

**Confidential**



Receipt Printer

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# TM-T20

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Specification

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STANDARD	
Rev. No.	F
Notes	

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**SEIKO EPSON CORPORATION**

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**REVISION SHEET**

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Revisions		Design Section			Sheet Rev. No.						
Rev.	Document	WRT	CHK	APL	Sheet	Rev.	Sheet	Rev.	Sheet	Rev.	
A	Enactment	Yokoyama	–	Fujikawa	I	A	17	D	42	B	
B	Change	Yokoyama	–	Fujikawa	II	D	18	D	43	B	
C	Change	Takizawa	Todaka	Usui	III	D	19	D	44	B	
D	Change	Yokoyama	–	Godo	IV	A	20	D	45	B	
E	Change	Saito	Todaka	Usui	V	F	21	B	46	B	
F	Change	Higuchi	Horiuchi	Usui	VI	F	22	B	47	B	
					VII	F	23	D	48	B	
					VIII	F	24	B	49	B	
							25	B	50	B	
					1	B	26	B	51	B	
					2	B	27	B	52	B	
					3	A	28	B	53	B	
					4	A	29	B	54	B	
					5	B	30	B	55	B	
					6	A	31	B	56	B	
					7	B	32	B	57	B	
					8	B	33	B	58	B	
					9	A	34	B	59	B	
					10	A	35	B	60	B	
					11	A	36	B	61	B	
					12	B	37	B	62	B	
					13	B	38	B	63	B	
					14	E	39	B	64	B	
					15	B	40	B	65	B	
					16	B	41	B	66	B	
<b>TITLE</b>  <b>TM-T20</b> <b>Specification</b> <b>(STANDARD)</b>					<b>Front Part</b>					Contents Appendix Total	181 16 215
					Cover	Rev. Sheet	Confidentiality Agreement	General Features	Table of Contents		
					1	9	1	1	6		

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A	Enactment				67	B	92	E	117	C
B	Change				68	B	93	B	118	B
C	Change				69	B	94	F	119	B
D	Change				70	B	95	F	120	B
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					88	B	113	F	138	F
					89	B	114	B	139	D
					90	B	115	F	140	B
					91	B	116	B	141	F
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A	Enactment				142	B	167	B	App.1	A	
B	Change				143	B	168	B	App.2	A	
C	Change				144	B	169	C	App.3	A	
D	Change				145	B	170	B	App.4	A	
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					149	B	174	B	App.8	A	
					150	B	175	B	App.9	F	
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					152	B	177	B	App.11	A	
					153	B	178	C	App.12	A	
					154	B	179	B	App.13	A	
					155	B	180	D	App.14	F	
					156	F	181	B	App.15	E	
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**REVISION SHEET**

REV.	SHEET	CHANGED CONTENTS
A	All	Newly enacted.
B	II	2) Features <Software> Added "Supports 42 column mode."
	III-VIII	Changed the table of contents.
	1	1.1 Printing Specifications NOTES: 2. Changed "with the customized value (memory switch)" to "with the software setting" and "See APPENDIX L" to "See Section 3.5.1."
	2	1.1 Printing Specifications 9) Maximum printing speed: NOTES: Added "Especially when using a serial interface, low transmission speed may cause intermittent printing. It is recommended to transmit data to the printer as quickly as possible."
	5	5) Print density adjustment depending on the paper type Changed "with the customized value (memory switch)" to "with the software setting" and "See APPENDIX L" to "See Section 3.5.1." NOTES: 2. Corrected "APPENDIX E" to "APPENDIX D." NOTES: 3. Removed "DIP switch" (corrected) Changed "with the customized value (memory switch)" to "with the software setting" and "See APPENDIX L" to "See Section 3.5.1."
	7	1.6 Printable Area <When paper width is set to 58 mm> Corrected "3.0 mm {0.15}" to 3.0 mm {0.12}." 1.8 Internal Buffer 1) Receive buffer: Changed "using the customized value (memory switch)" to "with the software setting" and "See APPENDIX L" to "See Section 3.5.1."
	8	1.9 Electrical Characteristics 1) Supply voltage: Added "and frequency."
	12	2.1.1 Universal Serial Bus (USB) interface 2) USB function: Changed "Switching of the class can be set by the customized value (memory switch) on startup. (See APPENDIX L for how to change the setting.)" to "Switching of the class can be set with the software setting value at startup. (See Section 3.5.1 for how to change the setting.)"
	13	2.1.1 Universal Serial Bus (USB) interface 4) USB Device Requests of USB printer class • GET DEVICE ID: Added "EpsonTM00000002 (42 column mode)" and "EpsonTM00000102 (42 column mode)" to "CID."
	14 - 17	2.1.2 RS-232 serial interface Added the section.
	18	2.2.3 Drawer kick-out connector (modular connector) Added "See APPENDIX E, NOTES ON USING THE DRAWER KICK-OUT CONNECTOR."
	19	2.2.3 Drawer kick-out connector (modular connector) 5) Connection of the optional external buzzer Changed "with the customized value (memory switch)" to "with the software setting" and "See APPENDIX L" to "See Section 3.5.1."
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**REVISION SHEET**

REV.	SHEET	CHANGED CONTENTS
B	18 -179	The sheet numbers are changed.
	21	Added <b>GS ( E</b> <Function 11> Set the configuration item for the serial interface, <Function 12> Transmit the configuration item for the serial interface.
	71-74	Added Section 3.5, Printer Setting. Added Section 3.5.1, Software setting. Added Section 3.5.1.1, Memory switch setting. Added Section 3.5.1.2, Customized value setting. Added Section 3.5.1.3, Serial interface communication condition setting. Added Section 3.5.1.4, USB interface communication condition setting. Added Section 3.5.1.5, Receipt enhancement setting.
	75-81	The section numbers are changed.
	75	3.6 Self-Test Added "BUSY conditions (depending on interfaces)." Changed "2) A self-test on the roll paper" to "2) Self-test with stand-alone printer." Added "3) Self-test printing with a command" and "4) Processing after a self-test has finished."
	77	Changed "3.7 NV Graphics Information Print Mode, R/E Information Print Mode, Customized Value (Memory Switch) Setting Mode" to "3.8 Various Information Print Modes and Setting Mode."
	78	3.8.3 Software setting mode Changed "customized value (memory switch)" to "software." 2) Starting the mode Added "(5) The instructions for the setting method are printed. Follow the instructions to set the values."
	81	3.13 Optional External Buzzer Changed "with the customized value (memory switch)" to "with the software setting" and "See APPENDIX L" to "See Section 3.5.1."
	83	5.1 Standard Accessories Added "or user's manual."
	90, 94, 102, 103, 107, 108, 131, 166	<b>DLE DC4</b> <i>fn m t</i> , <b>ESC ! n</b> , <b>ESC M n</b> , <b>ESC R n</b> , <b>ESC p m t1 t2</b> , <b>ESC t n</b> , <Function 50> <b>GS ( K</b> <i>pL pH fn m</i> , <b>GS a n</b> Changed "APPENDIX L: HOW TO CHANGE CUSTOMIZED VALUES (MEMORY SWITCHES)" to "3.5.1 Software setting."
	90, 107	<b>DLE DC4</b> <i>fn m t</i> , <b>ESC p m t1 t2</b> Changed "3.12 Optional External Buzzer" to "3.13 Optional External Buzzer."
	100	<b>ESC @</b> Changed "Setting values specified with the customized values (memory switches), <b>GS ( E</b> " to "Software setting values (See Section 3.5.1)."
	105	<b>ESC W</b> <i>xL xH yL yH dxL dxH dyL dyH</i> [When paper width is set to 58 mm]: Corrected "(dxL = 104)" to "(dxL = 164)." [When paper width is set to 58 mm and "Column emulation: 42 column mode" is selected]: Corrected "(dxL = 164)" to "(dxL = 122)." Removed "When single-color print control is selected" (corrected).
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REV.	SHEET	CHANGED CONTENTS
B	119	<b>GS ( E pL pH fn [parameters]</b> Added <Function 11> Set the configuration item for the serial interface, <Function 12> Transmit the configuration item for the serial interface.
	121	<Function 3> <b>GS ( E pL pH fn [a1 b18...b11]...[ak bk8...bk1]</b> Memory switch 5: Msw5-2: Added "(this function is effective when the receive buffer capacity is set to 4 KB)."
	125	<Function 5> <b>GS ( E pL pH fn [a1 n1L n1H]...[ak nkL nkH]</b> Changed "3.3.3 Customized values" to "3.5.1.2 Customized value setting."
	127, 128	Added <Function 11> <b>GS ( E pL pH fn a d1...dk (fn = 11),</b> <Function 12> <b>GS ( E pL pH fn a (fn = 12).</b>
	152	<Function 371> <b>GS ( k pL pH cn fn nL nH</b> Added "(nL + nH × 256) = 0 (0 ≤ nL ≤ 255, 0 ≤ nH ≤ 15)."
	154	<Function 471> <b>GS ( k pL pH cn fn nL nH</b> Added "(nL + nH × 256) = 0."
	161	<b>GS I n</b> ID: Hexadecimal: Corrected "84" to "63." Decimal: Corrected "132" to "99."
	163	<b>GS W nL nH</b> [When paper width is set to 58 mm]: Corrected "(dxL = 104)" to "(nL = 164)." [When paper width is set to 58 mm and "Column emulation: 42 column mode" is selected]: Corrected "(dxL = 164)" to "(nL = 122)." Corrected "dxL" to "nL", "dxH" to "nH."
	App.14	Deleted APPENDIX L: HOW TO CHANGE CUSTOMIZED VALUES (MEMORY SWITCHES)
C	109,115, 119,133, 158,167, 178	FS ( E, FS g 1, GS ( E, GS ( L, GS 8 L, GS D, GS g 0, FS q [Notes]: Corrected "Therefore, it is recommended to limit using the commands to no more than 10 times a day." to "Therefore, it is recommended to limit writing data with the write commands into the NV memory to 10 times or fewer a day."
	175	FS S [Note]: Corrected "39.88 mm" to "31.91 mm."
D	II	GENERAL FEATURES <Interface> Added an Ethernet interface.
	III – VIII	TABLE OF CONTENTS Changed sheet numbers.
	14	Added 2.1.2.1 Pin assignment and connector.
	17 – 20	Added 2.1.3 Ethernet interface.
	23	3.1 List of Commands (ESC ( A) Added <Function 97>.
	75, 76	Table 3.5.6 Types of Customized Value Added "Logo emulation mode *3." (Function Added *2) and *3).
	81	3.8.3 Software setting mode 1) Software setting function Changed "• Column emulation" to "• Column emulation mode." Added "Logo emulation mode (Supported by firmware Version 2.00 (Ethernet model) or later)."
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REV.	SHEET	CHANGED CONTENTS
D	86	5.1 Standard Accessories <ul style="list-style-type: none"> <li>• Interface cable (for other than the Ethernet interface model)</li> </ul>
	98	ESC & [Range] Changed $20 \leq x \leq$ (the number of dots in the horizontal direction for the character font)" to " $0 \leq x \leq 12$ [When Font A (12 × 24) is selected]." Added " $0 \leq x \leq 9$ [When Font B (9 × 17) is selected]."
	123 – 126	<Function 5> GS ( E [Range] Changed " $119 \leq a \leq 126$ " to " $119 \leq a \leq 127$ ." Added "(a = 127 is supported by the firmware Version 2.00 (Ethernet model or later).)" [Default] Added " $(nL + nH \times 256) = 0$ (nL = 0, nH = 0) [when a = 127]." [Description] (in the first table) Added Logo emulation mode (a = 127). Added Logo emulation mode (a =) 127.
	127	<Function 6> GS ( E [Range] Added "a = 127 is supported by firmware Version 2.00 or later (Logo emulation mode)." [Description] (In the table) Added Logo emulation mode (a =) 127.
	137, 139, 159, 160, 178	<Function 67>, <Function 83> GS ( L, <Function 67>, <Function 83> GS D, FS q [Notes] Added notes on the logo emulation mode.
	App.15	Added APPENDIX L: LOGO EMULATION MODE.
E	14	2.1.2.2 Specifications (Complies with RS-232) Connector (printer side): Corrected "Female DSUB-9 pin connector" to "Male DSUB-9 pin connector"
	84	3.13 Optional External Buzzer Cooperative sounding by using commands Corrected "ESC V 0, ESC V 65" to "GS V 0,GS V 65."
	76,81, 123,124 126,127 App.15	Changed "supported by the firmware Version 2.00 (Ethernet model or later" to "supported by the firmware Version 1.04 (USB/Serial model)/2.00 (Ethernet model or Later."
	91	DLE EOT [Description] <ul style="list-style-type: none"> <li>• Roll paper sensor status (n = 4)                              (Status for Bit 2, 3) Corrected "Roll paper near-end sensor: paper adequate." to "Fixed."</li> </ul>
F	All	EPSON logo has been replaced.
	V-VIII	Table of Contents Changed command parameter to italics. Corrected errors. Corrected page numbers.
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REV.	SHEET	CHANGED CONTENTS
F	75	3.5.1.2 Customized value setting Table 3.5.6 Types of Customized Value Added function "Automatic Reduction of Paper."
	78	3.5.1.5 Receipt enhancement setting Table 3.5.9 Receipt enhancement Auto top logo printing Added missing notation "Number of lines to be deleted below top logo." Extended settings for auto top logo/bottom logo printing Added "Prints the top logo while paper feeding to the cutting position: Enabled/disabled."
	82	3.8.3 Software setting mode Added "Automatic reduction of amount of paper to use."
	87	5.1 Standard Accessories Corrected "Partition plate for 58-mm width roll paper" to "58-mm width roll paper guide." Added "AC cable (Might not be included depending on unit specification and sales area.)"
	94, 95	Added note for <b>DLE DC4</b> $fn\ a\ b$ ( $fn = 1, 2$ ).
	96, 101	Deleted notation for buzzer sound end response.
	112, 113	<b>FS ( E <math>pL\ pH\ fn\ m\ c</math> (<math>fn = 61</math>)</b> Transmission data (3) Data amount Corrected error.
	115	<b>FS ( E <math>pL\ pH\ fn\ m\ c</math> (<math>fn = 64</math>)</b> Added "a = 48 Prints the top logo while paper feeding to the cutting position."
	121	<b>GS ( E</b> <Function 15> Corrected parameter $d$ .
	122	<b>GS ( E &lt;Function 3&gt;</b> Corrected error " $0 \leq pL \leq 46, 0 \leq pH \leq 0 \rightarrow 10 \leq pL \leq 46, pH = 0$ ."
	124,125, 127,129	<b>GS ( E &lt;Function 5&gt; &lt;Function 6&gt;</b> Added function "Automatic Reduction of Paper."
	124, 125	<b>GS ( E &lt;Function 5&gt;</b> [Range]: Corrected error " $(nL = 1, nH = 0, 1) \rightarrow (nL = 0, 1, nH = 0)$ [when $a = 119$ ]." Added "[when $a = 127$ ]."
	131	<b>GS ( E &lt;Function 15&gt;</b> [Format]: Changed " $d1...dk$ " to " $d$ ," [Range]: Deleted " $k = (pL + pH \times 256) - 2$ ," [Default] [Description]: Changed " $d1$ " to " $d$ ."
	134,135, 138,141	<b>GS ( L &lt;Function 67&gt; &lt;Function 83&gt;</b> Changed " $[c\ d1...dk]1...[c\ d1...dk]b$ " to " $c\ d1...dk$ ."
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REV.	SHEET	CHANGED CONTENTS
F	156	<Function 472> <b>GS ( k</b> Corrected " <b>GS ( k pL pH cn fn m</b> " to " <b>GS ( k pL pH cn fn n.</b> "
	164	<b>GS I n</b> Table [Transmission data 1] (3) Printer information A Data amount Corrected error.
	App.9	Standardized terminology "Power off status → Power off notification.
	App.14	Added function "Automatic Reduction of Paper." Added function "Prints the top logo while paper feeding to the cutting position."
	App.16	Appendix M Added width setup.

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## GENERAL FEATURES

1) This specification applies to the TM-T20 printer.

The following models are available:

- 1) Alphanumeric (ANK) model
- 2) Japanese model

\* This specification manual describes the outline of the model-dependent information and general functions of the commands. For detailed specifications and usage of the commands, please refer to the ESC/POS APG (Application Programming Guide) that is separately issued.

2) Features

The TM-T20 printer has the following features:

<General>

- An embedded power supply.
- The roll paper width can be switched from 80 mm to 58 mm.
- Bundles a CD-ROM that features drivers, utility software, and user's manual.

<Printing>

- Maximum printing speed: 150 mm/s {5.91"/s}.

<Installation>

- Besides horizontal installation, can be installed vertically or hung on the wall.

<Printer handling>

- Easy drop-in paper loading.

<Interface>

- Has a USB interface, a serial interface (in some areas), or an Ethernet interface (in some areas).
- Supports virtual USB serial interface and virtual USB parallel interface.

<Software>

- Command protocol is based on the ESC/POS Proprietary Command System\*.
- OPOS ADK, Windows printer drivers, and other drivers (Linux CUPS, Mac driver) are available.
- Supports printing of various types of bar codes, GS1-DataBar, two-dimensional symbols (PDF417, QR code, MaxiCode, Composite Symbology).
- Various layouts are possible by using page mode.
- Has a maintenance counter function.
- Supports a vast range of languages (with code pages, Windows drivers, and the user's manual).
- Supports 42 column mode.

<Environmental>

- The TM-T20 is Energy Star qualified.

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

- 1) Printing method: Thermal line printing
- 2) Dot density: 203 dpi × 203 dpi  
[dpi: dots per 25.4 mm {1"}]
- 3) Printing direction: Unidirectional with friction feed
- 4) Paper width: 80 mm paper width model is available with the ANK model, and Japanese model

- NOTES: 1. The only possible change of paper width is from 80 mm to 58 mm.
2. To change the paper width from 80 mm to 58 mm, be sure to set the paper width with the software setting to adjust the print area. (See Section 3.5.1 for how to change the setting.)
3. After changing the paper width from 80 mm to 58 mm and using the printer, do not change it back to 80 mm. (When using 58-mm width paper, a part of the print head without paper directly contacts the platen, which can damage the part of the print head. The part of the cutter blade that is not covered by paper may be worn out. The area of the 80 mm paper that is wider than the 58 mm paper cannot be used for printing or cut with the autocutter.)

## 5) Printing width:

	When paper width is set to 80 mm	When paper width is set to 58 mm
Normal mode (default)	72.1 mm {2.84"} 576 dot positions	52.6 mm {2.07"} 420 dot positions
42 column mode	68.3 mm {2.69"} 546 dot positions	47.3 mm {1.86"} 378 dot positions

## 6) Characters per line:

	When paper width is set to 80 mm	When paper width is set to 58 mm
Normal mode (default)	48 (Font A) 64 (Font B) 24 (Japanese)	35 (Font A) 46 (Font B) 17 (Japanese)
42 column mode	42 (Font A) 60 (Font B) 21 (Japanese)	42 (Font A) 31 (Font B) 15 (Japanese)

## 7) Character spacing:

	When paper width is set to 80 mm	When paper width is set to 58 mm
Normal mode (default)	0.25 mm {0.0098"} (2 dots) (Font A) 0.25 mm {0.0098"} (2 dots) (Font B) 0 mm (0 dots) (Japanese)	
42 column mode	0.38 mm {0.015"} (3 dots) (Font A) 0.25 mm {0.0098"} (2 dots) (Font B) 0.25 mm {0.0098"} (2 dots) (Japanese)	0.25 mm {0.0098"} (2 dots) (Font A) 0.25 mm {0.0098"} (2 dots) (Font B) 0 mm (0 dots) (Japanese)

NOTE: The above are the settings at factory shipment and programmable by control command.

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8) Line spacing:

3.75 mm {0.15"}

NOTE: Set at factory shipment, programmable by control command.

9) Maximum printing speed:

Text printing	150 mm/s {5.91 "/s} When line spacing is 3.75 mm: approx. 40 lps
Page mode printing	150 mm/s {5.91"/s}
Raster bit-image printing	150 mm/s {5.91"/s}
Ladder bar code, 2-dimensional symbol printing	100 mm/s {3.94"/s}

NOTES: 1. The printing speed listed above is the value when the printer prints with the standard print density level at 25°C {77°F}, normal print density level. The printing speed changes automatically depending on the condition of the head temperature.

2. The maximum printing speed listed above may not be achieved depending on the type of interface, the setting of data transmission speed, and the combination of control commands.

3. If the data transmission speed is slower than the maximum printing speed, the printing speed may fluctuate and there may be some cases where the print result becomes shaded and/or dot displacement in paper feeding occurs.

4. Furthermore, if the data transmission speed is much slower than the maximum printing speed, intermittent printing will occur.

5. Especially when using a serial interface, low transmission speed may cause intermittent printing. It is recommended to transmit data to the printer as quickly as possible.

10) Paper feed speed: 150 mm/s {5.91"/s} (continuous paper feeding with the Feed button)

## 1.2 Character Specifications

1) Number of characters:

- 1-byte code characters:

Alphanumeric characters: 95

Extended graphics: 128 × 43 pages  
(including user-defined page)

International characters: 18 sets

- Multi-byte code characters:

Japanese:

JIS (JIS X0208-1990): 6879

Special font: 845 (See the table below.)

JIS Code	Shift JIS Code
2D21 to 2D7E	8740 to 879D
7921 to 7C7E	ED40 to EEFC FA40 to FC4E

See "Character Code Table (for Japanese font)" for details.

2) Supported Characters for each model type:

Product Specifications	Supported Characters	
ANK model	• Alphanumeric	--
Japanese model	• Extended graphics • International characters	Japanese

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## 3) Character structure

	80-mm paper width	58-mm paper width
Normal mode (default)	<ul style="list-style-type: none"> <li>• 12 × 24 (including 2-dot spacing horizontally) (Font A)</li> <li>• 9 × 17 (including 2-dot spacing horizontally) (Font B)</li> <li>• 24 × 24 (Japanese)</li> </ul>	
42 column mode	<ul style="list-style-type: none"> <li>• 13 × 24 (including 3-dot spacing horizontally) (Font A) *1</li> <li>• 9 × 17 (including 2-dot spacing horizontally) (Font B)</li> <li>• 26 × 24 (including 2-dot spacing horizontally) (Japanese) *2</li> </ul>	<ul style="list-style-type: none"> <li>• 9 × 17 (including 2-dot spacing horizontally) (Font A)</li> <li>• 12 × 24 (including 2-dot spacing horizontally) (Font B)</li> <li>• 24 × 24 (Japanese)</li> </ul>

NOTES: The supported fonts depend on each model type. Font A is selected as the default.

\*1: 13 × 24 font is a font with a 1-dot horizontal space added to Font A (12 × 24) of the normal mode. Therefore, the character size is the same as Font A of the normal mode and the space between characters increases by 1 dot. When printing graphics characters, there is 1-dot space between characters.

\*2: 26 × 24 font is a font with a 2-dot horizontal space added to the Japanese font (24 × 24) of the normal mode. Therefore, the character size is the same as the Japanese font (24 × 24) of the normal mode and the space between characters increases by 2 dots.

## 4) Character size

Normal mode (default)	Standard		Double-height		Double-width		Double-width/ Double-height	
	W × H (mm)	cpl	W × H (mm)	cpl	W × H (mm)	cpl	W × H (mm)	cpl
Font A	1.25 × 3	48	1.25 × 6	48	2.5 × 3	24	2.5 × 6	24
		35		35		17		17
Font B	0.88 × 2.13	64	0.88 × 4.26	64	1.76 × 2.13	32	1.76 × 4.26	32
		46		46		23		23
Japanese	3 × 3	24	3 × 6	24	6 × 3	12	6 × 6	12
		17		17		8		8
42 column mode	Standard		Double-height		Double-width		Double-width/ Double-height	
	W × H (mm)	cpl	W × H (mm)	cpl	W × H (mm)	cpl	W × H (mm)	cpl
Font A	1.25 × 3	42	1.25 × 6	42	2.5 × 3	21	2.5 × 6	21
	0.88 × 2.13	42	0.88 × 4.26	42	1.76 × 2.13	21	1.76 × 4.26	21
Font B	0.88 × 2.13	60	0.88 × 4.26	60	1.76 × 2.13	30	1.76 × 4.26	30
	1.25 × 3	31	1.25 × 6	31	2.5 × 3	15	2.5 × 6	15
Japanese	3 × 3	21	3 × 6	21	6 × 3	10	6 × 6	10
		15		15		7		7

cpl = characters per line

NOTES: 1. Space between characters is not included.

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

3. The values listed above in the upper columns are for 80-mm paper width, in the lower columns are for 58-mm paper width.

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## 1.3 Autocutter

- 1) Cutting method: Scissors type with separated blades
- 2) Cutting type: Partial cut (cutting with one point in left edge left uncut)

NOTES: 1. The cut paper may be pulled at the uncut edge when it is removed, causing reduced printing pitch for the first line of the next receipt. To prevent dot displacement, after cutting, feed paper approximately 1 mm {8/203"} or more before printing.

- 2. When operating the autocutter after leaving the printer unused for some time, feed paper 40 mm {1.57"} or longer to prevent paper jams in the autocutter unit.

## 1.4 Roll Paper Supply Unit

- 1) Supply method: Drop-in roll paper
- 2) Roll paper end sensor: Detects whether paper is present or not. Detects a roll paper-end during printing, and stops printing when it detects a paper-end. The printer resumes printing when paper is loaded and the roll paper cover is closed.

- a) Detection method: Microswitch

NOTE: If any paper other than the specified paper is used, the roll paper end sensor may not work correctly.

## 1.5 Paper Specification

- 1) Paper type: Specified thermal paper
- 2) Form and size: Roll paper  
The chromogenic side must face outside.
  - a) Roll paper diameter: 83 mm {3.27"} maximum
  - b) Roll paper core: Inside: 12 mm {0.47"}  
Outside: 18 mm {0.71"}  
Width: Same as the paper width or less than the paper width by 1 mm.

NOTE: Paper must not be pasted to the roll paper core.

- c) Take-up roll paper width: When paper width is 80 mm: 80 +0.5/-1.0 mm {3.15+0.02/-0.04"}  
When paper width is 58 mm: 58 +0.5/-1.0 mm {2.28+0.02/-0.04"}  
d) Paper width: When paper width is 80 mm: 79.5 ± 0.5 mm {3.13 ± 0.02"}  
When paper width is 58 mm: 57.5 ± 0.5 mm {2.26 ± 0.02"}  
3) Specified paper: Specified thermal roll paper:  
When paper width is 80 mm: NTP080-80  
When paper width is 58 mm: NTP058-80  
[Original paper: TF50KS-E Nippon Paper Industries Co., Ltd.]  
In Japan: Nakagawa Manufacturing Co., Ltd.  
In U.S.A.: Nakagawa Mfg. (USA) Inc.  
In Europe: Nakagawa Mfg. (Europe) GmbH  
In Southeast Asia: N.A.K. Mfg. (Malaysia) SDN BHD

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4) Specified original paper type no.:

The following original paper can be used:

**Table 1.5.1 Specified Original Paper Type No.**

Specified original paper type no.	Manufacturer
TF50KS-E, TF60KS-E	NIPPON Paper Industries Co., Ltd.
PD150R, PD160R, PD190R	OJI Paper Mfg. Co., Ltd.
P220AGB-1	Mitsubishi Paper Mills Limited.
P300, P310, P350	Kanzaki Specialty Papers
AF50KS-E	Jujo Thermal Oy
F5041	Mitsubishi HiTec Paper Flensburg GmbH
KT55F20, KT48F20	Koehler Paper Group

- NOTES:
1. Use of paper other than the specified paper may cause serious problems such as poor print quality, deterioration of printer reliability, or damage of the print head.
  2. For PD160R, the printing sound will become a little bit high when printing in high duty; therefore, it is recommended to use PD160R with a print duty of 50% or less.

5) Print density adjustment depending on the paper type

- Depending on the paper type, it is recommended to set the print density as shown in the table below, to keep the print quality. The print density can be set with the software setting. (See Section 3.5.1 for how to change the setting.)

**Table 1.5.2 Original Paper Type and Density Level**

Original paper type	Density level
TF50KS-E, TF60KS-E, PD150R, PD160R, PD190R, P220AGB-1, P300, P310, P350, AF50KS-E, KT55F20, KT48F20	4 (100%)
F5041	5 (105%)

- NOTES:
1. When the print density setting is too dark, the printing speed tends to drop.
  2. When the print density setting is too dark, paper dust sticks to the print head surface, often resulting in faded print. (See APPENDIX D for how to clean the thermal head.)
  3. The print density levels shown in 5) are measurements in Epson evaluation conditions; you may need to change the level with the software setting if the print is faint or dark. (See Section 3.5.1 for how to change the setting.)

6) Notes on preprinting on the recording surface of thermal paper

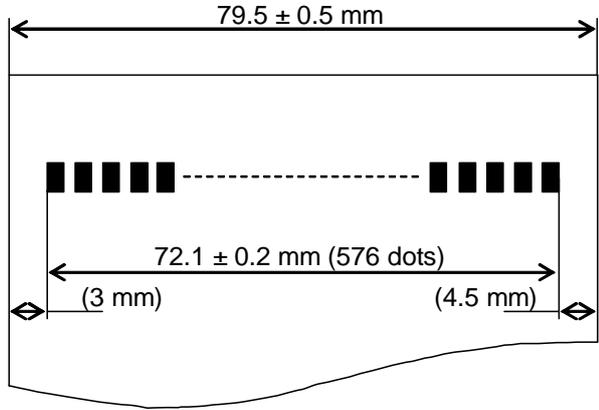
When using thermal paper with a recording surface which has been preprinted, sticking (a problem of the thermal head sticking to the surface of the thermal paper during printing) may occur, causing faulty printing and other problems. It is, therefore, strongly recommended to avoid using preprinted thermal paper. If such paper must be used, conduct preprinting tests under the conditions (type of ink/print conditions) recommended by the paper manufacturer and confirm that no faulty printing, print density, or any other problems occur before you use it for actual printing.

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**1.6 Printable Area**

<When paper width is set to 80 mm>

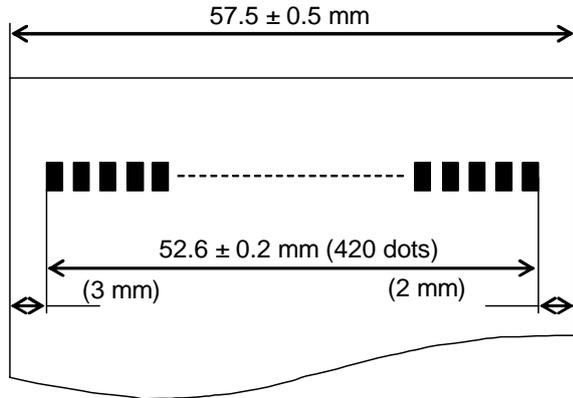
The maximum printable area of paper with a width of  $79.5 \pm 0.5$  mm { $3.13 \pm 0.02$ "} is  $72.1 \pm 0.2$  mm { $2.84 \pm 0.008$ "} (576 dots) and the approximate space is 3.0 mm {0.12"} on the left side and 4.5 mm {0.18"} on the right side.



**Figure 1.6.1 Roll Paper Printable Area**

<When paper width is set to 58 mm>

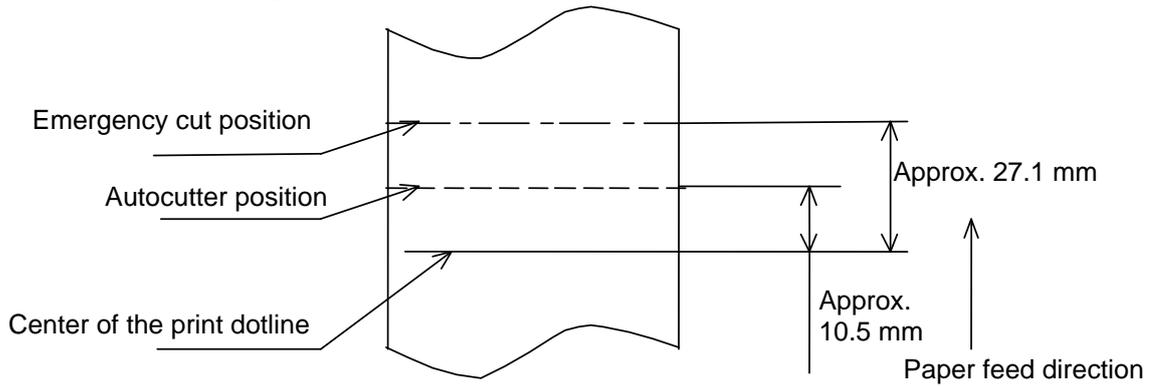
The maximum printable area of paper with a width of  $57.5 \pm 0.5$  mm { $2.26 \pm 0.02$ "} is  $52.6 \pm 0.2$  mm { $2.07 \pm 0.008$ "} (420 dots), and the approximate space is 3.0 mm {0.12"} on the left side and 2.0 mm {0.079"} on the right side.



**Figure 1.6.2 Roll Paper Printable Area**

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**1.7 Printing and Cutting Positions**



**Figure 1.7.1 Printing and Cutting Positions**

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

**1.8 Internal Buffer**

- 1) Receive buffer: Selectable as 45 bytes or 4 KB with the software setting. (See Section 3.5.1 for how to change the setting.)
- 2) User-defined buffer: 12 KB  
(both for user-defined characters and user-defined bit images)
- 3) Macro buffer: 2 KB
- 4) NV (Non-volatile) graphics memory: 256 KB
- 5) Download graphics memory: 208 KB
- 6) NV user memory: 1 KB
- 7) User-defined page area: 64 KB

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## 1.9 Electrical Characteristics

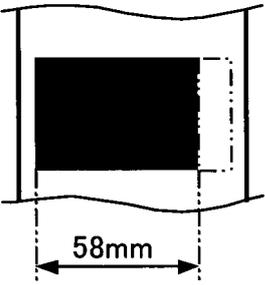
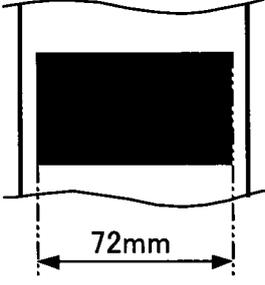
- 1) Supply voltage and frequency: AC100 -240 V 50-60Hz
- 2) Rated current: 1.0 A

NOTES: 1. Notes on printing with a high print ratio

Printing with this product is assumed to be receipts or the equivalent. If printing is continuously performed with a high print ratio, the overcurrent limitation may be operated. Therefore, the printing length must not exceed the following values when printing with high print ratio.

Print ratio: Number of dots being energized per one dotline / Total number of dots per one dotline (576 dots)

**Table 1.9.2 Limitation of the Printing Length on Print Ratio**

Print ratio	80%	100%
Print example		
Print length	30 mm	20 mm

If the overcurrent limitation is operated when printing is continuously performed with a high print ratio, uneven print density or a low voltage error may occur.

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## 1.10 EMI and Safety Standards Applied

(EMC is tested using an EPSON AC adapter.)

- |                  |   |
|------------------|---|
| 1) Europe        | CE marking:<br>Directive: 2004/108/EC<br>EN55022 Class A<br>EN55024<br>IEC61000-4-2<br>IEC61000-4-3<br>IEC61000-4-4<br>IEC61000-4-5<br>IEC61000-4-6<br>IEC61000-4-11<br>Directive: 73/23/EEC<br>EN60950-1<br>Safety Standard: TÜV (EN60950-1) |
| 2) North America | EMI: FCC/ICES-003 Class A<br>Safety standards: UL60950-1/CSA C22.2 No.60950-1   |
| 3) Japan         | EMI: VCCI Class A   |
| 4) Oceania       | EMI: AS/NZS CISPR22 Class A   |
| 5) Russia        | Safety standard & EMC: GOST-R (IEC60950, CISPR 22)  |

### Conditions of Acceptability

- 1) This component has been judged on the basis of the required spacing in the Standard for Information Technology equipment, Including Electrical Business Equipment, UL 60950-1 and CSA C22.2 No. 60950-1, Sub-clause 2.9, which would cover the component itself if submitted for Listing.
- 2) This unit is intended to be supplied by a SELV circuit only.
- 3) The terminals and connectors have not been evaluated for field wiring.

The TM-T20 is Energy Star qualified.

## 1.11 Reliability

### 1) Life:

(End of life is defined as the point at which the printer reaches the beginning of the wear out period.)

Printer mechanism (except thermal head and autocutter):

15 million lines (printing + paper feeding)

NOTE: Assumed in the condition where 10 line-printing + 5 line-paper feeding is repeated with 3.75 mm line spacing.

Thermal head: 100 million pulses, 100 km

Autocutter: 1,500,000 cuts

### 2) MTBF: 360,000 hours

(Failure is defined as a random failure occurring at the time of the random failure period.)

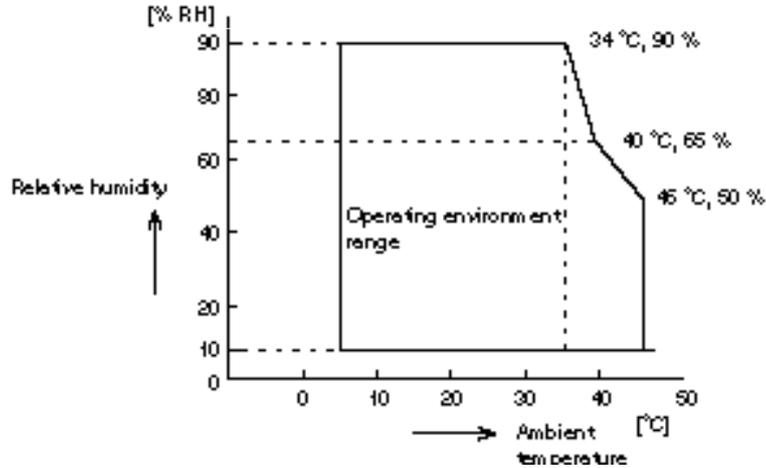
### 3) MCBF: 60 million lines

(This is an average failure interval based on failures related to wear out and random failures up to the life of 15 million lines.)

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**1.12 Environmental Conditions**

- 1) Temperature: Operating: 5 to 45°C {41 to 113°F}  
Storage: -10 to 50°C {14 to 122°F} (paper excluded)
- 2) Humidity: Operating: 10 to 90% RH  
Storage: 10 to 90% RH (paper excluded)



**Figure 1.12.1 Operating Temperature and Humidity Range**

NOTE: If the printer is not used for a long time with paper installed, some part of the printing may be light due to the deformation of the paper. If the printer is not used for a long time with paper installed, be sure to feed paper approximately 30 mm {1.18"} before printing.

- 3) Vibration resistance: When packed: Frequency: 5 to 55 Hz  
Acceleration: Approximately 19.6 m/s<sup>2</sup> {2 G}  
Sweep: 10 minutes (half cycle)  
Duration: 1 hour  
Directions: x, y, and z

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

- 4) Impact resistance: When packed: Package: Epson standard package  
Height: 60 cm {23.6"}  
Directions: 1 corner, 3 edges, and 6 surfaces

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

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

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

- 5) Acoustic noise (operating): Approximately 55 dB (bystander position)

NOTE: The values above are measured in the Epson evaluation condition.

The acoustic noise varies, depending on the paper used, printing contents, or the setting values, such as print speed or print density.

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**1.13 Installation**

- The TM-T20 printer can be installed horizontally or vertically. When installing vertically, it is also possible to install the printer so that the roll paper exit side is exactly perpendicular to the surface it is installed on by using the wall hanging bracket.
- For installation, vibration during paper cutting and using a drawer must be considered and measures must be taken to prevent the printer from moving. (Affixing tape is provided as an option.)
- When installing vertically, be sure to attach the bundled rubber feet for vertical installation. Also, be sure to attach the bundled power switch cover or waterproof power switch cover.
- The bundled hanging bracket can attach the printer to a wall.

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**2. CONFIGURATION**

**2.1 Interfaces**

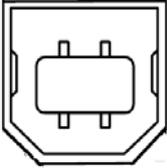
**2.1.1 Universal Serial Bus (USB) interface**

The USB interface has a USB upstream port connector (USB type-B connector).

1) Connector pin assignments: See Table 2.1.1.

**Table 2.1.1 USB Connector Pin Assignments**

Pin number	Signal name
1	VBUS
2	D-
3	D+
4	GND
Shell	Shield



2) USB function

- Overall specifications: USB 2.0
- Communication speed: Full-speed (12 Mbps)
- Communication method: USB bulk
- Power supply specifications: USB self power supply function
- Current consumed by USB bus: 2 mA (provided entirely from the main unit)
- USB packet size
  - With full-speed connection: USB bulk OUT 64 bytes
  - USB bulk IN 64 bytes

USB device class

Both USB vendor-defined class and USB printer class are supported.  
Switching of the class can be set with the software setting value at startup. (See Section 3.5.1 for how to change the setting.)

USB descriptor

	USB printer class	USB vendor-defined class
Vendor ID	04b8h	04b8h
Product ID	0E03h	0202h
String Descriptor		
Manufacturer	EPSON	EPSON
Product	TM-T20	TM-T20
Serial Number	Character string based on the product serial number	Character string based on the product serial number

3) Status transmission from printer with USB interface

With this interface, the status of the printer is transmitted to the host computer via the USB bulk transmission method.

The USB bulk transmission method is a host-controlled transmission method. Unlike RS-232 transmission, it cannot spontaneously interrupt data transmission to the host computer.

The printer has a 128-byte status data buffer. Statuses that exceed the buffer capacity are canceled. In order to avoid lack of status data, it is necessary to periodically retrieve status data at the host computer.

4) USB Device Requests of USB printer class

- GET PORT STATUS

When this USB Device Request is requested, the following status is returned:

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 Device ID: USB Device Request is requested, the following character string is returned:

```

[00H][ XXH] *1
MFG:EPSON;
CMD:ESC/POS;
MDL:TM-T20; *2
CLS:PRINTER;
DES:EPSON[SP]TM-T20;
CID: EpsonTM00001002; *2
    
```

\*1: Buffer size

\*2: The character string depends on the language model and the mode.

	MDL	CID
ANK model	TM-T20	EpsonTM00001002 (Normal mode) EpsonTM00000002 (42 column mode)
Japanese model	TM-T20-JPN	EpsonTM00001102 (Normal mode) EpsonTM00000102 (42 column mode)

- SOFT RESET

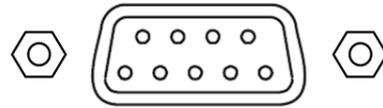
The host computer uses this USB Device Request when initializing the printer input buffer.

**2.1.2 RS-232 serial interface**

**2.1.2.1 Pin assignment and the connector**

**Table 2.1.2 USB Connector Pin Assignment and RS-232 Serial Interface Connector**

Pin numbers	Functions
1	—
2	RXD
3	TXD
4	DTR
5	SG
6	DSR
7	RTS
8	—
9	—
Shell	Shield



**2.1.2.2 Specifications** (Complies with RS-232)

- Data transmission: Serial
- Synchronization: Asynchronous
- Handshaking: DTR/DSR or XON/XOFF control
- Signal levels: MARK = -3 to -15 V: Logic "1"/ OFF  
SPACE = +3 to +15 V: Logic "0"/ ON
- Transmission speed: 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps  
[bps: bits per second]
- Data word lengths: 7 or 8 bits
- Parity settings: None, even, odd
- Stop bits: 1 or more
- Connector (printer side): Male DSUB-9 pin connector

- NOTES: 1. The handshaking, data word length, baud rate, and parity depend on the setting of the communication condition of the serial interface. (See Section 3.5.1.3, Serial interface communication condition.)
2. The stop bit for the printer side is fixed to 1.

**2.1.2.3 Switching between online and offline**

The printer does not have an online/offline switch. The printer goes offline:

- 1) Between when the power is turned on and when the printer is ready to receive data.
- 2) During a self-test.
- 3) When the roll paper cover is open.
- 4) During paper feeding using the Feed button.
- 5) When the printer stops printing due to a paper-end (in cases where a paper-out is detected by the roll paper-end sensor.)
- 6) When waiting for the Feed button to be pressed before macro execution.
- 7) When an error has occurred.

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## 2.1.2.4 Interface connector terminal assignments and signal functions

**Table 2.1.3 TM-T20 Printer Status and Signals**

Pin no.	Signal name	Signal direction	Function																															
2	RXD	Input	Receive data																															
3	TXD	Output	Transmit data																															
4	DTR	Output	<p>1) When DTR/DSR control is selected: This signal indicates whether the printer is busy. SPACE indicates that the printer is ready to receive data, and MARK indicates that the printer is busy. The printer goes BUSY (MARK) in the following conditions:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Printer status</th> <th colspan="2">Msw1-3 status</th> </tr> <tr> <th>ON</th> <th>OFF</th> </tr> </thead> <tbody> <tr> <td rowspan="8" style="writing-mode: vertical-rl; transform: rotate(180deg); text-align: center;">Offline</td> <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 cover is open.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>4. During paper feeding using the paper Feed button.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>5. When the printer stops printing due to a paper-end.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>6. When waiting for the Feed button to be pressed before macro execution.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>7. When an error has occurred.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>8. When the receive buffer becomes full. (*1)</td> <td>BUSY</td> <td>BUSY</td> </tr> </tbody> </table> <p>2) When XON/XOFF control is selected: The signal indicates whether the printer is correctly connected and is ready to receive data from the host computer. SPACE indicates that the printer is ready to receive data from the host computer. The signal is always SPACE except in the following cases:</p> <ul style="list-style-type: none"> <li>• During the period from when the power is turned on to when the printer becomes ready to receive data</li> <li>• During a self-test</li> </ul>		Printer status	Msw1-3 status		ON	OFF	Offline	1. During the period from when the power is turned on to when the printer becomes ready to receive data.	BUSY	BUSY	2. During a self-test.	BUSY	BUSY	3. When the cover is open.	—	BUSY	4. During paper feeding using the paper Feed button.	—	BUSY	5. When the printer stops printing due to a paper-end.	—	BUSY	6. When waiting for the Feed button to be pressed before macro execution.	—	BUSY	7. When an error has occurred.	—	BUSY	8. When the receive buffer becomes full. (*1)	BUSY	BUSY
	Printer status	Msw1-3 status																																
		ON	OFF																															
Offline	1. During the period from when the power is turned on to when the printer becomes ready to receive data.	BUSY	BUSY																															
	2. During a self-test.	BUSY	BUSY																															
	3. When the cover is open.	—	BUSY																															
	4. During paper feeding using the paper Feed button.	—	BUSY																															
	5. When the printer stops printing due to a paper-end.	—	BUSY																															
	6. When waiting for the Feed button to be pressed before macro execution.	—	BUSY																															
	7. When an error has occurred.	—	BUSY																															
	8. When the receive buffer becomes full. (*1)	BUSY	BUSY																															
5	SG	—	Signal ground																															
6	DSR	Input	<p>This signal indicates whether the host computer can receive data. SPACE indicates that the host computer can receive data, and MARK indicates that the host computer cannot receive data.</p> <p>When DTR/DSR control is selected, the printer transmits data after confirming this signal (except when transmitting data by <b>DLE EOT</b> or <b>GS a</b>).</p> <p>When XON/XOFF control is selected, the printer does not check this signal.</p>																															
7	RTS	Output	Same as DTR signal																															

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\*1 • Definition of “receive buffer full”

- 1) When the receive buffer capacity is specified as 4 KB (Msw1-2 is Off):
  - (1) If Msw5-2 is off, when the remaining space in the receive buffer drops to 128 bytes, the printer status becomes “buffer full” and it remains “buffer full” until the space in the receive buffer increases to 256 bytes.
  - (2) If Msw5-2 is on, when the remaining space in the receive buffer drops to 128 bytes, the printer status becomes “buffer full” and it remains “buffer full” until the space in the receive buffer increases to 138 bytes.

- 2) When the receive buffer capacity is specified as 45 bytes (Msw1-2 is On):  
 Regardless of the Msw5-2 setting, when the remaining space in the receive buffer drops to 16 bytes, the printer status becomes “buffer full” and it remains “buffer full” until the space in the receive buffer increases to 26 bytes.

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

**2.1.2.5 XON/XOFF transmission timing**

When XON/XOFF control is selected, the printer transmits XON or XOFF signal at the timing shown below. Transmission timing differs depending on the Msw1-3 setting.

**Table 2.1.4 XON/XOFF Transmission Timing**

	Printer status	Msw1-3 status	
		ON	OFF
XON transmission	1) When the printer goes online after turning 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 the <b>DLE ENQ 1</b> or <b>DLE ENQ 2</b> 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. Even in case 3), XON is not transmitted when the receive buffer is full.  
 3. Even in case 6), XOFF is not transmitted when the receive buffer is full.

**2.1.2.6 Example serial interface connection**

Host computer side	Printer side
TXD .....	RXD
DSR .....	DTR
CTS .....	RTS
RXD .....	TXD
DTR .....	DSR
FG .....	FG
SG .....	SG

- NOTES: 1. When connecting the printer to a DCE (Data Circuit Terminating Equipment), set the handshaking so that the transmit data can be received.  
 2. Transmit data to the printer after turning on the power and initializing the printer.

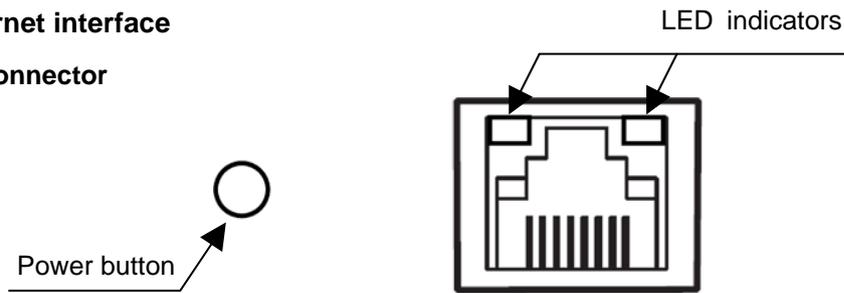
**2.1.2.7 Notes on setting Msw1-3 to ON**

- 1) The printer mechanism stops but does not become busy when: an error has occurred, the cover is open, the printer stops printing due to a paper-end, or paper is fed using the Feed button.
- 2) When setting Msw1-3 to ON to enable handshaking with the printer, be sure to check the printer status using the **GS a** command and the ASB function. In this setting, the default value of *n* for **GS a** is 2. The printer automatically transmits the printer status, depending on online/offline changes.
- 3) When using **DLE EOT**, **DLE ENQ**, and **DLE DC4**, 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**, **DLE ENQ**, and **DLE DC4** 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**, **DLE ENQ**, or **DLE DC4** used while transmitting the bit-image data is processed as bit-image data. The data transmitted when the receive buffer is full may be lost.

Example: Check the printer status using **GS r** after transmitting each line of data and use the 4 KB receive buffer. Data amount of one line must not make the receive buffer full.

**2.1.3 Ethernet interface**

**2.1.3.1 Connector**



**Figure 2.1.5 Ethernet Interface Connector**

**2.1.3.2 Physical communication specifications**

10BASE-T, 100BASE-TX Ethernet communication,  
Full duplex, half duplex 10BASE-T/100BASE-TX,

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**2.1.3.3 Button and Indicators**

1) Button

- Type: Non-lock push button
- Number of buttons: 1
- Functions:
- Setting initialization  
Hold down the push button while turning on the printer power until the message that indicates the start of initialization is printed (approximately 10 seconds), causes all of the internal setting to return to their factory default values.
  - Status sheet printing  
Holding down the push button for 3 seconds or longer while the printer is ready to print causes the modules internal setting parameters to be printed out.

2) Indicators

- Type: LED
- Number of indicators: Green: 1, yellow: 1
- Functions: The Green one comes on when an Ethernet link has been established, and the yellow one comes on when the printer has Ethernet traffic.

