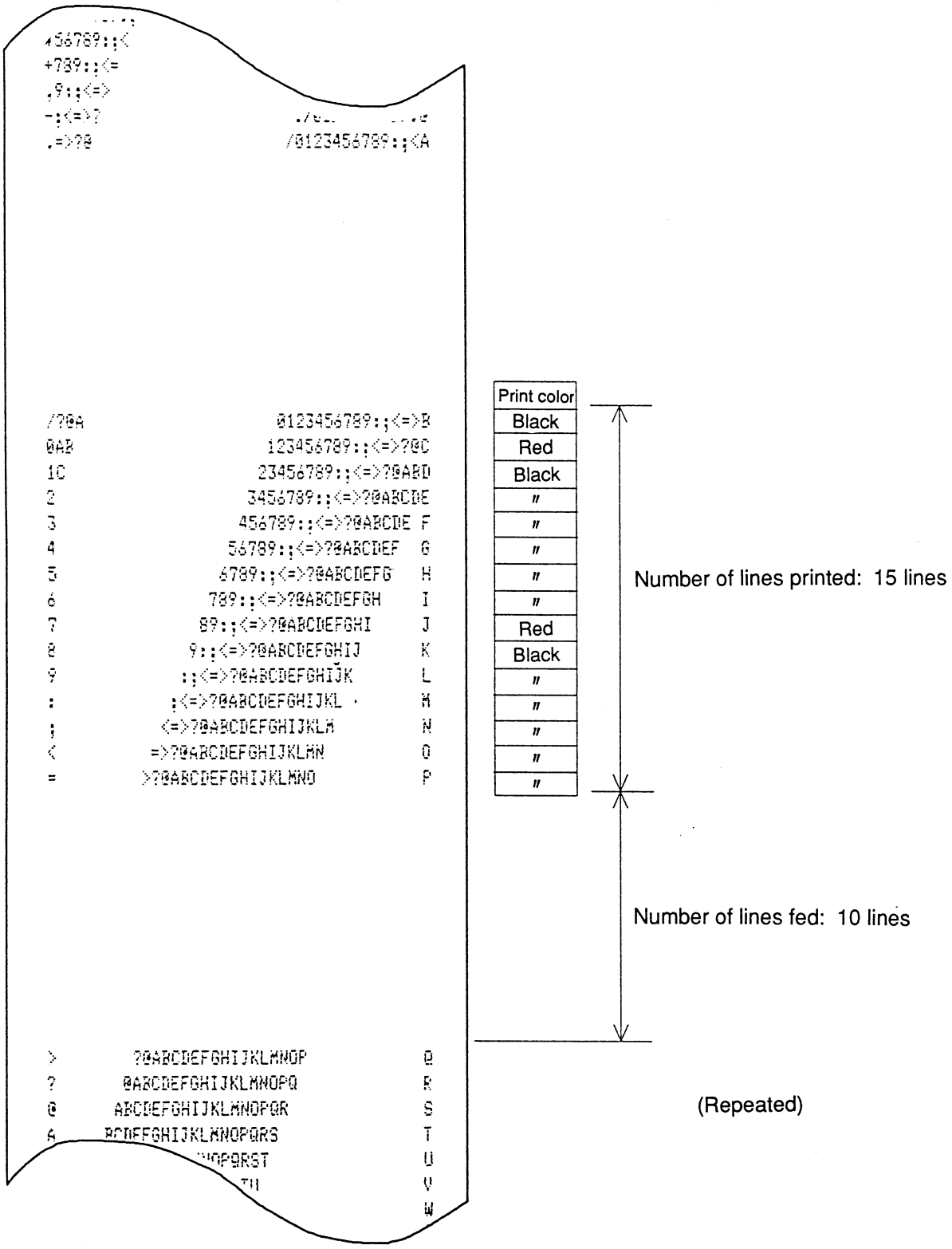


Figure A-2 Continuous Printing Test Pattern (Using the ERC-38(B/R))

5) Manual operation of the autocutter

In a paper jam, the printer may be stopped with the autocutter blade not in its normal position. In such cases, insert the screwdriver into the hole at the right side of the autocutter, as shown in Figure A-3, and turn the gear inside the cutter unit to move the cutter blade to its normal position.

