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EPSON

Thermal Printer Unit

EU-T482

Specification

Standard	
Rev. No.	C
Notes	

Copied Date	
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SEIKO EPSON CORPORATION

MATSUMOTO MINAMI PLANT
2070 KOTOBUKI KOAKA, MATSUMOTO-SHI, NAGANO, 399-8702 JAPAN
PHONE+81-263-86-5353 FAX+81-263-86-9925

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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	Gyotoku	-	Godo	I	A	1	A	27	A
B	Change	Endo	Gyotoku	Godo	II	A	2	A	28	A
C	Revised	Gyotoku		Godo	III	A	3	A	29	A
					IV	A	4	C	30	A
					V	A	5	A	31	A
					VI	A	6	A	32	A
							7	A	33	A
							8	A	34	A
							9	A	35	A
							10	B	36	A
							11	A	37	A
							12	A	38	A
							13	A	39	A
							14	A	40	A
							15	A	41	A
							16	A	42	A
							17	A	43	A
							18	A	44	A
							19	A	45	A
							20	A	46	A
							21	A	47	A
							22	A	48	A
							23	A	49	A
							24	A	50	A
							25	A	51	A
							26	A	52	A

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EU-T482 Specification (Standard)	Cover	Rev. Sheet	Scope	General Description	Table of Contents	Contents	Appendix	Total
	1	3	--	4	2	112	6	128

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Revisions		Design Section			Sheet Rev. No.					
Rev.	Document	WRT	CHK	APL	Sheet	Rev.	Sheet	Rev.	Sheet	Rev.
A	Enactment				53	A	79	A	105	A
B	Change				54	A	80	A	106	A
C	Revised				55	A	81	A	107	A
					56	A	82	A	108	A
					57	A	83	A	109	A
					58	A	84	A	110	A
					59	A	85	A	111	A
					60	A	86	A	112	A
					61	A	87	A		
					62	A	88	A		
					63	A	89	A		
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					67	A	93	A		
					68	A	94	A		
					69	A	95	A		
					70	A	96	A	App.1	A
					71	A	97	A	App.2	A
					72	A	98	A	App.3	A
					73	A	99	A	App.4	A
					74	A	100	A	App.5	A
					75	A	101	A	App.6	A
					76	A	102	A		
					77	A	103	A		
					78	A	104	A		

TITLE	Total pages							
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REVISION SHEET

REV.	SHEET	CHANGED CONTENTS
A	All	Newly enacted.
B	10	2.1.2 2) Removed NOTE 3. (corrected)
C	4	1.4.1 Module combinations, external dimensions, and mass Specification code 002 was corrected to 003

TITLE

EU-T482
Specification
(Standard)

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Points You Must Observe To Assure Product Safety

In order to assure the safe operation of this product, carefully observe the specifications as well as the notes provided below.

Seiko Epson Corporation will not bear any responsibility for any damage or injuries arising from use of this product that is not in accordance with the specifications and the notes provided below.

1) Do not apply voltage or current to any pins in excess of the absolute maximum ratings.

If voltage or current in excess of the absolute maximum ratings is applied, excess current will flow through the device, which may result in heat damage.

Absolute Maximum Ratings

Item	Symbol	Rated value	Unit
Input voltage	VIN	27.0	V
Storage temperature	Tstg	-25 to 70	°C
Storage humidity	Hstg	0 to 90	%

2) Operate the EU-T482 within the following conditions:

Recommended Operating Conditions

Item	Symbol	Standard Value			Unit
		Min.	Typ.	Max.	
Supply voltage to the printer	Vp	21.6	24.0	26.4	V
Operating temperature	Topr	0	--	50	°C
Operating humidity (no condensation)	Hopr	10	--	80	%

3) Do not short-circuit any of the output pins with the power supply.

Short-circuiting an output pin with a low-impedance power supply may cause heat damage due to excess current or may melt the solder bond.

4) Do not drop conductive material such as paper clips onto the circuit board.

Short circuiting pins on the board may cause heat damage due to excess current or may melt the bonding wire.

5) Never disassemble or modify this product.

Tampering with this product may result in injury, fire, or electric shock.

6) Do not touch movable parts, such as gears.

Touching moving parts could cause a laceration or other injury.

7) Be sure to set this equipment on a firm, stable, horizontal base.

Product may break or cause injury if it falls.

8) Do not use in locations subject to high humidity or dust levels.
Excessive humidity and dust may cause equipment damage, fire, or shock.

9) Do not place heavy objects on top of this product. Never stand or lean on this product.
Equipment may fall or collapse, causing breakage and possible injury.

10) To ensure safety, please unplug this product prior to leaving it unused for an extended period.

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GENERAL DESCRIPTION

1. Application

This specification applies to the thermal printer unit EU-T482.

2. Features

1) High speed printing: 153 mm/s {6.0"/s} maximum
2) High reliability: Receipt printing 300,000 times
3) Length of receipt: 228.4 mm {9.0"} maximum
   Possible to extend 600 mm {23.6"} maximum using optional loop guide
4) Can use a large paper diameter, 203 mm {8"} diameter maximum
5) Command protocol based on ESC/POS standard
6) Bar codes (fence bar code and ladder bar code) and graphics can be printed.
7) Driver and status monitoring software are provided.

3. Relationship between the model name and the specification

Example:

EU-T482 XXX
① ②③ ④

① indicates the EU-T400 series.

② Indicates the paper width to be used.
8: 79.5 ± 0.5 mm

③ indicates the type of the paper path.
2: Straight path

④ Specification code Indicates the difference in specifications

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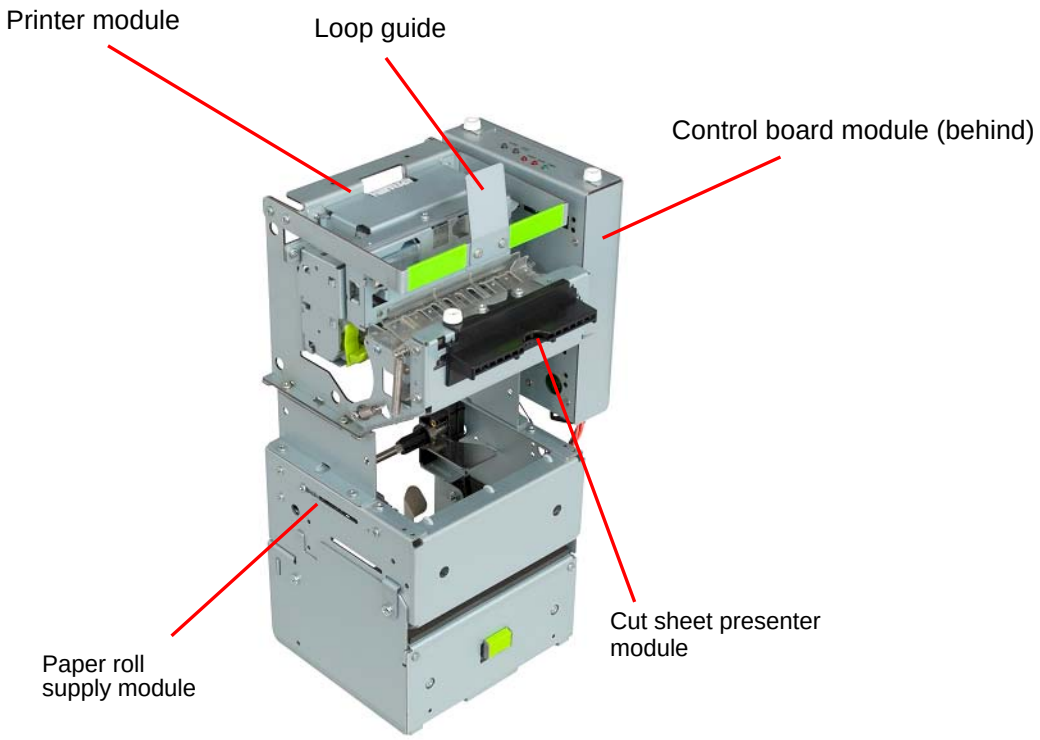
TABLE OF CONTENTS

1. GENERAL SPECIFICATIONS

1.1 System Configuration and Module Names

The whole system is called the “EU-T482” and each functional unit is called a “module.”



011 model

Figure 1.1.1 EU-T482 System Appearance

1.2 Function of Modules

1.2.1 Roll paper supply module

This module holds the large diameter roll paper and guides the paper to the printer module. In the paper path, there is a shock-absorbing mechanism that can reduce the paper feed load by the inertial force of the roll paper. It is equipped with power supply terminals.

1.2.2 Printer module

The printer module incorporates the printing mechanism with the paper feeding and cutting mechanism to cut the paper.

1.2.3 Cut sheet presenter module

The cut sheet presenter module carries the paper that is printed and cut by the printer module to the paper exit.

1.2.4 Control board module

The control board controls all functions of each module. It is equipped with a combo interface (serial and USB interfaces) or a parallel interface*.

* Option that is only permitted to be installed by an EPSON factory or an EPSON configuration center

1.3 General Specifications

1.3.1 Roll paper

1) Outside diameter: Maximum ϕ152.4 mm (6-inch model)
Maximum ϕ 203 mm (8-inch model)

2) Paper width: 79.5 ± 0.5 mm {3.13 ± 0.02"}

3) Paper thickness: 60 to 150 μm

4) Paper take-up direction: Outside of the paper must be printed on.

NOTE: If roll paper with the print face inside is used a paper jam may occur.

1.3.2 Paper carrying speed

153 mm/s {6.0"/s} maximum

1.3.3 Cut sheet length to be issued

Issuing the cut sheet	When the cut sheet is looped with the cut sheet presenter module (*)	76.2 mm to 228.6 mm
	When the cut sheet is looped with the cut sheet presenter module (when the product is equipped with an optional loop guide.) (*)	76.2 mm to 600 mm
	When the cut sheet is not looped with the cut sheet presenter module	76.2 mm to 3,000 mm

(*): If the paper thickness is more than 120 μm, the paper loop must not be used.

1.3.4 Print speed

Approximately 153 mm/s {6.0"/s} (when media type 4 is selected) or
Approximately 126 mm/s {5.0"/s} (when other than media type 4 is selected)
80 mm/s {3.1"/s} when printing ladder and two-dimensional bar codes

1.3.5 Paper width and printable width

For 79.5 ± 0.5 mm paper width 72 mm {2.84"}

1.3.6 Reliability

1) Receipt printing
Life: 300,000 times
MCBF: 740,000 times

2) Printer — Mechanism:
Life: 15,000,000 lines paper feeding (line spacing: 3.75 mm)
MCBF: 37,000,000 lines paper feeding (line spacing: 3.75 mm)

Thermal head:
Life: 100 km {62.14 miles}, 100 million pulses

1.4 Specification Codes and Module Combinations

1.4.1 Module combinations, external dimensions, and mass

Specification code	Roll paper supply module		Supports 600-mm loop guide	Mass	External dimensions (W×D×H) mm (See Section 2.6, Overall Dimensions.)
	6-inch model	8-inch model			
001	Yes		No	Approximately 3.9 kg	194 × 170 × 300 {7.64×6.70×11.81"}
003	Yes		Yes	Approximately 3.9 kg	194 × 170 × 324 {7.64×6.70×12.76"}
011		Yes	Yes	Approximately 4.0 kg	194 × 170 × 374 {7.64×6.70×14.72"}

1.4.2 Available module

Each Function	Roll paper supply module		
Selectable model	PS-180 connecting board (DC-T500II)	Roll paper diameter	Paper near-end sensor
Contents of selectable model	With	6" or 8"	One

Each Function	Control Board Module	Printer Module	Cut sheet presenter module
Selectable model	Multilingual	Black mark sensor installation position (*1)	Loop guide (Supports 600 mm length of the receipt paper)
Contents of selectable model	No	Right on the back of the paper	Yes or no

*1: See Section 2.2.5 for installation position of the black mark sensor.

1.5 Environmental Conditions

1.5.1 Print guaranteed temperature and humidity

1) Temperature: 5 to 50°C {41 to 122°F}

2) Humidity: 10 to 80%RH

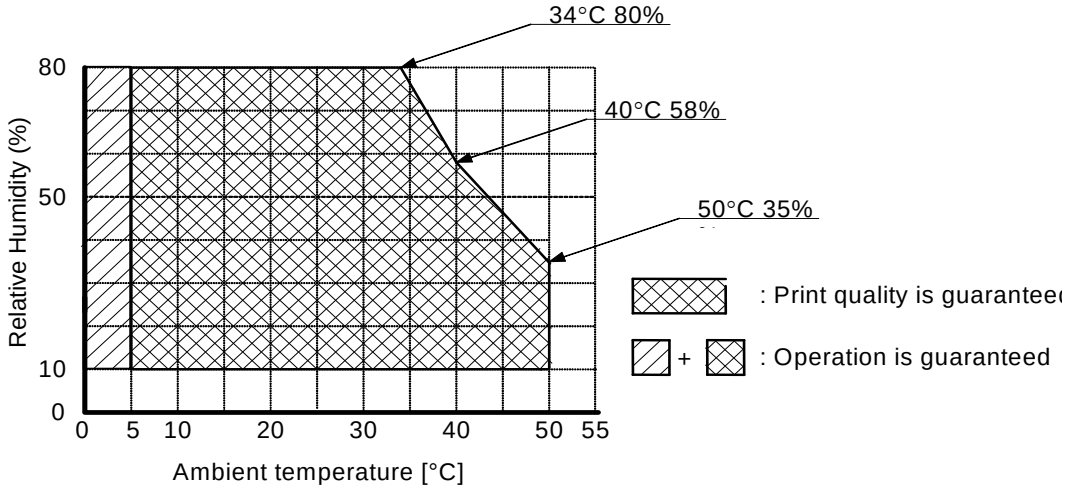


Figure 1.5.1 Environmental Conditions

1.5.2 Environmental conditions for storage

1) Storage at high temperatures and high humidity:
   Temperature: 50°C {122°F}
   Humidity: 90% RH
   Total time: 240 hours

2) Storage at high temperatures:
   Temperature: 70°C {158°F}
   Total time: 240 hours

3) Storage at low temperatures:
   Temperature: –25°C {–13°F}
   Total time: 240 hours

4) Long-term storage:
   Temperature: 5 to 35°C {41 to 95°F}
   Humidity: 40 to 70% RH
   Period: Within 12 months
   (Within 18 months after production)

5) Vibration resistance:
   When unpacked:
   Frequency: 5 to 150 Hz
   Acceleration: Approximately 19.6 m/s^2 {2 G}
   Sweep: 10 minutes (half cycle)
   Duration: 1 hour
   Directions: X, Y, and Z

   No external or internal damage should be found, and the unit should operate normally.

6) Impact resistance: (without roll paper)

When packed:
- Package: See the package specification.
- Height: 90 cm {35.4"} on concrete
- Directions: one corner, three edges, six faces

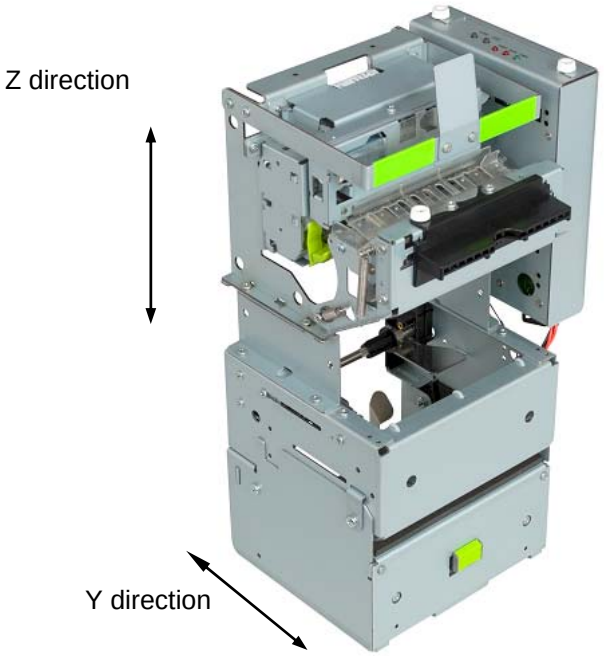
No external or internal damage should be found after the drop test, and the unit should operate normally.

When unpacked:
- Height: 5 cm {1.97"}
- Directions: Lift one edge and release it (for all 4 edges).

When the printer is not printing, no external or internal damage should be found after the drop test.

7) Impact resistance (with roll paper)

- Impact acceleration: 147 m/s^2 {15 G}
- Total operation time: 11 ms
- Direction: Once each for Y and Z direction
- Impact operation point: Any mechanism installed part



011 model

Figure 1.5.2 Directions to Make an Impact Test

1.6 Installation

Permitted installation angle: Within ± 15° for the installation standard
(See Section 2.5, Overall Dimensions.)

1.7 Applicable Standards

Product Name:	EU-T482
Model Name:	M289x(x=A to Z)
	When equipped with combo interface (serial and USB)
	When equipped with parallel interface 6-inch and 8-inch models

The following standards are applied only to the printers that are so labeled. (EMC is tested using the EPSON power supplies.)

1) Europe:	CE marking	
	Safety:	TÜV (EN60950-1)
2) North America:	EMI:	FCC/ICES-003 Class A
	Safety:	UL60950-1/CSA C22.2 No.60950-1
4) Oceania:	EMC:	AS/NZS CISPR22 Class A

Conditions of Acceptability

1) For use only in or with complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.
2) When installed in an end-product, consideration must be given to the following:
   The investigated Pollution Degree is 2.
   The end product enclosures are required fire enclosures.
3) This unit is intended to be supplied by SELV and LPS* circuit only.
   *The power supply defined by UL and IEC/ENI, which has the rated current of 4 A, and the fuses have to melt within 120 seconds when 210% of the rated current is applied.
4) Plastic materials with flame-retard grade 94 HB are used for components which exceed the mass stimulated by UL.

WARNING

The connection of a non-shielded printer interface cable to this printer will invalidate the EMC standards of this device. You are cautioned that changes or modifications not expressly approved by SEIKO EPSON Corporation could void your authority to operate the equipment.

CE Marking

The printer confirms to the following Directives and Norms:

Directive 89/336/EEC	EN 55022 Class A
	EN 55024
	IEC 61000-4-2
	IEC 61000-4-3
	IEC 61000-4-4
	IEC 61000-4-5
	IEC 61000-4-6
	IEC 61000-4-11

FCC Compliance Statement For American Users

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

FOR CANADIAN USERS

This Class A digital apparatus complies with Canadian ICES-033.

1.8 TSCA Compliance

All the EPSON-specified ink, grease and oil materials used in this product are listed in the TSCA chemical substance inventory of the U.S. Toxic Substances Control Act.

1.9 About Chemical Materials Included

The chemical materials contained in this product are managed based on Seiko Epson's policy and lists of chemical substances banned in products (level 1 and 2) and controlled chemical substances set forth
in Green Purchasing Standard. As for the chemical substances banned in products (level 1 and 2) and controlled chemical substances, please see the following documents that are uploaded to the Seiko Epson's homepage:

Homepage:
http://www.epson.co.jp/ecology/customer/green_cf.shtml (Japanese)
http://www.epson.co.jp/e/community/environmental_gpurchasing_2.htm (English)

Certification That Product Does Not Contain Banned Substances (level 1):
http://www.epson.co.jp/ecology/customer/green_p/seg_t_0102_j_20.pdf (Japanese)
http://www.epson.co.jp/ecology/customer/green_p/seg_t_0102_e_20.pdf (English)
http://www.epson.co.jp/ecology/customer/green_p/seg_t_0102_c20.pdf (Simplified Chinese)

Survey Tool for Substances to Be Eliminated From Products (level 2):
http://www.epson.co.jp/e/community/pdf/researchtool1_6_j.pdf (Japanese)
http://www.epson.co.jp/e/community/pdf/EliminationToolRev1_6.pdf (English)

SEG Green Purchasing Standard for Production Material:
http://www.epson.co.jp/e/community/pdf/gps_j.pdf (Japanese)
http://www.epson.co.jp/e/community/pdf/gps_e.pdf (English)
http://www.epson.co.jp/e/community/pdf/gps_c.pdf (Simplified Chinese)

2. DETAILED SPECIFICATIONS OF MODULES (except the control board)

2.1 Roll paper Supply Module

2.1.1 Roll paper holding method

Shaft-holding method with a fixed shaft.

2.1.2 Adapted roll paper

1) Diameter: Maximum ϕ152.4 mm (6-inch model)
Maximum ϕ203 mm (8-inch model)

2) Paper core size:

Inside diameter of roll paper		Outside diameter of paper core	Thickness of paper core	Paper thickness
Materials are solid such as plastic	Materials are soft such as paper	Center value and its tolerance		
25.4 ± 0.3 mm {1 ± 0.01"}	25.4 ± 0.5 mm {1 ± 0.02"}	33.4 ± 0.5 mm {1.32 ± 0.02"}	4 mm {0.16"}	60 to 90 μm
50.8 ± 0.3 mm {2 ± 0.01"}	50.8 ± 0.5 mm {2 ± 0.02"}	60.8 ± 0.5 mm {2.39 ± 0.02"}	5 mm {0.20"}	60 to 120 μm
76.2 ± 0.3 mm {3 ± 0.01"}	76.2 ± 0.5 mm {3 ± 0.02"}	86.2 ± 0.5 mm to 96.2 ± 0.5 mm {3.39 ± 0.02" to 3.79 ± 0.02"}	5 to10 mm {0.20" to 0.39"}	60 to 150 μm

NOTES: 1. Use the adapter (roll paper holder) to fit the shaft for each size of paper core.
2. A roll paper holder for 25.4 {1"} inside diameter roll paper core is standard equipment. Holders for 50.8 and 76.2 mm are available as options.

3) Paper width: 79.5 ± 0.5 mm {3.13 ± 0.02"}
4) Paper take-up direction: Outside of the paper must be printed on. (See Figure 2.1.1.)
NOTE: If roll paper with the print face inside is used, a paper jam may occur.
5) Paper end treatment: Use a roll paper in which the core and the paper are not glued together.

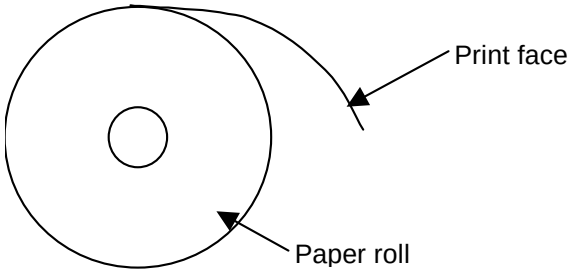


Figure 2.1.1 Paper Take-up Direction

2.1.3 Detectors

1) Paper near-end sensor

a) Type: Reflecting photosensor (with a remaining paper detection adjustment mechanism)

b) Length to be detected for the remaining paper: (as a guideline)

The length of the remaining paper can be changed with the position of the fixing screw of the roll paper near-end sensor. (See Section 2.5, Overall Dimensions.)

If the roll paper has the following conditions:

Inside diameter of the roll paper core: 25.4 ± 0.5 mm
Outside diameter of the roll paper core: 33.4 ± 0.5 mm
Paper thickness: 65 μm

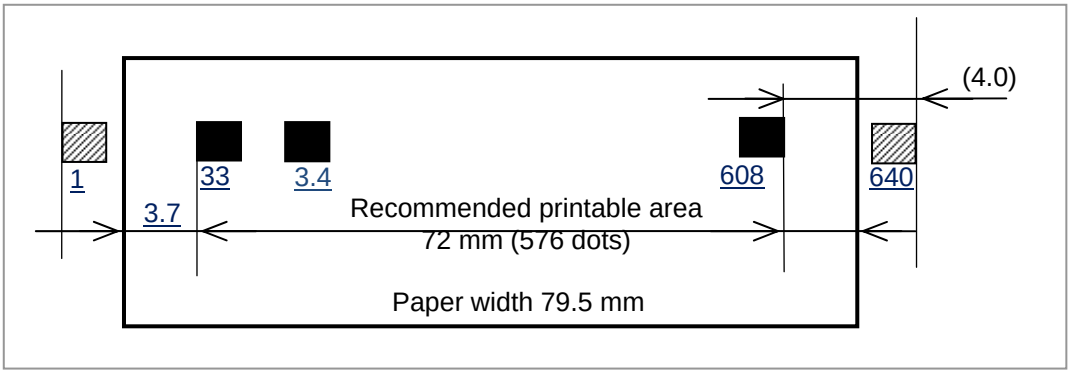
Adjusting scale of the roll paper near-end sensor	A	A' (default)	B	C	D	E	F
Outside diameter of the roll paper when near-end is detected	41.0	43.0	50.6	60.0	69.1	79.7	89.5
Length of the paper remaining when the paper near-end is detected	3.5 m or more	5.5 m or more	13 m or more	24 m or more	37 m or more	54 m or more	72 m or more

The printer enters the secondary paper near-end when the printer feeds paper for the specified length after detecting the paper near-end with the paper near-end sensor. The paper length for the time between detecting the primary paper near-end with the paper near-end sensor and sending the status of the secondary paper near-end can be adjusted with the memory switch. For detailed specifications, see Table 4.3.11.)

2.2 Printer Module

2.2.1 Print specifications

1) Printing method: Thermal line dot printing
2) Dot density: 8 dots/mm
3) Printable area: (Unit: mm)



Underlined numbers are the values as seen from the head element number printing paper printing surface.