NOTE: The indicators are both off in low-power consumption mode.

**2.1.3.4 Software specifications**

1) Basic communications protocols

Protocol	Application
IP, ARP, ICMP, UDP, TCP	Basic communications protocols for various functions (Used by the higher-level protocols below.)

2) Printing communications protocols

Protocol	Application
LP, LPR	Transfers printing data.
TCP Socket Port	Transfers printing data and printer status using bi-directional direct socket communications.

3) Status inquiry and setting protocols

Protocol	Application
HTTP	Displaying and setting module status with an HTTP browser.
SNMP	Obtaining and/or setting the module settings or printer status using the dedicated or a universal MIB tool
ENPC	Obtaining and /or setting the module settings or printer status.

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#### 4) Automatic IP address assignment protocols

- Supports DHCP and APIPA, the protocols that assign an IP address automatically.
- Automatic IP address assignment is performed with the protocols in the order of descending priorities shown in the table below. If automatic assignment with one protocol results in “disabled” or “failure,” the protocol that follows is used.

Protocol	Order	Application
DHCP	1	Acquiring IP address
APIPA	2	Assigning IP address
Manual assignment	3	Using the internal set parameters

#### 5) Internal settings

- List of items

Articles	Parameters	Default	Utility		Browser		Status sheet printing
			Refer	Setting	Refer	Setting	
IP address		192.168.192.168	Yes	Yes	Yes	Yes	Yes
Subnet mask		255.255.255.0	Yes	Yes	Yes	Yes	Yes
Gateway		0.0.0.0	Yes	Yes	Yes	Yes	Yes
DHCP	Enable/Disable	Disable	Yes	Yes	Yes	Yes	Yes
APIPA	Enable/Disable	Disable	Yes	Yes	Yes	Yes	Yes
Arp + ping	Enable/Disable	Enable	Yes	Yes	Yes	Yes	No
Community name 1 (Read-only)	Max.16 Chars.	“public”	Yes	No	Yes	No	Yes
Community name 2 (Read-only)	Max.16 Chars.	None	Yes	Yes	Yes	Yes	Yes
IP Trap 1 Enable	Enable/Disable	Disable	Yes	Yes	Yes	Yes	No
IP Trap 2 Enable	Enable/Disable	Disable	Yes	Yes	Yes	Yes	No
Community name (IP Trap #1)	Max.16 Chars.	None	Yes	Yes	Yes	Yes	No
Community name (IP Trap #2)	Max.16 Chars.	None	Yes	Yes	Yes	Yes	No
IP trap #1 address		None	Yes	Yes	Yes	Yes	No
IP trap #2 address		None	Yes	Yes	Yes	Yes	No
Socket timeout	0: No timeout 1 – 300: duration of timeout (seconds)	300	No	No	Yes	Yes	Yes
Password		None	Yes	Yes	No	Yes	No
Mode name	Auto negotiation / 10Base-T Half / 10Base-T Full / 100Base-TX Half / 100Base-TX Full	Auto negotiation	Yes	Yes	Yes	Yes	Yes
Hardware version			Yes	No	Yes	No	Yes
Firmware version			Yes	No	Yes	No	Yes
MAC Address			Yes	No	Yes	No	Yes

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- Changing internal parameter settings  
Change the internal settings in any of the following methods:
  - Using the dedicated utility
  - Using an HTTP browser
  - Using arp and ping commands (only IP address is settable)
- Making internal settings with the dedicated utility  
Epson provides a dedicated utility that makes a variety of settings with the ENPC protocol.
- Setting with an HTTP browser  
An HTTP browser can make setting when connected to the module.  
The new IP address takes effect when the printer power is turned off and back on.
- Setting the IP address with arp + ping  
This function is available when it has been enabled. The setting can be made only from a host computer in the same segment as the module. The host computer must support both arp and ping commands.  
The new IP address takes effect when the UB-E03 responds to the ping command.  
Example 1: Using Sun operation system  
arp -s 123.45.67.89 00:00:85:06:00:01 temp  
ping: 123.45.67.89  
Example 2: Using Windows operation system  
Arp: -s 123.45.67.89 00-00-85-06-00-01  
Ping: 123.45.67.89
- How to check the Mac address  
Check the Mac address of the UB-E03 with any of the following methods:
  - Printing the status sheet
  - Label attached to the UB-E03
  - Using an HTTP browser
  - Printer self-test (Some TM printers may not be supported.)

## 6) Start up period

The UB-E03 requires some boot time for network functions after power-on or system reset. The required boot time is as follows:

- When setting the IP address by manual assignment: approximately 15 seconds
- When setting the IP address by automatic assignment: approximately 20 seconds  
(\*Above values depend on the response time of the DHCP server.)

During this period, no network function works.

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**2.2 Connectors**

**2.2.1 Interface connectors**

See Section 2.1, Interfaces.

**2.2.2 AC inlet**

This inlet is used for the IEC320-C13 connector.

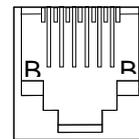
**2.2.3 Drawer kick-out connector (modular connector)**

The pulse specified by **ESC p** or **DLE DC4** is output to this connector. The host computer can confirm the status of the input signal by using the **DLE EOT**, **GS a**, or **GS r** command. See APPENDIX E, NOTES ON USING THE DRAWER KICK-OUT CONNECTOR.

1) Pin assignments: See Table 2.2.1.

**Table 2.2.1 Drawer Kick-out Connector Pin Assignments**

Pin numbers	Signal names	Direction
1	Frame GND	—
2	Drawer kick-out drive signal 1	Output
3	Drawer open/close signal	Input
4	+24 V	—
5	Drawer kick-out drive signal 2	Output
6	Signal GND	—



**Figure 2.2.1 Drawer Kick-out Connector**

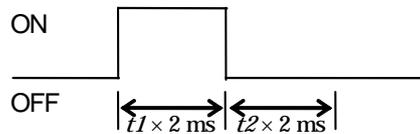
+24 V is output through pin 4 when the power is turned on. However, pin 4 must be used only for the drawer or the optional external buzzer.

- 2) Connector model: Printer side: MOLEX 52065-6615 or the equivalent  
User side: 6-position 6-contact (RJ12 telephone jack)
- 3) Drawer kick-out drive signal  
Output signal: Output voltage: Approximately 24 V  
Output current: 1 A or less

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

The ON/OFF signal of the drawer kick-out solenoid is shown in Figure 2.2.2.

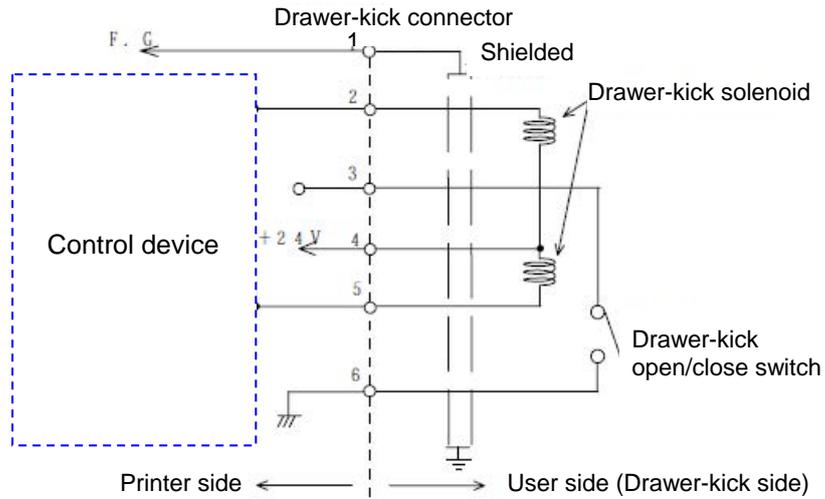
$t_1$  (ON time) and  $t_2$  (OFF time) are specified by **ESC p** or **DLE DC4**.



**Figure 2.2.2 Drawer Kick-out Drive Signal**

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4) Drawer open/close signal

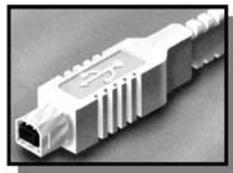


**Figure 2.2.3 Drawer Connection Diagram**

- NOTES:
1. Use a shielded cable for the drawer connector cable.
  2. Two driver transistors cannot be energized simultaneously.
  3. The drawer drive duty must be as shown below.

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

4. Be sure to use the printer power supply (connector pin 4) for the drawer power source.
5. The resistance of the drawer kick-out solenoid must not be less than specified. Otherwise, an overcurrent could damage the solenoid.
6. Do not connect a telecommunication network to the drawer kick-out connector.
7. Do not connect the USB connector ("B" Plugs of the series B connectors) to the drawer-kick connector. Doing so may damage the printer or the host computer system.



**"B" Plugs**  
(From the Host System)

5) Connection of the optional external buzzer

The optional external buzzer can be connected to the drawer kick-out connector. When the optional external buzzer is connected, be sure to set the optional external buzzer to Enable with the software setting. (See Section 3.5.1 for how to change the setting.)  
When the optional external buzzer is used, a drawer cannot be used. It is prohibited that both the optional external buzzer and the drawer are connected at the same time by using a branched connector.

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### 3. FUNCTIONS

#### 3.1 List of Commands

Command	Name
<b>HT</b>	Horizontal tab
<b>LF</b>	Print and line feed
<b>FF</b>	Print and return to standard mode (in page mode)
<b>CR</b>	Print and carriage return
<b>CAN</b>	Cancel print data in page mode
<b>DLE EOT</b>	Transmit real-time status
<b>DLE ENQ</b>	Send real-time request to printer
<b>DLE DC4</b>	Generate pulse in real-time ( <i>fn</i> = 1)
	Execute power-off sequence ( <i>fn</i> = 2)
	Control buzzer ( <i>fn</i> = 3) (optional external buzzer)
	Clear buffer(s) ( <i>fn</i> = 8)
<b>ESC FF</b>	Print data in page mode
<b>ESC SP</b>	Set right-side character spacing
<b>ESC !</b>	Select print mode(s)
<b>ESC \$</b>	Set absolute print position
<b>ESC %</b>	Select/cancel user-defined character set
<b>ESC &amp;</b>	Define user-defined characters
<b>ESC ( A</b>	Control buzzer (optional external buzzer)
	<Function 97> Control buzzer (Specify a beep pattern) (External optional buzzer)
<b>ESC *</b>	Select bit-image mode
<b>ESC -</b>	Turn underline mode on/off
<b>ESC 2</b>	Select default line spacing
<b>ESC 3</b>	Set line spacing
<b>ESC =</b>	Select peripheral device
<b>ESC ?</b>	Cancel user-defined characters
<b>ESC @</b>	Initialize printer
<b>ESC D</b>	Set horizontal tab positions
<b>ESC E</b>	Turn emphasized mode on/off
<b>ESC G</b>	Turn double-strike mode on/off
<b>ESC J</b>	Print and feed paper
<b>ESC L</b>	Select page mode
<b>ESC M</b>	Select character font
<b>ESC R</b>	Select an international character set
<b>ESC S</b>	Select standard mode
<b>ESC T</b>	Select print direction in page mode
<b>ESC V</b>	Turn 90° clockwise rotation mode on/off
<b>ESC W</b>	Set print area in page mode
<b>ESC \</b>	Set relative print position

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Command	Name
<b>ESC a</b>	Select justification
<b>ESC c 5</b>	Enable/disable panel buttons
<b>ESC d</b>	Print and feed <i>n</i> lines
<b>ESC p</b>	Generate pulse
<b>ESC t</b>	Select character code table
<b>ESC {</b>	Turn upside-down print mode on/off
<b>FS ( E</b>	Group of commands for receipt enhancement control <Function 60> Cancel set values for top/bottom logo printing. <Function 61> Transmit set values for top/bottom logo printing. <Function 62> Set top logo printing. <Function 63> Set bottom logo printing. <Function 64> Make extended settings for top/bottom logo printing. <Function 65> Enable/disable top/bottom logo printing.
<b>FS g 1</b>	Write to NV user memory
<b>FS g 2</b>	Read from NV user memory
<b>GS !</b>	Select character size
<b>GS \$</b>	Set absolute vertical print position in page mode
<b>GS ( A</b>	Execute test print
<b>GS ( D</b>	Enable/disable real-time command
<b>GS ( E</b>	Set user setup commands <Function 1> Change into the user setting mode. <Function 2> End the user setting mode session. <Function 3> Set value(s) for the memory switch. <Function 4> Transmit the setting of the memory switch. <Function 5> Set the customized setting values. <Function 6> Transmit the customized setting values. <Function 11> Set the configuration item for the serial interface. <Function 12> Transmit the configuration item for the serial interface. <Function 15> Set conditions for USB interface communication. <Function 16> Transmit conditions for USB interface communication.
<b>GS ( H</b>	Request transmission of response or status <Function 48> Set the process ID response.
<b>GS ( K</b>	Select print control method(s) <Function 50> Select the print speed.
<b>GS ( L / GS 8 L</b>	Set graphics data <Function 48> Transmit the NV graphics memory capacity. <Function 50> Print the graphics data in the print buffer. <Function 51> Transmit the remaining capacity of the NV graphics memory. <Function 52> Transmit the remaining capacity of the download graphics memory. <Function 64> Transmit the key code list for defined NV graphics. <Function 65> Delete all NV graphics data. <Function 66> Delete the specified NV graphics data. <Function 67> Define the NV graphics data (raster format). <Function 69> Print the specified NV graphics data. <Function 80> Transmit the key code list for defined download graphics. <Function 81> Delete all download graphics data. <Function 82> Delete the specified download graphics data. <Function 83> Define the download graphics data (raster format). <Function 85> Print the specified download graphics data. <Function 112> Store the graphics data in the print buffer (raster format).

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Command	Name
<b>GS ( k</b>	<p>Set up and print symbol</p> <ul style="list-style-type: none"> <li>&lt;Function 065&gt; PDF417: Set the number of columns in the data region.</li> <li>&lt;Function 066&gt; PDF417: Set the number of rows.</li> <li>&lt;Function 067&gt; PDF417: Set the width of the module.</li> <li>&lt;Function 068&gt; PDF417: Set the row height.</li> <li>&lt;Function 069&gt; PDF417: Set the error correction level.</li> <li>&lt;Function 070&gt; PDF417: Select the options.</li> <li>&lt;Function 080&gt; PDF417: Store the data in the symbol storage area.</li> <li>&lt;Function 081&gt; PDF417: Print the symbol data in the symbol storage area.</li> <li>&lt;Function 082&gt; PDF417: Transmit the size information of the symbol data in the symbol storage area.</li> <li>&lt;Function 165&gt; QR Code: Select the model.</li> <li>&lt;Function 167&gt; QR Code: Set the size of module.</li> <li>&lt;Function 169&gt; QR Code: Select the error correction level.</li> <li>&lt;Function 180&gt; QR Code: Store the data in the symbol storage area.</li> <li>&lt;Function 181&gt; QR Code: Print the symbol data in the symbol storage area.</li> <li>&lt;Function 182&gt; QR Code: Transmit the size information of the symbol data in the symbol storage area.</li> <li>&lt;Function 265&gt; MaxiCode: Select the mode.</li> <li>&lt;Function 280&gt; MaxiCode: Store the data in the symbol storage area.</li> <li>&lt;Function 281&gt; MaxiCode: Print the symbol data in the symbol storage area.</li> <li>&lt;Function 282&gt; MaxiCode: Transmit the size information of the symbol data in the symbol storage area.</li> <li>&lt;Function 367&gt; Two-dimensional GS1 DataBar: Set the width of the module.</li> <li>&lt;Function 371&gt; Two-dimensional GS1 DataBar: Set the maximum width of GS1 DataBar Expanded Stacked.</li> <li>&lt;Function 380&gt; Two-dimensional GS1 DataBar: Store the data in the symbol storage area.</li> <li>&lt;Function 381&gt; Two-dimensional GS1 DataBar: Print the symbol data in the symbol storage area.</li> <li>&lt;Function 382&gt; Two-dimensional GS1 DataBar: Transmit the size information of the symbol data in the symbol storage area.</li> <li>&lt;Function 467&gt; Composite Symbology: Set the width of module.</li> <li>&lt;Function 471&gt; Composite Symbology: Set the maximum width of GS1 DataBar Expanded Stacked.</li> <li>&lt;Function 472&gt; Composite Symbology: Select a font for HRI character.</li> <li>&lt;Function 480&gt; Composite Symbology: Store the data in the symbol storage area.</li> <li>&lt;Function 481&gt; Composite Symbology: Print the symbol data in the symbol storage area.</li> <li>&lt;Function 482&gt; Composite Symbology: Transmit the size information of the symbol data in the symbol storage area.</li> </ul>
<b>GS *</b>	Define downloaded bit image
<b>GS /</b>	Print downloaded bit image
<b>GS :</b>	Start/end macro definition
<b>GS B</b>	Turn white/black reverse print mode on/off
<b>GS D</b>	Specify Windows BMP graphics data <ul style="list-style-type: none"> <li>&lt;Function 67&gt; Define Windows BMP NV graphics data.</li> <li>&lt;Function 83&gt; Define Windows BMP download graphics data.</li> </ul>
<b>GS H</b>	Select print position of HRI characters
<b>GS I</b>	Transmit printer ID
<b>GS L</b>	Set left margin

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Command	Name
<b>GS P</b>	Set horizontal and vertical motion units
<b>GS V</b>	Select cut mode and cut paper
<b>GS W</b>	Set print area width
<b>GS \</b>	Set relative vertical print position in page mode
<b>GS ^</b>	Execute macro
<b>GS a</b>	Enable/disable Automatic Status Back (ASB)
<b>GS b</b>	Turn smoothing mode on/off
<b>GS f</b>	Select font for HRI characters
<b>GS g 0</b>	Initialize maintenance counter
<b>GS g 2</b>	Transmit maintenance counter
<b>GS h</b>	Set bar code height
<b>GS k</b>	Print bar code
<b>GS r</b>	Transmit status
<b>GS w</b>	Set bar code width

## List of Multi-byte Code Character Commands (for Japanese model)

Command	Name
<b>FS !</b>	Select print mode(s) for Kanji characters
<b>FS &amp;</b>	Select Kanji character mode
<b>FS -</b>	Turn underline mode on / off for Kanji characters
<b>FS .</b>	Cancel Kanji character mode
<b>FS 2</b>	Define user-defined Kanji characters
<b>FS C</b>	Select Kanji character code system
<b>FS S</b>	Set Kanji character spacing
<b>FS W</b>	Turn quadruple-size mode on / off for Kanji characters

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 command		Upward-compatible command
<b>ESC i</b>	Partial cut (one point left uncut)	<b>GS V</b>
<b>ESC m</b>	Partial cut (three points left uncut)	<b>GS V</b>
<b>ESC u</b>	Transmit peripheral device status	<b>GS r</b>
<b>ESC v</b>	Transmit paper sensor status	<b>GS r</b>
<b>FS p</b>	Print NV bit image	<b>GS ( L &lt;Function 69&gt;</b>
<b>FS q</b>	Define NV bit image	<b>GS ( L &lt;Function 67&gt;</b>
<b>GS v 0</b>	Print raster bit image	<b>GS ( L &lt;Function 112 + 50&gt;</b>

NOTE: “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 future products.

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## 3.2 Character Code Tables

- The character code tables show only character configurations. They do not show the actual print pattern.
- "SP" in the table shows space.

### 3.2.1 Common to all pages (International Character Set: USA)

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		XON 17	! 33	1 49	A 65	Q 81	a 97	q 113
2			" 34	2 50	B 66	R 82	b 98	r 114
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		& 38	6 54	F 70	V 86	f 102	v 118
7			' 39	7 55	G 71	W 87	g 103	w 119
8		CAN 24	( 40	8 56	H 72	X 88	h 104	x 120
9	HT 9		) 41	9 57	I 73	Y 89	i 105	y 121
A	LF 10		* 42	: 58	J 74	Z 90	j 106	z 122
B		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		RS 30	. 46	> 62	N 78	^ 94	n 110	~ 126
F			/ 47	? 63	O 79	_ 95	o 111	SP 127

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## 3.2.2 Page 0 [PC437: USA, Standard Europe]

HEX	8	9	A	B	C	D	E	F
0	Ç <span style="border: 1px solid black; padding: 2px;">128</span>	É <span style="border: 1px solid black; padding: 2px;">144</span>	á <span style="border: 1px solid black; padding: 2px;">160</span>	☼ <span style="border: 1px solid black; padding: 2px;">176</span>	Ł <span style="border: 1px solid black; padding: 2px;">192</span>	Ɑ <span style="border: 1px solid black; padding: 2px;">208</span>	ɑ <span style="border: 1px solid black; padding: 2px;">224</span>	≡ <span style="border: 1px solid black; padding: 2px;">240</span>
1	Ü <span style="border: 1px solid black; padding: 2px;">129</span>	æ <span style="border: 1px solid black; padding: 2px;">145</span>	í <span style="border: 1px solid black; padding: 2px;">161</span>	☼ <span style="border: 1px solid black; padding: 2px;">177</span>	⊥ <span style="border: 1px solid black; padding: 2px;">193</span>	Ɱ <span style="border: 1px solid black; padding: 2px;">209</span>	β <span style="border: 1px solid black; padding: 2px;">225</span>	‡ <span style="border: 1px solid black; padding: 2px;">241</span>
2	é <span style="border: 1px solid black; padding: 2px;">130</span>	Æ <span style="border: 1px solid black; padding: 2px;">146</span>	ó <span style="border: 1px solid black; padding: 2px;">162</span>	☼ <span style="border: 1px solid black; padding: 2px;">178</span>	τ <span style="border: 1px solid black; padding: 2px;">194</span>	π <span style="border: 1px solid black; padding: 2px;">210</span>	Γ <span style="border: 1px solid black; padding: 2px;">226</span>	≥ <span style="border: 1px solid black; padding: 2px;">242</span>
3	â <span style="border: 1px solid black; padding: 2px;">131</span>	ô <span style="border: 1px solid black; padding: 2px;">147</span>	ú <span style="border: 1px solid black; padding: 2px;">163</span>	∟ <span style="border: 1px solid black; padding: 2px;">179</span>	ƒ <span style="border: 1px solid black; padding: 2px;">195</span>	Ɐ <span style="border: 1px solid black; padding: 2px;">211</span>	π <span style="border: 1px solid black; padding: 2px;">227</span>	≤ <span style="border: 1px solid black; padding: 2px;">243</span>
4	ä <span style="border: 1px solid black; padding: 2px;">132</span>	ö <span style="border: 1px solid black; padding: 2px;">148</span>	ñ <span style="border: 1px solid black; padding: 2px;">164</span>	† <span style="border: 1px solid black; padding: 2px;">180</span>	– <span style="border: 1px solid black; padding: 2px;">196</span>	Ɒ <span style="border: 1px solid black; padding: 2px;">212</span>	Σ <span style="border: 1px solid black; padding: 2px;">228</span>	ƒ <span style="border: 1px solid black; padding: 2px;">244</span>
5	à <span style="border: 1px solid black; padding: 2px;">133</span>	ò <span style="border: 1px solid black; padding: 2px;">149</span>	Ñ <span style="border: 1px solid black; padding: 2px;">165</span>	‡ <span style="border: 1px solid black; padding: 2px;">181</span>	† <span style="border: 1px solid black; padding: 2px;">197</span>	ƒ <span style="border: 1px solid black; padding: 2px;">213</span>	σ <span style="border: 1px solid black; padding: 2px;">229</span>	∫ <span style="border: 1px solid black; padding: 2px;">245</span>
6	å <span style="border: 1px solid black; padding: 2px;">134</span>	û <span style="border: 1px solid black; padding: 2px;">150</span>	ª <span style="border: 1px solid black; padding: 2px;">166</span>	∥ <span style="border: 1px solid black; padding: 2px;">182</span>	ƒ <span style="border: 1px solid black; padding: 2px;">198</span>	π <span style="border: 1px solid black; padding: 2px;">214</span>	μ <span style="border: 1px solid black; padding: 2px;">230</span>	÷ <span style="border: 1px solid black; padding: 2px;">246</span>
7	ç <span style="border: 1px solid black; padding: 2px;">135</span>	ù <span style="border: 1px solid black; padding: 2px;">151</span>	º <span style="border: 1px solid black; padding: 2px;">167</span>	π <span style="border: 1px solid black; padding: 2px;">183</span>	∥ <span style="border: 1px solid black; padding: 2px;">199</span>	∥ <span style="border: 1px solid black; padding: 2px;">215</span>	τ <span style="border: 1px solid black; padding: 2px;">231</span>	≈ <span style="border: 1px solid black; padding: 2px;">247</span>
8	ê <span style="border: 1px solid black; padding: 2px;">136</span>	ÿ <span style="border: 1px solid black; padding: 2px;">152</span>	¿ <span style="border: 1px solid black; padding: 2px;">168</span>	‡ <span style="border: 1px solid black; padding: 2px;">184</span>	ℒ <span style="border: 1px solid black; padding: 2px;">200</span>	‡ <span style="border: 1px solid black; padding: 2px;">216</span>	φ <span style="border: 1px solid black; padding: 2px;">232</span>	° <span style="border: 1px solid black; padding: 2px;">248</span>
9	ë <span style="border: 1px solid black; padding: 2px;">137</span>	ö <span style="border: 1px solid black; padding: 2px;">153</span>	ƒ <span style="border: 1px solid black; padding: 2px;">169</span>	∥ <span style="border: 1px solid black; padding: 2px;">185</span>	ƒ <span style="border: 1px solid black; padding: 2px;">201</span>	∫ <span style="border: 1px solid black; padding: 2px;">217</span>	θ <span style="border: 1px solid black; padding: 2px;">233</span>	• <span style="border: 1px solid black; padding: 2px;">249</span>
A	è <span style="border: 1px solid black; padding: 2px;">138</span>	ü <span style="border: 1px solid black; padding: 2px;">154</span>	¬ <span style="border: 1px solid black; padding: 2px;">170</span>	∥ <span style="border: 1px solid black; padding: 2px;">186</span>	ⱪ <span style="border: 1px solid black; padding: 2px;">202</span>	ƒ <span style="border: 1px solid black; padding: 2px;">218</span>	Ω <span style="border: 1px solid black; padding: 2px;">234</span>	• <span style="border: 1px solid black; padding: 2px;">250</span>
B	ï <span style="border: 1px solid black; padding: 2px;">139</span>	ϕ <span style="border: 1px solid black; padding: 2px;">155</span>	½ <span style="border: 1px solid black; padding: 2px;">171</span>	∥ <span style="border: 1px solid black; padding: 2px;">187</span>	Ɱ <span style="border: 1px solid black; padding: 2px;">203</span>	■ <span style="border: 1px solid black; padding: 2px;">219</span>	δ <span style="border: 1px solid black; padding: 2px;">235</span>	√ <span style="border: 1px solid black; padding: 2px;">251</span>
C	î <span style="border: 1px solid black; padding: 2px;">140</span>	£ <span style="border: 1px solid black; padding: 2px;">156</span>	¼ <span style="border: 1px solid black; padding: 2px;">172</span>	∥ <span style="border: 1px solid black; padding: 2px;">188</span>	∥ <span style="border: 1px solid black; padding: 2px;">204</span>	■ <span style="border: 1px solid black; padding: 2px;">220</span>	ω <span style="border: 1px solid black; padding: 2px;">236</span>	∞ <span style="border: 1px solid black; padding: 2px;">252</span>
D	ì <span style="border: 1px solid black; padding: 2px;">141</span>	¥ <span style="border: 1px solid black; padding: 2px;">157</span>	ı <span style="border: 1px solid black; padding: 2px;">173</span>	Ɑ <span style="border: 1px solid black; padding: 2px;">189</span>	= <span style="border: 1px solid black; padding: 2px;">205</span>	∟ <span style="border: 1px solid black; padding: 2px;">221</span>	φ <span style="border: 1px solid black; padding: 2px;">237</span>	² <span style="border: 1px solid black; padding: 2px;">253</span>
E	Ä <span style="border: 1px solid black; padding: 2px;">142</span>	℞ <span style="border: 1px solid black; padding: 2px;">158</span>	« <span style="border: 1px solid black; padding: 2px;">174</span>	∫ <span style="border: 1px solid black; padding: 2px;">190</span>	∥ <span style="border: 1px solid black; padding: 2px;">206</span>	∟ <span style="border: 1px solid black; padding: 2px;">222</span>	ε <span style="border: 1px solid black; padding: 2px;">238</span>	■ <span style="border: 1px solid black; padding: 2px;">254</span>
F	Å <span style="border: 1px solid black; padding: 2px;">143</span>	ƒ <span style="border: 1px solid black; padding: 2px;">159</span>	» <span style="border: 1px solid black; padding: 2px;">175</span>	∫ <span style="border: 1px solid black; padding: 2px;">191</span>	ⱪ <span style="border: 1px solid black; padding: 2px;">207</span>	■ <span style="border: 1px solid black; padding: 2px;">223</span>	∩ <span style="border: 1px solid black; padding: 2px;">239</span>	SP <span style="border: 1px solid black; padding: 2px;">255</span>

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 29	SHEET 28

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## 3.2.3 Page 1 [Katakana]

HEX	8	9	A	B	C	D	E	F
0	— 128	⊥ 144	SP 160	- 176	夕 192	ミ 208	= 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	キ 226	年 242
3	■ 131	⊥ 147	└ 163	ウ 179	テ 195	モ 211	ト 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	ア 167	キ 183	ヌ 199	ラ 215	▼ 231	秒 247
8	136	┌ 152	イ 168	ク 184	ネ 200	リ 216	♠ 232	〒 248
9	137	└ 153	ウ 169	ケ 185	ノ 201	ル 217	♥ 233	市 249
A	138	└ 154	エ 170	コ 186	ハ 202	レ 218	♦ 234	区 250
B	139	└ 155	オ 171	サ 187	ヒ 203	ロ 219	♣ 235	町 251
C	■ 140	┌ 156	ヤ 172	シ 188	フ 204	ワ 220	● 236	村 252
D	■ 141	、 157	ユ 173	ス 189	ハ 205	ン 221	○ 237	人 253
E	■ 142	、 158	ヨ 174	セ 190	ホ 206	” 222	/ 238	☼ 254
F	⊥ 143	ノ 159	ツ 175	リ 191	マ 207	◦ 223	＼ 239	SP 255

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 30	SHEET 29

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## 3.2.4 Page 2 [PC850: Multilingual]

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	☼ 176	Ł 192	ǫ 208	Ó 224	- 240
1	Ü 129	æ 145	í 161	☼ 177	Ł 193	Đ 209	β 225	† 241
2	é 130	Æ 146	ó 162	☼ 178	Ƨ 194	Ê 210	ô 226	= 242
3	â 131	ô 147	ú 163	∣ 179	ƚ 195	Ë 211	ò 227	¼ 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	ä 166	Â 182	ã 198	Í 214	μ 230	÷ 246
7	ç 135	ù 151	ó 167	Ã 183	Ä 199	Î 215	þ 231	· 247
8	ê 136	ÿ 152	ı 168	© 184	Ł 200	Ï 216	þ 232	° 248
9	ë 137	ö 153	® 169	∣ 185	Ɔ 201	Ĵ 217	ú 233	¨ 249
A	è 138	ü 154	¬ 170	∥ 186	Ł 202	Ɔ 218	û 234	• 250
B	ï 139	ø 155	½ 171	∣ 187	Ƨ 203	■ 219	ù 235	¹ 251
C	î 140	£ 156	¼ 172	∣ 188	Ƨ 204	■ 220	ý 236	³ 252
D	ì 141	Ø 157	ı 173	¢ 189	= 205	ı 221	ÿ 237	² 253
E	Ä 142	× 158	« 174	¥ 190	Ƨ 206	Ï 222	- 238	■ 254
F	Å 143	f 159	» 175	Ƨ 191	Ƨ 207	■ 223	˘ 239	SP 255

<b>EPSON</b>	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 31	SHEET 30

**Confidential**

3.2.5 Page 3 [PC860: Portuguese]

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	☼ 176	Ł 192	Ɑ 208	ɑ 224	≡ 240
1	Ü 129	À 145	í 161	☼ 177	⊥ 193	Ɱ 209	β 225	± 241
2	é 130	È 146	ó 162	☼ 178	τ 194	π 210	Γ 226	≥ 242
3	â 131	Ô 147	ú 163	∣ 179	ƒ 195	Ɐ 211	π 227	≤ 243
4	ã 132	Õ 148	ñ 164	† 180	- 196	Ɒ 212	Σ 228	∫ 244
5	à 133	Ò 149	Ñ 165	‡ 181	† 197	ƒ 213	σ 229	∫ 245
6	Á 134	Ú 150	ã 166	∥ 182	ƒ 198	π 214	μ 230	÷ 246
7	ç 135	Ù 151	º 167	π 183	∥ 199	∥ 215	τ 231	≈ 247
8	ê 136	Ì 152	¿ 168	‡ 184	Ⱳ 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	ⱳ 202	∫ 218	Ω 234	• 250
B	Í 139	Φ 155	½ 171	∫ 187	∫ 203	■ 219	δ 235	√ 251
C	Ô 140	£ 156	¼ 172	∫ 188	∫ 204	■ 220	ω 236	∞ 252
D	ì 141	Û 157	ï 173	ⱴ 189	= 205	∣ 221	φ 237	² 253
E	Ă 142	℞ 158	« 174	∫ 190	∫ 206	∣ 222	ε 238	■ 254
F	Â 143	Ó 159	» 175	∫ 191	Ⱶ 207	■ 223	∩ 239	SP 255

<b>EPSON</b>	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 32	SHEET 31

# Confidential

## 3.2.6 Page 4 [PC863: Canadian-French]

HEX	8	9	A	B	C	D	E	F
0	Ç <span style="border: 1px solid black; padding: 2px;">128</span>	É <span style="border: 1px solid black; padding: 2px;">144</span>	Ì <span style="border: 1px solid black; padding: 2px;">160</span>	Ï <span style="border: 1px solid black; padding: 2px;">176</span>	Ĺ <span style="border: 1px solid black; padding: 2px;">192</span>	Œ <span style="border: 1px solid black; padding: 2px;">208</span>	ɑ <span style="border: 1px solid black; padding: 2px;">224</span>	≡ <span style="border: 1px solid black; padding: 2px;">240</span>
1	Ü <span style="border: 1px solid black; padding: 2px;">129</span>	È <span style="border: 1px solid black; padding: 2px;">145</span>	Í <span style="border: 1px solid black; padding: 2px;">161</span>	Î <span style="border: 1px solid black; padding: 2px;">177</span>	Ł <span style="border: 1px solid black; padding: 2px;">193</span>	Ƨ <span style="border: 1px solid black; padding: 2px;">209</span>	β <span style="border: 1px solid black; padding: 2px;">225</span>	‡ <span style="border: 1px solid black; padding: 2px;">241</span>
2	é <span style="border: 1px solid black; padding: 2px;">130</span>	Ê <span style="border: 1px solid black; padding: 2px;">146</span>	Ó <span style="border: 1px solid black; padding: 2px;">162</span>	Ï <span style="border: 1px solid black; padding: 2px;">178</span>	Τ <span style="border: 1px solid black; padding: 2px;">194</span>	Π <span style="border: 1px solid black; padding: 2px;">210</span>	Γ <span style="border: 1px solid black; padding: 2px;">226</span>	≥ <span style="border: 1px solid black; padding: 2px;">242</span>
3	â <span style="border: 1px solid black; padding: 2px;">131</span>	Ô <span style="border: 1px solid black; padding: 2px;">147</span>	Ú <span style="border: 1px solid black; padding: 2px;">163</span>	Ī <span style="border: 1px solid black; padding: 2px;">179</span>	ƒ <span style="border: 1px solid black; padding: 2px;">195</span>	Ʊ <span style="border: 1px solid black; padding: 2px;">211</span>	π <span style="border: 1px solid black; padding: 2px;">227</span>	≤ <span style="border: 1px solid black; padding: 2px;">243</span>
4	Â <span style="border: 1px solid black; padding: 2px;">132</span>	Ë <span style="border: 1px solid black; padding: 2px;">148</span>	Û <span style="border: 1px solid black; padding: 2px;">164</span>	Ĳ <span style="border: 1px solid black; padding: 2px;">180</span>	– <span style="border: 1px solid black; padding: 2px;">196</span>	Ɠ <span style="border: 1px solid black; padding: 2px;">212</span>	Σ <span style="border: 1px solid black; padding: 2px;">228</span>	Ɩ <span style="border: 1px solid black; padding: 2px;">244</span>
5	à <span style="border: 1px solid black; padding: 2px;">133</span>	Ï <span style="border: 1px solid black; padding: 2px;">149</span>	Ü <span style="border: 1px solid black; padding: 2px;">165</span>	ƚ <span style="border: 1px solid black; padding: 2px;">181</span>	† <span style="border: 1px solid black; padding: 2px;">197</span>	Ɣ <span style="border: 1px solid black; padding: 2px;">213</span>	σ <span style="border: 1px solid black; padding: 2px;">229</span>	Ʒ <span style="border: 1px solid black; padding: 2px;">245</span>
6	ŋ <span style="border: 1px solid black; padding: 2px;">134</span>	Û <span style="border: 1px solid black; padding: 2px;">150</span>	Ɔ <span style="border: 1px solid black; padding: 2px;">166</span>	ƚ <span style="border: 1px solid black; padding: 2px;">182</span>	ƒ <span style="border: 1px solid black; padding: 2px;">198</span>	π <span style="border: 1px solid black; padding: 2px;">214</span>	μ <span style="border: 1px solid black; padding: 2px;">230</span>	÷ <span style="border: 1px solid black; padding: 2px;">246</span>
7	ç <span style="border: 1px solid black; padding: 2px;">135</span>	Ù <span style="border: 1px solid black; padding: 2px;">151</span>	– <span style="border: 1px solid black; padding: 2px;">167</span>	π <span style="border: 1px solid black; padding: 2px;">183</span>	ƚ <span style="border: 1px solid black; padding: 2px;">199</span>	ƚ <span style="border: 1px solid black; padding: 2px;">215</span>	τ <span style="border: 1px solid black; padding: 2px;">231</span>	≈ <span style="border: 1px solid black; padding: 2px;">247</span>
8	ê <span style="border: 1px solid black; padding: 2px;">136</span>	Ɔ <span style="border: 1px solid black; padding: 2px;">152</span>	Î <span style="border: 1px solid black; padding: 2px;">168</span>	ƚ <span style="border: 1px solid black; padding: 2px;">184</span>	ƚ <span style="border: 1px solid black; padding: 2px;">200</span>	ƚ <span style="border: 1px solid black; padding: 2px;">216</span>	φ <span style="border: 1px solid black; padding: 2px;">232</span>	° <span style="border: 1px solid black; padding: 2px;">248</span>
9	ë <span style="border: 1px solid black; padding: 2px;">137</span>	Ô <span style="border: 1px solid black; padding: 2px;">153</span>	ƚ <span style="border: 1px solid black; padding: 2px;">169</span>	ƚ <span style="border: 1px solid black; padding: 2px;">185</span>	ƚ <span style="border: 1px solid black; padding: 2px;">201</span>	ƚ <span style="border: 1px solid black; padding: 2px;">217</span>	θ <span style="border: 1px solid black; padding: 2px;">233</span>	• <span style="border: 1px solid black; padding: 2px;">249</span>
A	è <span style="border: 1px solid black; padding: 2px;">138</span>	Û <span style="border: 1px solid black; padding: 2px;">154</span>	– <span style="border: 1px solid black; padding: 2px;">170</span>	ƚ <span style="border: 1px solid black; padding: 2px;">186</span>	ƚ <span style="border: 1px solid black; padding: 2px;">202</span>	ƚ <span style="border: 1px solid black; padding: 2px;">218</span>	Ω <span style="border: 1px solid black; padding: 2px;">234</span>	• <span style="border: 1px solid black; padding: 2px;">250</span>
B	ï <span style="border: 1px solid black; padding: 2px;">139</span>	Ɔ <span style="border: 1px solid black; padding: 2px;">155</span>	½ <span style="border: 1px solid black; padding: 2px;">171</span>	ƚ <span style="border: 1px solid black; padding: 2px;">187</span>	ƚ <span style="border: 1px solid black; padding: 2px;">203</span>	■ <span style="border: 1px solid black; padding: 2px;">219</span>	δ <span style="border: 1px solid black; padding: 2px;">235</span>	√ <span style="border: 1px solid black; padding: 2px;">251</span>
C	î <span style="border: 1px solid black; padding: 2px;">140</span>	£ <span style="border: 1px solid black; padding: 2px;">156</span>	¼ <span style="border: 1px solid black; padding: 2px;">172</span>	ƚ <span style="border: 1px solid black; padding: 2px;">188</span>	ƚ <span style="border: 1px solid black; padding: 2px;">204</span>	■ <span style="border: 1px solid black; padding: 2px;">220</span>	ω <span style="border: 1px solid black; padding: 2px;">236</span>	∞ <span style="border: 1px solid black; padding: 2px;">252</span>
D	= <span style="border: 1px solid black; padding: 2px;">141</span>	Ù <span style="border: 1px solid black; padding: 2px;">157</span>	¾ <span style="border: 1px solid black; padding: 2px;">173</span>	ƚ <span style="border: 1px solid black; padding: 2px;">189</span>	= <span style="border: 1px solid black; padding: 2px;">205</span>	■ <span style="border: 1px solid black; padding: 2px;">221</span>	φ <span style="border: 1px solid black; padding: 2px;">237</span>	² <span style="border: 1px solid black; padding: 2px;">253</span>
E	À <span style="border: 1px solid black; padding: 2px;">142</span>	Û <span style="border: 1px solid black; padding: 2px;">158</span>	« <span style="border: 1px solid black; padding: 2px;">174</span>	ƚ <span style="border: 1px solid black; padding: 2px;">190</span>	ƚ <span style="border: 1px solid black; padding: 2px;">206</span>	■ <span style="border: 1px solid black; padding: 2px;">222</span>	ε <span style="border: 1px solid black; padding: 2px;">238</span>	■ <span style="border: 1px solid black; padding: 2px;">254</span>
F	§ <span style="border: 1px solid black; padding: 2px;">143</span>	f <span style="border: 1px solid black; padding: 2px;">159</span>	» <span style="border: 1px solid black; padding: 2px;">175</span>	ƚ <span style="border: 1px solid black; padding: 2px;">191</span>	ƚ <span style="border: 1px solid black; padding: 2px;">207</span>	■ <span style="border: 1px solid black; padding: 2px;">223</span>	∩ <span style="border: 1px solid black; padding: 2px;">239</span>	SP <span style="border: 1px solid black; padding: 2px;">255</span>

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
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**3.2.7 Page 5 [PC865: Nordic]**

HEX	8	9	A	B	C	D	E	F
0	Ç <span style="border: 1px solid black; padding: 2px;">128</span>	É <span style="border: 1px solid black; padding: 2px;">144</span>	á <span style="border: 1px solid black; padding: 2px;">160</span>	☼ <span style="border: 1px solid black; padding: 2px;">176</span>	Ł <span style="border: 1px solid black; padding: 2px;">192</span>	Ɑ <span style="border: 1px solid black; padding: 2px;">208</span>	ɑ <span style="border: 1px solid black; padding: 2px;">224</span>	≡ <span style="border: 1px solid black; padding: 2px;">240</span>
1	Ü <span style="border: 1px solid black; padding: 2px;">129</span>	æ <span style="border: 1px solid black; padding: 2px;">145</span>	í <span style="border: 1px solid black; padding: 2px;">161</span>	☼ <span style="border: 1px solid black; padding: 2px;">177</span>	Ł̇ <span style="border: 1px solid black; padding: 2px;">193</span>	Ṁ <span style="border: 1px solid black; padding: 2px;">209</span>	β <span style="border: 1px solid black; padding: 2px;">225</span>	‡ <span style="border: 1px solid black; padding: 2px;">241</span>
2	é <span style="border: 1px solid black; padding: 2px;">130</span>	Æ <span style="border: 1px solid black; padding: 2px;">146</span>	ó <span style="border: 1px solid black; padding: 2px;">162</span>	☼ <span style="border: 1px solid black; padding: 2px;">178</span>	Ṫ <span style="border: 1px solid black; padding: 2px;">194</span>	Π <span style="border: 1px solid black; padding: 2px;">210</span>	Γ <span style="border: 1px solid black; padding: 2px;">226</span>	≥ <span style="border: 1px solid black; padding: 2px;">242</span>
3	â <span style="border: 1px solid black; padding: 2px;">131</span>	ô <span style="border: 1px solid black; padding: 2px;">147</span>	ú <span style="border: 1px solid black; padding: 2px;">163</span>	l̇ <span style="border: 1px solid black; padding: 2px;">179</span>	ƒ <span style="border: 1px solid black; padding: 2px;">195</span>	Ɱ <span style="border: 1px solid black; padding: 2px;">211</span>	π <span style="border: 1px solid black; padding: 2px;">227</span>	≤ <span style="border: 1px solid black; padding: 2px;">243</span>
4	ä <span style="border: 1px solid black; padding: 2px;">132</span>	ö <span style="border: 1px solid black; padding: 2px;">148</span>	ñ <span style="border: 1px solid black; padding: 2px;">164</span>	ł̇ <span style="border: 1px solid black; padding: 2px;">180</span>	– <span style="border: 1px solid black; padding: 2px;">196</span>	Ł̈ <span style="border: 1px solid black; padding: 2px;">212</span>	Σ <span style="border: 1px solid black; padding: 2px;">228</span>	ƒ <span style="border: 1px solid black; padding: 2px;">244</span>
5	à <span style="border: 1px solid black; padding: 2px;">133</span>	ò <span style="border: 1px solid black; padding: 2px;">149</span>	Ñ <span style="border: 1px solid black; padding: 2px;">165</span>	ł̈ <span style="border: 1px solid black; padding: 2px;">181</span>	† <span style="border: 1px solid black; padding: 2px;">197</span>	ƒ̇ <span style="border: 1px solid black; padding: 2px;">213</span>	σ <span style="border: 1px solid black; padding: 2px;">229</span>	Ƶ <span style="border: 1px solid black; padding: 2px;">245</span>
6	å <span style="border: 1px solid black; padding: 2px;">134</span>	û <span style="border: 1px solid black; padding: 2px;">150</span>	ǣ <span style="border: 1px solid black; padding: 2px;">166</span>	ł̈̇ <span style="border: 1px solid black; padding: 2px;">182</span>	ƒ̈ <span style="border: 1px solid black; padding: 2px;">198</span>	π̇ <span style="border: 1px solid black; padding: 2px;">214</span>	μ <span style="border: 1px solid black; padding: 2px;">230</span>	÷ <span style="border: 1px solid black; padding: 2px;">246</span>
7	ç <span style="border: 1px solid black; padding: 2px;">135</span>	ù <span style="border: 1px solid black; padding: 2px;">151</span>	ǫ <span style="border: 1px solid black; padding: 2px;">167</span>	π̇ <span style="border: 1px solid black; padding: 2px;">183</span>	ł̈̇ <span style="border: 1px solid black; padding: 2px;">199</span>	π̈ <span style="border: 1px solid black; padding: 2px;">215</span>	τ <span style="border: 1px solid black; padding: 2px;">231</span>	≈ <span style="border: 1px solid black; padding: 2px;">247</span>
8	ê <span style="border: 1px solid black; padding: 2px;">136</span>	ÿ <span style="border: 1px solid black; padding: 2px;">152</span>	ı̇ <span style="border: 1px solid black; padding: 2px;">168</span>	ƒ̇ <span style="border: 1px solid black; padding: 2px;">184</span>	Ł̈̇ <span style="border: 1px solid black; padding: 2px;">200</span>	ƒ̈̇ <span style="border: 1px solid black; padding: 2px;">216</span>	φ <span style="border: 1px solid black; padding: 2px;">232</span>	° <span style="border: 1px solid black; padding: 2px;">248</span>
9	ë <span style="border: 1px solid black; padding: 2px;">137</span>	ö̇ <span style="border: 1px solid black; padding: 2px;">153</span>	ı̈ <span style="border: 1px solid black; padding: 2px;">169</span>	ł̈̈ <span style="border: 1px solid black; padding: 2px;">185</span>	Ł̈̈̇ <span style="border: 1px solid black; padding: 2px;">201</span>	Ƶ̇ <span style="border: 1px solid black; padding: 2px;">217</span>	θ <span style="border: 1px solid black; padding: 2px;">233</span>	• <span style="border: 1px solid black; padding: 2px;">249</span>
A	è <span style="border: 1px solid black; padding: 2px;">138</span>	ü <span style="border: 1px solid black; padding: 2px;">154</span>	ı̈̇ <span style="border: 1px solid black; padding: 2px;">170</span>	ł̈̈̇ <span style="border: 1px solid black; padding: 2px;">186</span>	Ł̈̈̈̇ <span style="border: 1px solid black; padding: 2px;">202</span>	Ƶ̈ <span style="border: 1px solid black; padding: 2px;">218</span>	Ω <span style="border: 1px solid black; padding: 2px;">234</span>	•̇ <span style="border: 1px solid black; padding: 2px;">250</span>
B	ï <span style="border: 1px solid black; padding: 2px;">139</span>	ø <span style="border: 1px solid black; padding: 2px;">155</span>	½ <span style="border: 1px solid black; padding: 2px;">171</span>	ł̈̈̈̇ <span style="border: 1px solid black; padding: 2px;">187</span>	Ṫ̇ <span style="border: 1px solid black; padding: 2px;">203</span>	■ <span style="border: 1px solid black; padding: 2px;">219</span>	δ <span style="border: 1px solid black; padding: 2px;">235</span>	√ <span style="border: 1px solid black; padding: 2px;">251</span>
C	î <span style="border: 1px solid black; padding: 2px;">140</span>	£ <span style="border: 1px solid black; padding: 2px;">156</span>	¼ <span style="border: 1px solid black; padding: 2px;">172</span>	ł̈̈̈̈̇ <span style="border: 1px solid black; padding: 2px;">188</span>	ł̈̈̈̈̇ <span style="border: 1px solid black; padding: 2px;">204</span>	■̇ <span style="border: 1px solid black; padding: 2px;">220</span>	ω <span style="border: 1px solid black; padding: 2px;">236</span>	∞ <span style="border: 1px solid black; padding: 2px;">252</span>
D	ì <span style="border: 1px solid black; padding: 2px;">141</span>	ø̇ <span style="border: 1px solid black; padding: 2px;">157</span>	ı̈̈̇ <span style="border: 1px solid black; padding: 2px;">173</span>	ł̈̈̈̈̈̇ <span style="border: 1px solid black; padding: 2px;">189</span>	≡ <span style="border: 1px solid black; padding: 2px;">205</span>	ı̈̈̈̈̈̇ <span style="border: 1px solid black; padding: 2px;">221</span>	φ̇ <span style="border: 1px solid black; padding: 2px;">237</span>	² <span style="border: 1px solid black; padding: 2px;">253</span>
E	Ä <span style="border: 1px solid black; padding: 2px;">142</span>	Ɔ <span style="border: 1px solid black; padding: 2px;">158</span>	« <span style="border: 1px solid black; padding: 2px;">174</span>	ł̈̈̈̈̈̈̇ <span style="border: 1px solid black; padding: 2px;">190</span>	ł̈̈̈̈̈̈̇ <span style="border: 1px solid black; padding: 2px;">206</span>	ı̈̈̈̈̈̈̇ <span style="border: 1px solid black; padding: 2px;">222</span>	ε <span style="border: 1px solid black; padding: 2px;">238</span>	■̈ <span style="border: 1px solid black; padding: 2px;">254</span>
F	Å <span style="border: 1px solid black; padding: 2px;">143</span>	f <span style="border: 1px solid black; padding: 2px;">159</span>	Ꝥ <span style="border: 1px solid black; padding: 2px;">175</span>	ł̈̈̈̈̈̈̈̇ <span style="border: 1px solid black; padding: 2px;">191</span>	Ł̈̈̈̈̈̈̈̇ <span style="border: 1px solid black; padding: 2px;">207</span>	■̈̇ <span style="border: 1px solid black; padding: 2px;">223</span>	∩ <span style="border: 1px solid black; padding: 2px;">239</span>	SP <span style="border: 1px solid black; padding: 2px;">255</span>

