ESC/P commands

Version 1.01

Model Name Specifications Study: QL-1060N

<Written By> Brother Industries, Ltd.
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Introduction

This material provides the necessary information for directly controlling QL-1060N.
This information is provided assuming that the user has full understanding of the operating system being used and basic mastery of RS-232C in a developer’s environment.

We accept no responsibility for any problems caused by programs that you develop using the information provided in this material, affecting software, data or hardware, including the QL-1060N, and any problems resulting directly or indirectly from them. Use this material only if you accept these terms.

This material shall not be reproduced, in part or in full, without prior approval. In addition, this material shall not be used as evidence in a lawsuit or dispute in a way that is unfavorable towards our company.

These ESC/P commands have been adapted specifically for this company.
Control Code List

Character/style selection

<table>
<thead>
<tr>
<th>Code</th>
<th>Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC R</td>
<td>1B 52</td>
<td>Select international character set</td>
</tr>
<tr>
<td>ESC q</td>
<td>1B 71</td>
<td>Select character style</td>
</tr>
<tr>
<td>ESC k</td>
<td>1B 6B</td>
<td>Select font</td>
</tr>
<tr>
<td>ESC t</td>
<td>1B 74</td>
<td>Select character code table</td>
</tr>
</tbody>
</table>

Text printing

<table>
<thead>
<tr>
<th>Code</th>
<th>Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC 4</td>
<td>1B 34</td>
<td>Apply italic style</td>
</tr>
<tr>
<td>ESC 5</td>
<td>1B 35</td>
<td>Cancel italic style</td>
</tr>
<tr>
<td>ESC E</td>
<td>1B 45</td>
<td>Apply bold style</td>
</tr>
<tr>
<td>ESC F</td>
<td>1B 46</td>
<td>Cancel bold style</td>
</tr>
<tr>
<td>ESC G</td>
<td>1B 47</td>
<td>Apply double-strike printing</td>
</tr>
<tr>
<td>ESC H</td>
<td>1B 48</td>
<td>Cancel double-strike</td>
</tr>
<tr>
<td>ESC P</td>
<td>1B 50</td>
<td>Specify pica pitch (10 cpi)</td>
</tr>
<tr>
<td>ESC M</td>
<td>1B 4D</td>
<td>Specify elite pitch (12 cpi)</td>
</tr>
<tr>
<td>ESC g</td>
<td>1B 67</td>
<td>Specify micron pitch</td>
</tr>
<tr>
<td>ESC p</td>
<td>1B 70</td>
<td>Specify proportional characters</td>
</tr>
<tr>
<td>ESC W</td>
<td>1B 57</td>
<td>Specify double-width characters</td>
</tr>
<tr>
<td>SO</td>
<td>0E</td>
<td>Specify auto-cancelling enlarged characters</td>
</tr>
<tr>
<td>ESC SO</td>
<td>1B 0E</td>
<td>Specify auto-cancelling enlarged characters</td>
</tr>
<tr>
<td>SI</td>
<td>0F</td>
<td>Specify reduced characters</td>
</tr>
<tr>
<td>ESC SI</td>
<td>1B 0F</td>
<td>Specify reduced characters</td>
</tr>
<tr>
<td>DC2</td>
<td>12</td>
<td>Cancel reduced characters</td>
</tr>
<tr>
<td>DC4</td>
<td>14</td>
<td>Cancel auto-cancelling double-width characters</td>
</tr>
<tr>
<td>ESC -</td>
<td>1B 2D</td>
<td>Apply/cancel underlining</td>
</tr>
<tr>
<td>ESC !</td>
<td>1B 21</td>
<td>Global formatting</td>
</tr>
<tr>
<td>ESC SP</td>
<td>1B 20</td>
<td>Specify character spacing for ANK characters</td>
</tr>
<tr>
<td>ESC X</td>
<td>1B 58</td>
<td>Specify alphanumeric/kana character size</td>
</tr>
</tbody>
</table>

Line feeds

<table>
<thead>
<tr>
<th>Code</th>
<th>Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC 0</td>
<td>1B 30</td>
<td>Specify line feed of 1/8 inch</td>
</tr>
<tr>
<td>ESC 2</td>
<td>1B 32</td>
<td>Specify line feed of 1/6 inch</td>
</tr>
<tr>
<td>ESC 3</td>
<td>1B 33</td>
<td>Specify minimum line feed</td>
</tr>
<tr>
<td>ESC A</td>
<td>1B 41</td>
<td>Specify line feed of n/60 inch</td>
</tr>
</tbody>
</table>
### Horizontal direction movement

<table>
<thead>
<tr>
<th>Command</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC I</td>
<td>1B 6C</td>
<td>Specify left margin.</td>
</tr>
<tr>
<td>ESC Q</td>
<td>1B 51</td>
<td>Specify right margin.</td>
</tr>
<tr>
<td>CR</td>
<td>0D</td>
<td>Carriage return</td>
</tr>
<tr>
<td>ESC D</td>
<td>1B 44</td>
<td>Specify horizontal tab position</td>
</tr>
<tr>
<td>HT</td>
<td>09</td>
<td>Apply horizontal tab</td>
</tr>
<tr>
<td>ESC $</td>
<td>1B 24</td>
<td>Specify absolute horizontal position</td>
</tr>
<tr>
<td>ESC ¥</td>
<td>1B 5C</td>
<td>Specify relative horizontal position</td>
</tr>
<tr>
<td>ESC a</td>
<td>1B 61</td>
<td>Specify alignment</td>
</tr>
</tbody>
</table>

### Vertical movement

<table>
<thead>
<tr>
<th>Command</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF</td>
<td>0A</td>
<td>Line feed</td>
</tr>
<tr>
<td>FF</td>
<td>0C</td>
<td>Page feed</td>
</tr>
<tr>
<td>ESC J</td>
<td>1B 4A</td>
<td>Forward paper feed</td>
</tr>
<tr>
<td>ESC B</td>
<td>1B 42</td>
<td>Specify vertical tab position</td>
</tr>
<tr>
<td>VT</td>
<td>0B</td>
<td>Apply vertical tab</td>
</tr>
<tr>
<td>ESC ( V</td>
<td>1B 28 56</td>
<td>Specify absolute vertical position.</td>
</tr>
<tr>
<td>ESC ( v</td>
<td>1B 28 76</td>
<td>Specify relative vertical position.</td>
</tr>
</tbody>
</table>

### Paper formatting

<table>
<thead>
<tr>
<th>Command</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC ( c</td>
<td>1B 28 63</td>
<td>Specify page format.</td>
</tr>
<tr>
<td>ESC ( C</td>
<td>1B 28 43</td>
<td>Specify page length</td>
</tr>
</tbody>
</table>

### Printer control

<table>
<thead>
<tr>
<th>Command</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC @</td>
<td>1B 40</td>
<td>Defaults</td>
</tr>
</tbody>
</table>

### Graphic commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC *</td>
<td>1B 2A</td>
<td>Select a bit image.</td>
</tr>
<tr>
<td>ESC K</td>
<td>1B 4B</td>
<td>8-dot single-density bit image</td>
</tr>
<tr>
<td>ESC L</td>
<td>1B 4C</td>
<td>8-dot double-density bit image</td>
</tr>
<tr>
<td>ESC Y</td>
<td>1B 59</td>
<td>8-dot double-speed double-density bit image</td>
</tr>
<tr>
<td>ESC Z</td>
<td>1B 5A</td>
<td>8-dot quadruple-density bit image</td>
</tr>
</tbody>
</table>
### Advanced commands

<table>
<thead>
<tr>
<th>Code</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC i B</td>
<td>1B 69 42</td>
<td>Bar code</td>
</tr>
<tr>
<td>ESC i Q</td>
<td>1B 69 51</td>
<td>2D bar code QR codes</td>
</tr>
<tr>
<td>ESC i P</td>
<td>1B 69 50</td>
<td>QR code version setting</td>
</tr>
<tr>
<td>ESC i V</td>
<td>1B 69 56</td>
<td>2D bar codes PDF417</td>
</tr>
<tr>
<td>ESC i D</td>
<td>1B 69 44</td>
<td>2D bar code data matrix</td>
</tr>
<tr>
<td>ESC i M</td>
<td>1B 69 4D</td>
<td>2D bar code MaxiCode</td>
</tr>
<tr>
<td>ESC i F</td>
<td>1B 69 46</td>
<td>Print downloaded data</td>
</tr>
<tr>
<td>ESC i a</td>
<td>1B 69 61</td>
<td>Switch command mode *</td>
</tr>
<tr>
<td>ESC i S</td>
<td>1B 69 53</td>
<td>Request printer status</td>
</tr>
<tr>
<td>ESC i L</td>
<td>1B 69 4C</td>
<td>Select landscape orientation</td>
</tr>
<tr>
<td>ESC i C</td>
<td>1B 69 43</td>
<td>Specify cutting *</td>
</tr>
</tbody>
</table>

* Command supported in text mode

Text mode is a printing method restricted to ASCII codes. Text mode can reduce the time until the start of printing compared to standard mode. Switch between text mode and standard mode with the command mode switch command.
Print area
The printing media are die-cut rolls and continuous rolls.
The area that can physically be printed on depends on the size and type of the print media.

<<Die-cut>>
Below are the print areas for each media.

### Print area

<table>
<thead>
<tr>
<th>Media Description</th>
<th>Sensor NO.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Drive head No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Address</td>
<td>1</td>
<td>29mm</td>
<td>90mm</td>
<td>1.5mm</td>
<td>3mm</td>
<td>25.92mm</td>
<td>83.94mm</td>
<td>409 ~ 714</td>
</tr>
<tr>
<td>Large Address</td>
<td>2</td>
<td>38mm</td>
<td>90mm</td>
<td>1.5mm</td>
<td>3mm</td>
<td>34.98mm</td>
<td>83.94mm</td>
<td>296 ~ 708</td>
</tr>
<tr>
<td>Small Address</td>
<td>3</td>
<td>62mm</td>
<td>29mm</td>
<td>1.5mm</td>
<td>3mm</td>
<td>58.95mm</td>
<td>22.95mm</td>
<td>013 ~ 708</td>
</tr>
<tr>
<td>Sipping</td>
<td>4</td>
<td>62mm</td>
<td>100mm</td>
<td>1.5mm</td>
<td>3mm</td>
<td>58.95mm</td>
<td>93.93mm</td>
<td>013 ~ 708</td>
</tr>
<tr>
<td>Multi purpose</td>
<td>5</td>
<td>17mm</td>
<td>54mm</td>
<td>1.5mm</td>
<td>3mm</td>
<td>13.98mm</td>
<td>47.94mm</td>
<td>556 ~ 720</td>
</tr>
<tr>
<td>File Folder</td>
<td>6</td>
<td>17mm</td>
<td>87mm</td>
<td>1.5mm</td>
<td>3mm</td>
<td>13.98mm</td>
<td>80.97mm</td>
<td>556 ~ 720</td>
</tr>
<tr>
<td>CD/DVD (MKP)</td>
<td>7</td>
<td>58.3mm</td>
<td>58.3mm</td>
<td>3mm</td>
<td>3mm</td>
<td>52.26mm</td>
<td>52.26mm</td>
<td>052 ~ 668</td>
</tr>
<tr>
<td>Square Paper (23mm)</td>
<td>C</td>
<td>23mm</td>
<td>23.3mm</td>
<td>1.5mm</td>
<td>3mm</td>
<td>19.99mm</td>
<td>17.02mm</td>
<td>976 ~ 1211</td>
</tr>
<tr>
<td>Round Paper</td>
<td>11</td>
<td>12.0mm</td>
<td>12.0mm</td>
<td>2mm</td>
<td>2mm</td>
<td>7.96mm</td>
<td>7.96mm</td>
<td>514 ~ 607</td>
</tr>
<tr>
<td>Round Paper</td>
<td>12</td>
<td>24.0mm</td>
<td>24.0mm</td>
<td>2mm</td>
<td>2mm</td>
<td>19.99mm</td>
<td>19.99mm</td>
<td>443 ~ 678</td>
</tr>
<tr>
<td>4×2inch White Paper 102mm×51mm</td>
<td>45</td>
<td>101.6mm</td>
<td>50.50mm</td>
<td>1.5mm</td>
<td>3mm</td>
<td>98.59mm</td>
<td>44.47mm</td>
<td>77 ~ 1240</td>
</tr>
<tr>
<td>4×6inch White Paper 102mm×152mm</td>
<td>46</td>
<td>101.6mm</td>
<td>151.97mm</td>
<td>1.5mm</td>
<td>3mm</td>
<td>98.59mm</td>
<td>139.84mm</td>
<td>77 ~ 1240</td>
</tr>
<tr>
<td>Continuous Length Paper (29mm)</td>
<td>14</td>
<td>29mm</td>
<td>-</td>
<td>1.5mm</td>
<td>3mm</td>
<td>25.92mm</td>
<td>-</td>
<td>941 ~ 1246</td>
</tr>
<tr>
<td>Continuous Length Paper (62mm)</td>
<td>15</td>
<td>62mm</td>
<td>-</td>
<td>1.5mm</td>
<td>3mm</td>
<td>58.95mm</td>
<td>-</td>
<td>545 ~ 1240</td>
</tr>
<tr>
<td>Continuous Length Film-White (29mm)</td>
<td>16</td>
<td>29mm</td>
<td>-</td>
<td>1.5mm</td>
<td>3mm</td>
<td>25.92mm</td>
<td>-</td>
<td>941 ~ 1246</td>
</tr>
<tr>
<td>Continuous Length Film-White (62mm)</td>
<td>17</td>
<td>62mm</td>
<td>-</td>
<td>1.5mm</td>
<td>3mm</td>
<td>58.95mm</td>
<td>-</td>
<td>545 ~ 1240</td>
</tr>
<tr>
<td>Continuous Length Film-Yellow (62mm)</td>
<td>18</td>
<td>62mm</td>
<td>-</td>
<td>1.5mm</td>
<td>3mm</td>
<td>58.95mm</td>
<td>-</td>
<td>545 ~ 1240</td>
</tr>
<tr>
<td>Continuous Length Film-Clear (62mm)</td>
<td>19</td>
<td>62mm</td>
<td>-</td>
<td>1.5mm</td>
<td>3mm</td>
<td>58.95mm</td>
<td>-</td>
<td>545 ~ 1240</td>
</tr>
<tr>
<td>Continuous Length Paper (12mm)</td>
<td>1A</td>
<td>12mm</td>
<td>-</td>
<td>1.5mm</td>
<td>3mm</td>
<td>8.98mm</td>
<td>-</td>
<td>1117 ~ 1222</td>
</tr>
<tr>
<td>Removable (White)</td>
<td>21</td>
<td>62mm</td>
<td>-</td>
<td>1.5mm</td>
<td>3mm</td>
<td>58.95mm</td>
<td>-</td>
<td>012 ~ 707</td>
</tr>
<tr>
<td>Removable (Yellow)</td>
<td>22</td>
<td>62mm</td>
<td>-</td>
<td>1.5mm</td>
<td>3mm</td>
<td>58.95mm</td>
<td>-</td>
<td>012 ~ 707</td>
</tr>
<tr>
<td>4inch Continuous Length 102mm</td>
<td>39</td>
<td>101.6mm</td>
<td>-</td>
<td>1.5mm</td>
<td>3mm</td>
<td>98.59mm</td>
<td>-</td>
<td>77 ~ 1240</td>
</tr>
<tr>
<td>Continuous Length Paper (50 mm)</td>
<td>1B</td>
<td>50 mm</td>
<td>-</td>
<td>1.5mm</td>
<td>3mm</td>
<td>46.91mm</td>
<td>-</td>
<td>687 ~ 1240</td>
</tr>
</tbody>
</table>

