

EPSON®
Programming Guide
For
4 Color
EPSON Ink Jet Printer

ET-4500
L 575

(Level I)

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CHAPTER 1: Introduction

This section of this handbook will provide a technical overview of EPSON ET-4500/L575 to facilitate driver development.

1.1 Features

These printers are a narrow carriage of the four color inkjet printers introduced by EPSON. The advanced EPSON Micro Piezo technology that is implemented these printers produces smaller ink droplets. These printers are an ideal business printer. They will deliver resumes, letterheads, reports, envelopes and presentations on all types of paper or transparent media.

These printers use the original ink supply system.

These printers incorporate the following features:

- Highest resolution at 5760x1440dpi
- Ink supply system with outer ink tank
- I/F : USB2.0 High speed

These printers are bi-directional interfaces and EPSON's Remote Mode bi-directional printer control language, the host computer can obtain useful printer status information.

See Chapter 6 in this Handbook for further information concerning EPSON's Remote Mode printer control language.

Table 1 Outline and feature of printer

	Outline and feature
Print Head	180 nozzles for Black, 59 nozzles for Cyan, Magenta, Yellow Original individual ink cartridge.
Interface (s)	USB2.0
Printer Language	ESC/P Raster & Remote Mode
Resolution Max (dpi)	5760(h) x 1440(v)
Font	No support
Support Code table	No support
Ink Cartridge Type	*CMYK

* - - CMYK refers to: Cyan, Magenta, Yellow and Black

USB Endpoint

I/F No.	Endpoint Address	Endpoint Type	Linked Interface
0x00	0x01	Bulk Out	Scanner
	0x02	Bulk In	
0x01	0x04	Bulk Out	Printer
	0x05	Bulk In	

CHAPTER 2: PAPER TYPES AND SIZES Media Specification

In addition to the standard plain paper and envelope sizes, EPSON provides special paper types in the following sizes:

2.1. Paper Sizes for these printers

2.1.1 Paper Types

Paper Type		Size	US	EUR/Asia	Japan
普通紙(JPN) Plain paper(Others)	Cut sheets	Legal	YES	YES	YES
		Letter	YES	YES	YES
		A4	YES	YES	YES
		B5	NO	YES	YES
		A5	NO	YES	YES
		Half-Letter	YES	NO	NO
		A6	YES	YES	YES
Bright White Paper(US)	Cut sheets	Letter	YES	NO	NO
両面上質普通紙<再生紙>(JPN) Bright White Ink Jet Paper(EUR/Asia)	Cut sheets	A4	NO	YES	YES
写真用紙<光沢>(JPN) Premium Photo Paper Glossy(US) Premium Glossy Photo Paper(EUR/Asia)	Cut sheets	Letter	YES	NO	NO
		A4	YES	YES	YES
		8x10in.(六切)	YES	NO	YES
		5x7in./2L size	YES	YES	YES
		16:9 wide	NO	YES	YES
		4x6in.	YES	YES	YES
フォトマット紙(JPN) Premium Presentation Paper Matte(US) Matte Paper Heavy-weight(EUR/Asia)	Cut sheets	Letter	YES	NO	NO
		A4	YES	YES	YES
		8x10in.(六切)	YES	NO	NO
スーパーファイン紙(JPN) Presentation Paper Matte(US) Photo Quality Ink Jet Paper(EUR/Asia)	Cut sheets	Letter	YES	NO	NO
		A4	YES	YES	YES
スーパーファイン専用紙ハガキ(JPN)	Post Card	Postcard	NO	NO	YES
スーパーファイン専用ラベルシート(JPN) Photo Quality Self Adhesive Sheets(US) Photo Quality Self Adhesive Sheets(EUR/Asia)	Cut Sheets	A4	NO	NO	YES
往復ハガキ(JPN)	Post card	Double Postcard	NO	NO	YES
郵便ハガキ(JPN)	Post card	Postcard	NO	NO	YES
郵便 II ハガキ(JPN)	Post card	Postcard	NO	NO	YES
国内封筒(JPN) Envelope(US) Envelope(EUR/Asia)	Envelope	Japanese CHOKEI 3 Envelope	NO	NO	YES
		Japanese CHOKEI 4 Envelope	NO	NO	YES
		Japanese YOKEI 1 Envelope	NO	NO	YES
		Japanese YOKEI 3 Envelope	NO	NO	YES
		Japanese YOKEI 4 Envelope	NO	NO	YES
		Envelope #10 (Portrait)	YES	YES	NO
		Envelope DL (Portrait)	NO	YES	NO
Envelope C6 / Japanese YOKEI 2 Envelope (Portrait)	NO	YES	YES		