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## 3.2.8 Page 11 [PC851: Greek]

HEX	8	9	A	B	C	D	E	F
0	Ç <span style="border: 1px solid black; padding: 2px;">128</span>	Ï <span style="border: 1px solid black; padding: 2px;">144</span>	ï <span style="border: 1px solid black; padding: 2px;">160</span>	⋮ <span style="border: 1px solid black; padding: 2px;">176</span>	Ł <span style="border: 1px solid black; padding: 2px;">192</span>	Ƨ <span style="border: 1px solid black; padding: 2px;">208</span>	Ʒ <span style="border: 1px solid black; padding: 2px;">224</span>	- <span style="border: 1px solid black; padding: 2px;">240</span>
1	Ü <span style="border: 1px solid black; padding: 2px;">129</span>	SP <span style="border: 1px solid black; padding: 2px;">145</span>	ÿ <span style="border: 1px solid black; padding: 2px;">161</span>	⋷ <span style="border: 1px solid black; padding: 2px;">177</span>	⊥ <span style="border: 1px solid black; padding: 2px;">193</span>	Υ <span style="border: 1px solid black; padding: 2px;">209</span>	η <span style="border: 1px solid black; padding: 2px;">225</span>	± <span style="border: 1px solid black; padding: 2px;">241</span>
2	é <span style="border: 1px solid black; padding: 2px;">130</span>	ð <span style="border: 1px solid black; padding: 2px;">146</span>	ó <span style="border: 1px solid black; padding: 2px;">162</span>	⋸ <span style="border: 1px solid black; padding: 2px;">178</span>	Τ <span style="border: 1px solid black; padding: 2px;">194</span>	Φ <span style="border: 1px solid black; padding: 2px;">210</span>	θ <span style="border: 1px solid black; padding: 2px;">226</span>	υ <span style="border: 1px solid black; padding: 2px;">242</span>
3	â <span style="border: 1px solid black; padding: 2px;">131</span>	ô <span style="border: 1px solid black; padding: 2px;">147</span>	ú <span style="border: 1px solid black; padding: 2px;">163</span>	ı <span style="border: 1px solid black; padding: 2px;">179</span>	ƒ <span style="border: 1px solid black; padding: 2px;">195</span>	Χ <span style="border: 1px solid black; padding: 2px;">211</span>	ι <span style="border: 1px solid black; padding: 2px;">227</span>	φ <span style="border: 1px solid black; padding: 2px;">243</span>
4	ä <span style="border: 1px solid black; padding: 2px;">132</span>	ö <span style="border: 1px solid black; padding: 2px;">148</span>	À <span style="border: 1px solid black; padding: 2px;">164</span>	† <span style="border: 1px solid black; padding: 2px;">180</span>	- <span style="border: 1px solid black; padding: 2px;">196</span>	Ψ <span style="border: 1px solid black; padding: 2px;">212</span>	κ <span style="border: 1px solid black; padding: 2px;">228</span>	χ <span style="border: 1px solid black; padding: 2px;">244</span>
5	à <span style="border: 1px solid black; padding: 2px;">133</span>	ÿ <span style="border: 1px solid black; padding: 2px;">149</span>	Β <span style="border: 1px solid black; padding: 2px;">165</span>	Ɔ <span style="border: 1px solid black; padding: 2px;">181</span>	† <span style="border: 1px solid black; padding: 2px;">197</span>	Ω <span style="border: 1px solid black; padding: 2px;">213</span>	λ <span style="border: 1px solid black; padding: 2px;">229</span>	§ <span style="border: 1px solid black; padding: 2px;">245</span>
6	Ä <span style="border: 1px solid black; padding: 2px;">134</span>	Û <span style="border: 1px solid black; padding: 2px;">150</span>	Γ <span style="border: 1px solid black; padding: 2px;">166</span>	Λ <span style="border: 1px solid black; padding: 2px;">182</span>	Π <span style="border: 1px solid black; padding: 2px;">198</span>	α <span style="border: 1px solid black; padding: 2px;">214</span>	μ <span style="border: 1px solid black; padding: 2px;">230</span>	ψ <span style="border: 1px solid black; padding: 2px;">246</span>
7	ç <span style="border: 1px solid black; padding: 2px;">135</span>	û <span style="border: 1px solid black; padding: 2px;">151</span>	Δ <span style="border: 1px solid black; padding: 2px;">167</span>	Μ <span style="border: 1px solid black; padding: 2px;">183</span>	Ρ <span style="border: 1px solid black; padding: 2px;">199</span>	β <span style="border: 1px solid black; padding: 2px;">215</span>	ν <span style="border: 1px solid black; padding: 2px;">231</span>	· <span style="border: 1px solid black; padding: 2px;">247</span>
8	ê <span style="border: 1px solid black; padding: 2px;">136</span>	ϙ <span style="border: 1px solid black; padding: 2px;">152</span>	Ε <span style="border: 1px solid black; padding: 2px;">168</span>	Ν <span style="border: 1px solid black; padding: 2px;">184</span>	ℒ <span style="border: 1px solid black; padding: 2px;">200</span>	γ <span style="border: 1px solid black; padding: 2px;">216</span>	ξ <span style="border: 1px solid black; padding: 2px;">232</span>	° <span style="border: 1px solid black; padding: 2px;">248</span>
9	ë <span style="border: 1px solid black; padding: 2px;">137</span>	ö <span style="border: 1px solid black; padding: 2px;">153</span>	Ζ <span style="border: 1px solid black; padding: 2px;">169</span>	‡ <span style="border: 1px solid black; padding: 2px;">185</span>	Ɔ <span style="border: 1px solid black; padding: 2px;">201</span>	Ɔ <span style="border: 1px solid black; padding: 2px;">217</span>	ο <span style="border: 1px solid black; padding: 2px;">233</span>	¨ <span style="border: 1px solid black; padding: 2px;">249</span>
A	è <span style="border: 1px solid black; padding: 2px;">138</span>	Û <span style="border: 1px solid black; padding: 2px;">154</span>	Η <span style="border: 1px solid black; padding: 2px;">170</span>	‖ <span style="border: 1px solid black; padding: 2px;">186</span>	ℒ <span style="border: 1px solid black; padding: 2px;">202</span>	γ <span style="border: 1px solid black; padding: 2px;">218</span>	π <span style="border: 1px solid black; padding: 2px;">234</span>	ω <span style="border: 1px solid black; padding: 2px;">250</span>
B	ï <span style="border: 1px solid black; padding: 2px;">139</span>	á <span style="border: 1px solid black; padding: 2px;">155</span>	½ <span style="border: 1px solid black; padding: 2px;">171</span>	π <span style="border: 1px solid black; padding: 2px;">187</span>	π <span style="border: 1px solid black; padding: 2px;">203</span>	■ <span style="border: 1px solid black; padding: 2px;">219</span>	ρ <span style="border: 1px solid black; padding: 2px;">235</span>	Û <span style="border: 1px solid black; padding: 2px;">251</span>
C	î <span style="border: 1px solid black; padding: 2px;">140</span>	£ <span style="border: 1px solid black; padding: 2px;">156</span>	θ <span style="border: 1px solid black; padding: 2px;">172</span>	‡ <span style="border: 1px solid black; padding: 2px;">188</span>	‡ <span style="border: 1px solid black; padding: 2px;">204</span>	■ <span style="border: 1px solid black; padding: 2px;">220</span>	σ <span style="border: 1px solid black; padding: 2px;">236</span>	Ü <span style="border: 1px solid black; padding: 2px;">252</span>
D	Ë <span style="border: 1px solid black; padding: 2px;">141</span>	É <span style="border: 1px solid black; padding: 2px;">157</span>	Ι <span style="border: 1px solid black; padding: 2px;">173</span>	≡ <span style="border: 1px solid black; padding: 2px;">189</span>	= <span style="border: 1px solid black; padding: 2px;">205</span>	δ <span style="border: 1px solid black; padding: 2px;">221</span>	ς <span style="border: 1px solid black; padding: 2px;">237</span>	Ω <span style="border: 1px solid black; padding: 2px;">253</span>
E	Ä <span style="border: 1px solid black; padding: 2px;">142</span>	ñ <span style="border: 1px solid black; padding: 2px;">158</span>	« <span style="border: 1px solid black; padding: 2px;">174</span>	Ο <span style="border: 1px solid black; padding: 2px;">190</span>	‡ <span style="border: 1px solid black; padding: 2px;">206</span>	ε <span style="border: 1px solid black; padding: 2px;">222</span>	τ <span style="border: 1px solid black; padding: 2px;">238</span>	■ <span style="border: 1px solid black; padding: 2px;">254</span>
F	Η <span style="border: 1px solid black; padding: 2px;">143</span>	Í <span style="border: 1px solid black; padding: 2px;">159</span>	» <span style="border: 1px solid black; padding: 2px;">175</span>	Γ <span style="border: 1px solid black; padding: 2px;">191</span>	Σ <span style="border: 1px solid black; padding: 2px;">207</span>	■ <span style="border: 1px solid black; padding: 2px;">223</span>	´ <span style="border: 1px solid black; padding: 2px;">239</span>	SP <span style="border: 1px solid black; padding: 2px;">255</span>

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 35	SHEET 34

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## 3.2.9 Page 12 [PC853: Turkish]

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	☐ 176	L 192	SP 208	Ó 224	- 240
1	Ü 129	Ĉ 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	ħ 243
4	ä 132	Ö 148	ñ 164	† 180	- 196	È 212	Ĝ 228	˘ 244
5	à 133	Ò 149	Ñ 165	Á 181	† 197	ı 213	ğ 229	§ 245
6	ĉ 134	Û 150	Ğ 166	Â 182	Ŝ 198	Î 214	μ 230	÷ 246
7	ç 135	Û 151	ğ 167	Ă 183	Ŝ 199	İ 215	℥ 231	˙ 247
8	ê 136	İ 152	Ĥ 168	Ş 184	ℒ 200	Ï 216	ħ 232	° 248
9	ë 137	Ö 153	ĥ 169	‡ 185	ƒ 201	Ĵ 217	Ú 233	¨ 249
A	è 138	Ü 154	SP 170	186	⌌ 202	ƒ 218	Û 234	˙ 250
B	ï 139	Ĝ 155	½ 171	‡ 187	ƒ 203	■ 219	Ù 235	SP 251
C	î 140	£ 156	Ĵ 172	‡ 188	‡ 204	■ 220	Û 236	³ 252
D	ì 141	Ĝ 157	Ş 173	Ž 189	= 205	SP 221	Û 237	² 253
E	Ä 142	× 158	« 174	Ž 190	‡ 206	Ï 222	· 238	■ 254
F	Ĉ 143	Ĵ 159	» 175	ˆ 191	ⱡ 207	■ 223	˘ 239	SP 255

<b>EPSON</b>	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 36	SHEET 35

**3.2.10 Page 13 [PC857: Turkish]**

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	☼ 176	Ł 192	o 208	Ó 224	- 240
1	Ü 129	æ 145	í 161	☼ 177	Ł 193	a 209	ß 225	‡ 241
2	é 130	Æ 146	ó 162	☼ 178	Ƨ 194	Ê 210	Ô 226	SP 242
3	â 131	ô 147	ú 163	ı 179	Ƨ 195	Ë 211	Ò 227	¼ 243
4	ä 132	ö 148	ñ 164	ı 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	Ã 183	Ä 199	Î 215	SP 231	· 247
8	ê 136	î 152	ı 168	© 184	Ł 200	Ï 216	× 232	° 248
9	ë 137	ö 153	® 169	¶ 185	Ɔ 201	Ɔ 217	Ú 233	¨ 249
A	è 138	ü 154	¬ 170	¶ 186	Ł 202	Ɔ 218	Û 234	• 250
B	ï 139	ø 155	½ 171	¶ 187	Ƨ 203	■ 219	Ü 235	¹ 251
C	î 140	£ 156	¼ 172	¶ 188	Ƨ 204	■ 220	İ 236	³ 252
D	ı 141	Ø 157	ı 173	¢ 189	= 205	ı 221	ÿ 237	² 253
E	Ä 142	§ 158	« 174	¥ 190	¶ 206	İ 222	- 238	■ 254
F	Å 143	§ 159	» 175	ı 191	Ɔ 207	■ 223	ˆ 239	SP 255

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## 3.2.11 Page 14 [PC737: Greek]

HEX	8	9	A	B	C	D	E	F
0	Α 128	Ρ 144	Λ 160	⋮ 176	Λ 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	τ 194	π 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	ƒ 213	ί 229	ÿ 245
6	Η 134	Ψ 150	ο 166	182	‡ 198	π 214	ό 230	÷ 246
7	Θ 135	Ω 151	π 167	π 183	199	215	ύ 231	≈ 247
8	Ι 136	α 152	ρ 168	‡ 184	⋮ 200	‡ 216	ü 232	° 248
9	Κ 137	β 153	σ 169	185	ƒ 201	ƒ 217	ώ 233	• 249
A	Λ 138	γ 154	ς 170	186	⋮ 202	ƒ 218	À 234	• 250
B	Μ 139	δ 155	τ 171	187	⋮ 203	■ 219	É 235	√ 251
C	Ν 140	ε 156	υ 172	⋮ 188	204	■ 220	Η 236	η 252
D	Ξ 141	ζ 157	φ 173	⋮ 189	= 205	221	Ι 237	² 253
E	Ο 142	η 158	χ 174	‡ 190	206	222	Ο 238	■ 254
F	Π 143	θ 159	ψ 175	‡ 191	⋮ 207	■ 223	Υ 239	SP 255

<b>EPSON</b>	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 38	SHEET 37

**3.2.12 Page 15 [ISO8859-7: Greek]**

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	SP 160	° 176	ĩ 192	Π 208	Û 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	À 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	˘ 170	Ί 186	Κ 202	Ϊ 218	κ 234	ϊ 250
B	SP 139	SP 155	« 171	» 187	Λ 203	ÿ 219	λ 235	ÿ 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	Υ 190	Ξ 206	ή 222	ξ 238	ώ 254
F	SP 143	SP 159	- 175	Ϟ 191	Ο 207	ί 223	ο 239	SP 255

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## 3.2.13 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	í 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	f 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	^ 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

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 40	SHEET 39

**3.2.14 Page 17 [PC866: Cyrillic #2]**

HEX	8	9	A	B	C	D	E	F
0	А 128	Р 144	а 160	⌘ 176	Л 192	л 208	р 224	ё 240
1	Б 129	С 145	б 161	⌘ 177	⌘ 193	т 209	с 225	ё 241
2	В 130	Т 146	в 162	⌘ 178	т 194	п 210	т 226	ё 242
3	Г 131	У 147	г 163	⌘ 179	т 195	л 211	у 227	ё 243
4	Д 132	Ф 148	д 164	⌘ 180	— 196	т 212	ф 228	й 244
5	Е 133	Х 149	е 165	⌘ 181	† 197	т 213	х 229	й 245
6	Ж 134	Ц 150	ж 166	⌘ 182	† 198	п 214	ц 230	й 246
7	З 135	Ч 151	з 167	п 183	⌘ 199	⌘ 215	ч 231	й 247
8	И 136	Ш 152	и 168	т 184	л 200	† 216	ш 232	° 248
9	Й 137	Щ 153	й 169	⌘ 185	т 201	т 217	щ 233	• 249
A	К 138	Ъ 154	к 170	⌘ 186	л 202	т 218	ъ 234	• 250
B	Л 139	Ы 155	л 171	т 187	т 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	т 191	⌘ 207	■ 223	я 239	SP 255

# Confidential

## 3.2.15 Page 18 [PC852: Latin2]

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	⋮ 176	Ł 192	đ 208	Ó 224	- 240
1	Ü 129	Ĺ 145	í 161	⋮ 177	Ł 193	Đ 209	Ḃ 225	˘ 241
2	é 130	Í 146	ó 162	⋮ 178	Ƨ 194	Ǿ 210	ô 226	˙ 242
3	â 131	Ô 147	ú 163	l 179	Ƨ 195	Ě 211	Ń 227	ˇ 243
4	ä 132	ö 148	À 164	l 180	- 196	ǿ 212	ń 228	˘ 244
5	Û 133	Ľ 149	ą 165	Á 181	† 197	Ň 213	ň 229	§ 245
6	ć 134	ǻ 150	ž 166	Â 182	Ǻ 198	Ī 214	š 230	÷ 246
7	ç 135	Ś 151	ž 167	Ě 183	ǻ 199	Î 215	š 231	˙ 247
8	ł 136	Ś 152	Ę 168	Ş 184	Ł 200	ě 216	Ŕ 232	° 248
9	ë 137	Ö 153	ę 169	ł 185	Ƨ 201	Ĵ 217	Ú 233	˝ 249
A	õ 138	Ü 154	€ 170	ll 186	Ł 202	Ƨ 218	ŕ 234	˙ 250
B	õ 139	Ÿ 155	ž 171	ł 187	Ƨ 203	■ 219	Ů 235	ů 251
C	î 140	Ÿ 156	č 172	ll 188	Ƨ 204	■ 220	ý 236	ř 252
D	ž 141	ł 157	š 173	ž 189	= 205	Ƨ 221	ý 237	ř 253
E	Ǻ 142	× 158	« 174	ž 190	Ƨ 206	Ů 222	Ƨ 238	■ 254
F	ć 143	č 159	» 175	ł 191	ǻ 207	■ 223	˘ 239	SP 255

<b>EPSON</b>	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 42	SHEET 41

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## 3.2.16 Page 19 [PC858: Euro]

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	☼ 176	Ł 192	ǎ 208	Ó 224	- 240
1	Ü 129	æ 145	í 161	☼ 177	Ł 193	Đ 209	β 225	† 241
2	é 130	Æ 146	ó 162	☼ 178	Ƨ 194	Ê 210	Ô 226	= 242
3	â 131	ô 147	ú 163	∟ 179	ƚ 195	Ë 211	Ò 227	¼ 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	ä 166	Â 182	ã 198	Í 214	μ 230	÷ 246
7	ç 135	ù 151	ó 167	Ã 183	Ä 199	Î 215	þ 231	· 247
8	ê 136	ÿ 152	ı 168	© 184	ℒ 200	Ï 216	ƀ 232	° 248
9	ë 137	ö 153	® 169	∟ 185	Ʀ 201	Ɔ 217	Ú 233	¨ 249
A	è 138	Û 154	¬ 170	∟ 186	ℒ 202	Ʀ 218	Û 234	• 250
B	ï 139	ø 155	½ 171	∟ 187	Ƨ 203	■ 219	Ü 235	¹ 251
C	î 140	£ 156	¼ 172	∟ 188	Ƨ 204	■ 220	Ý 236	³ 252
D	ì 141	Ø 157	ı 173	¢ 189	= 205	∟ 221	Ÿ 237	² 253
E	Ä 142	× 158	« 174	¥ 190	∟ 206	Ï 222	- 238	■ 254
F	Å 143	f 159	» 175	ƚ 191	Ƨ 207	■ 223	˘ 239	SP 255

<b>EPSON</b>	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 43	SHEET 42

**Confidential**

3.2.17 Page 20 [KU42: Thai]

HEX	8	9	A	B	C	D	E	F
0	ร 128	อ 144	SP 160	ฃ 176	บ 192	ไ 208	· 224	๒๓ 240
1	๓ 129	๑ 145	ก 161	ค 177	๖ 193	แ 209	๕ 225	๒๔ 241
2	๔ 130	๒ 146	ข 162	ฅ 178	๗ 194	๓ 210	๖ 226	๒๕ 242
3	๕ 131	๓ 147	ค 163	ฆ 179	๘ 195	๔ 211	+ 227	๒๖ 243
4	๖ 132	๔ 148	ฃ 164	ง 180	๙ 196	๕ 212	๗ 228	๒๗ 244
5	๗ 133	๕ 149	ง 165	๘ 181	๔ 197	๖ 213	· 229	๒๘ 245
6	๘ 134	๖ 150	จ 166	๙ 182	๕ 198	๗ 214	๘ 230	๒๙ 246
7	๙ 135	๗ 151	ฉ 167	๐ 183	๖ 199	๘ 215	๙ 231	๓๐ 247
8	๐ 136	๘ 152	ช 168	๑ 184	๗ 200	๙ 216	๐๓ 232	๓๑ 248
9	๑ 137	๙ 153	ซ 169	๒ 185	๘ 201	๐ 217	๐๔ 233	๓๒ 249
A	๒ 138	๐ 154	ฃ 170	๓ 186	๙ 202	๑ 218	๐๕ 234	๓๓ 250
B	๓ 139	๑ 155	ค 171	๔ 187	๐ 203	๒ 219	๐๖ 235	๓๔ 251
C	๔ 140	๒ 156	ฅ 172	๕ 188	๑ 204	๓ 220	๐๗ 236	๓๕ 252
D	๕ 141	๓ 157	ฆ 173	๖ 189	๒ 205	๔ 221	๐๘ 237	๓๖ 253
E	๖ 142	๔ 158	ง 174	๗ 190	๓ 206	๕ 222	๐๙ 238	๓๗ 254
F	๗ 143	๕ 159	๘ 175	๘ 191	๔ 207	๖ 223	๑๐ 239	SP 255

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION B	NO.	
			NEXT 44	SHEET 43

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## 3.2.18 Page 21 [TIS11: Thai]

HEX	8	9	A	B	C	D	E	F
0	๕- 128	๙+ 144	โ 160	๙๙ 176	ภ 192	๕๕ 208	โ 224	๐ 240
1	๕๕ 129	๙- 145	ก 161	ท 177	ม 193	๕ 209	แ 225	๑ 241
2	๕๙ 130	๙๕ 146	บ 162	๗ 178	ย 194	า 210	โ 226	๒ 242
3	๕+ 131	๙๙ 147	ป 163	๗ 179	ร 195	ำ 211	โ 227	๓ 243
4	๖- 132	๙+ 148	ค 164	ด 180	ถ 196	๙ 212	โ 228	๔ 244
5	๖๕ 133	๐- 149	ค 165	ด 181	ถ 197	๙ 213	า 229	๕ 245
6	๖๙ 134	๐๕ 150	ฆ 166	ถ 182	ภ 198	๙ 214	ำ 230	๖ 246
7	๖+ 135	๐๙ 151	ง 167	ท 183	ว 199	๙ 215	๙ 231	๗ 247
8	๖๙ 136	๐+ 152	จ 168	ช 184	ศ 200	๐ 216	๐ 232	๘ 248
9	๖- 137	๐ 153	ฉ 169	น 185	ษ 201	๐ 217	๕ 233	๙ 249
A	๖๕ 138	๐ 154	ช 170	บ 186	ส 202	๐ 218	๕ 234	๐ 250
B	๖๙ 139	๐ 155	ช 171	ป 187	ห 203	- 219	+ 235	๑ 251
C	๖+ 140	๐ 156	ฉ 172	ผ 188	ฬ 204	๐ 220	๕ 236	๑ 252
D	๖- 141	๐ 157	ฉ 173	ผ 189	อ 205	๐ 221	๐ 237	๑ 253
E	๖๕ 142	๐ 158	ฉ 174	ผ 190	ฮ 206	๐ 222	๕ 238	๑ 254
F	๖๙ 143	๐ 159	ฉ 175	ผ 191	๑ 207	๐ 223	๐ 239	SP 255

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 45	SHEET 44

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3.2.19 Page 26 [TIS18: Thai]

HEX	8	9	A	B	C	D	E	F
0	┌ 128	๙ 144	SP 160	๙ 176	ภ 192	๕๕ 208	๒ 224	๐ 240
1	┐ 129	๑ 145	ก 161	ท 177	ม 193	๕๖ 209	๓ 225	๑ 241
2	└ 130	๒ 146	ข 162	ฑ 178	ย 194	๓ 210	๔ 226	๒ 242
3	┘ 131	๔๕ 147	ช 163	ฒ 179	ร 195	๓ 211	๕ 227	๓ 243
4	┌ 132	๕๖ 148	ค 164	ด 180	ถ 196	๓ 212	๖ 228	๔ 244
5	┐ 133	๕๗ 149	ค 165	ด 181	ถ 197	๓ 213	๗ 229	๕ 245
6	└ 134	๕๘ 150	ฆ 166	ถ 182	ภ 198	๓ 214	๘ 230	๖ 246
7	┘ 135	๕๙ 151	ง 167	ท 183	ว 199	๓ 215	๙ 231	๗ 247
8	┌ 136	๕๐ 152	จ 168	ช 184	ศ 200	๐ 216	๐ 232	๘ 248
9	┐ 137	๕๑ 153	ฉ 169	ฌ 185	ษ 201	๐ 217	๑ 233	๙ 249
A	└ 138	๕๒ 154	ช 170	บ 186	ส 202	๐ 218	๒ 234	๐ 250
B	█ 139	๕๓ 155	ช 171	บ 187	ท 203	๕๓ 219	๓ 235	๑ 251
C	← 140	๕๔ 156	ฉ 172	ฝ 188	ฬ 204	๕๔ 220	๔ 236	๒ 252
D	↑ 141	๕๕ 157	ฉ 173	ฝ 189	อ 205	๕๕ 221	๕ 237	๓ 253
E	→ 142	๕๖ 158	ฎ 174	พ 190	ฮ 206	๕๖ 222	๖ 238	๔ 254
F	↓ 143	๕๗ 159	ฎ 175	พ 191	ๆ 207	๕๗ 223	๗ 239	SP 255

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 46	SHEET 45

**Confidential**

**3.2.20 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	ễ 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	ă 198	ê 214	ổ 230	ử 246
7	SP 135	SP 151	SP 167	ã 183	â 199	ì 215	õ 231	ữ 247
8	SP 136	SP 152	ă 168	á 184	ã 200	ỉ 216	ố 232	ứ 248
9	SP 137	SP 153	â 169	ạ 185	ã 201	SP 217	ộ 233	ự 249
A	SP 138	SP 154	ê 170	SP 186	ă 202	SP 218	ờ 234	ỳ 250
B	SP 139	SP 155	ô 171	ă 187	â 203	SP 219	ở 235	ỷ 251
C	SP 140	SP 156	ơ 172	ã 188	è 204	ĩ 220	õ 236	ỹ 252
D	SP 141	SP 157	ư 173	ã 189	SP 205	í 221	ở 237	ý 253
E	SP 142	SP 158	đ 174	ă 190	ẻ 206	ì 222	ợ 238	ỵ 254
F	SP 143	SP 159	SP 175	SP 191	ễ 207	ò 223	ù 239	SP 255

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 47	SHEET 46

**3.2.21 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	Ě 209	Ó 225	Ů 241
2	SP 130	SP 146	Â 162	SP 178	SP 194	Ê 210	Õ 226	Ű 242
3	SP 131	SP 147	SP 163	SP 179	SP 195	Ë 211	Ó 227	Ú 243
4	SP 132	SP 148	SP 164	SP 180	SP 196	Ě 212	Ọ 228	Ụ 244
5	SP 133	SP 149	SP 165	À 181	SP 197	Ë 213	Ô 229	Û 245
6	SP 134	SP 150	SP 166	Ả 182	Ă 198	Ê 214	Õ 230	Ů 246
7	SP 135	SP 151	Đ 167	Ã 183	Â 199	Ì 215	Õ 231	Ű 247
8	SP 136	SP 152	SP 168	Á 184	Ã 200	Î 216	Ố 232	Ứ 248
9	SP 137	SP 153	SP 169	Ạ 185	Ã 201	SP 217	Ộ 233	Ự 249
A	SP 138	SP 154	Ê 170	SP 186	Ă 202	SP 218	Ờ 234	Ỡ 250
B	SP 139	SP 155	Ô 171	Ă 187	Â 203	SP 219	Ở 235	Ỡ 251
C	SP 140	SP 156	Ớ 172	Ă 188	È 204	Ĩ 220	Ỡ 236	Ỡ 252
D	SP 141	SP 157	Ư 173	Ă 189	SP 205	Í 221	Ớ 237	Ỡ 253
E	SP 142	SP 158	SP 174	Ă 190	Ê 206	Ị 222	Ợ 238	Ỡ 254
F	SP 143	SP 159	SP 175	SP 191	Ë 207	Ò 223	Ù 239	SP 255

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3.2.22 Page 32 [PC720: Arabic]

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	ب 160	⋮ 176	ل 192	ﻻ 208	ض 224	≡ 240
1	SP 129	◌ 145	ة 161	⋮ 177	ل 193	ﻻ 209	ط 225	◌ 241
2	é 130	◌ 146	ن 162	⋮ 178	ت 194	ﻻ 210	ظ 226	◌ 242
3	â 131	ô 147	ث 163	 179	ت 195	ﻻ 211	ع 227	◌ 243
4	SP 132	◌ 148	ج 164	ت 180	- 196	ﻻ 212	غ 228	◌ 244
5	à 133	- 149	ح 165	ت 181	ت 197	ﻻ 213	ف 229	◌ 245
6	SP 134	û 150	خ 166	ﻻ 182	ف 198	ﻻ 214	ﻻ 230	◌ 246
7	ç 135	ù 151	د 167	ﻻ 183	ﻻ 199	ﻻ 215	ق 231	≈ 247
8	ê 136	◌ 152	ذ 168	ﻻ 184	ﻻ 200	ﻻ 216	ك 232	◌ 248
9	ë 137	آ 153	ر 169	ﻻ 185	ﻻ 201	ل 217	ل 233	◌ 249
A	è 138	أ 154	ز 170	ﻻ 186	ﻻ 202	ر 218	م 234	◌ 250
B	ï 139	ؤ 155	س 171	ﻻ 187	ﻻ 203	◻ 219	ن 235	√ 251
C	î 140	£ 156	ش 172	ﻻ 188	ﻻ 204	◻ 220	ه 236	n 252
D	SP 141	ل 157	ص 173	ﻻ 189	= 205	ﻻ 221	و 237	2 253
E	SP 142	ئ 158	« 174	ل 190	ﻻ 206	ﻻ 222	ي 238	◻ 254
F	SP 143	ا 159	» 175	ل 191	ﻻ 207	◻ 223	ي 239	SP 255

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION B	NO.	
			NEXT 49	SHEET 48

**Confidential**

3.2.23 Page 33 [WPC775: Baltic Rim]

HEX	8	9	A	B	C	D	E	F
0	Ć 128	É 144	Ā 160	⋯ 176	Ł 192	ą 208	Ó 224	- 240
1	Ü 129	æ 145	Ī 161	⋯ 177	ł 193	č 209	β 225	† 241
2	é 130	Æ 146	Ó 162	⋯ 178	ṽ 194	ę 210	ō 226	“ 242
3	ā 131	ō 147	ž 163	l 179	ł 195	è 211	ń 227	¾ 243
4	ä 132	ö 148	ž 164	ł 180	- 196	i 212	õ 228	¶ 244
5	ǫ 133	Ǫ 149	ž 165	Ą 181	ł 197	š 213	õ 229	§ 245
6	ǻ 134	ϕ 150	” 166	č 182	Ů 198	ų 214	μ 230	÷ 246
7	ć 135	ś 151	ı 167	ę 183	Ū 199	ū 215	ń 231	” 247
8	ł 136	ś 152	© 168	É 184	Ł 200	ž 216	ķ 232	° 248
9	ē 137	ö 153	® 169	Ĳ 185	ŕ 201	ĵ 217	ķ 233	• 249
A	ŗ 138	ü 154	¬ 170	Ĳ 186	ł 202	ŕ 218	ł 234	• 250
B	ŕ 139	ø 155	½ 171	ŕ 187	ł 203	■ 219	ł 235	¹ 251
C	ī 140	£ 156	¼ 172	ł 188	ł 204	■ 220	ŕ 236	³ 252
D	ž 141	ø 157	ł 173	ł 189	= 205	ł 221	Ē 237	² 253
E	Ǽ 142	× 158	« 174	š 190	ł 206	ł 222	Ņ 238	■ 254
F	Ǽ 143	α 159	» 175	ł 191	ž 207	■ 223	’ 239	SP 255

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION B	NO.	
			NEXT 50	SHEET 49

# Confidential

## 3.2.24 Page 34 [PC855: Cyrillic]

HEX	8	9	A	B	C	D	E	F
0	ђ <span style="border: 1px solid black; padding: 2px;">128</span>	љ <span style="border: 1px solid black; padding: 2px;">144</span>	а <span style="border: 1px solid black; padding: 2px;">160</span>	▒ <span style="border: 1px solid black; padding: 2px;">176</span>	Љ <span style="border: 1px solid black; padding: 2px;">192</span>	л <span style="border: 1px solid black; padding: 2px;">208</span>	Я <span style="border: 1px solid black; padding: 2px;">224</span>	- <span style="border: 1px solid black; padding: 2px;">240</span>
1	ћ <span style="border: 1px solid black; padding: 2px;">129</span>	љ <span style="border: 1px solid black; padding: 2px;">145</span>	А <span style="border: 1px solid black; padding: 2px;">161</span>	▒ <span style="border: 1px solid black; padding: 2px;">177</span>	Љ <span style="border: 1px solid black; padding: 2px;">193</span>	л <span style="border: 1px solid black; padding: 2px;">209</span>	р <span style="border: 1px solid black; padding: 2px;">225</span>	ы <span style="border: 1px solid black; padding: 2px;">241</span>
2	ѓ <span style="border: 1px solid black; padding: 2px;">130</span>	њ <span style="border: 1px solid black; padding: 2px;">146</span>	б <span style="border: 1px solid black; padding: 2px;">162</span>	▒ <span style="border: 1px solid black; padding: 2px;">178</span>	т <span style="border: 1px solid black; padding: 2px;">194</span>	м <span style="border: 1px solid black; padding: 2px;">210</span>	Р <span style="border: 1px solid black; padding: 2px;">226</span>	џ <span style="border: 1px solid black; padding: 2px;">242</span>
3	ђ <span style="border: 1px solid black; padding: 2px;">131</span>	њ <span style="border: 1px solid black; padding: 2px;">147</span>	Б <span style="border: 1px solid black; padding: 2px;">163</span>	▒ <span style="border: 1px solid black; padding: 2px;">179</span>	т <span style="border: 1px solid black; padding: 2px;">195</span>	м <span style="border: 1px solid black; padding: 2px;">211</span>	С <span style="border: 1px solid black; padding: 2px;">227</span>	з <span style="border: 1px solid black; padding: 2px;">243</span>
4	ё <span style="border: 1px solid black; padding: 2px;">132</span>	ћ <span style="border: 1px solid black; padding: 2px;">148</span>	ц <span style="border: 1px solid black; padding: 2px;">164</span>	† <span style="border: 1px solid black; padding: 2px;">180</span>	- <span style="border: 1px solid black; padding: 2px;">196</span>	н <span style="border: 1px solid black; padding: 2px;">212</span>	С <span style="border: 1px solid black; padding: 2px;">228</span>	З <span style="border: 1px solid black; padding: 2px;">244</span>
5	Ё <span style="border: 1px solid black; padding: 2px;">133</span>	ћ <span style="border: 1px solid black; padding: 2px;">149</span>	Ц <span style="border: 1px solid black; padding: 2px;">165</span>	х <span style="border: 1px solid black; padding: 2px;">181</span>	† <span style="border: 1px solid black; padding: 2px;">197</span>	н <span style="border: 1px solid black; padding: 2px;">213</span>	Т <span style="border: 1px solid black; padding: 2px;">229</span>	Ш <span style="border: 1px solid black; padding: 2px;">245</span>
6	е <span style="border: 1px solid black; padding: 2px;">134</span>	ќ <span style="border: 1px solid black; padding: 2px;">150</span>	д <span style="border: 1px solid black; padding: 2px;">166</span>	Х <span style="border: 1px solid black; padding: 2px;">182</span>	К <span style="border: 1px solid black; padding: 2px;">198</span>	о <span style="border: 1px solid black; padding: 2px;">214</span>	Т <span style="border: 1px solid black; padding: 2px;">230</span>	Ш <span style="border: 1px solid black; padding: 2px;">246</span>
7	Е <span style="border: 1px solid black; padding: 2px;">135</span>	ќ <span style="border: 1px solid black; padding: 2px;">151</span>	Д <span style="border: 1px solid black; padding: 2px;">167</span>	и <span style="border: 1px solid black; padding: 2px;">183</span>	К <span style="border: 1px solid black; padding: 2px;">199</span>	О <span style="border: 1px solid black; padding: 2px;">215</span>	у <span style="border: 1px solid black; padding: 2px;">231</span>	э <span style="border: 1px solid black; padding: 2px;">247</span>
8	ѕ <span style="border: 1px solid black; padding: 2px;">136</span>	ђ <span style="border: 1px solid black; padding: 2px;">152</span>	е <span style="border: 1px solid black; padding: 2px;">168</span>	И <span style="border: 1px solid black; padding: 2px;">184</span>	Љ <span style="border: 1px solid black; padding: 2px;">200</span>	п <span style="border: 1px solid black; padding: 2px;">216</span>	у <span style="border: 1px solid black; padding: 2px;">232</span>	Э <span style="border: 1px solid black; padding: 2px;">248</span>
9	Ѕ <span style="border: 1px solid black; padding: 2px;">137</span>	ђ <span style="border: 1px solid black; padding: 2px;">153</span>	Е <span style="border: 1px solid black; padding: 2px;">169</span>	џ <span style="border: 1px solid black; padding: 2px;">185</span>	ѓ <span style="border: 1px solid black; padding: 2px;">201</span>	Ј <span style="border: 1px solid black; padding: 2px;">217</span>	ж <span style="border: 1px solid black; padding: 2px;">233</span>	Щ <span style="border: 1px solid black; padding: 2px;">249</span>
A	і <span style="border: 1px solid black; padding: 2px;">138</span>	џ <span style="border: 1px solid black; padding: 2px;">154</span>	ф <span style="border: 1px solid black; padding: 2px;">170</span>	И <span style="border: 1px solid black; padding: 2px;">186</span>	Љ <span style="border: 1px solid black; padding: 2px;">202</span>	г <span style="border: 1px solid black; padding: 2px;">218</span>	ж <span style="border: 1px solid black; padding: 2px;">234</span>	Щ <span style="border: 1px solid black; padding: 2px;">250</span>
B	І <span style="border: 1px solid black; padding: 2px;">139</span>	џ <span style="border: 1px solid black; padding: 2px;">155</span>	Ф <span style="border: 1px solid black; padding: 2px;">171</span>	џ <span style="border: 1px solid black; padding: 2px;">187</span>	Љ <span style="border: 1px solid black; padding: 2px;">203</span>	■ <span style="border: 1px solid black; padding: 2px;">219</span>	В <span style="border: 1px solid black; padding: 2px;">235</span>	Ч <span style="border: 1px solid black; padding: 2px;">251</span>
C	ї <span style="border: 1px solid black; padding: 2px;">140</span>	ю <span style="border: 1px solid black; padding: 2px;">156</span>	Г <span style="border: 1px solid black; padding: 2px;">172</span>	Ј <span style="border: 1px solid black; padding: 2px;">188</span>	Љ <span style="border: 1px solid black; padding: 2px;">204</span>	■ <span style="border: 1px solid black; padding: 2px;">220</span>	В <span style="border: 1px solid black; padding: 2px;">236</span>	Ч <span style="border: 1px solid black; padding: 2px;">252</span>
D	İ <span style="border: 1px solid black; padding: 2px;">141</span>	Ю <span style="border: 1px solid black; padding: 2px;">157</span>	Г <span style="border: 1px solid black; padding: 2px;">173</span>	Й <span style="border: 1px solid black; padding: 2px;">189</span>	= <span style="border: 1px solid black; padding: 2px;">205</span>	П <span style="border: 1px solid black; padding: 2px;">221</span>	ь <span style="border: 1px solid black; padding: 2px;">237</span>	§ <span style="border: 1px solid black; padding: 2px;">253</span>
E	ј <span style="border: 1px solid black; padding: 2px;">142</span>	Ь <span style="border: 1px solid black; padding: 2px;">158</span>	« <span style="border: 1px solid black; padding: 2px;">174</span>	Й <span style="border: 1px solid black; padding: 2px;">190</span>	Љ <span style="border: 1px solid black; padding: 2px;">206</span>	Я <span style="border: 1px solid black; padding: 2px;">222</span>	Ь <span style="border: 1px solid black; padding: 2px;">238</span>	■ <span style="border: 1px solid black; padding: 2px;">254</span>
F	Ј <span style="border: 1px solid black; padding: 2px;">143</span>	Ь <span style="border: 1px solid black; padding: 2px;">159</span>	» <span style="border: 1px solid black; padding: 2px;">175</span>	Г <span style="border: 1px solid black; padding: 2px;">191</span>	џ <span style="border: 1px solid black; padding: 2px;">207</span>	■ <span style="border: 1px solid black; padding: 2px;">223</span>	№ <span style="border: 1px solid black; padding: 2px;">239</span>	SP <span style="border: 1px solid black; padding: 2px;">255</span>

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 51	SHEET 50

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3.2.25 Page 35 [PC861: Icelandic]

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	☼ 176	Ł 192	Ɑ 208	ɑ 224	≡ 240
1	Ü 129	æ 145	í 161	☼ 177	⊥ 193	Ɱ 209	β 225	‡ 241
2	é 130	Æ 146	ó 162	☼ 178	⊤ 194	Ɐ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	179	† 195	Ɒ 211	Π 227	≤ 243
4	ä 132	ö 148	Á 164	‡ 180	- 196	ⱱ 212	Σ 228	ƒ 244
5	à 133	þ 149	Í 165	‡ 181	† 197	Ⱳ 213	σ 229	℄ 245
6	å 134	û 150	Ó 166	182	‡ 198	ⱳ 214	μ 230	÷ 246
7	ç 135	ý 151	Ú 167	π 183	199	ⱴ 215	τ 231	≈ 247
8	ê 136	ÿ 152	¿ 168	‡ 184	Ⱶ 200	‡ 216	φ 232	° 248
9	ë 137	ö 153	¬ 169	185	ⱶ 201	Ⱶ 217	θ 233	• 249
A	è 138	Ü 154	¬ 170	186	ⱷ 202	ⱶ 218	Ω 234	• 250
B	Ð 139	ø 155	½ 171	π 187	ⱸ 203	■ 219	δ 235	√ 251
C	ð 140	£ 156	¼ 172	ⱹ 188	204	■ 220	ω 236	∞ 252
D	Þ 141	Ø 157	í 173	ⱺ 189	= 205	221	φ 237	² 253
E	Ä 142	Ɀ 158	« 174	ⱻ 190	206	222	ε 238	■ 254
F	À 143	f 159	» 175	ⱼ 191	ⱽ 207	■ 223	∩ 239	SP 255

	<b>TITLE</b> <b>TM-T20</b> Specification (STANDARD)	<b>SHEET REVISION</b> B	<b>NO.</b>	
			NEXT 52	SHEET 51

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## 3.2.26 Page 36 [PC862: Hebrew]

HEX	8	9	A	B	C	D	E	F
0	א <span style="border: 1px solid black; padding: 2px;">128</span>	ב <span style="border: 1px solid black; padding: 2px;">144</span>	ג <span style="border: 1px solid black; padding: 2px;">160</span>	ד <span style="border: 1px solid black; padding: 2px;">176</span>	ה <span style="border: 1px solid black; padding: 2px;">192</span>	ו <span style="border: 1px solid black; padding: 2px;">208</span>	ז <span style="border: 1px solid black; padding: 2px;">224</span>	ח <span style="border: 1px solid black; padding: 2px;">240</span>
1	ט <span style="border: 1px solid black; padding: 2px;">129</span>	י <span style="border: 1px solid black; padding: 2px;">145</span>	יא <span style="border: 1px solid black; padding: 2px;">161</span>	יב <span style="border: 1px solid black; padding: 2px;">177</span>	יג <span style="border: 1px solid black; padding: 2px;">193</span>	יד <span style="border: 1px solid black; padding: 2px;">209</span>	יז <span style="border: 1px solid black; padding: 2px;">225</span>	יח <span style="border: 1px solid black; padding: 2px;">241</span>
2	יט <span style="border: 1px solid black; padding: 2px;">130</span>	כ <span style="border: 1px solid black; padding: 2px;">146</span>	כא <span style="border: 1px solid black; padding: 2px;">162</span>	כב <span style="border: 1px solid black; padding: 2px;">178</span>	כג <span style="border: 1px solid black; padding: 2px;">194</span>	כד <span style="border: 1px solid black; padding: 2px;">210</span>	כה <span style="border: 1px solid black; padding: 2px;">226</span>	כו <span style="border: 1px solid black; padding: 2px;">242</span>
3	כז <span style="border: 1px solid black; padding: 2px;">131</span>	כח <span style="border: 1px solid black; padding: 2px;">147</span>	כט <span style="border: 1px solid black; padding: 2px;">163</span>	ל <span style="border: 1px solid black; padding: 2px;">179</span>	מ <span style="border: 1px solid black; padding: 2px;">195</span>	נ <span style="border: 1px solid black; padding: 2px;">211</span>	ס <span style="border: 1px solid black; padding: 2px;">227</span>	ע <span style="border: 1px solid black; padding: 2px;">243</span>
4	פ <span style="border: 1px solid black; padding: 2px;">132</span>	צ <span style="border: 1px solid black; padding: 2px;">148</span>	ק <span style="border: 1px solid black; padding: 2px;">164</span>	ר <span style="border: 1px solid black; padding: 2px;">180</span>	ש <span style="border: 1px solid black; padding: 2px;">196</span>	ת <span style="border: 1px solid black; padding: 2px;">212</span>	י <span style="border: 1px solid black; padding: 2px;">228</span>	יג <span style="border: 1px solid black; padding: 2px;">244</span>
5	י <span style="border: 1px solid black; padding: 2px;">133</span>	יא <span style="border: 1px solid black; padding: 2px;">149</span>	יב <span style="border: 1px solid black; padding: 2px;">165</span>	יג <span style="border: 1px solid black; padding: 2px;">181</span>	יד <span style="border: 1px solid black; padding: 2px;">197</span>	טו <span style="border: 1px solid black; padding: 2px;">213</span>	טז <span style="border: 1px solid black; padding: 2px;">229</span>	יז <span style="border: 1px solid black; padding: 2px;">245</span>
6	יח <span style="border: 1px solid black; padding: 2px;">134</span>	יט <span style="border: 1px solid black; padding: 2px;">150</span>	כ <span style="border: 1px solid black; padding: 2px;">166</span>	כא <span style="border: 1px solid black; padding: 2px;">182</span>	כב <span style="border: 1px solid black; padding: 2px;">198</span>	כג <span style="border: 1px solid black; padding: 2px;">214</span>	כד <span style="border: 1px solid black; padding: 2px;">230</span>	כה <span style="border: 1px solid black; padding: 2px;">246</span>
7	כז <span style="border: 1px solid black; padding: 2px;">135</span>	כח <span style="border: 1px solid black; padding: 2px;">151</span>	כט <span style="border: 1px solid black; padding: 2px;">167</span>	ל <span style="border: 1px solid black; padding: 2px;">183</span>	מ <span style="border: 1px solid black; padding: 2px;">199</span>	נ <span style="border: 1px solid black; padding: 2px;">215</span>	ס <span style="border: 1px solid black; padding: 2px;">231</span>	ע <span style="border: 1px solid black; padding: 2px;">247</span>
8	פ <span style="border: 1px solid black; padding: 2px;">136</span>	צ <span style="border: 1px solid black; padding: 2px;">152</span>	ק <span style="border: 1px solid black; padding: 2px;">168</span>	ר <span style="border: 1px solid black; padding: 2px;">184</span>	ש <span style="border: 1px solid black; padding: 2px;">200</span>	ת <span style="border: 1px solid black; padding: 2px;">216</span>	י <span style="border: 1px solid black; padding: 2px;">232</span>	יג <span style="border: 1px solid black; padding: 2px;">248</span>
9	י <span style="border: 1px solid black; padding: 2px;">137</span>	יא <span style="border: 1px solid black; padding: 2px;">153</span>	יב <span style="border: 1px solid black; padding: 2px;">169</span>	יג <span style="border: 1px solid black; padding: 2px;">185</span>	יד <span style="border: 1px solid black; padding: 2px;">201</span>	טו <span style="border: 1px solid black; padding: 2px;">217</span>	טז <span style="border: 1px solid black; padding: 2px;">233</span>	יז <span style="border: 1px solid black; padding: 2px;">249</span>
A	יח <span style="border: 1px solid black; padding: 2px;">138</span>	יט <span style="border: 1px solid black; padding: 2px;">154</span>	כ <span style="border: 1px solid black; padding: 2px;">170</span>	כא <span style="border: 1px solid black; padding: 2px;">186</span>	כב <span style="border: 1px solid black; padding: 2px;">202</span>	כג <span style="border: 1px solid black; padding: 2px;">218</span>	כד <span style="border: 1px solid black; padding: 2px;">234</span>	כה <span style="border: 1px solid black; padding: 2px;">250</span>
B	כז <span style="border: 1px solid black; padding: 2px;">139</span>	כח <span style="border: 1px solid black; padding: 2px;">155</span>	כט <span style="border: 1px solid black; padding: 2px;">171</span>	ל <span style="border: 1px solid black; padding: 2px;">187</span>	מ <span style="border: 1px solid black; padding: 2px;">203</span>	נ <span style="border: 1px solid black; padding: 2px;">219</span>	ס <span style="border: 1px solid black; padding: 2px;">235</span>	ע <span style="border: 1px solid black; padding: 2px;">251</span>
C	פ <span style="border: 1px solid black; padding: 2px;">140</span>	צ <span style="border: 1px solid black; padding: 2px;">156</span>	ק <span style="border: 1px solid black; padding: 2px;">172</span>	ר <span style="border: 1px solid black; padding: 2px;">188</span>	ש <span style="border: 1px solid black; padding: 2px;">204</span>	ת <span style="border: 1px solid black; padding: 2px;">220</span>	י <span style="border: 1px solid black; padding: 2px;">236</span>	יג <span style="border: 1px solid black; padding: 2px;">252</span>
D	י <span style="border: 1px solid black; padding: 2px;">141</span>	יא <span style="border: 1px solid black; padding: 2px;">157</span>	יב <span style="border: 1px solid black; padding: 2px;">173</span>	יג <span style="border: 1px solid black; padding: 2px;">189</span>	יד <span style="border: 1px solid black; padding: 2px;">205</span>	טו <span style="border: 1px solid black; padding: 2px;">221</span>	טז <span style="border: 1px solid black; padding: 2px;">237</span>	יז <span style="border: 1px solid black; padding: 2px;">253</span>
E	יח <span style="border: 1px solid black; padding: 2px;">142</span>	יט <span style="border: 1px solid black; padding: 2px;">158</span>	כ <span style="border: 1px solid black; padding: 2px;">174</span>	כא <span style="border: 1px solid black; padding: 2px;">190</span>	כב <span style="border: 1px solid black; padding: 2px;">206</span>	כג <span style="border: 1px solid black; padding: 2px;">222</span>	כד <span style="border: 1px solid black; padding: 2px;">238</span>	כה <span style="border: 1px solid black; padding: 2px;">254</span>
F	כז <span style="border: 1px solid black; padding: 2px;">143</span>	כח <span style="border: 1px solid black; padding: 2px;">159</span>	כט <span style="border: 1px solid black; padding: 2px;">175</span>	ל <span style="border: 1px solid black; padding: 2px;">191</span>	מ <span style="border: 1px solid black; padding: 2px;">207</span>	נ <span style="border: 1px solid black; padding: 2px;">223</span>	ס <span style="border: 1px solid black; padding: 2px;">239</span>	ע <span style="border: 1px solid black; padding: 2px;">255</span>

