# FAQ for ESC/POS®

410306900

# FAQ about ESC/POS®

# 1 What is ESC/POS?

EPSON took the initiative by introducing ESC/POS®, a proprietary POS printer command system, which includes patented or patent pending commands and enables versatile POS system construction with high scalability. Compatible with all types of EPSON POS printers and displays, this proprietary control system also offers the flexibility to easily make future upgrades. Its popularity is worldwide.

ESC/POS® is designed to reduce the processing load on the host computer in POS environments. It comprises a set of highly functional and efficient commands that enables the full realization of the potential of printers.

## *A command set designed for universal applicability*

The commands that are supported by all EPSON POS printers and those that are specific to individual models are clearly described. This means that ESC/POS® compatible software will work with any system and be suitable for a wide range of applications.

## *Superb expandability allowing the addition of new functions*

New functions can be added and accommodated by the categories already provided in the command system.

## *Allows more effective use of software*

Once a software application has been created for one printer in the TM series, it can be used as the basis for versions for the other printers in the series. Only a small portion of the program source code needs to be modified.

If you would like to get more information about ESC/POS® commands, contact the dealer where you purchased the product to get the ESC/POS® Application Programming Guide (ESC/POS® APG).

## 2 Applicable printer models

This FAQ applies to TM-T90, TM-L90, TM- T88III, TM-J2000/TM-J2100, TM-L60II, TM-U200/TM-U210, TM-U220, and TM-U230. These printers support commands that are described in this FAQ as shown in the following table.

| Command | Name | TM-T90 | TM-L90 | TM- T88III TM-T88II | TM-J2000/TM-J2100 | TM-L60II | TM-U200/TM-U210 | TM-U220 | TM-U230 |
|---|---|---|---|---|---|---|---|---|---|
| LF | Print and line feed | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ESC ! | Select print mode(s) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ESC – | Turn underline mode on/off | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ESC @ | Initialize printer | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ESC E | Turn emphasized mode on/off | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ESC G | Turn double-strike mode on/off | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ESC M | Select character font | ✓ | ✓ | ✓ | ✓ | -- | -- | ✓ | -- |
| ESC a | Select justification | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ESC c 3 | Select paper sensor(s) to output paper-end signals | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ESC d | Print and feed n lines | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ESC e | Print and reverse feed n lines | -- | -- | -- | -- | -- | ✓ | ✓ | ✓ |
| ESC p | General pulse | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ESC r | Select print color | -- | -- | -- | ✓ | -- | ✓ | ✓ | ✓ |
| ESC t | Select character code table | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| GS B | Turn white/black reverse printing mode on/off | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | -- | ✓ |
| GS V | Select cut mode and cut paper | ✓ | ✓ | ✓ | ✓ | -- | ✓ | ✓ | ✓ |
| GS h | Set bar code height | ✓ | ✓ | ✓ | ✓ | ✓ | -- | -- | -- |
| GS k | Print bar code | ✓ | ✓ | ✓ | ✓ | ✓ | -- | -- | -- |

## 3 Command Notation

| | |
|---|---|
| [Name] | The name of the command. |
| [Format] | The code sequence.<br>[ ]*k* indicates the contents of the [ ] should be repeated *k* times. |
| [Range] | Gives the allowable ranges, if any, for the arguments. |
| [Default] | Gives the default values, if any, for the command parameters. |
| [Description] | Describes the function of the command. |

## *3.1 Control Commands*

### LF

[Name] Print and line feed

[Format]

| | | |
|---|---|---|
| ASCII | LF | |
| Hex | 0A | |
| Decimal | 10 | |

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

### ESC ! *n*

[Name] Select print mode (s)

[Format]

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

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

[Default] $n = 0$

[Description] Selects the character font and styles (emphasize, double-height, double-width, and underline) together.

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Character font A selected. |
| | On | 01 | 1 | Character font B selected. |
| 1, 2 | Off | 00 | 0 | Reserved. |
| 3 | Off | 00 | 0 | Emphasized mode not selected. |
| | On | 08 | 8 | Emphasized mode selected. |
| 4 | Off | 00 | 0 | Double-height mode not selected. |
| | On | 10 | 16 | Double-height mode selected. |
| 5 | Off | 00 | 0 | Double-width mode not selected. |
| | On | 20 | 32 | Double-width mode selected. |
| 6 | Off | 00 | 0 | Reserved. |
| 7 | Off | 00 | 0 | Underline mode not selected. |
| | On | 80 | 128 | Underline mode selected. |