The maximum length of continuous tape is 1 meter.
Characters

This system uses single-byte character codes and is installed with five bit-map fonts (Brougham, Letter Gothic bold, Brussels, Helsinki, and San Diego), and 3 out-line fonts (Letter Gothic, Brussels and Helsinki).

Fixed pitch or proportional pitch (PS pitch) can be specified for any of the fonts. However, there are fonts that are better with a fixed pitch and fonts that are better with a proportional pitch (PS pitch).

Fixed pitch fonts are: Brougham, Letter Gothic and Letter Gothic Bold.
Proportional pitch fonts are: Brussels, Helsinki, and San Diego.

Each bit-map font has three sizes: 24 dots, 32 dots, and 48 dots.
Each out-line font has 22 sizes: 33 dots-400 dots.
Character sizes

Each font is available in full size, reduced size (half width), double width, double height and half width, double height, and quadruple size.

The actual character size is slightly smaller than the nominal size (the parameter value received with the size command). (This varies depending on the font.)

<table>
<thead>
<tr>
<th></th>
<th>24</th>
<th>32</th>
<th>48</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal (dots)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height (dots)</td>
<td>21</td>
<td>28</td>
<td>44</td>
</tr>
<tr>
<td>Width (dot)</td>
<td>11</td>
<td>16</td>
<td>26</td>
</tr>
</tbody>
</table>

The above example is for Brougham (full size, no character styles applied)

The line-drawing characters (┘└├│┼┬┐┌, etc.) and shaded characters have the Brougham font applied regardless of the specified font and pitch setting (proportional or fixed).
Pitch

Pitch refers to the spacing between neighboring characters. When characters are arranged with a fixed pitch, they will be evenly spaced. If characters extend over several lines, they will align in straight rows.

![Fixed spacing](image)

When characters are arranged with a proportional pitch, the spacing will vary depending on the character. (For example, "W" is wide but "I" is narrow.) As a result, the excess space between characters is eliminated and the text appears more compact.

![Variable spacing](image)

If a fixed pitch is applied to a font that is better with a proportional pitch, all characters are given the same width as the widest character in the font.

![Fixed spacing](image)

This makes it possible to evenly space the characters of a proportional-pitch font without having to change the font. If a proportional pitch is applied to a font that is better with a fixed pitch, all characters are given the same width, appearing the same as with a fixed pitch.
Print position

The print position is the standard position for printing characters, bitmaps, and bar codes. There is a horizontal print position and vertical print position, which are the reference points for vertical position movement and horizontal position movement.

Characters are arranged with their top edges aligned with the print position. The baseline of each character is the bottom edge of the character, regardless of size, font, etc.

All characters on a single line are printed at baseline positions that are the same for each character. When characters of different heights are mixed together, they are aligned with the baseline of the tallest character on the line.
With horizontal printing, underlines are drawn 4 dots below the baseline position.
With vertical printing, underlines are drawn at the print position, and the characters start 4
dots below that.
With vertical printing, the characters are arranged with the vertical centerline for the font
aligned with the midpoint of the height of that line.
* The printing position for vertical printing of two lines of single-byte characters is
determined by assuming the position of a double-byte character, then arranging the 2
single-byte characters on the position for the double-byte character.
* The printing position for vertical printing of 1/4-size characters is determined by assuming
the position of a double-byte character, then vertically aligning the 1/4-size character with
the position of the double-byte character. (The horizontal position is the same as with
horizontal printing.)

Vertical printing

Bitmaps, bar codes, downloaded images

These types of image data are treated in the same way as characters and are printed with
the bottom edge of the image aligned with the baseline.

Same line
* Characters and images are considered to be on the same line, even if tabs are inserted.
* Horizontal movement to the right between characters or images is regarded as being on
the same line, however horizontal movement to the left is regarded as being on separate
lines if wrapping occurs.
Line feed amount

The amount of line feed is the amount of vertical movement from the print position of one line to the print position of the next line.

\[ \text{HHHHHHHHHHHHHH} \quad \text{Δ} \quad \text{HHHHHHHHHHHHHH} \]

The line feed amount is set with ESC 0, ESC 2, ESC A, and ESC 3.

- Within the same line of text, the tallest character is determined and the baseline is moved so that the top edge of that character is at the vertical print position.
- The tallest character on that line becomes the line height.
- If there is underlining, 4 dots are added to the line height.
  - With horizontal printing, they are attached to the bottom of the characters, with vertical printing to the top of the characters.
  - If underlined horizontal printing and underlined vertical printing are mixed on the same line, 8 dots are added to the line height.
- If the line height is greater than the set line feed amount, the line height is used as the actual line feed amount.
  - In this way, even if the set for line feed amount is small, the upper and lower lines will not overlap.
Document creation flow

Below is an explanation of the flow for creating documents.

A Switch command mode (ESC i a) Initialize (ESC @)

B Format Settings
   1. Select landscape orientation (ESC i L)
   2. Specify page length (ESC ( C)
   3. Specify print area
      Specify page format (ESC ( c)
      Left/right margins (ESC I, ESC Q)
   4. Specify line feed amount (ESC 0, ESC 2, ESC 3, ESC A)
   5. Specify tab positions
      Specify horizontal tab position (ESC D)
      Specify vertical tab position (ESC B)

C Print Operations
   1. Specify print position
      Specify vertical position (ESC ( v, ESC ( V, VT, ESC J)
      Specify horizontal position (ESC $, ESC ¥, HT, ESC a)
   2. Transfer print data (one line)
      Transfer necessary text operation codes (see D), bit images, bar codes, and
      downloaded data (see E).
   3. End of line, feed paper (CR, LF)
   4. Repeat 1–3 above.
   5. End of page, specify cutting (ESC i C), feed page (FF)
   6. Repeat 1–6 above.
   7. End of document
D Text operations

1. Specify character set
   - Select font (ESC k)
   - Select character code (ESC t)
   - Select international character set (ESC R)
   - Specify character size (ESC X)
   - Character spacing (ESC P, ESC M, ESC g, ESC SP)

2. Character style (ESC 4, ESC 5, ESC E, ESC F, ESC G,
   ESC H, ESC W, ESC SO, SI, ESC SI
   DC2, DC4, ESC -, ESC !)

3. Character code

Repeat 1–3 above as necessary.

E Bit image (ESC *, ESC K, ESC L, ESC Y, ESC Z)

- Bar code (ESC i B)
- 2D code (ESC i Q, ESC i V)
- Downloaded data (ESC i F)
  
  Downloaded image data must first be downloaded and saved on the main unit.
Control command details

Character/style selection commands

ESC R Select international character set

[ASCII] ESC R n
[Decimal] 27 82 n
[Hexadecimal] 1B 52 n
[Parameters] 0 ≤ n ≤ 13,64

[Description]
- Selects the international character set and changes some of the character codes in the code table according to the value of n.
  - n=0: U.S.A.
  - n=1: France
  - n=2: Germany
  - n=3: U.K.
  - n=4: Denmark
  - n=5: Sweden
  - n=6: Italy
  - n=7: Spain
  - n=8: Japan
  - n=9: Norway
  - n=10: Denmark II
  - n=11: Spain II
  - n=12: Latin America
  - n=13: South Korea
  - n=64: Legal
- The following 12 codes are changed:
  23h,24h,40h,5Bh,5Ch,5Dh,
  5Eh, 60h, 7Bh, 7Ch, 7Dh, 7Eh
- The default setting is n = 0 (U.S.A.)

[Example]
  Code
  5Ch ESC R 08h 5Ch FF
  Print result
  \ ¥
ESC q Select character style

[ASCII]  ESC  q  n
[Decimal]  27 113  n
[Hexadecimal]  1B  71  n
[Parameters]  0 ≤ n ≤ 3

[Description]
・Selects the character style.
  n=0:  Cancel (normal characters)
  n=1:  Outline
  n=2:  Shadow
  n=3:  Shadow and outline

[Example]
Code
  ABC ESC q 02h ABC ESC q 00h ABC FF
Print result
  ABCABCABC
ESC k Select font

[ASCII]    ESC k  n
[Decimal]   27 107  n
[Hexadecimal]  1B 6B  n
[Parameters]  0 ≤ n ≤ 4, 9 ≤ n ≤ 11
[Description]
- Selects the font.
  <Bit-map fonts>
    n=0  ··· Brougham (better with fixed pitch)
    n=1  ··· Letter Gothic bold (better with fixed pitch)
    n=2  ··· Brussels (better with proportional pitch)
    n=3  ··· Helsinki (better with proportional pitch)
    n=4  ··· San Diego (better with proportional pitch)
  <Out-line fonts>
    n=9  ··· Letter Gothic (better with fixed pitch)
    n=10 ··· Brussels (better with proportional pitch)
    n=11 ··· Helsinki (better with proportional pitch)
- The default value is n=0 Brougham (better with fixed pitch).
- In case font is changed from bit-map fonts to out-line fonts, character size is changed to default setting (42 dots).
- In case font is changed from out-line fonts to bit-map fonts, character size is changed to default setting (32 dots).

ESC t Select character code table

[ASCII]    ESC t  n
[Decimal]   27 116  n
[Hexadecimal]  1B 74  n
[Parameters]  n=0, 1, 2
[Description]
- From the two built-in character code tables, selects the character code table used.
  - n=0: Standard character code table
  - n=1: Eastern European character code table
  - n=2: Western European character code table
  - n=3: (Spare)
- The default setting is n = 0.
### Text printing commands

#### ESC 4 Apply italic style

<table>
<thead>
<tr>
<th>ASCII</th>
<th>ESC 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decimal</td>
<td>27 52</td>
</tr>
<tr>
<td>Hexadecimal</td>
<td>1B 34</td>
</tr>
</tbody>
</table>

- **Parameters**: None
- **Description**:
  - Applies italic character style.
  - This is valid for alphanumeric, kana, and kanji characters.
  - Although this command can be entered during vertical writing, it only applies to horizontal writing.

#### ESC 5 Cancel italic style

<table>
<thead>
<tr>
<th>ASCII</th>
<th>ESC 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decimal</td>
<td>27 53</td>
</tr>
<tr>
<td>Hexadecimal</td>
<td>1B 35</td>
</tr>
</tbody>
</table>

- **Parameter**: None
- **Description**:
  - Cancels italic character style.
- **Example**
  - **Code**
    ```
    ABC ESC 4 DEF ESC 5 GHI FF
    ```
  - **Print result**
    ```
    ABCDEFGHI
    ```
### ESC E Apply bold style

<table>
<thead>
<tr>
<th>[ASCII]</th>
<th>ESC E</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Decimal]</td>
<td>27  69</td>
</tr>
<tr>
<td>[Hexadecimal]</td>
<td>1B  45</td>
</tr>
</tbody>
</table>

**Parameters**: None

**Description**
- Prints subsequent print data bold.
- This is valid for alphanumeric, kana, and kanji characters.
- This command is valid anywhere in a text line.
- This command cancels any character style to normal.

### ESC F Cancel bold style

<table>
<thead>
<tr>
<th>[ASCII]</th>
<th>ESC F</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Decimal]</td>
<td>27  70</td>
</tr>
<tr>
<td>[Hexadecimal]</td>
<td>1B  46</td>
</tr>
</tbody>
</table>

**Parameters**: None

**Description**
- Cancels the bold style.
- This command is valid anywhere in a text line.
- This is valid for alphanumeric, kana, and kanji characters.

**Example**

**Code**

```
ABC ESC E DEF ESC F GHI FF
```

**Print result**

```
ABCDEF
```
ESC G Apply double-strike printing
[ASCII] ESC G
[Decimal] 27 71
[Hexadecimal] 1B 47
[Parameters] None
[Description]
  • Sets bold.
  • Prints subsequent print data bold.
  • This command is valid anywhere in a text line.
  • This is valid for alphanumeric, kana, and kanji characters.

ESC H Cancel double-strike printing
[ASCII] ESC H
[Decimal] 27 72
[Hexadecimal] 1B 48
[Parameters] None
[Description]
  • Cancels bold style.
  • This command is valid anywhere in a text line.
  • This is valid for alphanumeric, kana, and kanji characters.