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 53	SHEET 52

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3.2.27 Page 37 [PC864: Arabic]

HEX	8	9	A	B	C	D	E	F
0	° 128	β 144	SP 160	• 176	¢ 192	ذ 208	- 224	ء 240
1	• 129	ω 145	- 161	ا 177	ء 193	ر 209	ف 225	ء 241
2	• 130	φ 146	ل 162	ر 178	آ 194	ز 210	ف 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	ه 244
5	- 133	¼ 149	ل 165	ه 181	ع 197	ص 213	م 229	ي 245
6	134	≈ 150	SP 166	٦ 182	ئ 198	ف 214	ن 230	ي 246
7	† 135	« 151	€ 167	٧ 183	ا 199	ط 215	ه 231	غ 247
8	‡ 136	» 152	ل 168	٨ 184	ب 200	ظ 216	و 232	ق 248
9	‡ 137	لا 153	ب 169	٩ 185	ة 201	ع 217	ي 233	لا 249
A	‡ 138	لا 154	ن 170	ف 186	ت 202	غ 218	ب 234	لا 250
B	⊥ 139	SP 155	ن 171	؛ 187	ث 203	ا 219	ظ 235	ل 251
C	٦ 140	SP 156	، 172	س 188	ج 204	ا 220	ط 236	ك 252
D	‡ 141	لا 157	ج 173	ش 189	ح 205	÷ 221	غ 237	ي 253
E	ل 142	لا 158	ح 174	ص 190	خ 206	× 222	غ 238	■ 254
F	‡ 143	ع 159	خ 175	؟ 191	د 207	ع 223	م 239	SP 255

	<b>TITLE</b> <b>TM-T20</b> Specification (STANDARD)	<b>SHEET REVISION</b>  B	<b>NO.</b>	
			NEXT 54	SHEET 53

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## 3.2.28 Page 38 [PC869: Greek]

HEX	8	9	A	B	C	D	E	F
0	SP 128	Ι 144	ϊ 160	⋯ 176	Λ 192	Τ 208	Ζ 224	- 240
1	SP 129	Ϊ 145	Ͽ 161	⋯ 177	⊥ 193	Υ 209	η 225	± 241
2	SP 130	Ό 146	ό 162	⋯ 178	Τ 194	Φ 210	θ 226	U 242
3	SP 131	SP 147	Ό 163	Ι 179	† 195	Χ 211	Λ 227	Φ 243
4	SP 132	SP 148	Α 164	‡ 180	- 196	Ψ 212	Κ 228	Χ 244
5	SP 133	Υ 149	Β 165	Κ 181	† 197	Ω 213	λ 229	§ 245
6	Ä 134	ÿ 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	Ω 152	Ε 168	Ν 184	ℒ 200	γ 216	ξ 232	° 248
9	¬ 137	² 153	Ζ 169	‡ 185	Γ 201	Ј 217	ο 233	™ 249
A	ı 138	³ 154	Η 170	‡ 186	ℒ 202	Γ 218	π 234	ω 250
B	‘ 139	ά 155	½ 171	π 187	π 203	■ 219	ρ 235	Ü 251
C	’ 140	£ 156	θ 172	‡ 188	‡ 204	■ 220	σ 236	Ü 252
D	Έ 141	έ 157	Ι 173	≡ 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	Γ 191	Σ 207	■ 223	˘ 239	SP 255

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 55	SHEET 54

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## 3.2.29 Page 39 [ISO8859-2: Latin2]

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

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 56	SHEET 55

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## 3.2.30 Page 40 [ISO8859-15: Latin9]

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	SP 160	° 176	À 192	Ð 208	à 224	ð 240
1	SP 129	SP 145	í 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

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3.2.31 Page 41 [PC1098: Farsi]

HEX	8	9	A	B	C	D	E	F
0	SP 128	ؤ 144	ح 160	۰ 176	ل 192	غ 208	ک 224	- 240
1	SP 129	ئا 145	خ 161	۰ 177	ل 193	ء 209	ک 225	۰ 241
2	، 130	ب 146	خ 162	۰ 178	ت 194	ع 210	ک 226	ی 242
3	؛ 131	با 147	د 163	ا 179	ت 195	غ 211	ک 227	- 243
4	؟ 132	پ 148	ذ 164	ا 180	- 196	غ 212	ل 228	۰ 244
5	° 133	پ 149	ر 165	فی 181	ت 197	غ 213	ل 229	ا 245
6	آ 134	ن 150	ز 166	ف 182	ظ 198	غ 214	م 230	۲ 246
7	آ 135	تا 151	ژ 167	ط 183	ع 199	ف 215	م 231	۳ 247
8	آ 136	ث 152	سی 168	ط 184	لا 200	ف 216	ن 232	۴ 248
9	ا 137	ثا 153	ی 169	ا 185	را 201	ل 217	ن 233	۵ 249
A	ل 138	چ 154	ش 170	ا 186	لا 202	ر 218	و 234	۶ 250
B	د 139	چ 155	ش 171	ا 187	را 203	■ 219	ه 235	۷ 251
C	ء 140	چ 156	ص 172	ک 188	را 204	■ 220	ه 236	۸ 252
D	أ 141	چ 157	ط 173	وال 189	= 205	ق 221	ه 237	۹ 253
E	أ 142	خ 158	« 174	ظ 190	را 206	ق 222	ه 238	■ 254
F	ؤ 143	ح 159	» 175	ا 191	SP 207	■ 223	۰ 239	SP 255

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION B	NO.	
			NEXT 58	SHEET 57

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## 3.2.32 Page 42 [PC1118: Lithuanian]

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	☼ 176	Ł 192	ą 208	ą 224	≡ 240
1	Ü 129	æ 145	í 161	☼ 177	Ł 193	č 209	β 225	± 241
2	é 130	Æ 146	ó 162	☼ 178	τ 194	ę 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	ı 179	ƒ 195	è 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	† 180	- 196	ì 212	Σ 228	” 244
5	à 133	ò 149	Ñ 165	Ą 181	† 197	š 213	σ 229	“ 245
6	å 134	û 150	ą 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	ı 168	È 184	Ł 200	ž 216	φ 232	° 248
9	ë 137	ö 153	ƒ 169	‡ 185	Ŧ 201	ĵ 217	θ 233	• 249
A	è 138	Ü 154	ƒ 170	‡ 186	Ł 202	ŕ 218	Ω 234	· 250
B	ï 139	Φ 155	½ 171	π 187	π 203	■ 219	δ 235	√ 251
C	î 140	£ 156	¼ 172	Ɔ 188	‡ 204	■ 220	ω 236	n 252
D	ì 141	¥ 157	ı 173	‡ 189	= 205	ı 221	φ 237	² 253
E	Ä 142	Ŧ 158	« 174	š 190	‡ 206	ı 222	ε 238	■ 254
F	Å 143	f 159	» 175	ı 191	ž 207	■ 223	η 239	SP 255

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 59	SHEET 58

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## 3.2.33 Page 43 [PC1119: Lithuanian]

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

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 60	SHEET 59

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## 3.2.34 Page 44 [PC1125: Ukrainian]

HEX	8	9	A	B	C	D	E	F
0	А <small>128</small>	Р <small>144</small>	а <small>160</small>	⋮ <small>176</small>	Л <small>192</small>	л <small>208</small>	р <small>224</small>	ё <small>240</small>
1	Б <small>129</small>	С <small>145</small>	б <small>161</small>	⋮ <small>177</small>	Л̅ <small>193</small>	л̅ <small>209</small>	с <small>225</small>	ё̅ <small>241</small>
2	В <small>130</small>	Т <small>146</small>	в <small>162</small>	⋮ <small>178</small>	Т <small>194</small>	т <small>210</small>	т <small>226</small>	г <small>242</small>
3	Г <small>131</small>	У <small>147</small>	г <small>163</small>	<small>179</small>	т̅ <small>195</small>	л̅ <small>211</small>	у <small>227</small>	г̅ <small>243</small>
4	Д <small>132</small>	Ф <small>148</small>	д <small>164</small>	† <small>180</small>	– <small>196</small>	л̅ <small>212</small>	ф <small>228</small>	є <small>244</small>
5	Е <small>133</small>	Х <small>149</small>	е <small>165</small>	‡ <small>181</small>	† <small>197</small>	Г <small>213</small>	х <small>229</small>	є̅ <small>245</small>
6	Ж <small>134</small>	Ц <small>150</small>	ж <small>166</small>	<small>182</small>	‡ <small>198</small>	П <small>214</small>	ц <small>230</small>	І <small>246</small>
7	З <small>135</small>	Ч <small>151</small>	з <small>167</small>	π <small>183</small>	<small>199</small>	<small>215</small>	ч <small>231</small>	і̅ <small>247</small>
8	И <small>136</small>	Ш <small>152</small>	и <small>168</small>	‡ <small>184</small>	л̅ <small>200</small>	‡ <small>216</small>	ш <small>232</small>	ї̅ <small>248</small>
9	Й <small>137</small>	Щ <small>153</small>	й <small>169</small>	<small>185</small>	Г̅ <small>201</small>	Ј <small>217</small>	щ <small>233</small>	ї̅ <small>249</small>
A	К <small>138</small>	Ь <small>154</small>	к <small>170</small>	<small>186</small>	л̅ <small>202</small>	Г̅ <small>218</small>	ь <small>234</small>	÷ <small>250</small>
B	Л <small>139</small>	Ы <small>155</small>	л <small>171</small>	π̅ <small>187</small>	π̅ <small>203</small>	■ <small>219</small>	ы <small>235</small>	± <small>251</small>
C	М <small>140</small>	Ъ <small>156</small>	м <small>172</small>	<small>188</small>	<small>204</small>	■ <small>220</small>	ъ <small>236</small>	№ <small>252</small>
D	Н <small>141</small>	Э <small>157</small>	н <small>173</small>	<small>189</small>	= <small>205</small>	<small>221</small>	э̅ <small>237</small>	¤ <small>253</small>
E	О <small>142</small>	Ю <small>158</small>	о <small>174</small>	<small>190</small>	<small>206</small>	<small>222</small>	ю̅ <small>238</small>	■ <small>254</small>
F	П <small>143</small>	Я <small>159</small>	п <small>175</small>	Г̅ <small>191</small>	л̅ <small>207</small>	■ <small>223</small>	я̅ <small>239</small>	SP <small>255</small>

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 61	SHEET 60

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## 3.2.35 Page 45 [WPC1250: Latin2]

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	Ř 192	Ð 208	ř 224	đ 240
1	SP 129	‘ 145	˘ 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	, 130	, 146	˘ 162	˘ 178	Â 194	Ñ 210	â 226	ň 242
3	SP 131	“ 147	Ł 163	ł 179	Ǻ 195	Ó 211	ǻ 227	ó 243
4	” 132	” 148	ǻ 164	˘ 180	Ǻ 196	Ô 212	ǻ 228	ô 244
5	… 133	• 149	À 165	μ 181	Ĺ 197	Õ 213	Í 229	õ 245
6	† 134	- 150	ı 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	ª 185	É 201	Û 217	é 233	û 249
A	Š 138	š 154	Ş 170	ş 186	È 202	Ú 218	è 234	ú 250
B	< 139	> 155	« 171	» 187	Ë 203	Û 219	ë 235	ü 251
C	Š 140	š 156	˘ 172	Ĺ 188	Ë 204	Ü 220	ě 236	ü 252
D	Ÿ 141	Ÿ 157	- 173	˘ 189	Í 205	Ý 221	í 237	ý 253
E	Ž 142	ž 158	® 174	ř 190	Î 206	Ï 222	î 238	ț 254
F	Ž 143	ž 159	Ž 175	ž 191	Đ 207	ß 223	đ 239	˘ 255

	TITLE <b>TM-T20</b> Specification (STANDARD)	SHEET REVISION  B	NO.	
			NEXT 62	SHEET 61

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## 3.2.36 Page 46 [WPC1251: Cyrillic]

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

# Confidential

## 3.2.37 Page 47 [WPC1253: Greek]

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	ï 192	Π 208	Û 224	π 240
1	SP 129	‘ 145	” 161	± 177	À 193	Ρ 209	α 225	ρ 241
2	, 130	’ 146	À 162	² 178	Β 194	SP 210	β 226	ς 242
3	f 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	ι 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	à 170	Ί 186	Κ 202	Ϊ 218	κ 234	ϊ 250
B	< 139	> 155	« 171	» 187	Λ 203	ÿ 219	λ 235	ÿ 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	Υ 190	Ξ 206	ή 222	ξ 238	ώ 254
F	SP 143	SP 159	- 175	Ω 191	Ο 207	ί 223	ο 239	SP 255

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## 3.2.38 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	ı 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	f 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	ı 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	‡ 135	- 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
8	^ 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

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HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	· 192	। 208	ℵ 224	י 240
1	SP 129	‘ 145	ı 161	± 177	∴ 193	· 209	י 225	ו 241
2	, 130	’ 146	¢ 162	² 178	∴ 194	· 210	י 226	ו 242
3	f 131	“ 147	£ 163	³ 179	∴ 195	· 211	י 227	י 243
4	” 132	” 148	№ 164	´ 180	· 196	∥ 212	י 228	י 244
5	… 133	• 149	¥ 165	μ 181	∴ 197	∥ 213	י 229	י 245
6	† 134	- 150	ı 166	¶ 182	∴ 198	” 214	י 230	י 246
7	‡ 135	- 151	§ 167	· 183	- 199	’ 215	י 231	י 247
8	^ 136	~ 152	∴ 168	· 184	∴ 200	” 216	י 232	י 248
9	‰ 137	™ 153	© 169	¹ 185	· 201	SP 217	י 233	י 249
A	SP 138	SP 154	× 170	÷ 186	SP 202	SP 218	י 234	י 250
B	< 139	> 155	« 171	» 187	∴ 203	SP 219	י 235	SP 251
C	SP 140	SP 156	¬ 172	¼ 188	· 204	SP 220	י 236	SP 252
D	SP 141	SP 157	- 173	½ 189	· 205	SP 221	י 237	SP 253
E	SP 142	SP 158	® 174	¾ 190	- 206	SP 222	י 238	SP 254
F	SP 143	SP 159	- 175	¿ 191	- 207	SP 223	י 239	SP 255

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3.2.40 Page 50 [WPC1256: Arabic]

HEX	8	9	A	B	C	D	E	F
0	€ 128	ك 144	SP 160	° 176	^ 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	f 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	ل 197	ص 213	ه 229	ˆ 245
6	† 134	- 150	¡ 166	¶ 182	ئ 198	ض 214	و 230	˘ 246
7	‡ 135	- 151	§ 167	• 183	ا 199	x 215	ç 231	÷ 247
8	^ 136	ك 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	ن 202	ع 218	ê 234	° 250
B	< 139	> 155	« 171	» 187	ث 203	غ 219	ë 235	û 251
C	ƒ 140	œ 156	¬ 172	¼ 188	ج 204	ا 220	ی 236	ü 252
D	چ 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	أ 238	SP 254
F	ڈ 143	ں 159	- 175	? 191	د 207	ك 223	آ 239	ء 255

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HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	À 192	Š 208	ą 224	š 240
1	SP 129	‘ 145	SP 161	± 177	Ī 193	Ņ 209	į 225	ň 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	ı 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	Ū 216	č 232	ų 248
9	‰ 137	™ 153	© 169	¹ 185	É 201	Ł 217	é 233	ł 249
A	SP 138	SP 154	Ŕ 170	ŗ 186	Ž 202	Ś 218	ż 234	ś 250
B	< 139	> 155	« 171	» 187	È 203	Ū 219	è 235	ū 251
C	SP 140	SP 156	¬ 172	¼ 188	Ĝ 204	Ü 220	ğ 236	ü 252
D	¨ 141	- 157	- 173	½ 189	Ķ 205	Ž 221	ķ 237	ž 253
E	˘ 142	• 158	® 174	¾ 190	Ī 206	Ž 222	ī 238	ž 254
F	· 143	SP 159	Æ 175	æ 191	Ł 207	β 223	ł 239	· 255

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## 3.2.42 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	ì 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	, 130	’ 146	¢ 162	² 178	Â 194	” 210	â 226	· 242
3	f 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	ï 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	‡ 135	- 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
8	^ 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	à 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	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

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**3.2.43 Page 53 [KZ-1048: Kazakhstan]**

HEX	8	9	A	B	C	D	E	F
0	ӱ 128	ӓ 144	SP 160	° 176	А 192	Р 208	а 224	р 240
1	ғ 129	‘ 145	Ұ 161	± 177	Б 193	С 209	б 225	с 241
2	, 130	’ 146	Ұ 162	І 178	В 194	Т 210	в 226	т 242
3	ґ 131	“ 147	Ә 163	і 179	Г 195	У 211	г 227	у 243
4	” 132	” 148	Ҙ 164	ө 180	Д 196	Ф 212	д 228	ф 244
5	… 133	• 149	Ө 165	ұ 181	Е 197	Х 213	е 229	х 245
6	† 134	- 150	і 166	Ӧ 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	ӕ 138	ӗ 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	ӧ 140	ӧ 156	ҫ 172	ә 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	Ү 143	Ү 159	Ү 175	Ү 191	П 207	Я 223	п 239	я 255

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## 3.2.44 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

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## 3.2.45 International character sets

Country	ASCII code (Hex)													
	23	24	25	26	40	5B	5C	5D	5E	60	7B	7C	7D	7E
USA	#	\$	%	*	@	[	\	]	^	`	{		}	~
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	^	`	à	ò	è	ì
Spain I	¤	\$	%	*	@	í	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	í	Ñ	¿	é	`	í	ñ	ó	ú
Latin America	#	\$	%	*	á	í	Ñ	¿	é	ü	í	ñ	ó	ú
Korea	#	\$	%	*	@	[	#	]	^	`	{		}	~
Slovenia/ Croatia	#	\$	%	*	ž	š	đ	č	č	ž	š	đ	č	č
China	#	¥	%	*	@	[	\	]	^	`	{		}	~
Vietnam	đ	\$	%	*	@	[	\	]	^	`	{		}	~
Arabia	#	\$	%	*	@	[	\	]	^	`	{		}	~

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### 3.3 Switches and Buttons

#### 3.3.1 Power button

The Power button (a rocker switch) located on the lower right front of the printer turns the power on or off.

- NOTES:
1. Turn on the power only after connecting the AC cable.
  2. To turn the power on immediately after turning off the power, press the Power button after the Power LED indicator goes off.
  3. If the power is turned off without the execution of the **DLE DC4** ( $fn = 2$ ) command, the values of the maintenance counter are not updated correctly. To use the maintenance counter correctly, see APPENDIX F.

#### 3.3.2 Feed button

1) Feed button: Non-locking push button

[Function] • Feeds paper based on the line spacing set by **ESC 2** and **ESC 3**. However, paper feeding using the Feed button cannot be performed under the following conditions:

- 1) When the roll paper end sensor has detected a paper end
  - 2) When the roll paper cover is open
  - 3) While printing is in progress
- If you push this button when the printer is in the macro execution standby state, the defined macro is executed.
  - During self-test printing, you can stop the self-test temporarily by pressing this button and restart it by pressing the button again.

NOTE: Enabling/disabling of this button can be selected by **ESC c 5**. If the command is set to disable this button, it is unable to function.

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**3.4 Indicators**

**3.4.1 LEDs**

- 1) Power LED: Green
  - On: Power is stable.
  - Off: Power is not stable.
  
- 2) Error (Error) LED: Orange
  - On: Offline (except while paper is being fed using the Feed button, during test printing, and in the error state).
  - Off: Normal condition
  - Flashing: Error (See Section 3.9.)
  
- 3) Roll paper (Paper) LED: Orange
  - On: A roll paper end is detected.
  - Off: Paper is loaded (Normal condition)
  - Flashing:
    - Self-test standby state (See Section 3.6.) or macro standby state
    - Macro execution standby state when the macro execution command is used.

**Table 3.4.1 Standby State Indication**

State	Paper LED flashing pattern	Recovery conditions
Waiting for self-test printing to be continued or macro execution ready state.	Paper 	Pressing the Feed button causes self-test printing to be continued or executes the macro.

NOTE: A macro can be executed *r* times (*r* specifies the number of times to execute the macro.) within the specified definition range. The macro can be executed continuously or can be executed by pressing the Feed button. If the macro is executed by pressing the Feed button, the Paper LED flashes to indicate the macro execution ready state. (See Section 6, Commands.)



**Figure 3.4.1 Control Panel Buttons and Indicators**

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## 3.5 Printer Setting

### 3.5.1 Software setting

#### 3.5.1.1 Memory switch setting

The setting values for the memory switches can be changed by either of the following methods:

- User setup commands: **GS ( E**
  - 1) Change into the user setting mode with **GS ( E <Function 1>**.
  - 2) Change the setting with **GS ( E <Function 3>**.
  - 3) End the user setting mode with **GS ( E <Function 2>**.

NOTE: For details, see **GS ( E**, Set user setup commands in Section 6, COMMANDS.

- Software setting mode (except some functions)  
See Section 3.8.3, Software setting mode.

**Table 3.5.1 Memory Switch 1 (Msw1)**

Msw	Function	Setting value		Factory setting
		48 (OFF)	49 (ON)	
1-1	(Reserved)	--	--	48 (OFF)
1-2	Receive buffer capacity	4 KB	45 bytes	48 (OFF)
1-3	Condition for BUSY	Receive buffer full or offline	Receive buffer full	48 (OFF)
1-4	Data processing for receiving error	Replaced with "?"	Ignored	48 (OFF)
1-5	Automatic line feed	Always disabled	Always enabled	48 (OFF)
1-6 to 1-8	(Reserved)	--	--	48 (OFF)

**Table 3.5.2 Memory Switch 2 (Msw2)**

Msw	Function	Setting value		Factory setting
		48 (OFF)	49 (ON)	
2-1 to 2-8	(Reserved)	--	--	48 (OFF)

**Table 3.5.3 Memory Switch 3 (Msw3)**

Msw	Function	Setting value		Factory setting
		48 (OFF)	49 (ON)	
3-1 to 3-8	(Reserved)	--	--	48 (OFF)

**Table 3.5.4 Memory Switch 4 (Msw4)**

Msw	Function	Setting value		Factory setting
		48 (OFF)	49 (ON)	
4-1 to 4-8	(Reserved)	--	--	48 (OFF)

**Table 3.5.5 Memory Switch 5 (Msw5)**

Msw	Function	Setting value		Factory setting
		48 (OFF)	49 (ON)	
5-1	Sets USB power-saving function *1	Enabled	Disabled	48 (OFF)
5-2	Sets recovery conditions from receive buffer BUSY	Recovers when the remaining receive buffer capacity becomes 256 bytes	Recovers when the remaining receive buffer capacity becomes 138 bytes	48 (OFF)
5-3 to 5-8	(Undefined)	--	--	48 (OFF)

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\*1: Valid only when the USB interface communication condition is set to the vendor-defined class and the system configuration is set so that the USB driver can support the USB power-saving function.

### 3.5.1.2 Customized value setting

The customized values can be changed by any of the following methods:

- User setup commands: **GS ( E**
  - 1) Change into the user setting mode with **GS ( E <Function 1>**.
  - 2) Change the setting with **GS ( E <Function 5>**.
  - 3) End the user setting mode with **GS ( E <Function 2>**.

NOTE: For details, see **GS ( E**, Set user setup commands in Section 6, COMMANDS.

- Software setting mode  
See Section 3.8.3, Software setting mode.

- Utility software

The settings can be changed by using the utility software for the TM-T20 (except some functions).

**Table 3.5.6 Types of Customized Value**

Function	Value	Factory setting
Roll paper width	80 mm/58 mm	80 mm
Selection of print density	7 levels in the print density levels 1 to 7	Level 4 (standard)
Selection of print speed	13 levels in the print speed levels 1 to 13	Level 13
Character code table defaults	43 pages selectable with <b>ESC t</b>	0
International character defaults	18 types selectable with <b>ESC R</b>	0
Column emulation mode	Normal mode/42 column mode	Normal mode
Autocutting after closing the roll paper cover	Does not cut/cuts	Cuts
(ARP) Reduction of top margin	Does not reduce/reduces	Does not reduce
(ARP) Reduction of bottom margin	Does not reduce/reduces	Does not reduce
(ARP) Reduction of line spacing	Does not reduce/reduces 25%/reduces 50%/reduces 75%	Does not reduce
(ARP) Reduction of line spacing where extra line feeds are included	Does not reduce/reduces 25%/reduces 50%/reduces 75%	Does not reduce
(ARP) Reduction of bar code height	Does not reduce/reduces 25%/reduces 50%/reduces 75%	Does not reduce
Font A auto replacement *2	Does not replace/Font B.	Does not replace
Font B auto replacement *2	Does not replace/Font A.	Does not replace
Buzzer function: Enabling/disabling optional external buzzer	Enables/disables	Disables
Buzzer function: Buzzer frequency (Error) (See Note 1.)	Does not sound/sounds 1 time/sounds continuously.	Sounds continuously
Buzzer function: Sound pattern (Autocut) (See Note 1.)	5 patterns selectable with <b>ESC ( A</b>	Pattern A
Buzzer function: Buzzer frequency (Autocut) (See Note 1.)	Does not sound/sounds 1 time.	Sounds 1 time
Buzzer function: Sound pattern (Pulse 1) (See Note 1.)	5 patterns selectable with <b>ESC ( A</b>	Pattern A

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Buzzer function: Buzzer frequency (Pulse 1) (See Note 1.)	Does not sound/sounds 1 time.	Sounds 1 time
Buzzer function: Sound pattern (Pulse 2) (See Note 1.)	5 patterns selectable with <b>ESC ( A</b>	Pattern B
Buzzer function: Buzzer frequency (Pulse 2) (See Note 1.)	Does not sound/sounds 1 time.	Sounds 1 time
Logo emulation mode *3	Standard logo mode/180 dpi logo mode	Standard logo mode

(ARP = Automatic Reduction of Paper)

\*1) The functions are enabled for the optional external buzzer.

\*2) When the 42 column mode is selected in the column emulation mode, font replacement setting is ignored and the font is not replaced.

\*3) Supported by Firmware Version 1.04 (USB/Serial model)/2.00 (Ethernet model) or later.

### 3.5.1.3 Serial interface communication condition setting

The setting values for the serial interface communication condition can be changed by any of the following methods:

- User setup commands: **GS ( E**
  - 1) Change into the user setting mode with **GS ( E <Function 1>**.
  - 2) Change the setting with **GS ( E <Function 11>**.
  - 3) End the user setting mode with **GS ( E <Function 2>**.

NOTE: For details, see **GS ( E**, Set user setup commands in Section 6, COMMANDS.

- Software setting mode  
See Section 3.8.3, Software setting mode.

- Utility software  
The settings can be changed by using the utility software for the TM-T20.

**Table 3.5.7 Serial Interface Communication Condition**

Function	Selectable value	Factory setting
Transmission speed	2400 bps/4800 bps/9600 bps/19200 bps /38400 bps/57600 bps/115200 bps	38400 bps
Parity	None/odd/even	None
Handshaking	DTR/DSR XON/XOFF	DTR/DSR
Word length	7 bits/8 bits	8 bits

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**3.5.1.4 USB interface communication condition setting**

The setting values for the USB interface communication condition can be changed by any of the following methods:

- User setup commands: **GS ( E**
  - 1) Change into the user setting mode with **GS ( E <Function 1>**.
  - 2) Change the setting with **GS ( E <Function 15>**.
  - 3) End the user setting mode with **GS ( E <Function 2>**.

NOTE: For details, see **GS ( E**, Set user setup commands in Section 6, COMMANDS.

- Software setting mode  
See Section 3.8.3, Software setting mode.

- Utility software  
The settings can be changed by using the utility software for the TM-T20.

**Table 3.5.8 USB Interface Communication Condition**

Function	Selectable value	Factory setting
Class	Vendor-defined class/ Printer class	Printer class

**3.5.1.5 Receipt enhancement setting**

The setting values for the receipt enhancement can be changed by either of the following methods:

- Group of commands for receipt enhancement control: **FS ( E**  
 NOTE: For details, see **FS ( E**, Group of commands for receipt enhancement control in Section 6, COMMANDS.
- Utility software  
 The settings can be changed by using the utility software for the TM-T20 (except some functions).

**Table 3.5.9 Receipt Enhancement**

Function	Selectable value	Factory setting
Auto top logo printing	Key code	Undefined
	Justification (left/center/right)	Undefined
	Number of lines to be deleted below top logo	Undefined
Auto bottom logo printing	Key code	Undefined
	Justification (left/center/right)	Undefined
Extended settings for auto top logo/bottom logo printing	Prints the top logo while paper feeding to the cutting position: Enabled/disabled	Disabled
	Prints the top logo at power-on: Enabled/disabled	Disabled
	Prints the top logo when the roll paper cover is closed: Enabled/disabled	Enabled
	Prints the top logo while clearing the buffer to recover from a recoverable error: Enabled/disabled	Enabled
	Prints the top logo after paper feeding with the Feed button has finished: Enabled/disabled	Disabled

## 3.6 Self-test

### 1) Self-test function

The printer prints the following content during status printing and test printing:

1. Status printing
  - Control software version
  - Interface type
  - Receive buffer size
  - BUSY conditions (depending on interfaces)
  - Mounted character fonts
    - All models: Alphanumeric
    - Japanese model: Japanese
  - Print density
  - Maintenance information
    - Head running length, number of times of autocutting
  - Memory switch settings
2. Test printing
  - A rolling pattern using the built-in character set

### 2) Self-test with stand-alone printer

1. Hold down the Feed button while turning on the printer with the cover closed, then the current printer status is printed.
2. After printing the current printer status, the printer prints the following message:  
"Select Modes by pressing Feed Button."  
Continue SELF-TEST: Less than 1 second  
Mode Selection : 1 second or more"  
The Paper LED indicator flashes and the printer enters the test printing standby state. Briefly press the Feed button in this state to start test printing.
3. After a number of lines are printed, the printer indicates the end of the self-test by printing "\*\*\*\* completed \*\*\*\*".

### 3) Self-test printing with a command

1. Status printing  
Transmit the **GS ( A** command (printer status print).
2. Test printing  
Transmit the **GS ( A** command (rolling pattern print).

### 4) Processing after a self-test has finished

The printer performs a software reset when the self-test process ends.

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## 3.7 Hexadecimal Dumping

### 1) Hexadecimal dumping function

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

### 2) Running hexadecimal dumping

1. Start hexadecimal dumping by executing either of the following:
  - a. Open the cover and turn the power on while pressing the Feed button, and then close the roll paper cover.
  - b. Execute the **GS ( A** command (Hexadecimal dump print).
2. The printer first prints "Hexadecimal Dump To terminate ....." on roll paper, and then prints the received print data in hexadecimal numbers and in their corresponding characters.

- NOTES:
1. If no characters correspond to the data received, the printer prints ".".
  2. During hexadecimal dumping, any commands other than **DLE EOT** do not function.
  3. Insufficient print data to fill the last line can be printed by pressing down the Feed button.
3. After printing has finished, Hexadecimal dumping ends by executing any of the following:
    - a. Turn the power off.
    - b. Press the Feed button three times.
    - c. Reset the printer.