6) Other note

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

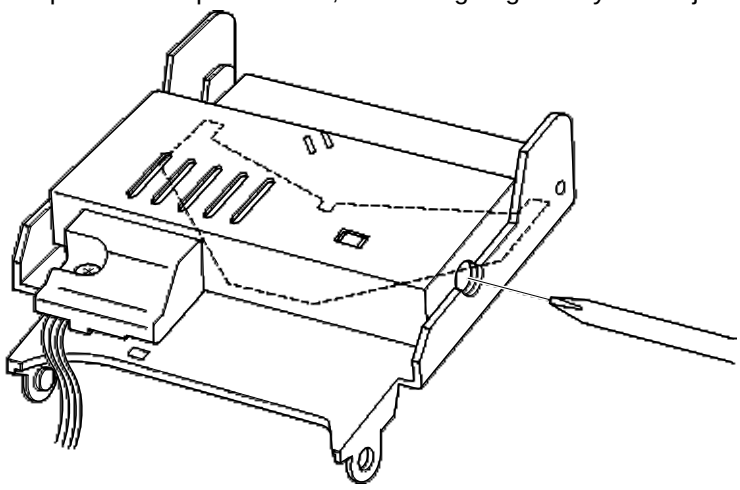


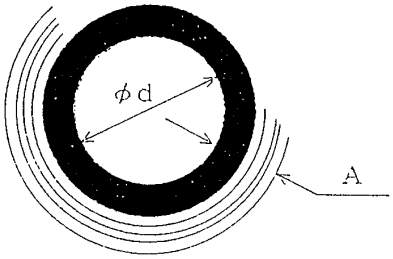
Figure A-3 Autocutter

APPENDIX B: INSTALLING THE NEAR-END DETECTOR AND ADJUSTING THE AMOUNT OF ROLL PAPER REMAINING

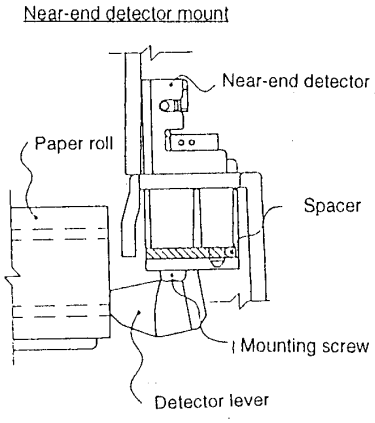
The near-end detector is mounted in place on the printer case by using the mounting screw provided. Because the amount of paper remaining on a roll differs according to the inner and outer diameters of the core of the roll, the spacer provided can be used to adjust the amount remaining within the range indicated below. The spacer is tightened along with the tightening screws, as shown in the diagram below.

1) The inner diameter of the core should be from 10.5 mm to 12.5 mm {0.41 to 0.49”}. (Refer to Section 1.4, "Roll Paper Supply Unit.")
2) Select the amount of adjustment needed, given the thickness of the core (including honeycomb cores).
3) The spacer can be used to set the amount remaining ("A"), including the thickness of the paper roll core.

* Honeycomb core: A core that resembles a honeycomb.



Spacer installed?	Dimension "A"	
Yes	3 ~ 4 mm	{0.12 ~ 0.16”}
No	6 mm	{0.24”}



Notes:

1. Because the values listed for "A" in the table are calculated values, there may be some deviation among individual units.
2. When the last portion of a roll of paper bears red markings at the end, the marking is sometimes an adhesive that pulls the entire paper roll up. In this case, the values shown in the table above do not properly correspond to the amount of paper remaining.
3. After installing the near-end detector, make sure that the detection lever moves smoothly.
4. If the roll of paper easily comes loose due to the quality of the paper, etc., incorrect detection of the end of the paper may result.