Figure 2.2.1 Printable Area

4) Example printing
   a) Dot pitch: Vertical direction: 0.125 mm {0.0049"}
      Horizontal direction: 0.125 mm {0.0049"}
   b) Example printing
      Character structure: 12 (W) × 24 (H) font (including a horizontal 2-dot space)
      Character size: 1.25 mm (W) × 3.0 mm (H) {0.05" × 0.12"}
      Column pitch: 1.5 mm {0.06"}
      Line pitch: 3.75 mm {0.15"} (including a 6-dot line spacing)
      Number of columns: 48 maximum
5) Printing speed: Approximately 153 mm/s {6.0"/s} (when media type 4 is selected) or approximately 126 mm/s {5.0"/s} (when other than media type 4 is selected) 80 mm/s {3.1"/s} when printing ladder and two-dimensional bar codes

6) Paper feeding method: Friction feed
7) Paper feeding speed: 153 mm/s {6.0"} maximum
8) Feeding pitch: 0.125 mm {0.0049"}

9) Print starting position (Dimension A in Figure 2.2.2):

When the back (reverse) feed is enabled (See Table 4.1.13.):
5.0 ± 0.5 mm

When the back (reverse) feed is disabled:
16.0 ± 0.5 mm

NOTE: It is recommended not to print for 16 dots (2 mm) {0.079"} after starting to drive the paper feed motor, because the paper feeding pitch disorder may occur.

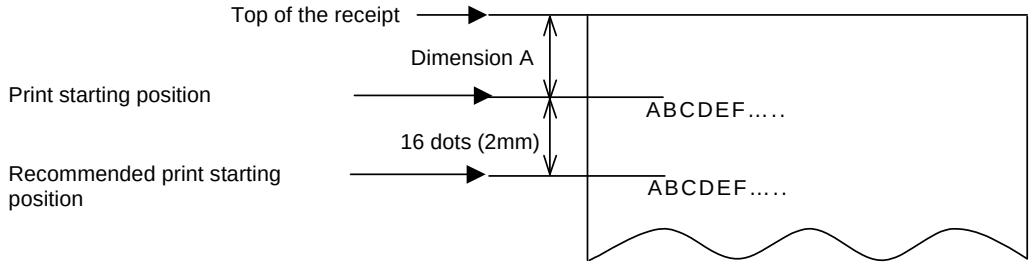


Figure 2.2.2 Print Starting Position

2.2.2 Thermal print head

1) Total number of heat elements: 640 dots/dotline
2) Heat element density: 8 dots/mm
3) Typical resistance value: 657 Ω ± 10%
(Heat element resistance value, default value)
4) Drive Voltage: Head: DC +24 V ± 2.4 V {±10%}
Driver IC: DC +3.3 V ± 0.17 V {±5%}

2.2.3 Autocutter

1) Cut method: Blade-separated scissors type
2) Cutting edge: Full-cut
3) Cutting position: See Figure 2.2.2

2.2.4 Paper feed motor

1) Type: 4-phase 48 bi-polar stepping motor
2) Driving voltage: DC +24 V ± 2.4 V {±10%}

2.2.5 Detectors

1) Autocutter reset sensor: Micro switch
2) Paper-end sensor: Photo sensor
3) Print head temperature sensor: Thermistor
4) Platen open sensor: Micro switch
5) Black mark sensor:
a) Type: Reflecting photo sensor

b) Size and specifications for black mark sensor

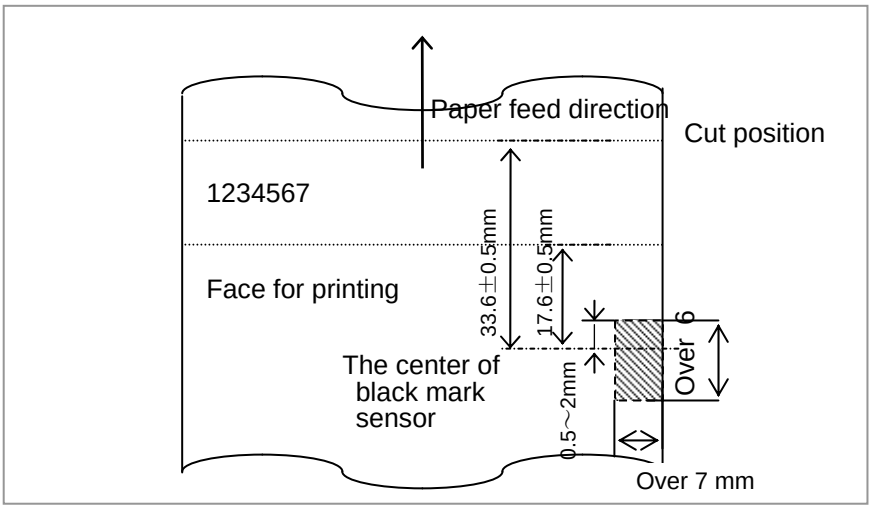


Figure 2.2.3 Size and Position for Black Mark

NOTES:
1. The printer recognizes the black mark position when the beginning of the black mark has traveled 0.5 to 2 mm past the center position of the black mark sensor. This value may differ depending on the reflecting rate or the distance between the paper edge and black mark position. Check it with the paper to be used in advance.
2. Printed on the right edge of the backside of the black mark paper.
3. The reflecting rate of the black mark must be 10% or less, and the reflecting rate of the white be 75% or less. The reflecting rate means the value which is measured with Macbeth density meter (PCMII) D filter.

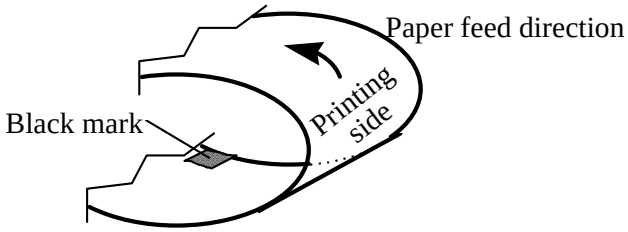


Figure 2.2.4 Black Mark Position

6) Paper-jam sensor: Photo sensor

2.2.6 Paper

1) Specified thermal paper:

Original paper No.	Manufacturer	Medi a type	Recommended density setting	Default set value
No.P350	KSP	4	90%	100%
No.TF50KS-E	NIPPON PAPER INDUSTRIES CO., LTD.	4	100%	100%
No.PD160R	OJI PAPER MFG. CO., LTD.	4	100%	100%
No.TF11KS-ET	NIPPON PAPER INDUSTRIES CO., LTD.	4	100%	100%
No.PD200N	OJI PAPER MFG. CO., LTD.	4	100%	100%
No.AFP234	MITSUBISHI PAPER MILLS CO., LTD.	4	100%	100%
PolyTherm 300-3.0	Appleton	3	90%	100%
PolyTherm 300-4.1	Appleton	3	90%	100%

Table 2.2.1 Recommended thermal paper type and media type

See Table 2.2.2 for reliability according to thermal paper type.
Print quality varies depending on paper quality. Media type and density must be selected so that they are appropriate for the type of paper used. See Appendix A.4 for media type and density setting procedures.

2) Paper width: 79.5 ± 0.5 mm {3.13 ± 0.02"}
3) Paper thickness: 60 to 150 μm
4) Diameter: 203 mm {8.0"} maximum
5) Paper take-up direction: Outside of the paper must be printed on. (See Figure 2.2.5.)
NOTE: If roll paper with the print face inside is used, a paper jam may occur.
6) Diameter of spool: See Section 2.1.2, Adapted roll paper.
7) Paper end treatment: Use a roll paper in which the core and the paper are not glued together.

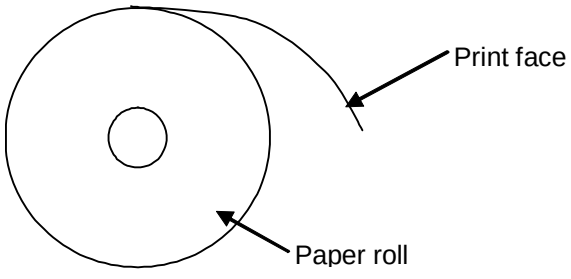


Figure 2.2.5 Paper Take-up Direction

8) Surface treatment:

Paper-end mark: When printing paper-end marks on a print surface, the roll paper that does not use ink that affects printing quality or that may damage the print head must be used.

Coating and pre-print: To coat and preprint on the print face, make sure to specify the types of coat and ink that are capable of preventing deterioration of print quality and paper's sticking to the print head while the printer is left in a high-temperature, high-humidity location. Check the printer thoroughly before using the printer, because the level of sticking of the paper to the print head and printing noise may become high.

The print method using a scratch tape that leaves the coating material on the surface is prohibited because the material left may adhere to the paper feed mechanism and cause a machine failure.

2.2.7 Reliability

1) Mechanism (except thermal head and autocutter)

Life: 15,000,000 lines paper feeding (line spacing: 3.75 mm)
MCBF: 37,000,000 lines paper feeding (line spacing: 3.75 mm)

2) Thermal head

Life: 100 km, 1×10^8 pulses

3) Autocutter

Life: 1,000,000 cuts
(750,000 cuts when the paper thickness is 60 to 90 μm at 30°C or more and 60%RH or more)

4) Paper and its Reliability

Table 2.2.2 Paper and its Reliability

Reliability / Paper type	Mechanism		Thermal head	Autocutter
	Life(line)	MCBF(line)	Life	Life (cut)
No. P350	15 million	37 million	100km, 1×10^8 pulses	1 million
TF50KS-E	15 million	37 million	100km, 1×10^8 pulses	1 million
PD160R	15 million	37 million	100km, 1×10^8 pulses	1 million
TF11KS-ET	15 million	37 million	100km, 1×10^8 pulses	1 million
PD200N	15 million	37 million	100km, 1×10^8 pulses	1 million
AFP234	15 million	37 million	100km, 1×10^8 pulses	1 million
PolyTherm 3.0-3.1	7.5 million	7.5 million	50 km, 0.5×10^8 pulses	0.5 million
PolyTherm 3.0-4.1	7.5 million	7.5 million	50 km, 0.5×10^8 pulses	0.5 million

(750,000 cuts when the paper thickness is 60 to 90 μm at 30°C or more and 60% RH or more)

2.3 Cut Sheet Presenter Module

2.3.1 Presenter method

Friction feed

2.3.2 Presenting speed

153 mm/s {6.0"} maximum

2.3.3 Length of the receipt to be presented

Issuing the cut sheet	When the cut sheet is looped with the cut sheet presenter module (*)	76.2 mm to 228.6 mm
	When the cut sheet is looped with the cut sheet presenter module (when the EU-T432/T442 is equipped with an optional loop guide.) (*)	76.2 mm to 600 mm
	When the cut sheet is not looped with the cut sheet presenter module	76.2 mm to 3,000 mm

(*): If the paper thickness is more than 120 μm, paper loop must not be used.

2.3.4 Paper feed motor

1) Type: 4-phase 20 bi-polar stepping motor
2) Power voltage: DC +24 V ± 2.4 V {±10%}
3) Driving method: Constant current control

NOTE: Provide a pause of 2t seconds or more after elapse of the total time required for printing and feeding the cut sheet (t seconds, t ≤ 60 seconds).

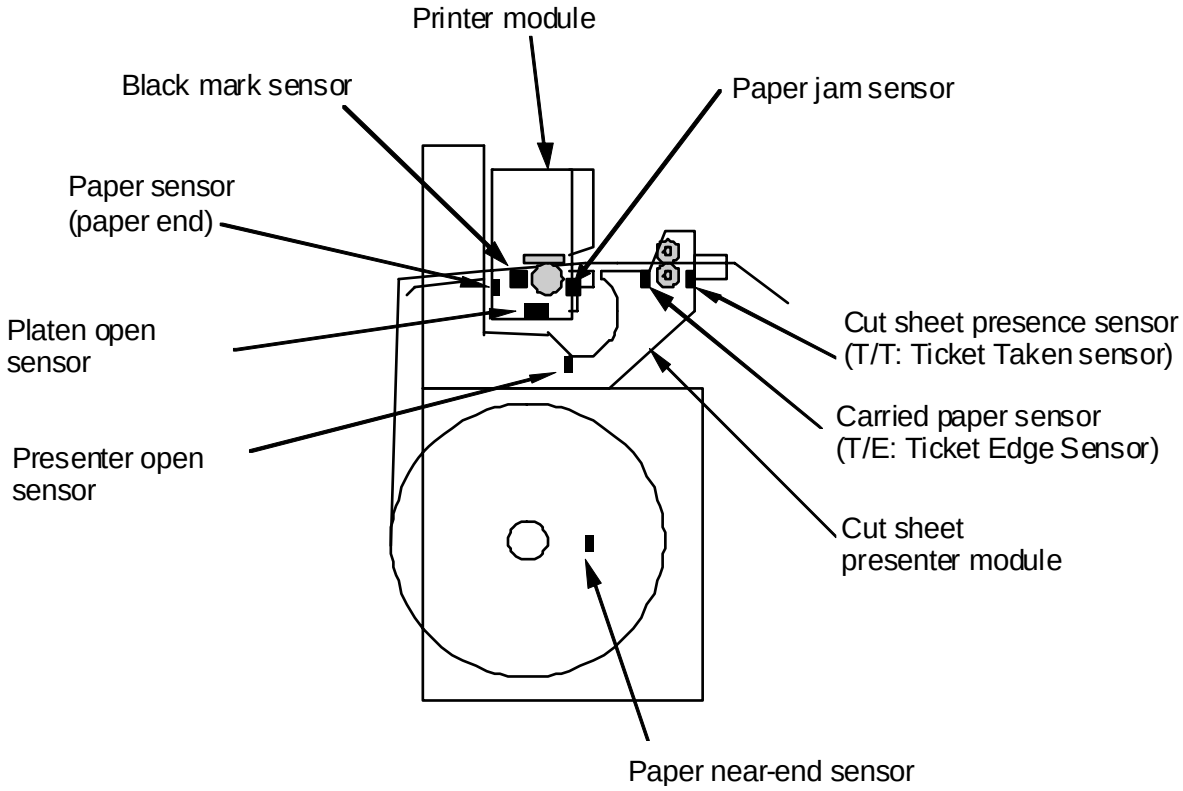
2.3.5 Detectors

1) Paper eject sensor: Photo sensor
2) Cut sheet presence sensor: Photo sensor
3) Presenter open sensor: Micro switch

2.3.6 Reliability

1) Life: Receipt printing: 300,000 times
2) MCBF: Receipt printing: 740,000 times

2.4 Sensors



Name of Sensors	Optical method		Mechanical Method
	Reflecting	Transparent	
Paper near-end	√		
Paper detector		√	
Black mark	√		
Platen open			√
Paper jam sensor	√		
Carried paper sensor (T/E: Ticket Edge sensor)		√	
Cut sheet presence sensor (T/T: Ticket Taken sensor)		√	
Presenter open			√

2.5.1 Paper width 79.5 mm (6"type, not equipped with 600-mm loop guide)(UNIT:mm)

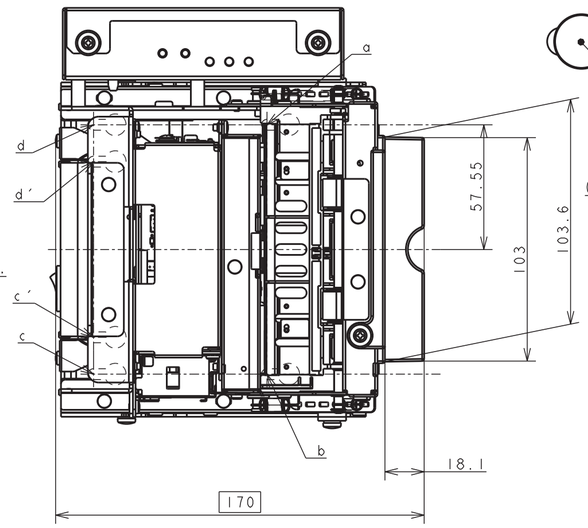
NOTES
1) Dimensions marked with [ ] indicate the overall dimensions described in 1.4 Module Combinations and Available Mode Types.
2) How smoothly the paper is ejected and how the ejected paper is dropped must be taken into consideration when designing the paper exit.
3) To prevent the unit from getting deformed during its installation, pay attention to the deviation from flatness of the mounting surface when designing. Particularly, the level difference among the four mounting positions (a, b and c or c', and d or d') must be within 0.3 mm.
4) Tighten four screws (a, b, c, and d), or tighten two screws (e and f) to fix the four mounting positions (a, b, c, and d) to mount the unit.
5) Since this printer uses plated steel, rust may occur at the cutting edges.
6) The precise shapes of the actual parts may differ slightly from those shown in the diagrams.
7) The lot indication describes the following.

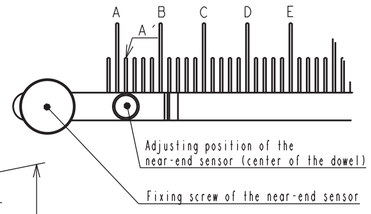
<Example>
EU-T482 ← Model name
001 00 KJ 0314

Specification code
Engineering change code
Production line
Production date(*)

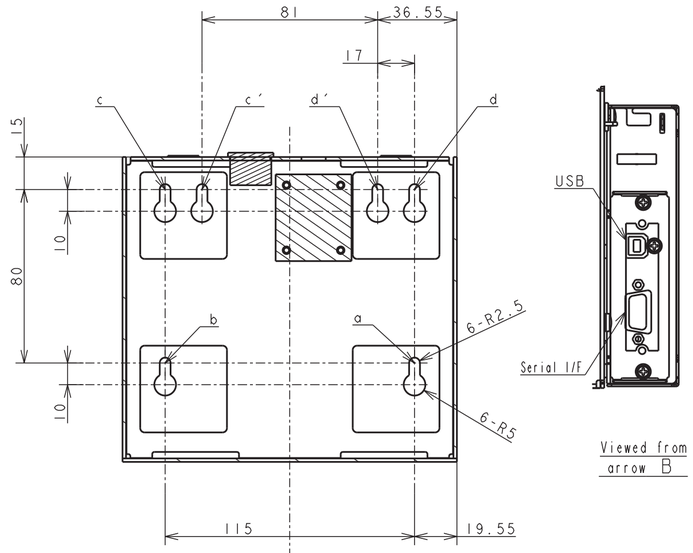
*:Production date is indicated as follows;
0 3 14
The last lowest digit of the year
Month
Date

Month:
January to September:1 to 9
October : O
November : N
December : D



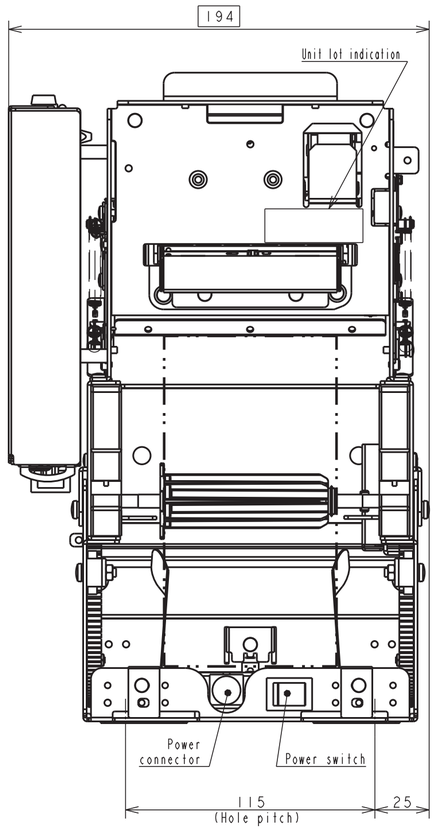


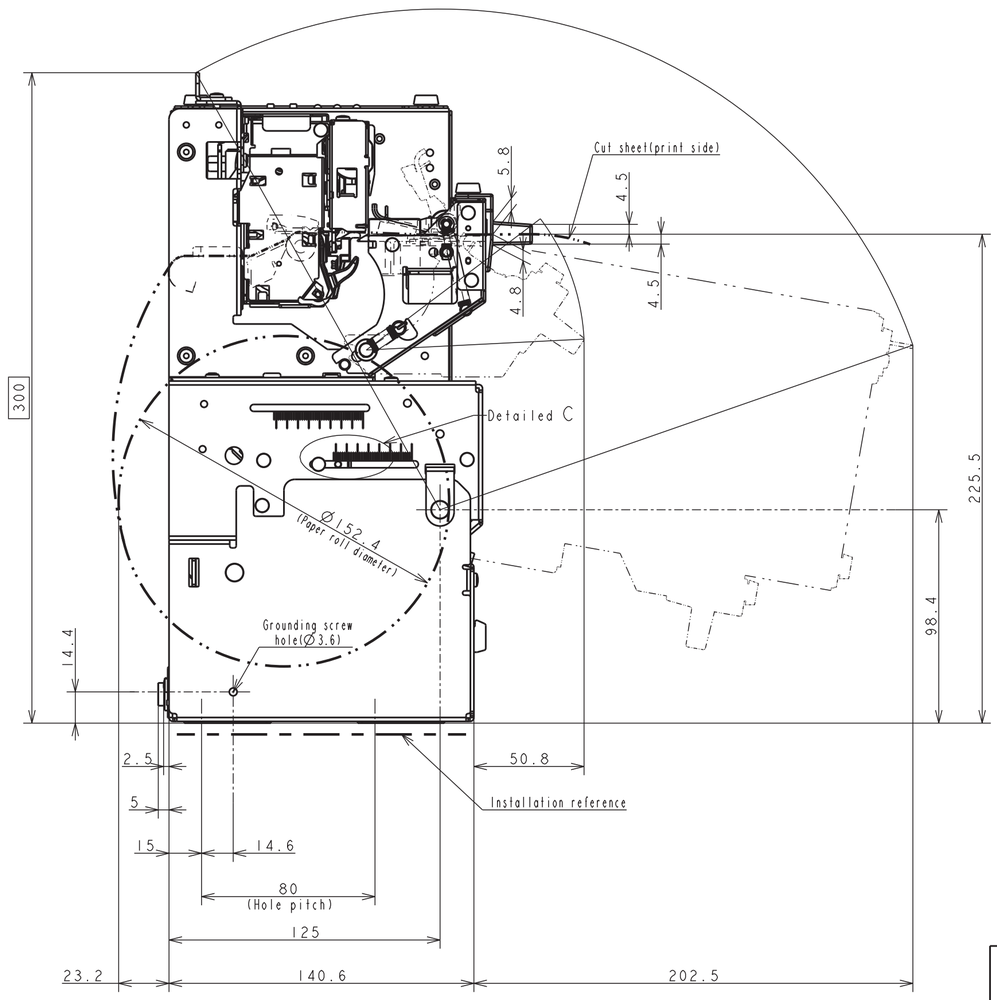
Detailed C
(Adjusting scale of the paper roll near-end sensor)

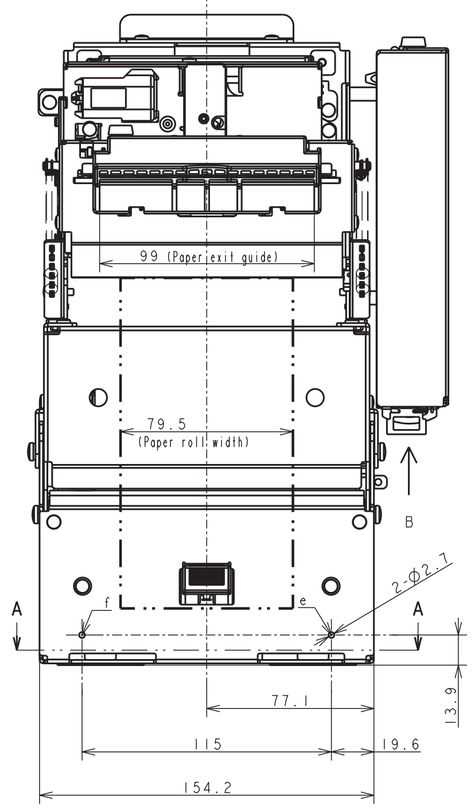


Viewed from arrow B

Cross section A-A
(Detailed installation part)







EPSON	TITLE: EU-T482 Specification (Standard)	SHEET REVISION: A	NO.
		NEXT: 21	SHEET: 20

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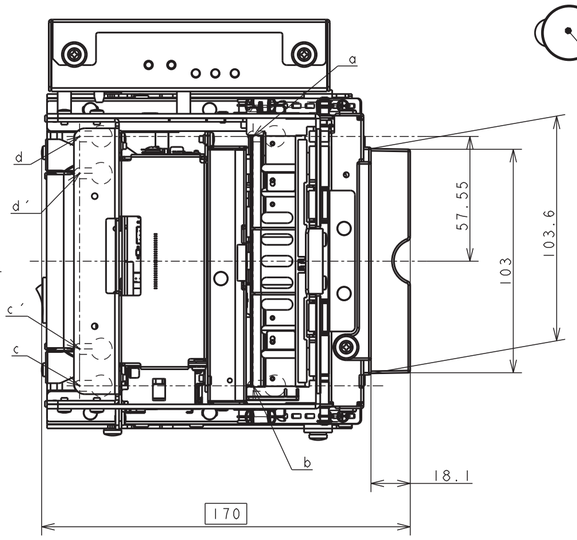
SP_9001E_64173.drw._____ 0.3

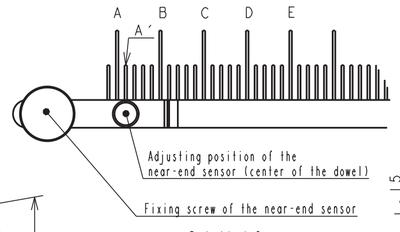
2.5.2 Paper width 79.5 mm (6"type, equipped with 600-mm loop guide)(UNIT:mm)

NOTES
1) Dimensions marked with [ ] indicate the overall dimensions described in 1.4 Module Combinations and Available Mode Types.
2) How smoothly the paper is ejected and how the ejected paper is dropped must be taken into consideration when designing the paper exit.
3) To prevent the unit from getting deformed during its installation, pay attention to the deviation from flatness of the mounting surface when designing. Particularly, the level difference among the four mounting positions (a, b and c or c', and d or d') must be within 0.3 mm.
4) Tighten four screws (a, b, c, and d), or tighten two screws (e and f) to fix the four mounting positions (a, b, c, and d) to mount the unit.
5) Since this printer uses plated steel, rust may occur at the cutting edges.
6) The precise shapes of the actual parts may differ slightly from those shown in the diagrams.
7) The lot indication describes the following.