***Note:***

*With the TM-U200/TM-210, TM-U230, or TM-U220, n = 1 by default.*

## ESC – *n*

[Name] Turn underline mode on/off

[Format]

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

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

[Default] $n = 0$

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

| n | Function |
|---|---|
| 0, 48 | Turns off underline mode |
| 1, 49 | Turns on underline mode, set at 1-dot width |
| 2, 50 | Turns on underline mode, set at 2-dot width |

*Note:*

*With the TM-U230 or TM-U200/TM-U210, the range is n = 0, 1, 48, 49.*

## ESC @

[Name] Initialize printer

[Format]

| | | |
|---|---|---|
| ASCII | ESC | @ |
| Hex | 1B | 40 |
| Decimal | 27 | 64 |

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

## ESC E *n*

[Name] Turn emphasized mode on/off

[Format]

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

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

[Default] $n = 0$

[Description] Turns emphasized mode on or off.

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

## ESC G *n*

[Name] Turn double-strike mode on/off

[Format]

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

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

[Default] $n = 0$

[Description] Turns double-strike mode on or off.

- When the LSB of *n* is 0, double-strike mode is turned off.
- When the LSB of *n* is 1, double-strike mode is turned on.

## ESC M *n*

[Name] Select character font

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | M | *n* |
| Hex | 1B | 4D | *n* |
| Decimal | 27 | 77 | *n* |

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

[Default] $n = 0$

[Description] Selects character fonts.

| n | Function |
|---|---|
| 0, 48 | Character font A selected. |
| 1, 49 | Character font B selected. |
| 2, 50 | Character font C selected. |

***Notes:***

*1. Some printers do not have font C. See the ESC/POS® Application Programming Guide (ESC/POS® APG).*

*2. With the TM-U220, the range of n is n = 0, 1, 48, and 49. The default value is 1.*

## ESC a *n*

[Name] Select justification

[Format]

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

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

[Default] $n = 0$

[Description] Aligns all the data in one line to the position specified by *n* as follows:

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

## ESC c 3 *n*

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

[Format]

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

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

[Default] $n = 0$

[Description] Selects whether to output paper-end signal to a parallel interface or not when a paper-end is detected by the sensor selected, using *n* as follows:

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

***Note:***

*With the TM-L60II, n = 3.*

With the TM-U200/TM-U210, TM-U220, TM-U230, n = 15.

## ESC d *n*

[Name] Print and feed *n* lines

[Format]

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

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

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

## ESC e *n*

[Name] Print and reverse feed *n* lines

[Format]

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

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

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

***Note:***

*With the TM-U200/TM-U210, TM-U220 and TM-U230, the range of n is $0 \le n \le 2$.*

## ESC p *m t1 t2*

[Name] Generate pulse

[Format]

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

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

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

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

- *t1* specifies the pulse ON time as [*t1* × 2 ms].
- *t2* specifies the pulse OFF time as [*t2* × 2 ms].

***Note:***

*With the TM-U200/TM-U210 or TM-U220, if t2 < 50, t2 should be 50.*

*With the TM-U230, if t1 < 50, t1 should be 50. If t2 < 50, t2 should be 50.*

## ESC r *n*

[Name] Select printing color

[Format]

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

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

[Default] *n* = 0

[Description] Selects the printing color specified by *n.*

- When *n* = 0,48, color 1 is selected.
- When *n* = 1,49, color 2 is selected.

***Note:***

*With the TM-J2100/2000, it is recommended to obtain the ESC/POS® Application programming Guide (ESC/POS® APG), which describes the recommended operation for 2 color printing control.*

## ESC t *n*

[Name] Select character code table

[Format]

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

[Range] Except for Thai model: $0 \le n \le 5$, $16 \le n \le 19$, $n = 254, 255$
For Thai model: $0 \le n \le 5$, $16 \le n \le 26$, $n = 254, 255$

[Default] Except for Thai model: $n = 0$
For Thai model: $n = 20$

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

| n | Selected character code |
|---|---|
| 0 | PC437 (USA: Standard Europe) |
| 1 | Katakana |
| 2 | PC850 (Multilingual) |
| 3 | PC860 (Portuguese) |
| 4 | PC863 (Canadian-French) |
| 5 | PC865 (Nordic) |
| 16 | WPC1252 |
| 17 | PC866 (Cyrillic #2) |
| 18 | PC852 (Latin 2) |
| 19 | PC858 (Euro) |
| 20 | Thai character code 42 |
| 21 | Thai character code 11 |
| 22 | Thai character code 13 |
| 23 | Thai character code 14 |
| 24 | Thai character code 16 |
| 25 | Thai character code 17 |
| 26 | Thai character code 18 |
| 254 | User-defined page |
| 255 | User-defined page |

($20 \le n \le 26$) is supported only by the Thai model.