<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 ***
```

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## 3.8 Various Information Print Modes and Setting Mode

### 3.8.1 NV graphics information print mode

#### 1) NV graphics information printing function

Prints the NV graphics information registered in the printer. The printer prints:

- Capacity of the NV graphics
- Occupied capacity of the NV graphics
- Unused capacity of the NV graphics
- Number of NV graphics that are registered
- Key code, number of dots in X direction, number of dots in Y direction, number of colors to be defined
- NV graphics data

#### 2) Starting the mode

- (1) With the roll paper cover closed, turn the printer power on while pressing the Feed button until printing of the printer status starts.
- (2) After the printer status has been printed, keep pressing the Feed button until printing of the guidance for operation method starts.
- (3) After the guidance for operation method has been printed, briefly press the paper Feed button once.
- (4) Then keep pressing the paper Feed button again until printing of the NV graphics information starts.

#### 3) Ending the mode

Turn the power off.

### 3.8.2 R/E information print mode

#### 1) R/E (receipt enhancement) information printing function

Prints the following R/E information presently registered in the printer.

- Auto top logo print setting
- Auto bottom logo print setting
- Extended settings for auto top logo/bottom logo printing

#### 2) Starting the mode

- (1) With the roll paper cover closed, turn the printer power on while pressing the Feed button until printing of the printer status starts.
- (2) After the printer status has been printed, keep pressing the Feed button until printing of the guidance for operation method starts.
- (3) After the guidance for operation method has been printed, briefly press the Feed button twice.
- (4) Then keep pressing the Feed button again until printing of the R/E information starts.

#### 3) Ending the mode

Turn the power off.

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**3.8.3 Software setting mode**

1) Software setting function

Executes software settings using the buttons on the printer.

The software setting values that can be set are as follows:

- Print density
- Printing speed
- Communication conditions using a serial interface
- Enabling/disabling paper autocutting at cover close
- Paper width
- Default value of character code page/international character set
- Auto replacement of font
- Communication conditions using a USB interface
- Optional external buzzer control
- Column emulation
- Interface setting
- Logo emulation mode (Supported by firmware Version 1.04(USB/Serial model)/2.00 (Ethernet model) or later)
- Automatic reduction of amount of paper to use

2) Starting the mode

- (1) With the roll paper cover closed, turn the printer power on while pressing the Feed button until printing of the printer status starts.
- (2) After the printer status has been printed, press the Feed button until printing of the instructions for operation method starts.
- (3) After the instructions for operation method have been printed, briefly press the Feed button three times.
- (4) Then hold down the Feed button again until printing of the software setting mode starts.
- (5) The instructions for the setting method are printed. Follow the instructions to set the values.

3) Ending the mode

After completing the setting, the set content is stored, and the printer is initialized. When printer initialization ends, the printer is ready for normal printing.

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### 3.9 Error Processing

#### 3.9.1 Error types

1) Automatically recoverable errors

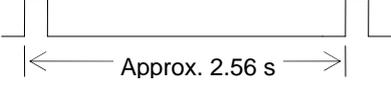
**Table 3.9.1 Automatically Recoverable Errors**

Error	Description	Error LED flashing pattern →   ← Approx.160 ms	Recovery
Print head temperature error	The temperature of the print head is extremely high.		Recovers automatically when the print head cools.
Roll paper cover open error	Printing on the roll paper is not performed correctly due to a cover-open.		Recovers automatically when the cover is closed.

NOTE: Print head temperature error is not an abnormality.

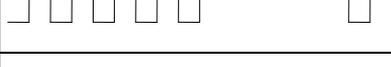
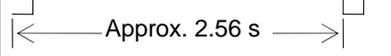
2) Recoverable errors

**Table 3.9.2 Recoverable Errors**

Error	Description	Error LED flashing pattern →   ← Approx.160 ms	Recovery
Autocutter error	The autocutter does not work correctly.		Recovers with <b>DLE ENQ 1</b> or <b>DLE ENQ 2</b> .

3) Unrecoverable errors

**Table 3.9.3 Unrecoverable Errors**

Error	Description	Error LED flashing pattern →   ← Approx.160 ms	Recovery
R/W error in memory	After R/W checking, the printer does not work correctly.		Unable to recover.
High voltage error	The power supply voltage is extremely high.		Unable to recover.
Low voltage error	The power supply voltage is extremely low.		Unable to recover.
CPU execution error	The CPU executes an incorrect address.		Unable to recover.
Internal circuit connection error	Internal circuits are not connected correctly.		Unable to recover.

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

**3.9.2 Printer operation when an error has occurred**

The printer executes the following operations when detecting an error.

- Stops all printer operations for the selected paper section.
- Goes offline.
- Goes BUSY.
- Flashes the Error LED.

**3.10 Cover Open Lever**

When the cover open lever (located to the right of the cover) is operated, the roll paper cover opens.

- NOTES:
1. Be sure to use the cover open lever to open the roll paper cover.
  2. Do not open the roll paper cover during printing.
  3. Never open the roll paper cover during autcutting operation; doing so may damage the mechanism.

**3.11 Cover Open Sensor**

The cover open sensor monitors the roll paper cover. When the sensor detects a cover open during printing, the Error LED flashes and the printer stops printing. The printer recovers when the cover is closed. When the sensor detects a cover open while the printer is in the standby status, the printer goes offline. The printer recovers when the cover is closed.

NOTE: The status reported by the paper sensors remains the same as that reported immediately before the cover was opened.

**3.12 Print Buffer-full Printing**

- When in standard mode  
When subsequent data is received after the printer processes one line of data in the print buffer, the printer automatically prints the processed line and feeds the paper by one line.
- When in page mode  
When subsequent data is received after the printer processes one line of data in the print buffer, the printer automatically moves the printing position to one line below the processed line.

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**3.13 Optional External Buzzer**

The optional external buzzer (OT-BZ20) can be used by connecting to the drawer kick-out connector and setting “Enabling/disabling optional external buzzer” to Enabled with the software setting. (See Section 3.5.1 for how to change the setting.)

- Sounding/stopping by the buzzer commands  
 It is possible to sound the buzzer by setting a sound pattern and a buzzer frequency with **ESC ( A**.  
 It is possible to stop sounding the buzzer with **DLE DC4** <Function 3>.
- Cooperative sounding by using commands other than the buzzer commands  
 Buzzer sounding is possible by autocutting commands/operations (**GS V 0**, **GS V 65**, **ESC i**, **ESC m**, autocutting for automatic top logo printing, automatic cutting at cover close).  
 Buzzer sounding is possible by the commands that generate the specified pulse (drawer kick-out) (**ESC p**, **DLE DC4** <*fn* = 1>).  
 The sound pattern and buzzer frequency can be set with the software setting. (See Section 3.5.1 for how to change the setting.)
- Autonomic sound  
 Buzzer sounding is possible when a paper-end is detected.  
 Buzzer sounding is possible when an error occurs.  
 The sound pattern and buzzer frequency can be set with the software setting. (See Section 3.5.1 for how to change the setting.)

\*Notes on connecting, installing, and using the optional external buzzer:

- When the optional external buzzer is set to Enabled with the software setting, a pulse is not output to the drawer kick-out connector pin; therefore, a drawer cannot be driven.
- It is prohibited that both the optional external buzzer and the drawer are connected at the same time by using a branched connector.
- The optional external buzzer does not sound when the optional external buzzer is connected after the printer power is on or if the optional external buzzer is disconnected and reconnected while the printer power is on; therefore, be sure to turn on the printer with the optional external buzzer connected and do not disconnect the optional external buzzer when the printer power is on.
- Be sure to fix the buzzer to the printer unit with the affixing tape (bundled with the optional external buzzer).
- For the position (surface) where the optional external buzzer is attached to the printer, it is prohibited to install the optional external buzzer at the roll paper exit; otherwise, it interrupts paper ejection. The following surfaces are recommended:  
 When installing horizontally: both sides  
 When installing vertically, wall-hanging installation: both sides, top, bottom for wall-hanging installation
- Be sure to clean and dry the surface of the printer and the optional external buzzer where the affixing tape is attached before attaching the affixing tape to the printer and the optional external buzzer.
- To prevent liquid from entering, it is recommended to install the optional external buzzer so that the volume adjustment knob is positioned sideways or downward.
- Be sure not to apply any liquid components such as water, oil, or chemicals on the optional external buzzer intentionally. Otherwise, the optional external buzzer may become damaged.

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**4. CASE SPECIFICATIONS**

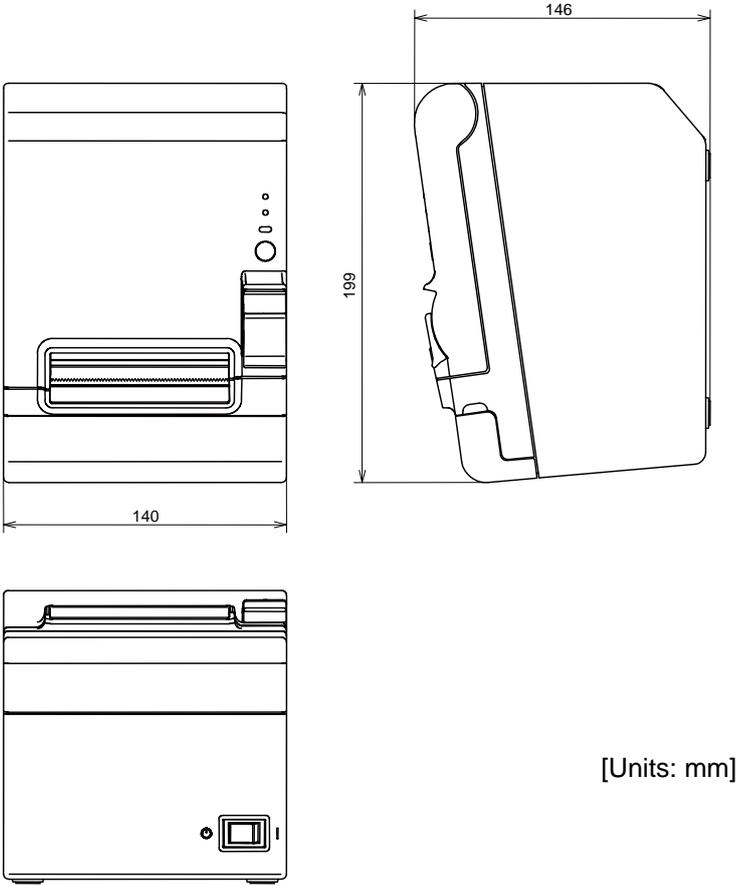
**4.1 External Dimensions and Mass**

- Width:            Approximately 140 mm {5.51"}
- Depth:           Approximately 199 mm {7.83"}
- Height:           Approximately 146 mm {5.75"}
- Mass:             Approximately 1.7 kg {3.74 lb} (Roll paper excluded)

**4.2 Color**

EPSON standard color (ECW (Epson Cool White), EDG (Epson Dark Gray))

**4.3 External Dimensions**



Materials for the exterior: 94V-0 (UL grade for flame resistance)

**Figure 4.3.1 External Dimensions**

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**5. OPTIONS AND CONSUMABLES**

**5.1 Standard Accessories**

- Roll paper × 1 roll (for checking the initial movement of the printer)
- CD-ROM
  - Drivers
  - Utility software
  - Manuals
- Setup guide or user's manual
- Power switch cover
- Waterproof power switch cover
- Wall hanging bracket
- Screws for wall hanging bracket
- Rubber feet for vertical installation
- Control panel sheet for vertical installation
- 58-mm width roll paper guide
- Interface cable (for other than the Ethernet interface model)
- AC cable (Might not be included depending on unit specification and sales area.)

**5.2 Options**

- Affixing tape  
Model: DF-10
- Optional external buzzer  
Model: OT-BZ20

**5.3 Consumables**

- Specified paper
  - Thermal roll paper: NTP080-80 (when the paper width is set to 80 mm)
  - NTP058-80 (when the paper width is set to 58 mm)
  - [Original paper: TF50KS-E Nippon Paper Industries Co., Ltd.]
  - In Japan: Nakagawa Manufacturing Co., Ltd.
  - In U.S.A.: Nakagawa Mfg. (USA) Inc.
  - In Europe: Nakagawa Mfg. (Europe) GmbH
  - In Southeast Asia: N.A.K. Mfg. (Malaysia) SDN BHD

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## 6. COMMANDS

### 6.1 Command Notation

#### XXXX

---

[Name]	The name of the command.
[Format]	The code sequence. [ /]k indicates the contents in brackets [ ] should be repeated k times.
[Range]	Gives the allowable ranges, if any, for the command parameters.
[Default]	Gives the default values, if any, for the arguments.
[Description]	Describes the function of the command. "–" in the table indicates 0 or 1.
[Notes]	Provides important information on setting and using the printer command, if necessary.
[Reference]	Gives references, if any.

### 6.2 Explanation of Terms

- 1) Real-time command  
Real-time commands are identified with a **DLE** extension, such as **DLE EOT**, **DLE ENQ**, or **DLE DC4**. The printer executes these commands as soon as they are received.
- 2) Obsolete command  
Obsolete commands are commands that will not be supported by future printer models. Therefore, we recommend replacing them with more recent, upward-compatible commands that have the same functions.
- 3) NV memory write command  
NV memory write commands delete or store data in the NV memory (flash ROM).  
**GS ( E <some functions>**, **GS ( L / GS 8 L <some functions>**, **GS g 0**, **GS D**, **FS g 1**, **FS q**
- 4) ESC/POS Handshaking Protocol  
ESC/POS Handshaking Protocol is a handshaking protocol between the host computer and the printer when the printer transmits data. The ESC/POS Handshaking Protocol is required if the following commands are executed:  
**GS ( L / GS 8 L <some functions>**
- 5) Print buffer  
The print buffer is used to store image data for printing.
- 6) Receive buffer  
The receive buffer is used to store data from the host computer. All received data is stored in this buffer and processed in the order received.
- 7) Maximum printable area  
The maximum printable area of this printer is as follows:
  - Standard Mode (Horizontal direction) : 72 mm {576/203"} [when paper width is set to 80 mm]  
: 52.5 mm {420/203"} [when paper width is set to 58 mm]
  - Page Mode (Horizontal direction) : 72 mm {576/203"} [when paper width is set to 80 mm]  
: 52.5 mm {420/203"} [when paper width is set to 58 mm]
  - Page Mode (Vertical direction) : 207.95 mm {3324/406"} [when paper width is set to 58 mm]

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8) Horizontal or vertical motion units

The horizontal or vertical motion units are used for calculating the setting values for various commands and can be changed with **GS P**.

9) Left edge of the print area

The left edge of the print area indicates the first column for character(s) to be developed, and also the print position to be moved when  $(nL + nH \times 256) = 0$  is specified with **ESC \$**.

- In standard mode, the left edge of the print area is the position of the left margin.
- In page mode, the left edge of the print area is the position of the left edge when the starting position specified with **ESC T** is viewed as the top left of the print area.

10) Column format / Raster format

Column format is a format where data is set in descending order (bit 7, 6, ..., 0) from the top vertically.

<i>d1</i>	<i>d4</i>	<i>d7</i>	MSB
			LSB
<i>d2</i>	<i>d5</i>	<i>d8</i>	MSB
			LSB
<i>d3</i>	<i>d6</i>	<i>d9</i>	MSB
			LSB

Raster format is a format where data is set in descending order (bit 7, 6, ..., 0) from the left horizontally.

<i>d1</i>	<i>d2</i>	<i>d3</i>
<i>d4</i>	<i>d5</i>	<i>d6</i>
<i>d7</i>	<i>d8</i>	<i>d9</i>
MSB	LSB	MSB
		LSB
		MSB
		LSB

11) Inch

A unit of length. One inch is 25.4 mm.

12) dpi

dpi (dots per inch) is the number of dots per 25.4 mm.

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### 6.3 Control Commands

#### HT

---

[Name] Horizontal tab  
 [Format] ASCII HT  
 Hex 09  
 Decimal 9

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

#### LF

---

[Name] Print and line feed  
 [Format] ASCII LF  
 Hex 0A  
 Decimal 10

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

#### FF (In page mode)

---

[Name] Print and return to standard mode (in page mode)  
 [Format] ASCII FF  
 Hex 0C  
 Decimal 12

[Description] • Prints all the data in the print buffer collectively and switches from page mode to standard mode.

#### CR

---

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

[Description] • Executes one of the following operations.

Condition	Function
When automatic line feed is enabled.	Functions the same as <b>LF</b> .
When automatic line feed is disabled and when using the serial interface model.	This command is ignored.

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## CAN

[Name] Cancel print data in page mode

[Format] ASCII      CAN  
 Hex           18  
 Decimal       24

[Description] • In page mode, deletes all the print data in the current print area.

## DLE EOT *n*

[Name] Transmit real-time status

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

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

[Description] • Transmits the real-time status.

<i>n</i>	Function
1	Transmits printer status.
2	Transmits offline cause status.
3	Transmits error cause status.
4	Transmits roll paper sensor status.

• This printer transmits the following status in real time.

• Printer status (*n* = 1)

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Fixed.
1	On	02	2	Fixed.
2	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	04	4	Drawer kick-out connector pin 3 is HIGH.
3	Off	00	0	Online.
	On	08	8	Offline.
4	On	10	16	Fixed.
5, 6	--	--	--	Reserved.
7	Off	00	0	Fixed.

• Offline cause status ( $n = 2$ )

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Fixed.
1	On	02	2	Fixed.
2	Off	00	0	Cover is closed.
	On	04	4	Cover is open.
3	Off	00	0	Paper is not being fed with the paper Feed button.
	On	08	8	Paper is being fed with the paper Feed button.
4	On	10	16	Fixed.
5	Off	00	0	No paper end stop.
	On	20	32	Printing stopped due to paper end.
6	Off	00	0	No error.
	On	40	64	Error occurred.
7	Off	00	0	Fixed.

• Error cause status ( $n = 3$ )

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Fixed.
1	On	02	2	Fixed.
2	--	--	--	Reserved.
3	Off	00	0	No autocutter error.
	On	08	8	Autocutter error occurred.
4	On	10	16	Fixed.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	No automatically recoverable error.
	On	40	64	Automatically recoverable error occurred.
7	Off	00	0	Fixed.

• Roll paper sensor status ( $n = 4$ )

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Fixed.
1	On	02	2	Fixed.
2, 3	Off	00	0	Fixed.
4	On	10	16	Fixed.
5, 6	Off	00	0	Roll paper end sensor (paper sensor): paper present.
	On	60	96	Roll paper end sensor (paper sensor): paper not present.
7	Off	00	0	Fixed.

Bits 5 and 6: While the cover is open, this shows the state when the cover was still closed.

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[Notes]

- Take the following into consideration:
  - If the received data includes a data string matching this command, the printer performs this command. Users must consider this.  
Example: Graphic data might accidentally include a data string matching this command.
  - Do not embed this command within another command.  
Example: Graphic data might include this command.
- Transmit this command using the following method:
  - When this command is transmitted, subsequent data must not be transmitted until the status is received.
  - However, if this command must be transmitted continuously, it is possible to transmit up to 4 commands at once.  
In this case, subsequent data must not be transmitted until the all status is received. If this command is transmitted without using the above method, the status may not be received.

## DLE ENQ *n*

[Name] Send real-time request to printer

[Format] ASCII DLE ENQ *n*  
 Hex 10 05 *n*  
 Decimal 16 5 *n*

[Range] *n* = 1, 2

[Description] • Responds to a request in real-time from the host computer.

<i>n</i>	Function
1	Recovers from a recoverable error and restarts printing from the line where the error occurred. • This command is ignored unless a recoverable error has occurred.
2	Recovers from a recoverable error after clearing the receive and print buffers. • This command is ignored unless a recoverable error has occurred.

[Notes]

- Use this command after removing the cause of the error.
- Take the following into consideration:
  - If the received data includes a data string matching this command, the printer performs the command. Users must consider this.  
Example: Graphic data might accidentally include a data string matching this command.
  - Do not embed this command within another command.  
Example: Graphic data might include this command.

[Reference] APPENDIX C: RECOVERY FROM AN AUTOCUTTER ERROR

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## DLE DC4 *fn m t* (*fn* = 1)

---

[Name] Generate pulse in real-time

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

[Range] *fn* = 1  
*m* = 0, 1  
 1 ≤ *t* ≤ 8

[Description] • Outputs the pulse specified by *t* in real-time to the output pulse specified by *m*.

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

• *t* specifies the pulse on time or off time as [*t* × 100 ms].

[Notes]

- Take the following into consideration:
  - If the received data includes a data string with this command, the printer performs the command. Users must consider this.  
 Example: Graphic data might accidentally include a data string matching this command.
  - Do not embed this command within another command.  
 Example: Graphic data might include this command.
  - It is recommended to disable this function with **GS ( D** as it is possible that data such as graphics or downloaded text might accidentally include a data string corresponding to this function.  
 (The default for **GS ( D** of this function is "Enabled".)
  - When the setting of "Enabling/disabling optional external buzzer" is enabled with the customized value, <Function 5> **GS ( E <a = 119>**, a pulse is not output to the drawer kick-out connector pin; however, the optional external buzzer sounds.  
 Note: For the sound pattern and the buzzer frequency for the optional external buzzer, follow the customized value setting, <Function 5> **GS ( E <a = 123 to 126>**.

[Reference] APPENDIX E: NOTES ON USING THE DRAWER KICK-OUT CONNECTOR, "3.13 Optional External Buzzer," "3.5.1 Software setting"

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## DLE DC4 *fn a b* (*fn* = 2)

---

[Name]	Execute power-off sequence
[Format]	ASCII    DLE   DC4 <i>fn a b</i> Hex        10    14 <i>fn a b</i> Decimal    16    20 <i>fn a b</i>
[Range]	<b><i>fn</i> = 2</b> <b><i>a</i> = 1</b> <b><i>b</i> = 8</b>
[Description]	<ul style="list-style-type: none"> <li>• Executes the printer power-off sequence and transmits the power-off notice.</li> <li>• Stores the values of the maintenance counter.</li> <li>• Sets the interface to BUSY.</li> <li>• Sets the printer to standby mode.</li> </ul>
[Notes]	<ul style="list-style-type: none"> <li>• Take the following into consideration:             <ul style="list-style-type: none"> <li>• If the received data includes a data string matching this command, the printer performs the command. Users must consider this.                Example:    Graphic data might accidentally include a data string matching this command.</li> <li>• Do not embed this command within another command.                Example:    Graphic data might include this command.</li> <li>• It is recommended to disable this function with <b>GS ( D</b> as it is possible that data such as graphics or downloaded text might accidentally include a data string corresponding to this function.                (The default for <b>GS ( D</b> of this function is "Disabled".)</li> </ul> </li> <li>• This command does not shut the power off. The operator must turn the power off after receiving the power-off notice.</li> <li>• If this command is executed, the printer will not continue to process anything. To recover the printer to print again, it is necessary to turn the power on again or execute a hardware reset.</li> </ul>
[Reference]	APPENDIX F: NOTES ON UPDATING THE MAINTENANCE COUNTER AND TURNING THE PRINTER'S POWER OFF

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## DLE DC4 *fn a n r t1 t2* (*fn* = 3)

---

[Name]	Control buzzer (optional external buzzer)					
[Format]	ASCII	DLE	DC4	<i>fn</i>	<i>a n r</i>	<i>t1 t2</i>
	Hex	10	14	03	<i>a n r</i>	<i>t1 t2</i>
	Decimal	16	20	3	<i>a n r</i>	<i>t1 t2</i>
[Range]	<i>fn</i> = 3 <i>a</i> = 0 <i>n</i> = 0 <i>r</i> = 0 <i>t1</i> = 1 <i>t2</i> = 0					

[Description] • Stops sounding the optional external buzzer.

- [Notes]
- Take the following into consideration:
    - If the received data includes a data string matching this command, the printer performs the command. Users must consider this.
      - Example: Graphic data might accidentally include a data string matching this command.
    - Do not embed this command within another command.
      - Example: Graphic data might include this command.

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## DLE DC4 *fn d1...d7* (*fn* = 8)

[Name]	Clear buffer(s)
[Format]	ASCII    DLE   DC4 <i>fn d1...d7</i> Hex        10    14 <i>fn d1...d7</i> Decimal    16    20 <i>fn d1...d7</i>
[Range]	<i>fn</i> = 8 <i>d1</i> = 1, <i>d2</i> = 3, <i>d3</i> = 20, <i>d4</i> = 1, <i>d5</i> = 6, <i>d6</i> = 2, <i>d7</i> = 8
[Description]	<ul style="list-style-type: none"><li>• Clears all data stored in the receive buffer and the print buffer and transmits Clear response.</li><li>• If a recoverable error occurs, recovers from the error.</li></ul>
[Notes]	<ul style="list-style-type: none"><li>• Do not use this command in a system that uses the printer with the OPOS driver or the JavaPOS driver provided by Seiko Epson Corporation.</li><li>• Take the following into consideration:<ul style="list-style-type: none"><li>• If the received data includes a data string matching this command, the printer performs the command. Users must consider this. Example: Graphic data might accidentally include a data string matching this command.</li><li>• Do not embed this command within another command. Example: Graphic data might include this command.</li></ul></li><li>• Do not transmit subsequent data until the status is received after transmitting this command.</li></ul>

## ESC FF

[Name]	Print data in page mode
[Format]	ASCII    ESC   FF Hex        1B    0C Decimal    27    12
[Description]	<ul style="list-style-type: none"><li>• In page mode, prints all the data in the print buffer collectively.</li></ul>

## ESC SP *n*

[Name]	Set right-side character spacing
[Format]	ASCII    ESC   SP <i>n</i> Hex        1B    20 <i>n</i> Decimal    27    32 <i>n</i>
[Range]	$0 \leq n \leq 255$
[Default]	<i>n</i> = 0
[Description]	<ul style="list-style-type: none"><li>• Sets the right-side character spacing to [<i>n</i> × (horizontal or vertical motion unit)].</li></ul>
[Note]	<ul style="list-style-type: none"><li>• The maximum right-side spacing is 31.91 mm {255/203"}.</li></ul>

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## ESC ! *n*

[Name] Select print mode(s)

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

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

[Default]  $n = 0$

[Description] • Selects the character font and styles (emphasized, double-height, double-width, and underlined) together.

( <i>n</i> ) Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A (12 × 24) selected.
	On	01	1	Character font B (9 × 17) selected.
1, 2	Off	00	0	Reserved.
3	Off	00	0	Emphasized mode is turned off.
	On	08	8	Emphasized mode is turned on.
4	Off	00	0	Double-height canceled.
	On	10	16	Double-height selected.
5	Off	00	0	Double-width canceled.
	On	20	32	Double-width selected.
6	Off	00	0	Reserved.
7	Off	00	0	Underline mode is turned off.
	On	80	128	Underline mode is turned on.

[Note] • When auto replacement of font selected by bit 0 is enabled by the customized values, <Function 5> **GS ( E <a = 111, 112>**, the font set to replace becomes valid.

[Reference] "3.5.1 Software setting"

## ESC \$ *nL nH*

[Name] Set absolute print position

[Format] ASCII ESC \$ *nL nH*  
Hex 1B 24 *nL nH*  
Decimal 27 36 *nL nH*

[Range]  $0 \leq (nL + nH \times 256) \leq 65535$  ( $0 \leq nL \leq 255, 0 \leq nH \leq 255$ )

[Description] • Moves the print position to  $[(nL + nH \times 256) \times (\text{horizontal or vertical motion unit})]$  from the left edge of the print area.

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## ESC % *n*

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

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

[Name]	Define user-defined characters					
[Format]	ASCII	ESC	&	<i>y c1 c2</i>	<i>[ x1 d1...d(y×x1)]...[ xk d1...d(y×xk)]</i>	
	Hex	1B	26	<i>y c1 c2</i>	<i>[ x1 d1...d(y×x1)]...[ xk d1...d(y×xk)]</i>	
	Decimal	27	38	<i>y c1 c2</i>	<i>[ x1 d1...d(y×x1)]...[ xk d1...d(y×xk)]</i>	
[Range]	$y = 3$ $32 \leq c1 \leq c2 \leq 126$ $0 \leq x \leq 12$ [When Font A (12 × 24) is selected] $0 \leq x \leq 9$ [When Font B (9 × 17) is selected] $0 \leq d \leq 255$ $k = c2 - c1 + 1$					
[Description]	<ul style="list-style-type: none"> <li>• Defines the user-defined character pattern for the specified character codes.</li> <li>• <i>y</i> specifies the number of bytes in the vertical direction.</li> <li>• <i>c1</i> specifies the beginning character code for the definition, and <i>c2</i> specifies the final code.</li> <li>• <i>x</i> specifies the number of dots in the horizontal direction from the left edge.</li> <li>• <i>d</i> specifies the defined data (column format).</li> </ul>					
[Note]	<ul style="list-style-type: none"> <li>• User-defined characters and a downloaded bit image (<b>GS *</b>) cannot be defined simultaneously. When this command is executed, the downloaded bit image is deleted.</li> </ul>					

## ESC ( *A pL pH fn [parameters]*

[Name]	Control buzzer (optional external buzzer)		
[Description]	Controls the optional external buzzer <ul style="list-style-type: none"> <li>• <i>pL</i>, <i>pH</i> specify (<math>pL + pH \times 256</math>) as the number of bytes after <i>pH</i> (<i>fn</i> and <i>[parameters]</i>).</li> <li>• <i>fn</i> specifies the function.</li> <li>• <i>[parameters]</i> specify the process of the function.</li> </ul>		

<i>fn</i>	Format	Function no.	Function
97	ESC ( <i>A pL pH fn n c</i>	Function 97	Sounds buzzer (sound pattern specified).

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## <Function 97> ESC ( A pL pH fn n c (fn = 97)

[Name] Sound buzzer (sound pattern specified) (optional external buzzer)

[Format] ASCII ESC ( A pL pH fn n c  
 Hex 1B 28 41 pL pH fn n c  
 Decimal 27 40 65 pL pH fn n c

[Range]  $(pL + pH \times 256) = 3$  ( $pL = 3, pH = 0$ )  
 $fn = 97$   
 $1 \leq n \leq 7$   
 $0 \leq c \leq 255$

[Description] • Sounds a pattern specified by *n* the number of times specified by *c*.  
 When *c* = 0, repeats the specified sound pattern infinitely.  
 If the cover is opened during sounding and a sound stop is requested by **DLE DC4** <Function 3>, the sound stops.

Sound patterns are as follows:

Pattern name	n	X th sound	Sound pattern	
			Counter for making frequency	Sound time*
Pattern A	1	1st	777h (2093.005Hz)	3
		2nd	5EDh (2637.020Hz)	3
		3rd	4FCh (3135.963Hz)	3
		4th	3BCh (4186.009Hz)	3
Pattern B	2	1st	3BCh (4186.009Hz)	6
		2nd	4FCh (3135.963Hz)	6
		3rd	0h (0.000Hz)	0 (No setting)
		4th	0h (0.000Hz)	0 (No setting)
Pattern C	3	1st	4FCh (3135.963Hz)	3
		2nd	5EDh (2637.020Hz)	3
		3rd	4FCh (3135.963Hz)	3
		4th	777h (2093.005Hz)	3
Pattern D	4	1st	777h (2093.005Hz)	1
		2nd	6A7h (2349.318Hz)	2
		3rd	5EDh (2637.020Hz)	1
		4th	598h (2793.826Hz)	2
Pattern E	5	1st	3BCh (4186.009Hz)	3
		2nd	4FCh (3135.963Hz)	3
		3rd	5EDh (2637.020Hz)	3
		4th	777h (2093.005Hz)	3
Pattern for error	6	1st	3BCh (4186.009Hz)	1
		2nd	3F4h (3951.066Hz)	2
		3rd	470h (3520.000Hz)	1
		4th	4FCh (3135.963Hz)	2
Pattern for paper-end	7	1st	4FCh (3135.963Hz)	2
		2nd	0h (0.000Hz) (No sound)	1
		3rd	3F4h (3951.066Hz)	2
		4th	0h (0.000Hz) (No sound)	1

\* Sound time units: 100 ms

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## ESC \* *m nL nH d1...dk*

[Name] Select bit-image mode

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

[Range]  $m = 0, 1, 32, 33$   
 $1 \leq (nL + nH \times 256) \leq 2047$  ( $0 \leq nL \leq 255, 0 \leq nH \leq 7$ )  
 $0 \leq d \leq 255$   
 $k = nL + nH \times 256$  [when  $m = 0, 1$ ]  
 $k = (nL + nH \times 256) \times 3$  [when  $m = 32, 33$ ]

[Description] • Stores the bit image data in the print buffer using the bit image mode specified by *m*.

<i>m</i>	Bit image mode	Vertical direction	Horizontal direction
0	8-dot single-density	203/3 dpi	203/2 dpi
1	8-dot double-density	203/3 dpi	203 dpi
32	24-dot single-density	203 dpi	203/2 dpi
33	24-dot double-density	203 dpi	203 dpi

- *nL, nH* specify the number of dots of the image data in the horizontal direction as ( $nL + nH \times 256$ ).
- *d* specifies the bit image data (column format).

## ESC - *n*

[Name] Turn underline mode on/off

[Format] ASCII ESC - *n*  
 Hex 1B 2D *n*  
 Decimal 27 45 *n*

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

[Default]  $n = 0$

[Description] • Turns underline mode on or off.

<i>n</i>	Function
0, 48	Turns off underline mode.
1, 49	Turns on underline mode, set at 1-dot width.
2, 50	Turns on underline mode, set at 2-dot width.

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## ESC 2

---

[Name]	Select default line spacing		
[Format]	ASCII	ESC	2
	Hex	1B	32
	Decimal	27	50
[Description]	• Sets the line spacing to approximately 3.75 mm {30/203"}.		

## ESC 3 *n*

---

[Name]	Set line spacing			
[Format]	ASCII	ESC	3	<i>n</i>
	Hex	1B	33	<i>n</i>
	Decimal	27	51	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	Equivalent to approximately 3.75 mm {30/203"}.			
[Description]	• Sets the line spacing to [ <i>n</i> × (vertical or horizontal motion unit)].			
[Note]	• The maximum is 900 mm {35.5"}.			

## ESC = *n*

---

[Name]	Select peripheral device			
[Format]	ASCII	ESC	=	<i>n</i>
	Hex	1B	3D	<i>n</i>
	Decimal	27	61	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	<i>n</i> = 1			
[Description]	• Selects the device to which the host computer transmits data.			

<i>n</i>	Function
1, 3	Enables printer.
2	Disables printer.

- When the printer is disabled (*n* = 2), all data except this command and the real-time commands are ignored.

## ESC ? *n*

---

[Name]	Cancel user-defined characters			
[Format]	ASCII	ESC	?	<i>n</i>
	Hex	1B	3F	<i>n</i>
	Decimal	27	63	<i>n</i>
[Range]	$32 \leq n \leq 126$			
[Description]	• Deletes the user-defined character pattern specified by character code <i>n</i> .			

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## ESC @

---

[Name] Initialize printer

[Format] ASCII ESC @  
Hex 1B 40  
Decimal 27 64

- [Description]
- Clears the data in the print buffer and resets the printer modes to the modes that were in effect when the power was turned on.  
Keeps the following data:
    - Macro definition data.
    - Contents stored in the NV user memory.
    - Contents defined for the NV graphics (NV bit image).
    - Maintenance counter value.
    - Software setting values (See Section 3.5.1.)

## ESC D $n_1...n_k$ NUL

---

[Name] Set horizontal tab positions

[Format] ASCII ESC D  $n_1...n_k$  NUL  
Hex 1B 44  $n_1...n_k$  00  
Decimal 27 68  $n_1...n_k$  0

[Range]  $1 \leq n_1 \leq n_2 \leq \dots \leq n_k \leq 255$   
 $0 \leq k \leq 32$

[Default]  $n = 8, 16, 24, 32, 40, \dots, 232, 240, 248$   
[for Font A (12 × 24) in a standard character size width]

- [Description]
- Sets horizontal tab positions.
    - $n$  specifies the number of digits from the setting position to the left edge of the print area.
    - $k$  is used to indicate the number of bytes set for the horizontal tab position.

## ESC E $n$

---

[Name] Turn emphasized mode on/off

[Format] ASCII ESC E  $n$   
Hex 1B 45  $n$   
Decimal 27 69  $n$

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

[Default]  $n = 0$

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

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## ESC G *n*

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

## ESC J *n*

[Name]	Print and feed paper			
[Format]	ASCII	ESC	J	<i>n</i>
	Hex	1B	4A	<i>n</i>
	Decimal	27	74	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Description]	<ul style="list-style-type: none"><li>• Prints the data in the print buffer and feeds the paper [<i>n</i> × (vertical or horizontal motion unit)].</li></ul>			
[Note]	<ul style="list-style-type: none"><li>• The maximum paper feed amount is 900 mm {35.4"}.</li></ul>			

## ESC L

[Name]	Select page mode			
[Format]	ASCII	ESC	L	
	Hex	1B	4C	
	Decimal	27	76	
[Description]	<ul style="list-style-type: none"><li>• Switches from standard mode to page mode.</li></ul>			

## ESC M *n*

[Name]	Select character font									
[Format]	ASCII	ESC	M	<i>n</i>						
	Hex	1B	4D	<i>n</i>						
	Decimal	27	77	<i>n</i>						
[Range]	$n = 0, 1, 48, 49$									
[Default]	$n = 0$									
[Description]	<ul style="list-style-type: none"><li>• Selects a character font.</li></ul>									
	<table border="1"><thead><tr><th><i>n</i></th><th>Character font</th></tr></thead><tbody><tr><td>0, 48</td><td>Character font A (12 × 24)</td></tr><tr><td>1, 49</td><td>Character font B (9 × 17)</td></tr></tbody></table>	<i>n</i>	Character font	0, 48	Character font A (12 × 24)	1, 49	Character font B (9 × 17)			
<i>n</i>	Character font									
0, 48	Character font A (12 × 24)									
1, 49	Character font B (9 × 17)									
[Note]	<ul style="list-style-type: none"><li>• When auto replacement of font selected by bit 0 is enabled by the customized values, &lt;Function 5&gt; <b>GS (E &lt;a = 111, 112&gt;</b>, the font set to replace becomes valid.</li></ul>									
[Reference]	"3.5.1 Software setting"									

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## ESC R *n*

---

[Name] Select an international character set

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

[Range]  $0 \leq n \leq 17$

[Default]  $n = 0$

However, if the default of the international character set is changed with the customized value, <Function 5> **GS ( E <a = 9>**, the default value becomes the one specified by the customized value.

[Description] • Selects an international character set.

<i>n</i>	International character set
0	U.S.A.
1	France
2	Germany
3	U.K.
4	Denmark I
5	Sweden
6	Italy
7	Spain I
8	Japan
9	Norway
10	Denmark II
11	Spain II
12	Latin America
13	Korea
14	Slovenia / Croatia
15	China
16	Vietnam
17	Arabia

[Reference] "3.2.45 International character sets," "3.5.1 Software setting"

## ESC S

---

[Name] Select standard mode

[Format] ASCII ESC S  
Hex 1B 53  
Decimal 27 83

[Description] • Switches from page mode to standard mode.

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## ESC T *n*

[Name] Select print direction in page mode

[Format] ASCII ESC T *n*  
Hex 1B 54 *n*  
Decimal 27 84 *n*

[Range]  $0 \leq n \leq 3, 48 \leq n \leq 51$

[Default]  $n = 0$

[Description] • In page mode, selects the print direction and starting position.

<i>n</i>	Print direction	Starting position
0, 48	Left to right	Upper left
1, 49	Bottom to top	Lower left
2, 50	Right to left	Lower right
3, 51	Top to bottom	Upper right

## ESC V *n*

[Name] Turn 90° clockwise rotation mode on/off

[Format] ASCII ESC V *n*  
Hex 1B 56 *n*  
Decimal 27 86 *n*

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

[Default]  $n = 0$

[Description] • In standard mode, turns 90° clockwise rotation mode on or off for characters.

<i>n</i>	Function
0, 48	Turns off 90° clockwise rotation mode.
1, 49 2, 50	Turns on 90° clockwise rotation mode.

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## ESC W *xL xH yL yH dxL dxH dyL dyH*

[Name]	Set print area in page mode
[Format]	ASCII    ESC W <i>xL xH yL yH dxL dxH dyL dyH</i> Hex        1B    57 <i>xL xH yL yH dxL dxH dyL dyH</i> Decimal    27    87 <i>xL xH yL yH dxL dxH dyL dyH</i>
[Range]	$0 \leq (xL + xH \times 256) \leq 65535$ ( $0 \leq xL \leq 255, 0 \leq xH \leq 255$ ) $0 \leq (yL + yH \times 256) \leq 65535$ ( $0 \leq yL \leq 255, 0 \leq yH \leq 255$ ) $1 \leq (dxL + dxH \times 256) \leq 65535$ ( $0 \leq dxL \leq 255, 0 \leq dxH \leq 255$ ) $1 \leq (dyL + dyH \times 256) \leq 65535$ ( $0 \leq dyL \leq 255, 0 \leq dyH \leq 255$ )
[Default]	$(xL + xH \times 256) = 0$ ( $xL = 0, xH = 0$ ) $(yL + yH \times 256) = 0$ ( $yL = 0, yH = 0$ ) $(dxL + dxH \times 256) = 576$ ( $dxL = 64, dxH = 2$ ) [When paper width is set to 80 mm] $(dxL + dxH \times 256) = 546$ ( $dxL = 34, dxH = 2$ ) [When paper width is set to 80 mm and "Column emulation: 42 column mode" is selected] $(dxL + dxH \times 256) = 420$ ( $dxL = 164, dxH = 1$ ) [When paper width is set to 58 mm] $(dxL + dxH \times 256) = 378$ ( $dxL = 122, dxH = 1$ ) [When paper width is set to 58 mm and "Column emulation: 42 column mode" is selected] $(dyL + dyH \times 256) = 1662$ ( $dyL = 126, dyH = 6$ )
[Description]	<ul style="list-style-type: none"> <li>• In page mode, sets the size and the logical origin of the print area.</li> <li>• <i>xL, xH</i> specify the horizontal logical origin as <math>[(xL + xH \times 256) \times (\text{horizontal motion unit})]</math> from absolute origin.</li> <li>• <i>yL, yH</i> specify the vertical logical origin as <math>[(yL + yH \times 256) \times (\text{vertical motion unit})]</math> from absolute origin.</li> <li>• <i>dxL, dxH</i> specify the horizontal dimension of print area as <math>[(dxL + dxH \times 256) \times (\text{horizontal motion unit})]</math>.</li> <li>• <i>dyL, dyH</i> specify the vertical dimension of print area as <math>[(dyL + dyH \times 256) \times (\text{vertical motion unit})]</math>.</li> </ul>
[Note]	<ul style="list-style-type: none"> <li>• The vertical dimension of the print area can be set to 207.95 mm {3324/406"} maximum.</li> </ul>

## ESC \ *nL nH*

[Name]	Set relative print position
[Format]	ASCII    ESC \ <i>nL nH</i> Hex        1B    5C <i>nL nH</i> Decimal    27    92 <i>nL nH</i>
[Range]	$-32768 \leq (nL + nH \times 256) \leq 32767$
[Description]	<ul style="list-style-type: none"> <li>• Moves the print position to <math>[(nL + nH \times 256) \times (\text{horizontal or vertical motion unit})]</math> from the current position.</li> <li>• A positive number specifies movement to the right, and a negative number specifies movement to the left.</li> </ul>

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## ESC a n

[Name]	Select justification			
[Format]	ASCII	ESC	a	<i>n</i>
	Hex	1B	61	<i>n</i>
	Decimal	27	97	<i>n</i>
[Range]	$0 \leq n \leq 2, 48 \leq n \leq 50$			
[Default]	$n = 0$			
[Description]	• In standard mode, aligns all the data in one line to the selected layout.			

<i>n</i>	Justification
0, 48	Left justification
1, 49	Centering
2, 50	Right justification

## ESC c 5 n

[Name]	Enable/disable panel buttons				
[Format]	ASCII	ESC	c	5	<i>n</i>
	Hex	1B	63	35	<i>n</i>
	Decimal	27	99	53	<i>n</i>
[Range]	$0 \leq n \leq 255$				
[Default]	$n = 0$				
[Description]	• Enables or disables the panel buttons. <ul style="list-style-type: none"><li>• When the LSB of <i>n</i> is 0, the panel buttons are enabled.</li><li>• When the LSB of <i>n</i> is 1, the panel buttons are disabled.</li></ul>				
[Notes]	• This command affects the Feed button. <ul style="list-style-type: none"><li>• The Feed button is disabled regardless of the settings with this command, when the roll paper cover is open.</li></ul>				

## ESC d n

[Name]	Print and feed <i>n</i> lines			
[Format]	ASCII	ESC	d	<i>n</i>
	Hex	1B	64	<i>n</i>
	Decimal	27	100	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Description]	• Prints the data in the print buffer and feeds the paper [ <i>n</i> × (current line spacing)].			
[Note]	• The maximum paper feed amount is 900 mm {35.5"}.			

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## ESC p m t1 t2

[Name] Generate pulse

[Format] ASCII ESC p m t1 t2  
Hex 1B 70 m t1 t2  
Decimal 27 112 m t1 t2

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

[Description] • Outputs the pulse specified by **t1** and **t2** to the output pulse specified by **m**.

<b>m</b>	Output pulse
0, 48	Drawer kick-out connector pin 2.
1, 49	Drawer kick-out connector pin 5.

- **t1** specifies the pulse on time as [**t1** × 2 ms].
- **t2** specifies the pulse off time as [**t2** × 2 ms].

[Note] • Specify a value (**t1** < **t2**) so that the off time is longer than the on time.  
• When the setting of “Enabling/disabling optional external buzzer” is enabled with the customized value, <Function 5> **GS (E <a = 119>**, a pulse is not output to the drawer kick-out connector pin; however, the optional external buzzer sounds.  
Note: For the sound pattern and the buzzer frequency for the optional external buzzer, follow the customized value setting, <Function 5> **GS (E <a = 123 to 126>**.

[Reference] APPENDIX E: NOTES ON USING THE DRAWER KICK-OUT CONNECTOR, "3.13 Optional External Buzzer," "3.5.1 Software setting"

## ESC t n

[Name] Select character code table

[Format] ASCII ESC t n  
Hex 1B 74 n  
Decimal 27 116 n

[Range]  $0 \leq n \leq 5, 11 \leq n \leq 21, n = 26, 30 \leq n \leq 53, n = 255$

[Default]  $n = 0$

However, if the default of the international character set is changed with the customized value, <Function 5> **GS (E <a = 8>**, the default value becomes the one specified by the customized value.

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

<b>n</b>	Character code table
0	Page 0 [PC437 (USA: Standard Europe)]
1	Page 1 [Katakana]
2	Page 2 [PC850 (Multilingual)]
3	Page 3 [PC860 (Portuguese)]
4	Page 4 [PC863 (Canadian-French)]
5	Page 5 [PC865 (Nordic)]
11	Page 11 [PC851 (Greek)]
12	Page 12 [PC853 (Turkish)]
13	Page 13 [PC857 (Turkish)]
14	Page 14 [PC737 (Greek)]

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15	Page 15 [ISO8859-7 (Greek)]
16	Page 16 [WPC1252]
17	Page 17 [PC866 (Cyrillic #2)]
18	Page 18 [PC852 (Latin2)]
19	Page 19 [PC858 (Euro)]
20	Page 20 [KU42 (Thai)]
21	Page 21 [TIS11 (Thai)]
26	Page 26 [TIS18 (Thai)]
30	Page 30 [TCVN-3 (Vietnamese)]
31	Page 31 [TCVN-3 (Vietnamese)]
32	Page 32 [PC720 (Arabic)]
33	Page 33 [WPC775 (Baltic Rim)]
34	Page 34 [PC855 (Cyrillic)]
35	Page 35 [PC861 (Icelandic)]
36	Page 36 [PC862 (Hebrew)]
37	Page 37 [PC864 (Arabic)]
38	Page 38 [PC869 (Greek)]
39	Page 39 [ISO8859-2 (Latin2)]
40	Page 39 [ISO8859-15 (Latin9)]
41	Page 41 [PC1098 (Farsi)]
42	Page 42 [PC1118 (Lithuanian)]
43	Page 43 [PC1119 (Lithuanian)]
44	Page 44 [PC1125 (Ukrainian)]
45	Page45 [WPC1250 (Latin2)]
46	Page 46 [WPC1251 (Cyrillic)]
47	Page 47 [WPC1253 (Greek)]
48	Page 48 [WPC1254 (Turkish)]
49	Page 49 [WPC1255 (Hebrew)]
50	Page 50 [WPC1256 (Arabic)]
51	Page 51 [WPC1257 (Baltic Rim)]
52	Page 52 [WPC1258 (Vietnamese)]
53	Page 53 [KZ-1048(Kazakhstan)]
255	Page 255 [User-defined page]

[Reference] "3.2 Character Code Tables," "3.5.1 Software setting"

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## ESC { *n*

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

## FS ( E *pL pH fn* [*parameters*]

[Name]	Group of commands for receipt enhancement control
[Description]	<ul style="list-style-type: none"> <li>• Controls the receipt enhancement functions               <ul style="list-style-type: none"> <li>• <i>pL</i>, <i>pH</i> specify (<i>pL</i> + <i>pH</i> × 256) as the number of bytes after <i>pH</i> (<i>fn</i> and [<i>parameters</i>]).</li> <li>• <i>fn</i> specifies the function.</li> <li>• [<i>parameters</i>] specify the process of each function.</li> </ul> </li> </ul>

<i>fn</i>	Code	Function no.	Function name
60	FS ( E <i>pL pH fn m c d1 d2 d3</i>	Function 60	Cancel set values for top/bottom logo printing
61	FS ( E <i>pL pH fn m c</i>	Function 61	Transmit set values for top/bottom logo printing
62	FS ( E <i>pL pH fn m kc1 kc2 a n</i>	Function 62	Set top logo printing
63	FS ( E <i>pL pH fn m kc1 kc2 a</i>	Function 63	Set bottom logo printing
64	FS ( E <i>pL pH fn m a1 n1 ... [ak nk]</i>	Function 64	Make extended settings for top/bottom logo printing
65	FS ( E <i>pL pH fn m a n</i>	Function 65	Enable/disable top/bottom logo printing

[Notes]	<ul style="list-style-type: none"> <li>• Frequent write command executions by an NV memory write command may damage the NV memory. Therefore, it is recommended to limit writing data with the write commands into the NV memory to 10 times or fewer a day.</li> <li>• If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Be careful not to turn the power off or let the printer be reset via an interface while this command is being executed.</li> <li>• While processing this command, the printer may become BUSY while writing the data to the NV memory and stops receiving data. Therefore, be sure not to transmit data from the host computer while the printer is BUSY.</li> </ul>
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## <Function 60> **FS ( E *pL pH fn m c d1 d2 d3* (fn = 60)**

[Name] Cancel set values for top/bottom logo printing

[Format] ASCII FS ( E *pL pH fn m c d1 d2 d3*  
 Hex 1C 28 45 *pL pH fn m c d1 d2 d3*  
 Decimal 28 40 69 *pL pH fn m c d1 d2 d3*

[Range] (*pL + pH* × 256) = 6 (*pL* = 6, *pH* = 0)  
*fn* = 60  
*m* = 2  
*c* = 48, 49  
*d1* = 67 (Character "C")  
*d2* = 76 (Character "L")  
*d3* = 82 (Character "R")

[Description] • Cancels set values for top/bottom logo printing by specifying **c**.

<b>c</b>	Function
48	Cancels set values for top logo printing.
49	Cancels set values for bottom logo printing.

After canceling set values for top/bottom logo printing, no settings remain for logo printing.

## <Function 61> **FS ( E *pL pH fn m c* (fn = 61)**

[Name] Transmit set values for top/bottom logo printing

[Format] ASCII FS ( E *pL pH fn m c*  
 Hex 1C 28 45 *pL pH fn m c*  
 Decimal 28 40 69 *pL pH fn m c*

[Range] (*pL + pH* × 256) = 3 (*pL* = 3, *pH* = 0)  
*fn* = 61  
*m* = 2  
*c* = 48, 49, 50

[Description] • Transmits set values for top/bottom logo printing by specifying **c**.

<b>c</b>	Function
48	Transmits set values for top logo printing.
49	Transmits set values for bottom logo printing.
50	Transmits extended set values for top/bottom logo printing.

• Transmission data is as follows:

Transmission data	Hex	Decimal	Data amount
(1) Header	37H	55	1 byte
(2) Identifier	48H	72	1 byte
(3) Set values for top/bottom logo or extended set values for top/bottom logo printing.	See the next page.	See the next page.	0 to 9 bytes
(4) NUL	00H	0	1 byte

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- [(3) Top logo printing set values] are as follows when (**c** = 48).

(3) Set values for top logo	Hex	Decimal	Data amount
a) Fixed value ( <b>m</b> )	32H	50	0 or 1 byte
b) Recognition of top logo/bottom logo	30H	48	0 or 1 byte
c) Fixed value	32H	50	0 or 1 byte
d) NV graphics key codes	20H to 7EH	32 to 126	0 or 2 bytes
e) Justification setting	30H to 32H	48 to 50	0 or 1 byte
f) Number of lines to be deleted	30H to 39H	48 to 57	0 to 3 bytes

- [(3) Bottom logo printing set values] are as follows when (**c** = 49).

(3) Set values for bottom logo	Hex	Decimal	Data amount
a) Fixed value ( <b>m</b> )	32H	50	0 or 1 byte
b) Recognition of top logo/bottom logo	31H	49	0 or 1 byte
c) Fixed value	32H	50	0 or 1 byte
d) NV graphics key codes	20H to 7EH	32 to 126	0 or 2 bytes
e) Justification setting	30H to 32H	48 to 50	0 or 1 byte

- [(3) Extended set values for top/bottom logo printing set values] are as follows when (**c** = 50).

(3) Extended set values for top logo/bottom logo	Hex	Decimal	Data amount
a) Fixed value ( <b>m</b> )	32H	50	0 or 1 byte
b) Recognition of top logo/bottom logo	32H	50	0 or 1 byte
c) Fixed value	32H	50	0 or 1 byte
d) Prints the top logo at paper feeding until cut position:	30H,31H	48, 49	0 or 1 byte
e) Prints the top logo at power-on.	30H, 31H	48, 49	0 or 1 byte
f) Prints the top logo when the roll paper cover is closed.	30H, 31H	48, 49	0 or 1 byte
g) Prints the top logo while clearing the buffer to recover from a recoverable error.	30H, 31H	48, 49	0 or 1 byte
h) Prints the top logo after paper feeding with the paper Feed button has finished.	30H, 31H	48, 49	0 or 1 byte

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## <Function 62> **FS ( E pL pH fn m kc1 kc2 a n (fn = 62)**

[Name]	Set top logo printing											
[Format]	ASCII	FS	(	E	pL	pH	fn	m	kc1	kc2	a	n
	Hex	1C	28	45	pL	pH	fn	m	kc1	kc2	a	n
	Decimal	28	40	69	pL	pH	fn	m	kc1	kc2	a	n

[Range]  $(pL + pH \times 256) = 6$  ( $pL = 6, pH = 0$ )  
**fn = 62**  
**m = 2**  
 $32 \leq kc1 \leq 126$   
 $32 \leq kc2 \leq 126$   
 $48 \leq a \leq 50$   
 $0 \leq n \leq 255$

- [Description]
- Sets top logo key code, justification, and number of lines to be removed after top logo printing.
    - Associates key codes (**kc1, kc2**) of NV graphics to be printed as a top logo.
    - **a** specifies justification for top logo printing.

a	Function
48	Specifies left justification.
49	Specifies centering.
50	Specifies right justification.

- **n** specifies the number of lines to be removed after top logo printing.
- [Note]
- NV memory is used as the storage area for set values of top logo printing.

## <Function 63> **FS ( E pL pH fn m kc1 kc2 a (fn = 63)**

[Name]	Set bottom logo printing											
[Format]	ASCII	FS	(	E	pL	pH	fn	m	kc1	kc2	a	
	Hex	1C	28	45	pL	pH	fn	m	kc1	kc2	a	
	Decimal	28	40	69	pL	pH	fn	m	kc1	kc2	a	

[Range]  $(pL + pH \times 256) = 5$  ( $pL = 5, pH = 0$ )  
**fn = 63**  
**m = 2**  
 $32 \leq kc1 \leq 126$   
 $32 \leq kc2 \leq 126$   
 $48 \leq a \leq 50$

- [Description]
- Sets bottom logo key code, and justification.
    - Associates key codes (**kc1, kc2**) of NV graphics to be printed as a bottom logo.
    - **a** specifies justification for bottom logo printing.

a	Function
48	Specifies left justification.
49	Specifies center justification
50	Specifies right justification.

- [Note]
- NV memory is used as the storage area for set values of bottom logo printing.

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<Function 64> **FS ( E  $\rho_L$   $\rho_H$   $fn$   $m$   $a1$   $n1...[ak nk]$  ( $fn = 64$ )**

- [Name] Make extended settings for top/bottom logo printing
- [Format] ASCII FS ( E  $\rho_L$   $\rho_H$   $fn$   $m$   $a1$   $n1 ... [ak nk]$   
 Hex 1C 28 45  $\rho_L$   $\rho_H$   $fn$   $m$   $a1$   $n1 ... [ak nk]$   
 Decimal 28 40 69  $\rho_L$   $\rho_H$   $fn$   $m$   $a1$   $n1 ... [ak nk]$
- [Range]  $4 \leq (\rho_L + \rho_H \times 256) \leq 12$  (However,  $(\rho_L + \rho_H \times 256) = 2 \times k + 2$ :  $4 \leq \rho_L \leq 12$ ,  $\rho_H = 0$ )  
 $fn = 64$   
 $m = 2$   
 $a = 48, 64$  to 67  
 $n = 48, 49$   
 $1 \leq k \leq 5$
- [Default]  $n = 48$  [when  $a = 48$ ]  
 $n = 48$  [when  $a = 64$ ]  
 $n = 49$  [when  $a = 65$ ]  
 $n = 49$  [when  $a = 66$ ]  
 $n = 48$  [when  $a = 67$ ]
- [Description] • Makes extended settings for top/bottom logo printing.

<b>a</b>	Function
48	Prints the top logo while paper feeding to the cutting position.
64	Prints the top logo at power-on.
65	Prints the top logo when the roll paper cover is closed.
66	Prints the top logo while clearing the buffer to recover from a recoverable error.
67	Prints the top logo after paper feeding with the paper Feed button has finished.

- $n$  specifies enabling/disabling extended settings.

<b>n</b>	Function
48	Disabled
49	Enabled

- [Note] • NV memory is used as the storage area for set values ( $n$ ).

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<Function 65> **FS ( E *pL pH fn m a n* (fn = 65)**

[Name] Enable/disable top/bottom logo printing

[Format] ASCII FS ( E *pL pH fn m a n*  
 Hex 1C 28 45 *pL pH fn m a n*  
 Decimal 28 40 69 *pL pH fn m a n*

[Range] (*pL* + *pH* × 256) = 4 (*pL* = 4, *pH* = 0)  
*fn* = 65  
*m* = 2  
*a* = 48, 49  
*n* = 48, 49

[Default] *n* = 48 [when *a* = 48]  
*n* = 48 [when *a* = 49]

[Description] • Specifies top/bottom logo printing by *a* and enables or disables top/bottom logo printing by *n*.

- Top/bottom logo printing specified by *a* is as follows:

<i>a</i>	Function
48	Specifies top logo printing.
49	Specifies bottom logo printing.

- Enabling/disabling setting specified by *n* is as follows:

<i>n</i>	Function
48	Enables.
49	Disables.

[Notes] • Volatile memory is used as the storage area for set values (*n*).  
 • This command is used when changing the setting of “Logo printing enabled” set with **FS ( E <Function 64>** to Disabled temporarily.

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## FS g 1 m a1 a2 a3 a4 nL nH d1...dk

[Obsolete command]

[Name]	Write to NV user memory
[Format]	ASCII    FS    g    1    m a1 a2 a3 a4 nL nH d1...dk Hex        1C    67    31    m a1 a2 a3 a4 nL nH d1...dk Decimal    28    103   49    m a1 a2 a3 a4 nL nH d1...dk
[Range]	<b>m = 0</b> $0 \leq (a1 + a2 \times 256 + a3 \times 65536 + a4 \times 16777216) \leq 1023$ $(0 \leq a1 \leq 255, 0 \leq a2 \leq 3, a3 = 0, a4 = 0)$ $1 \leq (nL + nH \times 256) \leq 1024 \quad (0 \leq nL \leq 255, 0 \leq nH \leq 4)$ $32 \leq d \leq 255$ $k = (nL + nH \times 256)$ The entire capacity size = 1 KB.
[Description]	<ul style="list-style-type: none"> <li>Stores the data (<b>d1...dk</b>) in the area from (<b>a1 + a2 × 256 + a3 × 65536 + a4 × 16777216</b>) to (<b>nL + nH × 256</b>) bytes in the NV user memory.</li> </ul>
[Notes]	<ul style="list-style-type: none"> <li>Frequent write command executions by an NV memory write command may damage the NV memory. Therefore, it is recommended to limit writing data with the write commands into the NV memory to 10 times or fewer a day.</li> <li>If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Be careful not to turn the power off or let the printer be reset via an interface while this command is being executed.</li> <li>While processing this command, the printer may become BUSY while writing the data to the NV memory and stops receiving data. Therefore, be sure not to transmit data from the host computer while the printer is BUSY.</li> </ul>

## FS g 2 m a1 a2 a3 a4 nL nH

[Obsolete command]

[Name]	Read from NV user memory
[Format]	ASCII    FS    g    2    m a1 a2 a3 a4 nL nH Hex        1C    67    32    m a1 a2 a3 a4 nL nH Decimal    28    103   50    m a1 a2 a3 a4 nL nH
[Range]	<b>m = 0</b> $0 \leq (a1 + a2 \times 256 + a3 \times 65536 + a4 \times 16777216) \leq 1023$ $(0 \leq a1 \leq 255, 0 \leq a2 \leq 3, a3 = 0, a4 = 0)$ $1 \leq (nL + nH \times 256) \leq 80 \quad (1 \leq nL \leq 80, nH = 0)$
[Description]	<ul style="list-style-type: none"> <li>Transmits the data in the area from (<b>a1 + a2 × 256 + a3 × 65536 + a4 × 16777216</b>) to (<b>nL + nH × 256</b>) bytes in the NV user memory.</li> </ul>
[Note]	<ul style="list-style-type: none"> <li>When this command is transmitted, do not transmit subsequent data until the status is received.</li> </ul>

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## GS ! n

[Name]	Select character size
[Format]	ASCII    GS    !    n Hex        1D    21    n Decimal    29    33    n
[Range]	$0 \leq n \leq 7$ , $16 \leq n \leq 23$ , $32 \leq n \leq 39$ , $48 \leq n \leq 55$ , $64 \leq n \leq 71$ , $80 \leq n \leq 87$ , $96 \leq n \leq 103$ , $112 \leq n \leq 119$ ( $1 \leq$ Enlargement in vertical direction $\leq 8$ , $1 \leq$ Enlargement in horizontal direction $\leq 8$ )
[Default]	$n = 0$
[Description]	• Selects character size (height magnification and width magnification).

(n) Bit	Off/On	Hex	Decimal	Function
0 - 2	See table [Height magnification].			Selects the height magnification.
3	Off	00	0	Reserved.
4 - 6	See table [Width magnification].			Selects the width magnification.
7	Off	00	0	Reserved.

[Height magnification]

Hex	Decimal	Enlargement
00	0	1 time (standard)
01	1	2 times
02	2	3 times
03	3	4 times
04	4	5 times
05	5	6 times
06	6	7 times
07	7	8 times

[Width magnification]

Hex	Decimal	Enlargement
00	0	1 time (standard)
10	16	2 times
20	32	3 times
30	48	4 times
40	64	5 times
50	80	6 times
60	96	7 times
70	112	8 times

## GS \$ nL nH

[Name]	Set absolute vertical print position in page mode
[Format]	ASCII    GS    \$    nL   nH Hex        1D    24    nL   nH Decimal    29    36    nL   nH
[Range]	$0 \leq (nL + nH \times 256) \leq 65535$ ( $0 \leq nL \leq 255$ , $0 \leq nH \leq 255$ )
[Description]	• In page mode, moves the vertical print position to $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$ from the starting position set with <b>ESC T</b> .

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## GS ( A $\rho_L$ $\rho_H$ $n$ $m$ )

---

[Name] Execute test print

[Format] ASCII GS ( A  $\rho_L$   $\rho_H$   $n$   $m$   
 Hex 1D 28 41  $\rho_L$   $\rho_H$   $n$   $m$   
 Decimal 29 40 65  $\rho_L$   $\rho_H$   $n$   $m$

[Range]  $(\rho_L + \rho_H \times 256) = 2$  ( $\rho_L = 2, \rho_H = 0$ )  
 $0 \leq n \leq 2, 48 \leq n \leq 50$   
 $1 \leq m \leq 3, 49 \leq m \leq 51$

- [Description]