2.2. Paper Size and Orientation

Paper Type	Dimensions W x L	Orientation	
			
A4	210 mm x 297 mm	Yes	No
A5	148 mm x 210 mm	Yes	No
A6	105 mm x 148 mm	Yes	No
B5	182 mm x 257 mm	Yes	No
Legal	8.5in. x 14in.	Yes	No
Letter	8.5in. x 11in.	Yes	No
8x10in.(六切)	203mm x 254mm	Yes	No
Half Letter	5.5 in. x 8.5 in.	Yes	No
5in. x8in.	5 in. x 8 in.	Yes	No
5x7in. / 2L size	127x178 mm	Yes	No
4 x 6 in.	113.6 mm x 164.4 mm*1)	Yes	No
3.5x5in. / L size	89 x 127 mm	Yes	No
16:9 wide	102mm x152mm	Yes	No
Postcard	100 mmx148 mm	Yes	No
Double Postcard	200 mmx148 mm	No	Yes
Envelope #10	9.5 in. x 4 .125 in.	Yes	No
Envelope DL	220 mm x 110 mm	Yes	No
Envelope C4 / Japanese KAKUGATA 20 Envelope	229 mm x 324 mm	Yes	No
Japanese YOKEI 1 Envelope	120mm x 176mm	Yes	No
Envelope C6 / Japanese YOKEI 2 Envelope	162 mm x 114 mm	Yes	No
Japanese YOKEI 3 Envelope	98mm x 148mm	Yes	No
Japanese YOKEI 4 Envelope	105mm x 235mm	Yes	No
Japanese CHOKEI 3 Envelope	120mm x 235mm *2)	Yes *3)	No
Japanese CHOKEI 4 Envelope	90mm x 205mm *2)	Yes *3)	No
User-defined	89 to 215.9 mm x 127 to 1117.6 mm (3.5 in. to 8.5 in. x 5 in. to 44 in.)	Yes	No

- 1) Each of the predetermined sizes is inserted only in the orientation indicated by "Yes" in the above table.
- 2) Dimension indicates body size without flap.
- 3) Loading envelope, flap edge first, with printable side up.

2.3. Printable Area

For the purpose of printing, a sheet of paper is divided into two regions: the printable area and the non-printable area. These areas are defined as follows.

The printable area is the region within which the printing position can be set, and is the portion which is surrounded by the left margin position, the right margin position, the top margin position, and the bottom margin position. The non-printable area is the region in which the printing position cannot be set, except for the right margin position, and is the region on the paper outside the printable area.

The margins, which determine the printable area, are defined as follows.

The left margin determines the non-printable strip appended to the left side of the printable area. The left margin position, which defines the margin boundary, is set upon the X axis. Moreover, the left margin position is considered as being included in the printable area.

The right margin determines the non-printable strip appended to the right side of the printable area. The right margin position, which defines the margin boundary, is set upon the X axis. Moreover, the right margin position is considered as being included in the non-printable area. However, it is possible to set the printing position to the right margin position.

The top margin determines the non-printable strip appended to the upper side of the printable area. The top margin position, which defines the margin boundary, is set upon the Y axis. Moreover, the top margin position is considered as being included in the printable area.

The bottom margin determines the non-printable strip appended to the lower side of the printable area. The bottom margin position, which defines the margin boundary, is set upon the Y axis. Moreover, the bottom margin position is considered as being included in the printable area.

The page management X-Y discrete coordinate system (hereinafter abbreviated as the page management coordinate system) which is used as the reference for setting the position of each of these margins, is the same as the position management coordinate system, except for the definition of the origin.

The position management coordinate system is the coordinate system for management of the printable area which is set within the page management coordinate system.

The position management coordinate system is set for each page separately.

The origin of the page management coordinate system is defined as follows.

The origin upon the X axis is set to the minimum printing position. The minimum printing position is the farthest leftward printing position that can physically be set upon the paper. The minimum printing position depends upon the horizontal position of the paper when it is inserted.