***Note:***

*With TM-L60II, the range of n is $0 \le n \le 5$, $n = 255$.*

*With the TM-U200/TM-U210, the range of n is $0 \le n \le 5$, $19 \le n \le 26$, $n = 254, 255$.*

*With the TM-U220, the range of n is $0 \le n \le 5$, $16 \le n \le 26$, $n = 254, 255$.*

*With the TM-U230, the range of n is $0 \le n \le 5$, $n = 16, 254, 255$.*

## GS B *n*

[Name] Turn white/black reverse printing mode on/off

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | B | *n* |
| Hex | 1D | 42 | *n* |
| Decimal | 29 | 66 | *n* |

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

[Default] *n* = 0

[Description] Turns white/black reverse printing mode on or off.

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

## GS V *m* *(Function A)*
## GS V *m n* *(Function B)*

[Name] Select cut mode and cut paper

[Format]

| | | | | | |
|---|---|---|---|---|---|
| ASCII | GS | V | *m* | | *(Function A)* |
| Hex | 1D | 56 | *m* | | |
| Decimal | 29 | 86 | *m* | | |
| ASCII | GS | V | *m* | *n* | *(Function B)* |
| Hex | 1D | 56 | *m* | *n* | |
| Decimal | 29 | 86 | *m* | *n* | |

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

*(Function A)* *m* = 0, 1, 48, 49

*(Function B* *m* = 65, 66

[Description] Cuts paper in the specified mode.

| | m | Function |
|---|---|---|
| Function A | 0, 48 | Executes a full cut (cuts the paper completely). |
| | 1, 49 | Executes a partial cut (one point left uncut). |
| Function B | 65 | Feeds paper to (cutting position + n × vertical motion unit) and executes a full cut (cuts the paper completely). |
| | 66 | Feeds paper to (cutting position + n × vertical motion unit) and executes a partial cut (one point left uncut). |

•The paper is completely or partially (with one point left uncut) cut depending on the printer model.

***Note:***

*With the TM-U200/TM-U210, the reange of m is m = 66, 0 ≤ n ≤ 255 (Function B).*

*With the TM-U220, the ranges of n are:*
*(Function A) m = 0, 1, 48, 49*
*(Function B) m = 65, 66, 0 ≤ n ≤ 255*

*With the TM-U230, the ranges of n are:*
*(Function A) m = 1, 49*
*(Function B) m = 66, 0 ≤ n ≤ 255*

## GS h *n*

[Name] Select bar code height

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | h | *n* |
| Hex | 1D | 68 | *n* |
| Decimal | 29 | 104 | *n* |

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

[Default] $n = 162$

[Description] Selects the height of the bar code as *n* dots.

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

[Name] Print bar code

[Format]

| | | | |
|---|---|---|---|
| ASCII | ①GS | k | *m d1...dk NUL* |
| Hex | ①1D | 6B | *m d1...dk 00* |
| Decimal | ①29 | 107 | *m d1...dk 0* |
| ASCII | ②GS | k | *m n d1...dn* |
| Hex | ②1D | 6B | *m n d1...dn* |
| Decimal | ②29 | 107 | *m n d1...dn* |

[Range] ① $0 \le m \le 6$ (*k* and *d* depend on the bar code system used)
② $65 \le m \le 73$ (*n* and *d* depend on the bar code system used)

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

**For ①**

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

**For ②**

| m | Bar Code System | Range of *n* | Range of *d* |
|---|---|---|---|
| 65 | UPC-A | $11 \le n \le 12$ | $48 \le d \le 57$ |
| 66 | UPC-E | $11 \le n \le 12$ | $48 \le d \le 57$ |
| 67 | JAN13(EAN13) | $12 \le n \le 13$ | $48 \le d \le 57$ |
| 68 | JAN8(EAN8) | $7 \le n \le 8$ | $48 \le d \le 57$ |
| 69 | CODE39 | $1 \le n \le 255$ | $48 \le d \le 57, 65 \le d \le 90$, *d* = 32,36,37,43,45,46,47 |
| 70 | ITF | $1 \le n \le 255$ (even number) | $48 \le d \le 57$ |