- Executes a specified test print.
  - $\rho_L, \rho_H$  specify  $(\rho_L + \rho_H \times 256)$  as the number of bytes after  $\rho_H$  ( $n$  and  $m$ ).
  - $n$  specifies the paper used for the test print.

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

- $m$  specifies a test pattern.

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

- [Notes]
- The printer executes a software reset after processing this command.
  - Clears the receive and print buffers.
  - Resets all setting values in RAM (the print area, the character styles, and others) that were in effect at power on. (The data in the NV memory is not reset.)

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## GS ( D $\rho_L$ $\rho_H$ $m$ [ $a_1$ $b_1$ ]...[ $a_k$ $b_k$ ]

[Name] Enable/disable real-time command

[Format] ASCII GS ( D  $\rho_L$   $\rho_H$   $m$  [ $a_1$   $b_1$ ]...[ $a_k$   $b_k$ ]  
 Hex 1D 28 44  $\rho_L$   $\rho_H$   $m$  [ $a_1$   $b_1$ ]...[ $a_k$   $b_k$ ]  
 Decimal 29 40 68  $\rho_L$   $\rho_H$   $m$  [ $a_1$   $b_1$ ]...[ $a_k$   $b_k$ ]

[Range]  $3 \leq (\rho_L + \rho_H \times 256) \leq 65535$  ( $0 \leq \rho_L \leq 255, 0 \leq \rho_H \leq 255$ )  
 $m = 20$   
 $a = 1, 2$   
 $b = 0, 1, 48, 49$

[Default]  $b = 1$  [when  $a = 1$ ]  
 $b = 0$  [when  $a = 2$ ]

[Description] • Enables or disables the real-time command specified by  $a$ .  
 •  $\rho_L, \rho_H$  specify  $(\rho_L + \rho_H \times 256)$  as the number of bytes after  $\rho_H$  ( $m$  and [ $a_1$   $b_1$ ]...[ $a_k$   $b_k$ ]).

$a$	$b$	Function
1	0, 48	<b>DLE DC4 <math>fn</math> <math>m</math> <math>t</math> (<math>fn = 1</math>):</b> Not processed (disabled).
	1, 49	<b>DLE DC4 <math>fn</math> <math>m</math> <math>t</math> (<math>fn = 1</math>):</b> Processed (enabled).
2	0, 48	<b>DLE DC4 <math>fn</math> <math>a</math> <math>b</math> (<math>fn = 2</math>):</b> Not processed (disabled).
	1, 49	<b>DLE DC4 <math>fn</math> <math>a</math> <math>b</math> (<math>fn = 2</math>):</b> Processed (enabled).

[Note] • If graphics data includes a data string matching **DLE DC4 ( $fn = 1$  or  $2$ )**, it is recommended to use this command in advance to disable the real-time commands.

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## GS ( E *pL pH fn* [*parameters*]

[Name] Set user setup commands

- [Description]
- Controls the user setting modes.
  - *pL*, *pH* specify ( $pL + pH \times 256$ ) as the number of bytes after *pH* (*fn* and [*parameters*]).
  - *fn* specifies the function.
  - [*parameters*] specify the process of each function.

<i>fn</i>	Format	Function no.	Function name
1	GS ( E <i>pL pH fn d1 d2</i>	1	Change into the user setting mode.
2	GS ( E <i>pL pH fn d1 d2 d3</i>	2	End the user setting mode session.
3	GS ( E <i>pL pH fn</i> [ <i>a1 b1s<sub>1</sub> b11</i> ] ... [ <i>ak bk8 bk1</i> ]	3	Set the memory switch value
4	GS ( E <i>pL pH fn a</i>	4	Transmit the memory switch value
5	GS ( E <i>pL pH fn</i> [ <i>a1 n1L n1H</i> ] ... [ <i>ak nkL nkH</i> ]	5	Set the customized values
6	GS ( E <i>pL pH fn a</i>	6	Transmit the customized setting values
11	GS ( E <i>pL pH fn a d1...dk</i>	11	Set the configuration item for the serial interface
12	GS ( E <i>pL pH fn a</i>	12	Transmit the configuration item for the serial interface
15	GS ( E <i>pL pH fn a d</i>	15	Set conditions for USB interface communication
16	GS ( E <i>pL pH fn a</i>	16	Transmit conditions for USB interface communication

- [Notes]
- Frequent write command executions by an NV memory write command may damage the NV memory. Therefore, it is recommended to limit writing data with the write commands into the NV memory to 10 times or fewer a day.
  - If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Be careful not to turn the power off or let the printer be reset via an interface while this command is being executed.
  - While processing this command, the printer may become BUSY while writing the data to the NV memory and stops receiving data. Therefore, be sure not to transmit data from the host computer while the printer is BUSY.
  - When <Function 1, 4, 6, 12, or 16> is transmitted, the data following must not be transmitted until the status is received.

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## <Function 1> **GS ( E $\rho_L$ $\rho_H$ $fn$ $d1$ $d2$ ( $fn = 1$ )**

[Name] Change into the user setting mode

[Format] ASCII GS ( E  $\rho_L$   $\rho_H$   $fn$   $d1$   $d2$   
 Hex 1D 28 45  $\rho_L$   $\rho_H$   $fn$   $d1$   $d2$   
 Decimal 29 40 69  $\rho_L$   $\rho_H$   $fn$   $d1$   $d2$

[Range]  $(\rho_L + \rho_H \times 256) = 3$  ( $\rho_L = 3, \rho_H = 0$ )  
 $fn = 1$   
 $d1 = 73$   
 $d2 = 78$

[Description] • Enters the user setting mode and transmits a mode change notice.

## <Function 2> **GS ( E $\rho_L$ $\rho_H$ $fn$ $d1$ $d2$ $d3$ ( $fn = 2$ )**

[Name] End the user setting mode session

[Format] ASCII GS ( E  $\rho_L$   $\rho_H$   $fn$   $d1$   $d2$   $d3$   
 Hex 1D 28 45  $\rho_L$   $\rho_H$   $fn$   $d1$   $d2$   $d3$   
 Decimal 29 40 69  $\rho_L$   $\rho_H$   $fn$   $d1$   $d2$   $d3$

[Range]  $(\rho_L + \rho_H \times 256) = 4$  ( $\rho_L = 4, \rho_H = 0$ )  
 $fn = 2$   
 $d1 = 79$   
 $d2 = 85$   
 $d3 = 84$

[Description] • Ends the user setting mode and performs a software reset.

## <Function 3> **GS ( E $\rho_L$ $\rho_H$ $fn$ [ $a1$ $b1_8...b1_1$ ]...[ $ak$ $bk_8...bk_1$ ] ( $fn = 3$ )**

[Name] Set the memory switch values

[Format] ASCII GS ( E  $\rho_L$   $\rho_H$   $fn$  [ $a1$   $bk_8...bk_1$ ] ... [ $ak$   $bk_8...bk_1$ ]  
 Hex 1D 28 45  $\rho_L$   $\rho_H$   $fn$  [ $a1$   $bk_8...bk_1$ ] ... [ $ak$   $bk_8...bk_1$ ]  
 Decimal 29 40 69  $\rho_L$   $\rho_H$   $fn$  [ $a1$   $bk_8...bk_1$ ] ... [ $ak$   $bk_8...bk_1$ ]

[Range]  $10 \leq (\rho_L + \rho_H \times 256) \leq 46$   
 (where  $(\rho_L + \rho_H \times 256) = 9 \times k + 1$ :  $10 \leq \rho_L \leq 46, \rho_H = 0$ )  
 $fn = 3$   
 $1 \leq a \leq 5$   
 $b = 48, 49, 50$   
 $1 \leq k \leq 5$

[Default] Msw 1 ~ Msw 5 = 48 (All OFF)

[Description] • Set the memory switch specified by  $a$  to the value set by  $b$ .  
 • When ( $b = 48$ ), sets the corresponding bit to OFF.  
 • When ( $b = 49$ ), sets the corresponding bit to ON.  
 • When ( $b = 50$ ), does not change the corresponding bit. Set the bit for [Reserved] to ( $b = 50$ ).

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- Memory switch 1 is set as follows:

Msw	Function	Setting value	
		48 (OFF)	49 (ON)
1-1	(Reserved)	--	--
1-2	Receive buffer capacity	4 KB	45 bytes
1-3	Condition for BUSY	Receive buffer full or offline	Receive buffer full
1-4	Data processing for receiving error	Replaced with "?"	Ignored
1-5	Automatic line feed	Always disabled	Always enabled
1-6	(Reserved)	--	--
1-7	(Reserved)	--	--
1-8	(Reserved)	--	--

- Memory switch 2 is set as follows:

Msw	Function	Setting value	
		48 (OFF)	49 (ON)
2-1 to 2-8	(Reserved)	--	--

- Memory switch 3

Msw	Function	Setting value	
		48 (OFF)	49 (ON)
3-1 to 3-8	(Reserved)	--	--

- Memory switch 4

Msw	Function	Setting value	
		48 (OFF)	49 (ON)
4-1 to 4-8	(Reserved)	--	--

- Memory switch 5

Msw	Function	Setting value	
		48 (OFF)	49 (ON)
5-1	Sets USB power-saving function *1	Enabled	Disabled
5-2	Sets recovery conditions from receive buffer BUSY (this function is effective when the receive buffer capacity is set to 4 KB)	Recovers when the remaining receive buffer capacity becomes 256 bytes	Recovers when the remaining receive buffer capacity becomes 138 bytes
5-3 to 5-8	(Undefined)	--	--

- \*1: Valid only when the USB interface communication condition is set to the vendor-defined class and the system configuration is set so that the USB driver can support the USB power-saving function.

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## <Function 4> **GS ( E $\rho L$ $\rho H$ $fn$ $a$ ( $fn = 4$ )**

[Name] Transmit the memory switch setting values  
 [Format] ASCII GS ( E  $\rho L$   $\rho H$   $fn$   $a$   
 Hex 1D 28 45  $\rho L$   $\rho H$   $fn$   $a$   
 Decimal 29 40 69  $\rho L$   $\rho H$   $fn$   $a$   
 [Range]  $(\rho L + \rho H \times 256) \leq 2$  ( $\rho L = 2, \rho H = 0$ )  
 $fn = 4$   
 $1 \leq a \leq 5$   
 [Description] • Transmit the memory switch setting values specified by  $a$ .

Transmission data	Hex	Decimal	Data amount
(1) Header	37H	55	1 byte
(2) Identifier	21H	33	1 byte
(3) Data	30H or 31H	48 or 49	8 bytes
(4) NUL	00H	0	1 byte

## <Function 5> **GS ( E $\rho L$ $\rho H$ $fn$ [ $a1$ $n1L$ $n1H$ ]... [ $ak$ $nkL$ $nkH$ ] ( $fn = 5$ )**

[Name] Set the customized setting values  
 [Format] ASCII GS ( E  $\rho L$   $\rho H$   $fn$  [ $a1$   $n1L$   $n1H$ ]... [ $ak$   $nkL$   $nkH$ ]  
 Hex 1D 28 45  $\rho L$   $\rho H$   $fn$  [ $a1$   $n1L$   $n1H$ ]... [ $ak$   $nkL$   $nkH$ ]  
 Decimal 29 40 69  $\rho L$   $\rho H$   $fn$  [ $a1$   $n1L$   $n1H$ ]... [ $ak$   $nkL$   $nkH$ ]  
 [Range]  $4 \leq (\rho L + \rho H \times 256) \leq 65533$  ( $0 \leq \rho L \leq 255, 0 \leq \rho H \leq 255$ )  
 $fn = 5$   
 $a = 3, 5, 6, 8, 9, 11, 100 \leq a \leq 105, 111, 112, 119 \leq a \leq 127$   
 ( $a = 127$  is supported by the firmware Version 1.04(USB/Serial model)/2.00 (Ethernet model).)  
 $(nL + nH \times 256) = 2, 6$  ( $nL = 2, 6, nH = 0$ ) [when  $a = 3$ ]  
 $0 \leq (nL + nH \times 256) \leq 3, 65533 \leq (nL + nH \times 256) \leq 65535$   
 $(0 \leq nL \leq 3, nH = 0, 253 \leq nL \leq 255, nH = 255)$  [when  $a = 5$ ]  
 $1 \leq (nL + nH \times 256) \leq 13$  ( $1 \leq nL \leq 13, nH = 0$ ) [when  $a = 6$ ]  
 $0 \leq (nL + nH \times 256) \leq 5, 11 \leq (nL + nH \times 256) \leq 21, (nL + nH \times 256) = 26,$   
 $30 \leq (nL + nH \times 256) \leq 53, (nL + nH \times 256) = 255$  ( $0 \leq nL \leq 5, 11 \leq nL \leq 21,$   
 $nL = 26, 30 \leq nL \leq 53, nL = 255, nH = 0$ ) [when  $a = 8$ ]  
 $0 \leq (nL + nH \times 256) \leq 17$  ( $0 \leq nL \leq 17, nH = 0$ ) [when  $a = 9$ ]  
 $(nL + nH \times 256) = 0, 1$  ( $nL = 0, 1, nH = 0$ ) [when  $a = 11$ ]  
 $(nL + nH \times 256) = 0, 1$  ( $nL = 0, 1, nH = 0$ ) [when  $a = 100$ ]  
 $(nL + nH \times 256) = 0, 1$  ( $nL = 0, 1, nH = 0$ ) [when  $a = 101$ ]  
 $(nL + nH \times 256) = 0, 1$  ( $nL = 0, 1, nH = 0$ ) [when  $a = 102$ ]  
 $(nL + nH \times 256) = 0, 1, 2, 3$  ( $nL = 0, 1, 2, 3, nH = 0$ ) [when  $a = 103$ ]  
 $(nL + nH \times 256) = 0, 1, 2, 3$  ( $nL = 0, 1, 2, 3, nH = 0$ ) [when  $a = 104$ ]  
 $(nL + nH \times 256) = 0, 1, 2, 3$  ( $nL = 0, 1, 2, 3, nH = 0$ ) [when  $a = 105$ ]  
 $(nL + nH \times 256) = 0, 1, 48, 49$  ( $nL = 0, 1, 48, 49, nH = 0$ ) [when  $a = 111$ ]  
 $(nL + nH \times 256) = 0, 1, 48, 49$  ( $nL = 0, 1, 48, 49, nH = 0$ ) [when  $a = 112$ ]  
 $(nL + nH \times 256) = 0, 1$  ( $nL = 0, 1, nH = 0$ ) [when  $a = 119$ ]  
 $(nL + nH \times 256) = 0, 1, 65535$  ( $nL = 0, 1, nH = 0, nL = 255, nH = 255$ ) [when  $a = 120$ ]  
 $1 \leq (nL + nH \times 256) \leq 5$  ( $1 \leq nL \leq 5, nH = 0$ ) [when  $a = 121, 123, 125$ ]  
 $(nL + nH \times 256) = 0, 1$  ( $nL = 0, 1, nH = 0$ ) [when  $a = 122, 124, 126$ ]

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[Default]	$(nL + nH \times 256) = 0, 1$ ( $nL = 0, 1, nH = 0$ )	[when $a = 127$ ]
	$(nL + nH \times 256) = 6$ ( $nL = 6, nH = 0$ )	[when $a = 3$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 5$ ]
	$(nL + nH \times 256) = 13$ ( $nL = 13, nH = 0$ )	[when $a = 6$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 8$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 9$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 11$ ]
	$(nL + nH \times 256) = 1$ ( $nL = 1, nH = 0$ )	[when $a = 100$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 101$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 102$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 103$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 104$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 105$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 111$ ]
	$(nL + nH \times 256) = 1$ ( $nL = 1, nH = 0$ )	[when $a = 112$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 119$ ]
	$(nL + nH \times 256) = 65535$ ( $nL = 255, nH = 255$ )	[when $a = 120$ ]
	$(nL + nH \times 256) = 1$ ( $nL = 1, nH = 0$ )	[when $a = 121, 123$ ]
	$(nL + nH \times 256) = 2$ ( $nL = 2, nH = 0$ )	[when $a = 125$ ]
	$(nL + nH \times 256) = 1$ ( $nL = 1, nH = 0$ )	[when $a = 122, 124, 126$ ]
	$(nL + nH \times 256) = 0$ ( $nL = 0, nH = 0$ )	[when $a = 127$ ]

[Description] • Sets the customized value specified by  $a$  to the values specified by  $(nL + nH \times 256)$ .

$a$	Type of customized value
3	Roll paper width
5	Print density
6	Print speed
8	Default character code table
9	Default international character set
11	Column emulation mode
100	Autocutting of roll paper after closing the roll paper cover
101	(ARP) Reduction of top margin
102	(ARP) Reduction of bottom margin
103	(ARP) Reduction ratio of line spacing
104	(ARP) Reduction ratio of line spacing where extra line feeds are included
105	(ARP) Reduction ratio of bar code height
111	Auto replacement of font A
112	Auto replacement of font B
119	Buzzer function: Enabling/disabling optional external buzzer
120	Buzzer function: Buzzer frequency (Error) *1
121	Buzzer function: Sound pattern (Autocut) *1
122	Buzzer function: Buzzer frequency (Autocut) *1
123	Buzzer function: Sound pattern (Pulse 1) *1
124	Buzzer function: Buzzer frequency (Pulse 1) *1
125	Buzzer function: Sound pattern (Pulse 2) *1
126	Buzzer function: Buzzer frequency (Pulse 2) *1
127	Logo emulation mode (supported by the firmware Version 1.04 (USB/Serial model)/2.00 (Ethernet model) or later)

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(ARP = Automatic Reduction of Paper)

\*1 The functions are enabled for the optional external buzzer.

- Roll paper width setting (when **a** = 3)

( <i>nL</i> + <i>nH</i> × 256)	Roll paper width
2	58 mm
6	80 mm

- Print density setting (when **a** = 5)

( <i>nL</i> + <i>nH</i> × 256)	Print density	
65533	Print density level 1.	light
65534	Print density level 2.	
65535	Print density level 3.	
0	Print density level 4.	standard
1	Print density level 5.	
2	Print density level 6.	
3	Print density level 7.	dark

- Print speed setting (when **a** = 6)

( <i>nL</i> + <i>nH</i> × 256)	Print speed	
1	Print speed level 1.	slow
2	Print speed level 2.	
3	Print speed level 3.	
4	Print speed level 4.	
5	Print speed level 5.	
6	Print speed level 6.	
7	Print speed level 7.	
8	Print speed level 8.	
9	Print speed level 9.	
10	Print speed level 10	
11	Print speed level 11	
12	Print speed level 12	
13	Print speed level 13	fast

- Default character code table (when **a** = 8)

See (*n*) of the **ESC t** command to select character code table.

- Default international character set (when **a** = 9)

See (*n*) of the **ESC R** command to select international character.

- Column emulation mode (when **a** = 11)

( <i>nL</i> + <i>nH</i> × 256)	Column emulation mode
0	Normal mode
1	42 column mode

- Autocutting of roll paper after closing the roll paper cover (when **a** = 100)

( <i>nL</i> + <i>nH</i> × 256)	Autocutting of roll paper after closing the roll paper cover
0	Disabled
1	Enabled

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- (ARP) Reduction of top margin (when **a** = 101)

$(nL + nH \times 256)$	Reduction of top margin
0	Margin not reduced
1	Margin reduced

- (ARP) Reduction of bottom margin (when **a** = 102)

$(nL + nH \times 256)$	Reduction of bottom margin
0	Margin not reduced
1	Margin reduced

- (ARP) Reduction ratio of line spacing (when **a** = 103)

$(nL + nH \times 256)$	Reduction ratio of line spacing
0	Not reduced
1	Reduced 25%
2	Reduced 50%
3	Reduced 75%

- (ARP) Reduction ratio of line spacing where extra line feeds are included (when **a** = 104)

$(nL + nH \times 256)$	Reduction ratio of line spacing where extra line feeds are included
0	Not reduced
1	Reduced 25%
2	Reduced 50%
3	Reduced 75%

- (ARP) Reduction ratio of bar code height (when **a** = 105)

$(nL + nH \times 256)$	Reduction ratio of bar code height
0	Not reduced
1	Reduced 25%
2	Reduced 50%
3	Reduced 75%

(ARP = Automatic Reduction of Paper)

- Automatic replacement of Font A (when **a** = 111)

$(nL + nH \times 256)$	Automatic replacement of Font A
0, 48	Font A (Same as no replacement)
1, 49	Font B

- Automatic replacement of Font B (when **a** = 112)

$(nL + nH \times 256)$	Automatic replacement of Font B
0, 48	Font A
1, 49	Font B (Same as no replacement)

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- Buzzer function: Enabling/disabling optional external buzzer (when **a** = 119)

$(nL + nH \times 256)$	Enabling/disabling optional external buzzer
0	Disabled
1	Enabled

- Buzzer function: Buzzer frequency (Error) (when **a** = 120) (optional external buzzer)

$(nL + nH \times 256)$	Buzzer frequency
0	No sound
1	1 time
65535	Continuous

- Buzzer function: Sound pattern (when **a** = 121, 123, 125) (optional external buzzer)

$(nL + nH \times 256)$	Sound pattern
1	Pattern A
2	Pattern B
3	Pattern C
4	Pattern D
5	Pattern E

- Buzzer function: Buzzer frequency (when **a** = 122, 124, 126) (optional external buzzer)

$(nL + nH \times 256)$	Buzzer frequency
0	No sound
1	1 time

- Logo emulation mode (when **a** = 127 is selected) (Supported by the firmware Version 1.04(USB/Serial model)/2.00 (Ethernet model))

$(nL + nH \times 256)$	Logo emulation mode
0	Standard logo emulation mode
1	180 dpi logo mode

[Reference] “3.5.1.2 Customized value setting”

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## <Function 6> **GS ( E $\rho_L$ $\rho_H$ $fn$ $a$ ( $fn = 6$ )**

[Name] Transmit the customized setting values

[Format] ASCII GS ( E  $\rho_L$   $\rho_H$   $fn$   $a$   
 Hex 1D 28 45  $\rho_L$   $\rho_H$   $fn$   $a$   
 Decimal 29 40 69  $\rho_L$   $\rho_H$   $fn$   $a$

[Range] ( $\rho_L + \rho_H \times 256$ ) = 2 ( $\rho_L = 2, \rho_H = 0$ )  
 $fn = 6$

$a = 3, 5, 6, 8, 9, 11, 100 \leq a \leq 105, 111, 112, 119 \leq a \leq 127$

$a = 127$  is supported by firmware Version 1.04(USB/Serial model)/2.00(Ethernet model) or later (Logo emulation mode).

[Description] • Transmits the customized value specified by  $a$ .

$a$	Type of customized value
3	Roll paper width
5	Print density
6	Print speed
8	Default character code table
9	Default international character set
11	Column emulation mode
100	Autocutting of the roll paper after closing the roll paper cover
101	(ARP) Reduction of top margin
102	(ARP) Reduction of bottom margin
103	(ARP) Reduction ratio of line spacing
104	(ARP) Reduction ratio of line spacing where extra line feeds are included
105	(ARP) Reduction ratio of bar code height
111	Auto replacement of Font A
112	Auto replacement of Font B
119	Buzzer function: Enabling/disabling optional external buzzer
120	Buzzer function: Buzzer frequency (Error) *1
121	Buzzer function: Sound pattern (Autocut) *1
122	Buzzer function: Buzzer frequency (Autocut) *1
123	Buzzer function: Sound pattern (Pulse 1) *1
124	Buzzer function: Buzzer frequency (Pulse 1) *1
125	Buzzer function: Sound pattern (Pulse 2) *1
126	Buzzer function: Buzzer frequency (Pulse 2) *1
127	Logo emulation mode (Supported by firmware Version 1.04(USB/Serial model)/2.00(Ethernet model) or later)

(ARP = Automatic Reduction of Paper)

\*1 The functions are enabled for the optional external buzzer.

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<Function 11> **GS ( E  $\rho_L$   $\rho_H$   $fn$   $a$   $d1...dk$  ( $fn = 11$ )**

- [Name] Set the configuration item for the serial interface
- [Format] ASCII GS ( E  $\rho_L$   $\rho_H$   $fn$   $a$   $d1 ... dk$   
 Hex 1D 28 45  $\rho_L$   $\rho_H$   $fn$   $a$   $d1 ... dk$   
 Decimal 29 40 69  $\rho_L$   $\rho_H$   $fn$   $a$   $d1 ... dk$
- [Range]  $3 \leq (\rho_L + \rho_H \times 256) \leq 65535$  ( $0 \leq \rho_L \leq 255, 0 \leq \rho_H \leq 255$ )  
 $fn = 11$   
 $1 \leq a \leq 4$   
 $48 \leq d \leq 57$
- [Default (upon shipment)]  
 $d1...dk = "38400"$  [when  $a = 1$ ]  
 $d1 = 48$  [when  $a = 2$ ]  
 $d1 = 48$  [when  $a = 3$ ]  
 $d1 = 56$  [when  $a = 4$ ]
- [Description] • Sets the configuration item for the serial interface specified by  $a$  to the values specified by  $d$ .

$a$	Configuration item
1	Transmission speed
2	Parity
3	Handshaking
4	Bit length

• Transmission speed settings ( $a = 1$ )

$d1...dk$	Transmission speed
"2400"	2400 bps
"4800"	4800 bps
"9600"	9600 bps
"19200"	19200 bps
"38400"	38400 bps
"57600"	57600 bps
"115200"	115200 bps

• Parity settings ( $a = 2$ )

$d1$	Parity
48	None
49	Odd
50	Even

• Handshaking settings ( $a = 3$ )

$d1$	Handshaking
48	DTR/DSR control
49	XON/XOFF control

• Bit length settings ( $a = 4$ )

$d1$	Bit length
55	7 bits
56	8 bits

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- [Note] • The configuration item set by this function is enabled by executing **GS ( E <Function 2>** or restarting the printer. Note that the host computer must be set to enable the printer to communicate with the host computer.

## <Function 12> **GS ( E *pL pH fn a* (fn = 12)**

[Name] Transmit the configuration item for the serial interface

[Format] ASCII GS ( E *pL pH fn a*  
 Hex 1D 28 45 *pL pH fn a*  
 Decimal 29 40 69 *pL pH fn a*

[Range] ( $pL + pH \times 256$ ) = 2 ( $pL = 2, pH = 0$ )  
 $fn = 12$   
 $1 \leq a \leq 4$

[Description] • Transmits the configuration item for the serial interface specified by **a**.

<b>a</b>	Configuration item
1	Transmission speed
2	Parity
3	Handshaking
4	Bit length

## <Function 15> **GS ( E *pL pH fn a d* (fn = 15)**

[Name] Set conditions for USB interface communication

[Format] ASCII GS ( E *pL pH fn a d*  
 Hex 1D 28 45 *pL pH fn a d*  
 Decimal 29 40 69 *pL pH fn a d*

[Range] ( $pL + pH \times 256$ ) = 3 ( $pL = 3, pH = 0$ )  
 $fn = 15$   
 $a = 1$   
 $48 \leq d \leq 49$

[Default (upon shipment)]  
 $d = 49$

[Description] • Sets the set value for USB interface communication specified by **a** to the value specified by **d**.

<b>a</b>	Configuration item
1	Class

• Class settings ( $a = 1$ )

<b>d</b>	Class
48	Vendor-defined class
49	Printer class

- [Note] • The configuration item set by this function is enabled by executing **GS ( E <Function 2>** or restarting the printer. Note that the host computer must be set to enable the printer to communicate with the host computer.

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## <Function 16> **GS ( E *pL pH fn a* (fn = 16)**

- [Name] Transmit conditions for USB interface communication
- [Format] ASCII GS ( E *pL pH fn a*  
 Hex 1D 28 45 *pL pH fn a*  
 Decimal 29 40 69 *pL pH fn a*
- [Range] ( $pL + pH \times 256$ ) = 2 ( $pL = 2, pH = 0$ )  
 $fn = 16$   
 $a = 1$
- [Description] • Transmits the set value for USB interface communication specified by **a**.

<b>a</b>	Configuration item
1	Class

- Transmission data is as follows:

Transmission data	Hex	Decimal	Data amount
(1) Header	37H	55	1 byte
(2) Identifier	52H	82	1 byte
(3) Type of configuration item	30H ~ 39H	48 ~ 57	1 ~ 2 bytes
Separator	1FH	31	1 byte
(4) Set value	30H ~ 39H	48 ~ 57	1 byte
(5) NUL	00H	0	1 byte

## **GS ( H *pL pH fn [parameters]***

- [Name] Request transmission of response or status
- [Description] • Various processes are performed in response.
- **pL, pH** specify ( $pL + pH \times 256$ ) as the number of bytes after **pH** (**fn** and **[parameters]**).
  - **fn** specifies the function.
  - **[parameters]** specify the process of each function.

<i>fn</i>	Format	Function no.	Function name
48	<b>GS ( H <i>pL pH fn m d1 d2 d3 d4</i></b>	48	Set the process ID response.

- [Note] • Do not use this command in a system that uses the printer with the OPOS driver or the JavaPOS driver provided by Seiko Epson Corporation.

## <Function 48> **GS ( H *pL pH fn m d1 d2 d3 d4* (fn = 48)**

- [Name] Set the process ID response
- [Format] ASCII GS ( H *pL pH fn m d1 d2 d3 d4*  
 Hex 1D 28 48 *pL pH fn m d1 d2 d3 d4*  
 Decimal 29 40 72 *pL pH fn m d1 d2 d3 d4*
- [Range] ( $pL + pH \times 256$ ) = 6 ( $pL = 6, pH = 0$ )  
 $fn = 48$   
 $m = 48$   
 $32 \leq d \leq 126$
- [Description] • Saves the process ID specified by (**d1, d2, d3, d4**) for the data processed immediately before this function.

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## GS ( K *pL* *pH* *fn* [*parameters*]

[Name] Select print control method(s)

- [Description] • Selects the print control methods.
- *pL*, *pH* specify ( $pL + pH \times 256$ ) as the number of bytes after *pH* (*fn* and [*parameters*]).
  - *fn* specifies the function.
  - [*parameters*] specify the process of each function.

<i>fn</i>	Format	Function no.	Function name
50	GS ( K <i>pL</i> <i>pH</i> <i>fn</i> <i>m</i>	50	Select the print speed.

### <Function 50> GS ( K *pL* *pH* *fn* *m* (*fn* = 50)

[Name] Select the print speed

[Format] ASCII GS ( K *pL* *pH* *fn* *m*  
 Hex 1D 28 4B *pL* *pH* *fn* *m*  
 Decimal 29 40 75 *pL* *pH* *fn* *m*

[Range] ( $pL + pH \times 256$ ) = 2 (*pL* = 2, *pH* = 0)  
*fn* = 50  
 $0 \leq m \leq 13, 48 \leq m \leq 57$

[Default] *m* = 0 (Customized setting value of <Function 5> GS ( E < *a* = 6 >)

- [Description] • Selects the print speed.

<i>m</i>	Print speed	
0, 48	Customized setting value of <Function 5> GS ( E < <i>a</i> = 6 >.	
1, 49	Print speed level 1.	slow
2, 50	Print speed level 2.	
3, 51	Print speed level 3.	
4, 52	Print speed level 4.	
5, 53	Print speed level 5.	
6, 54	Print speed level 6.	
7, 55	Print speed level 7.	
8, 56	Print speed level 8.	
9, 57	Print speed level 9.	
10	Print speed level 10.	
11	Print speed level 11.	
12	Print speed level 12.	
13	Print speed level 13.	fast

[Reference] "3.5.1 Software setting"

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## **GS ( L *pL pH m fn [parameters]*** **GS 8 L *p1 p2 p3 p4 m fn [parameters]***

[Name]	Set graphics data										
[Format]	ASCII	GS	(	L	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>	<i>[parameters]</i>		
	Hex	1D	28	4C	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>	<i>[parameters]</i>		
	Decimal	29	40	76	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>	<i>[parameters]</i>		
	ASCII	GS	8	L	<i>p1</i>	<i>p2</i>	<i>p3</i>	<i>p4</i>	<i>m</i>	<i>fn</i>	<i>[parameters]</i>
	Hex	1D	38	4C	<i>p1</i>	<i>p2</i>	<i>p3</i>	<i>p4</i>	<i>m</i>	<i>fn</i>	<i>[parameters]</i>
	Decimal	29	56	76	<i>p1</i>	<i>p2</i>	<i>p3</i>	<i>p4</i>	<i>m</i>	<i>fn</i>	<i>[parameters]</i>

- In the description below, only **GS ( L** is used for explanation.
  - Note that **GS ( L** and **GS 8 L** have the same function.
  - If the *[parameters]* in the Format column in the table below exceed 65533 bytes, use **GS 8 L**.
- The only differences between **GS ( L** and **GS 8 L** are as listed below. The format for **GS 8 L** is not provided in the following descriptions; however, [Range], [Default], [Description], and [Notes] for parameters other than those listed in the table below are the same as for **GS ( L**.

<Parameters specifying the number of parameters after *pH* or *p4*>

Command	Parameters	Structure	Maximum value
<b>GS ( L</b>	<i>pL, pH</i>	2 bytes	65,535
<b>GS 8 L</b>	<i>p1, p2, p3, p4</i>	4 bytes	4,294,967,295

- [Description]
- Processes graphics data.
    - *pL, pH* specify (*pL* + *pH* × 256) as the number of bytes after *pH* (*m, fn*, and *[parameters]*).
    - *fn* specifies the function.
    - *[parameters]* specify the process of each function.

<i>fn</i>	Format	Function no.	Function name
0, 48	<b>GS ( L <i>pL pH m fn</i></b>	48	Transmit the NV graphics memory capacity
2, 50	<b>GS ( L <i>pL pH m fn</i></b>	50	Print the graphics data in the print buffer
3, 51	<b>GS ( L <i>pL pH m fn</i></b>	51	Transmit the remaining capacity of the NV graphics memory
4, 52	<b>GS ( L <i>pL pH m fn</i></b>	52	Transmit the remaining capacity of the download graphics memory
64	<b>GS ( L <i>pL pH m fn d1 d2</i></b>	64	Transmit the key code list for defined NV graphics
65	<b>GS ( L <i>pL pH m fn d1 d2 d3</i></b>	65	Delete all NV graphics data
66	<b>GS ( L <i>pL pH m fn kc1 kc2</i></b>	66	Delete the specified NV graphics data
67	<b>GS ( L <i>pL pH m fn a kc1 kc2 b xL xH yL yH c d1...dk</i></b>	67	Define the NV graphics data (raster format)
69	<b>GS ( L <i>pL pH m fn kc1 kc2 x y</i></b>	69	Print the specified NV graphics data
80	<b>GS ( L <i>pL pH m fn d1 d2</i></b>	80	Transmit the key code list for defined download graphics
81	<b>GS ( L <i>pL pH m fn d1 d2 d3</i></b>	81	Delete all download graphics data
82	<b>GS ( L <i>pL pH m fn kc1 kc2</i></b>	82	Delete the specified download graphics data

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<i>fn</i>	Format	Function no.	Function name
83	<b>GS ( L <i>pL pH m fn a kc1 kc2 b xL xH yL yH c d1...dk</i></b>	83	Define the download graphics data (raster format)
85	<b>GS ( L <i>pL pH m fn a kc1 kc2 b x y</i></b>	85	Print the specified download graphics data
112	<b>GS ( L <i>pL pH m fn a bx by c xL xH yL yH d1...dk</i></b>	112	Store the graphics data in the print buffer (raster format)

[Notes]

- Frequent write command executions by an NV memory write command may damage the NV memory. Therefore, it is recommended to limit writing data with the write commands into the NV memory to 10 times or fewer a day.
- If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Be careful not to turn the power off or let the printer be reset via an interface while this command is being executed.
- While processing this command, the printer may become BUSY while writing the data to the NV memory and stops receiving data. Therefore, be sure not to transmit data from the host computer while the printer is BUSY.
- When <Function 48, 51, 64, or 80> is transmitted, do not transmit subsequent data until the status is received. ESC/POS Handshaking Protocol procedures are required when using <Function 64>.

## <Function 48> **GS ( L *pL pH m fn* ( *fn* = 0, 48)**

[Name] Transmit the NV graphics memory capacity

[Format] ASCII GS ( L *pL pH m fn*  
 Hex 1D 28 4C *pL pH m fn*  
 Decimal 29 40 76 *pL pH m fn*

[Range] (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)  
*m* = 48  
*fn* = 0, 48

[Description] • Transmits the entire capacity of the NV graphics area (number of bytes in the NV graphics area).

## <Function 50> **GS ( L *pL pH m fn* ( *fn* = 2, 50)**

[Name] Print the graphics data in the print buffer

[Format] ASCII GS ( L *pL pH m fn*  
 Hex 1D 28 4C *pL pH m fn*  
 Decimal 29 40 76 *pL pH m fn*

[Range] (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)  
*m* = 48  
*fn* = 2, 50

[Description] • Prints the buffered graphics data stored by processing of **GS ( L** <Function 112>.

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## <Function 51> **GS ( L *pL* *pH* *m* *fn* (fn = 3, 51)**

---

[Name]	Transmit the remaining capacity of the NV graphics memory							
[Format]	ASCII	GS	(	L	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>
	Hex	1D	28	4C	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>
	Decimal	29	40	76	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>
[Range]	$(pL + pH \times 256) = 2$ ( $pL = 2, pH = 0$ ) $m = 48$ $fn = 3, 51$							
[Description]	<ul style="list-style-type: none"> <li>Transmits the number of bytes of remaining memory (unused area) in the NV graphics area.</li> </ul>							

## <Function 52> **GS ( L *pL* *pH* *m* *fn* (fn = 4, 52)**

---

[Name]	Transmit the remaining capacity of the download graphics memory							
[Format]	ASCII	GS	(	L	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>
	Hex	1D	28	4C	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>
	Decimal	29	40	76	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>
[Range]	$(pL + pH \times 256) = 2$ ( $pL = 2, pH = 0$ ) $m = 48$ $fn = 4, 52$							
[Description]	<ul style="list-style-type: none"> <li>Transmits the number of bytes of remaining memory (unused area) in the download graphics area.</li> </ul>							

## <Function 64> **GS ( L *pL* *pH* *m* *fn* *d1* *d2* (fn = 64)**

---

[Name]	Transmit the key code list for defined NV graphics									
[Format]	ASCII	GS	(	L	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>	<i>d1</i>	<i>d2</i>
	Hex	1D	28	4C	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>	<i>d1</i>	<i>d2</i>
	Decimal	29	40	76	<i>pL</i>	<i>pH</i>	<i>m</i>	<i>fn</i>	<i>d1</i>	<i>d2</i>
[Range]	$(pL + pH \times 256) = 4$ ( $pL = 4, pH = 0$ ) $m = 48$ $fn = 64$ $d1 = 75$ $d2 = 67$									
[Description]	<ul style="list-style-type: none"> <li>Transmits the key code list for defined NV graphics.</li> </ul>									

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<Function 65> **GS ( L  $\rho L$   $\rho H$   $m$   $fn$   $d1$   $d2$   $d3$  ( $fn = 65$ )**

---

[Name]	Delete all NV graphics data										
[Format]	ASCII	GS	(	L	$\rho L$	$\rho H$	$m$	$fn$	$d1$	$d2$	$d3$
	Hex	1D	28	4C	$\rho L$	$\rho H$	$m$	$fn$	$d1$	$d2$	$d3$
	Decimal	29	40	76	$\rho L$	$\rho H$	$m$	$fn$	$d1$	$d2$	$d3$
[Range]	$(\rho L + \rho H \times 256) = 5$ ( $\rho L = 5, \rho H = 0$ ) $m = 48$ $fn = 65$ $d1 = 67$ $d2 = 76$ $d3 = 82$										
[Description]	• Deletes all NV graphics data.										

<Function 66> **GS ( L  $\rho L$   $\rho H$   $m$   $fn$   $kc1$   $kc2$  ( $fn = 66$ )**

---

[Name]	Delete the specified NV graphics data										
[Format]	ASCII	GS	(	L	$\rho L$	$\rho H$	$m$	$fn$	$kc1$	$kc2$	
	Hex	1D	28	4C	$\rho L$	$\rho H$	$m$	$fn$	$kc1$	$kc2$	
	Decimal	29	40	76	$\rho L$	$\rho H$	$m$	$fn$	$kc1$	$kc2$	
[Range]	$(\rho L + \rho H \times 256) = 4$ ( $\rho L = 4, \rho H = 0$ ) $m = 48$ $fn = 66$ $32 \leq kc1 \leq 126$ $32 \leq kc2 \leq 126$										
[Description]	• Deletes the NV graphics data defined by the key codes ( $kc1$ and $kc2$ ).										

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<Function 67>

**GS ( L *pL pH m fn a kc1 kc2 b xL xH yL yH c d1...dk* (fn = 67)**

[Name] Define the NV graphics data (raster format)

[Format] ASCII GS ( L *pL pH m fn a kc1 kc2 b xL xH yL yH c d1...dk*  
 Hex 1D 28 4C *pL pH m fn a kc1 kc2 b xL xH yL yH c d1...dk*  
 Decimal 29 40 76 *pL pH m fn a kc1 kc2 b xL xH yL yH c d1...dk*

[Range] (*pL, pH*) for **GS ( L:**  
 $12 \leq (pL + pH \times 256) \leq 65535 \quad (0 \leq pL \leq 255, 0 \leq pH \leq 255)$   
 (*p1, p2, p3, p4*) for **GS 8 L:**  
 $12 \leq (p1 + p2 \times 256 + p3 \times 65536 + p4 \times 16777216) \leq 4294967295$   
 $(0 \leq p1 \leq 255, 0 \leq p2 \leq 255, 0 \leq p3 \leq 255, 0 \leq p4 \leq 255)$   
 Common parameters for **GS ( L** and **GS 8 L:**  
*m* = 48  
*fn* = 67  
*a* = 48  
 $32 \leq kc1 \leq 126$   
 $32 \leq kc2 \leq 126$   
*b* = 1  
 $1 \leq (xL + xH \times 256) \leq 8192 \quad (0 \leq xL \leq 255, 0 \leq xH \leq 32)$   
 $1 \leq (yL + yH \times 256) \leq 2304 \quad (0 \leq yL \leq 255, 0 \leq yH \leq 9)$   
*c* = 49  
 $0 \leq d \leq 255$   
 $k = (\text{int}((xL + xH \times 256) + 7) / 8) \times (yL + yH \times 256)$   
 The entire capacity size = 256 KB.

[Description] • Defines the NV graphics data (raster format) as a record specified by the key codes (*kc1, kc2*) in the NV graphics area.

• *a* specifies the data format of the defined data.

<i>a</i>	Data format
48	Monochrome (digital)

- *b* specifies the number of the color of the data to define.
- *xL, xH* specify the number of dots in the horizontal direction as  $(xL + xH \times 256)$ .
- *yL, yH* specify the number of dots in the vertical direction as  $(yL + yH \times 256)$ .
- *c* specifies the color of the data to define.

<i>c</i>	Defined data color
49	Color 1

• *d* specifies the defined data (raster format).

- [Notes]
- In cases where sufficient capacity is not available for storing NV graphics data specified by  $(xL + xH \times 256)$  and  $(yL + yH \times 256)$ , this function is ignored.
  - The number of items of NV graphics registered should be within 50 to shorten the execution time of this function. The execution time is 60 seconds or less when the number of items registered is within 50. The execution time for 100 items is 120 seconds or less.
  - The [data value (*k*) + control information data value (24 bytes)] area of the NV graphics data domain is used when this function is executed.
  - NV graphics and NV bit image (**FS q**) cannot be defined simultaneously. When this function is executed, all NV bit images are deleted.

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- When the logo emulation mode (customized value **a** = 127) is set to 180 dpi logo mode, NV graphics data is registered after being enlarged to the specified scaling factor. Scaling factors depend on the NV graphics data size, roll paper width (customized value **a** = 3), or setting value for column emulation mode (customized value **a** = 11). This function does not work when the NV graphics data size in the horizontal direction or vertical direction after enlargement is larger than the specified range. (See APPENDIX L for more details.)

## <Function 69> **GS ( L pL pH m fn kc1 kc2 x y (fn = 69)**

[Name] Print the specified NV graphics data

[Format] ASCII GS ( L pL pH m fn kc1 kc2 x y  
 Hex 1D 28 4C pL pH m fn kc1 kc2 x y  
 Decimal 29 40 76 pL pH m fn kc1 kc2 x y

[Range]  $(pL + pH \times 256) = 6$  ( $pL = 6, pH = 0$ )  
**m** = 48  
**fn** = 69  
 $32 \leq kc1 \leq 126$   
 $32 \leq kc2 \leq 126$   
**x** = 1, 2  
**y** = 1, 2

- [Description] • Prints the NV graphics data defined by the key codes (**kc1** and **kc2**).  
 • The graphics data is enlarged by **x** and **y** in the horizontal and vertical directions.

<b>x, y</b>	Vertical direction	Horizontal direction
1	203 dpi	203 dpi
2	203/2 dpi	203/2 dpi

## <Function 80> **GS ( L pL pH m fn d1 d2 (fn = 80)**

[Name] Transmit the key code list for defined download graphics

[Format] ASCII GS ( L pL pH m fn d1 d2  
 Hex 1D 28 4C pL pH m fn d1 d2  
 Decimal 29 40 76 pL pH m fn d1 d2

[Range]  $(pL + pH \times 256) = 4$  ( $pL = 4, pH = 0$ )  
**m** = 48  
**fn** = 80  
**d1** = 75 (Character "K")  
**d2** = 67 (Character "C")

- [Description] • Transmits the key code list for defined download graphics.

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<Function 81> **GS ( L  $\rho L$   $\rho H$   $m$   $fn$   $d1$   $d2$   $d3$  ( $fn = 81$ )**

[Name] Delete all download graphics data

[Format] ASCII GS ( L  $\rho L$   $\rho H$   $m$   $fn$   $d1$   $d2$   $d3$   
 Hex 1D 28 4C  $\rho L$   $\rho H$   $m$   $fn$   $d1$   $d2$   $d3$   
 Decimal 29 40 76  $\rho L$   $\rho H$   $m$   $fn$   $d1$   $d2$   $d3$

[Range] ( $\rho L + \rho H \times 256$ ) = 5 ( $\rho L = 5, \rho H = 0$ )  
 $m = 48$   
 $fn = 81$   
 $d1 = 67$   
 $d2 = 76$   
 $d3 = 82$

[Description] • Deletes all defined download graphics data.

<Function 82> **GS ( L  $\rho L$   $\rho H$   $m$   $fn$   $kc1$   $kc2$  ( $fn = 82$ )**

[Name] Delete the specified download graphics data

[Format] ASCII GS ( L  $\rho L$   $\rho H$   $m$   $fn$   $kc1$   $kc2$   
 Hex 1D 28 4C  $\rho L$   $\rho H$   $m$   $fn$   $kc1$   $kc2$   
 Decimal 29 40 76  $\rho L$   $\rho H$   $m$   $fn$   $kc1$   $kc2$

[Range] ( $\rho L + \rho H \times 256$ ) = 4 ( $\rho L = 4, \rho H = 0$ )  
 $m = 48$   
 $fn = 82$   
 $32 \leq kc1 \leq 126$  ( $20H \leq kc1 \leq 7EH$ )  
 $32 \leq kc2 \leq 126$  ( $20H \leq kc2 \leq 7EH$ )

[Description] • Deletes the download graphics data defined by the key codes ( $kc1$  and  $kc2$ ).

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# Confidential

<Function 83>

## GS ( L *pL pH m fn a kc1 kc2 b xL xH yL yH c d1...dk* (fn = 83)

[Name] Define the download graphics data (raster format)

[Format] ASCII GS ( L *pL pH m fn a kc1 kc2 b xL xH yL yH c d1...dk*  
 Hex 1D 28 4C *pL pH m fn a kc1 kc2 b xL xH yL yH c d1...dk*  
 Decimal 29 40 76 *pL pH m fn a kc1 kc2 b xL xH yL yH c d1...dk*

[Range] (*pL, pH*) for GS ( L:  
 $12 \leq (pL + pH \times 256) \leq 65535 \quad (0 \leq pL \leq 255, 0 \leq pH \leq 255)$   
 (*p1, p2, p3, p4*) for GS 8 L:  
 $12 \leq (p1 + p2 \times 256 + p3 \times 65536 + p4 \times 16777216) \leq 4294967295$   
 $(0 \leq p1 \leq 255, 0 \leq p2 \leq 255, 0 \leq p3 \leq 255, 0 \leq p4 \leq 255)$   
 Common parameters for GS ( L and GS 8 L:  
*m* = 48  
*fn* = 83  
*a* = 48  
 $32 \leq kc1 \leq 126 \quad (20H \leq kc1 \leq 7EH)$   
 $32 \leq kc2 \leq 126 \quad (20H \leq kc2 \leq 7EH)$   
 $1 \leq (xL + xH \times 256) \leq 8192 \quad (0 \leq xL \leq 255, 0 \leq xH \leq 32)$   
 $1 \leq (yL + yH \times 256) \leq 2304 \quad (0 \leq yL \leq 255, 0 \leq yH \leq 9)$   
 $0 \leq d \leq 255$   
 $k = (\text{int}((xL + xH \times 256) + 7) / 8) \times (yL + yH \times 256)$   
*b* = 1  
*c* = 49

The entire capacity size = 208 KB.

- [Description] • Defines the download graphics data (raster format) as a record specified by the key codes (*kc1, kc2*) in the download graphics area.
- *a* specifies the data format of the defined data.

<i>a</i>	Data format
48	Monochrome (digital)

- *b* specifies the number of the color of the defined data.
- *c* specifies the color of the defined data.

<i>c</i>	Defined data color
49	Color 1

- *xL, xH* specify the number of dots in the horizontal direction as  $(xL + xH \times 256)$ .
- *yL, yH* specify the number of dots in the vertical direction as  $(yL + yH \times 256)$ .
- *d* specifies the defined data (raster format).

- [Notes] • In cases where sufficient capacity is not available for storing download graphics data specified by  $(xL + xH \times 256)$  and  $(yL + yH \times 256)$ , this function is ignored.
- The [data value (*k*) + control information data value (16 bytes)] area of the download graphics data domain is used when this function is executed.
- When the logo emulation mode (customized value *a* = 127) is set to 180 dpi logo mode, NV graphics data is registered after being enlarged to the specified scaling factor. Scaling factors depend on the NV graphics data size, roll paper width (customized value *a* = 3), or setting value for column emulation mode (customized value *a* = 11). This function does not work when the NV graphics data size in the horizontal direction or vertical direction after enlargement is larger than the specified range. (See APPENDIX L for more details.)

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<Function 85> **GS ( L *pL* *pH* *m* *fn* *kc1* *kc2* *x* *y* (fn = 85)**

[Name] Print the specified download graphics data

[Format] ASCII GS ( L *pL* *pH* *m* *fn* *kc1* *kc2* *x* *y*  
 Hex 1D 28 4C *pL* *pH* *m* *fn* *kc1* *kc2* *x* *y*  
 Decimal 29 40 76 *pL* *pH* *m* *fn* *kc1* *kc2* *x* *y*

[Range] (*pL* + *pH* × 256) = 6 (*pL* = 6, *pH* = 0)  
*m* = 48  
*fn* = 85  
 32 ≤ *kc1* ≤ 126 (20H ≤ *kc1* ≤ 7EH)  
 32 ≤ *kc2* ≤ 126 (20H ≤ *kc2* ≤ 7EH)  
 1 ≤ *x* ≤ 2  
 1 ≤ *y* ≤ 2

- [Description] • Prints the download graphics data defined by the key codes (***kc1*** and ***kc2***).  
 • The graphics data is enlarged by ***x*** and ***y*** in the horizontal and vertical directions.

<b><i>x, y</i></b>	Vertical direction	Horizontal direction
1	203 dpi	203 dpi
2	203/2 dpi	203/2 dpi

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<Function 112> **GS ( L pL pH m fn a bx by c xL xH yL yH d1...dk (fn = 112)**

[Name] Store the graphics data in the print buffer (raster format)  
 [Format] ASCII GS ( L pL pH m fn a bx by c xL xH yL yH d1...dk  
 Hex 1D 28 4C pL pH m fn a bx by c xL xH yL yH d1...dk  
 Decimal 29 40 76 pL pH m fn a bx by c xL xH yL yH d1...dk

[Range] (**pL, pH**) for **GS ( L**:  
 $11 \leq (pL + pH \times 256) \leq 65535$  ( $0 \leq pL \leq 255, 0 \leq pH \leq 255$ )  
 (**p1, p2, p3, p4**) for **GS 8 L**:  
 $11 \leq (p1 + p2 \times 256 + p3 \times 65536 + p4 \times 16777216) \leq 4294967295$   
 ( $0 \leq p1 \leq 255, 0 \leq p2 \leq 255, 0 \leq p3 \leq 255, 0 \leq p4 \leq 255$ )  
 Common parameters for **GS ( L** and **GS 8 L**:  
**m** = 48  
**fn** = 112  
**a** = 48  
**bx** = 1, 2  
**by** = 1, 2  
**c** = 49  
 $1 \leq (xL + xH \times 256) \leq 2047$  ( $0 \leq xL \leq 255, 0 \leq xH \leq 7$ )  
 $1 \leq (yL + yH \times 256) \leq 1662$  ( $0 \leq yL \leq 255, 0 \leq yH \leq 6$ ) [when **by** = 1]  
 $1 \leq (yL + yH \times 256) \leq 831$  ( $0 \leq yL \leq 255, 0 \leq yH \leq 3$ ) [when **by** = 2]  
 $0 \leq d \leq 255$   
 $k = (\text{int}((xL + xH \times 256) + 7) / 8) \times (yL + yH \times 256)$

- [Description] • Stores the graphics data (raster format) in the print buffer.  
 • The graphics data is enlarged by **bx** and **by** in the horizontal and vertical directions.

<b>bx, by</b>	Vertical direction	Horizontal direction
1	203 dpi	203 dpi
2	203/2 dpi	203/2 dpi

- **a** specifies the data format of the stored data.

<b>a</b>	Data format
48	Monochrome (digital)

- **c** specifies the color for the stored data.

<b>c</b>	Stored data color
49	Color 1

- **xL, xH** specify the number of dots in the horizontal direction as  $(xL + xH \times 256)$ .  
 • **yL, yH** specify the number of dots in the vertical direction as  $(yL + yH \times 256)$ .  
 • **d** specifies the stored data (raster format).

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## GS ( k *pL* *pH* *cn* *fn* [*parameters*]

[Name] Set up and print symbol

[Description] • Processes the data for symbols.

- *pL*, *pH* specify ( $pL + pH \times 256$ ) as the number of bytes after *pH* (*cn*, *fn*, and [*parameters*]).
- *cn* specifies the type of symbol.
- *fn* specifies the function.
- [*parameters*] specify the process of each function.

<i>cn</i>	Type of symbol
48	PDF417 (two-dimensional codes)
49	QR Code (two-dimensional codes)
50	MaxiCode (two-dimensional codes)
51	Two-dimensional GS1 DataBar (GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional, GS1 DataBar Expanded Stacked)
52	Composite Symbology (two-dimensional codes)

<i>cn</i>	<i>fn</i>	Format	Function no.	Function name
48	65	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>n</i></b>	065	PDF417: Set the number of columns in the data region.
	66	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>n</i></b>	066	PDF417: Set the number of rows.
	67	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>n</i></b>	067	PDF417: Set the width of the module.
	68	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>n</i></b>	068	PDF417: Set the row height.
	69	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>m</i> <i>n</i></b>	069	PDF417: Set the error correction level.
	70	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>m</i></b>	070	PDF417: Select the options.
	80	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>m</i> <i>d1...dk</i></b>	080	PDF417: Store the data in the symbol storage area.
	81	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>m</i></b>	081	PDF417: Print the symbol data in the symbol storage area.
49	82	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>m</i></b>	082	PDF417: Transmit the size information of the symbol data in the symbol storage area.
	65	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>n1</i> <i>n2</i></b>	165	QR Code: Select the model.
	67	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>n</i></b>	167	QR Code: Set the size of module.
	69	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>n</i></b>	169	QR Code: Select the error correction level.
	80	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>m</i> <i>d1...dk</i></b>	180	QR Code: Store the data into the symbol storage area.
	81	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>m</i></b>	181	QR Code: Print the symbol data in the symbol storage area.
	82	<b>GS ( k <i>pL</i> <i>pH</i> <i>cn</i> <i>fn</i> <i>m</i></b>	182	QR Code: Transmit the size information of the symbol data in the symbol storage area.

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<b>cn</b>	<b>fn</b>	<b>Format</b>	<b>Function no.</b>	<b>Function name</b>
50	65	<b>GS ( k pL pH cn fn n</b>	265	MaxiCode: Select mode
	80	<b>GS ( k pL pH cn fn m d1...dk</b>	280	MaxiCode: Store
	81	<b>GS ( k pL pH cn fn m</b>	281	MaxiCode: Print data in the symbol storage area
	82	<b>GS ( k pL pH cn fn m</b>	282	MaxiCode: Transmit size information of data in the symbol storage area
51	67	<b>GS ( k pL pH cn fn n</b>	367	2-dimensional GS1 DataBar: Set module width
	71	<b>GS ( k pL pH cn fn nL nH</b>	371	2-dimensional GS1 DataBar: Set the maximum width of GS1 DataBar Expanded Stacked
	80	<b>GS ( k pL pH cn fn m n d1...dk</b>	380	2-dimensional GS1 DataBar: Store data in the symbol storage area
	81	<b>GS ( k pL pH cn fn m</b>	381	2-dimensional GS1 DataBar: Print data in the symbol storage area
	82	<b>GS ( k pL pH cn fn m</b>	382	2-dimensional GS1 DataBar: Transmit size information of data in the symbol storage area
52	67	<b>GS ( k pL pH cn fn n</b>	467	Composite Symbology: Set module width
	71	<b>GS ( k pL pH cn fn nL nH</b>	471	Composite Symbology: Set the maximum width of GS1 DataBar Expanded Stacked
	72	<b>GS ( k pL pH cn fn n</b>	472	Composite Symbology: Select HRI character font
	80	<b>GS ( k pL pH cn fn m a b d1...dk</b>	480	Composite Symbology: Store data in the symbol storage area
	81	<b>GS ( k pL pH cn fn m</b>	481	Composite Symbology: Print data in the symbol storage area
	82	<b>GS ( k pL pH cn fn m</b>	482	Composite Symbology: Transmit size information of symbol data in the symbol storage area

- "Symbol data" means the data received with <Function 080, 180, 280, 380, or 480> before encoding.
  - "Symbol storage area" means the area where the data received with <Function 080, 180, 280, 380, or 480> before encoding is stored.
- [Notes]
- When <Function 082, 182, 282, 382, or 482> is transmitted, do not transmit subsequent data until the status is received.
  - PDF417 (**cn** = 48) is supported by the ANK model.

[Reference] APPENDIX G: NOTES ON PRINTING 2-DIMENSIONAL SYMBOLS, APPENDIX H: NOTES ON SCANNING THE PRINT RESULT ON THE RECEIPT

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# Confidential

## <Function 065> **GS ( k pL pH cn fn n (cn = 48, fn = 65)**

---

[Name]	PDF417: Set the number of columns in the data region								
[Format]	ASCII	GS	(	k	pL	pH	cn	fn	n
	Hex	1D	28	6B	pL	pH	cn	fn	n
	Decimal	29	40	107	pL	pH	cn	fn	n
[Range]	$(pL + pH \times 256) = 3$ ( $pL = 3, pH = 0$ )								
	$cn = 48$								
	$fn = 65$								
	$0 \leq n \leq 30$								
[Default]	$n = 0$								
[Description]	<ul style="list-style-type: none"> <li>• Sets the number of columns in the data region for PDF417.               <ul style="list-style-type: none"> <li>• When <math>n = 0</math>, specifies automatic processing. In this case, the number of columns in the data region is calculated from the number of codewords or the range of the print area.</li> <li>• When <math>n \neq 0</math>, sets the number of columns in the data region to <math>n</math> codewords:</li> </ul> </li> </ul>								
[Notes]	<ul style="list-style-type: none"> <li>• The following data is not included in the number of columns.               <ul style="list-style-type: none"> <li>• Start pattern and stop pattern</li> <li>• Left-row indicator codewords and right-row indicator codewords</li> </ul> </li> </ul>								

## <Function 066> **GS ( k pL pH cn fn n (cn = 48, fn = 66)**

---

[Name]	PDF417: Set the number of rows								
[Format]	ASCII	GS	(	k	pL	pH	cn	fn	n
	Hex	1D	28	6B	pL	pH	cn	fn	n
	Decimal	29	40	107	pL	pH	cn	fn	n
[Range]	$(pL + pH \times 256) = 3$ ( $pL = 3, pH = 0$ )								
	$cn = 48$								
	$fn = 66$								
	$n = 0, 3 \leq n \leq 90$								
[Default]	$n = 0$								
[Description]	<ul style="list-style-type: none"> <li>• Sets the number of rows for PDF417.               <ul style="list-style-type: none"> <li>• When <math>n = 0</math>, specifies automatic processing. In this case, the number of rows in the data region is calculated from the number of codewords or the range of the print area.</li> <li>• When <math>n \neq 0</math>, sets the number of rows to <math>n</math> rows.</li> </ul> </li> </ul>								

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<Function 067> **GS ( k pL pH cn fn n (cn = 48, fn = 67)**

---

[Name] PDF417: Set the width of the module

[Format] ASCII GS ( k pL pH cn fn n  
 Hex 1D 28 6B pL pH cn fn n  
 Decimal 29 40 107 pL pH cn fn n

[Range]  $(pL + pH \times 256) = 3$  (pL = 3, pH = 0)  
**cn = 48**  
**fn = 67**  
 $2 \leq n \leq 8$

[Default] **n = 3**

[Description] • Sets the width of the module for PDF417 to **n** dots.

<Function 068> **GS ( k pL pH cn fn n (cn = 48, fn = 68)**

---

[Name] PDF417: Set the row height

[Format] ASCII GS ( k pL pH cn fn n  
 Hex 1D 28 6B pL pH cn fn n  
 Decimal 29 40 107 pL pH cn fn n

[Range]  $(pL + pH \times 256) = 3$  (pL = 3, pH = 0)  
**cn = 48**  
**fn = 68**  
 $2 \leq n \leq 8$

[Default] **n = 3**

[Description] • Sets the row height for PDF417 to [**n** × (the width of the module)].

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<Function 069> **GS ( k pL pH cn fn m n (cn = 48, fn = 69)**

[Name] PDF417: Set the error correction level  
 [Format] ASCII GS ( k pL pH cn fn m n  
 Hex 1D 28 6B pL pH cn fn m n  
 Decimal 29 40 107 pL pH cn fn m n  
 [Range]  $(pL + pH \times 256) = 4$  ( $pL = 4, pH = 0$ )  
**cn = 48**  
**fn = 69**  
**m = 48, 49**  
 $48 \leq n \leq 56$  [when **m = 48**]  
 $1 \leq n \leq 40$  [when **m = 49**]  
 [Default] **m = 49, n = 1**  
 [Description] • Sets the error correction level for PDF417.

- When **m = 48**, the error correction level is set by the “Level Setting” and the error correction level set by “Ratio Setting” is canceled. The number of error correction codewords are as follows:

n	Function	Number of error correction codewords
48	Selects error correction level 0.	2
49	Selects error correction level 1.	4
50	Selects error correction level 2.	8
51	Selects error correction level 3.	16
52	Selects error correction level 4.	32
53	Selects error correction level 5.	64
54	Selects error correction level 6.	128
55	Selects error correction level 7.	256
56	Selects error correction level 8.	512

- When **m = 49**, the error correction level is set by the “Ratio Setting” to the level indicated by the number for encoded data, and the error correction level set by the “Level Setting” is canceled. The rate is set to  $[n \times 10\%]$ .

The error correction levels in the following table are determined by the calculation [Data codeword  $\times n \times 0.1 = (A)$ ] (Fractions of 0.5 and over are rounded up, and others are truncated.)

Result (A)	Use the error correction level	Number of error correction codeword
0 to 3	Error correction level 1	4
4 to 10	Error correction level 2	8
11 to 20	Error correction level 3	16
21 to 45	Error correction level 4	32
46 to 100	Error correction level 5	64
101 to 200	Error correction level 6	128
201 to 400	Error correction level 7	256
401 or more	Error correction level 8	512

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<Function 070> **GS ( k pL pH cn fn m (cn = 48, fn = 70)**

[Name] PDF417: Select the options

[Format] ASCII GS ( k pL pH cn fn m  
 Hex 1D 28 6B pL pH cn fn m  
 Decimal 29 40 107 pL pH cn fn m

[Range]  $(pL + pH \times 256) = 3$  ( $pL = 3, pH = 0$ )  
**cn = 48**  
**fn = 70**  
**m = 0, 1**

[Default] **m = 0**

[Description] • Selects the options for PDF417.

m	Function
0	Selects the standard PDF417.
1	Selects the truncated PDF417.

<Function 080> **GS ( k pL pH cn fn m d1...dk (cn = 48, fn = 80)**

[Name] PDF417: Store the data in the symbol storage area

[Format] ASCII GS ( k pL pH cn fn m d1...dk  
 Hex 1D 28 6B pL pH cn fn m d1...dk  
 Decimal 29 40 107 pL pH cn fn m d1...dk

[Range]  $4 \leq (pL + pH \times 256) \leq 65535$  ( $0 \leq pL \leq 255, 0 \leq pH \leq 255$ )  
**cn = 48**  
**fn = 80**  
**m = 48**  
 $0 \leq d \leq 255$   
**k = (pL + pH × 256) – 3**

[Description] • Stores the PDF417 symbol data (**d1...dk**) in the symbol storage area.

<Function 081> **GS ( k pL pH cn fn m (cn = 48, fn = 81)**

[Name] PDF417: Print the symbol data in the symbol storage area

[Format] ASCII GS ( k pL pH cn fn m  
 Hex 1D 28 6B pL pH cn fn m  
 Decimal 29 40 107 pL pH cn fn m

[Range]  $(pL + pH \times 256) = 3$  ( $pL = 3, pH = 0$ )  
**cn = 48**  
**fn = 81**  
**m = 48**

[Description] • Encodes and prints the PDF417 symbol data in the symbol storage area with **GS ( k** <Function 080>.

[Notes] • User must secure the quiet zone (left, right, upward, and downward space areas defined by the PDF417 symbol specifications) for PDF417 printing.  
 • In standard mode, symbols higher than 831 dots cannot be printed with this printer.

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## <Function 082> **GS ( k *pL* *pH* *cn* *fn* *m* ( *cn* = 48, *fn* = 82)**

- [Name] PDF417: Transmit the size information of the symbol data in the symbol storage area
- [Format] ASCII GS ( k *pL* *pH* *cn* *fn* *m*  
 Hex 1D 28 6B *pL* *pH* *cn* *fn* *m*  
 Decimal 29 40 107 *pL* *pH* *cn* *fn* *m*
- [Range] ( $pL + pH \times 256$ ) = 3 ( $pL = 3, pH = 0$ )  
*cn* = 48  
*fn* = 82  
*m* = 48
- [Description] • Transmits the size information for the encoded PDF417 symbol data in the symbol storage area with **GS ( k <Function 080>**.
- [Notes] • This function does not print.  
 • The size information does not include the quiet zone (left, right, upward, and downward space areas defined by the PDF417 symbol specifications).

## <Function 165> **GS ( k *pL* *pH* *cn* *fn* *n1* *n2* ( *cn* = 49, *fn* = 65)**

- [Name] QR Code: Select the model
- [Format] ASCII GS ( k *pL* *pH* *cn* *fn* *n1* *n2*  
 Hex 1D 28 6B *pL* *pH* *cn* *fn* *n1* *n2*  
 Decimal 29 40 107 *pL* *pH* *cn* *fn* *n1* *n2*
- [Range] ( $pL + pH \times 256$ ) = 4 ( $pL = 4, pH = 0$ )  
*cn* = 49  
*fn* = 65  
*n1* = 49, 50  
*n2* = 0
- [Default] *n1* = 50, *n2* = 0
- [Description] • Selects the model for QR Code.

<i>n1</i>	Function
49	Selects model 1 conversion processing.
50	Selects model 2 conversion processing.

## <Function 167> **GS ( k *pL* *pH* *cn* *fn* *n* ( *cn* = 49, *fn* = 67)**

- [Name] QR Code: Set the size of module
- [Format] ASCII GS ( k *pL* *pH* *cn* *fn* *n*  
 Hex 1D 28 6B *pL* *pH* *cn* *fn* *n*  
 Decimal 29 40 107 *pL* *pH* *cn* *fn* *n*
- [Range] ( $pL + pH \times 256$ ) = 3 ( $pL = 3, pH = 0$ )  
*cn* = 49  
*fn* = 67  
 $1 \leq n \leq 16$
- [Default] *n* = 3
- [Description] • Sets the size of the module for QR Code to *n* dots.

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## <Function 169> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $n$ ( $cn = 49$ , $fn = 69$ )**

- [Name] QR Code: Select the error correction level
- [Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $n$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $n$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $n$
- [Range]  $(\rho_L + \rho_H \times 256) = 3$  ( $\rho_L = 3$ ,  $\rho_H = 0$ )  
 $cn = 49$   
 $fn = 69$   
 $48 \leq n \leq 51$
- [Default]  $n = 48$
- [Description] • Selects the error correction level for QR Code.

$n$	Function	Reference: Approx. figure of recovery
48	Selects error correction level L.	7 %
49	Selects error correction level M.	15 %
50	Selects error correction level Q.	25 %
51	Selects error correction level H.	30 %

## <Function 180> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $m$ $d1...dk$ ( $cn = 49$ , $fn = 80$ )**

- [Name] QR Code: Store the data in the symbol storage area
- [Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   $d1...dk$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   $d1...dk$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   $d1...dk$
- [Range]  $4 \leq (\rho_L + \rho_H \times 256) \leq 7092$  ( $0 \leq \rho_L \leq 255$ ,  $0 \leq \rho_H \leq 27$ )  
 $cn = 49$   
 $fn = 80$   
 $m = 48$   
 $0 \leq d \leq 255$   
 $k = (\rho_L + \rho_H \times 256) - 3$
- [Description] • Stores the QR Code symbol data ( $d1...dk$ ) into the symbol storage area.

## <Function 181> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $m$ ( $cn = 49$ , $fn = 81$ )**

- [Name] QR Code: Print the symbol data in the symbol storage area
- [Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$
- [Range]  $(\rho_L + \rho_H \times 256) = 3$  ( $\rho_L = 3$ ,  $\rho_H = 0$ )  
 $cn = 49$   
 $fn = 81$   
 $m = 48$
- [Description] • Encodes and prints the QR Code symbol data in the symbol storage area with **GS ( k** <Function 180>.
- [Note] • User must secure the quiet zone (left, right, upward, and downward space areas defined by the QR Code symbol specifications) for QR Code printing.

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## <Function 182> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $m$ ( $cn = 49$ , $fn = 82$ )**

- [Name] QR Code: Transmit the size information of the symbol data in the symbol storage area
- [Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$
- [Range]  $(\rho_L + \rho_H \times 256) = 3$  ( $\rho_L = 3$ ,  $\rho_H = 0$ )  
 $cn = 49$   
 $fn = 82$   
 $m = 48$