APPENDIX C: NOTES ON CHARACTER PRINTING

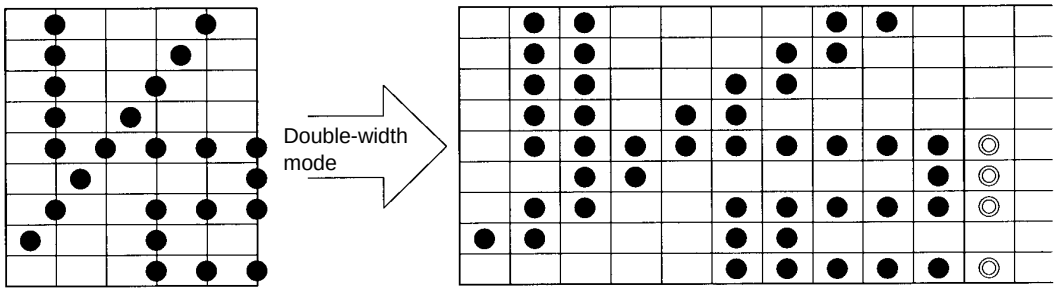
Applied for the user-defined characters and the following characters.

Font	Page	Character code
7 × 9	0	<B0>H, <B2>H
9 × 9	1	<E5>H, <E7>H
9 × 9	0	<B2>H

1) The printer deletes the right-most dots of a character during double-width mode, if another character follows.

If the characters shown above are double-width enlarged (dots exist in the right-most position), the right-most dots of the enlarged character are not printed, as shown in the figure below.

Example: 7 × 9 font is selected



◎ dots are not printed when another character follows.
◎ Dots are printed when no character follows. (except ◎ dots on 401st dot position)

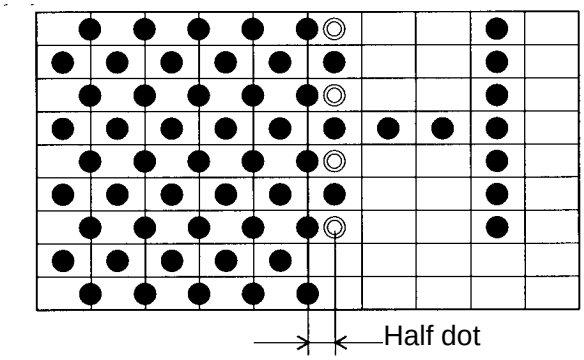
Figure C-1 7 × 9 Font

2) The printer cannot print horizontally adjacent half dots. A special procedure that avoids horizontally adjacent half dots is used when print data is buffered in the print buffer. Therefore, some dots of the character that follows the characters prescribed above are not printed because of the affect of the previous dots. Also, when double-height mode is selected, the dots affected by the previous dots are not printed, as shown in the following figure, because double-height processing is carried out during printing after the print pattern is buffered in the print buffer. To avoid this, program the software so that half dots are not adjoined horizontally. (For example, set the right side spacing of a character to 1 or more (**ESC SP**), etc.) In this case the user should Note that the total number of dots in the horizontal direction is 400 dots.