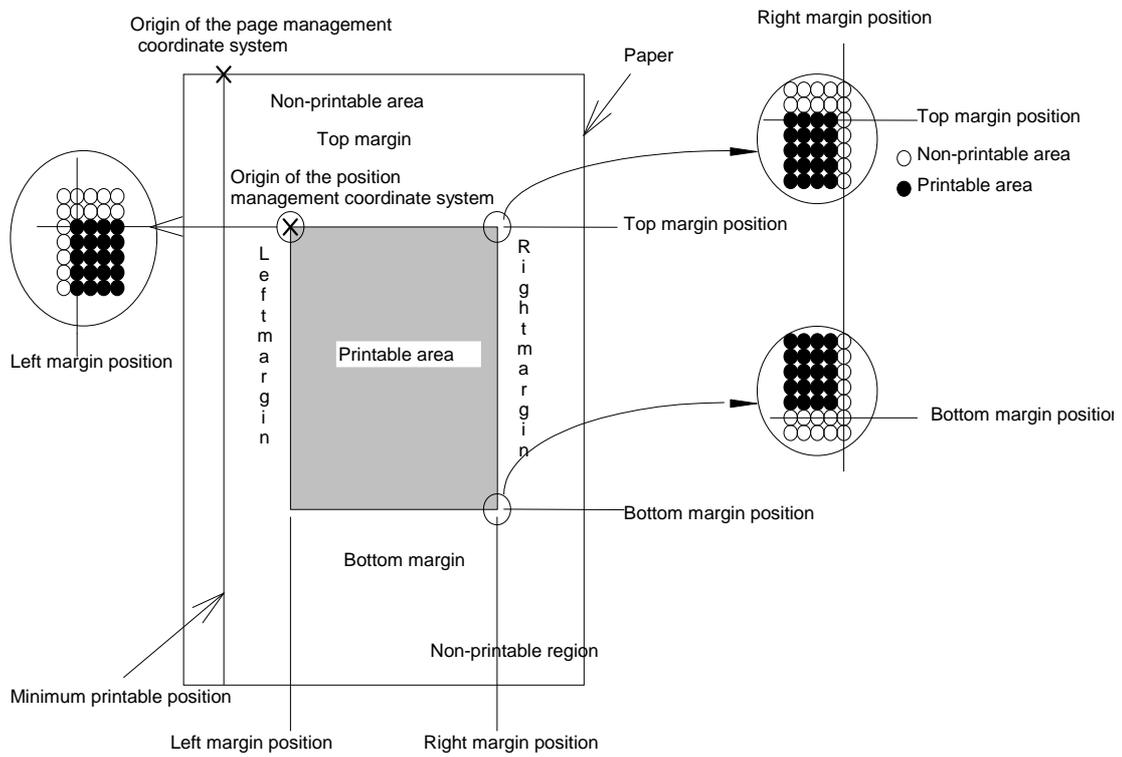
As for the origin upon the Y axis, for the first page directly after paper insertion, the upper edge of the paper is defined as the origin. For the second and subsequent pages, a position advanced by the page length from the origin on the page management coordinate system for the previous page is defined as the origin for the current page. Since in the case of single sheet paper only one page at a time can be inserted, the upper edge of the paper is always taken as the origin.

Here, page and page length are defined as follows.

A page means a unit region in the Y direction, which includes within it a single printable area. If the paper that is inserted is single sheet paper, only one page can be established upon each sheet. If the paper that is inserted is continuous paper, a plurality of pages can be established upon it.

The page length is the length in the Y direction of the page. If the paper that is inserted is single sheet paper, the length of the printing region in the Y direction from the top margin position to just before the bottom margin position is taken as the page length. If the paper that is inserted is continuous paper, the distance from the top margin position on the present page to the top margin position upon the next page is taken as the page length.

Table 2 Coordinate Systems for a Single Sheet of Paper



2.3.1 Printing Area (Standard)

The printable areas of various paper sizes on these printers are defined hereafter. Values are expressed in dot units, where 1 dot = 1/360 inch. As is displayed in the following diagram, printable area can be defined as follows:

A = the width of the unprintable left margin area

A (Centered) = the width of the unprintable left margin area when the printable area is centered

B = the width of the printable area

B (Centered) = the width of the printable area when the printable area is centered