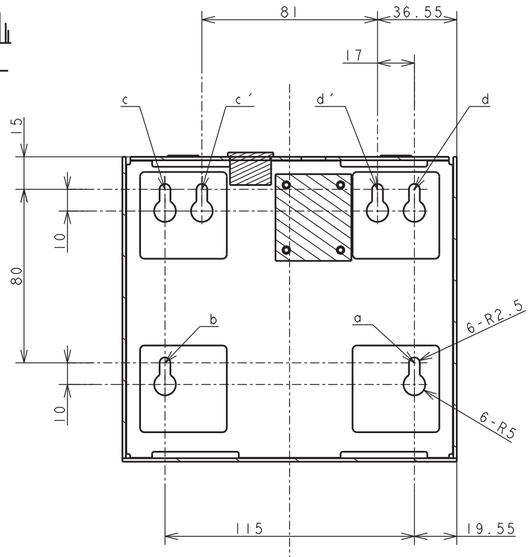
<Example>
EU-T482 ← Model name
002 00 KJ 0314
Specification code
Engineering change code
Production line
Production date(*)

*:Production date is indicated as follows;
0 3 14
The last lowest digit of the year
Month
Date
Month:
January to September:1 to 9
October : O
November : N
December : D

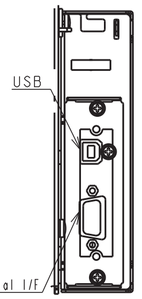




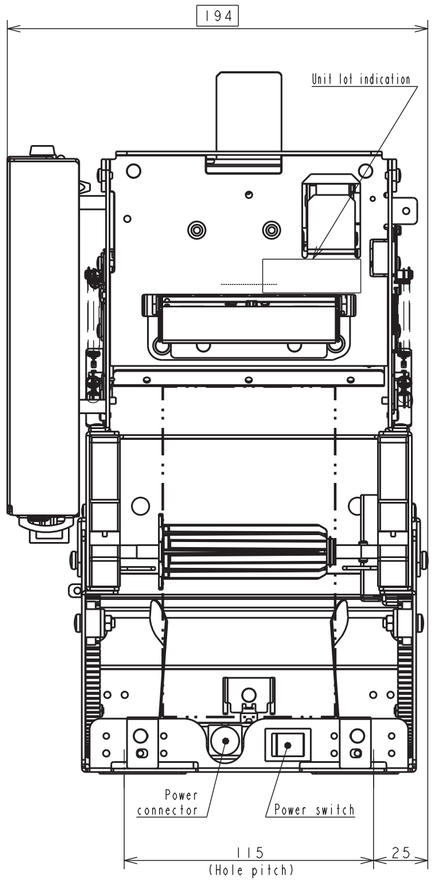
Detailed C
(Adjusting scale of the paper roll near-end sensor)

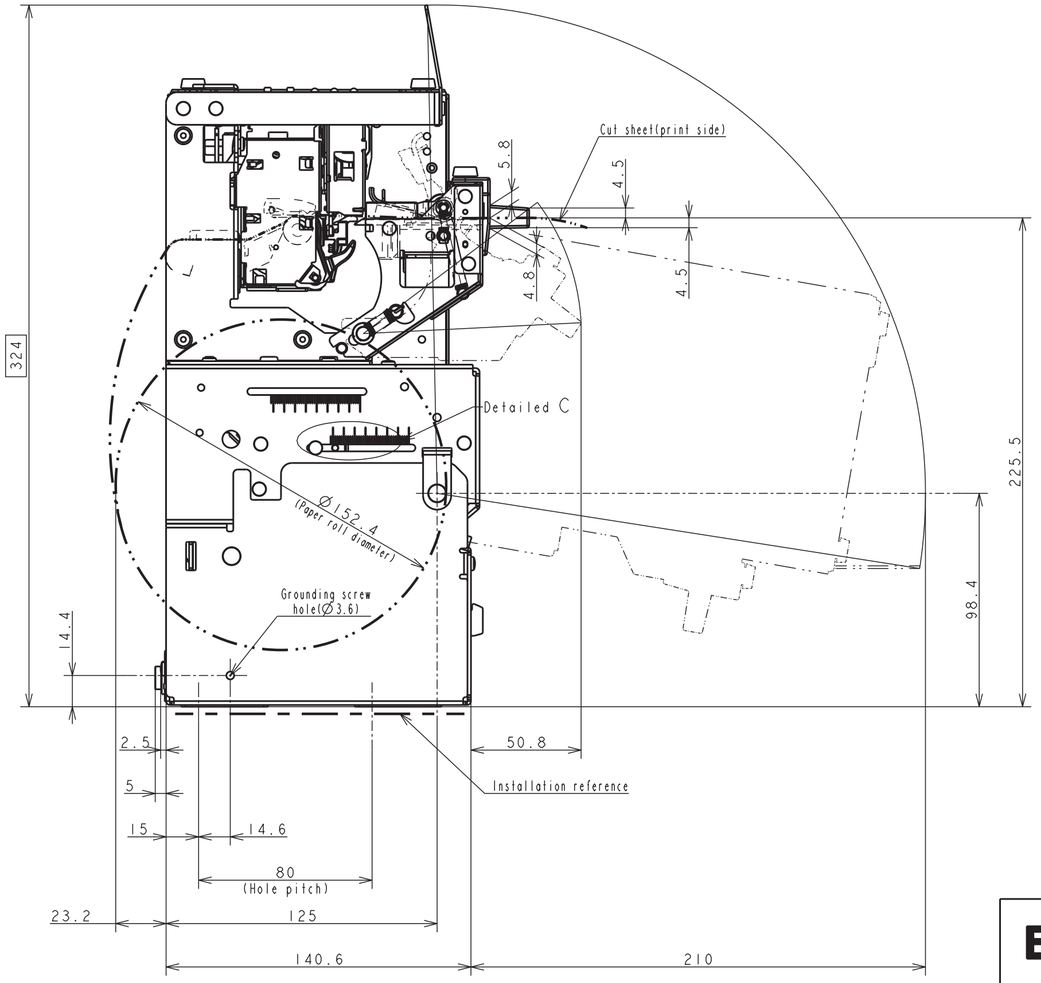


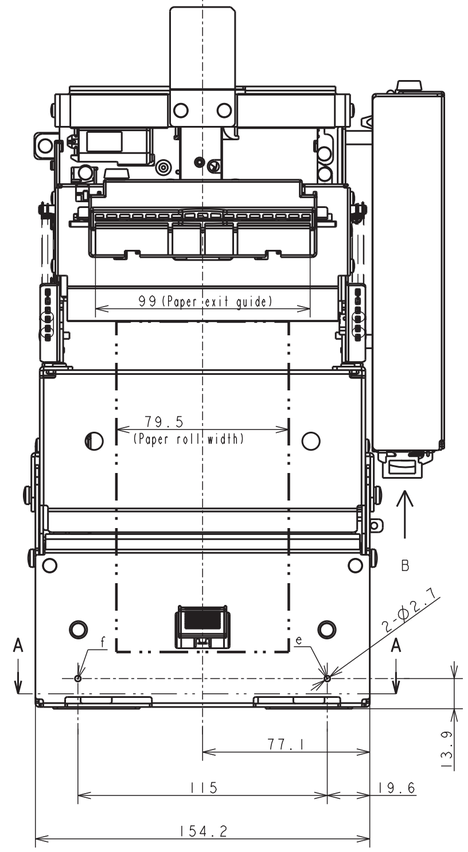
Cross section A-A
(Detailed installation part)



Viewed from arrow B







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		NEXT: 22	SHEET: 21

000-TOP_64173.61INCH_. ASSEM . 0.3
SP_9002E_64173.drw. 0.1

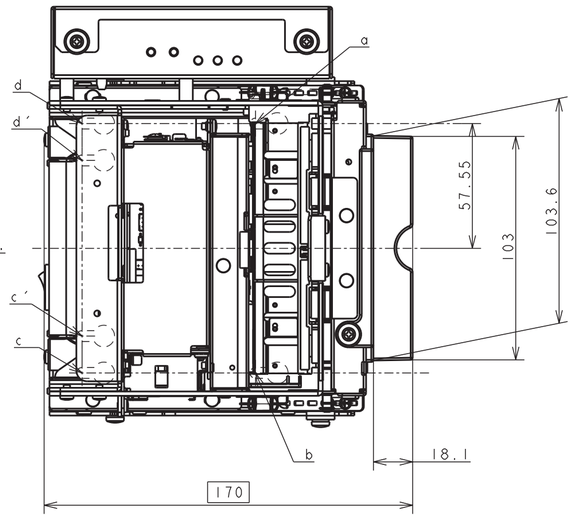
2.5.3 Paper width 79.5 mm (8"type, equipped with 600-mm loop guide)(UNIT:mm)

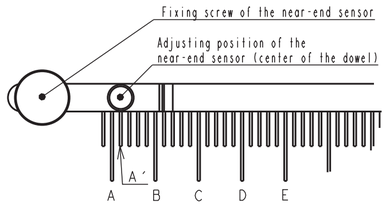
NOTES
1) Dimensions marked with [ ] indicate the overall dimensions described in 1.4 Module Combinations and Available Mode Types.
2) How smoothly the paper is ejected and how the ejected paper is dropped must be taken into consideration when designing the paper exit.
3) To prevent the unit from getting deformed during its installation, pay attention to the deviation from flatness of the mounting surface when designing. Particularly, the level difference among the four mounting positions (a, b and c or c', and d or d') must be within 0.3 mm.
4) Tighten four screws (a, b, c, and d), or tighten two screws (e and f) to fix the four mounting positions (a, b, c, and d) to mount the unit.
5) Since this printer uses plated steel, rust may occur at the cutting edges.
6) The precise shapes of the actual parts may differ slightly from those shown in the diagrams.
7) The lot indication describes the following.

<Example>
EU-T482 ← Model name
011 00 KJ 0314
Specification code / Engineering change code / Production line / Production date(*)

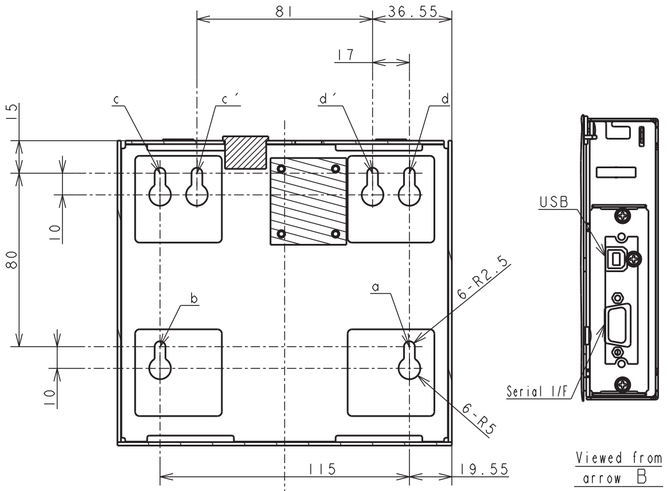
*:Production date is indicated as follows;
0 3 14
The last lowest digit of the year / Month / Date

Month:
January to September:1 to 9
October : O
November : N
December : D



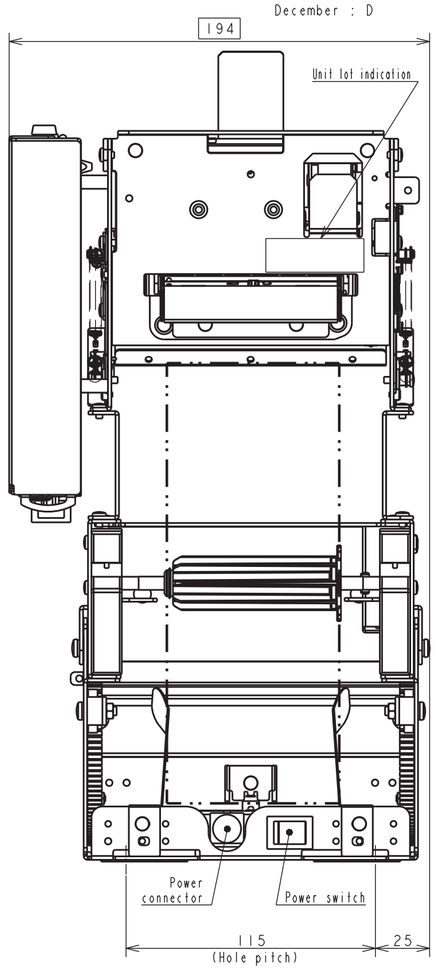


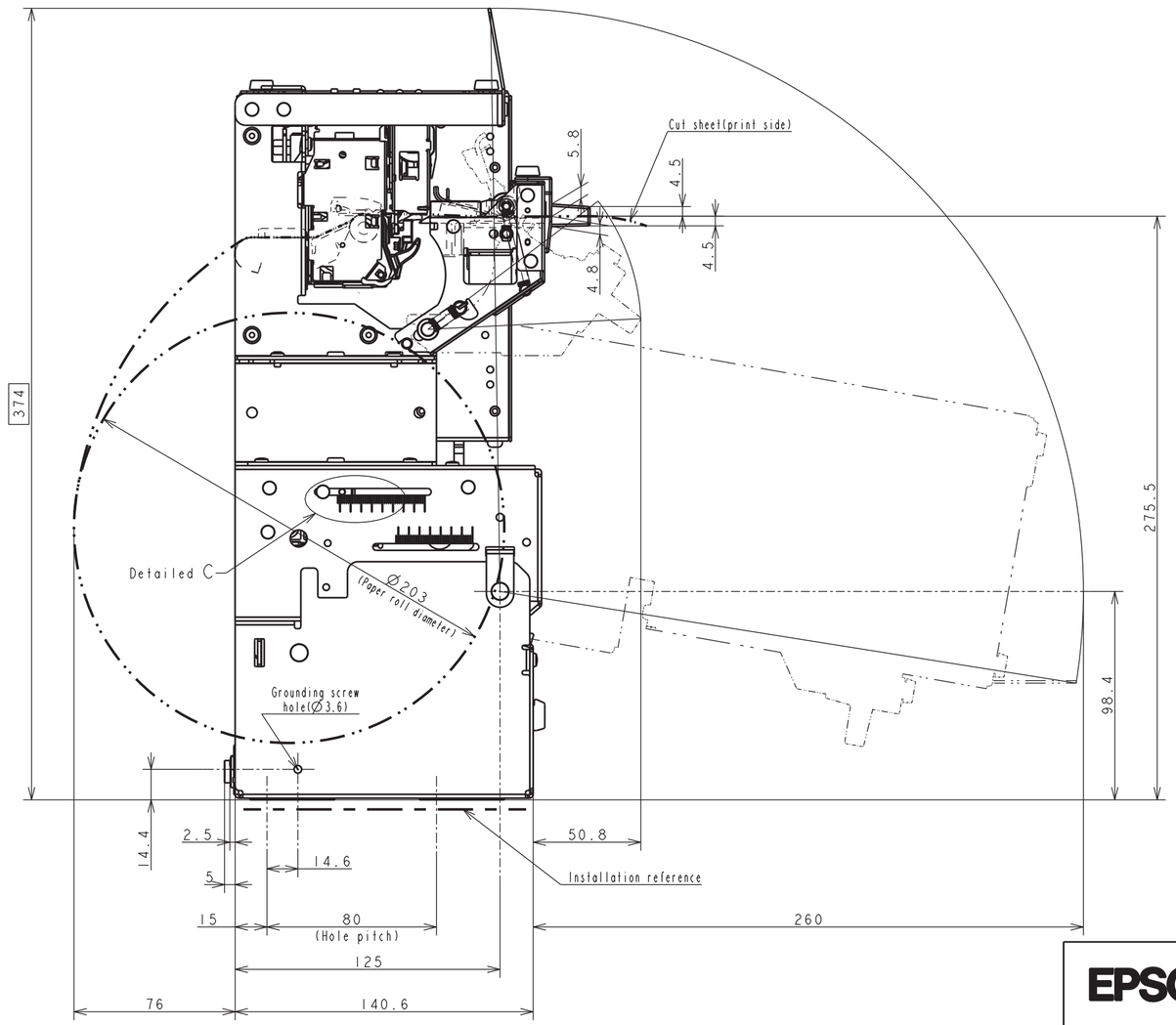
Detailed C
(Adjusting scale of the paper roll near-end sensor)

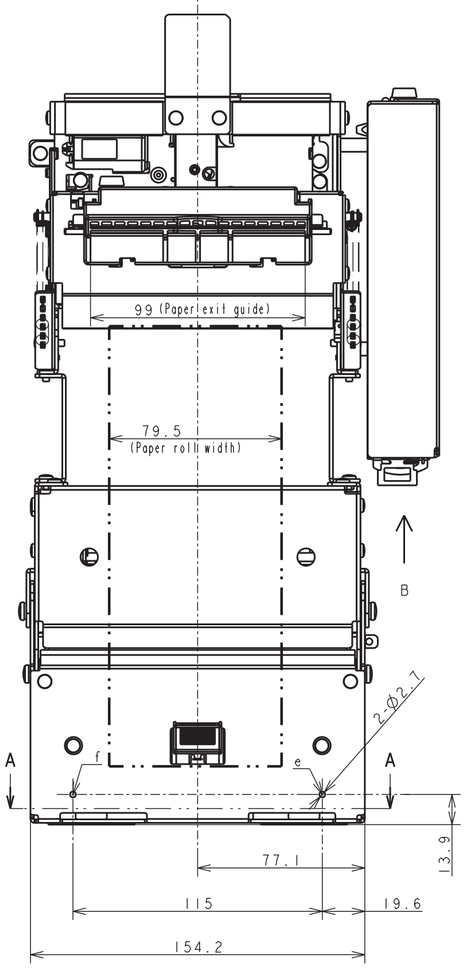


Cross section A-A
(Detailed installation part)

Viewed from arrow B







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000-TOP_64173_61INCH_.ASSEM. 0.3
SP_9003E_64173.drw. 0.2

3. CONTROL BOARD SPECIFICATION

3.1 General Specifications

3.1.1 General features

1) Available models

Only standard model is available

Standard model: Supports ANK characters

2) Software

The control board module is supported by a command protocol based on the ESC/POS standard. (See detailed command specifications.)

3) Hardware

- Print mode can be selected by DIP switches.

<Combo (Serial and USB) Specifications>

- Built-in serial interface (RS-232)
- Built-in USB interface

< Parallel Specifications> Option

- Built-in parallel interface (IEEE 1284)

Option that is only permitted to be installed by an EPSON factory or an EPSON configuration center.

4) Driver software

The following software is provided by EPSON.

- Windows driver
- Status monitor (this is packaged with the Windows driver).

(Contact EPSON for the availability of the driver software)

Note)

- EPSON and ESC/POS are registered trademarks of Seiko Epson Corporation in Japan and other countries/regions.
- Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries.

3.1.2 Printing specifications

1) Printing method: Thermal line printing

2) Dot density: 8 dot/mm (203 dpi x 203 dpi)

dpi: dots per 25.4 mm (dots per inch)

3) Printing direction: Unidirectional with friction feed

4) Printing width (maximum):

Papepr width model	Maximum print width	Recommended print width
79.5 mm model	72 mm (576 dot position)	72 mm (576 dot position)

5) Characters per line:

Papepr width model	Maximum print width		Recommended print width	
	When font A is selected	When font B is selected	When font A is selected	When font B is selected
79.5 mm model	48	64	48	64

6) Character spacing (default): Font A: 0.25 mm {0.0098"} (2 dots)
Font B: 0.25 mm {0.0098"} (2 dots)
Programmable by control command
(in increments of 0.125 mm {1/203"}).

7) Printing speed: when media type 4 is selected

Approximately 40 lps (when a line spacing is set to 30 dots, with Font A printing)

Approximately 153 mm/s {6.0"/s}

when other than media type 4 is selected

Approximately 33 lps (when a line spacing is set to 30 dots, with Font A printing)

approximately 126 mm/s {5.0"/s}

when printing ladder bar codes and two-dimensional codes

Approximately 80 mm/s {3.142"/s}

Printing speed may be slower, depending on the data transmission speed and combination of control commands, temperature, supply voltage, or selection of the print density.

[lps: lines per second]

8) Paper feed speed: Approximately 153 mm/s {6.0"/s}

9) Line spacing (default): 30 dots (3.75 mm {0.15"})
Programmable by control command (in increments of 0.125 mm {1/203"}).

3.1.3 Character specifications

1) Number of characters:
   - Alphanumeric characters: 95
   - Extended graphics: 128 × 43 pages (including a user-defined page)
   - International characters: 18

2) Character structure:
   - Font A: 12 × 24 (including 2-dot horizontal spacing)
   - Font B: 9 × 17 (including 2-dot horizontal spacing)
   - Font A is selected as the default.

3) Character size:

Table 3.1.2 Character Size

	Standard	Double-height	Double-width	Double-width/ Double-height
	W × H (mm)	W × H (mm)	W × H (mm)	W × H (mm)
Font A 12 × 24	1.25 × 3.0	1.25 × 6.0	2.5 × 3.0	2.5 × 6.0
Font B 9 × 17	0.88 × 2.13	0.88 × 4.25	1.76 × 2.13	1.76 × 4.25

Space between characters is not included.

Characters can be scaled up to 64 times as large as the standard sizes.

3.1.4 Shifting of the print position

1) Two-part energizing mode

In two-part energizing mode, printing may shift from the center of the print head position.

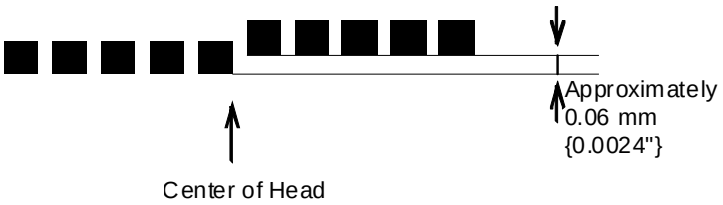


Figure 3.1.1 Shifting of the Print Position

NOTE: The print position within the printable area of the thermal elements for the second block is shifted approximately 0.06 mm in the paper feed direction from the position for the first block. Be sure not to print a ladder bar code across both printable areas, as this can cause variations in printing which are difficult to read.

3.1.5 Notes on using a roll paper with marks

1) Due to possible paper slack and/or variations, the starting position of printing may vary by approximately ± 1 mm {± 0.04"}.
2) To compensate for a potential error of approximately ± 1 mm in recognition of label lengths, set the printing area within this tolerance in size (label length – 4 mm {0.16"}).
3) To print data within the printable area, be sure to send an **FF** after the data for each label is sent.
4) Do not mix labels of different lengths on one roll.

3.1.6 Receive buffer

4 KB (fixed)

3.1.7 Electrical characteristics

1) Supply voltage (input voltage to the PCB): +24 VDC ± 2.4 V

2) Current consumption (at full-dot printing, 24 V, 25 °C {77 °F})

Operating (Unit: A)

Media	3		4			
Two-part energizing mode	Off		Off		On	
Priority	Power	Speed	Power	Speed	Power	Speed
Default setting speed	126mm/s		153mm/s		105mm/s	
Peak	13.3	13.3	14.3	14.3	8.2	8.2
Mean	7.1	7.1	4.7	6.1	4.2	5.1

Standby: 13mA

Sleep mode: Sleep 1: Approximately 13mA
Sleep 2: Approximately 13mA
Sleep 3: Approximately 2mA

3.2 Interfaces

3.2.1 USB serial interface

3.2.1.1 Specifications

General specifications: Complies with USB 2.0.

Transmission speed: USB Full-speed mode (12 Mbps).

Communication method: USB bulk transfer

Power: USB self-powered function device

USB bus current consumption: 0 mA (All power is supplied from the EU-T482.)

HUB: None

USB packet size: (in full-speed connection)
USB bulk OUT (TM) 64 bytes
USB bulk IN (TM) 64 bytes USB device class

USB device class: USB vendor-defined class and USB printer class
The setting value of DIP switch 1-8 specifies the class at power-on.

USB descriptor:

	USB vendor-defined class	USB printer class
Vendor ID	04b8h	04b8h
Product ID	0202h	0E14h
String Descriptor		
Manufacturer	EPSON	EPSON
Product	EU-T482	EU-T482
SerialNumber	Character string based on the product serial number	Character string based on the product serial number

3.2.1.2 Printer status transmission from the printer through the USB interface

The USB interface uses USB bulk transfer to transmit the printer status to the host computer.

USB bulk transfer is a host-computer-driven transfer method. Unlike RS232 communication and other communication methods, voluntary interrupt transmission of data to the host computer is disabled for the printer with USB bulk transfer.

Any status transmitted to the printer's 128-byte status data buffer after buffer-full is discarded. To avoid loss of printer status data, regular readout of status data on the host computer is required.

3.2.1.3 USB Printer class USB device requests

- GET PORT STATUS

When the printer receives USB Device Request, it returns the following statuses.

Bit	Field	Description
7,6	Reserved	Reserved
5	Paper Empty	0: Paper Not Empty
		1: Paper Empty
4	Select	0: Not Select
		1: Select
3	Not Error	0: Error
		1: Not Error
2,1,0	Reserved	Reserved

- GET DEVICE ID

When the printer receives Device ID: USB Device Request, it returns the following character string.

```
[00H][XXH]   *1
MFG:EPSON;
CMD:ESC/POS;
MDL:EU-T482;   *2
CLS:PRINTER;
DES:EPSON[SP] EU-T482;
CID: Epson TM20001002;   *2
```

*1: Buffer size

*2: Character string depends on the language specifications.