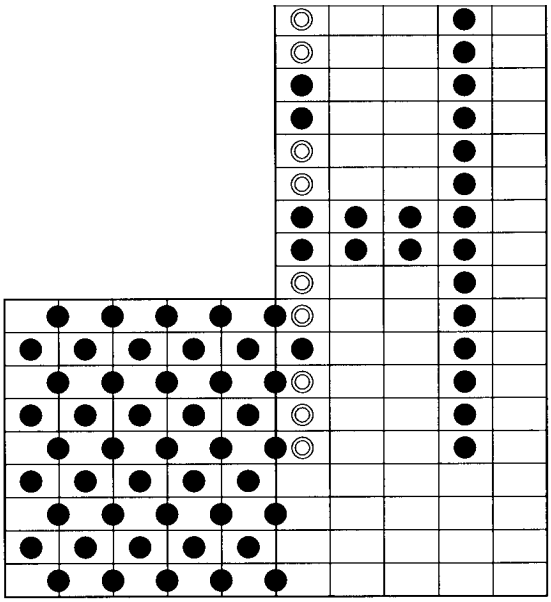
Example: If the following codes are transmitted, some dots are not printed.
(Graphic character H<B2> + "H" double-height enlarged)

```
PRINT #1, CHR$ (&HB2) ;
PRINT #1, CHR$ (&H1B);"!"; CHR$ (&H11);
PRINT #1, "H"; CHR$ ($HA) ;
```

When the data is buffered in the print buffer



◎ dots are deleted because of the next character and not printed.
Printing result (unidirectional printing)



◎ dots are not printed.
To avoid this, program the software as follows.
(Set the right-side spacing of the graphic character (H<B2>) to 1.)

```
PRINT #1, CHR$ (&H1B) ;" "; CHR$(1) ; CHR$(&HB2) ;
PRINT #1, CHR$ (&H1B);"!"; CHR$ (&H11);
PRINT #1, "H" ; CHR$ ($HA) ;
```

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

1) Drawer specifications (see Section 2.2.3, Drawer kick-out connector)

Drawer specifications differ significantly depending on manufacturer and model number. Make sure that the specifications of the drawer used meet the following conditions when connected to the drawer kick-out connector. These conditions also apply to any equipment (other than a drawer) that is connected to the drawer kick-out connector.

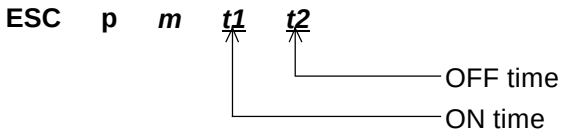
Never use a drawer (or other equipment) that does not meet all of the following conditions:

- The load, such as a drawer kick-out solenoid, must be connected between pins 4 and 2 or pins 4 and 5 of the drawer kick-out connector. (*1)
- When the drawer open/close signal (indicating the state of the drawer) is used, a switch must be provided between drawer kick-out connector pins 3 and 6. (*2)
- The resistance of the load, such as a drawer kick-out solenoid, must be 24 Ω or more or the input current must be 1A or less. (*3)
- Be sure to use the 24 V power output on drawer kick-out connector pin 4 for driving the equipment. Never connect any other power supply to the drawer kick-out connector. (*4) The peak current is 1 A. See item 2) below for drive signal duty.

NOTES : (*1): Proper operation is not guaranteed with different connections.
(*2): Proper operation is not guaranteed with different connections or connection to a component other than a switch.
(*3): Connection to equipment whose resistance is less than 24 Ω or less or whose input current is more than 1 A or more may damage the connected equipment as well as the printer.
(*4): Operation is not guaranteed with other power supplies.

2) Notes on the pulse generating command (**ESC p**)

When using **ESC p** to drive the drawer connected to the drawer kick-out connector, set the command parameters to meet the following conditions:



$$\frac{\text{ON time}}{\text{ON time + OFF time}} \leq 0.2 \quad \text{Formula D-1}$$

$$\text{or, OFF time} \geq \text{ON time} \times 4 \quad \text{Formula D-2}$$

The drive signal waveform generated when the drawer is driven according to the above conditions is shown in Figure D-1.