[Example]
  Code
  ABC ESC E DEF ESC F GHI FF
  Print result
  ABCDEEGHI
ESC P Specify pica pitch

[ASCII] ESC P
[Decimal] 27 80
[Hexadecimal] 1B 50
[Parameters] None

[Description]
- Prints subsequent data (ANK characters) with pica pitch (10 characters/inch).
- This prints subsequent data (ANK characters) with pica pitch (10 characters/inch).
- If the character width is 30 dots or less, the character spacing is set to 30 minus the character width.
- If the character width exceeds 30 dots, the character spacing is set to the character width. (The space between characters is 0 dot.)
In this case, the pitch does not exactly equal the pica pitch.
- With double-width characters, the character spacing is doubled (60 dots).
- With half-width characters, the character spacing is cut in half (15 dots).
- When the character spacing is changed with ESC SP, the setting is updated.
- This command is invalid when proportional pitch is selected.
- In out-line fonts, the space between character is 0 dot.

<table>
<thead>
<tr>
<th>Setting (dots)</th>
<th>Full width</th>
<th>Double width</th>
<th>Half width</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 32 48</td>
<td>24 32 48</td>
<td>24 32 48</td>
</tr>
<tr>
<td>Brougham</td>
<td>11 16 26</td>
<td>22 32 52</td>
<td>6 8 13</td>
</tr>
<tr>
<td>Letter Gothic bold</td>
<td>10 14 22</td>
<td>20 28 44</td>
<td>5 7 11</td>
</tr>
<tr>
<td>Brussels</td>
<td>25 35 56</td>
<td>50 70 112</td>
<td>13 18 28</td>
</tr>
<tr>
<td>Helsinki</td>
<td>21 28 44</td>
<td>42 56 88</td>
<td>11 14 22</td>
</tr>
<tr>
<td>San Diego</td>
<td>24 35 57</td>
<td>48 70 114</td>
<td>12 18 29</td>
</tr>
</tbody>
</table>

The above table refers to characters with a fixed pitch. (Applying styles may increase the size.)

[Example] For a 24-dot font at full width

<table>
<thead>
<tr>
<th>Full width</th>
<th>Double width</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 dots</td>
<td>48 dots</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>6 dots</td>
<td>12 dots</td>
</tr>
</tbody>
</table>

24
ESC M Specify elite pitch

[ASCII] ESC M
[Decimal] 27 77
[Hexadecimal] 1B 4D
[Parameters] None
[Description]

- Prints subsequent data (ANK characters) with elite pitch (12 characters/inch).
- Character width is 25 dots (=300 dots/12 characters).
- Character spacing is 25 dots (=300 dots/12 characters).
- If the character width exceeds 25 dots, character spacing is set to character width. (Character spacing is 0 dot.)
  In this case, the pitch does not exactly equal the pica pitch.
- With double-width characters, the character spacing is doubled (50 dots).
- With half-width characters, the character spacing is reduced to 13 dots.
- When the character spacing is changed with ESC SP, the setting is updated.
- This command is invalid when proportional pitch is selected.
- In out-line fonts, the space between character is 0 dot.

[Example] For a 24-dot font at full width

<table>
<thead>
<tr>
<th>Full width</th>
<th>Double width</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 dots</td>
<td>48 dots</td>
</tr>
<tr>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>1 dots</td>
<td>2 dots</td>
</tr>
</tbody>
</table>
ESC g Specify micron pitch

[ASCII]   ESC g
[Decimal]  27 103
[Hexadecimal]  1B 67

[Parameters] None

[Description]
• Prints subsequent data (ANK characters) with micron pitch (15 characters/inch).
• Character spacing is 20 dots (=300 dots/15 characters).
• If the character width is 20 dots or less, character spacing is set to 20 minus the character width.
• If the character width exceeds 20 dots, character spacing is set to character width. (The character spacing is 0 dot.)

In this case, the pitch does not exactly equal the micron pitch.
• With double-width characters, the character spacing is doubled (40 dots).
• With half-width characters, the character spacing is reduced to 10 dots.
• When the character spacing is changed with ESC SP, the setting is updated.
• This command is invalid when proportional pitch is selected.
• In outline fonts, the space between character is 0 dot.

[Example] For an 11-dot font at full width

<table>
<thead>
<tr>
<th></th>
<th>Full width</th>
<th>Double width</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11 dots</td>
<td>22 dots</td>
</tr>
<tr>
<td></td>
<td>9 dots</td>
<td>18 dots</td>
</tr>
</tbody>
</table>

A          B

A          B
ESC p Specify proportional characters

[ASCII] ESC p  n
[Decimal] 27 112  n
[Hexadecimal] 1B 70  n
[Parameters] n=0,1,"0","1"

[Description]
- Specifies proportional characters.
- n=1 applies proportional characters.
- n=0 cancels proportional characters.

- When proportional characters are specified, the character spacing set with ESC SP is retained as is.
**ESC W Specify double width characters**

<table>
<thead>
<tr>
<th>[ASCII]</th>
<th>ESC W  n</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Decimal]</td>
<td>27  87 n</td>
</tr>
<tr>
<td>[Hexadecimal]</td>
<td>1B  57 n</td>
</tr>
<tr>
<td>[Parameters]</td>
<td>n=0,1 or 48,49</td>
</tr>
</tbody>
</table>

**Description**

- Specifies double-width characters.
- \( n = 1 \) or 49 specifies double-width characters.
- \( n = 0 \) or 48 cancels double-width characters.
- Double-width characters specified with this code is not cancelled with the DC4 or FS DC4 code or line feed.
- Canceling double width characters mode will also cancel half width mode.

**Example**

Code

```
ABC ESC W 1 ABC ESC W 0 ABC FF
```

Print result

```
ABCABCABC
```
SO Specify auto-cancelling enlarged characters

[ASCII]   SO
[Decimal]  14
[Hexadecimal]  0E
[Parameters]  None
[Description]

- Prints subsequent data at double width.
- This mode is cancelled with DC4, LF, VT, FF, or an automatic line feed.
- This mode is cancelled with ESC $ or ESC ¥.
- This mode can also be cancelled with ESC W+0.

ESC SO Specify auto-cancelling enlarged characters

[ASCII]  ESC SO
[Decimal]  27  14
[Hexadecimal]  1B  0E
[Parameters]  None
[Description]

- Same as SO

[Example]

Code
ABC ESC SO ABCDEFGHI J K...XYZ FF
Print result

ABCABCDEFGHI J K... (Automatic line feed)
XYZ
### SI Specify reduced characters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>ASCII</th>
<th>Decimal</th>
<th>Hexadecimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>SI</td>
<td>15</td>
<td>0F</td>
</tr>
</tbody>
</table>

**Description**
- Prints subsequent data at half width.

### ESC SI Specify reduced characters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>ASCII</th>
<th>Decimal</th>
<th>Hexadecimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>ESC SI</td>
<td>27 15</td>
<td>1B 0F</td>
</tr>
</tbody>
</table>

**Description**
- Same as SI

### DC2 Cancel reduced characters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>ASCII</th>
<th>Decimal</th>
<th>Hexadecimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>DC2</td>
<td>18</td>
<td>12</td>
</tr>
</tbody>
</table>

**Description**
- Cancels reduced characters specified with SI.
DC 4 Cancel auto-cancelling double-width characters

[ASCII]   DC4
[Decimal]  20
[Hexadecimal]  14
[Parameters] None

[Description]
・Cancels double-width characters specified with ESC SO, SO or FS SO.
・Does not cancel a setting made with ESC W.

[Example]
Code
   ABC ESC SO ABCDEF DC4 GHIJK FF
Print result
   ABCABCDEFGHIJK
**ESC – Applies/cancels underlining**

<table>
<thead>
<tr>
<th>ASCII</th>
<th>Escape Code</th>
<th>Parameter n</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC</td>
<td>-</td>
<td>n</td>
</tr>
</tbody>
</table>

**Parameters:**
- n = 0, 1, 2, 3, 4 or 48, 49, 50, 51, 52

**Description:**
- Applies or cancels underlining.
  - n = 4 applies 4-dot-wide underlining.
  - n = 3 applies 3-dot-wide underlining.
  - n = 2 applies 2-dot-wide underlining.
  - n = 1 applies 1-dot-wide underlining.
  - n = 0 cancels underlining.
- This command is valid anywhere in a text line.
- Underlining printed by this code forms a continuous underline.
  - Spaces between characters and words are also underlined.
  - Areas defined by specifying an absolute horizontal position (ESC $) or relative horizontal position (ESC ¥) are not underlined.
  - Areas defined by specifying an absolute horizontal position (ESC $) or relative horizontal position (ESC ¥) are not underlined.
  - 4/300 inch (4 dots) is added to the line feed amount for lines that include underlined characters.
  - With 1-dot-wide underlining, the underline is positioned as follows:
    - 2/300 inch (2 dots) below the characters
  - With 2-dot-wide underlining, the underline is positioned as follows:
    - Between 2/300 inch (2 dots) and 3/300 inch (3 dots) below the characters
  - With 3-dot-wide underlining, the underline is positioned as follows:
    - Between 1/300 inch (1 dot) and 3/300 inch (3 dots) below the characters
  - With 4-dot-wide underlining, the underline is positioned as follows:
    - Between 1/300 inch (1 dot) and 4/300 inch (4 dots) below the characters

```
ABCDE  ABCDE  ABCDE
    (1-dot width)  (3-dot width)
```
[Example]

Code

ABC ESC - 1 ABC ESC - 0 ABC FF

Print result

ABCABCABC
ESC ! Global formatting

[ASCII] ESC ! n
[Decimal] 27 33 n
[Hexadecimal] 1B 21 n
[Parameters] 0 ≤ n ≤ 255

[Description]

- Specifies a combination of print modes.
- Specifies modes depending on the bit value of n.
- When the ESC ! code is used, a combination of multiple print modes can be specified at one time.
- The priority order is: Bit 5 > Bit 2
- Bit 0 is available only if Bit 1 is 0.
- Canceling double width characters mode will also cancel half width mode.

<table>
<thead>
<tr>
<th>Bit</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cancel</td>
<td>Cancel</td>
<td>Cancel</td>
<td>Cancel</td>
<td>Cancel</td>
<td>Cancel</td>
<td>Cancel</td>
<td>12 cpi</td>
</tr>
<tr>
<td>0</td>
<td>Cancel</td>
<td>Cancel</td>
<td>Cancel</td>
<td>Cancel</td>
<td>Cancel</td>
<td>Cancel</td>
<td>Cancel</td>
<td>10 cpi</td>
</tr>
</tbody>
</table>

[Example] Specifying underlining and double-width characters at the same time.

Code

ABC ESC ! A0h ABC ESC ! 00h ABC FF

Print result

ABCABCABC
ESC SP Specify character spacing for ANK characters

[ASCII]  ESC  SP n
[Decimal]  27  32 n
[Hexadecimal]  1B  20 n

[Parameters]  0 ≤ n ≤ 127

[Description]

・Specifies the character spacing.
・n indicates the number of dots.
・The default setting is 0 dot.
・With double-width characters, the character spacing is doubled, with half-width characters, it is halved.
・This setting is available in ANK mode.
ESC X Specify alphanumeric/kana character size

[ASCII] ESC X m nL nH
[Decimal] 27 88 m nL nH
[Hexadecimal] 1C 58 m nL nH

[Parameters] Character width : The value of m is irrelevant.
character size:

<Bit-map fonts> nL = 24, 32, 48 dots
Available only when nH=0
<Out-line fonts>
nL=33, 38, 42, 46, 50, 58, 67, 75,
nL=83, 92, 100, 117, 133, 150,
nL=167, 200, 233
nH =0
nL=11, 44, 77, 111, 144
Available only when nH = 1

[Description]
• This command is used only to change the size.
• Outline must not be specified.
• Character width cannot be set.
• The character size is set to n = nL + nH * 256 dots.
• Width and height are the same.
• In case of bit-map fonts, only n = 24, 32, and 48 are available. In case of out-line fonts, only n = 33, 38, 42, 46, 50, 58, 67, 75, 83, 92, 100, 117, 133, 150, 167, 200, 233, 267, 300, 333, 367, 400 are available.
• The commands for specifying enlarged characters, reduced characters, character spacing for alphanumeric/kana characters (SO, ESC W, ESC !, ESC SP) remain available.