	MDL	CID
ANK standard model	EU-T482	EpsonTM20001002

- SOFT RESET

USB Device Request is used when the host computer initializes the printer input buffer.

3.2.2 RS-232 Serial interface

3.2.2.1 Specifications (Complies with RS-232C)

Data transmission:	Serial
Synchronization:	Asynchronous
Handshaking:	DTR/DSR or CTS/RTS, XON/XOFF control
Signal levels:	MARK = -3 to -15 V: Logic '1'/ OFF
	SPACE = +3 to +15 V: Logic '0'/ ON
Transmission speed:	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps [bps: bits per second]
Bit length:	8 bits (fixed)
Parity Settings:	None, even, odd
Stop bits:	1 or more
Connector (printer side):	Male D-SUB9 pin connector

NOTES: 1. The handshaking, baud rate, and parity depend on the DIP switch settings or serial interface communication condition. (See Section 4.3.2. and 4.3.3)

2. The stop bit from the printer side is fixed to 1.

3.2.2.2 Interface connector terminal assignments and signal functions

Table 3.2.1 Signal Assignments and Functions

<table>
<tr><th>Pin no.</th><th>Signal name</th><th>Signal direction</th><th>Function</th></tr>
<tr><td>2</td><td>RXD</td><td>Input</td><td>Receive data</td></tr>
<tr><td>3</td><td>TXD</td><td>Output</td><td>Transmit data</td></tr>
<tr><td>4</td><td>DTR</td><td>Output</td><td>1) When DTR/DSR or CTS/RTS 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. Memory Switch 1-3 can change the busy condition. (See Section 4.3.3.2)
The printer goes busy (MARK) in the following cases:
<table>
<tr><th rowspan="2">Printer status</th><th colspan="2">Memory SW1-3 status</th></tr>
<tr><th>ON</th><th>OFF</th></tr>
<tr><td>(1) During the period from when the power is turned on to when the printer becomes ready to receive data.</td><td>BUSY</td><td>BUSY</td></tr>
<tr><td>(2) During a self-test.</td><td>BUSY</td><td>BUSY</td></tr>
<tr><td>(3) When the platen is opened.</td><td>—</td><td>BUSY</td></tr>
<tr><td>(4) When the presenter is open.</td><td>—</td><td>BUSY</td></tr>
<tr><td>(5) While paper is being fed using the paper FEED button.</td><td>—</td><td>BUSY</td></tr>
<tr><td>(6) When the printer stops printing due to a paper-end.</td><td>—</td><td>BUSY</td></tr>
<tr><td>(7) When printing is stopped due to a paper jam.</td><td>—</td><td>BUSY</td></tr>
<tr><td>(8) When an error has occurred.</td><td>—</td><td>BUSY</td></tr>
<tr><td>(9) While auto-loading.</td><td>—</td><td>BUSY</td></tr>
<tr><td>(10) When the receive buffer becomes full.(*1)</td><td>BUSY</td><td>BUSY</td></tr>
</table>
2) When XON/XOFF is selected:
The signal indicates whether the printer is correctly connected and is ready to receive data. SPACE indicates that the printer is ready to receive data. The signal is always SPACE except in the following cases:
• During the period from when the power is turned on to when the printer becomes ready to receive data.
• During a self-test.</td></tr>
<tr><td>5</td><td>SG</td><td>—</td><td>Signal ground</td></tr>
<tr><td>6</td><td>DSR</td><td>Input</td><td>This signal indicates whether the host computer can receive data.
SPACE indicates that the host computer is ready to receive data, and MARK indicates that the host computer cannot receive data.
When DTR/DSR or CTS/RTS is selected, the printer transmits data after confirming this signal (except when transmitting data with DLE EOT, and GS a).
When XON/XOFF is selected, the printer does not check this signal.
By setting the DIP switch, this signal can be used as the printer reset signal. (See section 4.3.2.)</td></tr>
<tr><td>7</td><td>RTS</td><td>Output</td><td>Same as DTR signal</td></tr>
<tr><td>8</td><td>CTS</td><td>Input</td><td>This signal indicates whether the host computer can receive data.
SPACE indicates that the host computer is ready to receive data, and MARK indicates that the host computer cannot receive data.
When DTR/DSR or CTS/RTS is selected, the printer confirms this signal and transmits data (except when transmitting data with DLE EOT, and GS a).
When XON/XOFF is selected, the printer does not check this signal.</td></tr>
</table>

*1: The status of a period between when the space in the receive buffer drops to 128 bytes and when it increases to 256 bytes is called "buffer full."

3.2.2.3 XON/XOFF transmission timing

When XON/XOFF is selected, the printer transmits XON or XOFF signals at the timing shown in the table below. Transmission timing differs, depending on the setting of Memory Switch 3.

Table 3.2.2 XON/XOFF Transmission Timing

	Printer status	Memory switch	
		ON	OFF
XON transmission	(1) When the printer goes online after you turn on the power	Transmit	Transmit
	(2) When the receive buffer is released from the buffer full state	Transmit	Transmit
	(3) When the printer switches from offline to online	—	Transmit
	(4) When the printer recovers from a recoverable error using a command.	—	Transmit
XOFF transmission	(5) When the receive buffer becomes full	Transmit	Transmit
	(6) When the printer switches from online to offline	—	Transmit

NOTES: 1. The XON code is <11>H, and the XOFF code is <13>H.
2. In case of (3), XON is not transmitted when the receive buffer is full.
3. In case of (6), XOFF is not transmitted when the receive buffer is full.

3.2.2.4 Serial interface connection example

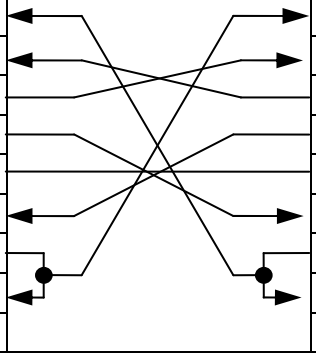
Correct connection example

Board (EU-T482) side			User side	
D-sub9 Pin no.	Signal Name		Signal Name	D-SUB9 Pin no.
1	(NC)		DCD	1
2	RxD		RxD	2
3	TxD		TxD	3
4	DTR		DTR	4
5	SG		SG	5
6	DSR		DSR	6
7	RTS		RTS	7
8	CTS		CTS	8
9	(NC)		RI	9

A cable that has the signal connection shown below cannot be used.

Incorrect connection example

Board (EU-T482) side			User side	
D-sub9 Pin no.	Signal Name		Signal Name	D-SUB9 Pin no.
1	(NC)		DCD	1
2	RxD		RxD	2
3	TxD		TxD	3
4	DTR		DTR	4
5	SG		SG	5
6	DSR		DSR	6
7	RTS		RTS	7
8	CTS		CTS	8
9	(NC)		RI	9



NOTES: 1. Before sending data to the control board, turn the power of the control board and make sure that the connected printer has finished its initialization.

2. If any one of CTS or DSR is SPACE in the DTR/DSR or CTS/RTS control, the printer recognizes that the host computer is ready to receive data. Therefore, be sure not to connect the unused signal (CTS or DSR) or to fix the signal unused on the host computer to MARK.

3.2.2.5 Notes on setting memory switch 1-3 to ON

1) The printer mechanism stops printing but does not become busy when: an error has occurred, the platen is opened, printing stops due to a paper-end, or paper is fed using the paper FEED button.

2) When setting the Memory Switch 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 its status each time it goes online or offline.

3) When using **DLE EOT**, be sure that the receive buffer does not become full.

- When using a host computer that cannot transmit data when the printer is busy:

  If an error has occurred, **DLE EOT** cannot be used when the printer is busy due to a receive buffer-full state.

- When using a host computer that can transmit data when the printer is busy:

  When the receive buffer becomes full while transmitting bit-image data, **DLE EOT** sent while bit-image data is processed is considered bit-image data. Data transmitted when the receive buffer is full may be lost.

  Example: Check printer status using **GS r 1** after transmitting each line of data.

3.2.2.6 Notes on resetting the printer through the interface

The printer can be reset using interface pin #6 by changing the DIP switch setting (see Section 4.3.1, DIP switch).

Table 3.2.3 Reset Switching

Signal line	DIP switch	Reset condition
Pin #6 (DSR)	DSW 1-5: ON	MARK level input

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

<DC characteristics>

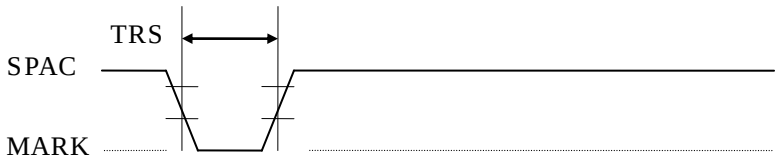
Table 3.2.4 Reset DC Characteristics

		Pin #6 (DSR)
Active reset voltage	V_A	–15 to –3 V
Negative reset voltage	V_N	+3 to +15 V
Active reset voltage	I_A	–5.3 mA (max.)
Negative reset voltage	I_N	–5.0 mA (max.)
Input impedance	R_{IN}	3 kΩ (min.)

<AC characteristics>

Minimum reset pulse width: TRS 1 ms (minimum)

- When using pin #6 (DSR) (DIP switch 1-5 is ON):



When DIP SW 1-5 is on with pin #6 (DSR) opened, the printer is reset.

NOTE: When a signal that does not satisfy the requirements above is input, printer operation is not guaranteed.

3.2.3 IEEE 1284 bi-directional parallel interface (IEEE 1284)

* Option that is only permitted to be installed by an EPSON factory or an EPSON configuration center.

3.2.3.1 Compatibility mode
(Data transmission from host computer to printer: Centronics-compatible)

1) Outline

Compatibility Mode supports the compatibility with the Centronics parallel interface.

2) Specifications

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

3.2.3.2 Reverse mode (Data transmission from printer to host computer)

Status data transmissions from the printer to the host computer proceed in the Nibble Mode.

- Outline

  This mode allows data transmission from an asynchronous printer controlled by the host computer.

  Data transmissions in the Nibble Mode use the existing control lines in units of four bits (a Nibble).

  The data transmission in the Nibble Mode is half duplex transmission because it cannot be executed simultaneously with the Compatibility Mode.

3.2.3.3 Interface pin assignments for each mode

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

* NC: Not Connected
ND: Not Defined

NOTES: 1. A prefix “n” to signal names refers to “L” active signals. To the host computer not provided with all 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 all be based on the TTL level to meet the characteristics described below. In addition, both rise time and fall time of each signal shall be 0.5 μs 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 data loss.
5. Interface cables shall be as minimum required short in length as possible.

3.2.3.4 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 mA	--	V_{OH}=2.4 V
Output LOW current	I_{OL}	-12 mA	--	V_{OL}=0.4 V
Input HIGH voltage	V_{IH}	2.0 V	--	
Input LOW voltage	V_{IL}	--	0.8 V	
Input HIGH current	I_{IH}	--	-0.32 mA	V_{IH}=2.0 V
Input LOW current	I_{IL}	--	12 mA	V_{IL}=0.8 V

Logic-H Signal Sender Characteristics

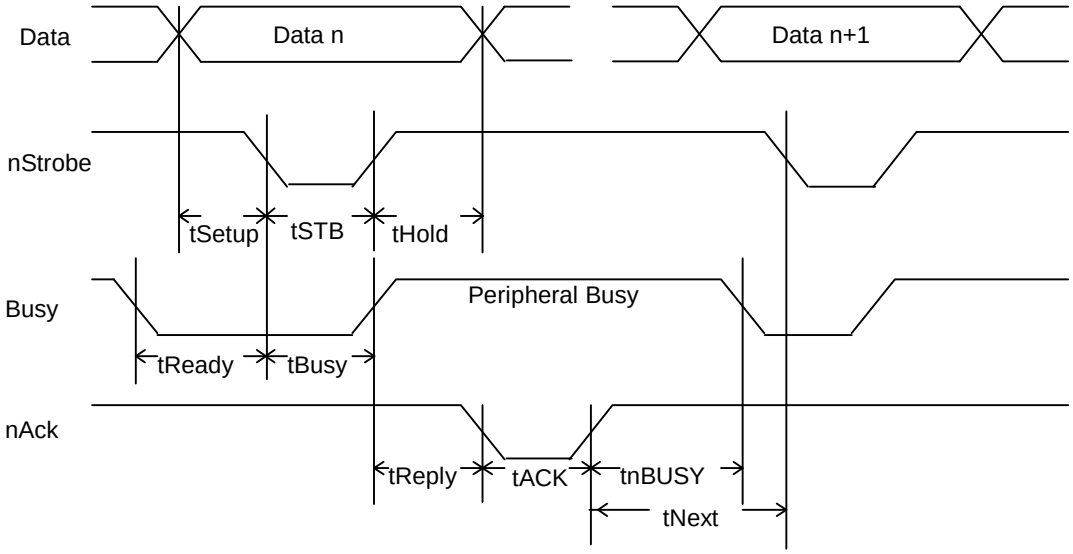
Characteristics	Symbol	Specifications		Conditions
		Min	Max	
Output HIGH voltage	V_{OH}	3.0 V	5.5 V	
Output LOW voltage	V_{OL}	--	2.0 V	While the power is OFF

+5 V Signal Sender Characteristics

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

3.2.3.5 Data receiving timing (Compatibility mode)

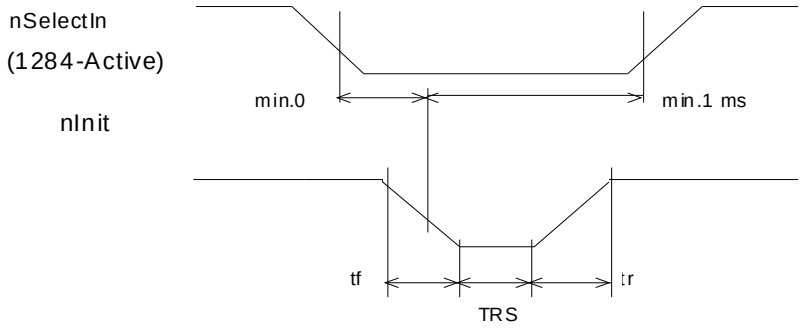


Characteristics	Symbol	Specifications	
		Min [ns]	Max [ns]
Data Hold Time (host PC)	tHold	750	--
Data Setup Time	tSetup	750	--
STROBE Pulse Width	tSTB	750	--
READY Cycle Idle Time	tReady	0	--
BUSY Output Delay Time	tBUSY	0	500
Data Processing Time	tReply	0	∞
ACKNLG Pulse Width	tACK	500	10 μs
BUSY Release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

3.2.3.6 Notes on resetting the printer through the interface

To enable the printer reset through the interface nInit signal (pin #31) in compatibility mode, satisfy the following characteristics; however, note that the printer reset signal is ignored when the signal nSelectIn (#36 pin, 1284-Active high) is active in reverse mode.

- DC characteristic:
  TTL level
- AC characteristics:
  Minimum reset pulse width: TRS: 50 μs (min.)



3.2.3.7 Reception of status from the printer through the bi-directional parallel interface

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

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

1) When ASB is used, the host computer is preferably in the wait state for data reception (Reverse idle state). When this state is not available, the host computer shall enter the Reverse mode to constantly monitor the presence of data.

2) When ASB is used, preference shall be given to the ASB status for transmission over the other status signals in the Reverse Mode. Any accumulated ASB status signals left for transmission from the last to the latest ASB status shall be transmitted together at one 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
0000 0000	0000 0000	0000 0000	0000 0000

Then, for example, when a near-end detection, opening of the platen, and closing of the platen are performed, the following ASB statuses are accumulated.

	First Status	Second Status	Third Status	Fourth Status	
1	0000 0000	0000 0000	0000 0011	0000 0000	Near end has been detected.
2	0010 1000	0000 0000	0000 0011	0000 0000	The printer platen is opened.
3	0000 0000	0000 0000	0000 0011	0000 0000	The printer platen is closed.

The ASB status that the printer actually transmits after that is a total of 8 bytes, which is accumulated ASB (1 + 2 + 3) + the latest ASB (3), as shown below.

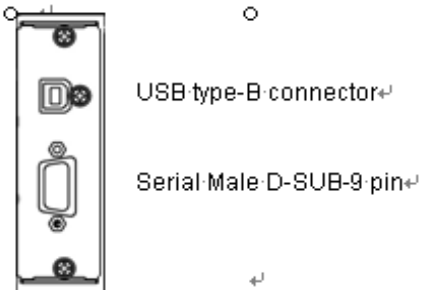
		First Status	Second Status	Third Status	Fourth Status
Accumulated ASB	(1 + 2 + 3)	0010 1000	0000 0000	0000 0011	0000 0000
+					
Latest ASB (3)		0000 0000	0000 0000	0000 0011	0000 0000

3.2.3.8 Notes on setting memory switch 1-3 to ON

See Section 3.2.2.5, Notes on setting Memory Switch 1-3 to ON.

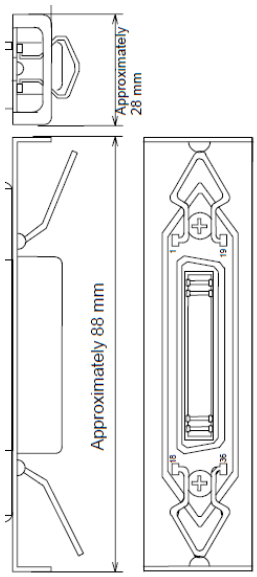
3.3 Connector

3.3.1 Combo interface (serial and USB) connector



3.3.2 Bidirectional parallel interface (IEEE1284) connector

* Option that is only permitted to be installed by an EPSON factory or an EPSON configuration center



3.3.3 Power supply connector

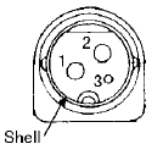
This connector is used to connect the printer to an external power source.

1) Pin assignments: See section 3.3.1.

2) Model: Hoshiden TCS7960-532010 or equivalent

Pin Number	Signal Name
1	+24V
2	GND
3	N.C
Shell	**Frame** GND

Table 3.3.1 Power Supply Connector Pin Assignments



3.4 Switching between online and offline

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

1) When the power is turned on or until the printer becomes ready for data transmission after it is initialized by the reset signal (nInit) from the interface.
2) During the self-test.
3) When the platen is open.
4) When the presenter is open.
5) During paper feeding using the paper FEED button.
6) When the paper sensor detects a paper end. (*)
7) When printing is stopped due to a paper jam.
8) When an error has occurred.
9) While auto-loading.

(*) The printer goes offline even if the paper sensor does not detect a paper end, when the paper is ejected in a backward direction by a reverse feed command or by a paper FEED button and a paper exchange (BACK FEED) button simultaneously.

4. FUNCTIONS

4.1 List of Commands

Command	Name	Command classification		Standard mode	Page mode
		Executing	Setting		
HT	Horizontal tab	✓		✓	✓
LF	Print and line feed	✓		✓	✓
FF	(1) Print and return to standard mode (in page mode)	✓		Ignored	✓
	(2) Print and feed label to print starting position (When black mark sensor is enabled *)	✓		✓	Disabled
CR	Print and carriage return	✓		✓	✓
CAN	Cancel print data in page mode	✓		Ignored	✓
DLE EOT	Real-time status transmission	✓		✓	✓
DLE ENQ	Real-time request to printer	✓		✓	✓
DLE DC4 7	Transmit specified status in real-time	✓		✓	✓
DLE DC4 8	Clear buffer(s)	✓		✓	✓
ESC FF	Print data in page mode	✓		Ignored	✓
ESC SP	Set right-side character spacing		✓	✓	✓
ESC !	Select print mode(s)		✓	✓	✓
ESC $	Set absolute print position	✓		✓	✓
ESC %	Select/cancel user-defined character set		✓	✓	✓
ESC &	Define user-defined characters		✓	✓	✓
ESC *	Select bit-image mode	✓		✓	✓
ESC -	Turn underline mode on/off		✓	✓	✓
ESC 2	Select 3.75mm {0.15"} line spacing		✓	✓	✓
ESC 3	Set line spacing		✓	✓	✓
ESC ?	Cancel user-defined characters		✓	✓	✓
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	Print and feed paper	✓		✓	✓
ESC L	Select page mode	✓		(L)	Ignored
ESC M	Select character font			✓	✓
ESC R	Select an international character set		✓	✓	✓
ESC S	Select standard mode	✓		Ignored	✓
ESC T	Select print direction in page mode		✓	(S)	✓
ESC V	Turn 90° clockwise rotation mode on/off		✓	✓	(S)
ESC W	Set printing area in page mode		✓	(S)	✓
**ESC **	Set relative print position	✓		✓	✓

Command	Name	Command classification		Standard mode	Page mode
		Executing	Setting		
ESC a	Select justification		✓	(L)	(S)
ESC 3	Select paper-end sensor(s) to output paper-end signals		✓	✓	✓
ESC c 4	Select paper sensor(s) to stop printing		✓	✓	✓
ESC c 5	Enable/disable panel buttons		✓	✓	✓
ESC d	Print and feed ***n*** lines	✓		✓	✓
ESC t	Select character code table		✓	✓	✓
ESC {	Turn upside-down printing mode on/off		✓	(L)	(S)
FS (z	Optional device control	✓	✓	✓	✓
FS p	Print NV bit image	✓		✓	✓
FS q	Define NV bit image		✓	(L)	✓
GS FF	Feed marked paper to print starting position	✓		✓	✓
GS !	Select character size		✓	✓	✓
GS $	Set absolute vertical print position in page mode	✓		Ignored	✓
GS (A	Execute test print	✓		✓	Ignored
GS (C	Edit user NV memory	✓	✓	✓	✓
GS (E	User setup commands	✓	✓	(L)	Disabled
GS (F	Set adjustment values(s)		✓	✓	✓
GS (H	Request response transmission		✓	✓	✓
GS (K	Select print control method(s)		✓	✓	✓
GS (L/ GS 8 L	Specify graphic data	✓	✓	✓	✓
GS (M	Customize printer control value(s)	✓		(L)	Ignored
GS (k	Setup and print symbol	✓	✓	✓	✓
GS *	Define downloaded bit image		✓	✓	✓
GS /	Print downloaded bit image	✓		(D)	✓
GS B	Turn white/black reverse printing mode on/off		✓	✓	✓
GS E	Select head control method		✓	✓	✓
GS H	Select printing position of HRI characters		✓	✓	✓
GS I	Transmit printer ID	✓		✓	✓
GS L	Set left margin		✓	(L)	(S)
GS T	Set print position to the beginning of print line	✓		✓	Ignored
GS V	Select cut mode and cut paper	✓		(L)	✓
GS W	Set printing area width		✓	(L)	(S)
**GS **	Set relative vertical print position in page mode	✓		Ignored	✓
GS a	Enable/disable Automatic Status Back (ASB)	✓	✓	✓	✓
GS b	Turn smoothing mode on/off		✓	✓	✓
GS f	Select font for HRI characters		✓	✓	✓

Command	Name	Command classification		Standard mode	Page mode
		Executing	Setting		
GS g 0	Initialize maintenance counter	✓		(L)	Ignored
GS g 2	Transmit maintenance counter value	✓		✓	✓
GS h	Set bar code height		✓	✓	✓
GS k	Print bar code	✓		(D)	✓
GS r	Transmit status	✓		✓	✓
GS v 0	Print raster bit image	✓		(D)	✓
GS w	Set bar code width		✓	✓	✓

Command classification
- Executing: The printer executes the command, which does not then affect the following data.
- Setting: The printer uses flags to make settings, and those settings affect the following data.

Standard mode
- ✓: Enabled.
- (L): Enabled only when the command is set at the beginning of a line.
- (D): Enabled only when data is not present in the printer buffer.

Page mode
- ✓: Enabled.
- (S): Only a value setting is possible.
- Disabled: Parameters are processed as printable data.
- Ignored: All command codes, including parameters, are ignored and nothing is executed.

The commands listed below in the first column are defined as “obsolete commands (*)” in the ESC/POS command system. This printer supports both upward-compatible commands and obsolete commands. However, the upward-compatible commands are recommended to use.

Obsolete commands		Upward-compatible commands
FS p	Print NV bit image	**GS (L** <Function 69>
FS q	Define NV bit image	**GS (L** <Function 67>
GS v 0	Print raster bit image	**GS (L** <Function 112 + 50>

(*): “Obsolete commands” are commands that are supported by legacy models; however it is recommended to replace them with upward-compatible commands, because they will not be supported in the future products.