**For ②**

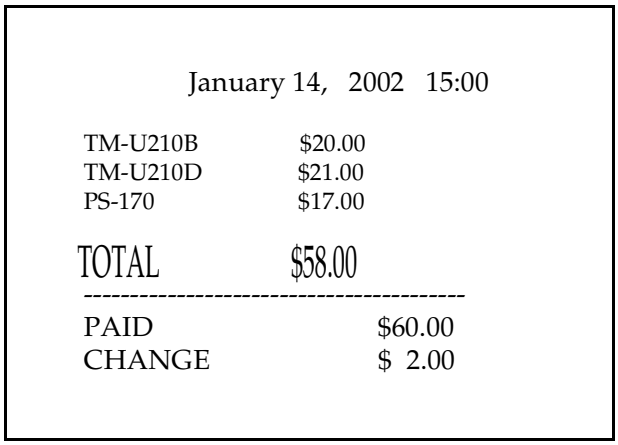
| | | | |
|---|---|---|---|
| 71 | CODABAR (NW7) | $1 \le n \le 255$ | $48 \le d \le 57, 65 \le d \le 68,$ $d = 36,43,45,46,47,58$ |
| 72 | CODE93 | $1 \le n \le 255$ | $0 \le d \le 127$ |
| 73 | CODE128 | $2 \le n \le 255$ | $0 \le d \le 127$ |

***Note:***

*Refer to the ESC/POS® Application Programming Guide (ESC/POS® APG) for details of printing barcode.*

## 4 Sample Program (Basic)

```
PRINT #1, CHR$(&H1B);"@"; 'Initializes the printer (ESC @)



PRINT #1, CHR$(&H1B);"a";CHR$(1);'Specifies a centered printing position (ESC a)
PRINT #1, CHR$(&H1B);"!";CHR$(0); 'Specifies font A (ESC !)
PRINT #1, "January 14, 2002  15:00";
PRINT #1, CHR$(&H1B);"d";CHR$(3); 'Prints and 3 line feeding (ESC d)

PRINT #1, CHR$(&H1B);"a";CHR$(0); 'Selects the left print position (ESC a)
PRINT #1, CHR$(&H1B);"!";CHR$(1); 'Selects font B
PRINT #1, "TM-U210B             $20.00";CHR$(&HA);
PRINT #1, "TM-U210D             $21.00";CHR$(&HA);
PRINT #1, "PS-170               $17.00";CHR$(&HA);
PRINT #1, CHR$(&HA);                    'Line feeding (LF)

PRINT #1, CHR$(&H1B);"!";CHR$(17); 'Selects double-height mode
PRINT #1, "TOTAL              $58.00"; CHR$(&HA);
PRINT #1, CHR$(&H1B);"!";CHR$(0); 'Cancels double-height mode

PRINT #1, "------------------------------";CHR$(&HA);
PRINT #1, "PAID               $60.00";CHR$(&HA);
PRINT #1, "CHANGE              $ 2.00";CHR$(&HA);


PRINT #1, CHR$(&H1D);"V";CHR$(66);CHR$(0); 'Feeds paper & cut

'Drawer Kick (ESC p)
PRINT #1, CHR$(&H1B); CHR$(&H70); CHR$(&H0); CHR$(60); CHR$(120);
```




*Print image*

## 5 Serial Connection

When the TM printer is connected to the host PC with a serial interface, the usable serial cross cable is as follows:

| D-Sub 25P(TM) | | | D-Sub 9P(PC) | |
|---|---|---|---|---|
| Pin No | Signal | | Signal | Pin No |
| 1 | FG | | DCD | 1 |
| 2 | TXD | | TXD | 3 |
| 3 | RXD | | RXD | 2 |
| 20 | DTR | | DTR | 4 |
| 6 | DSR | | DSR | 6 |
| 4 | RTS | | RTS | 7 |
| 5 | CTS | | CTS | 8 |
| 7 | GD | | GD | 5 |
| 25 | RESET | | RI/RESET | 9 |

## 6 Self-test Mode

In self-test mode, the following items are checked and printed out:

- Control software version
- DIP switch settings
  And others.

Use the following procedure to start a self-test.

1. To start the selftest, hold down the FEED button (*1)(*2) and turn on the printer with the roll paper cover closed.

***Note:***

*(*1) With the TM-J2000/TM-J2100, hold down the PAPER FEED button instead of the FEED button.*

*(*2) With the TM-L90, keep holding down the FEED button until the ERROR LED comes on.*

2. After printing the current printer status, the printer prints the message to show the standby state; then the paper out LED blinks. The printer is now in the self-test wait mode.

3. To start a test print, press the FEED button when the printer is in the self-test wait mode.

4. Make sure that the following message is printed.

```
***   completed   ***
```

# EPSON

**SEIKO EPSON CORPORATION**

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