C = the width of the unprintable right margin area

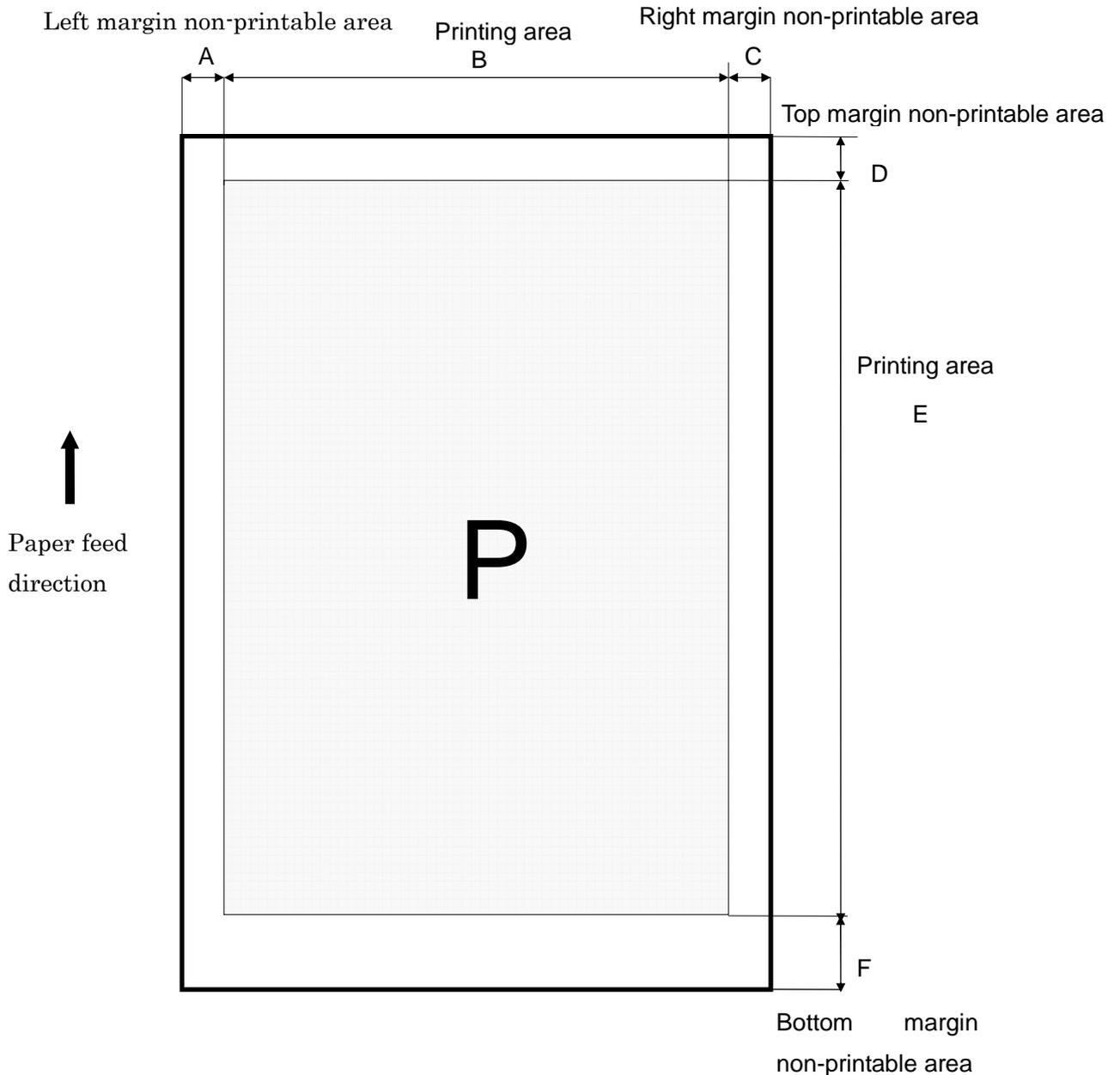
C (Centered) = the width of the unprintable right margin area when the printable area is centered

D = the length of the unprintable top margin area

D (Centered) = the length of the unprintable top margin area when the printable area is centered

E = the length of the printable area

E (Centered) = the length of the printable area when the printable area is centered



Standard Sizes

The printing area is specified by A, B, D, and E.