4.2 Character Code Tables

4.2.1 Common to all pages (International character set: U.S.A.)

HEX	0	1	2	3	4	5	6	7
0	NUL 0	DLE 16	SP 32	0 48	@ 64	P 80	` 96	p 112
1	1	XON 17	! 33	1 49	A 65	Q 81	a 97	q 113
2	2	18	" 34	2 50	B 66	R 82	b 98	r 114
3	3	XOFF 19	# 35	3 51	C 67	S 83	c 99	s 115
4	EOT 4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116
5	ENQ 5	NAK 21	% 37	5 53	E 69	U 85	e 101	u 117
6	ACK 6	22	& 38	6 54	F 70	V 86	f 102	v 118
7	7	23	' 39	7 55	G 71	W 87	g 103	w 119
8	8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120
9	HT 9	25	) 41	9 57	I 73	Y 89	i 105	y 121
A	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122
B	11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123
C	FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	| 124
D	CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	} 125
E	14	RS 30	. 46	> 62	N 78	^ 94	n 110	~ 126
F	15	31	/ 47	? 63	O 79	_ 95	o 111	SP 127

4.2.2 Page 0 (PC437: USA, Standard Europe)

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

4.2.3 Page 1 (Katakana)

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

4.2.4 Page 2 (PC850: Multilingual)

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

4.2.5 Page 3 (PC860: Portuguese)

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

4.2.6 Page 4 (PC863: Canadian-French)

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

4.2.7 Page 5 (PC865: Nordic)

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

4.2.8 Page 11 (PC851: Greek)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	Ί 144	ΐ 160	░ 176	└ 192	Τ 208	ζ 224	- 240
1	ü 129	SP 145	Ϊ 161	▒ 177	┴ 193	Υ 209	η 225	± 241
2	é 130	Ό 146	ό 162	▓ 178	┬ 194	Φ 210	θ 226	ϋ 242
3	â 131	ô 147	ύ 163	│ 179	├ 195	Χ 211	ι 227	φ 243
4	ä 132	ö 148	Α 164	┤ 180	─ 196	Ψ 212	κ 228	χ 244
5	à 133	Ύ 149	Β 165	Κ 181	┼ 197	Ω 213	λ 229	§ 245
6	Ά 134	û 150	Γ 166	Λ 182	Π 198	α 214	μ 230	ψ 246
7	ç 135	ù 151	Δ 167	Μ 183	Ρ 199	β 215	ν 231	΄ 247
8	ê 136	Ώ 152	Ε 168	Ν 184	╚ 200	γ 216	ξ 232	° 248
9	ë 137	Ö 153	Ζ 169	╣ 185	╔ 201	┘ 217	ο 233	¨ 249
A	è 138	Ü 154	Η 170	║ 186	╩ 202	┌ 218	π 234	ώ 250
B	ï 139	ά 155	½ 171	╗ 187	╦ 203	█ 219	ρ 235	Ü 251
C	î 140	£ 156	Θ 172	╝ 188	╠ 204	■ 220	σ 236	ΰ 252
D	Έ 141	έ 157	Ι 173	Ξ 189	═ 205	δ 221	ς 237	ώ 253
E	Ä 142	ή 158	« 174	Ο 190	╬ 206	ε 222	τ 238	▮ 254
F	Ή 143	ί 159	» 175	┐ 191	Σ 207	■ 223	΄ 239	SP 255

4.2.9 Page 12 (PC853: Turkish)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	▒ 176	└ 192	SP 208	Ó 224	- 240
1	ü 129	ċ 145	í 161	▓ 177	┴ 193	SP 209	ß 225	SP 241
2	é 130	Ċ 146	ó 162	▓ 178	┬ 194	Ê 210	Ô 226	ℓ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	ŉ 243
4	ä 132	ö 148	ñ 164	┤ 180	─ 196	È 212	Ġ 228	˘ 244
5	à 133	ò 149	Ñ 165	Á 181	┼ 197	ı 213	ġ 229	§ 245
6	ĉ 134	û 150	ğ 166	Â 182	ŝ 198	Í 214	µ 230	÷ 246
7	ç 135	ù 151	Ğ 167	À 183	Ŝ 199	Î 215	ħ 231	¸ 247
8	ê 136	İ 152	Ĥ 168	Ş 184	╚ 200	Ï 216	Ħ 232	° 248
9	ë 137	Ö 153	ĥ 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
A	è 138	Ü 154	SP 170	║ 186	╩ 202	┌ 218	Û 234	· 250
B	ï 139	ĝ 155	½ 171	╗ 187	╦ 203	▉ 219	Ù 235	SP 251
C	î 140	£ 156	Ĵ 172	╝ 188	╠ 204	■ 220	ŭ 236	³ 252
D	ì 141	Ĝ 157	ş 173	Ż 189	═ 205	SP 221	Ŭ 237	² 253
E	Ä 142	× 158	« 174	ż 190	╬ 206	Ì 222	• 238	▮ 254
F	Ĉ 143	ĵ 159	» 175	┐ 191	¤ 207	■ 223	´ 239	SP 255

4.2.10 Page 13 (PC857: Turkish)

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

4.2.11 Page 14 (PC737: Greek)

HEX	8	9	A	B	C	D	E	F
0	Α 128	Ρ 144	ι 160	▒ 176	└ 192	╨ 208	ω 224	Ω 240
1	Β 129	Σ 145	κ 161	▓ 177	┴ 193	╤ 209	ά 225	± 241
2	Γ 130	Τ 146	λ 162	▓ 178	┬ 194	╥ 210	έ 226	≥ 242
3	Δ 131	Υ 147	μ 163	│ 179	├ 195	╙ 211	ή 227	≤ 243
4	Ε 132	Φ 148	ν 164	┤ 180	─ 196	╘ 212	ϊ 228	Ϊ 244
5	Ζ 133	Χ 149	ξ 165	╡ 181	┼ 197	╒ 213	ί 229	Ÿ 245
6	Η 134	Ψ 150	ο 166	╢ 182	╞ 198	╓ 214	ό 230	÷ 246
7	Θ 135	Ω 151	π 167	╖ 183	╟ 199	╫ 215	ύ 231	≈ 247
8	Ι 136	α 152	ρ 168	╕ 184	╚ 200	╪ 216	ϋ 232	° 248
9	Κ 137	β 153	σ 169	╣ 185	╔ 201	┘ 217	ώ 233	• 249
A	Λ 138	γ 154	ς 170	║ 186	╩ 202	┌ 218	Ά 234	· 250
B	Μ 139	δ 155	τ 171	╗ 187	╦ 203	█ 219	Έ 235	√ 251
C	Ν 140	ε 156	υ 172	╝ 188	╠ 204	■ 220	Ή 236	n 252
D	Ξ 141	ζ 157	φ 173	╜ 189	═ 205	▌ 221	Ί 237	2 253
E	Ο 142	η 158	χ 174	╛ 190	╬ 206	▐ 222	Ό 238	■ 254
F	Π 143	θ 159	ψ 175	┐ 191	╧ 207	■ 223	Ύ 239	SP 255

4.2.12 Page 15 (ISO8859: Greek)

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	SP 160	° 176	Ϊ 192	Π 208	ΰ 224	π 240
1	SP 129	SP 145	‘ 161	± 177	Α 193	Ρ 209	α 225	ρ 241
2	SP 130	SP 146	’ 162	² 178	Β 194	SP 210	β 226	ς 242
3	SP 131	SP 147	£ 163	³ 179	Γ 195	Σ 211	γ 227	σ 243
4	SP 132	SP 148	€ 164	΄ 180	Δ 196	Τ 212	δ 228	τ 244
5	SP 133	SP 149	₯ 165	΅ 181	Ε 197	Υ 213	ε 229	υ 245
6	SP 134	SP 150	¦ 166	Ά 182	Ζ 198	Φ 214	ζ 230	φ 246
7	SP 135	SP 151	§ 167	· 183	Η 199	Χ 215	η 231	χ 247
8	SP 136	SP 152	¨ 168	Έ 184	Θ 200	Ψ 216	θ 232	ψ 248
9	SP 137	SP 153	© 169	Ή 185	Ι 201	Ω 217	ι 233	ω 249
A	SP 138	SP 154	ͺ 170	Ί 186	Κ 202	Ϊ 218	κ 234	ϊ 250
B	SP 139	SP 155	« 171	» 187	Λ 203	Ϋ 219	λ 235	ü 251
C	SP 140	SP 156	¬ 172	Ό 188	Μ 204	ά 220	μ 236	ό 252
D	SP 141	SP 157	- 173	½ 189	Ν 205	έ 221	ν 237	ύ 253
E	SP 142	SP 158	SP 174	Ύ 190	Ξ 206	ή 222	ξ 238	ώ 254
F	SP 143	SP 159	― 175	Ώ 191	Ο 207	ί 223	ο 239	SP 255

4.2.13 Page 16 (WPC1252)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	À 192	Ð 208	à 224	ð 240
1	SP 129	‘ 145	¡ 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	‚ 130	’ 146	¢ 162	² 178	Â 194	Ò 210	â 226	ò 242
3	ƒ 131	“ 147	£ 163	³ 179	Ã 195	Ó 211	ã 227	ó 243
4	„ 132	” 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	… 133	• 149	¥ 165	µ 181	Å 197	Õ 213	å 229	õ 245
6	† 134	– 150	¦ 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	‡ 135	— 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
8	ˆ 136	˜ 152	¨ 168	¸ 184	È 200	Ø 216	è 232	ø 248
9	‰ 137	™ 153	© 169	¹ 185	É 201	Ù 217	é 233	ù 249
A	Š 138	š 154	ª 170	º 186	Ê 202	Ú 218	ê 234	ú 250
B	‹ 139	› 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
C	Œ 140	œ 156	¬ 172	¼ 188	Ì 204	Ü 220	ì 236	ü 252
D	SP 141	SP 157	173	½ 189	Í 205	Ý 221	í 237	ý 253
E	Ž 142	ž 158	® 174	¾ 190	Î 206	Þ 222	î 238	þ 254
F	SP 143	Ÿ 159	¯ 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

4.2.14 Page 17 (PC866: Cyrillic #2)

HEX	8	9	A	B	C	D	E	F
0	А 128	Р 144	а 160	▒ 176	└ 192	╙ 208	р 224	Ё 240
1	Б 129	С 145	б 161	▓ 177	┴ 193	╘ 209	с 225	ё 241
2	В 130	Т 146	в 162	▒ 178	┬ 194	╒ 210	т 226	Є 242
3	Г 131	У 147	г 163	│ 179	├ 195	╓ 211	у 227	є 243
4	Д 132	Ф 148	д 164	┤ 180	─ 196	╫ 212	ф 228	Ї 244
5	Е 133	Х 149	е 165	╡ 181	┼ 197	╪ 213	х 229	ї 245
6	Ж 134	Ц 150	ж 166	╢ 182	╞ 198	╒ 214	ц 230	Ў 246
7	З 135	Ч 151	з 167	╖ 183	╟ 199	╪ 215	ч 231	ў 247
8	И 136	Ш 152	и 168	╕ 184	╚ 200	╪ 216	ш 232	° 248
9	Й 137	Щ 153	й 169	╣ 185	╔ 201	┘ 217	щ 233	• 249
A	К 138	Ъ 154	к 170	║ 186	╩ 202	┌ 218	ъ 234	· 250
B	Л 139	Ы 155	л 171	╗ 187	╦ 203	▉ 219	ы 235	√ 251
C	М 140	Ь 156	м 172	╝ 188	╠ 204	■ 220	ь 236	№ 252
D	Н 141	Э 157	н 173	╜ 189	═ 205	▌ 221	э 237	¤ 253
E	О 142	Ю 158	о 174	╛ 190	╬ 206	▐ 222	ю 238	▮ 254
F	П 143	Я 159	п 175	┐ 191	╧ 207	▀ 223	я 239	SP 255

4.2.15 Page 18 (PC852: Latin2)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	▒ 176	└ 192	đ 208	Ó 224	- 240
1	ü 129	Ĺ 145	í 161	▓ 177	┴ 193	Đ 209	ß 225	˝ 241
2	é 130	Í 146	ó 162	▓ 178	┬ 194	Ď 210	Ô 226	˛ 242
3	â 131	Ô 147	ú 163	│ 179	├ 195	Ë 211	Ń 227	ˇ 243
4	ä 132	ö 148	Ą 164	┤ 180	─ 196	ď 212	ń 228	˘ 244
5	ů 133	Ľ 149	ą 165	Á 181	┼ 197	Ň 213	ň 229	§ 245
6	ć 134	ľ 150	Ž 166	Â 182	Ă 198	Í 214	Š 230	÷ 246
7	ç 135	Ś 151	ž 167	Ě 183	ă 199	Î 215	š 231	¸ 247
8	ł 136	ś 152	Ę 168	Ş 184	╚ 200	ě 216	Ř 232	° 248
9	ë 137	Ö 153	ę 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
A	ő 138	Ü 154	€ 170	║ 186	╩ 202	┌ 218	ŕ 234	· 250
B	ő 139	Ť 155	Ź 171	╗ 187	╦ 203	█ 219	Ű 235	ű 251
C	î 140	ť 156	Č 172	╝ 188	╠ 204	■ 220	ý 236	Ř 252
D	Ź 141	Ł 157	Ş 173	Ż 189	═ 205	Ţ 221	Ý 237	ř 253
E	Ä 142	× 158	« 174	ż 190	╬ 206	Ů 222	ţ 238	▮ 254
F	Ć 143	Č 159	» 175	┐ 191	¤ 207	■ 223	´ 239	SP 255

4.2.16 Page 19 (PC858: Euro)

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

4.2.17 Page 20 (KU42: Thai)

HEX	8	9	A	B	C	D	E	F
0	ร 128	๐ 144	SP 160	ฒ 176	ย 192	เ 208	- 224	◌๑ 240
1	ฯ 129	๑ 145	ก 161	ณ 177	ร 193	แ 209	◌ั 225	◌๑+ 241
2	ล 130	๒ 146	ข 162	ด 178	ฤ 194	โ 210	◌ิ 226	◌๒ 242
3	ฯ 131	๓ 147	ค 163	ต 179	ล 195	ใ 211	◌ี 227	◌๒- 243
4	ฯ 132	๔ 148	ฆ 164	ถ 180	ว 196	ไ 212	◌ึ 228	◌๒๎ 244
5	– 133	๕ 149	ง 165	ท 181	ศ 197	ๆ 213	◌ื 229	◌๓ 245
6	ฯ 134	๖ 150	จ 166	ธ 182	ษ 198	ฯ 214	◌ุ 230	◌๓+ 246
7	ฯ 135	๗ 151	ฉ 167	น 183	ส 199	◌ู 215	◌ุ๎ 231	◌๓- 247
8	⊥ 136	๘ 152	ช 168	บ 184	ห 200	◌ฺ 216	◌ู๎ 232	◌๓๎ 248
9	⊤ 137	๙ 153	ซ 169	ป 185	ฬ 201	◌็ 217	◌ุ+ 233	◌๔ 249
A	┼ 138	ฃ 154	ฌ 170	ผ 186	อ 202	◌่ 218	◌ุ- 234	◌๔+ 250
B	▮ 139	ค 155	ญ 171	ฝ 187	ฮ 203	◌้ 219	◌ุ๎ 235	◌๔- 251
C	← 140	ฅ 156	ฏ 172	พ 188	ะ 204	◌๊ 220	◌ู 236	◌๔๎ 252
D	↑ 141	ฆ 157	ฏ 173	ฟ 189	ั 205	◌๋ 221	◌ู+ 237	◌๕ 253
E	→ 142	ง 158	ฐ 174	ภ 190	า 206	◌์ 222	◌ู- 238	◌๕+ 254
F	↓ 143	ไ 159	ฑ 175	ม 191	ำ 207	◌ๆ 223	◌ู๎ 239	SP 255

4.2.18 Page 21 (TIS11: Thai)

HEX	8	9	A	B	C	D	E	F
0	◌ุ 128	◌ฺ 144	เ 160	฿ 176	ภ 192	๐ 208	เ 224	๐ 240
1	◌ู 129	◌็ 145	ก 161	ฑ 177	ม 193	๑ 209	แ 225	๑ 241
2	◌ื 130	◌๎ 146	ข 162	ฒ 178	ย 194	๒ 210	โ 226	๒ 242
3	◌ึ 131	◌๏ 147	ฃ 163	ณ 179	ร 195	๓ 211	ใ 227	๓ 243
4	◌ั 132	◌๐ 148	ค 164	ด 180	ฤ 196	๔ 212	ไ 228	๔ 244
5	◌ั 133	◌๑ 149	ฅ 165	ต 181	ล 197	๕ 213	ๅ 229	๕ 245
6	◌ิ 134	◌๒ 150	ฆ 166	ถ 182	ฦ 198	๖ 214	ๆ 230	๖ 246
7	◌ี 135	◌๓ 151	ง 167	ท 183	ว 199	๗ 215	๗ 231	๗ 247
8	◌ึ 136	◌๔ 152	จ 168	ธ 184	ศ 200	◌ๆ 216	◌ 232	๘ 248
9	◌ื 137	◌๕ 153	ฉ 169	น 185	ษ 201	◌ๅ 217	◌ 233	๙ 249
A	◌ุ 138	◌๖ 154	ช 170	บ 186	ส 202	◌ๆ 218	◌ 234	๚ 250
B	◌ู 139	◌๗ 155	ซ 171	ป 187	ห 203	◌ๅ 219	◌ 235	๛ 251
C	◌ุ 140	◌๘ 156	ฌ 172	ผ 188	ฬ 204	◌ๆ 220	◌ 236	๛ 252
D	◌ู 141	◌๙ 157	ญ 173	ฝ 189	อ 205	◌ๅ 221	◌ 237	๑ 253
E	◌ุ 142	◌๚ 158	ฎ 174	พ 190	ฮ 206	◌ๆ 222	◌ 238	๕ 254
F	◌ู 143	◌๛ 159	ฏ 175	ฟ 191	ฯ 207	฿ 223	◌ 239	SP 255

4.2.19 Page 26 (TIS18: Thai)

HEX	8	9	A	B	C	D	E	F
0	ร 128	ั 144	SP 160	฿ 176	ภ 192	๑ 208	เ 224	๐ 240
1	ล 129	า 145	ก 161	ฯ 177	ม 193	๒ 209	แ 225	๑ 241
2	ว 130	ำ 146	ข 162	ะ 178	ย 194	๓ 210	โ 226	๒ 242
3	ศ 131	ิ 147	ฃ 163	ั 179	ร 195	๔ 211	ใ 227	๓ 243
4	ษ 132	ี 148	ค 164	า 180	ฤ 196	๕ 212	ไ 228	๔ 244
5	ส 133	ึ 149	ฅ 165	ำ 181	ล 197	๖ 213	ๅ 229	๕ 245
6	ห 134	ื 150	ฆ 166	ิ 182	ฦ 198	๗ 214	ๆ 230	๖ 246
7	ฬ 135	ุ 151	ง 167	ี 183	ว 199	๘ 215	็ 231	๗ 247
8	อ 136	ู 152	จ 168	ึ 184	ศ 200	๙ 216	่ 232	๘ 248
9	ฮ 137	ฺ 153	ฉ 169	ื 185	ษ 201	๚ 217	้ 233	๙ 249
A	ฯ 138	ๅ 154	ช 170	ุ 186	ส 202	๛ 218	๊ 234	๚ 250
B	ะ 139	็ 155	ซ 171	ู 187	ห 203	๜ 219	๋ 235	๛ 251
C	ั 140	่ 156	ฌ 172	ฺ 188	ฬ 204	๝ 220	์ 236	๜ 252
D	า 141	้ 157	ญ 173	ฝ 189	อ 205	๞ 221	ํ 237	๝ 253
E	ำ 142	๊ 158	ฎ 174	พ 190	ฮ 206	๟ 222	๎ 238	๞ 254
F	ิ 143	๋ 159	ฏ 175	ฟ 191	ฯ 207	฿ 223	๏ 239	SP 255

4.2.20 Page 30 (TCVN-3: Vietnamese)

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	SP 160	SP 176	SP 192	é 208	SP 224	SP 240
1	SP 129	SP 145	SP 161	SP 177	SP 193	ẹ 209	ỏ 225	ủ 241
2	SP 130	SP 146	SP 162	SP 178	SP 194	ề 210	õ 226	ũ 242
3	SP 131	SP 147	SP 163	SP 179	SP 195	ể 211	ó 227	ú 243
4	SP 132	SP 148	SP 164	SP 180	SP 196	ễ 212	ọ 228	ụ 244
5	SP 133	SP 149	SP 165	à 181	SP 197	ế 213	ồ 229	ừ 245
6	SP 134	SP 150	SP 166	ả 182	ặ 198	ệ 214	ổ 230	ử 246
7	SP 135	SP 151	SP 167	ã 183	ầ 199	ì 215	ỗ 231	ữ 247
8	SP 136	SP 152	ă 168	á 184	ẩ 200	ỉ 216	ố 232	ứ 248
9	SP 137	SP 153	â 169	ạ 185	ẫ 201	SP 217	ộ 233	ự 249
A	SP 138	SP 154	ê 170	SP 186	ấ 202	SP 218	ờ 234	ỳ 250
B	SP 139	SP 155	ô 171	ắ 187	ậ 203	SP 219	ở 235	ỷ 251
C	SP 140	SP 156	ơ 172	ằ 188	è 204	ĩ 220	ỡ 236	ỹ 252
D	SP 141	SP 157	ư 173	ẵ 189	SP 205	í 221	ớ 237	ý 253
E	SP 142	SP 158	đ 174	ắ 190	ẻ 206	ị 222	ợ 238	ỵ 254
F	SP 143	SP 159	SP 175	SP 191	ẽ 207	ò 223	ù 239	SP 255

4.2.21 Page 31 (TCVN-3: Vietnamese)

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	SP 160	SP 176	SP 192	É 208	SP 224	SP 240
1	SP 129	SP 145	Ă 161	SP 177	SP 193	Ẹ 209	Ỏ 225	Ủ 241
2	SP 130	SP 146	Â 162	SP 178	SP 194	Ề 210	Ỗ 226	Ũ 242
3	SP 131	SP 147	SP 163	SP 179	SP 195	Ể 211	Ố 227	Ú 243
4	SP 132	SP 148	SP 164	SP 180	SP 196	Ễ 212	Ọ 228	Ụ 244
5	SP 133	SP 149	SP 165	À 181	SP 197	Ễ 213	Ồ 229	Ừ 245
6	SP 134	SP 150	SP 166	Ả 182	Ặ 198	Ệ 214	Ỗ 230	Ử 246
7	SP 135	SP 151	Đ 167	Ã 183	Ầ 199	Ì 215	Ỗ 231	Ữ 247
8	SP 136	SP 152	SP 168	Á 184	Ẩ 200	Ỉ 216	Ố 232	Ứ 248
9	SP 137	SP 153	SP 169	Ạ 185	Ẫ 201	SP 217	Ộ 233	Ự 249
A	SP 138	SP 154	Ê 170	SP 186	Ấ 202	SP 218	Ờ 234	Ỳ 250
B	SP 139	SP 155	Ô 171	Ằ 187	Ậ 203	SP 219	Ở 235	Ỷ 251
C	SP 140	SP 156	Ơ 172	Ẳ 188	È 204	Ĩ 220	Ỡ 236	Ỹ 252
D	SP 141	SP 157	Ư 173	Ẵ 189	SP 205	Í 221	Ớ 237	Ý 253
E	SP 142	SP 158	SP 174	Ắ 190	Ẻ 206	Ị 222	Ợ 238	Ỵ 254
F	SP 143	SP 159	SP 175	SP 191	Ẽ 207	Ò 223	Ù 239	SP 255

4.2.22 Page 32 (PC720: Arabic)

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	ب 160	▒ 176	└ 192	╨ 208	ض 224	≡ 240
1	SP 129	ّ 145	ة 161	▒ 177	┴ 193	╤ 209	ط 225	ً 241
2	é 130	° 146	ت 162	▒ 178	┬ 194	╥ 210	ظ 226	ٌ 242
3	â 131	Ô 147	ث 163	│ 179	├ 195	╙ 211	ع 227	ٍ 243
4	SP 132	¤ 148	ج 164	┤ 180	─ 196	╘ 212	غ 228	َ 244
5	à 133	– 149	ح 165	╡ 181	┼ 197	╒ 213	ف 229	ُ 245
6	SP 134	Û 150	خ 166	╢ 182	╞ 198	╥ 214	µ 230	ِ 246
7	ç 135	Ù 151	د 167	╖ 183	╟ 199	╫ 215	ق 231	≈ 247
8	ê 136	ء 152	ذ 168	╕ 184	╚ 200	╪ 216	ك 232	° 248
9	ë 137	آ 153	ر 169	╣ 185	╔ 201	┘ 217	ل 233	• 249
A	è 138	أ 154	ز 170	║ 186	╩ 202	┌ 218	م 234	· 250
B	ï 139	ؤ 155	س 171	╗ 187	╦ 203	▉ 219	ن 235	√ 251
C	î 140	£ 156	ش 172	╝ 188	╠ 204	■ 220	ه 236	n 252
D	SP 141	إ 157	ص 173	╜ 189	═ 205	▌ 221	و 237	2 253
E	SP 142	ئ 158	« 174	╛ 190	╬ 206	▐ 222	ى 238	▮ 254
F	SP 143	ا 159	» 175	┐ 191	╧ 207	▀ 223	ي 239	SP 255

4.2.23 Page 33 (WPC775: Baltic Rim)

HEX	8	9	A	B	C	D	E	F
0	Ć 128	É 144	Ā 160	▒ 176	└ 192	ą 208	Ó 224	- 240
1	ü 129	æ 145	Ī 161	▒ 177	┴ 193	č 209	ß 225	± 241
2	é 130	Æ 146	ó 162	▒ 178	┬ 194	ę 210	Ō 226	“ 242
3	ā 131	ō 147	Ż 163	│ 179	├ 195	ė 211	Ń 227	¾ 243
4	ä 132	ö 148	ż 164	┤ 180	─ 196	į 212	õ 228	¶ 244
5	ģ 133	Ģ 149	ź 165	Ą 181	┼ 197	š 213	Õ 229	§ 245
6	å 134	¢ 150	” 166	Č 182	Ų 198	ų 214	µ 230	÷ 246
7	ć 135	Ś 151	¦ 167	Ę 183	Ū 199	ū 215	ń 231	” 247
8	ł 136	ś 152	© 168	Ė 184	╚ 200	Ž 216	Ķ 232	° 248
9	ē 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	ķ 233	• 249
A	Ŗ 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ļ 234	· 250
B	ŗ 139	ø 155	½ 171	╗ 187	╦ 203	█ 219	ļ 235	¹ 251
C	Ī 140	£ 156	¼ 172	╝ 188	╠ 204	■ 220	Ņ 236	³ 252
D	Ź 141	Ø 157	Ł 173	Į 189	═ 205	▌ 221	Ē 237	² 253
E	Ä 142	× 158	« 174	Š 190	╬ 206	▐ 222	Ņ 238	■ 254
F	Å 143	¤ 159	» 175	┐ 191	Ž 207	■ 223	’ 239	SP 255