- [Description] • Transmits the size information for the encoded QR Code symbol data in the symbol storage area with **GS ( k <Function 180>**.
- [Notes] • This function does not print data.  
 • The size information does not include the quiet zone (left, right, upward, and downward space areas defined by the QR Code symbol specifications).

## <Function 265> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $n$ ( $cn = 50$ , $fn = 65$ )**

- [Name] MaxiCode: Select mode
- [Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$
- [Range]  $(\rho_L + \rho_H \times 256) = 3$  ( $\rho_L = 3$ ,  $\rho_H = 0$ )  
 $cn = 50$   
 $fn = 65$   
 $50 \leq n \leq 54$
- [Default]  $n = 50$
- [Description] • Specifies a mode for MaxiCode.

$n$	Function
50	Executes conversion mode 2.
51	Executes conversion mode 3.
52	Executes conversion mode 4.
53	Executes conversion mode 5.
54	Executes conversion mode 6.

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## <Function 280> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $m$ $d1...dk$ ( $cn = 50$ , $fn = 80$ )**

- [Name] MaxiCode: Store data in the symbol storage area
- [Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   $d1...dk$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   $d1...dk$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   $d1...dk$
- [Range]  $4 \leq (\rho_L + \rho_H \times 256) \leq 141$  ( $4 \leq \rho_L \leq 141$ ,  $\rho_H = 0$ )  
 $cn = 50$   
 $fn = 80$   
 $m = 48$   
 $0 \leq d \leq 255$   
 $k = (\rho_L + \rho_H \times 256) - 3$
- [Description] • Stores symbol data ( $d1...dk$ ) in MaxiCode in the symbol storage area

## <Function 281> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $m$ ( $cn = 50$ , $fn = 81$ )**

- [Name] MaxiCode: Print symbol data in the symbol storage area
- [Code] ASCII ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$
- [Range]  $4 \leq (\rho_L + \rho_H \times 256) \leq 3$  ( $\rho_L = 3$ ,  $\rho_H = 0$ )  
 $cn = 50$   
 $fn = 81$   
 $m = 48$
- [Description] • Encodes and prints the symbol data stored by **GS ( K <Function 280>** in the symbol storage area.
- [Notes] • The user must secure the quiet zones (the space at the top, bottom, right, and left of the symbols, which is specified by the MaxiCode standard).

## <Function 282> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $m$ ( $cn = 50$ , $fn = 82$ )**

- [Name] MaxiCode: Transmit size information of symbol data in the symbol storage area
- [Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$
- [Range]  $4 \leq (\rho_L + \rho_H \times 256) = 3$  ( $\rho_L = 3$ ,  $\rho_H = 0$ )  
 $cn = 50$   
 $fn = 82$   
 $m = 48$
- [Description] • Transmits size information for printing the symbol data stored by **GS ( K <Function 280>** in the symbol storage area.
- [Notes] • This function does not print.  
 • The size information excludes the quiet zones (the space at the top, bottom, right, and left of the symbols, which is specified by the MaxiCode standard).

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## <Function 367> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $n$ ( $cn = 51$ , $fn = 67$ )**

[Name] 2-dimensional GS1 DataBar: Set the module width

[Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $n$   
Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $n$   
Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $n$

[Range] ( $\rho_L + \rho_H \times 256$ ) = 3 ( $\rho_L = 3$ ,  $\rho_H = 0$ )  
 $cn = 51$   
 $fn = 67$   
 $2 \leq n \leq 8$

[Default]  $n = 2$

[Description] • Sets the width of one module of 2-dimensional GS1 DataBar to  $n$  dots.

## <Function 371> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $nL$ $nH$ ( $cn = 51$ , $fn = 71$ )**

[Name] Set the maximum width of GS1 DataBar: 2-dimensional GS1 DataBar Expanded Stacked

[Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $nL$   $nH$   
Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $nL$   $nH$   
Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $nL$   $nH$

[Range] ( $\rho_L + \rho_H \times 256$ ) = 4 ( $\rho_L = 4$ ,  $\rho_H = 0$ )  
 $cn = 51$   
 $fn = 71$   
 $106 \leq (nL + nH \times 256) \leq 3952$ , ( $nL + nH \times 256$ ) = 0 ( $0 \leq nL \leq 255$ ,  $0 \leq nH \leq 15$ )

[Default] ( $nL + nH \times 256$ ) = 160 ( $nL = 160$ ,  $nH = 0$ )

[Description] • Sets the maximum width of GS1 DataBar Expanded Stacked (2-dimensional GS1 DataBar) to ( $nL + nH \times 256$ ) dots.

## <Function 380> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $m$ $n$ $d1...dk$ ( $cn = 51$ , $fn = 80$ )**

[Name] 2-dimensional GS1 DataBar: Store data in the symbol storage area

[Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   $n$   $d1...dk$   
Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   $n$   $d1...dk$   
Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   $n$   $d1...dk$

[Range]  $6 \leq (\rho_L + \rho_H \times 256) \leq 259$  ( $0 \leq \rho_L \leq 255$ ,  $\rho_H = 0, 1$ )  
 $cn = 51$   
 $fn = 80$   
 $m = 48$   
 $n = 72, 73, 76$   
 $0 \leq d \leq 255$   
 $k = (\rho_L + \rho_H \times 256) - 4$

[Description] • Stores symbol data ( $d1...dk$ ) in 2-dimensional GS1 DataBar in the symbol storage area

$n$	Types of 2-dimensional GS1 DataBar
72	GS1 DataBar Stacked
73	GS1 DataBar Stacked Omnidirectional
76	GS1 DataBar Expanded Stacked

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## <Function 381> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $m$ ( $cn = 51$ , $fn = 81$ )**

[Name]	2-dimensional GS1 DataBar: Print data in the symbol storage area								
[Format]	ASCII	GS	(	k	$\rho_L$	$\rho_H$	$cn$	$fn$	$m$
	Hex	1D	28	6B	$\rho_L$	$\rho_H$	$cn$	$fn$	$m$
	Decimal	29	40	107	$\rho_L$	$\rho_H$	$cn$	$fn$	$m$
[Range]	$(\rho_L + \rho_H \times 256) \leq 3$ ( $\rho_L = 3$ , $\rho_H = 0$ ) $cn = 51$ $fn = 81$ $m = 48$								
[Description]	<ul style="list-style-type: none"> <li>Encodes and prints the symbol data stored by <b>GS ( k</b> &lt;Function 380&gt; in the symbol storage area.</li> </ul>								
[Notes]	<ul style="list-style-type: none"> <li>The user must secure the quiet zones (the space at the top, bottom, right, and left of the symbols, which is specified by the 2-dimensional GS1 DataBar standard).</li> <li>In standard mode, if the symbol size exceeds the print area, feeds the paper as much as the symbol's height, without printing the symbol.</li> </ul>								

## <Function 382> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $m$ ( $cn = 51$ , $fn = 82$ )**

[Name]	2-dimensional GS1 DataBar: Transmit size information of the symbol data in the symbol storage area								
[Format]	ASCII	GS	(	k	$\rho_L$	$\rho_H$	$cn$	$fn$	$m$
	Hex	1D	28	6B	$\rho_L$	$\rho_H$	$cn$	$fn$	$m$
	Decimal	29	40	107	$\rho_L$	$\rho_H$	$cn$	$fn$	$m$
[Range]	$4 \leq (\rho_L + \rho_H \times 256) = 3$ ( $\rho_L = 3$ , $\rho_H = 0$ ) $cn = 51$ $fn = 82$ $m = 48$								
[Description]	<ul style="list-style-type: none"> <li>Transmits the size information when printing the symbol data stored by <b>GS ( k</b> &lt;Function 380&gt; in the symbol storage area.</li> </ul>								
[Notes]	<ul style="list-style-type: none"> <li>Processing this function does not execute printing.</li> <li>The size information excludes the quiet zones (the space at the top, bottom, right, and left of the symbols, which is specified by the 2-dimensional GS1 DataBar standard).</li> </ul>								

## <Function 467> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $n$ ( $cn = 52$ , $fn = 67$ )**

[Name]	Composite Symbology: Set module width								
[Format]	ASCII	GS	(	k	$\rho_L$	$\rho_H$	$cn$	$fn$	$n$
	Hex	1D	28	6B	$\rho_L$	$\rho_H$	$cn$	$fn$	$n$
	Decimal	29	40	107	$\rho_L$	$\rho_H$	$cn$	$fn$	$n$
[Range]	$(\rho_L + \rho_H \times 256) = 3$ ( $\rho_L = 3$ , $\rho_H = 0$ ) $cn = 52$ $fn = 67$ $2 \leq n \leq 8$								
[Default]	$n = 2$								
[Description]	<ul style="list-style-type: none"> <li>Sets one module width of Composite Symbology to <math>n</math> dots.</li> </ul>								

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## <Function 471> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $nL$ $nH$ ( $cn = 52$ , $fn = 71$ )**

- [Name] Composite Symbology: Set the maximum width of GS1 DataBar Expanded Stacked
- [Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $nL$   $nH$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $nL$   $nH$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $nL$   $nH$
- [Range] ( $\rho_L + \rho_H \times 256$ ) = 4 ( $\rho_L = 4$ ,  $\rho_H = 0$ )  
 $cn = 52$   
 $fn = 71$   
 $106 \leq (nL + nH \times 256) \leq 3952$ , ( $nL + nH \times 256$ ) = 0 ( $0 \leq nL \leq 255$ ,  $0 \leq nH \leq 15$ )
- [Default] ( $nL + nH \times 256$ ) = 160 ( $nL = 160$ ,  $nH = 0$ )
- [Description] • Sets the maximum width of GS1 DataBar Expanded Stacked (the straight line element of Composite Symbology) to ( $nL + nH \times 256$ ).

## <Function 472> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $n$ ( $cn = 52$ , $fn = 72$ )**

- [Name] Composite Symbology: Select a font for HRI character
- [Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $n$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $n$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $n$
- [Range] ( $\rho_L + \rho_H \times 256$ ) = 3 ( $\rho_L = 3$ ,  $\rho_H = 0$ )  
 $cn = 52$   
 $fn = 72$   
 $0 \leq n \leq 2$ ,  $48 \leq n \leq 50$
- [Default]  $n = 0$
- [Description] • Selects whether or not to turn on/off, and selects a font for HRI character when printing Composite Symbology.

$n$	Function
0, 48	Does not turn HRI character on.
1, 49	Turns HRI character on. (Selects Font A.)
2, 50	Turns HRI character on. (Selects Font B.)

- [Notes] • HRI character is not turned on for the straight line element of the following, even if "Turn HRI character on" is selected.
- GS1 DataBar Stacked
  - GS1 DataBar Stacked Omnidirectional
  - GS1 DataBar Expanded Stacked

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<Function 480> **GS ( k pL pH cn fn m a b d1...dk (cn = 52, fn = 80)**

[Name] Composite Symbology: Store data in the symbol storage area

[Format] ASCII GS ( k pL pH cn fn m a b d1...dk  
 Hex 1D 28 6B pL pH cn fn m a b d1...dk  
 Decimal 29 40 107 pL pH cn fn m a b d1...dk

[Range]  $7 \leq (pL + pH \times 256) \leq 2366$  ( $0 \leq pL \leq 255, 0 \leq pH \leq 9$ ) [When a = 48]  
 $8 \leq (pL + pH \times 256) \leq 2366$  ( $0 \leq pL \leq 255, 0 \leq pH \leq 9$ ) [When a = 49]  
**cn = 52**  
**fn = 80**  
**m = 48**  
**a = 48, 49**  
 $65 \leq b \leq 67$  [When a = 48]  
**b = 65, 66** [When a = 49]  
 $0 \leq d \leq 255$   
**k = (pL + pH × 256) - 5**

- [Description] • Store symbol data (**d1...dk**) in Composite Symbology in the symbol storage area
- (When **a = 48**) **b** specifies the type of straight line element.

<b>b</b>	Type of straight line element
65	EAN8
66	EAN13
67	UPC-A
68	UPC-E (6-digit version (0 excluded))
69	UPC-E (11-digit version (0 included))
70	GS1 DataBar Omnidirectional
71	GS1 DataBar Truncated
72	GS1 DataBar Stacked
73	GS1 DataBar Stacked Omnidirectional
74	GS1 DataBar Limited
75	GS1 DataBar Expanded
76	GS1 DataBar Expanded Stacked
77	GS1-128

- (When **a = 49**) **b** selects the type of 2-dimensional synthetic element.

<b>b</b>	2-dimensional synthetic element
65	CC-A, CC-B, or CC-C is automatically selected depending on the number of digits.
66	Fixed to CC-C.

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## <Function 481> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $m$ ( $cn = 52$ , $fn = 81$ )**

- [Name] Composite Symbology: Print symbol data in the symbol storage area
- [Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$
- [Range]  $(\rho_L + \rho_H \times 256) \leq 3$  ( $\rho_L = 3$ ,  $\rho_H = 0$ )  
 $cn = 52$   
 $fn = 81$   
 $m = 48$
- [Description] • Encodes and prints the symbol data stored by **GS ( k** <Function 480> in the symbol storage area.
- [Notes] • The user must secure the quiet zones (the space at the top, bottom, right, and left of the symbols, which is specified by the Composite Symbology standard).  
 • In standard mode, if the symbol size exceeds the print area, feeds the paper as much as the symbol's height, without printing the symbol.

## <Function 482> **GS ( k $\rho_L$ $\rho_H$ $cn$ $fn$ $m$ ( $cn = 52$ , $fn = 82$ )**

- [Name] Composite Symbology: Transmit size information of the symbol data in the symbol storage area
- [Format] ASCII GS ( k  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Hex 1D 28 6B  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$   
 Decimal 29 40 107  $\rho_L$   $\rho_H$   $cn$   $fn$   $m$
- [Range]  $(\rho_L + \rho_H \times 256) \leq 3$  ( $\rho_L = 3$ ,  $\rho_H = 0$ )  
 $cn = 52$   
 $fn = 82$   
 $m = 48$
- [Description] • Transmits size information of the symbol data stored by **GS ( k** <Function 480> in the symbol storage area.  
 • Detailed error information added to size information

Detailed information	Value
Ready for printing (No error)	"0000"
Symbol data of straight line element is incorrect.	"1001"
Symbol data for 2-dimensional synthetic element is incorrect.	"1002"
Number of digits of symbol data for 2-dimensional synthetic element is too large.	"1003"
(Reserved: matrix setting for 2-dimensional synthetic element is incorrect.)	"1004"
Combination of the straight line element type and 2-dimensional synthetic element type is incorrect.	"1005"
There is no symbol data that has a straight line element or 2-dimensional synthetic element in the symbol storage area.	"1006"
Data exists in the print buffer.	"2001"
Size of encoded symbols exceeds the print area.	"2002"

- [Notes] • Printing is excluded from the processing executed by this function.  
 • The size information excludes the quiet zones (the space at the top, bottom, right, and left of the symbols, which is specified by the Composite Symbology standard).

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## GS \* x y d1...dk

[Obsolete command]

[Name]	Define downloaded bit image			
[Format]	ASCII	GS	*	x y d1...dk
	Hex	1D	2A	x y d1...dk
	Decimal	29	42	x y d1...dk
[Range]	$1 \leq x \leq 255$ $1 \leq y \leq 48$ [where $1 \leq x \times y \leq 1536$ ] $0 \leq d \leq 255$ $k = x \times y \times 8$			
[Description]	<ul style="list-style-type: none"> <li>Defines the downloaded bit image in the downloaded graphic area.</li> <li><b>x</b> specifies the number of bytes in the horizontal direction as <b>x</b> bytes.</li> <li><b>y</b> specifies the number of bytes in the vertical direction as <b>y</b> bytes.</li> <li><b>d</b> specifies the defined data (column format).</li> </ul>			
[Note]	<ul style="list-style-type: none"> <li>A downloaded bit image and user-defined characters (<b>ESC &amp;</b>) cannot be defined simultaneously. When this command is executed, all user-defined characters are deleted.</li> </ul>			

## GS / m

[Obsolete command]

[Name]	Print downloaded bit image		
[Format]	ASCII	GS	/ m
	Hex	1D	2F m
	Decimal	29	47 m
[Range]	$0 \leq m \leq 3, 48 \leq m \leq 51$		
[Description]	<ul style="list-style-type: none"> <li>Prints downloaded bit image defined by <b>GS *</b> and using the mode specified by <b>m</b>.</li> </ul>		

<b>m</b>	Mode	Vertical direction	Horizontal direction
0, 48	Normal	203 dpi	203 dpi
1, 49	Double-width	203 dpi	203/2 dpi
2, 50	Double-height	203/2 dpi	203 dpi
3, 51	Quadruple	203/2 dpi	203/2 dpi

## GS :

[Name]	Start/end macro definition	
[Format]	ASCII	GS :
	Hex	1D 3A
	Decimal	29 58
[Description]	<ul style="list-style-type: none"> <li>Starts or ends macro definition.</li> </ul>	
[Note]	<ul style="list-style-type: none"> <li>The contents of the macro can be defined up to 2048 bytes</li> </ul>	

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**GS B *n***

- [Name] Turn white/black reverse print mode on/off
- [Format] ASCII GS B *n*  
 Hex 1D 42 *n*  
 Decimal 29 66 *n*
- [Range]  $0 \leq n \leq 255$
- [Default]  $n = 0$
- [Description] • Turns white/black reverse print mode on or off.  
 • When the LSB of *n* is 0, turns off white/black reverse mode.  
 • When the LSB of, *n* is 1, turns on white/black reverse mode.

**GS D *m fn [parameters]***

- [Name] Specify Windows BMP graphics data
- [Description] • Executes the processing regarding Windows BMP data specified by function code (*fn*).  
 • *m* specifies the fixed value that finalizes the function.  
 • *fn* specifies the function.  
 • [*parameters*] specify the process of each function.

<i>fn</i>	Code	Function no.	Function name
67	<b>GS D <i>m fn a kc1 kc2 b c d1...dk</i></b>	67	Define Windows BMP NV graphics data
83	<b>GS D <i>m fn a kc1 kc2 b c d1...dk</i></b>	83	Define Windows BMP download graphics data

- [Notes]
- Frequent write command executions by an NV memory write command may damage the NV memory. Therefore, it is recommended to limit writing data with the write commands into the NV memory to 10 times or fewer a day.
  - If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Be careful not to turn the power off or let the printer be reset via an interface while this command is being executed.
  - While processing this command, the printer may become BUSY while writing the data to the NV memory and stops receiving data. Therefore, be sure not to transmit data from the host computer while the printer is BUSY.

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<Function 67> **GS D m fn a kc1 kc2 b c d1...dk** (fn = 67)

[Name]	Define Windows BMP NV graphics data										
[Format]	ASCII	GS	D	<i>m</i>	<i>fn</i>	<i>a</i>	<i>kc1</i>	<i>kc2</i>	<i>b</i>	<i>c</i>	<i>d1...dk</i>
	Hex	1D	44	<i>m</i>	<i>fn</i>	<i>a</i>	<i>kc1</i>	<i>kc2</i>	<i>b</i>	<i>c</i>	<i>d1...dk</i>
	Decimal	29	68	<i>m</i>	<i>fn</i>	<i>a</i>	<i>kc1</i>	<i>kc2</i>	<i>b</i>	<i>c</i>	<i>d1...dk</i>

[Range] **m** = 48  
**fn** = 67  
**a** = 48  
 $32 \leq \mathbf{kc1} \leq 126$  ( $20\text{h} \leq \mathbf{kc1} \leq 7\text{Eh}$ )  
 $32 \leq \mathbf{kc2} \leq 126$  ( $20\text{h} \leq \mathbf{kc2} \leq 7\text{Eh}$ )  
**b** = 48  
**c** = 49  
 $0 \leq \mathbf{d} \leq 255$   
The value of *k* depends on the BMP file size.

[Default] None

[Description] • Converts Windows BMP data to the specified tone and defines NV graphics data (raster format) that corresponds to the key codes (**kc1**, **kc2**).  
• **b** specifies the tone of data to define.

<b>b</b>	Tone of data to define
48	Monochrome (digital)

• **c** specifies the color of data to define.

<b>c</b>	Color of data to define
49	Color 1

• **d** specifies the data to define (Windows BMP format).

[Notes] • If the number of the defined data exceeds the remaining capacity of the NV graphics memory, this function is ignored.  
• The number of items of NV graphics registered should be within 50 to shorten the execution time of this function. The execution time is 60 seconds or less when the number of items registered is within 50. The execution time for 100 items is 120 seconds or less.  
• The [data value (**k**) + control information data value (24 bytes)] area of the NV graphics data domain is used when this function is executed.  
• NV graphics and NV bit image (**FS q**) cannot be defined simultaneously. When this function is executed, all NV bit images are deleted.  
• When the logo emulation mode (customized value **a** = 127) is set to 180 dpi logo mode, NV graphics data is registered after being enlarged to the specified scaling factor. Scaling factors depend on the NV graphics data size, roll paper width (customized value **a** = 3), or setting value for column emulation mode (customized value **a** = 11). This function does not work when the NV graphics data size in the horizontal direction or vertical direction after enlargement is larger than the specified range. (See APPENDIX L for more details.)

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<Function 83> **GS D m fn a kc1 kc2 b c d1...dk** (fn = 83)

[Name]	Define Windows BMP download graphics data										
[Format]	ASCII	GS	D	<i>m</i>	<i>fn</i>	<i>a</i>	<i>kc1</i>	<i>kc2</i>	<i>b</i>	<i>c</i>	<i>d1...dk</i>
	Hex	1D	44	<i>m</i>	<i>fn</i>	<i>a</i>	<i>kc1</i>	<i>kc2</i>	<i>b</i>	<i>c</i>	<i>d1...dk</i>
	Decimal	29	68	<i>m</i>	<i>fn</i>	<i>a</i>	<i>kc1</i>	<i>kc2</i>	<i>b</i>	<i>c</i>	<i>d1...dk</i>

[Range] **m** = 48  
**fn** = 83  
**a** = 48  
 $32 \leq \mathbf{kc1} \leq 126$  ( $20h \leq \mathbf{kc1} \leq 7Eh$ )  
 $32 \leq \mathbf{kc2} \leq 126$  ( $20h \leq \mathbf{kc2} \leq 7Eh$ )  
**b** = 48  
**c** = 49  
 $0 \leq \mathbf{d} \leq 255$   
 The value of *k* depends on the BMP file size.

[Default] None

[Description] • Converts Windows BMP data to the specified tone and defines download graphics data (raster format) that corresponds to the key codes (**kc1**, **kc2**).  
 • **b** specifies the tone of the data to define.

<b>b</b>	Tone of data to define
48	Monochrome (digital)

• **c** specifies the color of data to define.

<b>c</b>	Color of data to define
49	Color 1

[Notes] • **d** specifies the data to define (Windows BMP format).  
 • If the number of the defined data exceeds the remaining capacity of the download graphics memory, this function is ignored.  
 • The [data value (**k**) + control information data value (16 bytes)] area of the download graphics data domain is used when this function is executed.  
 • When the logo emulation mode (customized value **a** = 127) is set to 180 dpi logo mode, NV graphics data is registered after being enlarged to the specified scaling factor. Scaling factors depend on the NV graphics data size, roll paper width (customized value **a** = 3), or setting value for column emulation mode (customized value **a** = 11). This function does not work when the NV graphics data size in the horizontal direction or vertical direction after enlargement is larger than the specified range. (See APPENDIX L for more details.)

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## GS H *n*

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

<i>n</i>	Print position
0, 48	Not printed.
1, 49	Above the bar code.
2, 50	Below the bar code.
3, 51	Both above and below the bar code.

## GS I *n*

- [Name] Transmit printer ID
- [Format] ASCII GS I *n*  
 Hex 1D 49 *n*  
 Decimal 29 73 *n*
- [Range]  $n = 1, 2, 49, 50$  [the printer ID]  
 $n = 35$  [printer information A]  
 $65 \leq n \leq 69$  [printer information B]
- [Description] • Transmits the printer ID or the information of the printer specified.  
 • The printer IDs that can be specified are as follows:

<i>n</i>	Type of printer ID	ID
1, 49	Printer model ID	Hexadecimal: 63 / Decimal: 99
2, 50	Type ID	See table [Type ID].

### [Type ID]

Bit	Off/On	Hex	Decimal	Contents
0	Off	00	0	Multi-byte code characters not supported.
	On	01	1	Multi-byte code characters supported.
1	On	02	2	Autocutter Installed. (Fixed)
2,3	--	--	--	Not used.
4	Off	00	0	Fixed.
5	--	--	--	Reserved.
6	--	--	--	Not used.
7	Off	00	0	Fixed.

- The printer information A that can be specified is as follows:

<i>n</i>	Type of printer information A	Transmission data (printer information)
35	Column emulation mode	See table [Transmission data 1].

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[Transmission data 1]

Transmission data	Hex	Decimal	Data amount
(1) Header	3DH	61	1 byte
(2) Identifier	23H	35	1 byte
(3) Printer information A	See table [Transmission data 2].	See table [Transmission data 2].	1 byte
(4) NUL	00H	0	1 byte

[Transmission data 2]

Column emulation mode (customized value, <Function 5> <b>GS ( E &lt;a = 11&gt;</b> )	Transmission data of this command
0 (normal mode)	"0"
1 (42 column mode)	"1"

- The printer information B that can be specified is as follows:

<i>n</i>	Type of printer information	Contents
65	Firmware version	Depends on firmware version.
66	Manufacturer	"EPSON"
67	Printer name	"TM-T20"
68	Serial number	Serial number
69	Type of mounted additional fonts	Japanese model: "KANJI JAPANESE"

[Note]

- When this command is transmitted, do not transmit subsequent data until the status is received.

## **GS L *nL nH***

[Name] Set left margin

[Format] ASCII GS L *nL nH*  
 Hex 1D 4C *nL nH*  
 Decimal 29 76 *nL nH*

[Range]  $0 \leq (nL + nH \times 256) \leq 65535$  ( $0 \leq nL \leq 255, 0 \leq nH \leq 255$ )

[Default]  $(nL + nH \times 256) = 0$  ( $nL = 0, nH = 0$ )

[Description] • In standard mode, sets the left margin to  $[(nL + nH \times 256) \times (\text{horizontal motion unit})]$ .

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## GS P x y

- [Name] Set horizontal and vertical motion units
- [Format] ASCII GS P x y  
 Hex 1D 50 x y  
 Decimal 29 80 x y
- [Range]  $0 \leq x \leq 255$   
 $0 \leq y \leq 255$
- [Default]  $x = 203, y = 406$  [other than the condition below]  
 $x = 180, y = 360$  [when "Column emulation: 42 column mode" is selected]
- [Description] • Sets the horizontal and vertical motion units to approximately  $25.4/x$  mm  $\{1/x''\}$  and approximately  $25.4/y$  mm  $\{1/y''\}$ , respectively.  
 • When  $x = 0$ , the default value of the horizontal motion unit is used.  
 • When  $y = 0$ , the default value of the vertical motion unit is used.

## <A> GS V m

## <B> GS V m n

- [Name] Select cut mode and cut paper
- [Format] <A> ASCII GS V m  
 Hex 1D 56 m  
 Decimal 29 86 m  
 <B> ASCII GS V m n  
 Hex 1D 56 m n  
 Decimal 29 86 m n
- [Range] <A>  $m = 0, 1, 48, 49$   
 <B>  $m = 65, 66, 0 \leq n \leq 255$
- [Description] • Executes paper cutting specified by  $m$ .

$m$		Function
<A>	0, 48 1, 49	Cuts paper.
<B>	65, 66	Feeds paper to (cutting position + [ $n \times$ (vertical motion unit)]) and cuts the paper.

- [Note] • This printer executes a partial cut (one point left uncut).

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## GS W nL nH

[Name]	Set print area width			
[Format]	ASCII	GS	W	nL nH
	Hex	1D	57	nL nH
	Decimal	29	87	nL nH
[Range]	$0 \leq (nL + nH \times 256) \leq 65535$ ( $0 \leq nL \leq 255, 0 \leq nH \leq 255$ )			
[Default]	$(nL + nH \times 256) = 576$ ( $nL = 64, nH = 2$ ) [When paper width is set to 80 mm] $(nL + nH \times 256) = 546$ ( $nL = 34, nH = 2$ ) [When paper width is set to 80 mm and "Column emulation: 42 column mode" is selected] $(nL + nH \times 256) = 420$ ( $nL = 164, nH = 1$ ) [When paper width is set to 58 mm] $(nL + nH \times 256) = 378$ ( $nL = 122, nH = 1$ ) [When paper width is set to 58 mm and "Column emulation: 42 column mode" is selected]			
[Description]	• In standard mode, sets the print area width to $[(nL + nH \times 256) \times (\text{horizontal motion unit})]$ .			

## GS \ nL nH

[Name]	Set relative vertical print position in page mode			
[Format]	ASCII	GS	\	nL nH
	Hex	1D	5C	nL nH
	Decimal	29	92	nL nH
[Range]	$-32768 \leq (nL + nH \times 256) \leq 32767$			
[Description]	• In page mode, moves the vertical print position to $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$ from the current position. • A positive number specifies downward movement, and a negative number specifies upward movement.			

## GS ^ r t m

[Name]	Execute macro			
[Format]	ASCII	GS	^	r t m
	Hex	1D	5E	r t m
	Decimal	29	94	r t m
[Range]	$1 \leq r \leq 255$ $0 \leq t \leq 255$ $m = 0, 1$			
[Description]	• Executes the macro defined with <b>GS</b> :			

m	Operation
0	Executes the macro <i>r</i> times continuously at an interval of $[t \times 100 \text{ ms}]$ .
1	After waiting for $[t \times 100 \text{ ms}]$ , flashes the LED indicator and waits for the Feed button to be pressed. After the button is pressed, executes the macro once. Then repeats the operation <i>r</i> times.

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## GS a n

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

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

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

[Default]  $n = 0$  [when memory switch [SW 1-3] is off.]  
 $n = 2$  [when memory switch [SW 1-3] is on.]

[Description] • Enables or disables basic ASB (Automatic Status Back).

(n) Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Drawer kick-out connector status disabled.
	On	01	1	Drawer kick-out connector status enabled.
1	Off	00	0	Online/offline status disabled.
	On	02	2	Online/offline status enabled.
2	Off	00	0	Error status disabled.
	On	04	4	Error status enabled.
3	Off	00	0	Roll paper sensor status disabled.
	On	08	8	Roll paper sensor status enabled.
4 to 7	Off	00	0	Reserved.

- While basic ASB is active, the selected enabled basic ASB status is transmitted whenever the status changes.

- The basic ASB status to be transmitted is the four bytes that follow:

- First byte (printer information)

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

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• Second byte (printer information)

Bit	Off/On	Hex	Decimal	Status
0 to 2	--	--	--	Reserved.
3	Off	00	0	No autocutter error.
	On	08	8	Autocutter error occurred.
4	Off	00	0	Fixed.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	No automatically recoverable error.
	On	40	64	Automatically recoverable error occurred.
7	Off	00	0	Fixed.

• Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status
0, 1	Off	00	0	Fixed
2, 3	Off	00	0	Roll paper end sensor (Paper sensor): paper present.
	On	0C	12	Roll paper end sensor (Paper sensor): paper not present.
4	Off	00	0	Fixed.
5, 6	--	--	--	Reserved.
7	Off	00	0	Fixed.

Bits 2 and 3: While the cover is open, this shows the state when the cover was still closed.

• Fourth byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Status
0 to 3	--	--	--	Reserved.
4	Off	00	0	Fixed.
5, 6	--	--	--	Reserved.
7	Off	00	0	Fixed.

[Reference] APPENDIX I: NOTES ON USING THE ASB STATUS

## GS b n

[Name] Turn smoothing mode on/off

[Format] ASCII GS b n  
Hex 1D 62 n  
Decimal 29 98 n

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

[Default]  $n = 0$

[Description] • Turns smoothing mode on or off.  
• When the LSB of  $n$  is 0, turns smoothing mode off.  
• When the LSB of  $n$  is 1, turns smoothing mode on.

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## GS f n

[Name]	Select font for HRI characters			
[Format]	ASCII	GS	f	n
	Hex	1D	66	n
	Decimal	29	102	n
[Range]	n = 0, 1, 48, 49			
[Default]	n = 0			
[Description]	<ul style="list-style-type: none"> <li>Selects a font for the HRI characters when printing a bar code.</li> </ul>			

n	Font for the HRI characters
0, 48	Character font A (12 × 24)
1, 49	Character font B (9 × 17)

## GS g 0 m nL nH

[Name]	Initialize maintenance counter						
[Format]	ASCII	GS	g	0	m	nL	nH
	Hex	1D	67	30	m	nL	nH
	Decimal	29	103	48	m	nL	nH
[Range]	m = 0						
	(nL + nH × 256) = 20, 21, 22, 50, 70 (nL = 20, 21, 22, 50, 70, nH = 0)						
[Description]	<ul style="list-style-type: none"> <li>Sets the resettable maintenance counter specified by (nL + nH × 256) to 0.</li> </ul>						

(nL + nH × 256)		Maintenance counter [Units]
Hex	Decimal	
14	20	Number of lines fed. [Lines]
15	21	Number of head energizations. [Times]
16	22	Number of lines fed (when the print head was replaced) [Lines]
32	50	Number of autocutter operations. [Times].
46	70	Duration of printer operation. [Hours].

[Notes]	<ul style="list-style-type: none"> <li>Frequent write command executions by an NV memory write command may damage the NV memory. Therefore, it is recommended to limit writing data with the write commands into the NV memory to 10 times or fewer a day.</li> <li>If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Do not turn the power off or do not reset the printer via an interface while this command is being executed.</li> <li>While processing this command, the printer may become BUSY while writing the data to the NV memory and stops receiving data. Therefore, do not transmit data from the host computer while the printer is BUSY.</li> </ul>
[Reference]	APPENDIX F: NOTES ON UPDATING THE MAINTENANCE COUNTER AND TURNING THE PRINTER'S POWER OFF

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## GS g 2 m nL nH

[Name] Transmit maintenance counter

[Format] ASCII GS g 2 m nL nH  
 Hex 1D 67 32 m nL nH  
 Decimal 29 103 50 m nL nH

[Range]  $m = 0$   
 $(nL + nH \times 256) = 20, 21, 22, 50, 70, 148, 149, 150, 178, 198$   
 $(nL = 20, 21, 22, 50, 70, 148, 149, 150, 178, 198, nH = 0)$

[Description] • Transmits the value of the maintenance counter specified by  $(nL + nH \times 256)$ .

$(nL + nH \times 256)$		Maintenance counter [Units]	Type of counter
Hex	Decimal		
14	20	Number of lines fed. [Lines]	Resettable (can be reset)
15	21	Number of head energizations. [Times]	
16	22	Number of lines fed (when the print head was replaced) [Lines]	
32	50	Number of autocutter operations. [Times].	
46	70	Duration of printer operation. [Hours].	
94	148	Number of lines fed. [Lines]	Cumulative
95	149	Number of head energizations. [Times]	
96	150	Number of lines fed (when the print head was replaced) [Lines]	
B2	178	Number of autocutter operations. [Times].	
C6	198	Duration of printer operation. [Hours].	

[Notes] • The maintenance counter values are measurements; therefore, their values will be affected by the timing of errors and how and when the power is turned off.  
 • When this command is transmitted, do not transmit subsequent data until the status is received.

[Reference] APPENDIX F: NOTES ON UPDATING THE MAINTENANCE COUNTER AND TURNING THE PRINTER'S POWER OFF

## GS h n

[Name] Set bar code height

[Format] ASCII GS h n  
 Hex 1D 68 n  
 Decimal 29 104 n

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

[Default]  $n = 162$

[Description] • Sets the height of the bar code to  $n$  dots.

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**<A> GS k m d1...dk NUL**

**<B> GS k m n d1...dn**

[Name] Print bar code

[Format] <A> ASCII GS k m d1...dk NUL  
 Hex 1D 6B m d1...dk 00  
 Decimal 29 107 m d1...dk 0  
 <B> ASCII GS k m n d1...dn  
 Hex 1D 6B m n d1...dn  
 Decimal 29 107 m n d1...dn

[Range] <A>  $0 \leq m \leq 6$  (For the range of **k** and **d**, see [Description].)  
 <B>  $65 \leq m \leq 78$  (For the range of **n** and **d**, see [Description].)

[Description] • Prints the bar code using the bar code system specified by **m**.  
 For <Function A>

<b>m</b>	Bar code system	Range of <b>k</b>	Range of <b>d</b>
0	UPC-A	<b>k</b> = 11, 12	$48 \leq d \leq 57$
1	UPC-E	$6 \leq k \leq 8$ <b>k</b> = 11, 12	$48 \leq d \leq 57$ [where <b>k</b> = 7,8,11,12, <b>d1</b> = 48]
2	JAN13 / EAN13	<b>k</b> = 12, 13	$48 \leq d \leq 57$
3	JAN8 / EAN8	<b>k</b> = 7, 8	$48 \leq d \leq 57$
4	CODE39	$1 \leq k$	$48 \leq d \leq 57, 65 \leq d \leq 90,$ <b>d</b> = 32, 36, 37, 42, 43, 45, 46, 47
5	ITF	$2 \leq k$ (even number)	$48 \leq d \leq 57$
6	CODABAR (NW-7)	$2 \leq k$	$48 \leq d \leq 57, 65 \leq d \leq 68,$ $97 \leq d \leq 100,$ <b>d</b> = 36, 43, 45, 46, 47, 58 [where $65 \leq d1 \leq 68, 65 \leq dk \leq 68,$ $97 \leq d1 \leq 100, 97 \leq dk \leq 100$ ]

- **k** of <Function A> indicates the number of bytes of bar code data.
- **d** specifies the bar code data.

For <Function B>

<i>m</i>	Bar code system	Range of <i>n</i>	Range of <i>d</i>
65	UPC-A	$n = 11, 12$	$48 \leq d \leq 57$
66	UPC-E	$6 \leq n \leq 8$ $n = 11, 12$	$48 \leq d \leq 57$ [where $k = 7, 8, 11, 12, d1 = 48$ ]
67	JAN13 / EAN13	$n = 12, 13$	$48 \leq d \leq 57$
68	JAN8 / EAN8	$n = 7, 8$	$48 \leq d \leq 57$
69	CODE39	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 90,$ $d = 32, 36, 37, 42, 43, 45, 46, 47$
70	ITF	$2 \leq n \leq 254$ (even number)	$48 \leq d \leq 57$
71	CODABAR (NW-7)	$2 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 68,$ $97 \leq d \leq 100,$ $d = 36, 43, 45, 46, 47, 58$ [where $65 \leq d1 \leq 68, 65 \leq dn \leq 68,$ $97 \leq d1 \leq 100, 97 \leq dn \leq 100$ ]
72	CODE93	$1 \leq n \leq 255$	$0 \leq d \leq 127$
73	CODE128	$2 \leq n \leq 255$	$0 \leq d \leq 127$ [where $d1 = 123, 65 \leq d2 \leq 67$ ]
74	GS1-128	$2 \leq n \leq 255$	$0 \leq d \leq 127$
75	GS1 DataBar Omnidirectional	$n = 13$	$48 \leq d \leq 57$
76	GS1 DataBar Truncated	$n = 13$	$48 \leq d \leq 57$
77	GS1 DataBar Limited	$n = 13$	$48 \leq d \leq 57$ [However, $48 \leq d1 \leq 49$ ]
78	GS1 DataBar Expanded	$2 \leq n \leq 255$	$32 \leq d \leq 34, 37 \leq d \leq 63, 65 \leq d \leq 90, d =$ $95, 97 \leq d \leq 122, d = 123$ [where $d1 = 40, 48 \leq d2 \leq 57, 48 \leq d3 \leq 57,$ or $48 \leq d1 \leq 57, 48 \leq d2 \leq 57$ ]

- *n* of <Function B> specifies the number of bytes of bar code data.
- *d* specifies the bar code data.

[Note]

- Users must secure the quiet zone (left or right side space area defined by the bar code standard) for bar code printing.

[Reference]

APPENDIX G: NOTES ON PRINTING 2-DIMENSIONAL SYMBOLS, APPENDIX H: NOTES ON SCANNING THE PRINT RESULT ON THE RECEIPT

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## GS r n

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

[Range] n = 1, 2, 49, 50

[Description] • Transmits the status.

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

• This printer transmits the following status.

• Paper sensor status (n = 1, 49)

Bit	Off/On	Hex	Decimal	Status
0, 1	Off	--	--	Reserved
2, 3	Off	00	0	Roll paper end sensor (Paper sensor): paper present.
	On	0C	12	Roll paper end sensor (Paper sensor): paper not present.
4	Off	00	0	Fixed.
5, 6	--	--	--	Reserved.
7	Off	00	0	Fixed.

Bits 2 and 3: While the cover is open, this shows the state when the cover was still closed (this command is not executed).

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

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	01	1	Drawer kick-out connector pin 3 is HIGH.
1 - 3	--	--	--	Reserved.
4	Off	00	0	Fixed.
5, 6	--	--	--	Reserved.
7	Off	00	0	Fixed.

[Note]

• When this command is transmitted, do not transmit subsequent data until this status is received.

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## GS w n

- [Name] Set bar code width
- [Format] ASCII GS w n  
 Hex 1D 77 n  
 Decimal 29 119 n
- [Range]  $2 \leq n \leq 6$
- [Default]  $n = 3$
- [Description] • Sets the horizontal size of the bar code.

n	Multi-level bar code	Binary-level bar code	
	Module width (mm)	Thin element width (mm)	Thick element width (mm)
2	0.250	0.250	0.625
3	0.375	0.375	1.000
4	0.500	0.500	1.250
5	0.625	0.625	1.625
6	0.750	0.750	2.000

- Multi-level bar codes are as follows:  
 UPC-A, UPC-E, JAN13 / EAN13, JAN8 / EAN8, CODE93, and CODE128,  
 GS1-128, GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Limited, GS1 DataBar Expanded
- Binary-level bar codes are as follows:  
 CODE39, ITF, and CODABAR

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## 6.4 Commands for Multi-byte Code Characters (for Japanese Model)

### FS ! *n*

[Name]	Select print mode(s) for Kanji characters			
[Format]	ASCII	FS	!	<i>n</i>
	Hex	1C	21	<i>n</i>
	Decimal	28	33	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	<i>n</i> = 0			
[Description]	<ul style="list-style-type: none"> <li>• Selects the character styles (double-height, double-width, and Kanji-underlined) together for multi-byte code character.</li> </ul>			

( <i>n</i> ) Bit	Off/On	Hex	Decimal	Function
0, 1	Off	00	0	Reserved.
2	Off	00	0	Double-width canceled.
	On	04	4	Double-width selected.
3	Off	00	0	Double-height canceled.
	On	08	8	Double-height selected.
4 - 6	Off	00	0	Reserved.
7	Off	00	0	Kanji-underline mode is turned off.
	On	80	128	Kanji-underline mode is turned on.

### FS &

[Name]	Select Kanji character mode		
[Format]	ASCII	FS	&
	Hex	1C	26
	Decimal	28	38
[Description]	<ul style="list-style-type: none"> <li>• Selects Kanji character mode.</li> </ul>		

### FS – *n*

[Name]	Turn underline mode on/off for Kanji characters			
[Format]	ASCII	FS	–	<i>n</i>
	Hex	1C	2D	<i>n</i>
	Decimal	28	45	<i>n</i>
[Range]	$0 \leq n \leq 2, 48 \leq n \leq 50$			
[Default]	<i>n</i> = 0			
[Description]	<ul style="list-style-type: none"> <li>• Turns on or off underline mode for multi-byte code character (Kanji-underline).</li> </ul>			

<i>n</i>	Function
0, 48	Turns off Kanji-underline mode.
1, 49	Turns on Kanji-underline mode, set at 1-dot width.
2, 50	Turns on Kanji-underline mode, set at 2-dot width.

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## FS .

[Name] Cancel Kanji character mode  
 [Format] ASCII FS .  
 Hex 1C 2E  
 Decimal 28 46  
 [Description] • Cancels Kanji character mode.

## FS 2 c1 c2 d1...dk

[Name] Define user-defined Kanji characters  
 [Format] ASCII FS 2 c1 c2 d1...dk  
 Hex 1C 32 c1 c2 d1...dk  
 Decimal 28 50 c1 c2 d1...dk  
 [Range] The ranges of **c1** and **c2** differ, depending on the models and the character code system used.

Model	Hexadecimal	
	<b>c1</b>	<b>c2</b>
Japanese (JIS code)	<b>c1 = 77</b>	$21 \leq \mathbf{c2} \leq 7E$
Japanese (SHIFT JIS code)	<b>c1 = EC</b>	$40 \leq \mathbf{c2} \leq 7E$ $80 \leq \mathbf{c2} \leq 9E$

$0 \leq \mathbf{d} \leq 255$   
 $\mathbf{k} = 72$

[Description] • Defines the user-defined Kanji character pattern (**d1...dk**) specified by the character codes (**c1** and **c2**).

## FS C n

[Name] Select Kanji character code system  
 [Format] ASCII FS C n  
 Hex 1C 43 n  
 Decimal 28 67 n  
 [Range]  $n = 0, 1, 48, 49$   
 [Default]  $n = 0$   
 [Description] • Selects a Kanji character code system for the Japanese model.

<b>n</b>	Kanji character code system
0, 48	JIS code
1, 49	SHIFT JIS code

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## FS S *n1 n2*

---

[Name]	Set Kanji character spacing				
[Format]	ASCII	FS	S	<i>n1</i>	<i>n2</i>
	Hex	1C	53	<i>n1</i>	<i>n2</i>
	Decimal	28	83	<i>n1</i>	<i>n2</i>
[Range]	$0 \leq n1 \leq 255$ $0 \leq n2 \leq 255$				
[Default]	<i>n1</i> = 0, <i>n2</i> = 0				
[Description]	<ul style="list-style-type: none"><li>• Sets the left-side character spacing of the multi-byte code character to [<i>n1</i> × (horizontal or vertical motion unit)]; sets the right-side character spacing of the multi-byte code character to [<i>n2</i> × (horizontal or vertical motion unit)].</li></ul>				
[Note]	<ul style="list-style-type: none"><li>• The maximum of the left- and the right-side character spacing is 31.91 mm {255/203"} respectively.</li></ul>				

## FS W *n*

---

[Name]	Turn quadruple-size mode on/off for Kanji characters			
[Format]	ASCII	FS	W	<i>n</i>
	Hex	1C	57	<i>n</i>
	Decimal	28	87	<i>n</i>
[Range]	$0 \leq n \leq 255$			
[Default]	<i>n</i> = 0			
[Description]	<ul style="list-style-type: none"><li>• Turns quadruple-size mode on or off for multi-byte code character.<ul style="list-style-type: none"><li>• When the LSB of <i>n</i> is 0, turns quadruple-size mode off.</li><li>• When the LSB of <i>n</i> is 1, turns quadruple-size mode on.</li></ul></li></ul>			

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## 6.5 Obsolete Commands

### ESC i

[Obsolete command]

**GS V**, which is the upward-compatible command replacing **ESC i**, is recommended to use, since **ESC i** is an obsolete command in the ESC/POS command system.

[Name] Partial cut (one point left uncut)

[Format] ASCII ESC i  
 Hex 1B 69  
 Decimal 27 105

[Description] • Executes a partial cut of the roll paper.

[Note] • This printer executes a partial cut (one point left uncut).

### ESC m

[Obsolete command]

**GS V**, which is the upward-compatible command replacing **ESC m**, is recommended to use, since **ESC m** is an obsolete command in the ESC/POS command system.

[Name] Partial cut (three points left uncut)

[Format] ASCII ESC m  
 Hex 1B 6D  
 Decimal 27 109

[Description] • Executes a partial cut of the roll paper.

[Note] • This printer executes a partial cut (one point left uncut).

### ESC u n

[Obsolete command]

**GS r**, which is the upward-compatible command replacing **ESC u**, is recommended to use, since **ESC u** is an obsolete command in the ESC/POS command system.

[Name] Transmit peripheral device status

[Format] ASCII ESC u n  
 Hex 1B 75 n  
 Decimal 27 117 n

[Range] n = 0, 48

[Description] • Transmits the peripheral device status as 1 byte of data, as follows.

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	01	1	Drawer kick-out connector pin 3 is HIGH.
1 - 3	--	--	--	Reserved.
4	Off	00	0	Fixed.
5, 6	--	--	--	Reserved.
7	Off	00	0	Fixed.

[Note] • When this command is transmitted, do not transmit subsequent data until the status is received.

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**ESC v**

[Obsolete command]

**GS r**, which is the upward-compatible command replacing **ESC v**, is recommended to use, since **ESC v** is an obsolete command in the ESC/POS command system.

[Name] Transmit paper sensor status

[Format] ASCII ESC v  
Hex 1B 76  
Decimal 27 118

[Description] • Transmits the status of paper sensor(s) as 1 byte of data, as follows:

Bit	Off/On	Hex	Decimal	Status
0, 1	Off	--	--	Fixed
2, 3	Off	00	0	Roll paper end sensor: paper present.
	On	0C	12	Roll paper end sensor: paper not present.
4	Off	00	0	Fixed.
5, 6	--	--	--	Reserved.
7	Off	00	0	Fixed.

Bits 2 and 3: While the cover is open, this shows the state when the cover was still closed. (This command is not executed.)

[Note] • When this command is transmitted, do not transmit subsequent data until the status is received.

**FS p n m**

[Obsolete command]

**GS ( L <Function 69>**, which is the upward-compatible command replacing **FS p**, is recommended to use, since **FS p** is an obsolete command in the ESC/POS command system.

[Name] Print NV bit image

[Format] ASCII FS p n m  
Hex 1C 70 n m  
Decimal 28 112 n m

[Range]  $1 \leq n \leq 255$   
 $0 \leq m \leq 3, 48 \leq m \leq 51$

[Description] • Prints NV bit image *n* using the process of **FS q** and using the mode specified by *m*.

<i>m</i>	Mode	Vertical direction	Horizontal direction
0, 48	Normal	203 dpi	203 dpi
1, 49	Double-width	203 dpi	203/2 dpi
2, 50	Double-height	203/2 dpi	203 dpi
3, 51	Quadruple	203/2 dpi	203/2 dpi

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

[Obsolete command]

**GS ( L <Function 67>**, which is the upward-compatible command replacing **FS q**, is recommended to use, since **FS q** is an obsolete command in the ESC/POS command system.

[Name] Define NV bit image

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

[Range]  $1 \leq n \leq 255$   
 $1 \leq (xL + xH \times 256) \leq 1023$  ( $0 \leq xL \leq 255, 0 \leq xH \leq 3$ )  
 $1 \leq (yL + yH \times 256) \leq 288$  ( $0 \leq yL \leq 255, yH = 0,1$ )  
 $0 \leq d \leq 255$   
 $k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$   
 The entire capacity size = 256 KB.

[Description] • Defines the NV bit image in the NV graphics area.  
 • **n** specifies the number of defined NV bit images.  
 • **xL, xH** specify the number of bytes in the horizontal direction as  $(xL + xH \times 256)$ .  
 • **yL, yH** specify the number of bytes in the vertical direction as  $(yL + yH \times 256)$ .  
 • **d** specifies the defined data (column format).

[Notes] • Frequent write command executions by an NV memory write command may damage the NV memory. Therefore, it is recommended to limit writing data with the write commands into the NV memory to 10 times or fewer a day.  
 • If the power is turned off or the printer is reset via an interface while this command is being executed, the printer may go into an abnormal condition. Do not turn the power off or do not reset the printer via an interface while this command is being executed.  
 • While processing this command, the printer may become BUSY while writing data to the NV memory and stops receiving data. Therefore, do not to transmit data from the host computer while the printer is BUSY.  
 • The printer executes a software reset after processing this command.  
 • Clears the receive and print buffers.  
 • Resets all setting values in RAM (the print area, the character styles, user-defined characters, and others) that were in effect at power on. (The data in the NV memory are not reset.)  
 • NV bit image and NV graphics (**GS ( L / GS 8 L**) cannot be defined simultaneously. When this command is executed, all NV graphics are deleted.  
 • When the logo emulation mode (customized value **a** = 127) is set to 180 dpi logo mode, NV graphics data is registered after being enlarged to the specified scaling factor. Scaling factors depend on the NV graphics data size, roll paper width (customized value **a** = 3), or setting value for column emulation mode (customized value **a** = 11). This function does not work when the NV graphics data size in the horizontal direction or vertical direction after enlargement is larger than the specified range. (See APPENDIX L for more details.)

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

[Obsolete command]

**GS** ( L <Function 112 and 50>, which is the upward-compatible command replacing **GS v 0**, is recommended to use, since **GS v 0** is an obsolete command in the ESC/POS command system.

[Name] Print raster bit image

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

[Range]  $0 \leq m \leq 3, 48 \leq m \leq 51$   
 $1 \leq (xL + xH \times 256) \leq 65535$  ( $0 \leq xL \leq 255, 0 \leq xH \leq 255$ )  
 $1 \leq (yL + yH \times 256) \leq 2303$  ( $0 \leq yL \leq 255, 0 \leq yH \leq 8$ )  
 $0 \leq d \leq 255$   
 $k = (xL + xH \times 256) \times (yL + yH \times 256)$

[Description] • Prints a raster bit image using the mode specified by **m**.

m	Mode	Vertical direction	Horizontal direction
0, 48	Normal	203 dpi	203 dpi
1, 49	Double-width	203 dpi	203/2 dpi
2, 50	Double-height	203/2 dpi	203 dpi
3, 51	Quadruple	203/2 dpi	203/2 dpi

- **xL, xH** specify the number of bytes in the horizontal direction as  $(xL + xH \times 256)$ .
- **yL, yH** specify the number of dots in the vertical direction as  $(yL + yH \times 256)$ .
- **d** specifies the defined data (raster format).

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## **APPENDIX A: MISCELLANEOUS NOTES**

### **A.1 Notes on Printing and Paper Feeding**

- 1) Because the TM-T20 printer is a line printer, it automatically feeds paper after printing data. Therefore, when the line spacing for one line is set to a smaller value than the print data, paper may be fed more than the set amount just to print the data.
- For example, when the line spacing for one line is set to 10 dots (10/203 inches) and only paper feeding is executed, paper is fed for 10 dots; however, if bit-image characters are printed, paper is fed for 24 dots. (See Table A.1.)
- When only rotated characters are printed on one line, paper feeding is executed as shown in Table A.1.

**Table A.1 Paper Feeding Amount**

			Required paper feeding amount (dots)	
			80-mm paper width	58-mm paper width
Normal mode (default)	Normal Characters	Font A	24 × vertical scaling factor	
		Font B	17 × vertical scaling factor	
		Kanji font	24 × vertical scaling factor	
	Rotated Characters	Font A	12 × vertical scaling factor	
		Font B	9 × vertical scaling factor	
		Kanji font	24 × vertical scaling factor	
42 column mode	Normal Characters	Font A	24 × vertical scaling factor	17 × vertical scaling factor
		Font B	17 × vertical scaling factor	24 × vertical scaling factor
		Kanji font	24 × vertical scaling factor	
	Rotated Characters	Font A	13 × vertical scaling factor	9 × vertical scaling factor
		Font B	9 × vertical scaling factor	12 × vertical scaling factor
		Kanji font	26 × vertical scaling factor	24 × vertical scaling factor
Bit image (ESC *)			24	

- 2) When the printer goes to the standby (data-waiting) state during printing, it temporarily stops printing and feeding paper. When data is transmitted and printing is executed, paper may shift 1 to 3 dots from the print starting position, which especially affects bit-image printing.
- 3) It is recommended to run the autocutter operation after a minimum of 10 lines of printing or paper feeding to prevent small pieces of cut paper from dropping into the autocutter to cause paper jams.

### **A.2 Notes on Installation**

- In both high and low voltage errors, the Error LED indicator flashes.
- When either a high or low voltage error occurs, turn the power off as soon as possible.
- The interface connectors are supplied from Non-LPS.

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## A.3 Notes on Use Environment

Using in the presence of silicon gas (silicon adhesive, silicon oil, silicon powder, etc.) including siloxane and of malignant gas (nitric acid, hydrosulfuric, ammonia, chlorine, etc.) may cause contact failure at contact points in a mechanical switch and a DC motor, etc., in a short time because of adhesion or oxidization of the insulation film.

## A.4 Other Notes

### 1) Handling of printer mechanism

- Do not pull the paper out when the roll paper cover is closed.
- Because the thermal elements of the print head and driver IC are easy to break, do not touch them with any metal objects.
- Since the areas around the print head become very hot during and immediately after printing, do not touch them.
- Do not open the roll paper cover during printing operation or the printer mechanism may become damaged.
- Do not touch the surface of the print head because dust and dirt can stick to the surface and damage the elements.
- Thermal paper containing  $\text{Na}^+$ ,  $\text{K}^+$ , and  $\text{Cl}^-$  ions can harm the print head thermal elements. Be sure to use only the specified paper.
- Label paper cannot be used.

### 2) Notes on handling thermal paper

#### (1) Notes on using thermal paper

Chemicals and oil on thermal paper may cause discoloration and faded printing. Therefore, pay attention to the following:

- a) Use water paste, starch paste, polyvinyl paste, or CMC paste when gluing thermal paper.
- b) Volatile organic solvents such as alcohol, ester, and ketone can cause discoloration.
- c) Some adhesive tapes may cause discoloration or faded printing.
- d) If thermal paper touches anything that includes phthalic acid ester plasticizer for a long time, it can reduce the image-formation ability of the paper and can cause the printed image to fade. When storing thermal paper in a card case or sample notebook, therefore, be sure to use only products made of polyethylene, polypropylene, or polyester.
- e) If thermal paper touches diazo copy paper immediately after copying, the printed surface may become discolored.
- f) Thermal paper must not be stored with the printed surfaces against each other because the printing may be transferred between the surfaces.
- g) If the surface of thermal paper is scratched with a nail or a hard metal, the paper may become discolored.

#### (2) Notes on thermal paper storage

Since color development begins approximately at  $70^\circ\text{C}$  { $158^\circ\text{F}$ }, thermal paper should be protected from high temperature, humidity, and light, both before and after printing.

- a) Store paper away from high temperature and humidity.  
Do not store thermal paper near a heater or in enclosed places exposed to direct sunlight.
- b) Avoid direct sunlight.  
Extended exposure to direct sunlight by windows may cause discoloration or faded printing to the printed surface.

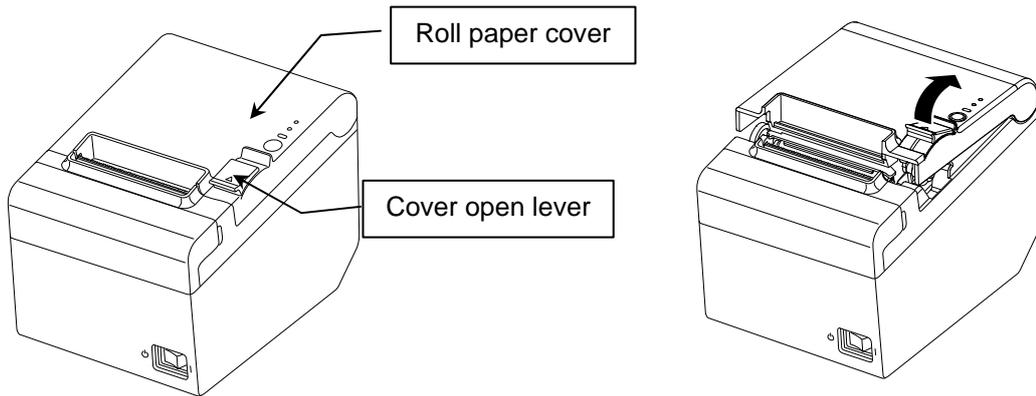
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3) Others

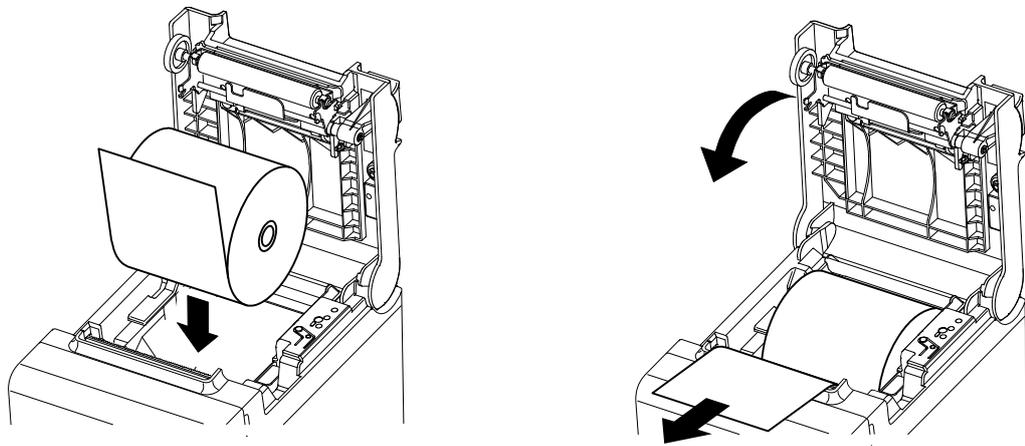
- Because this printer uses plated steel, the cutting edges may be subject to rust. However, this does not affect the printer performance.

**APPENDIX B: ROLL PAPER SETUP**

- 1) Open the roll paper cover by operating the cover open lever.
- 2) Load a roll of paper, and pull some of the paper from the roll paper out toward the front of the printer.
- 3) Close the roll paper cover.



**Figure B.1 Operation of Cover Open Lever**



**Figure B.2 Loading a Roll of Paper**

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**APPENDIX C: RECOVERY FROM AN AUTOCUTTER ERROR**

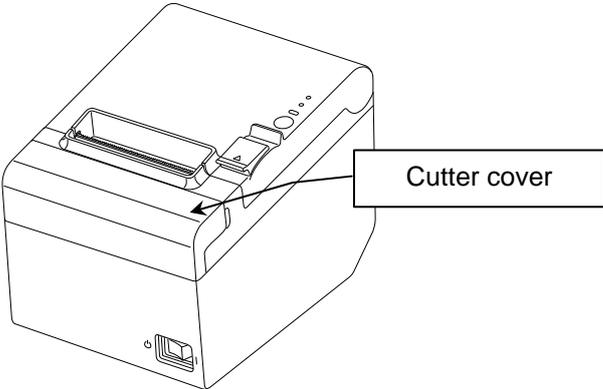
- If a foreign object such as a push pin or paper clip drops in the autocutter and causes the autocutter to lock up, the printer enters an error state and begins the recovery operation automatically. (Although the Error LED indicator flashes continuously, the error is recoverable.)

If the problem is not serious, the autocutter returns to its normal position without any intervention by the user.

If the autocutter does not return to its normal position by itself, follow the steps below to resolve the problem:

- 1) Pull the cutter cover (See Figure C.1.) toward you and remove it so that you can rotate the cutter motor knob.
  - 2) Rotate the cutter motor knob in the direction shown by an arrow.
  - 3) Following the instructions on the caution label on the reverse side of the cutter cover, rotate the knob until the triangular mark appears in the hole.
- If the motor knob does not rotate, rotate it in the reverse direction to loosen it; then transmit the **DLE ENQ n** command. Next, check the Error LED indicator. If the Error LED indicator is not off, repeat the same procedure and confirm that the Error LED indicator is off.

When the Error LED indicator is off, the autocutter blade has returned to its normal position and the roll paper cover can be opened. Open the roll paper cover, remove the jammed paper, and reinstall the roll of paper. Then close the roll paper cover.



**Figure C.1 Cutter Cover**

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**APPENDIX D: PRINT HEAD AND PLATEN ROLLER CLEANING**

**D.1 Thermal Head Unit**

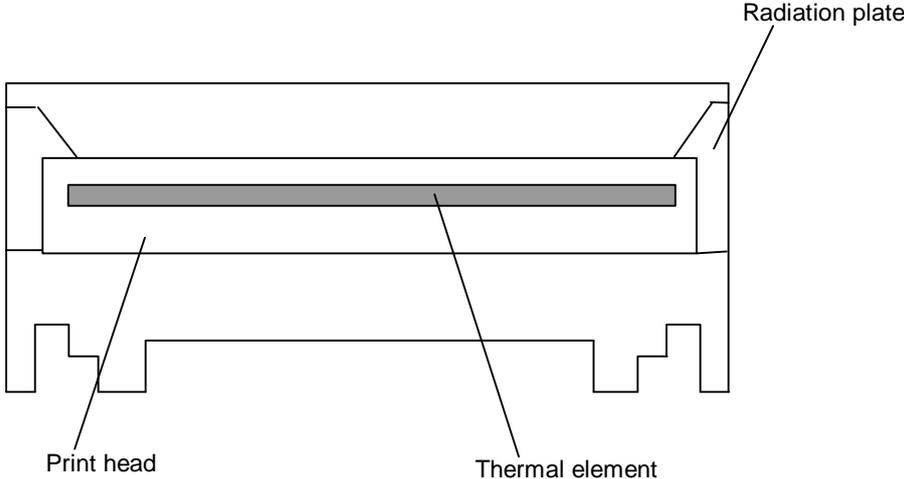
Paper dust or other foreign objects on the thermal elements may lower the print quality. In this case, clean the print head as follows:

- 1) Open the roll paper cover.
- 2) Clean the thermal elements of the print head using a cotton swab moistened with alcohol solvent (ethanol or IPA).

NOTES: 1. Never touch the print head thermal elements.  
 2. Do not scratch the print head.

- 3) Insert roll paper, pull out some paper, and close the roll paper cover.

NOTES: 1. The print head becomes very hot immediately after printing. Be sure to allow the print head to cool down (after printing) before cleaning it.  
 2. Be sure to turn off the printer power before cleaning the print head.  
 3. Turn on the printer power only after alcohol has completely dried.



**Figure D.1 Print Head Thermal Element**

**D.2 Platen Roller Unit**

Depending on the roll paper used, paper dust may stick to the platen roller and the paper may not be fed correctly. To remove the paper dust, clean the platen roller with a cotton swab moistened with water as described in the thermal head section above. Turn on the printer power only after the water has completely dried.

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

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

Drawer specifications differ significantly depending on the manufacturer and the model. Make sure that the specifications of the drawer used meet the following conditions when connected to the drawer kick-out connector. These conditions also apply to any other devices to be connected to the drawer kick-out connector.

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

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

NOTES: (\*1): Proper operation is not guaranteed with different connections.

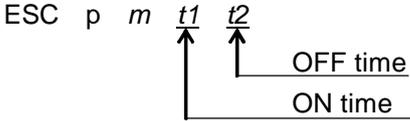
(\*2): Proper operation is not guaranteed with different connections or connection to a component other than a switch.

(\*3): Connection to equipment whose resistance is less than 24Ω or whose input current is more than 1 A may damage the connected equipment as well as the printer.

(\*4): Operation is not guaranteed with other power supplies.

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

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

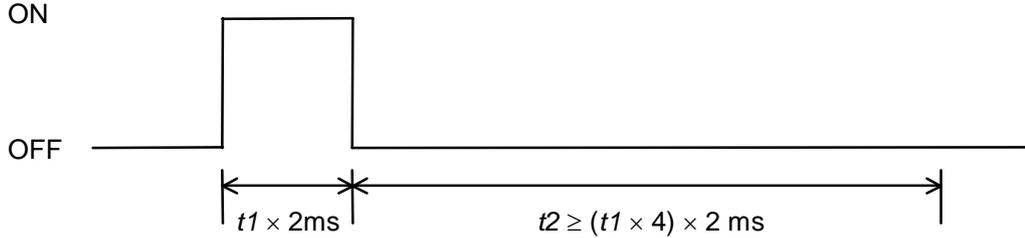


$$\frac{\text{ON time}}{\text{ON time} + \text{OFF time}} \leq 0.2 \dots\dots\dots \text{Formula E-1}$$

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

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Figure E-1 shows the drive signal waveform generated when the drawer is driven according to the above conditions.



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

The ON time depends on the specifications of the drawer used. Be sure to check the drawer specifications and set a suitable time. To use a drawer that does not meet the conditions of Formulas E-1 and E-2, see the following section (3).

3) Using a drawer that does not meet the conditions in 2) (**ESC p, DLE DC4**)

(1) For **ESC p**

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

$$\frac{\text{ON time}}{\text{ON time} + (\text{OFF time} + \alpha)} \leq 0.2 \dots\dots\dots \text{Formula E-3}$$

$\alpha$ : processing time of other sequence

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

(2) For **DLE DC4**

Since **DLE DC4** sets ON time equal to OFF time, use  $\alpha$  so that Formula E-3 is met.

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