	A/A(Expanded)	B/B(Expanded)	D/D(Expanded)	E/E(Expanded)
Legal	42/42	2976/2976	42/42	4715/4956
Letter	42/42	2976/2976	42/42	3635/3876
A4	42/42	2892/2892	42/42	3884/4125
A5	42/42	2014/2014	42/42	2651/2892
A6	42/42	1404/1404	42/42	1773/2014
B5	42/42	2496/2496	42/42	3318/3559
Half Letter	42/42	1896/1896	42/42	2735/2976
5x7in. / 2L Size	42/42	1716/1716	42/42	2197/2438
4x6in	42/42	1356/1356	42/42	1835/2076
3.5x5in. / L Size	42/42	1177/1177	42/42	1475/1716
8x10in.	42/42	2796/2796	42/42	3275/3516
5x8in.	42/42	1716/1716	42/42	2555/2796
Postcard	42/42	1333/1333	42/42	1773/2014
Double Postcard	42/42	2751/2751	42/42	1773/2014
Envelope #10	42/42	1401/1401	42/42	3095/3095
Envelope DL	42/42	1475/1475	42/42	2793/2793
Envelope C4 / Japanese KAKUGATA 20 Envelope	42/42	3162/3162	42/42	3812/4267
Japanese YOKEI 1 Envelope	42/42	1617/1617	42/42	2169/2410
Envelope C6 / Japanese YOKEI 2 Envelope	42/42	1532/1532	42/42	1971/212
Japanese YOKEI 3 Envelope	42/42	1305/1305	42/42	1773/2014
Japanese YOKEI 4 Envelope	42/42	1404/1404	42/42	3006/3247
Japanese CHOKEI 3 Envelope	42/42	1617/1617	42/42	3006/3247
Japanese CHOKEI 4 Envelope	42/42	1404/1404	539/42	3006/3247
16:9wide	42/42	1356/1356	42/42	2235/2476

Unit [1/360inch]

User-defined

With a paper type set by the user, a printing area defined by A, B, D, and E of at least the following number of dots are reserved.

	A/A(Expanded)	B/B(Expanded)	D/D(Expanded)	E/E(Expanded)
User-defined	42/42	max. 2976 / max. 2976	42/42	max. 15515 / max. 15756

CHAPTER 3: Printing Option

3.1. Printing Quality

These printers have the capability of printing at eleven different levels of quality.

Print density			Dot size	Raster command density	ESC (D setting horizontal)	ESC (D setting vertical)	ESC i setting	ESC (e setting)	Remarks
Plain Paper	Special Paper	(H x V)		(H x V)	h / r	v / r	mH*256 + mL	n2	
Fast Eco		360dpi x 180dpi	VSD1	360dpi x 180dpi 2bit	4/1440	8/1440	Max 60 (Color)/Max 180 (Mono)	11H	Color and Mono
Economy		360dpi x 180dpi	VSD1	360dpi x 180dpi 2bit	4/1440	8/1440	Max 60 (Color)/Max 180 (Mono)	11H	Color and Mono
Normal		360dpi x 360dpi	VSD1	360dpi x 180dpi 2bit	4/1440	8/1440	Max 60 (Color)/Max 180 (Mono)	11H	Color and Mono
Fine		360dpi x 720dpi	VSD2	360dpi x 180dpi 2bit	4/1440	8/1440	Max 60 (Color)/Max 180 (Mono)	12H	Color and Mono
Super Fine		720dpi x 720dpi	VSD3	360dpi x 180dpi 2bit	4/1440	8/1440	Max 60 (Color)/Max 180 (Mono)	13H	Color and Mono
	Photo Draft	360dpi x 720dpi	VSD2	360dpi x 180dpi 2bit	4/1440	8/1440	Max 60	12H	Color only
	Photo	720dpi x 720dpi	VSD2	360dpi x 180dpi 2bit	4/1440	8/1440	Max 60 (Color)/Max 180 (Mono)	12H	Color and Mono
	Best Photo	1440dpi x 720dpi	VSD3	360dpi x 180dpi 2bit	4/1440	8/1440	Max 60 (Color)/Max 180 (Mono)	13H	Color and Mono
	Photo RPM	5760dpi x 1440dpi	VSD3	360dpi x 180dpi 2bit	4/1440	8/1440	Max 60	13H	Color only

3.2 Recommended Settings for Color and Monochrome Printing

Monochrome or Color printing mode depends on the ESC (K command). See the individual command specifications.