4.2.24 Page 34 (PC855: Cylillic)

HEX	8	9	A	B	C	D	E	F
0	Ђ 128	Љ 144	а 160	▒ 176	└ 192	л 208	Я 224	- 240
1	Ћ 129	Љ 145	А 161	▒ 177	┴ 193	Л 209	р 225	ы 241
2	Ѓ 130	Њ 146	б 162	▒ 178	т 194	м 210	Р 226	Ы 242
3	Ѓ 131	Њ 147	Б 163	| 179	├ 195	М 211	с 227	з 243
4	ё 132	ћ 148	ц 164	┤ 180	— 196	н 212	С 228	З 244
5	Ё 133	Ћ 149	Ц 165	х 181	┼ 197	Н 213	т 229	ш 245
6	є 134	Ќ 150	д 166	Х 182	к 198	о 214	Т 230	Ш 246
7	Є 135	Ќ 151	Д 167	и 183	К 199	О 215	у 231	э 247
8	ѕ 136	ў 152	е 168	И 184	╚ 200	п 216	У 232	Э 248
9	Ѕ 137	Ў 153	Е 169	╣ 185	╔ 201	┘ 217	ж 233	щ 249
A	і 138	џ 154	ф 170	║ 186	╩ 202	г 218	Ж 234	Щ 250
B	І 139	Џ 155	Ф 171	╗ 187	╦ 203	▉ 219	в 235	ч 251
C	ї 140	ю 156	г 172	╝ 188	╠ 204	■ 220	В 236	Ч 252
D	Ї 141	Ю 157	Г 173	й 189	═ 205	П 221	ь 237	§ 253
E	ј 142	ъ 158	« 174	Й 190	╬ 206	Я 222	Ь 238	▮ 254
F	Ј 143	Ъ 159	» 175	┐ 191	¤ 207	■ 223	№ 239	SP 255

4.2.25 Page 35 (PC861: Icelandic)

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

4.2.26 Page 36 (PC862: Hebrew)

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

4.2.27 Page 37 (PC864: Arabic)

HEX	8	9	A	B	C	D	E	F
0	° 128	β 144	SP 160	• 176	₵ 192	ذ 208	ـ 224	ّـ 240
1	• 129	ϖ 145	– 161	١ 177	ء 193	ر 209	ف 225	ّ 241
2	• 130	ϕ 146	ﻵ 162	٢ 178	آ 194	ز 210	ق 226	ن 242
3	√ 131	± 147	£ 163	٣ 179	أ 195	س 211	ك 227	ه 243
4	▒ 132	½ 148	¤ 164	٤ 180	ؤ 196	ش 212	ل 228	ھ 244
5	─ 133	¼ 149	ﻷ 165	٥ 181	ع 197	ص 213	م 229	ى 245
6	│ 134	≈ 150	SP 166	٦ 182	ئ 198	ض 214	ن 230	ي 246
7	┼ 135	« 151	€ 167	٧ 183	ا 199	ط 215	ه 231	ﻏ 247
8	┤ 136	» 152	ﻻ 168	٨ 184	ب 200	ظ 216	و 232	ق 248
9	┬ 137	ﻸ 153	ب 169	٩ 185	ة 201	ع 217	ى 233	ﻵ 249
A	├ 138	ﻹ 154	ت 170	ف 186	ت 202	غ 218	ي 234	ﻶ 250
B	┴ 139	SP 155	ث 171	؛ 187	ث 203	ـا 219	ض 235	ل 251
C	┐ 140	SP 156	، 172	س 188	ج 204	ـ 220	ـع 236	ك 252
D	└ 141	ﻼ 157	ج 173	ش 189	ح 205	÷ 221	خ 237	ي 253
E	┘ 142	ﻼ 158	ح 174	ص 190	خ 206	× 222	غ 238	■ 254
F	┘ 143	ـ 159	خ 175	؟ 191	د 207	ع 223	م 239	SP 255

4.2.28 Page 38 (PC869: Greek)

HEX	8	9	A	B	C	D	E	F
0	SP 128	Ί 144	ΐ 160	▒ 176	└ 192	Τ 208	ζ 224	- 240
1	SP 129	Ϊ 145	Ά 161	▒ 177	┴ 193	Υ 209	η 225	± 241
2	SP 130	Ό 146	ά 162	▒ 178	┬ 194	Φ 210	θ 226	υ 242
3	SP 131	SP 147	έ 163	│ 179	├ 195	Χ 211	ι 227	φ 243
4	SP 132	SP 148	Α 164	┤ 180	─ 196	Ψ 212	κ 228	χ 244
5	SP 133	Ύ 149	Β 165	Κ 181	┼ 197	Ω 213	λ 229	§ 245
6	Ά 134	Ϋ 150	Γ 166	Λ 182	Π 198	α 214	μ 230	ψ 246
7	€ 135	© 151	Δ 167	Μ 183	Ρ 199	β 215	ν 231	΄ 247
8	• 136	Ώ 152	Ε 168	Ν 184	╚ 200	γ 216	ξ 232	° 248
9	¬ 137	² 153	Ζ 169	╣ 185	╔ 201	┘ 217	ο 233	¨ 249
A	¦ 138	³ 154	Η 170	║ 186	╩ 202	┌ 218	π 234	ω 250
B	‘ 139	ά 155	½ 171	╗ 187	╦ 203	█ 219	ρ 235	ϋ 251
C	’ 140	£ 156	Θ 172	╝ 188	╠ 204	■ 220	σ 236	ΰ 252
D	Έ 141	έ 157	Ι 173	Ξ 189	═ 205	δ 221	ς 237	ώ 253
E	– 142	ή 158	« 174	Ο 190	╬ 206	ε 222	τ 238	▮ 254
F	Ή 143	ί 159	» 175	┐ 191	Σ 207	■ 223	΄ 239	SP 255

4.2.29 Page 39 (ISO8859-2: Latin2)

HEX	8	9	A	B	C	D	E	F
0	128	144	SP 160	° 176	Ŕ 192	Đ 208	ŕ 224	đ 240
1	129	145	Ą 161	ą 177	Á 193	Ń 209	á 225	ń 241
2	130	146	˘ 162	˛ 178	Â 194	Ň 210	â 226	ň 242
3	131	147	Ł 163	ł 179	Ă 195	Ó 211	ă 227	ó 243
4	132	148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	133	149	Ľ 165	ľ 181	Ĺ 197	Ő 213	Í 229	ő 245
6	134	150	Ś 166	ś 182	Ć 198	Ö 214	ć 230	ö 246
7	135	151	§ 167	ˇ 183	Ç 199	× 215	ç 231	÷ 247
8	© 136	152	¨ 168	¸ 184	Č 200	Ř 216	č 232	ř 248
9	137	153	Š 169	š 185	É 201	Ů 217	é 233	ů 249
A	138	154	Ş 170	ş 186	Ę 202	Ú 218	ę 234	ú 250
B	139	155	Ť 171	ť 187	Ë 203	Ű 219	ë 235	ű 251
C	140	156	Ź 172	ź 188	Ě 204	Ü 220	ě 236	ü 252
D	¢ 141	157	- 173	˝ 189	Í 205	Ý 221	í 237	ý 253
E	¥ 142	158	Ž 174	ž 190	Î 206	Ţ 222	î 238	ţ 254
F	143	® 159	Ż 175	ż 191	Ď 207	ß 223	ď 239	˙ 255

4.2.30 Page 40 (ISO8859-15: Latin9)

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	SP 160	° 176	À 192	Đ 208	à 224	ð 240
1	SP 129	SP 145	¡ 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	SP 130	SP 146	¢ 162	² 178	Â 194	Ò 210	â 226	ò 242
3	SP 131	SP 147	£ 163	³ 179	Ã 195	Ó 211	ã 227	ó 243
4	SP 132	SP 148	€ 164	Ž 180	Ä 196	Ô 212	ä 228	ô 244
5	SP 133	SP 149	¥ 165	µ 181	Å 197	Õ 213	å 229	õ 245
6	SP 134	SP 150	Š 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	SP 135	SP 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
8	SP 136	SP 152	š 168	ž 184	È 200	Ø 216	è 232	ø 248
9	SP 137	SP 153	© 169	¹ 185	É 201	Ù 217	é 233	ù 249
A	SP 138	SP 154	ª 170	º 186	Ê 202	Ú 218	ê 234	ú 250
B	SP 139	SP 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
C	SP 140	SP 156	¬ 172	Œ 188	Ì 204	Ü 220	ì 236	ü 252
D	SP 141	SP 157	- 173	œ 189	Í 205	Ý 221	í 237	ý 253
E	SP 142	SP 158	® 174	Ÿ 190	Î 206	Þ 222	î 238	þ 254
F	SP 143	SP 159	¯ 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

4.2.31 Page 41 (PC1098: Farsi)

HEX	8	9	A	B	C	D	E	F
0	SP 128	ؤ 144	ح 160	▒ 176	┗ 192	ع 208	ک 224	- 240
1	SP 129	ئ 145	خ 161	▒ 177	┻ 193	ع 209	ک 225	ی 241
2	، 130	ب 146	خ 162	▒ 178	┳ 194	ع 210	گ 226	ے 242
3	؛ 131	ب 147	د 163	┃ 179	┣ 195	غ 211	گ 227	ـ 243
4	؟ 132	پ 148	ذ 164	┫ 180	─ 196	غ 212	ل 228	٥ 244
5	ً 133	پ 149	ر 165	ض 181	╋ 197	غ 213	ل 229	١ 245
6	آ 134	ت 150	ز 166	ض 182	ظ 198	غ 214	م 230	٢ 246
7	آ 135	ت 151	ژ 167	ط 183	ع 199	ف 215	م 231	٣ 247
8	آ 136	ث 152	س 168	ط 184	╚ 200	ف 216	ن 232	۴ 248
9	ا 137	ث 153	س 169	╣ 185	╔ 201	ل 217	ن 233	۵ 249
A	ا 138	ج 154	ش 170	║ 186	╩ 202	ر 218	و 234	۶ 250
B	ا 139	ج 155	ش 171	╗ 187	╦ 203	■ 219	ه 235	٧ 251
C	ء 140	چ 156	ص 172	╝ 188	╠ 204	■ 220	ه 236	٨ 252
D	أ 141	چ 157	ض 173	╜ 189	═ 205	ق 221	ه 237	٩ 253
E	أ 142	× 158	« 174	ظ 190	╬ 206	ق 222	ة 238	▮ 254
F	ؤ 143	ح 159	» 175	┐ 191	SP 207	■ 223	ی 239	SP 255

4.2.32 Page 42 (PC1118: Lithuanian)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	▒ 176	└ 192	ą 208	α 224	≡ 240
1	ü 129	æ 145	í 161	▒ 177	┴ 193	č 209	β 225	± 241
2	é 130	Æ 146	ó 162	▒ 178	┬ 194	ę 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	ė 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	┤ 180	─ 196	į 212	Σ 228	⌠ 244
5	à 133	ò 149	Ñ 165	Ą 181	┼ 197	š 213	σ 229	⌡ 245
6	å 134	û 150	ª 166	Č 182	Ų 198	ų 214	µ 230	÷ 246
7	ç 135	ù 151	º 167	Ę 183	Ū 199	ū 215	τ 231	≈ 247
8	ê 136	ÿ 152	¿ 168	Ė 184	╚ 200	ž 216	Φ 232	° 248
9	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	∙ 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	ï 139	¢ 155	½ 171	╗ 187	╦ 203	▉ 219	δ 235	√ 251
C	î 140	£ 156	¼ 172	╝ 188	╠ 204	■ 220	∞ 236	n 252
D	ì 141	¥ 157	¡ 173	Į 189	═ 205	▌ 221	φ 237	² 253
E	Ä 142	₧ 158	« 174	Š 190	╬ 206	▐ 222	ε 238	▮ 254
F	Å 143	ƒ 159	» 175	┐ 191	Ž 207	▀ 223	∩ 239	SP 255

4.2.33 Page 43 (PC1119: Lithuanian)

HEX	8	9	A	B	C	D	E	F
0	А 128	Р 144	а 160	▒ 176	└ 192	ą 208	р 224	Ё 240
1	Б 129	С 145	б 161	▒ 177	┴ 193	č 209	с 225	ё 241
2	В 130	Т 146	в 162	▒ 178	┬ 194	ę 210	т 226	≥ 242
3	Г 131	у 147	г 163	│ 179	├ 195	ė 211	у 227	≤ 243
4	Д 132	ф 148	д 164	┤ 180	─ 196	į 212	ф 228	⌠ 244
5	Е 133	Х 149	е 165	Ą 181	┼ 197	š 213	х 229	⌡ 245
6	Ж 134	Ц 150	ж 166	Č 182	Ų 198	ų 214	ц 230	÷ 246
7	З 135	Ч 151	з 167	Ę 183	Ū 199	ū 215	ч 231	≈ 247
8	И 136	Ш 152	и 168	Ė 184	╚ 200	ž 216	ш 232	° 248
9	Й 137	Щ 153	й 169	╣ 185	╔ 201	┘ 217	щ 233	∙ 249
A	К 138	Ъ 154	к 170	║ 186	╩ 202	┌ 218	ъ 234	· 250
B	Л 139	Ы 155	л 171	╗ 187	╦ 203	█ 219	ы 235	√ 251
C	М 140	Ь 156	м 172	╝ 188	╠ 204	■ 220	ь 236	n 252
D	Н 141	Э 157	н 173	Į 189	═ 205	▌ 221	э 237	2 253
E	О 142	Ю 158	о 174	Š 190	╬ 206	▐ 222	ю 238	■ 254
F	П 143	Я 159	п 175	┐ 191	Ž 207	■ 223	я 239	SP 255

4.2.34 Page 44 (PC1125: Ukrainian)

HEX	8	9	A	B	C	D	E	F
0	А 128	Р 144	а 160	▒ 176	└ 192	╨ 208	р 224	Ё 240
1	Б 129	С 145	б 161	▓ 177	┴ 193	╤ 209	с 225	ё 241
2	В 130	Т 146	в 162	▒ 178	┬ 194	╥ 210	т 226	Ґ 242
3	Г 131	У 147	г 163	│ 179	├ 195	╙ 211	у 227	ґ 243
4	Д 132	Ф 148	д 164	┤ 180	─ 196	╘ 212	ф 228	Є 244
5	Е 133	Х 149	е 165	╡ 181	┼ 197	╒ 213	х 229	є 245
6	Ж 134	Ц 150	ж 166	╢ 182	╞ 198	╓ 214	ц 230	І 246
7	З 135	Ч 151	з 167	╖ 183	╟ 199	╫ 215	ч 231	і 247
8	И 136	Ш 152	и 168	╕ 184	╚ 200	╪ 216	ш 232	Ї 248
9	Й 137	Щ 153	й 169	╣ 185	╔ 201	┘ 217	щ 233	ї 249
A	К 138	Ъ 154	к 170	║ 186	╩ 202	┌ 218	ъ 234	÷ 250
B	Л 139	Ы 155	л 171	╗ 187	╦ 203	█ 219	ы 235	± 251
C	М 140	Ь 156	м 172	╝ 188	╠ 204	▄ 220	ь 236	№ 252
D	Н 141	Э 157	н 173	╜ 189	═ 205	▌ 221	э 237	¤ 253
E	О 142	Ю 158	о 174	╛ 190	╬ 206	▐ 222	ю 238	■ 254
F	П 143	Я 159	п 175	┐ 191	╧ 207	▀ 223	я 239	SP 255

4.2.35 Page 45 (WPC1250: Latin 2)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	Ŕ 192	Đ 208	ŕ 224	đ 240
1	SP 129	‘ 145	ˇ 161	± 177	Á 193	Ń 209	á 225	ń 241
2	’ 130	’ 146	˘ 162	˛ 178	Â 194	Ň 210	â 226	ň 242
3	SP 131	“ 147	Ł 163	ł 179	Ă 195	Ó 211	ă 227	ó 243
4	” 132	” 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	… 133	• 149	Ą 165	µ 181	Ĺ 197	Ő 213	Í 229	ő 245
6	† 134	– 150	¦ 166	¶ 182	Ć 198	Ö 214	ć 230	ö 246
7	‡ 135	— 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
8	SP 136	SP 152	¨ 168	¸ 184	Č 200	Ř 216	č 232	ř 248
9	‰ 137	™ 153	© 169	ą 185	É 201	Ů 217	é 233	ů 249
A	Š 138	š 154	Ş 170	ş 186	Ę 202	Ú 218	ę 234	ú 250
B	‹ 139	› 155	« 171	» 187	Ë 203	Ű 219	ë 235	ű 251
C	Ś 140	ś 156	¬ 172	Ľ 188	Ě 204	Ü 220	ě 236	ü 252
D	Ť 141	ť 157	- 173	˝ 189	Í 205	Ý 221	í 237	ý 253
E	Ž 142	ž 158	® 174	ľ 190	Î 206	Ţ 222	î 238	ţ 254
F	Ź 143	ź 159	Ż 175	ż 191	Ď 207	ß 223	ď 239	˙ 255

4.2.36 Page 46 (WPC1251: Cyrillic)

HEX	8	9	A	B	C	D	E	F
0	Ђ 128	ђ 144	SP 160	° 176	А 192	Р 208	а 224	р 240
1	Ѓ 129	‘ 145	ў 161	± 177	Б 193	С 209	б 225	с 241
2	’ 130	’ 146	Ў 162	І 178	В 194	Т 210	в 226	т 242
3	ѓ 131	“ 147	Ј 163	і 179	Г 195	У 211	г 227	у 243
4	” 132	” 148	¤ 164	ґ 180	Д 196	Ф 212	д 228	ф 244
5	… 133	• 149	Ґ 165	µ 181	Е 197	Х 213	е 229	х 245
6	† 134	– 150	¦ 166	¶ 182	Ж 198	Ц 214	ж 230	ц 246
7	‡ 135	— 151	§ 167	· 183	З 199	Ч 215	з 231	ч 247
8	€ 136	SP 152	Ё 168	ё 184	И 200	Ш 216	и 232	ш 248
9	‰ 137	™ 153	© 169	№ 185	Й 201	Щ 217	й 233	щ 249
A	Љ 138	љ 154	Є 170	є 186	К 202	Ъ 218	к 234	ъ 250
B	‹ 139	› 155	« 171	» 187	Л 203	Ы 219	л 235	ы 251
C	Њ 140	њ 156	¬ 172	ј 188	М 204	Ь 220	м 236	ь 252
D	Ќ 141	ќ 157	- 173	Ѕ 189	Н 205	Э 221	н 237	э 253
E	Ћ 142	ћ 158	® 174	ѕ 190	О 206	Ю 222	о 238	ю 254
F	Џ 143	џ 159	Ї 175	ї 191	П 207	Я 223	п 239	я 255

4.2.37 Page 47 (WPC1253: Greek)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	ΐ 192	Π 208	ΰ 224	π 240
1	SP 129	‘ 145	΅ 161	± 177	Α 193	Ρ 209	α 225	ρ 241
2	’ 130	’ 146	Ά 162	² 178	Β 194	SP 210	β 226	ς 242
3	ƒ 131	“ 147	£ 163	³ 179	Γ 195	Σ 211	γ 227	σ 243
4	„ 132	” 148	¤ 164	΄ 180	Δ 196	Τ 212	δ 228	τ 244
5	… 133	• 149	¥ 165	µ 181	Ε 197	Υ 213	ε 229	υ 245
6	† 134	– 150	¦ 166	¶ 182	Ζ 198	Φ 214	ζ 230	φ 246
7	‡ 135	— 151	§ 167	· 183	Η 199	Χ 215	η 231	χ 247
8	SP 136	SP 152	¨ 168	Έ 184	Θ 200	Ψ 216	θ 232	ψ 248
9	‰ 137	™ 153	© 169	Ή 185	Ι 201	Ω 217	ι 233	ω 249
A	SP 138	SP 154	ª 170	Ί 186	Κ 202	Ϊ 218	κ 234	ϊ 250
B	‹ 139	› 155	« 171	» 187	Λ 203	Ϋ 219	λ 235	ü 251
C	SP 140	SP 156	¬ 172	Ό 188	Μ 204	ά 220	μ 236	ό 252
D	SP 141	SP 157	- 173	½ 189	Ν 205	έ 221	ν 237	ύ 253
E	SP 142	SP 158	® 174	Ύ 190	Ξ 206	ή 222	ξ 238	ώ 254
F	SP 143	SP 159	― 175	Ώ 191	Ο 207	ί 223	ο 239	SP 255

4.2.38 Page 48 (WPC1254: Turkish)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	À 192	Ğ 208	à 224	ğ 240
1	SP 129	‘ 145	¡ 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	‚ 130	’ 146	¢ 162	² 178	Â 194	Ò 210	â 226	ò 242
3	ƒ 131	“ 147	£ 163	³ 179	Ã 195	Ó 211	ã 227	ó 243
4	„ 132	” 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	… 133	• 149	¥ 165	µ 181	Å 197	Õ 213	å 229	õ 245
6	† 134	– 150	¦ 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	‡ 135	— 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
8	ˆ 136	˜ 152	¨ 168	¸ 184	È 200	Ø 216	è 232	ø 248
9	‰ 137	™ 153	© 169	¹ 185	É 201	Ù 217	é 233	ù 249
A	Š 138	š 154	ª 170	º 186	Ê 202	Ú 218	ê 234	ú 250
B	‹ 139	› 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
C	Œ 140	œ 156	¬ 172	¼ 188	Ì 204	Ü 220	ì 236	ü 252
D	SP 141	SP 157	173	½ 189	Í 205	İ 221	í 237	ı 253
E	SP 142	SP 158	® 174	¾ 190	Î 206	Ş 222	î 238	ş 254
F	SP 143	Ÿ 159	¯ 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

4.2.39 Page 49 (WPC1255: Hebrew)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	ְ 192	׀ 208	א 224	ן 240
1	SP 129	‘ 145	¡ 161	± 177	ֱ 193	ׁ 209	ב 225	ס 241
2	‚ 130	’ 146	¢ 162	² 178	ֲ 194	ׂ 210	ג 226	ע 242
3	ƒ 131	“ 147	£ 163	³ 179	ֳ 195	׃ 211	ד 227	ף 243
4	„ 132	” 148	₪ 164	´ 180	ִ 196	ׄ 212	ה 228	פ 244
5	… 133	• 149	¥ 165	µ 181	ֵ 197	ׅ 213	ו 229	ץ 245
6	† 134	– 150	¦ 166	¶ 182	ֶ 198	׆ 214	ז 230	צ 246
7	‡ 135	— 151	§ 167	· 183	ַ 199	ׇ 215	ח 231	ק 247
8	ˆ 136	˜ 152	¨ 168	¸ 184	ָ 200	״ 216	ט 232	ר 248
9	‰ 137	™ 153	© 169	¹ 185	ֹ 201	SP 217	י 233	ש 249
A	SP 138	SP 154	× 170	÷ 186	SP 202	SP 218	ך 234	ת 250
B	‹ 139	› 155	« 171	» 187	ֻ 203	SP 219	כ 235	SP 251
C	SP 140	SP 156	¬ 172	¼ 188	ּ 204	SP 220	ל 236	SP 252
D	SP 141	SP 157	173	½ 189	ֽ 205	SP 221	ם 237	SP 253
E	SP 142	SP 158	® 174	¾ 190	־ 206	SP 222	מ 238	SP 254
F	SP 143	SP 159	¯ 175	¿ 191	ֿ 207	SP 223	ן 239	SP 255

4.2.40 Page 50 (WPC1256: Arabic)

HEX	8	9	A	B	C	D	E	F
0	€ 128	ک 144	SP 160	° 176	ـ 192	ذ 208	à 224	ً 240
1	پ 129	‘ 145	، 161	± 177	ء 193	ر 209	ل 225	ٌ 241
2	‚ 130	’ 146	¢ 162	² 178	آ 194	ز 210	â 226	ٍ 242
3	ƒ 131	“ 147	£ 163	³ 179	أ 195	س 211	م 227	َ 243
4	„ 132	” 148	¤ 164	´ 180	ؤ 196	ش 212	ن 228	Ô 244
5	… 133	• 149	¥ 165	µ 181	ﻹ 197	ص 213	ه 229	ُ 245
6	† 134	– 150	¦ 166	¶ 182	ئ 198	ض 214	و 230	ّ 246
7	‡ 135	— 151	§ 167	· 183	ا 199	× 215	ç 231	÷ 247
8	ˆ 136	ک 152	¨ 168	¸ 184	ب 200	ط 216	è 232	ّ 248
9	‰ 137	™ 153	© 169	¹ 185	ة 201	ظ 217	é 233	ù 249
A	ٹ 138	ڑ 154	ھ 170	؛ 186	ت 202	ع 218	ê 234	° 250
B	‹ 139	› 155	« 171	» 187	ث 203	غ 219	ë 235	û 251
C	Œ 140	ۃ 156	¬ 172	¼ 188	ج 204	ـ 220	ى 236	ü 252
D	ۓ 141	SP 157	173	½ 189	ح 205	ف 221	ي 237	SP 253
E	ژ 142	SP 158	® 174	¾ 190	خ 206	ق 222	î 238	SP 254
F	ڈ 143	ں 159	¯ 175	؟ 191	د 207	ك 223	ï 239	ے 255