```
PRINT #1,CHR$(&H1B);"p";CHR$(0);CHR$(100);CHR$(250);
GOSUB *WAIT300MS
*WAIT300MS
  300 [ms] wait routine
RETURN
```

ON time 200 ms    OFF time 500 ms

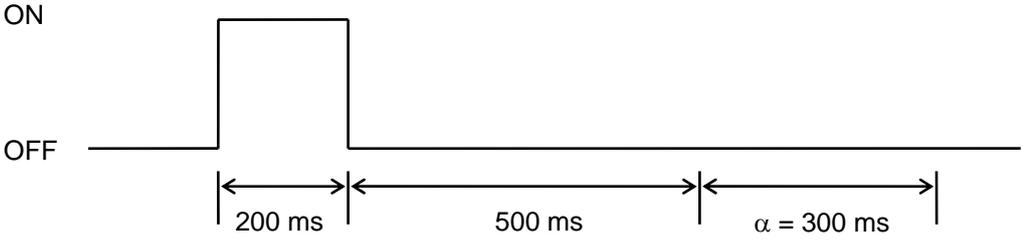
} (\*1)

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

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



**Figure E-2 Drawer Drive Signal Waveform**

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**APPENDIX F: NOTES ON UPDATING THE MAINTENANCE COUNTER  
AND TURNING THE PRINTER'S POWER OFF**

**F.1 About Updating the Maintenance Counter**

- This printer has a maintenance counter with functions as described in the command description for **GS g 0** and **GS g 2**.
- The values of the maintenance counter are automatically stored in the NV memory every 2 minutes (or 4 minutes maximum) when the printer is operating, except in the power save mode.
- However, if the power off is performed as described in Section F.2, the printer stores the latest values of the maintenance counter and executes the power off control, regardless of the updating interval described above.
- If the printer is not sending/receiving data or is not operating while the power is turned on, the printer enters the power-saving mode.

**F.2 Printer Power-off Procedures**

It is recommended to turn off the printer after executing the powering-off command **DLE DC4** ( $fn = 2$ ). The following is an example of the printer power off process when the printer is turned off using the **DLE DC4** ( $fn = 2$ ) command.

- 1) The host computer transmits the following continuous procedure before the system is turned off:
  - (1) Executes **GS ( D pL pH m a b** ( $pL=3, pH=0, m=20, a=2, b=1$ )
  - (2) Executes **GS r n** ( $n=1$ )
- 2) The host computer waits for the paper sensor status sent from the printer in response to the **GS r n** command.
- 3) The host computer transmits **DLE DC4 fn a b** ( $fn=2, a=1, b=8$ ).
- 4) The host computer waits for the power off notification.
  - The values of the maintenance counter are stored and the power-off sequence is performed within 20 seconds after the host computer transmits **DLE DC4 fn a b**; then the power off notification is transmitted.
  - With the USB interface model, the printer is required to be ready to receive data from the host computer.
  - With the serial interface model, the printer status is transmitted regardless of the condition of the host computer.
  - If the power off notification is not confirmed, wait for at least 20 seconds after transmitting **DLE DE4 fn a b**.

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

- 5) Power off the host computer and the printer.

NOTE: Do not reset the printer until you have confirmed the power off notification after transmitting **DLE DC4** ( $fn = 2$ ).

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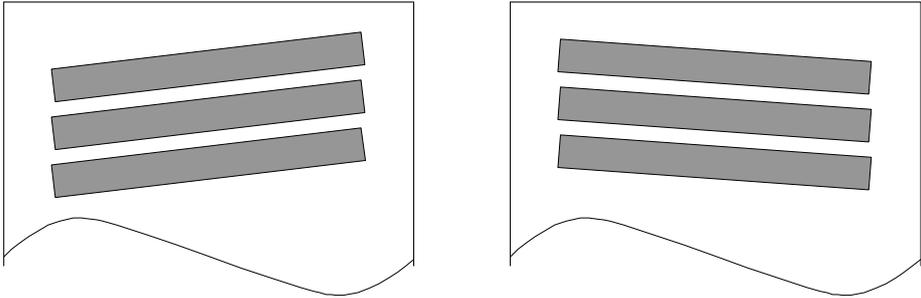
**APPENDIX G: NOTES ON PRINTING 2-DIMENSIONAL SYMBOLS**

- 1) The user must set the quiet zone, depending on the bar code standards.
- 2) When printing PDF417 (2-dimensional symbols), it is recommended to set the height of one step of the symbol to three to five times the width of one module, and the total height should be approximately 5 mm {0.20"} or more.
- 3) The recognition rate of ladder bar codes and 2-dimensional symbols may vary depending on widths of the modules, print density, environmental temperature, type of thermal paper, and characteristics of the reader. Therefore, the user must check the recognition rate before setting the use conditions so that the restrictions of the reader are satisfied.
- 4) When printing ladder bar codes/2-dimensional symbols with graphics printing, instead of using the bar codes/2-dimensional symbols print commands, set the printing speed to 100 mm/s (printing speed level 8). The printing speed level can be set with **GS ( K**.

**APPENDIX H: NOTES ON SCANNING THE PRINT RESULT ON THE RECEIPT**

To determine whether the ability of the reader (scanner) can be satisfied by using bar codes, 2-dimensional symbols, or characters printed on receipt (roll paper), take the following points into consideration.

- 1) Print density
  - The print density may vary depending on the type of roll paper or the environmental conditions.
- 2) Slant of the print result
  - The printed bar code or characters may not be horizontal to the paper as shown in Figure I-1. They may slant in the range of  $\pm 1.6^\circ$  and the slanting direction or the angle varies during printing or each time a receipt is issued.



**Figure H-1 Slant of the Print**

NOTE: If paper other than the ones described in Section 1.5, Paper Specification, is used or if the paper is used out of the range described in Section 1.12, Environmental Conditions, the print density may vary or the slant of print result may become wider.

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**APPENDIX I: NOTES ON USING THE ASB STATUS**

Any accumulated ASB status signals left for transmission from the last to the newest ASB status transmission shall be transmitted together at a time as one ASB status showing the presence of change, followed by the latest ASB status.

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

First Status	Second Status	Third Status	Fourth Status
0001 0100	0000 0000	0000 0000	0000 1111

When a sequence of operations as follows is performed and the printer status changes, the following pieces of data are accumulated.

	First Status	Second Status	Third Status	Fourth Status	
1	0011 1100	0000 0000	0000 0000	0000 1111	The printer cover is opened.
2	0001 1100	0000 0000	0000 1111	0000 1111	The printer cover is closed after removing paper.
3	0011 1100	0000 0000	0000 1111	0000 1111	The printer cover is opened.
4	0001 1100	0000 0000	0000 1111	0000 1111	The printer cover is closed.

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

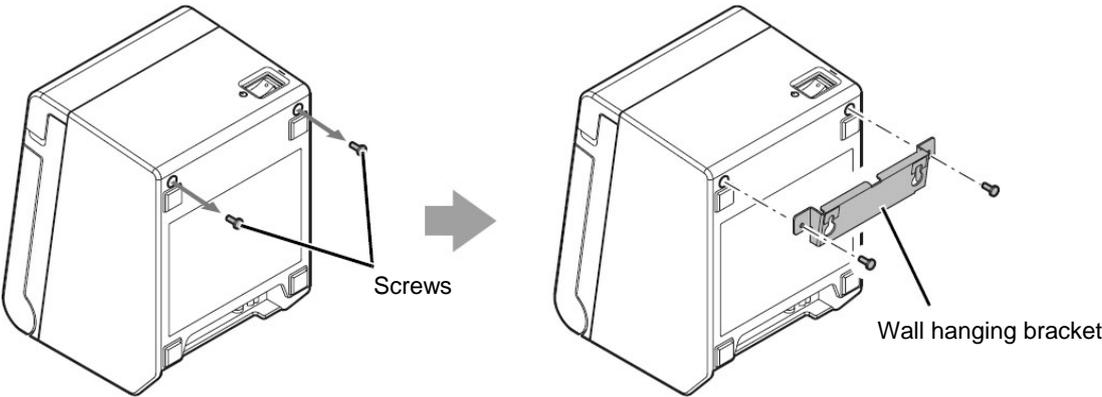
	First Status	Second Status	Third Status	Fourth Status
Accumulated ASB (1+2+3+4)	0011 1100	0000 0000	0000 0000	0000 1111
+				
The latest ASB (4)	0001 1100	0000 0000	0000 1111	0000 1111

**APPENDIX J: WALL HANGING BRACKET**

**J.1 Hanging the Printer on the Wall**

1) Attaching the wall hanging bracket to the printer

Affix the control panel sheet for vertical installation to the control panel of the printer. Remove two Phillips-head bind tight (S) 3 × 10 screws from the printer and attach the wall hanging bracket to the printer with the screws.



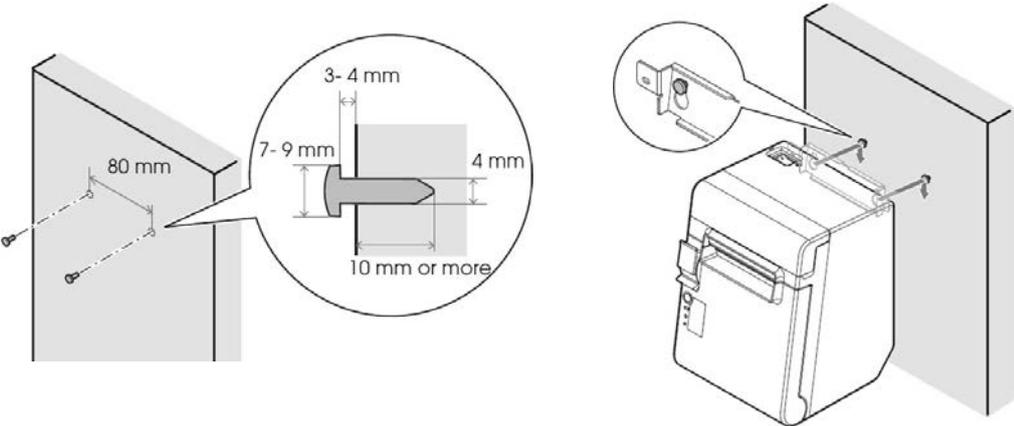
**Figure J.1.1**

2) Attaching the wall hanging bracket to the wall

Hook the wall hanging bracket on two screws fixed in the wall (Screw diameter: 4 mm, head diameter: 7 to 9 mm).

- For the screws fixed in the wall, in order to support the weight of the printer, be sure to use the screws that are appropriate to the type of wall and that their length is sufficient.
- Install the wall hanging bracket on a wall made of wood, concrete, or metal. The thickness of the wall should be 10 mm or more.

NOTE: The screws on the wall side must have a pull-out strength of 150 N (15.3 kgf) or more.

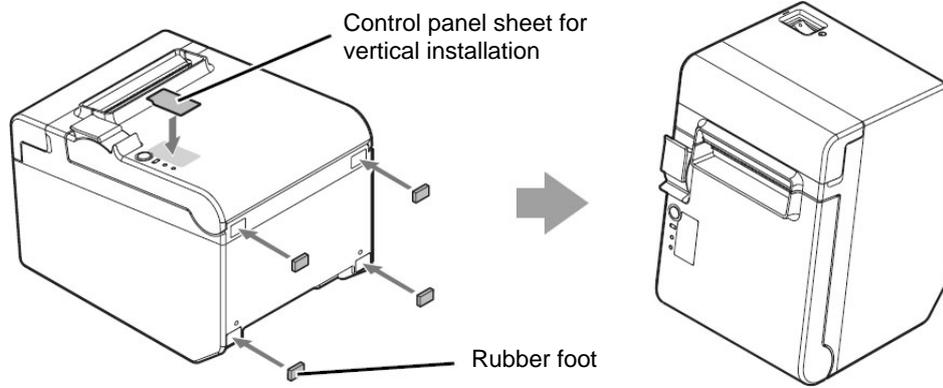


**Figure J.1.2**

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**J.2 Installing the Printer Vertically**

- 1) Attaching to the printer
  - (1) Affix the control panel sheet for vertical installation to the control panel of the printer.
  - (2) Attach the four rubber feet to the concave portions on the bottom of the printer when installing vertically.

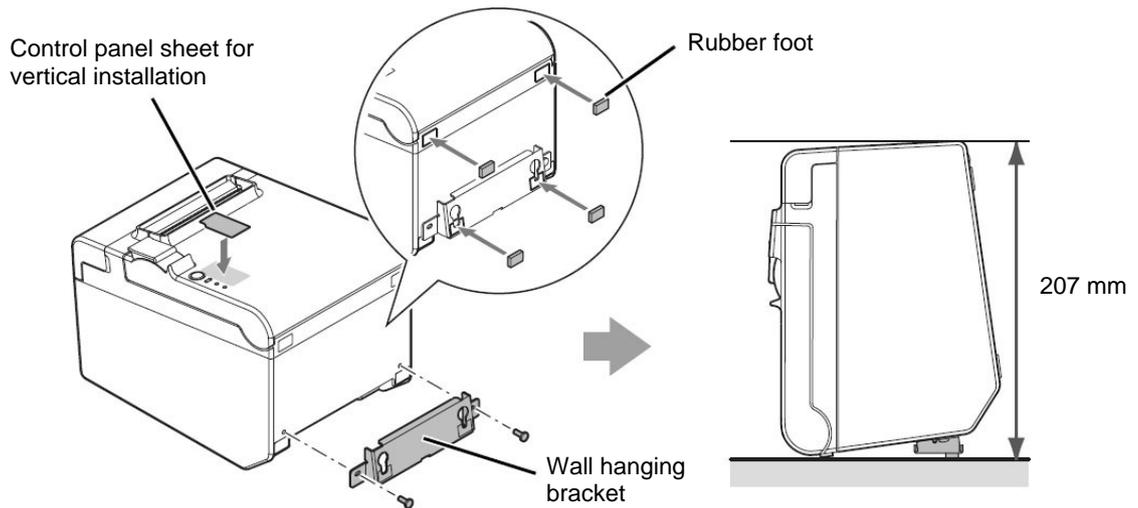


**Figure J.2.1**

**J.3 Usage When Installing the Printer Vertically (Roll Paper Exit Side Perpendicular to Mounting Surface)**

With the wall hanging bracket, the printer can be installed so that the roll paper exit side is exactly perpendicular to the surface it is installed on.

- 1) Attaching to the printer
  - (1) Affix the control panel sheet for vertical installation to the control panel of the printer.
  - (2) Attach the wall hanging bracket to the printer with two Phillips-head bind tight (P) 3 × 8 screws.
  - (3) Attach the two rubber feet within the scribed line on the wall hanging bracket.
  - (4) Attach the two rubber feet to the bottom of the printer when installing vertically. Be sure to attach the rubber feet to the two concave portions to the front side when installing vertically.



**Figure J.3.1**

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**APPENDIX K: NOTES ON ARP (AUTOMATIC REDUCTION OF PAPER)  
AND AUTOMATIC LOGO PRINTING FUNCTION**

**K.1 ARP: Reduction of Top Margin, Reduction of Bottom Margin, Reduction of Line Spacing, and Reduction of Line Spacing Where Extra Line Feeds Are Included**

- Paper reduction is not performed for space dot lines of graphics printing data.

**K.2 ARP: Reduction of Bar Code Height**

- When reducing bar code height, reading of the bar code is not guaranteed. Be sure to check reading a bar code with a user's bar code reader in advance.

**K.3 Automatic Logo Printing Function**

- The automatic bottom logo printing is a function of logo printing that works with an autocutting command and produces good printing quality when using the **GS V m n** (paper feeding + paper cutting) command. When using cutting only commands (**GS V m**, **ESC i**, or **ESC m**), extra line spacing above a bottom logo occurs, depending on the paper feeding command before the cutting command.
- When printing a top logo during paper feeding to the cutting position, the **GS V m n** (paper feeding + paper cutting) command will produce good printing quality. When using cutting only commands, printing a logo before cutting is not performed.

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## APPENDIX L: LOGO EMULATION MODE

(Supported by firmware Version 1.04 (USB/Serial model)/2.00 (Ethernet model) or later)

- When logo emulation mode is set to 180 dpi logo mode, the graphics data used on a 180 dpi printer is registered enlarged so that the print result stays the same on a 203 dpi printer.
- The commands that affect 180 dpi logo mode setting are <Function 67>, <Function 83> of **GS ( L**, <Function 67>, <Function 83> of **GS D**, and **FS q**.
- Select logo emulation mode in software setting. (See Section 3.5.1 for how to change the setting.)
- The enlargement factors for graphic data depend on the graphics data size, roll paper width (customized value  $a = 3$ ), and the setting value for column emulation mode (customized value  $a = 11$ ).

**Table N.1 Enlargement Factors for 180 dpi Logo Mode (GS ( L, GS D)**

Paper width	Column emulation mode	Graphics data size	Enlargement factor
80 mm	Standard column mode	$1 \text{ dot} \leq X \leq 7282 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2048 \text{ dots}$	1.12
		$7283 \text{ dots} \leq X$ or $2049 \text{ dots} \leq Y$	1.00
	42 column mode	$1 \text{ dot} \leq X \leq 486 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2048 \text{ dots}$	1.12
		$487 \text{ dots} \leq X \leq 7711 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2169 \text{ dots}$ $7712 \text{ dots} \leq X$ or $2170 \text{ dots} \leq Y$	1.06 1.00
58 mm	Standard column mode	$1 \text{ dot} \leq X \leq 7282 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2048 \text{ dots}$	1.12
		$7283 \text{ dots} \leq X$ or $2049 \text{ dots} \leq Y$	1.00
	42 column mode	$1 \text{ dot} \leq X \leq 336 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2048 \text{ dots}$	1.12
		$337 \text{ dots} \leq X \leq 7865 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2212 \text{ dots}$	1.05
		$7866 \text{ dots} \leq X$ or $2213 \text{ dots} \leq Y$	1.00

**Table N.2 Enlargement Factors for 180 dpi Logo Mode (FS q)**

Paper width	Column emulation mode	Graphics data size	Enlargement factor
80 mm	Standard column mode	$1 \text{ dot} \leq X \leq 7274 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2048 \text{ dots}$	1.12
		$7275 \text{ dots} \leq X$ or $2049 \text{ dots} \leq Y$	1.00
	42 column mode	$1 \text{ dot} \leq X \leq 486 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2048 \text{ dots}$	1.12
		$487 \text{ dots} \leq X \leq 7703 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2169 \text{ dots}$ $7704 \text{ dots} \leq X$ or $2170 \text{ dots} \leq Y$	1.06 1.00
58 mm	Standard column mode	$1 \text{ dot} \leq X \leq 7274 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2048 \text{ dots}$	1.12
		$7275 \text{ dots} \leq X$ or $2049 \text{ dots} \leq Y$	1.00
	42 column mode	$1 \text{ dot} \leq X \leq 336 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2048 \text{ dots}$	1.12
		$337 \text{ dots} \leq X \leq 7857 \text{ dots}$ and $1 \text{ dot} \leq Y \leq 2212 \text{ dots}$	1.05
		$7858 \text{ dots} \leq X$ or $2213 \text{ dots} \leq Y$	1.00

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**APPENDIX M: PAPER WIDTH SETUP**

If using a paper roll width of 58 mm, it is necessary to attach the included 58-mm width roll paper guide and set the software.

- NOTES:
- To change the paper width from 80 mm to 58 mm, be sure to set the paper width in software setting to adjust the print area. (See 3.5.1 for how to change settings.)
  - After changing the paper width from 80 mm to 58 mm and using the printer, do not change it back to 80 mm. (When using 58-mm width paper, a part of the print head without paper directly contacts the platen, which can damage the part of the print head. The part of the cutter blade that is not covered by paper may be worn out. The area of the 80-mm paper that is wider than the 58-mm paper cannot be used for printing or cut with the autocutter.)

1. Open the roll paper cover.
2. Align the three protruding parts of the 58-mm width roll paper guide with the square holes of the printer, and insert the guide.

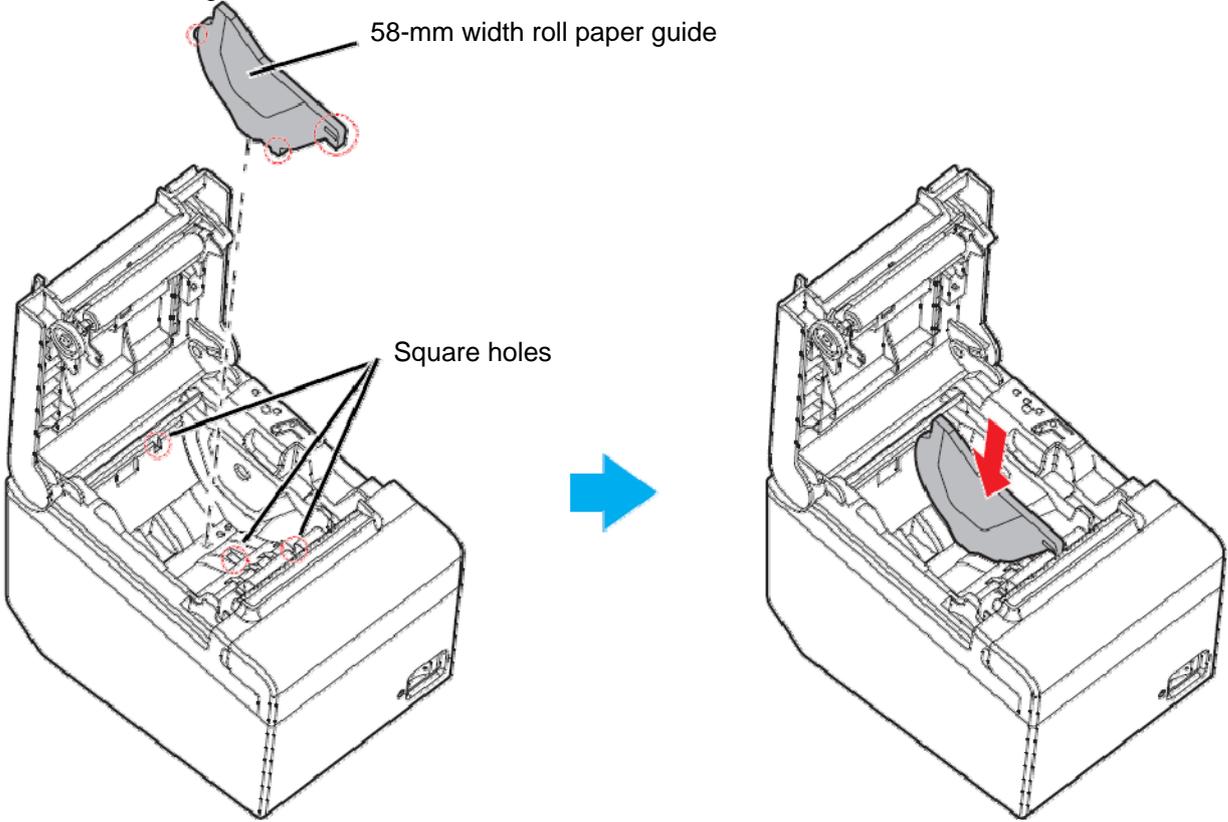


Figure. M.1

3. Set the roll paper.
4. Close the roll paper cover.
5. Set the paper width to 58 mm according to the procedures of Section "3.8.3 Software setting mode".

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