[Example] ABC in 24-dot font and DEF in 48-dot font

Code
ESC X 00h 18h 00h ABC
ESC X 00h 30h 00h DEF FF

Print result
ABCDEF
### Line feed commands

**ESC 0 Specify line feed of 1/8 inch**

<table>
<thead>
<tr>
<th>ASCII</th>
<th>ESC 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decimal</td>
<td>27 48</td>
</tr>
<tr>
<td>Hexadecimal</td>
<td>1B 30</td>
</tr>
<tr>
<td>Parameters</td>
<td>None</td>
</tr>
<tr>
<td>Description</td>
<td>Specifies a line feed of 1/8 inch (about 0.32 cm). Specifies a line feed of 38/300 inch (= 38 dots).</td>
</tr>
</tbody>
</table>

**ESC 2 Specify line feed of 1/6 inch**

<table>
<thead>
<tr>
<th>ASCII</th>
<th>ESC 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decimal</td>
<td>27 50</td>
</tr>
<tr>
<td>Hexadecimal</td>
<td>1B 32</td>
</tr>
<tr>
<td>Parameters</td>
<td>None</td>
</tr>
<tr>
<td>Description</td>
<td>Specifies a line feed of 1/6 inch (about 0.42 cm). Specifies a line feed of 50/300 inch (= 50 dots).</td>
</tr>
</tbody>
</table>

**ESC 3 Specify minimum line feed**

<table>
<thead>
<tr>
<th>ASCII</th>
<th>ESC 3 n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decimal</td>
<td>27 51 n</td>
</tr>
<tr>
<td>Hexadecimal</td>
<td>1B 33 n</td>
</tr>
<tr>
<td>Parameters</td>
<td>0 ≤ n ≤ 255</td>
</tr>
<tr>
<td>Description</td>
<td>Specifies a line feed of n/300 inch per line. The line feed unit is 1 dot.</td>
</tr>
</tbody>
</table>
ESC A Specify line feed of n/60 inch

[ASCII] ESC A n
[Decimal] 27 65 n
[Hexadecimal] 1B 41 n
[Parameters] 0 ≤ n ≤ 255

[Description]

- Specifies a line feed of n/60 inch.
- The line feed unit is 5 dots.
Horizontal direction movement commands

ESC I Specify left margin

[ASCII] ESC I n
[Decimal] 27 108 n
[Hexadecimal] 1B 6C n

[Parameters] 0 ≤ n ≤ 255
0 ≤ left margin < right margin

[Description]
・The left margin and the right margin use the left edge of the physically printable area as the reference.
・The space between the left edge of the physically printable area and the set number of columns is set as an unprinted area. The left margin position is the right edge of the specified column. (Character width * n)
・The setting is in the range 0 ≤ (character width * n) ≤ x. Settings outside that range are ignored. However, x is a value dependent on the media.
・The area between the left edge (first column) to the nth column is specified as an unprinted area.
・The position of the left margin is the character width * n (at the time that the left margin is set) from the left edge.

The character width when specifying the margin includes the settings for specifying character spacing, character spacing for full-width characters or half-width characters. In addition, when pitches of 10 cpi (= 30 dots), 12 cpi (= 25 dots), or 15 cpi (= 20 dots), reduced characters, or double-width characters are specified, that character width is considered the unit.

However, increases in the character width due to character styles are not applied.
Example: Left margin = Column 5; right margin = Column 14
• The horizontal direction print position is moved to the left margin position.
• If the left margin setting is not at the beginning of the line, the left margin is set after a line feed.
  The beginning of the line indicates the left margin position for left alignment; for right and center alignment, it means that no image or character is entered on the line.
• Even if the character width is changed after the left margin is set, the left margin position does not change.
• Any left margin setting that puts the left margin position to the right of the right margin position is ignored.
• When setting the left margin, set it at least one column (10 cpi = 30 dots) smaller than the right margin.
  \[\text{((the character width } \times \text{ n at the setting)} > (\text{number of dots of right margin } - 30 \text{ dots}) \rightarrow \text{the setting will be ignored.}]\]
• If the difference between the right margin position and the left margin position is less than one character, that character is ignored.
• When proportional pitch is specified with the ESC p command, a character width of 10 cpi (= 30 dot) is applied.
• If the print media is long tape, the print direction is landscape, and the page length is not specified, commands specifying the left margin are ignored.

[Example] The left margin is set to Column 3.

Code
  ABC CR ESC l 03h EFGHIJ FF

Print result
  ABC
  EFGHIJ
**ESC Q Specify right margin**

[ASCII]   ESC   Q   n
[Decimal]  27   81   n
[Hexadecimal]  1B   51   n

[Parameters] \(1 \leq n \leq 255\)

Left margin < character width \(\times n\) at time of setting = printable area

**Description**

・The left margin and the right margin use the left edge of the physically printable area as the reference.

・The left margin position is the right edge of the set column. (Character width \(\times n\))

・The setting is in the range \(0 \leq (\text{character width} \times n) \leq x\). Settings outside that range are ignored. However, \(x\) is a value dependent on the media.

・Left margin = print area < right margin

・The position of the right margin is the character width \(\times n\) (at the time that the right margin is set) from the left edge.

The character width when specifying the margin includes the settings for specifying character spacing, character spacing for full-width characters or half-width characters. In addition, when pitches of 10 cpi (= 30 dots), 12 cpi (= 25 dots), or 15 cpi (= 20 dots), reduced characters, or double-width characters are specified, that character width is considered the unit.

However, increases in the character width due to character styles are not applied.

・The horizontal printing position is moved to the left margin position.

・If the right margin setting is not at the beginning of the line, the right margin is set after a line feed.

The beginning of the line indicates the left margin position for left alignment; for right and center alignment, it means that no image or character is entered on the line.

・Even if the character width is changed after the right margin is set, the right margin position does not change.

・Any right margin setting that puts the right margin position to the left of the left margin position is ignored.

・When setting the right margin, set it at least one column (10 cpi = 30 dots) greater than the left margin.

(If the character width \(\times n\) at the time of setting < (left margin + 30 dots), the setting is ignored.)

・If the difference in the right margin position and the left margin position is less than one character, that character is ignored.
• When proportional pitch is specified with the ESC p command, a character width of 10 cpi (= 30 dot) is applied.
• If the print media is long tape, the print direction is landscape, and the page length is not specified, commands specifying the right margin are ignored.
CR Carriage return
[ASCII] CR
[Decimal] 13
[Hexadecimal] 0D
[Parameters] None
[Description]
  • Finalizes the input of a line and waits for input of the next line.
  • The next print position is the beginning of the next line.
  • A line feed command immediately after the carriage return is ignored.
  Specifying auto-cancelling double-width characters in ANK mode with SO or ESC SO is cancelled.
  • Same processing as LF.
ESC D Specify horizontal tab position

[ASCII]  ESC  D [n]  \0
[Decimal]  27 68  [n]  \0
[Hexadecimal]  1B 44  [n]  00h

[Parameters] 1=n=255
               0=k=32

[Description]
• The position of the horizontal tab is the character width * n (at the time that the horizontal tab is set) from the left margin.
• Enter n values in ascending order and end the setting with NUL.
• If an n value is smaller than the previous one, the tab setting is finished.
• Even if the character width is changed after the horizontal tab positions are set, those horizontal tab setting positions do not change.
• ESC D NUL deletes all horizontal tab positions.
• If the left margin is moved, the horizontal tab positions are moved along with it.
• Up to 32 horizontal tab positions can be set. However, horizontal tab positions beyond the right margin are invalid and only become valid when a change in the right margin setting or left margin setting moves the print area to those tab positions.
• The character width at the time that the horizontal tabs are set includes the command settings for specifying character spacing, full-width character spacing, or half-width character spacing. In addition, when the 10 cpi, 12 cpi, or 15 cpi pitch, reduced characters, or double-width characters are specified, that character width is considered the unit.
• When proportional pitch is specified with ESC p, horizontal tab positions are set at 10 cpi.
• When the unit is switched on, horizontal tab positions are set every 8 columns at 10 cpi. Even if the character width is changed before the horizontal tab positions are set, the horizontal tab positions do not change.
HT Apply horizontal tab

[ASCII] HT
[Decimal] 9
[Hexadecimal] 09

[Parameters] None

[Description]
- Moves the horizontal print position to the nearest horizontal tab position to the right of the input position.
- If there is no horizontal tab position to the right of the input position or the next horizontal tab position is beyond the right margin, the HT command is ignored.
- When underlining is specified, no underline is applied between the current position and the next horizontal tab position.
- When the unit is switched on, horizontal tab positions are set every 8 columns at 10 cpi. Even if the character width is changed before the horizontal tab positions are set, the horizontal tab positions do not change.
- This command is available only with left alignment.

[Example] Specifying horizontal tabs at Column 4, Column 8, and Column 12, and applying a horizontal tab

Code
ESC D 04h 08h 0Ah 00h
123456789012 CR A HT B HT C HT D FF

Print result
123456789012
A B C D
ESC $ Specify absolute horizontal position

[ASCII]   ESC   $  n1 n2
[Decimal] 27 36 n1 n2
[Hexadecimal]  1B 24 n1 n2

[Parameters]  0≤n1≤255 ,0≤n2≤255

[Description]

・Specifies in dots the absolute print position for the next data.
・An absolute print position specifies the next print position as the number of dots from the left margin.
・n1 and n2 indicate the number of dots from the left margin. (Number of dots = n1 + 256*n2)
・The dot spacing is calculated as 1/300 inch.
・The maximum number of dots that can be specified with n1 and n2 depends on the media.
・This command is available only with left alignment.

ESC ¥ Specify relative horizontal position

[ASCII]   ESC   ¥  n1 n2
[Decimal] 27 92 n1 n2
[Hexadecimal]  1B 5C n1 n2

[Parameters]  0≤n1≤255,0≤n2≤255

[Description]

・Specifies in dots the horizontal print position as a relative position from the current position.
・A relative position specifies the next print position as the number of dots from the current position.
・n1 and n2 indicate the number of dots from the current position. (Number of dots = n1 + 256*n2)
・The dot spacing is calculated as 1/300 inch.
・Left margin position = horizontal position after moving = right margin position
  Horizontal position after moving = n1 + n2*256
・The specified value for moving to the left is expressed as the 2's complement. It is determined by the following equation.
  n1 + n2 * 256 = 65536 - distance of actual movement
・This command is available only with left alignment.
ESC Specify alignment

[ASCII] ESC a n

[Decimal] 27 97 n

[Hexadecimal] 1B 61 n

[Parameters] 0≤n≤3 or "0"≤n="3"

[Description]

・The data is printed aligned as follows according to the value of n.
  n=0 specifies left alignment
  n=1 specifies center alignment
  n=2 specifies right alignment
  n=3 specifies nothing

・The default setting is n = 0.

・Data is aligned between the left and right margins with CR, LF, and FF code input and buffer printing.

・If the alignment setting is not at the beginning of the line, the alignment is set after a line feed.
  The beginning of the line indicates the left margin position for left alignment;
  for right and center alignment, it means that no image or character is entered on the line.

・HT, ESC ¥, ESC $ are ignored when n = 1 or n = 2.

・If the print media is long tape, the print direction is landscape, and the page length is not set, commands specifying alignment are ignored.
Vertical movement commands

LF Line feed

[ASCII]   LF
[Decimal]  10
[Hexadecimal]  0A
[Parameters] None

[Description]
・Feeds the paper by the amount set with the commands specifying the line feed amount (ESC 0, ESC 2, ESC 3, ESC A).
・The print position moves to the beginning of the next line.
・The default value is a 48-dot line feed.
・When a carriage return comes immediately after a line feed, the carriage return is ignored.
・Automatic cancellation of double-width characters in ANK mode with SO or ESC SO is cancelled.
・Same processing as CR

FF Page feed

[ASCII]   FF
[Decimal]  12
[Hexadecimal]  0C
[Parameters] None

[Description]
・Starts the printing.
・Data line of the characters and commands entered before this command is cleared after printing.
・At this time, automatic cancellation of double-width characters in ANK mode specified with SO or ESC SO is cancelled.
ESC J Forward paper feed

[ASCII]   ESC  J  n
[Decimal]  27  74  n
[Hexadecimal]  1B  4A  n
[Parameters]  0≤n≤255

[Description]

・Ends input for the current line and moves the vertical print position forward by n/300 inch (=1 dot).
・If the bottom margin setting is exceeded, printing starts.
・With left alignment, the print position for the next line is the end position of the current line. (The horizontal position does not move to the left margin.)

With right alignment and center alignment, the horizontal position moves to the beginning of the line.

Automatic cancellation of double-width characters in ANK mode specified with SO or ESC SO is cancelled.

Example: Performing a forward paper feed after the second row
ESC B Specify vertical tab position

[ASCII]   ESC  B  [n]  \kNUL
[Decimal]  27 66   [n]  \k0
[Hexadecimal]  1B 42  [n]  \00h

[Parameters]  1≤n≤255
0≤k≤16

[Description]
• The position of the vertical tab is the line feed amount * n (at the time that the vertical tab is set) from the top margin.
• Enter n values in ascending order and end the setting with NUL.
• If an n value is smaller than the previous one, the tab setting is finished.
• Up to 16 vertical tabs can be set.
• To cancel all vertical tab positions, use ESC B NUL.
• Vertical tab positions can be set regardless of the setting of the bottom margin position. However, any vertical tab position outside the print area (beyond the bottom margin position) is invalid and only becomes valid when a change in the top or bottom margin position moves the print area to that vertical tab.
• Move to a vertical tab position with VT.
• When changing vertical tab positions, they must all be reset.
• If the top margin is moved, the vertical tab positions are also moved by the same amount.
• Even if the line feed amount is changed after the vertical tab positions are set, those vertical tab setting positions do not change.
• Performing a VT when no vertical tabs is set is equal to performing a CR.
VT Apply vertical tab

[ASCII] VT
[Decimal] 11
[Hexadecimal] 0B
[Parameters] None

[Description]

- Moves the print position to the nearest vertical tab position down from the input position.
- The next horizontal print position is the beginning of the line.
- If the next vertical tab position exceeds the bottom margin, or if there is no vertical tab position set below the current position, performing a VT is equal to performing an FF. (Movement to the TOF position for the next page)

Example: Vertical tabs are set to Lines 6, 11, and 15, and data is entered while VT is performed

- In the default state and when all the vertical tab positions have been cancelled with ESC B NUL, performing a VT is equal to performing a CR.
- Automatic cancellation of double-width characters in ANK mode with SO or ESC SO is cancelled.
**ESC (V Specify absolute vertical position**

<table>
<thead>
<tr>
<th>[ASCII]</th>
<th>ESC ( V mL nL nH mL mH</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Decimal]</td>
<td>27 40 86 nL nH mL mH</td>
</tr>
<tr>
<td>[Hexadecimal]</td>
<td>1B 28 56 nL nH mL mH</td>
</tr>
</tbody>
</table>

**Parameters**
- nL=2
- nH=0
- $0 \leq mL \leq 255$
- $0 \leq mL \leq 127$

**Description**
- Specifies the vertical print position as an absolute position from the top margin position. Vertical position = mL * 256 + top margin
- The absolute vertical position is measured from the top margin position at the time.
- If a position exceeding the bottom margin is specified, printing starts.
- There is no restriction on the amount of movement back (upward) from the current position.
- With left alignment, the print position for the next line is the end position of the current line. (The horizontal position does not move to the left margin.)
- With right alignment and center alignment, the horizontal position moves to the beginning of the line.
- Automatic cancellation of double-width characters specified in ANK mode with SO or ESC SO is cancelled.
ESC (v Specify relative vertical position

[ASCII] ESC ( v nL nH mL mH
[Decimal] 27 40 118 nL nH mL mH
[Hexadecimal] 1B 28 76 nL nH mL mH
[Parameters] nL=2
  nH=0
  0\leq mL \leq 255
  0\leq mH \leq 127
  -16384 \leq (mL + mH \times 256) \leq 16383

[Description]
  • Specifies the vertical print position as a relative position from the current position.
    Vertical position after movement = mL + mH * 256 + current position
  • When moving upwards, the specified value is expressed as a 2’s complement. It is
    determined by the following equation.
    mL + mH \times 256 = 65536 – amount of actual movement
  • Settings moving the print position above the top margin are ignored.
  • If a position exceeding the bottom margin is specified, printing starts.
  • With left alignment, the print position for the next line is the end position of the current
    line. (The horizontal position does not move to the left margin.)
  With right alignment and center alignment, the horizontal position moves to the
  beginning of the line.
  Automatic cancellation of double-width characters in ANK mode with SO or ESC SO is
  cancelled.