4.2.41 Page 51 (WPC1257: Baltic Rim)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	Ą 192	Š 208	ą 224	š 240
1	SP 129	‘ 145	SP 161	± 177	Į 193	Ń 209	į 225	ń 241
2	‚ 130	’ 146	¢ 162	² 178	Ā 194	Ņ 210	ā 226	ņ 242
3	SP 131	“ 147	£ 163	³ 179	Ć 195	Ó 211	ć 227	ó 243
4	„ 132	” 148	¤ 164	´ 180	Ä 196	Ō 212	ä 228	ō 244
5	… 133	• 149	SP 165	µ 181	Å 197	Õ 213	å 229	õ 245
6	† 134	– 150	¦ 166	¶ 182	Ę 198	Ö 214	ę 230	ö 246
7	‡ 135	— 151	§ 167	· 183	Ē 199	× 215	ē 231	÷ 247
8	SP 136	SP 152	Ø 168	ø 184	Č 200	Ų 216	č 232	ų 248
9	‰ 137	™ 153	© 169	¹ 185	É 201	Ł 217	é 233	ł 249
A	SP 138	SP 154	Ŗ 170	ŗ 186	Ź 202	Ś 218	ź 234	ś 250
B	‹ 139	› 155	« 171	» 187	Ė 203	Ū 219	ė 235	ū 251
C	SP 140	SP 156	¬ 172	¼ 188	Ģ 204	Ü 220	ģ 236	ü 252
D	¨ 141	¯ 157	- 173	½ 189	Ķ 205	Ż 221	ķ 237	ż 253
E	ˇ 142	‘ 158	® 174	¾ 190	Ī 206	Ž 222	ī 238	ž 254
F	¸ 143	SP 159	Æ 175	æ 191	Ļ 207	ß 223	ļ 239	˙ 255

4.2.42 Page 52 (WPC1258: Vietnamese)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	À 192	Đ 208	à 224	đ 240
1	SP 129	‘ 145	¡ 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	‚ 130	’ 146	¢ 162	² 178	Â 194	̉ 210	â 226	· 242
3	ƒ 131	“ 147	£ 163	³ 179	Ă 195	Ó 211	ă 227	ó 243
4	„ 132	” 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	… 133	• 149	¥ 165	µ 181	Å 197	Ơ 213	å 229	ơ 245
6	† 134	– 150	¦ 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	‡ 135	— 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
8	ˆ 136	˜ 152	¨ 168	̧ 184	È 200	Ø 216	è 232	ø 248
9	‰ 137	™ 153	© 169	¹ 185	É 201	Ù 217	é 233	ù 249
A	SP 138	SP 154	a 170	º 186	Ê 202	Ú 218	ê 234	ú 250
B	‹ 139	› 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
C	Œ 140	œ 156	¬ 172	¼ 188	̀ 204	Ü 220	́ 236	ü 252
D	SP 141	SP 157	173	½ 189	Í 205	Ư 221	í 237	ư 253
E	SP 142	SP 158	® 174	¾ 190	Î 206	̃ 222	î 238	đ 254
F	SP 143	Ÿ 159	¯ 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

4.2.43 Page 53 (KZ1048: Kazakhstan)

HEX	8	9	A	B	C	D	E	F
0	Ђ 128	ђ 144	SP 160	° 176	А 192	Р 208	а 224	р 240
1	Ѓ 129	‘ 145	¥ 161	± 177	Б 193	С 209	б 225	с 241
2	’ 130	’ 146	¥ 162	І 178	В 194	Т 210	в 226	т 242
3	Ѓ 131	“ 147	∂ 163	і 179	Г 195	У 211	г 227	у 243
4	” 132	” 148	¤ 164	ө 180	Д 196	Ф 212	д 228	ф 244
5	… 133	• 149	Ө 165	µ 181	Е 197	Х 213	е 229	х 245
6	† 134	– 150	¦ 166	¶ 182	Ж 198	Ц 214	ж 230	ц 246
7	‡ 135	— 151	§ 167	· 183	З 199	Ч 215	з 231	ч 247
8	€ 136	SP 152	Ё 168	ё 184	И 200	Ш 216	и 232	ш 248
9	‰ 137	™ 153	© 169	№ 185	Й 201	Щ 217	й 233	щ 249
A	Љ 138	љ 154	Ғ 170	ғ 186	К 202	Ъ 218	к 234	ъ 250
B	‹ 139	› 155	« 171	» 187	Л 203	Ы 219	л 235	ы 251
C	Њ 140	њ 156	¬ 172	ə 188	М 204	Ь 220	м 236	ь 252
D	Қ 141	қ 157	- 173	Ң 189	Н 205	Э 221	н 237	э 253
E	Һ 142	һ 158	® 174	ң 190	О 206	Ю 222	о 238	ю 254
F	Ұ 143	ұ 159	Ү 175	ү 191	П 207	Я 223	п 239	я 255

4.2.44 Page 255 (User-defined page)

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

4.2.45 International character sets

Country	ASCII codes (Hex)													
	23	24	25	2A	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	₧	$	%	*	@	¡	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	#	$	%	*	@	[	₩	]	^	`	{	|	}	~
Slovenia/Croatia	#	$	%	*	Ž	Š	Đ	Ć	Č	ž	š	đ	ć	č
China	#	¥	%	*	@	[	\	]	^	`	{	|	}	~
Vietnam	₫	$	%	*	@	[	\	]	^	`	{	|	}	~
Arabia	#	$	٪	*	@	[	\	]	^	`	{	|	}	~

4.3 Buttons

4.3.1 Buttons

1) Paper FEED button

Type: Non-locking push button

Functions:
- When the BM (black mark) sensor is disabled, the printer feeds paper one line, based on the line spacing set by **ESC 2** and **ESC 3**. When the BM sensor is enabled, the printer will feed paper by mark paper unit.

  Paper feeding using the paper FEED button cannot be performed under the following conditions:

  (1) The panel buttons are disabled by **ESC c 5**.
  (2) The roll paper end sensor detects a paper end.
  (3) When the platen cover is open.
- During self-test printing, you can stop the self-test temporarily by pressing this button and restart it by pressing the button again.

NOTE: The **ESC c 5** command enables or disables the panel buttons. When disabled, none of the buttons will function.

2) Paper Exchange button (BACK FEED)

Type: Non-locking push button

Functions:
- When the BACK FEED button is pressed while the PAPER FEED button is pressed, the paper is fed into the backward direction.

  This button makes paper exchange easy when the paper is still remaining in the paper module.

4.3.2 DIP switches

DIP switche is mounted on the EU-T482 as shown in Figure 4.3.1.

Figure 4.3.1 DIP Switch (DSW1) Layout

4.3.2.1 DIP switch

Table 4.3.1 DIP SW1 (DSW1)

SW no.	Function	ON	OFF	Factory setting	Remarks
1	Reserved	—	—	On	Fixed to On
2	Reserved	—	—	Off	Fixed to Off
3	Serial interface baud rate selection	See Table 4.3.2.		Off	Effective with the serial interface type only. Reserved (fixed to Off) with other interface types.
4				Off	
5	DSR reset	Enabled	Disabled	Off	Effective with the serial interface type only. Reserved (fixed to Off) with other interface types.
6	Factory setting	—	—	Off	Fixed to Off
7	Setting of BM sensor	Enabled	Disabled	Off	
8	Selection of interface class	Printer class	Vendor class	Off	Effective with the USB interface type only. Reserved (fixed to Off) with other interface types.

Table 4.3.2 Selection of Transmission Speed

Transmission speed [bps]	Switch number	
	3	4
(*1)	On	On
9600	Off	On
19200	On	Off
38400	Off	Off

[bps: bits per second]

NOTES:
1. The default value of the factory setting of the transmission speed is 38400 bps.
2. (*1) The transmission speed depends on the transmission condition settings of the serial interface. 2400, 4800, 9600, 19200, 38400, 57600, and 115200 are available as setting values. The default value is 19200 bps when DIP switches 3 and 4 are set to on.
3. See Appendix A.5 Procedures for Changing Set Customized Values (Memory Switches) for changing settings of transmission conditions for the serial interface.
4. Values of the transmission conditions for the serial interface are only enabled if DIP switches 3 and 4 are on. For other settings, the values set to DIP switch 1 are enabled.

NOTE: Changes in DIP switch settings are recognized only when the printer power is turned on or when the printer is reset through the interface, and any changes made after that do not take effect until the printer is turned on again or is reset.

4.3.3 Transmission conditions for customized values, memory switches and serial interface

4.3.3.1 Types of customized values

See Appendix A.5 for setting customized values.

Table 4.3.3 Types of Customized Values

Function	Available set value	Customized value	Factory setting
Print density	16 levels	5	7
Print speed	10 levels	6	10
Default of the character code table	30 pages	8	PC437 USA Standard Europe
Default of international characters	16 types	9	America
BM length	Disabled, 6 mm to 20 mm	116	Disabled
BM interval	Disabled, 20 mm to 400 mm	117	Disabled
Sleep transition pattern	4 patterns	120	Pattern 2
LED lighting setting	3 patterns	121	Pattern 2
Sleep transition time setting (IDLE0 => IDLE1)	Disabled, 10 sec. to 3,600 sec.	122	10 seconds
Sleep transition time setting (IDLE0 => IDLE2)	Disabled, 10 sec. to 3,600 sec.	123	300 seconds
Sleep transition time setting (IDLE0 => IDLE3)	Disabled, 10 sec. to 21,600 sec.	124	1800 seconds
Sleep transition time setting (IDLE0 => GoFF)	Disabled, 120 sec. to 86,400 sec.	125	14400 seconds
Media type setting	4 types	126	Normal paper

4.3.3.2 Types of memory switches

See Appendix A.5 for memory switch settings.

Table 4.3.4 Memory Switch 1

SW no.	Function	ON (Set to “1”)	OFF (Set to “0”)	Factory setting
1	Reserved	—	Fixed to Off (0)	—
2	Reserved	—	Fixed to Off	Off (0)
3	BUSY condition	Receive buffer full	Receive buffer full or offline	Off (0)
4	Receive error	Ignored	Prints ‘?’	Off (0) *1
5	Auto line feed	Always enabled	Always disabled	Off (0) *2
6	Reserved	—	Fixed to Off	Off (0)
7	Reserved	—	Fixed to Off	Off (0)
8	Reserved	—	Fixed to Off	Off (0)

*1: Effective only with the serial interface model.

*2: Effective only with the parallel interface model.

Table 4.3.5 Memory Switch 2, 3, and 4

SW no.	Function	ON (Set to “1”)	OFF (Set to “0”)	Factory setting
1	Reserved	—	Fixed to Off	Off (0)
2	Reserved	—	Fixed to Off	Off (0)
3	Reserved	—	Fixed to Off	Off (0)
4	Reserved	—	Fixed to Off	Off (0)
5	Reserved	—	Fixed to Off	Off (0)
6	Reserved	—	Fixed to Off	Off (0)
7	Reserved	—	Fixed to Off	Off (0)
8	Reserved	—	Fixed to Off	Off (0)

Table 4.3.6 Memory Switch 5

SW no.	Function	ON (Set to “1”)	OFF (Set to “0”)	Factory setting	Remarks
1	Reserved	—	Fixed to Off	Off (0)	
2	Reserved	—	Fixed to Off	Off (0)	
3	Reserved	—	Fixed to Off	Off (0)	
4	Setting of a paper jam detection	Disabled	Enabled	Off (0)	
5	Reserved	—	Fixed to Off (0)	—	
6	Setting of the USB power saving functions	Disabled	Enabled	Off (0)	Effective only with the USB interface model.
7	Paper exit LED output	Disabled	Disabled	Off (0)	
8	Reserved	—	Fixed to Off (0)		

Table 4.3.7 Memory Switch 6

SW no.	Function	ON (Set to “1”)	OFF (Set to “0”)	Factory setting	Remarks
1	Selection of paper loading operation	See Table 4.3.10.		Off (0)	
2	Output of error signal	Disabled	Enabled	Off (0)	(*1)
3	Print speed control	Speed has priority over power consumption.	Power consumption has priority over print speed.	Off (0)	(*2)
4	Auto eject when a paper out is detected	Disabled	Enabled	Off (0)	(*3)
5	Reserved	—	Fixed to Off	Off (0)	
6	Reserved	—	Fixed to Off	Off (0)	
7	Selection of the paper near-end detection	By the black mark sensor	By the paper near-end sensor	Off (0)	(*4)
8	Selection of the operation by **GS FF**	Disabled	Enabled	Off (0)	

Table 4.3.8 Memory Switch 7

SW no.	Function	ON (Set to "1")	OFF (Set to "0")	Factory setting	Remarks
1	Reserved	—	Fixed to Off	Off (0)	
2	Secondary paper near-end setting	See Table 4.3.11		Off (0)	(*5)
3				Off (0)	
4	Operation after cutting	Ejects fully	Clamps	Off (0)	See note below.
5	Paper initializing operation at power on	Always cuts	Detects paper's tip	Off (0)	
6	Affix/Peel-off operation	Enabled	Disabled	Off (0)	
7	Serial DSR Software reset	Enabled	Disabled	On (1)	
8	Reserved	—	Fixed to Off	Off (0)	

NOTE: This function is enabled only when the presenter module is installed.

Table 4.3.9 Memory Switch 8

SW no.	Function	ON (Set to "1")	OFF (Set to "0")	Factory setting	Remarks
1	Default print control mode	See Table 4.3.12.		Off (0)	(*6)
2	Reserved	—	Fixed to Off	Off (0)	
3	Backward paper feeding	Enabled	Disabled	Off (0)	(*7)
4	Autocutter installation	Not installed	Installed	Off (0)	
5	Specific offline operation	Discards receive data.	Keeps receive data.	Off (0)	(*8)
6	Reserved	—	Fixed to Off	Off (0)	
7	Test print when the paper is loaded	Enabled	Disabled	Off (0)	
8	Initialization for black mark position when the power is turned on	Does not initialize	Initializes	Off (0)	

Table 4.3.10 Selection of Paper Loading Operations

	ON	OFF
Operations after closing the open platen (If presenter module is attached)	Feeds the paper for approximately 60 mm, and then cuts it.	Detects paper's tip (Does not cut the paper)
Operations after closing the open platen (If there is no presenter module)	Feeds the paper for approximately 125 mm, and then cuts it.	Does not feed or cut the paper.
Operations in semi-auto loading (If presenter module is attached)	Cuts the paper after loading (Settings are not affected)	
Operations in semi-auto loading (If there is no presenter module)	Cuts the paper after loading	Does not cut the paper.

Table 4.3.11 Setting for Secondary Paper Near-end

Paper length from primary to secondary near-end detection	Memory SW	
	2	3
Approximately 5 m {16.40'}	Off	Off
Approximately 10 m {32.81'}	On	Off
Approximately 20 m {65.62'}	Off	On
Approximately 30 m {98.43'}	On	On

Table 4.3.12 Selection of Print Control Mode

Default print control mode	Switch number
	1
Non-divided energization mode	Off
Two-part energization mode	On

*1: Some host PCs with a parallel interface may not be able to transmit the data to the printer even though the printer does not transmit the BUSY signal if the parallel interface error signal output is On while the printer is in the error status, depending on the operating system's types..

*2: This setting is used for selecting the following modes:

- Power consumption has priority over print speed:
  In this mode, the printer operates with power consumption as low as possible.
- Print speed has priority over power consumption:
  In this mode, the printer prints at the maximum speed.

If the printer power is supplied with a power source that is less than 100 W, do not turn on the print speed mode.

*3: This setting specifies the printer's operation when a paper out is detected during printing and feeding.

- Enabled: Ejects paper automatically.
- Disabled: Does not eject paper (Waits with the paper jammed on the platen roller.)

*4: Table 4.3.13 shows settings for detection of a paper near-end and black marks.

Table 4.3.13

Selection of black mark control and near-end detection	Switch number	
	DIP SW1-7	Memory SW6-7
Black mark control: Enabled Near-end detection: Black mark sensor	On	On
Black mark control: Disabled Near-end detection: Black mark sensor	Off	On
Black mark control: Enabled Near-end detection: Near-end sensor	On	Off
Black mark control: Disabled Near-end detection: Near-end sensor	Off	Off

*5: Effective only for the model type with the roll paper supply module.

- This setting lets the printer tell the paper near-end by sending the secondary paper near-end status when the specified length of paper is fed after the paper near-end sensor detects the paper near-end.

*6: Default print control mode

Constantly in non-divided energization mode if other than media type 4

*7: If backward paper feeding is enabled, the following functions are added:. (See the product specification manual of each printer mechanism for details.)

- After cutting the paper with a **GS V** command, performs backward paper feeding. (When BM sensor is disabled)
- The print starting position adjustment with the **GS (F** command can be set to the backward direction relative to the cutting position.

In this case, the maximum of the correction value to backward is 88STEP.

*8: (a) Specific offline means the following states:

- When not automatically recoverable error has occurred
- Platen open
- Presenter open
- Paper out

If this switch is turned on, the printer clears the receive buffer when the offline status shown above occurs. Then the printer executes any real-time command (**DLE ENQ**, **DLE EOT**, **DLE DC4**) if it is there, and discards all other data.

(b) Take considerations in the following points, if this switch is On:

- If the bit image data that includes the same data strings with the recoverable error (**DLE ENQ *n***), is transmitted when a possibly-recoverable error occurs, the printer recovers from the error state. In this case, the printer may print the succeeding bit image data as the character data since the printer release to ignore data after recovering from the error state.
- Since the printer ignores all data other than the real-time commands, when the printer is in the specific offline operation, the request to send command (such as **GS I**) is not also processed. Therefore, user must consider it in programming the application software.

(c) When the receive buffer is cleared, if this switch is turned on, three bytes of data – 37H, 24H, and 00H – are transmitted.

4.3.3.3 Transmission Condition of the Serial Interface

See Appendix A.5 for settings of transmission conditions for the serial interface.

Table 4.3.14 Transmission Condition of the Serial Interface

Function	Available set value	**Factory setting**
Transmission speed:	2400 bps/4800 bps/9600 bps/ 19200 bps/38400 bps/57600 bps/ 115200 bps	19200 bps
Parity Settings	None/even/odd	None
Flow control	DTR/DSR or CTS/RTS/ XON/XOFF	DTR/DSR or CTS/RTS

Note: Set DIP switches 1-3 and 1-4 to on beforehand if setting transmission conditions for the serial interface by other than DIP switches.

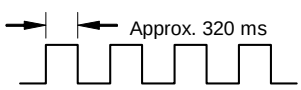
4.4 LED Indicators

4.4.1 LED

1) Power (POWER) LED: Green
   - On: Power is stable.
   - Off: Power is not stable.

2) Roll paper end (PAPER OUT) LED: Red
   - On: The roll paper end or near-end is detected.
   - Off: Paper is loaded (normal condition)
   - Flashing: Self-test standby state (See Section 4.5.)

Table 4.4.1 Standby State Indication

Status	PAPER OUT LED flashing pattern	Recovery conditions
Waiting for self-test printing to be continued.	PAPER OUT LED 	Pressing the FEED button causes self-test printing to be continued.

3) Error (ERROR) LED: Red
   - On: Offline (except during paper feeding using the FEED button, during self-test printing, when a paper jam has occurred, and in an error state) See Section 3.4, Switching between online and offline.
   - Off: Normal condition
   - Flashing: Error (See Section 4.7, Error Processing.)

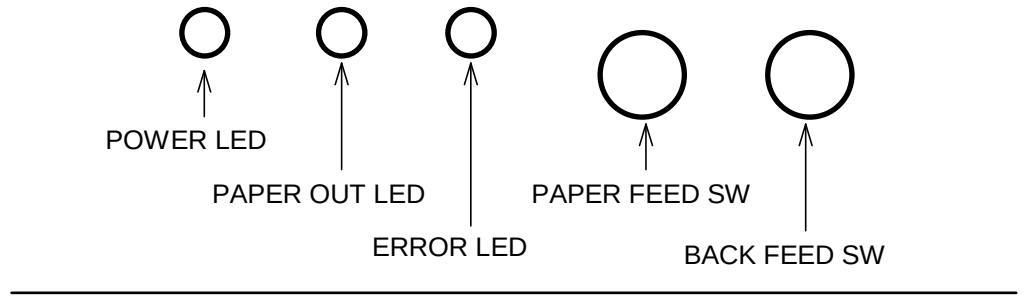


Figure 4.4.1 Panel Buttons and LED Indicators

4.5 Self-test

1) The printer has a self-test function that checks the following:
   - Control circuit functions
   - Status of the printer mechanism which is connected to the EU-T482
   - Print quality
   - Interface type and its operating condition
   - Control software version
   - DIP switch settings
   - Memory switch settings

2) Starting a self-test

   To start a self-test on the roll paper, and hold down the FEED button while turning on the printer with the platen closed, then the current printer status (*1) is printed.

   (*1) • Control software version
   - Type of the interface selected, and the communication conditions
   - DIP switch settings
   - Memory switch settings

   Rolling pattern printing standby state

   After printing the current printer status, the printer prints the message "SELF-TEST printing. Please press FEED button." The PAPER OUT LED indicator flashes and the printer enters the rolling pattern printing (*2) standby state. Press the FEED button to start rolling pattern printing.

   (*2) • A rolling pattern uses only the built-in character set

3) Ending the self-test and operation after the test

   After a number of lines are printed, the printer indicates the end of the self-test by printing "*** completed ***," initializes, and goes into the standard mode. (See Section 4.10, Page Mode.)

4.6 Hexadecimal Dumping

1) Hexadecimal dumping function

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

2) Running hexadecimal dumping

1. Start hexadecimal dumping by executing any of the following:
   a. Open the platen and turn the power on while pressing the FEED button, and then close the platen.
   b. Execute the **GS (A** command.
2. The printer first prints "Hexadecimal Dump" on the roll paper and prints the received print data in hexadecimal numbers and in its corresponding characters.
3. After printing has finished, hexadecimal dumping ends by executing any of the following:
   a. Turn the printer off.
   b. Reset the printer.
   c. Press the FEED button three times.

NOTES: 1. If no characters correspond to the data received, the printer prints "."