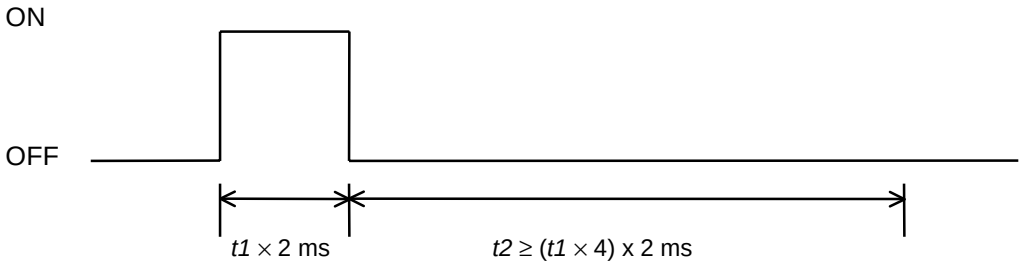


Figure D-1 Drawer Drive Signal Waveform (Formulas D-1 and D-2)

The ON time depends on the specifications of the drawer used. Be sure to check the drawer specifications and set a suitable time. To use a drawer that does not meet the conditions of Formulas D-1 and D-2, see the following section.

3) Using a drawer that does not meet the conditions in 2)

Setting the values of t1 and t2 according to the conditions in 2) results in a maximum ON time of 126 ms ($0 \leq t1 \leq 63$), since the setting ranges of t1 and t2 are 0 to 255. To use a drawer that requires an ON time exceeding 126 ms, the following conditions must be met:

$$\frac{\text{ON time}}{\text{ON time + OFF time}} \leq 0.2 \quad \text{.....Formula D-3}$$

α: other sequence processing time

NOTE: α is the period when drawer-driving is prohibited from the OFF time until the next ON time.

An example program in which the drawer connected to drive signal 1 is driven with an ON time of 200 ms is shown below.

```
PRINT #1, CHR$(&H1B);"p" ;CHR$(0);CHR$(100);CHR$(250);
GOSUB *WAIT300MS
                                   ON time 200 msOFF time 500 ms

*WAIT300MS
      300 [ms]   wait routine  ---- (*1)
RETURN
```

*1 Corresponds to α of Formula D-3. Set the value so that it satisfies Formula D-3 (or include an internal processing time that is equal to or longer than this wait routine).

The drive signal waveform generated when the drawer is driven according to the above conditions is shown in Figure D-2.

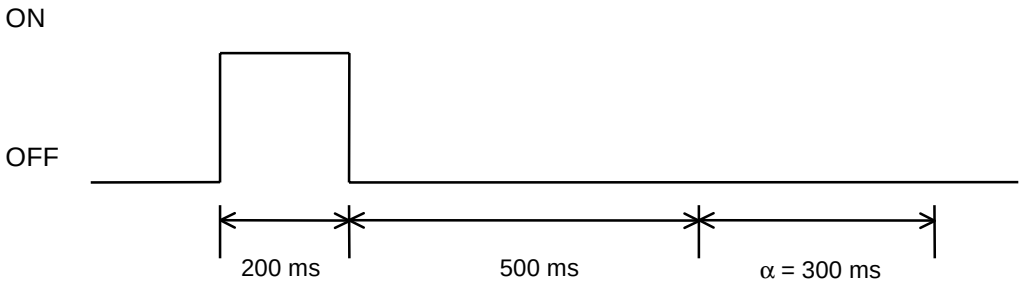


Figure D-2 Drawer Drive Signal Waveform

APPENDIX E: TRANSMISSION STATUS IDENTIFICATION

The values of specific bits are fixed in the status information transmitted by the printer, so that the status bytes of commands can be identified. The user can therefore confirm the command to which the status belongs, as shown in the following table.

When using Auto Status Back (ASB), however, process the consecutive three-byte code (except for XOFF) as ASB data after confirming the first byte of the ASB. Otherwise, the status transmitted by using the **GS I** and the status of the second and following bytes of the ASB cannot be differentiated.

Table E-1 Transmission Status Identification

Command	Status Reply
GS I	<0**0****>B
GS r	<0**0****>B
XON	<00010001>B
XOFF	<00010011>B
DLE EOT	<0**1**10>B
ASB (1st byte)	<0**1**00>B
ASB (2nd byte - 4th byte)	<0**0****>B