Abcdefg
ABC
\[\textit{SDFASG}\]

Abcdefg
ABC
\[\textit{SDFASG}\]

Abcdefg
ABC
\[\textit{SDFASG}\]

\textbf{Left alignment} \hspace{1cm} \textbf{Center alignment} \hspace{1cm} \textbf{Right alignment}

Example: Specifying a vertical position after the second row and moving to it
Paper formatting

ESC (c Specify page format

<table>
<thead>
<tr>
<th>ASCII</th>
<th>ESC</th>
<th>c nL nH tL tH BL BH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decimal</td>
<td>27</td>
<td>40 99 nL nH tL tH BL BH</td>
</tr>
<tr>
<td>Hexadecimal</td>
<td>1B</td>
<td>28 63 nL nH tL tH BL BH</td>
</tr>
<tr>
<td>Parameters</td>
<td>nL=4,nH=0</td>
<td></td>
</tr>
</tbody>
</table>

\[(tL + tH \times 256) < (BL + BH \times 256)\]  
Top margin < bottom margin

[Description]
- Specifies settings for the top and bottom margins.
- The physically printable area depends on the media.
  The top margin and the bottom margin are set in units of 1/30 inch (= 1 dot) using the top edge of the physically printable area as the reference.
  (The left margin and the right margin use the left edge of the physically printable area as the reference.)
  
  Top margin = tL + tH \times 256
  Bottom margin = BL + BH \times 256
- The top margin position is the TOF in the vertical direction.
- All text content before this is cleared.
- The character baseline for the first line is 24/300 inch (24 dots) below the top margin.
- When this code is set, previously set top and bottom margins are deleted.
- The standard unit is not used.
- If the print media is long tape and, the print direction is landscape, and the page length is not set, commands specifying the page format are ignored.
ESC (C Specify page length

[ASCII] ESC ( C nL nH mL mH
[Decimal] 27 40 67 nL nH mL mH
[Hexadecimal] 1B 28 43 nL nH mL mH

[Parameters] nL=2,nH=0

0< (mL+mH*256) <12000

[Description]

・Specifies the page length.
・The unit is 1/300 inch (= 1 dot).

Page length = mL + mH * 256
・The current paper position is set as the TOF.
・The top and bottom margins are deleted with ESC ( c.
・The standard unit is not used.
・This command is available only with long tape.

Inch, mm, and dot conversion table

<table>
<thead>
<tr>
<th>inch</th>
<th>mm</th>
<th>Number of dots</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>25.4</td>
<td>300</td>
</tr>
<tr>
<td>2</td>
<td>50.8</td>
<td>600</td>
</tr>
<tr>
<td>3</td>
<td>76.2</td>
<td>900</td>
</tr>
<tr>
<td>4</td>
<td>101.6</td>
<td>1200</td>
</tr>
<tr>
<td>5</td>
<td>127.0</td>
<td>1500</td>
</tr>
<tr>
<td>6</td>
<td>152.4</td>
<td>1800</td>
</tr>
<tr>
<td>7</td>
<td>177.8</td>
<td>2100</td>
</tr>
<tr>
<td>8</td>
<td>203.2</td>
<td>2400</td>
</tr>
<tr>
<td>9</td>
<td>228.6</td>
<td>2700</td>
</tr>
<tr>
<td>10</td>
<td>254.0</td>
<td>3000</td>
</tr>
<tr>
<td>11</td>
<td>279.4</td>
<td>3300</td>
</tr>
<tr>
<td>12</td>
<td>304.8</td>
<td>3600</td>
</tr>
<tr>
<td>13</td>
<td>330.2</td>
<td>3900</td>
</tr>
<tr>
<td>14</td>
<td>355.6</td>
<td>4200</td>
</tr>
<tr>
<td>15</td>
<td>381.0</td>
<td>4500</td>
</tr>
<tr>
<td>16</td>
<td>406.4</td>
<td>4800</td>
</tr>
<tr>
<td>17</td>
<td>431.8</td>
<td>5100</td>
</tr>
<tr>
<td>18</td>
<td>457.2</td>
<td>5400</td>
</tr>
<tr>
<td>19</td>
<td>482.6</td>
<td>5700</td>
</tr>
<tr>
<td>20</td>
<td>508.0</td>
<td>6000</td>
</tr>
</tbody>
</table>
Printer control commands

ESC @ Initialize

<table>
<thead>
<tr>
<th>Item</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input buffer</td>
<td>Save</td>
</tr>
<tr>
<td>Test buffer</td>
<td>Clear</td>
</tr>
<tr>
<td>Print buffer</td>
<td>Clear</td>
</tr>
<tr>
<td>Top margin</td>
<td>0 dot</td>
</tr>
<tr>
<td>Bottom margin</td>
<td>Depends on media</td>
</tr>
<tr>
<td>Left margin</td>
<td>0 dot</td>
</tr>
<tr>
<td>Right margin</td>
<td>Depends on media</td>
</tr>
<tr>
<td>Line feed amount</td>
<td>48 dots</td>
</tr>
<tr>
<td>Horizontal tab positions</td>
<td>Horizontal tab every 8 characters</td>
</tr>
<tr>
<td></td>
<td>(with 10-cpi character width)</td>
</tr>
<tr>
<td>Vertical tab positions</td>
<td>None</td>
</tr>
<tr>
<td>ANK character size</td>
<td>32 dots</td>
</tr>
<tr>
<td>ANK character spacing</td>
<td>0 dot</td>
</tr>
<tr>
<td>Proportional pitch</td>
<td>Off</td>
</tr>
<tr>
<td>International character set</td>
<td>USA</td>
</tr>
<tr>
<td>ANK character style</td>
<td>Off</td>
</tr>
<tr>
<td>Reduced</td>
<td>Off</td>
</tr>
<tr>
<td>Horizontal print position</td>
<td>Top margin position (TOF position)</td>
</tr>
<tr>
<td>Vertical print position</td>
<td>Left margin position</td>
</tr>
<tr>
<td>Landscape setting</td>
<td>Off</td>
</tr>
<tr>
<td>Page length setting</td>
<td>Off</td>
</tr>
<tr>
<td>Cut setting</td>
<td>Off</td>
</tr>
</tbody>
</table>
Graphics commands

**ESC * Select bit image**

**[ASCII]** ESC  *  m n1 n2 Data

**[Decimal]** 27  42 m n1 n2 Data

**[Hexadecimal]** 1B  2A m n1 n2 Data

**[Parameters]** m=0,1,2,3,4,6,32,33,38,39,40

0≤n1≤255, 0≤n2≤11

The image data is n1 + n2*256 bytes when m = 0,1,2,3,4,6;

(n1+n2*256)*3 bytes when m = 32,33,38,39,40

(n1+n2*256)*6 bytes when m = 71,72,73

**[Description]**

・Selects and outputs a bit image according to the value of m.

・n1 and n2 indicate the number of dot positions.
  
  n1: the remainder from dividing the number of dot positions by 256.

  n2: the quotient from dividing the number of dot positions by 256.

<table>
<thead>
<tr>
<th>m</th>
<th>Horizontal dot density</th>
<th>Vertical dot density</th>
<th>Horizontal dot resolution</th>
<th>Vertical dot resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>60DPI</td>
<td>60DPI</td>
<td>6/300 inch</td>
<td>6/300 inch</td>
</tr>
<tr>
<td>1</td>
<td>120DPI</td>
<td>60DPI</td>
<td>3/300 inch</td>
<td>6/300 inch</td>
</tr>
<tr>
<td>2</td>
<td>120DPI</td>
<td>60DPI</td>
<td>3/300 inch</td>
<td>6/300 inch</td>
</tr>
<tr>
<td>3</td>
<td>240DPI</td>
<td>60DPI</td>
<td>2/300 inch</td>
<td>6/300 inch</td>
</tr>
<tr>
<td>4</td>
<td>80DPI</td>
<td>60DPI</td>
<td>4/300 inch</td>
<td>6/300 inch</td>
</tr>
<tr>
<td>6</td>
<td>90DPI</td>
<td>60DPI</td>
<td>4/300 inch</td>
<td>6/300 inch</td>
</tr>
<tr>
<td>32</td>
<td>60DPI</td>
<td>180DPI</td>
<td>6/300 inch</td>
<td>2/300 inch</td>
</tr>
<tr>
<td>33</td>
<td>120DPI</td>
<td>180DPI</td>
<td>3/300 inch</td>
<td>2/300 inch</td>
</tr>
<tr>
<td>38</td>
<td>90DPI</td>
<td>180DPI</td>
<td>4/300 inch</td>
<td>2/300 inch</td>
</tr>
<tr>
<td>39</td>
<td>180DPI</td>
<td>180DPI</td>
<td>2/300 inch</td>
<td>2/300 inch</td>
</tr>
<tr>
<td>40</td>
<td>360DPI</td>
<td>180DPI</td>
<td>1/300 inch</td>
<td>2/300 inch</td>
</tr>
</tbody>
</table>

・Horizontally neighboring dots are not omitted.
When \( m = 0, 1, 2, 3, 4, 6 \)

- \( n_1 \) and \( n_2 \) indicate the number of dot positions.
  - \( n_1 \): the remainder from dividing the number of dot positions by 256
  - \( n_2 \): the quotient from dividing the number of dot positions by 256

First, the data is lined up in one row as follows:

One dot of the image data is enlarged as follows according to the value of \( m \).

As a result, the image is sized depending on the value of \( m \) as follows:

\[
\begin{align*}
\text{m = 0} & \quad 48 \text{ dots vertically } \times (n_1 + n_2 \times 256) \times 6 \text{ dots horizontally} \\
\text{m = 1} & \quad 48 \text{ dots vertically } \times (n_1 + n_2 \times 256) \times 3 \text{ dots horizontally} \\
\text{m = 2} & \quad 48 \text{ dots vertically } \times (n_1 + n_2 \times 256) \times 3 \text{ dots horizontally} \\
\text{m = 3} & \quad 48 \text{ dots vertically } \times (n_1 + n_2 \times 256) \times 2 \text{ dots horizontally} \\
\text{m = 4} & \quad 48 \text{ dots vertically } \times (n_1 + n_2 \times 256) \times 4 \text{ dots horizontally} \\
\text{m = 6} & \quad 48 \text{ dots vertically } \times (n_1 + n_2 \times 256) \times 4 \text{ dots horizontally}
\end{align*}
\]
When \( m = 32, 33, 38, 39, 40 \)

- \( n_1 \) and \( n_2 \) indicate the number of dot positions.
  - \( n_1 \): the remainder from dividing the number of dot positions by 256
  - \( n_2 \): the quotient from dividing the number of dot positions by 256

<table>
<thead>
<tr>
<th>1st byte</th>
<th>2nd byte</th>
<th>3rd byte</th>
</tr>
</thead>
<tbody>
<tr>
<td>B7 B6 B5</td>
<td>B4 B3 B2</td>
<td>B1 B0</td>
</tr>
<tr>
<td>B7 B6 B5</td>
<td>B4 B3 B2</td>
<td>B1 B0</td>
</tr>
<tr>
<td>B7 B6 B5</td>
<td>B4 B3 B2</td>
<td>B1 B0</td>
</tr>
</tbody>
</table>

First, the data is lined up in three rows as follows:

\[
(n_1 + n_2 \times 256) \times 3 \text{ byte}
\]
One dot of the image data is enlarged as follows according to the value of $m$.

$m = 32$ 48 dots vertically x $(n1 + n2 \times 256)$ * 6 dots horizontally
$m = 33$ 48 dots vertically x $(n1 + n2 \times 256)$ * 3 dots horizontally
$m = 38$ 48 dots vertically x $(n1 + n2 \times 256)$ * 4 dots horizontally
$m = 39$ 48 dots vertically x $(n1 + n2 \times 256)$ * 2 dots horizontally
$m = 40$ 48 dots vertically x $(n1 + n2 \times 256)$ * 1 dots horizontally

As a result, the image is sized depending on the value of $m$ as follows:
When $m = 71, 72, 73$

- n1 and n2 indicate the number of dot positions.
  - n1: the remainder from dividing the number of dot positions by 256
  - n2: the quotient from dividing the number of dot positions by 256

Relationship between the image data and the dots
First, the data is lined up in three rows as follows:

![Diagram of data lined up in three rows]

… One dot of the image data is enlarged as follows according to the value of m.

\[
m = 71 \quad \text{m = 72} \quad \text{m = 73}
\]

• As a result, the image is sized depending on the value of m as follows:

\[
\begin{align*}
m = 71 & \quad 48 \text{ dots vertically } \times (n_1 + n_2 \times 256) \times 2 \text{ dots horizontally} \\
m = 72 & \quad 48 \text{ dots vertically } \times (n_1 + n_2 \times 256) \times 1 \text{ dots horizontally} \\
m = 73 & \quad 48 \text{ dots vertically } \times (n_1 + n_2 \times 256) \times 1 \text{ dots horizontally}
\end{align*}
\]

ESC K 8-dot standard-density bit image

[ASCII] ESC K n1 n2 Data
[Decimal] 27 75 n1 n2 Data
[Hexadecimal] 1B 4B n1 n2 Data
[Parameters] 0 ≤ n1 ≤ 255, 0 ≤ n2 ≤ 3

The data contains n1 + n2 * 256 byte image data.