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

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

<Printing example>

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

1B 21 00 1B 26 02 40 40 1B 69          . ! . . & . @@ . i
1B 25 01 1B 63 34 00 1B 30 31          . % . . c 4 . . 0 1
41 42 43 44 45 46 47 48 49 4A          A B C D E F G H I J

                          *** completed ***
```

4.7 Error Processing

4.7.1 Error types

1) Errors that automatically recover

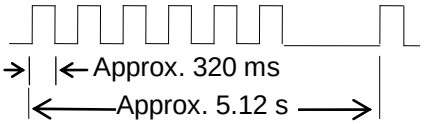
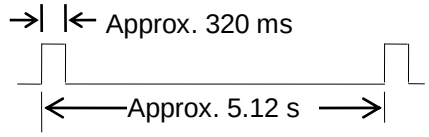
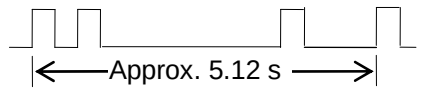
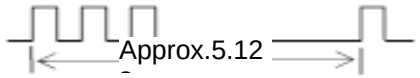
Table 4.7.1 Errors That Automatically Recover

Error	Description	ERROR LED flashing pattern	Recovery
Print head temperature error	The temperature of the print head is 75°C {167°F} or higher.		Recovers automatically when the print head drops to 70°C {158°F} or lower.

NOTE: Print head temperature error is not an abnormality.

2) Recoverable errors

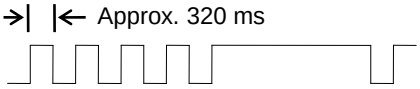
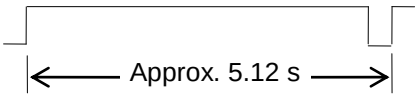
Table 4.7.2 Recoverable Errors

Error	Description	ERROR LED flashing pattern	Recovery
Platen open error	Printing is not performed due to a platen open.		Recovers by **DLE ENQ 1** or **DLE ENQ 2** or **DLE DC4 8** when the platen is loaded to the head.
Autocutter error	The autocutter does not work correctly.		Recovers by **DLE ENQ 1** or **DLE ENQ 2** or **DLE DC4 8** when the jammed paper is removed if occurred.
BM sensor detection error	No black mark is detected even though the roll paper is marked correctly.		Recovers by **DLE ENQ 1** or **DLE ENQ 2** or **DLE DC4 8** when the paper with BM is inserted correctly again.
Presenter error	Paper jam is detected within presenter		Recovers by **DLE ENQ 1** or **DLE ENQ 2** or **DLE DC4 8** when the jammed paper is removed from within the presenter.

NOTE: If the paper jams, turn the printer off and remove jammed paper; then turn the printer on again.

3) Unrecoverable errors

Table 4.7.3 Unrecoverable Errors

Error	Description	ERROR LED flashing pattern	Recovery
CPU execution error	The CPU executes an incorrect address or the I/F board is not connected.		Impossible to recover.
R/W error in memory or gate array	An error is detected when the Read/Write check is executed.		Impossible to recover.
High voltage error	The power supply voltage is extremely high.		Impossible to recover.
Low voltage error	The power supply voltage is extremely low.		Impossible to recover.
PCB connection error	The printer is not connected or the internal wiring is not connected correctly.		Impossible to recover.

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

4.7.2 Printer operation when an error occurs

The printer executes the following operations when detecting an error.

- Stops all printer operations for the selected paper section.
- Goes BUSY (When memory switch 1-3 is set to off to go BUSY during printer offline.).
- Flashes the ERROR LED.

Reference: 4.3.3.2 Memory switch

4.8 Paper Sensors

The printer has the following three paper sensors:

1) Roll paper end sensor: Detects whether paper is present or not. When the sensor detects a paper-end, the printer stops printing.

2) Roll paper near-end sensor: Detects a near-end of a roll of paper. When the roll paper diameter becomes sufficiently small, the sensor detects a near-end of roll paper and the PAPER OUT LED lights. If the sensor is enabled by **ESC c 4**, the printer stops printing.

3) Paper jam sensor: Stops printing when a paper jam occurs.

NOTES: 1. After loading a new roll of paper, close the platen; then the printer resumes printing.
2. The roll paper near-end sensor is supposed to be provided by the user.
3. Be sure to open the platen to remove the jammed paper.

4.9 Platen Open Sensor

Monitors the open/close status of the platen cover that covers the paper feeding rubber rollers. When the sensor detects a platen open, the printer goes offline and printing stops. The printer recovers when the platen is closed.

4.10 Page Mode

4.10.1 General description

The printer operates in two print modes: standard mode and page mode. In standard mode, the printer prints and feeds paper each time it receives print data or paper feed commands. In page mode, all the received print data and paper feed commands are processed in the specified memory, and the printer executes no operations. All the data in the memory is then printed collectively when an **ESC FF** or **FF** command is received.

For example, when the printer receives the data "ABCDEF" in standard mode, it prints "ABCDEF" and feeds the paper by one line. In page mode, "ABCDEF" is written to the specified printing area in memory, and the position in memory for the next print data is shifted by one line.

The **ESC L** command puts the printer into page mode, and all commands received thereafter are processed in page mode. Executing an **ESC FF** command prints the received data collectively, and executing an **FF** command restores the printer to standard mode after the received data is printed collectively. Executing an **ESC S** command restores the printer to standard mode without printing the received data in page mode; the received data is cleared from memory instead.

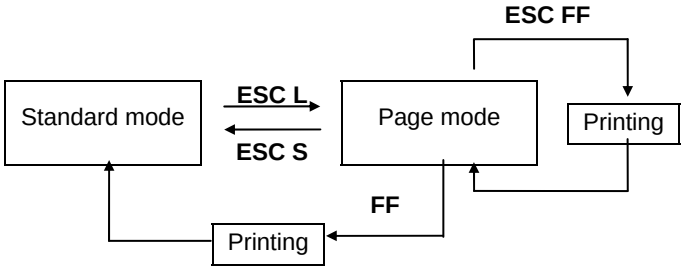


Figure 4.10.1 Shifting Between Standard Mode and Page Mode

4.10.2 Setting values in standard and page modes

1) The available commands and parameters are the same for both standard and page modes. However, these values can be set independently in each mode for the **ESC SP**, **ESC 2**, and **ESC 3** commands. For these commands, different settings can be stored for each mode.

2) Although the maximum number of printable dots for a bit image when the roll paper is selected as the paper supply is 576 in standard mode, maximum 738 bit-image dots can be printed in the y direction (paper feed direction) in page mode. (This is possible only when the **ESC W** command has specified 738 printable-area dots in the y direction and the printing direction value of ***n*** in the **ESC T** command is 1 or 3.)

4.10.3 Formatting of print data in the printable area

Formatting of print data in the printable area is performed as follows:

1) The printable area is set using **ESC W**. If all printing and feeding are complete before the printer receives the **ESC W** command, the left side (as you face the printer) is taken as the origin (x0, y0) of the printable area. The printable rectangular area is defined by the length (dx dots) extending from and including the origin (x0, y0) in the x direction (perpendicular to the paper feed direction), and by the length (dy dots) in the y direction (paper feed direction). (If the **ESC W** command is not used, the printable area remains the default value.)

2) When the printer receives print data after **ESC W** sets the printable area and **ESC T** sets the printing direction, the print data is formatted within the printable area so that point A in Figure 4.10.2 is at the beginning of the printable area as a default value. (When a character is printed, point A is the baseline.)

   Print data containing downloaded bit images or bar codes is formatted so that the bottom point of the left side of the image data (point B in Figure 4.10.3) is aligned with the baseline. However, any Human Readable Interpretation (HRI) characters are printed under the baseline.

   At the points labeled Point B, if characters (such as double-height characters) that are higher than normal size characters or downloaded bit image characters are received, any part of the character higher than the normal-size character is not printed.

3) If the print data (including the space to the right of a character) exceeds the printable area before the printer receives a command (e.g., **LF** or **ESC J**) that includes line feeding, a line feed is executed automatically within the printable area. The print position, therefore, moves to the beginning of the next line. The line feed amount depends on the values set by commands (such as **ESC 2** and **ESC 3**).

4) The default amount of line spacing is set to 30 dots in the vertical direction. If print data for the next line contains extended characters that are higher than double-height characters, bit images taking up two or more lines, or bar codes higher than normal characters, the amount of line feeding may be insufficient, resulting in overlapping of the characters' higher-order dots with the previous line. To avoid this, increase the amount of line spacing. The line spacing in Figure 4.10.4 requires 27 dots (54 pitch) or more.

   Example

   When printing a downloaded bit image of six bytes in the vertical direction, use the following formula:

   {number of vertical dots (8 x 6) - number of dots for feeding at the beginning of the printable area (21)} = 27

   Therefore, 27 dots are required for feeding.

   Use the following commands:

   ESC W ***xL***, ***xH***, ***yL***, ***yH***, ***dxL***, ***dxH***, ***dyL***, ***dyH***
   ESC T ***n***
   ESC 3 27 ← Set line spacing to be added.
   LF
   GS / 1
   ESC 2 ← Reset the line spacing to 30 dots.

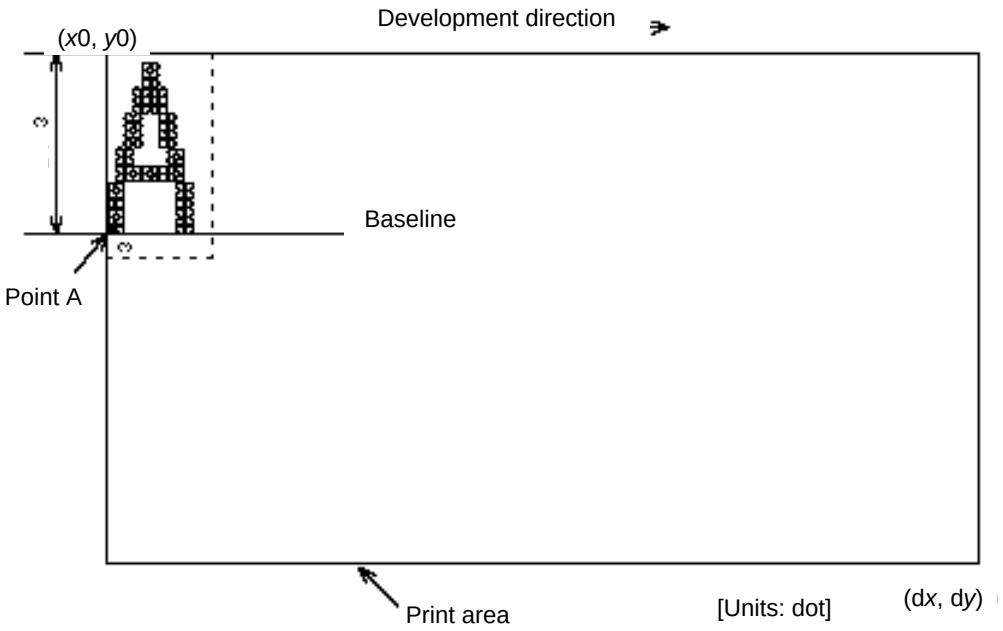


Figure 4.10.2 Character Data Developing Position

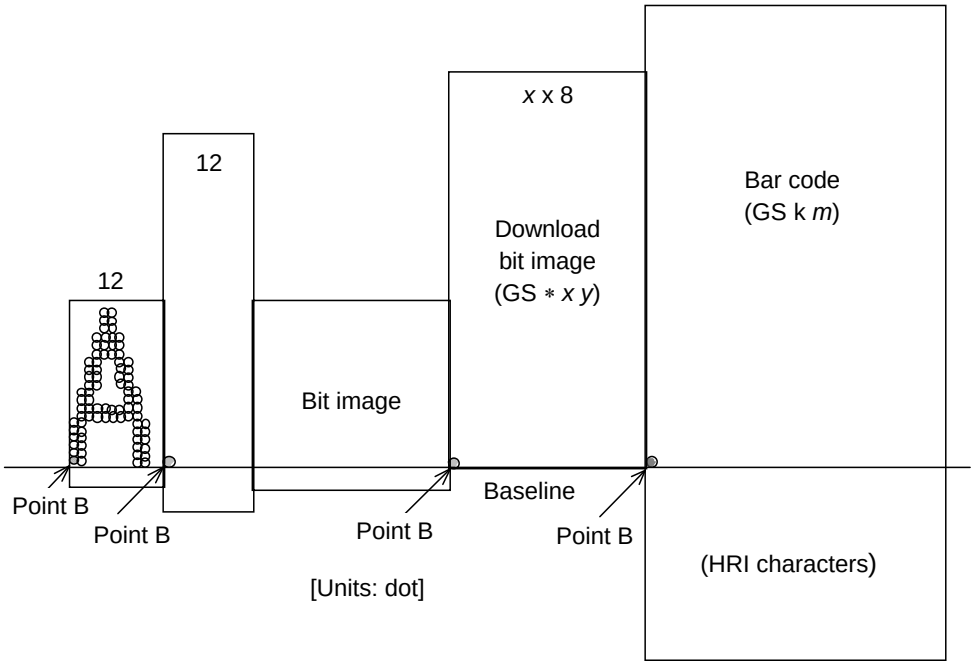


Figure 4.10.3 Print Data Developing Positions

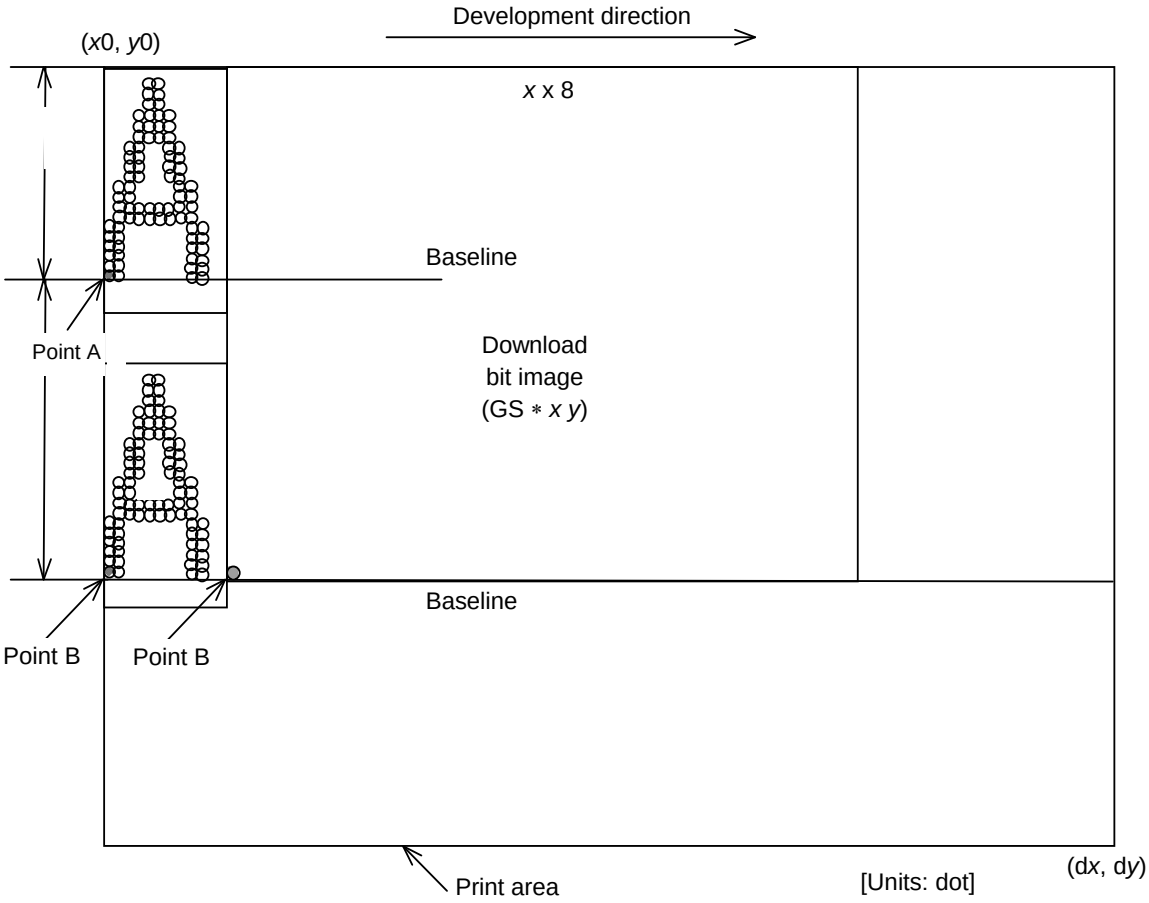


Figure 4.10.4 Downloaded Bit Image Developing Position

4.11 Black Mark Sensor

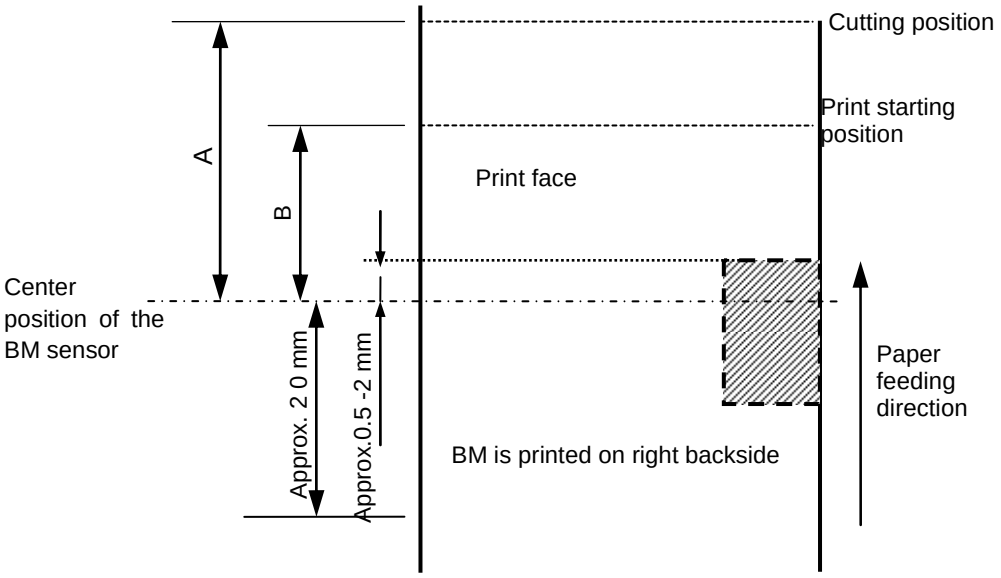
The product can use the paper which is pre-printed with a black mark (abbreviated to BM). As for the specification of the BM, see the printer specification.

4.11.1 How to use the BM

Set the DIP switch 1-6 to On to use the black mark. (See Section 4.3.2.1.)

4.11.2 Detection position of the black mark

The BM is detected at the position which the top edge of the BM comes into approximately 0.5 to 2 mm from the center of the BM sensor. After detecting the BM, the BM is not detected for approximately 20 mm.



A: 33.6 mm (for straight paper-path model)
B: 17.6 mm (for straight paper-path model)

Figure 4.11.1 BM Detection Position, Print Starting Position, Cutting Position

4.11.3 Print starting position and cutting position

At the factory, the print starting position and the cutting position are set to the print head position and the cutter position respectively when the BM sensor detects the BM.

The print starting position and the cutting position can be changed with the **GS (F** command.

(See Commands Specifications for details.)

4.11.4 Applicable width and interval of BM

The width and interval of BM for which the printer operation is guaranteed are as follows:

BM width: 6 to 20 mm {0.24"} to {0.79"}
BM interval: 50 to 300 mm {1.97"} to {11.81"}

4.12 Power Supply which Can Be Used

4.12.1 Recommended Power Supply

It is recommended to use a power supply unit that has the capacity of the +24V and 4 A or more (for 100 W or more). If the power supply meets the required specifications, memory switch 6-3 can be On. In this case, (memory switch 6-3 is On), the printer prints as fast as possible. Otherwise, the printing could stop temporarily or be uneven.

4.12.2 Epson Power Supply

Always be sure to turn off memory switch 6-3 if using EPSON power supply PS-180.

APPENDIX

A.1 Notes on Handling the Printer

The descriptions in this chapter are the abstract of the EU-T482 technical manual.

A.1.1 Initial installation

1) To prevent electrostatic damage to the ICs and heat elements of the print head, handle the printer only after taking proper countermeasures against static electricity in the environment and on your body.
2) When this unit would be installed in a case, be sure to connect the frame to the ground to prevent electrostatic damage, or incorrect operation to the ICs, detectors, and heat elements of the print head.

A.1.2 Handling

1) Because the printer uses a line thermal print head, avoid operating it in dusty environments so as not to shorten the life of the print head.
2) Avoid condensation, because the printer uses a thermal print head. If it does occur, do not turn on the power until condensation has disappeared.
3) Do not initialize the printer or turn on/off the printer until the paper is removed from the printer module after ejecting the paper in the backward direction by a reverse feed command or by pressing a paper FEED button and a paper exchange (BACK FEED) button simultaneously. Otherwise, the printer may return an error since the initialization cannot be executed.

A.1.3 Warnings

1) Do not touch heat elements of the print head, the driver IC, or the IC terminals with a screwdriver or tweezers, or directly with your fingers.
2) Avoid applying mechanical stress or shocks, including friction generated from microparticles, to the print head surface.
3) Do not touch the print head area and the motor surface, because they become very hot during and just after printing.
4) Avoid leaving the printer unused for a long period without paper, because the platen and the print head may stick together temporarily.
5) Do not force the thermal head excessively. The maximum times of removing and inserting the FFC should be 10.

A.1.4 How to load the paper

1) Loading paper for the paper roll supply module

Follow the steps below to load the paper for the paper roll supply module.

1. Pull the **Plate, open close** or **Loop guide** forward while pressing the **Frame, open lever** downward.
2. Open the Paper roll supply module. (See Figure A.1.1.)
3. Load the paper roll in the Holder, paper roll with the printing face of the paper facing upwards. (See Figure A.1.2.)

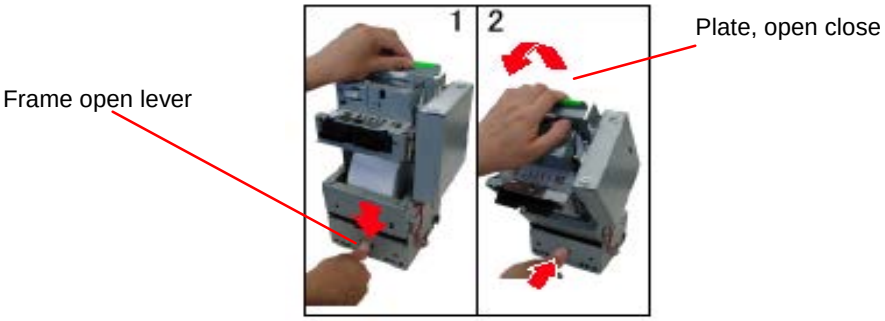


Figure A.1.1 Open and Close of Paper Roll Supply Module

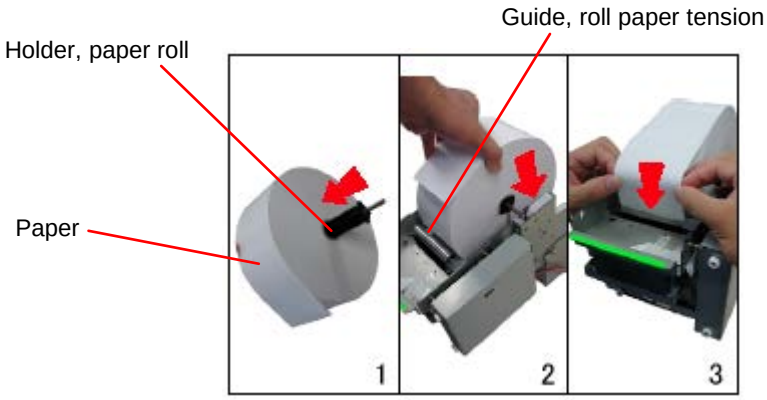


Figure A.1.2 Loading paper for Paper Roll Supply Module

2) Loading paper for printer module

Follow the steps below to load the paper for the printer module from the paper roll supply module.

1. Cut the edge of the paper as shown in Figure A.1.3.

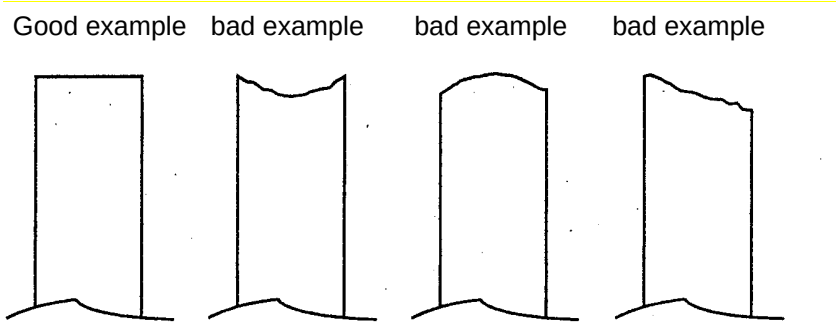


Figure A.1.3 Shape of Paper Edge

2. Pull out the paper.
3. After inserting the paper edge straight into the paper slot of the printer module so that the paper is against the **Guide, roll paper tension**, push the paper with your hand. (See Figure A.1.2.)
4. When the inserted paper is detected by the **Paper feed sensor** of the printer module, the paper is fed automatically in the semi-autoloading mode of Paper feed motor.
5. When the semi-autoloading is finished, the extra paper is automatically cut.
6. Remove the extra paper from the **Paper exit**.
7. Push the **Plate, open close** or **Loop guide** so that the paper roll supply module is in its original position.

A.1.5 Removing paper

Follow the steps below to remove the paper roll.

1) Manual paper removal

1. Pull the **Plate, open close** or **Loop guide** forward while pressing the **Frame, open lever** downward.
2. Turn the **Lever, platen** to open the **Platen unit.**
3. Pull out the paper from the paper slot of the printer module.
4. Pull the paper from the paper roll supply module, remove the **Paper roll shaft set** from the paper; then place it in the paper roll supply module.
5. Push the **Plate, open close** or **Loop guide** so that the paper roll supply module is in its original position.

2) Removing paper automatically

1. While the printer is online, the paper can be removed with the paper exchange button. Using this button, the paper is fed in the reverse direction and ejected backward.
2. Pull out the paper from the paper slot of the printer module.
3. Pull the paper from the paper roll supply module, remove the **Paper roll shaft set** from the paper; then place it in the paper roll supply module.
4. Push the **Plate, open close** or **Loop guide** so that the paper roll supply module is in its original position.

A.1.6 When not using the printer for a long period

1) If the printer is left unused for a long period with the print head loaded on the platen, discoloration of the thermal paper, loss of heat sensitivity, or sticking of the paper to the platen may occur. In addition, some printed characters may be faint due to deformation of the platen rubber.

A.1.7 Using the printer at low temperature

1) When printing is started at a low temperature (especially when the temperature is very low), the first few lines may be somewhat faint because the print head is cold.

A.1.8 Using the printer at high temperature

1) When printing is started at a high temperature, poor print quality (such as blurred print) may result.

A.1.9 Maintenance (See technical manual for details.)

1) Cleaning the thermal head and the platen

Paper dust, paper chips, and thermal chemicals attached to the heat elements of the print head and the platen may reduce print quality. If this occurs, clean the print head and the platen as follows:

a) Open the cut sheet presenter module.

b) Raise the print head from the Platen unit by turning the Lever, platen (green) to the left.

c) Wipe the heat elements of the print head and the platen lightly with a cotton swab soaked in alcohol solvent (ethanol, methanol, or IPA). Using other solvents may damage the print head.

d) After the alcohol evaporates completely, return the Platen unit to its original position by pushing the platen cover down.

NOTE: Do not touch the print head or the motor surface just after printing, as these areas are very hot.

2) Removing jammed paper

a) Removing jammed paper in the cut sheet presenter module.

1. Uninstall the Paper exit and remove the paper jam.
2. Open the cut sheet presenter unit and remove the paper jam.

b) Removing jammed paper in the printer module

1. Open the cut sheet presenter module.
2. Turn the Lever, platen to open the Platen unit and remove the paper jam.

A.2 Notes on Handling Thermal Paper

1) Usage

1. Do not allow chemicals or oil to contact thermal paper because they may cause discoloration or print fading.
2. Strongly rubbing thermal paper with a piece of metal or with fingernails may also cause discoloration.

2) Storage

Avoid storing thermal paper in high temperatures and humidity. Avoid exposing thermal paper to direct sunlight, because it will gradually become discolored at about 70°C {158°F}.

A.3 Notes on Usage of Power Supply Unit

1) To enable the product to perform fully, it is recommended to use the power supply which has a rating capacity of 100 W or more.

A.4 Media Type and Density Setting Procedures

1) In order to obtain high quality printing, it is necessary to supply the optimal electrical power in accordance with the paper characteristics and operating environment. Always be sure to specify the media type and density shown in Table 2.2.1 that matches the paper used.
2) Change the customized values and reset the printer in order to attain proper printing control. (See Appendix A.5 for procedures for changing set customized values.)

A.5 Procedures for Changing Set Customized Values (Memory Switches)

1) The set customized values (memory switches) can be changed using utility software (EU-T482 Utility). See the EU-T482 Utility User Manual for details regarding the EU-T482 Utility.