[Description]
Specifies that an 8-dot standard-density bit image is printed with the number of dot positions indicated by n1 and n2.

• n1 and n2 indicate the number of dot positions.
n1: the remainder from dividing the number of dot positions by 256
n2: the quotient from dividing the number of dot positions by 256

First, the data is lined up in one row as follows:

Relation between the image data and the dots

- One dot of image data is enlarged to 6 dots vertically by 6 dots horizontally.

- As a result, the image is 48 dots vertically by (n1 + n2 * 256) * 6 dots horizontally.
ESC L 8-dot double-density bit image

[ASCII]    ESC  L n1 n2 Data
[Decimal]  27   76 n1 n2 Data
[Hexadecimal]  1B  4C n1 n2 Data

[Parameters] 0 ≤ n1 ≤ 255, 0 ≤ n2 ≤ 3

The data contains n1 + n2 * 256 byte image data.

[Description]
Specifies that an 8-dot double-density bit image is printed with the number of dot positions indicated by n1 and n2.

- n1 and n2 are specified in the same way as for ESC K.
- First, the data is lined up in one row as follows:

```
      1  1  1  1  1  1
     b b b b b b
    y y y y y y
   t t t t t t
  e e e e e e
```

- One dot of image data is enlarged to 6 dots vertically by 3 dots horizontally.

- As a result, the image is 48 dots vertically by (n1 + n2 * 256) * 3 dots horizontally.
ESC Y 8-dot double-speed double-density bit image

[ASCII]   ESC  Y n1 n2 Data
[Decimal]   27  89 n1 n2 Data
[Hexadecimal]   1B  59 n1 n2 Data

[Parameters] $0 \leq n1 \leq 255, 0 \leq n2 \leq 3$

The data contains $n1 + n2 \times 256$ byte image data.

[Description]
- Same as for an 8-dot double-density bit image. Horizontally neighboring dots are not omitted.

ESC Z 8-dot quadruple-density bit image

[ASCII]   ESC  Z n1 n2 Data
[Decimal]   27  90 n1 n2 Data
[Hexadecimal]   1B  5A n1 n2 Data

[Parameters] $0 \leq n1 \leq 255, 0 \leq n2 \leq 7$

The data contains $n1 + n2 \times 256$ byte image data.

[Description]
Specifies that an 8-dot double-density bit image is printed with the number of dot positions indicated by $n1$ and $n2$.
- $n1$ and $n2$ are specified in the same way as for ESC K.
- Horizontally neighboring dots are not omitted.
- First, the data is lined up in one row as follows:

```
<table>
<thead>
<tr>
<th>1</th>
<th>1</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>b</td>
<td>b</td>
<td>b</td>
</tr>
<tr>
<td>y</td>
<td>y</td>
<td>y</td>
<td>y</td>
</tr>
<tr>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
</tr>
</tbody>
</table>
```

- One dot of image data is enlarged to 6 dots vertically by 2 dots horizontally.

```
. 
```

- As a result, the image is 48 dots vertically by $(n1 + n2 \times 256) \times 2$ dots horizontally.
Advanced commands

ESC i B Bar code

[ASCII]  ESC  i  [Parameters]  B or b  [Bar code data]  Backslash
[Hexadecimal]  1B  69  [Parameters]  42  or  62  [Bar code data]  5C

[Parameters]

1) [Parameters]:  Bar code parameters
   T or t  (type)
      t0 :  CODE39
      t1 :  INTERLEAVED 2 OF 5
      t5 :  EAN-8,EAN-13,UPC-A
      t6 :  UPC-E
      t9 :  CODABAR
      ta :  CODE128
      tb :  EAN128
      tc :  RSS symbols
   s (style)  Ignored
   p (number of passes)  Ignored
   R or r (characters below bar code)
      r0 :  OFF
      r1 :  ON
   u (units of measurement)  Ignored
   x (horizontal position)  Ignored
   y (vertical offset)  Ignored
   h (height)
      h n1 n2
      Height = n1 + n2*256 (dots)
      48 ≤ height ≤ 480
      If height < 48, height = 48
      If height > 480, height = 480

   However, this is as shown below with tc.
      131 ≤ height ≤ 1296 (RSS-14 Standard)
      71 ≤ height ≤ 1296 (RSS-14 Truncated)
      71 ≤ height ≤ 1296 (RSS-14 Stacked)
      239 ≤ height ≤ 1296 (RSS-14 Stacked Omni)
62 ≤ height ≤ 1296 (RSS Limited)
134 ≤ height ≤ 1296 (RSS Expanded)
If height < min., height = min.
If height > max., height = max.
(A bar code with a large number of stacked rows may be considered out of specifications and unreadable by the reader.)

w (width)
w0: extra small
w1: small
w2: medium
w3: large

E or e (parentheses deletion)
e0: ON
e1: OFF

o (RSS symbols model)
o0: RSS-14 Standard
o1: RSS-14 Truncated
o2: RSS-14 Stacked
o3: RSS-14 Stacked Omnidirectional
o4: RSS Limited
o5: RSS Expanded Standard
o6: RSS Expanded Stacked

c (number of horizontal characters for RSS Expanded Stacked)
c No. of horizontal characters
This must be an even value where 2 ≤ no. of horizontal characters ≤ 20.

z (ratio between thick and thin bars)
z0: (2:1)
z1: (2.5:1)
z2: (3:1)

f (equalize bar lengths)
f0: ON
f1: OFF

*Notes:
• For parameter numerals 0–9, both 00H–09H and 30H–39H are recognized.
• The parameter types a, b and c are recognized even when uppercase.
• The parameter “parentheses deletion” is available only when EAN128 is selected.
• The parameter “ratio between thick and thin bars” is available only when t0, t1 or t9 is selected.
• The parameter “equalize bar lengths” is available only when t5 or t6 is selected.
• When another type is selected, these parameters are ignored.
• When there is no type command or an invalid type command is specified, Code 39 is set.
• The number of bar code characters that can be entered for each type is as follows:
  t0:  2–50 characters (* is not included)
  t1:  3–64 characters
  t5:  7 characters (for EAN-8)
       12 characters (for EAN-13)
       11 characters (for UPC-A)
  t6:  6 characters
  t9:  4–64 characters (Must begin and end with A, B, C, or D.)
  ta:  1–64 characters
  tb:  1–64 characters
  tc:  3–15 characters (begins with “01”) (except with RSS Expanded)
       1–64 numbers or 1–40 letters* (for RSS Expanded)
* ISO646 characters can be printed.
   (numbers, letters, spaces, !, ”, %, &, ’, (, ), *, +, -, /, :, ;, <, =, >, ? and _)

② B or b : Beginning of bar code data

③ [Bar code data]:  Bar code data
   ? (Generate check digit)
   Generates a check digit if there is “?” in the bar code data.
The position of “?” is irrelevant as long as “?” is within the bar code data.
With Code128 and EAN128, no check digit is generated.
If “?” is inserted, it is treated as bar code data.

④ Backslash:  End of bar code data
   [When the type is Code39, Interleaved 2 of 5, EAN-8, EAN-13, UPC-A, UPC-E, CODABAR or RSS symbols]
   ESC i [Parameter]  B or b [Bar code data] \ 
   [When the type is Code128 or EAN128]
   ESC i [Parameter]  B or b [Bar code data] \ \ \
[Description]

- This specifies a bar code image.
- Any data exceeding the right margin is ignored.
- Since the check digit is generated automatically from the bar code data, the check digit is not sent as bar code data. Since the bar code data is also checked, the data would not be correctly recognized if the check digit data was present.
- With Code39, Interleaved 2 of 5, CODABAR, Code128, EAN128 or RSS Expanded, the buffer length for the bar code image is about 22 cm. A bar code longer than 22 cm will not be printed.
- The characters that can be printed with Code128 and EAN128 are the 128 ASCII characters and the special codes FNC1, FNC2, FNC3 and FNC4.
- Codes assigned to the special codes
  - FNC1: 86H
  - FNC2: 81H
  - FNC3: 80H
  - FNC4: 84H
- The control codes and special codes appear as spaces when characters are printed below Code128 and EAN128 bar codes.
- Special code FNC1 can also be printed with RSS Expanded. This special code also appears as a space when characters are printed below the bar code.
- Code assigned to the special code
  - FNC1: 86H
ESC i Q 2D Bar code QR codes

[ASCII] ESC i Q or q Data
[Decimal] 27 105 81 or 113 Data
[Hexadecimal] 1B 69 51 or 71 Data

- Format
  ESC i Q or q [Parameters] [Bar code data] \ \ \ ① ② ③

① Parameters
  Unlike with 1D bar codes, it is necessary to specify all parameters from the top down.
  If a value other than those listed is entered for a parameter, that parameter is set to its default value.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cell size</td>
<td>3</td>
<td>Sets the dot size per cell side.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Prints 3 dots per cell side.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Prints 4 dots per cell side.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Prints 5 dots per cell side.</td>
</tr>
<tr>
<td>2. Symbol type</td>
<td>1</td>
<td>Model 1 (default value)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Model 2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Micro QR</td>
</tr>
<tr>
<td>3. Linkage setting</td>
<td>0</td>
<td>Do not link.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Link.</td>
</tr>
<tr>
<td>4. Code number</td>
<td>1–16</td>
<td>Shows the number of the QR code that is linked.</td>
</tr>
<tr>
<td>5. Number of partitions</td>
<td>2–16</td>
<td>Shows the total number of QR codes linked.</td>
</tr>
<tr>
<td>6. Parity data</td>
<td>0–FF</td>
<td>The value of exclusively OR'ing all the print data (print data before partition) in bytes</td>
</tr>
<tr>
<td>7. Error correction level</td>
<td>1</td>
<td>High-density level L 7%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Standard level M 15% (default value)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>High-reliability level Q 25%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Ultra-high-reliability level H 30%</td>
</tr>
<tr>
<td>8. Data input method</td>
<td>0</td>
<td>Auto input (default value)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Manual input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selects numbers, English alphanumeric characters, kanji, binaries.</td>
</tr>
</tbody>
</table>
Supplement What is the QR code linkage setting?

With QR codes, there are linkage settings.

A long character string can be partitioned into 2 to 16 partitions and printed.
With the ESC/P command, it is necessary to input only the number of partitions.
For example, if the print data is partitioned into 3 partitions, the bar code data is as follows:

```
ESC i Q or q [1st parameter] [1st set of bar code data]  \ \ \ 
ESC i Q or q [2nd parameter] [2nd set of bar code data]  \ \ \ 
ESC i Q or q [3rd parameter] [3rd set of bar code data]  \ \ \ 
```

3. Linkage Setting: This determines whether or not the bar code data is partitioned with the linkage setting. When not partitioned, input 0.

When not partitioning, the values of 4 (code number), 5 (number of partitions), and 6 (parity data) are ignored; therefore, input 0 as a dummy value for these parameters.

4. Code number: The code number shows which number the ESC/P command for that QR code is.

For example, if there are four partitions, for the second ESC/P command, this is 2; for the fourth ESC/P command, this is 4.

5. Number of partitions: For the number of partitions, input the number of existing partitions.

6. Parity data is the value of exclusively OR'ing all the print data (print data before partition) in bytes. The same value is input here as for the partitioned QR code ESC/P command to show that these codes are linked.

**What is exclusive OR'ing in bytes?**
The data is exclusively OR'ed (XOR'ed) in bytes and in order.
For example, if the character string is put into hexadecimal, this gives 0x31, 0x32, 0x33, 0x34.

```
XOR of 0x31 and 0x32  0011 0001 ^= 0011 0010  Result:  0000 0011 (0x03)
XOR of 0x03 and 0x33  0000 0011 ^= 0011 0011  Result:  0011 0000 (0x30)
XOR of 0x30 and 0x34  0011 0000 ^= 0011 0100  Result:  0000 0100 (0x04)
```
Therefore, the parity is 0x04.

Note: If this parity value is incorrect, the correct QR code is not generated.

Summary

Printing the character string "123456789" with a cell size of 4 dots, Model 2, standard error correction level, and automatic data input

- No linkage

```
ESC i Q  0x04  0x02  0x00  0x00  0x00  0x02  0x00 123456789 \ \ \ 
```
With linkage.  [Three partitions]  (The parity for the character string "123456789" is 0x31.)

ESC i Q 0x04 0x02 0x01 0x01 0x03 0x31 0x02 0x00 "123" \\ \  
ESC i Q 0x04 0x02 0x01 0x02 0x03 0x31 0x02 0x00 "456" \\ \  
ESC i Q 0x04 0x02 0x01 0x03 0x03 0x31 0x02 0x00 "789" \\ \  

2 [Bar code data]:  Bar code data
When manual input is selected in 8 (data input method of the parameters), the bar code data must be preceded with one of the following single-byte alphanumeric characters.

<table>
<thead>
<tr>
<th>Type</th>
<th>Character(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number input</td>
<td>N or n</td>
</tr>
<tr>
<td>Alphanumeric input</td>
<td>A or a</td>
</tr>
<tr>
<td>Kanji input</td>
<td>K or k</td>
</tr>
<tr>
<td>Binary input</td>
<td>B or b + 4 digits of numbers</td>
</tr>
</tbody>
</table>

Specify numbers of binary character that is input the “4 digits numbers”

For example, if you input 12 characters, it should be;

B 0012 (0x30,0x30,0x31,0x32)

<Example>
1. Kanji
ESC i Q [other parameters] 1 K kanji input \\ \  

2. Alphanumeric input
ESC i Q [other parameters] 1 A012345678aBcDe \\ \  

3. Binary input
ESC i Q [other parameters] 1 B0005##### \\ \  

The number of bar code data items that can be input depends on the model type and the input type.

Model 1:  707 English alphanumeric characters, 1167 numbers, 486 binary bytes, 299 kanji
Model 2:  4296 English alphanumeric characters, 7089 numbers, 2953 binary bytes, 1817 kanji
Micro QR:  21 English alphanumeric characters, 35 numbers, 15 binary bytes, 9 kanji

Note: The numbers shown here is for high-density Level L 7% of Error correction level. If you specify them on more than standard level, the number may decrease. And, even if you specify then on high-density level, it may decrease because of the treatment of compression.

3 \\ \: End of bar code
Three back slashes are necessary for end of 2D bar code.
ESC i P QR code version setting

[ASCII]  ESC  i  P  n
[Decimal]  27  105  80  n
[Hexadecimal]  1B  69  50  n
[Parameters]  0≤n≤40

[Description]

- The barcode size can be fixed.
- The default value is “0”.
- The available versions differ depending on the symbol type used.

If a setting other than those listed is specified, the setting returns to its default. The following settings are available for each symbol type.

Model1 (0–14), Model2 (0–40), MicroQR (0–4)
**ESC i V 2D bar code PDF417**

[ASCII] ESC i V or v Data
[Decimal] 27 105 86 or 118 Data
[Hexadecimal] 1B 69 56 or 76 Data

- **Format**
  
  \[
  \text{ESC i V or v} \quad \text{[Parameters]} \quad \text{[Bar code data]} \quad \text{\\}
  \]

- **Parameters**
  Unlike with 1D bar codes, it is necessary to specify all parameters from the top down.

  If a value other than those listed is entered for a parameter, that parameter is set to its default value.

1. **Cell size**
   - [Decimal 1 byte] 3
   - [Decimal 1 byte] 4
   - [Decimal 1 byte] 6
   - [Decimal 1 byte] 8
   - Sets the dot size per cell side.
     - **Prints 3 dots per cell side. (default value)**
     - Prints 4 dots per cell side.
     - Prints 6 dots per cell side.
     - Prints 8 dots per cell side.

2. **Symbol type**
   - [Decimal 1 byte] 0
   - [Decimal 1 byte] 1
   - [Decimal 1 byte] 2
   - [Decimal 1 byte] 3
   - Standard (default value)
     - Truncate
     - MicroPDF417 standard
     - MicroPDF417 Code128 emulation

3. **Data input method**
   - [Decimal 1 byte] 0
   - [Decimal 1 byte] 1
   - Auto input (default value)
     - Binary input

4. **Error correction capacity and type**
   - [Decimal 1 byte] 0
   - [Decimal 1 byte] 1
   - Level input setting (default value)
     - Percentage input setting

5. **Error correction capacity and value Level input selection**
   - [Decimal 2 bytes] 0–8
   - Percentage input selection
   - [Decimal 2 bytes] 0–400
   - Inputs the level. (The default value is 0.)
   - Inputs the percentage. (The default value is 10.)

6. **Symbol size X specification**
   - [Decimal 1 byte] 0
   - [Decimal 1 byte] 1–30
   - Inputs the level. (The default value is 0.)
     - Manual setting

7. **Symbol size Y specification**
   - [Decimal 1 byte] 0
   - [Decimal 1 byte] 3–90
   - Inputs the level. (The default value is 0.)
     - Manual setting
8. Aspect value
[Decimal 2 bytes] 1–1000

Inputs the aspect value. Actually, this is 0.01–10.0, but since the decimal point can not be entered, 100x the value is entered.
The default value is 50. (Actual value of 0.5)

*Notes:
- When the Symbol size X specification or the symbol size specification is input, Aspect value is ignored.
- When the Symbol size X specification or the symbol size specification is input, sometimes bar cord is not printed or unreadable barcode is printed.
- If both large cell size and high level error correction capacity is specified, it may not print because of over print buffer.

[With symbol type MicroPDF417]
- Since the error correction capacity is automatically determined from symbol size X specification, the settings for “Error correction capacity and type” and “Error correction capacity and value” are ignored.
- The aspect value setting is ignored.
The following table shows the values available for symbol size Y specification according to symbol size X specification. If an invalid setting is specified for symbol size Y specification, the default setting is specified.

<table>
<thead>
<tr>
<th>Symbol size X specification</th>
<th>Symbol size Y specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTO</td>
<td>AUTO</td>
</tr>
<tr>
<td>1   AUTO</td>
<td>11 14 17 20 24 28</td>
</tr>
<tr>
<td>2   AUTO</td>
<td>8 11 14 17 20 23 26</td>
</tr>
<tr>
<td>3   AUTO</td>
<td>6 8 10 12 15 20 26 32 38 44</td>
</tr>
<tr>
<td>4   AUTO</td>
<td>4 6 8 10 12 15 20 26 32 38 44</td>
</tr>
</tbody>
</table>

② Bar code data
The numbers of bar code data items that can be input are as follows.
1850 alphanumeric characters, 2710 numbers, 1108 binary bytes
Though it is available to input Kanji characters, it is treated as binary data. One Kanji character uses 2 bytes of data.
*Note: The numbers shown here is for high-density Level L 7% of Error correction level. If you specify them on more than standard level, the number may decrease. And, even if you Specify then on high-density level, it may decrease because of the treatment of compression.
Maximum of 250 alphanumeric characters, maximum of 366 numbers, maximum of 150 bytes of binary data

However, the following table shows the maximum amount of information allowed according to symbol size X specification and symbol size Y specification.

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
<th>Maximum amount of information allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Alphanumeric characters</td>
</tr>
<tr>
<td>1</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>1</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>1</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>1</td>
<td>28</td>
<td>38</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>36</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>46</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>56</td>
</tr>
<tr>
<td>2</td>
<td>23</td>
<td>64</td>
</tr>
<tr>
<td>2</td>
<td>26</td>
<td>72</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>34</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>46</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>66</td>
</tr>
<tr>
<td>3</td>
<td>26</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>32</td>
<td>114</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>138</td>
</tr>
<tr>
<td>3</td>
<td>44</td>
<td>162</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>34</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>58</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>76</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>106</td>
</tr>
<tr>
<td>4</td>
<td>26</td>
<td>142</td>
</tr>
<tr>
<td>4</td>
<td>32</td>
<td>178</td>
</tr>
<tr>
<td>4</td>
<td>38</td>
<td>214</td>
</tr>
<tr>
<td>4</td>
<td>44</td>
<td>250</td>
</tr>
</tbody>
</table>

End of bar codes

Three back slashes are necessary for end of 2D bar code.
ESC i D 2D bar code DataMatrix control

[ASCII] ESC i D or d data
[Decimal] 27 105 68 or 100 data
[Hexadecimal] 1B 69 44 or 64 data

Format
ESC i D or d [Parameters] [Bar code data] \\
1 2 3

1. Parameters
Unlike with 1D bar codes, it is necessary to specify all parameters from the top down.
If a value other than those listed is entered for a parameter, that parameter is set to its
default value.

<table>
<thead>
<tr>
<th>1. Cell size</th>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Decimal 1 byte]</td>
<td>3</td>
<td>Prints 3 dots per cell side. (default value)</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>4</td>
<td>Prints 4 dots per cell side.</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>5</td>
<td>Prints 5 dots per cell side.</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>6</td>
<td>Prints 6 dots per cell side.</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>8</td>
<td>Prints 8 dots per cell side.</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>10</td>
<td>Prints 10 dots per cell side.</td>
</tr>
</tbody>
</table>

2. Symbol type

<table>
<thead>
<tr>
<th>2. Symbol type</th>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Decimal 1 byte]</td>
<td>0</td>
<td>ECC200 square (default value)</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>1</td>
<td>ECC200 rectangular</td>
</tr>
</tbody>
</table>

3. Vertical size

<table>
<thead>
<tr>
<th>3. Vertical size</th>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Decimal 1 byte]</td>
<td>0</td>
<td>Vertical no. of cells: AUTO (default value)</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>10</td>
<td>Vertical no. of cells: 10 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>12</td>
<td>Vertical no. of cells: 12 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>14</td>
<td>Vertical no. of cells: 14 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>16</td>
<td>Vertical no. of cells: 16 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>18</td>
<td>Vertical no. of cells: 18 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>20</td>
<td>Vertical no. of cells: 20 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>22</td>
<td>Vertical no. of cells: 22 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>24</td>
<td>Vertical no. of cells: 24 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>26</td>
<td>Vertical no. of cells: 26 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>32</td>
<td>Vertical no. of cells: 32 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>36</td>
<td>Vertical no. of cells: 36 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>40</td>
<td>Vertical no. of cells: 40 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>44</td>
<td>Vertical no. of cells: 44 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>48</td>
<td>Vertical no. of cells: 48 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>52</td>
<td>Vertical no. of cells: 52 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>64</td>
<td>Vertical no. of cells: 64 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>72</td>
<td>Vertical no. of cells: 72 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>80</td>
<td>Vertical no. of cells: 80 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>88</td>
<td>Vertical no. of cells: 88 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>96</td>
<td>Vertical no. of cells: 96 cells</td>
</tr>
<tr>
<td>[Decimal 1 byte]</td>
<td>Vertical no. of cells</td>
<td>Horizontal no. of cells</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>104</td>
<td>104 cells</td>
<td>Same value as vertical size (x)</td>
</tr>
<tr>
<td>120</td>
<td>120 cells</td>
<td>Same value as vertical size (x)</td>
</tr>
<tr>
<td>132</td>
<td>132 cells</td>
<td>Same value as vertical size (x)</td>
</tr>
<tr>
<td>144</td>
<td>144 cells</td>
<td>Same value as vertical size (x)</td>
</tr>
<tr>
<td>0</td>
<td>AUTO (default value)</td>
<td>Same value as vertical size (x)</td>
</tr>
<tr>
<td>8</td>
<td>8 cells</td>
<td>Same value as vertical size (x)</td>
</tr>
<tr>
<td>12</td>
<td>12 cells</td>
<td>Same value as vertical size (x)</td>
</tr>
<tr>
<td>16</td>
<td>16 cells</td>
<td>Same value as vertical size (x)</td>
</tr>
</tbody>
</table>

4. Horizontal size

- **ECC200 square**
  - Horizontal no. of cells: Same value as vertical size (x)

- **ECC200 rectangular**
  1. When the vertical size is “AUTO”
  2. When the vertical size is 8 cells
  3. When the vertical size is 12 cells
  4. When the vertical size is 16 cells

5. Reserved

<table>
<thead>
<tr>
<th>[Decimal 1 byte]</th>
<th>Horizontal no. of cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>(x)</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>AUTO (default value)</td>
</tr>
<tr>
<td>18</td>
<td>18 cells</td>
</tr>
<tr>
<td>32</td>
<td>32 cells</td>
</tr>
<tr>
<td>26</td>
<td>26 cells</td>
</tr>
<tr>
<td>36</td>
<td>36 cells</td>
</tr>
<tr>
<td>36</td>
<td>36 cells</td>
</tr>
<tr>
<td>48</td>
<td>48 cells</td>
</tr>
</tbody>
</table>

5 bytes of dummy data (0) is sent.

*Note:
If the vertical size is set to a value other than those listed for ECC200 square, the “AUTO” setting is selected. If the horizontal size is set to a value different from the vertical size, the setting is changed to the same value as the horizontal size.

If the vertical or horizontal size for ECC200 rectangular is set to a value other than those listed, the “AUTO” setting is selected.

② [Bar code data]: Bar code data

The maximum number of bar code data that can be entered is listed below.

2335 alphanumeric characters, 3116 numbers, 1556 bytes of binary data
*Note:*
The numbers of characters that can be entered (as listed above) are for the maximum vertical × horizontal cell settings (144 cells × 144 cells). The number of characters that can be entered may decrease, depending on the specified settings.

③ \:\:\\: End of bar code
There must be three backslashes at the end of 2D bar codes.

Sample input
For data “12345” with symbol type ECC square at 40 × 40 with a 3-dot cell size, the command will be as shown below.
ESC iD 03h 00h 28h(40d) 28h 00h 00h 00h 00h “12345” \\

ESC i M 2D bar code MaxiCode control

[ASCII] ESC i M or m data
[Decimal] 27 105 77 or 109 data
[Hexadecimal] 1B 69 4D or 6D data

• Format
  ESC i M or m [Parameters] \ [Bar code data] \ \ \ ① ② ③ ④

① Parameters
If a value other than those listed is entered for a parameter, that parameter is set to its
default value.

<table>
<thead>
<tr>
<th>1. Symbol type</th>
<th>[Decimal 1 byte] 0</th>
<th>Standard (default value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[Decimal 1 byte] 1</td>
<td>Full EEC</td>
</tr>
<tr>
<td></td>
<td>[Decimal 1 byte] 2</td>
<td>Structured carrier message</td>
</tr>
</tbody>
</table>

② \ 
Separator between parameters and bar code data

③ Bar code data
The number of bar code data that can be entered is listed below.

<table>
<thead>
<tr>
<th>Symbol type</th>
<th>Maximum amount of information allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alphanumeric characters</td>
</tr>
<tr>
<td>Standard</td>
<td>93</td>
</tr>
<tr>
<td>Full EEC</td>
<td>77</td>
</tr>
<tr>
<td>Structured carrier message</td>
<td>84</td>
</tr>
</tbody>
</table>

*Notes:
The numbers of characters that can be entered (as listed above) are for when using only
the common character set (code set A in the MaxiCode specifications). The number of
characters that can be entered may decrease, depending on the characters that are used.

When the symbol type is the structured carrier message, the service class, country code
and postal code can be specified separately from the normal data. Specify each value,
separated by a backslash and comma (\,), immediately before the normal data.

\<postal_code\\><country_code\\><service_class\\><normal_bar_code_data\\>

When "\" is not used three times, the data is written as shown in the following example.

Example \<data1\\><data2\\><normal_bar_code_data\\>
⇒ Postal code = data1
⇒ Country code = data2
⇒ Service class = default value

If a value other than those listed is entered for a parameter, that parameter is set to its default value.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postal code</td>
<td>Ignored when not structured carrier message. <strong>Default value: 000000000</strong></td>
</tr>
<tr>
<td>9 or less numbers, or 6 or less alphanumeric characters</td>
<td></td>
</tr>
<tr>
<td>Country code</td>
<td>Ignored when not structured carrier message. <strong>Default value: 000</strong></td>
</tr>
<tr>
<td>3 or less numbers</td>
<td></td>
</tr>
<tr>
<td>Service class</td>
<td>Ignored when not structured carrier message. <strong>Default value: 000</strong></td>
</tr>
<tr>
<td>3 or less numbers</td>
<td></td>
</tr>
</tbody>
</table>

*Notes:
If the postal code is specified as alphanumeric characters, characters other than those listed below are invalid.
A~Z " # $ % & ' ( ) * + , . / 0~9 :
However, lowercase letters (a~z) are converted to the valid uppercase letters (A~Z).

④ \\\: End of bar code
   There must be three backslashes at the end of 2D bar codes.
ESC i F Print downloaded data

[ASCII]  ESC i F P n
[Decimal]  27 105 70 80 n
[Hexadecimal]  1B 69 46 50 n

Parameters

- n : file header index
  0 ≤ n ≤ 98

Description

- Expands downloaded data in the print buffer as image data.
- Expands downloaded image data from the print position.
- If there is no image data, this command is ignored.

Example: Combination of text and downloaded image
- As with text, if the image data does not all fit on the current line, an automatic line feed is performed, and the data is placed at the beginning of the next line. At that time, the section exceeding the print area is deleted.

1. Enter text.
2. Enter downloaded image after an automatic line feed.
3. Since the image does not fit, it is pasted in after an automatic line feed and trimmed to fit between the left and right margins.

Example: Normal size

---

Example: Larger than distance between left and right margins
If the result of pasting in the downloaded image exceeds the bottom margin position, it is pasted in after a page feed. However, if the downloaded image is larger than the entire area between the top and bottom margins, the entire image is ignored.

Example: Data is smaller than the distance between the top and bottom margins

Example: Data is larger than the distance between top and bottom margins
• There are limits on the amount of image data that can be stored in the main unit. The size of the storage area is 288 KB. However, bitmap data is not stored as is, but is converted into the main unit storage format by the transfer manager.
• Image data larger than the media size is handled by deleting the portion of the image that does not fit into the size of the media.

The portion of image data deleted depends on the media orientation.

Examples

**Portrait (media: die-cut shipping)**

<table>
<thead>
<tr>
<th>Size of downloaded image</th>
<th>Print size</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1109 vertical x 696 horizontal</td>
<td>-&gt; 1109 vertical x 696 horizontal</td>
<td>(No deletion)</td>
<td></td>
</tr>
<tr>
<td>696 vertical x 1109 horizontal</td>
<td>-&gt; 696 vertical x 696 horizontal</td>
<td>(Part deleted)</td>
<td></td>
</tr>
</tbody>
</table>

*With downloaded image saved as 696 vertical by 1109 horizontal*

---

**Landscape (media: die-cut shipping)**

<table>
<thead>
<tr>
<th>Size of downloaded image</th>
<th>Print size</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>696 vertical x 1109 horizontal</td>
<td>-&gt; 1109 vertical x 696 horizontal</td>
<td>(No deletion)</td>
<td></td>
</tr>
<tr>
<td>1109 vertical x 696 horizontal</td>
<td>-&gt; 696 vertical x 696 horizontal</td>
<td>(Part deleted)</td>
<td></td>
</tr>
</tbody>
</table>

*With downloaded image saved as 1109 vertical by 696 horizontal*
ESC i a Switch command mode

[ASCII]        ESC  i  a n
[Decimal]     27 105 97 n
[Hexadecimal]  1B  69 61 n

[Parameters]
  n  : Command mode
     0 or 48 = ESC/P standard mode
     2 or 50 = ESC/P text mode
     Other than the above = Raster graphics

[Description]
  • Sets the command mode to ESC/P and PTCBP (raster graphics).
  • These two modes can be switched dynamically.
  • Since this is a dynamic command, after the unit is turned off and on again, the setting
    returns to the previously set value.
ESC i S Request printer status

[ASCII]    ESC  i  S
[Decimal]  27 105 83
[Hexadecimal]  1B  69 53
[Parameters] None
[Description]

* Requests the printer status.

The printer status comprises 32 bytes.

<table>
<thead>
<tr>
<th>Order</th>
<th>Offset</th>
<th>Size</th>
<th>Name</th>
<th>Value/Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
<td>Head mark</td>
<td>Fixed to 80H</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
<td>Size</td>
<td>Fixed to 20H</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td>Brother code</td>
<td>Fixed to &quot;B&quot; (42H)</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>1</td>
<td>Series code</td>
<td>Fixed to &quot;4&quot; (34H)</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>1</td>
<td>Model code</td>
<td>Fixed to &quot;4&quot; (34H)</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>1</td>
<td>Country code</td>
<td>Fixed to &quot;0&quot; (30H)</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>1</td>
<td>Main unit information</td>
<td>Fixed to 00H</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>1</td>
<td>Reservation</td>
<td>Fixed to 00H</td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td>1</td>
<td>Error information 1</td>
<td>See below.</td>
</tr>
<tr>
<td>10</td>
<td>9</td>
<td>1</td>
<td>Error information 2</td>
<td>See below.</td>
</tr>
<tr>
<td>11</td>
<td>10</td>
<td>1</td>
<td>Media width</td>
<td>See Page 9 Print Area.</td>
</tr>
<tr>
<td>12</td>
<td>11</td>
<td>1</td>
<td>Media type</td>
<td>See below.</td>
</tr>
<tr>
<td>13</td>
<td>12</td>
<td>1</td>
<td>Number of colors</td>
<td>Fixed to 00H</td>
</tr>
<tr>
<td>14</td>
<td>13</td>
<td>1</td>
<td>Media length (upper byte)</td>
<td>See Page 9 Print Area.</td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>1</td>
<td>Media sensor value</td>
<td>See Page 9 Print Area.</td>
</tr>
<tr>
<td>16</td>
<td>15</td>
<td>1</td>
<td>Mode</td>
<td>Fixed to 00H</td>
</tr>
<tr>
<td>17</td>
<td>16</td>
<td>1</td>
<td>Density</td>
<td>Fixed to 00H</td>
</tr>
<tr>
<td>18</td>
<td>17</td>
<td>1</td>
<td>Media length (lower byte)</td>
<td>See Page 9 Print Area.</td>
</tr>
<tr>
<td>19</td>
<td>18</td>
<td>1</td>
<td>Status type</td>
<td>See below.</td>
</tr>
<tr>
<td>20</td>
<td>19</td>
<td>1</td>
<td>Phase type</td>
<td>Fixed to 00H</td>
</tr>
<tr>
<td>21</td>
<td>20</td>
<td>1</td>
<td>Phase number (upper byte)</td>
<td>Fixed to 00H</td>
</tr>
<tr>
<td>22</td>
<td>21</td>
<td>1</td>
<td>Phase number (lower byte)</td>
<td>Fixed to 00H</td>
</tr>
<tr>
<td>23</td>
<td>22</td>
<td>1</td>
<td>Notification number</td>
<td>Not used</td>
</tr>
<tr>
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<td>23</td>
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<td>Expansion section (number of bytes)</td>
<td>Fixed to 00H</td>
</tr>
<tr>
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<td>Reservation</td>
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### Error information 1

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<td>0x01</td>
<td>No media error</td>
</tr>
<tr>
<td>Bit 1</td>
<td>0x02</td>
<td>Media end error</td>
</tr>
<tr>
<td>Bit 2</td>
<td>0x04</td>
<td>Cutter jam error</td>
</tr>
<tr>
<td>Bit 3</td>
<td>0x08</td>
<td>Not used</td>
</tr>
<tr>
<td>Bit 4</td>
<td>0x10</td>
<td>Main unit in use</td>
</tr>
<tr>
<td>Bit 5</td>
<td>0x20</td>
<td>Power Off</td>
</tr>
<tr>
<td>Bit 6</td>
<td>0x40</td>
<td>Not used</td>
</tr>
<tr>
<td>Bit 7</td>
<td>0x08</td>
<td>Not used</td>
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### Error information 2

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</tr>
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</tr>
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<td>Bit 1</td>
<td>0x02</td>
<td>Not used</td>
</tr>
<tr>
<td>Bit 2</td>
<td>0x04</td>
<td>Communication error</td>
</tr>
<tr>
<td>Bit 3</td>
<td>0x08</td>
<td>Image generation error</td>
</tr>
<tr>
<td>Bit 4</td>
<td>0x10</td>
<td>Cover open error</td>
</tr>
<tr>
<td>Bit 5</td>
<td>0x20</td>
<td>Not used</td>
</tr>
<tr>
<td>Bit 6</td>
<td>0x40</td>
<td>Leading edge detection error</td>
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<td>Bit 7</td>
<td>0x08</td>
<td>System error</td>
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### Media type

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<td>None</td>
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<td>No media</td>
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<tr>
<td>Long tape</td>
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<td>Die-cut tape</td>
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### Status type

<table>
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<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Reply to status request</td>
<td>00H</td>
</tr>
<tr>
<td>(Not used)</td>
<td>01H</td>
</tr>
<tr>
<td>Error generation</td>
<td>02H</td>
</tr>
<tr>
<td>(Not used)</td>
<td>03H - FFH</td>
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</table>
ESC i L Select landscape orientation

[ASCII] ESC i L n
[Decimal] 27 105 76 n
[Hexadecimal] 1B 69 4C n
[Parameters] n=0, 1 or 48, 49

[Description]
- Specifies and cancels the landscape orientation
- When n = 1 or 49 ("1"), the landscape orientation is specified.
- When n = 0 or 48 ("0"), the landscape orientation is cancelled.
- When this command is executed, all text is cleared.
- Set the paper orientation with this command before creating text.
- When the unit is turned on, landscape orientation is off.
ESC i C Specify cutting

[ASCII] ESC i C n

[Decimal] 27 105 67 n

[Hexadecimal] 1B 69 43 n

[Parameters] n=0,1 or 48,49

[Description]
- Specifies the cutting after printing.
- When n = 1 or 49 ("1"), cutting is specified.
- When n = 0 or 48 ("0"), cutting is cancelled.
- When cutting is specified, the auto cut function is performed each time a page is fed.
## Character codes

### Standard character code table for ESC/P codes

<p>| | | | | | | | | | | | | | | | | | |</p>
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</table>

"■" indicates that a space is printed.

"■■" indicates that the character will change if the international character set is switched.
### Eastern European character code table (Windows-1250)

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<td>„</td>
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</tbody>
</table>

- "■" indicates that a space is printed.
- "■" indicates that the character will change if the international character set is switched.
Western European character code table (Windows 1252)

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 0 | SP | 0 | @ | P | ` | p | € |  É | ° | Å | Đ | à |  à | | | | | | | | | |
| 1 | ! | 1 | A | Q | a | q | \u00bc | \u00b1 | ± | Á | Ñ | á | ñ | | | | | | | | | |
| 2 | " | 2 | B | R | b | r | \u00f9 | \u00c2 | Å | Ô | â | ã | ò | ò | | | | | | | | |
| 3 | # | 3 | C | S | c | s | f | £ | 3 | À | Ó | ã | ó | | | | | | | | |
| 4 | $ | 4 | D | T | d | t | \u00f4 | \u00b4 | Å | Ô | æ | ã | õ | | | | | | | | |
| 5 | % | 5 | E | U | e | u | ... | ¥ | ì | µ | Å | Ò | Ñ | á | ñ | | | | | | |
| 6 | & | 6 | F | V | f | v | † | - | | | | | | | | | | | | |
| 7 | ' | 7 | G | W | g | w | ‡ | · | $ | · | Ç | x | ç | + | | | | | | |
| 8 | ( | 8 | H | X | h | x | ^ | ~ | " | , | È | Ø | è | ò | | | | | |
| 9 | ) | 9 | I | Y | i | y | % | \u00b7 | Ì | Ü | é | ù | | | | | | | | |
| A | * | : | J | Z | j | z | Š | š | a | ò | É | Ù | é | ù | | | | | |
| B | + | ; | K | { | k | { | < | > | « | » | É | Û | ë | û | | | | | |
| C | , | < | L | \ | l | | | | | | | | | | | | | | | | |
| D | - | = | M | ] | m | ] | | | | | | | | | | | | | | | |
| E | . | > | N | ^ | n | ~ | Ž | ž | ® | ¼ | ï | ò | ñ | | | | | |
| F | / | ? | 0 | _ | o | DEL | Ÿ | - | ć | Í | ß | î | ÿ | | | | | |

“■” indicates that a space is printed.
“■” indicates that the character will change if the international character set is switched.
International character set

Compatible characters in each language when the international character set is switched

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<th>France</th>
<th>Germany</th>
<th>Britain</th>
<th>Denmark I</th>
<th>Sweden</th>
<th>Italy</th>
<th>Spain I</th>
<th>Japan</th>
<th>Norway</th>
<th>Denmark II</th>
<th>Spain II</th>
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