3.2.1 Recommended Setting Modes

Media	Preset name	Print quality	Resolution (dpi)	Bi-d	Dot Size	ESC (m)	
						Color	Black only
普通紙(JPN) Plain paper(Others) Bright White Paper(US) 両面上質普通紙<再生紙>(JPN) Bright White Ink Jet Paper(EUR/Asia)	Draft	Fast Economy	360x180	ON	VSD1	10H	11H
	*Standard	Economy	360x360	*ON/OFF	VSD1	20H	21H
		Normal	360x360	*ON/OFF	VSD1	20H	21H
	High	Fine	360x720	*ON/OFF	VSD2	30H	31H
		Super Fine	720x720	*ON/OFF	VSD3	50H	51H
写真用紙<光沢>(JPN) Premium Photo Paper Glossy(US) Premium Glossy Photo Paper(EUR/Asia)	*Standard	Photo	720x720	*ON/OFF	VSD2	52H	-
	High	Best Photo	1440x720	*ON/OFF	VSD2	70H	-
		Photo RPM	5760x1440	*ON/OFF	VSD3	A0H	-
フォトマット紙(JPN) Premium Presentation Paper Matte(US) Matte Paper Heavy-weight(EUR/Asia) スーパーファイン紙(JPN) Presentation Paper Matte(US) Photo Quality Ink Jet Paper(EUR/Asia)	*Standard	Photo	720x720	*ON/OFF	VSD2	52H	53H
	High	Best Photo	1440x720	*ON/OFF	VSD3	70H	71H
国内封筒(JPN) Envelope(US) Envelope(EUR/Asia)	*Standard		360x360	ON	VSD1	20H	21H
	High		360x720	ON	VSD2	30H	31H

*Default

CHAPTER 4: COMMAND SEQUENCE

4.1 Raster Graphics Modes

The following two modes are available for raster graphics commands:

- 1) Non-compressed mode - the print data is transferred without being compressed.
Effective for printing data with a low compression ratio, such as photographs.
- 2) Run-length encoded mode - the print data is transmitted after run-length encoding compression.
Effective for printing data such as graphs and figures, in which patterns appear repeatedly.

4.2 Command Transfer Procedure

4.2.1 Command transfer sequence for non-compressed and the run-length encoded compression modes

The following are the basic commands used in non-compressed and run-length encoded modes. The commands are listed in order as they are sent:

Table 3 Command Sequence for the Conventional command method of graphics data transmission

Transfer cycle	Details of setting	Items set	Commands used	
By document	1. Initialize settings	1.1 Exit Packet Mode 1.2 Enter remote mode Set Printer Timer*** Job Start*** Set Job Name Paper Feed Setup Set paper path Set Media information Set double paper print Set user setting Other Remote Commands (optional) Exit Remote Mode 1.3 Initialize printer 1.4 Data Processing Setting 1.5 Select graphics mode 1.6 Set unit	ESC SOH @EJL... ESC (R TI JS JH SN PP MI DP US ESC 00H 00H 00H ESC @ ESC (A ESC (G ESC (U	
	2. Printing method control	2.1 Turn unidirectional mode on/off 2.2 Select Micro-Weave printing mode 2.3 Select Monochrome or Color 2.4 Set Driver Color Mode 2.5 Select Ink Drop Size	ESC U ESC (i ESC (K ESC (K ESC (e	
	3. Set print format (single sheet)	3.1 Set page length 3.2 Set page format 3.3 Set paper dimension 3.4 Set Print method	ESC (C ESC (c ESC (S ESC (m	
By page	By raster	4. Set vertical position	4.1 Set vertical print position	ESC (V or ESC (v
		5. Transfer data	5.1 Select color 5.2 Set horizontal print position 5.3 Print raster graphics: * repeat above for each color 5.4 Print compulsory**	ESC (r ESC (/ or ESC (\$ ESC . ESC ACK
		6. Printing method control	6.1 Select Monochrome or Color****	ESC (K
			6.2 Set Driver Color Mode****	ESC (K
		7. Form feed	7.1 Form feed	FF
8. Terminate printing	8.1 Initialize printer 8.2 Enter Remote Mode Load NVR Settings Job End Exit Remote Mode	ESC @ ESC (R LD JE ESC 00H 00H 00H		

*Parameters and data format of non-compressed vs. run-length encoded transmissions will differ with the Print Raster Graphics command.

**In the case of micro weave print mode, ESC ACK command is inserted only when the plural passes are specified with no paper feed.

*** It is necessary to send the TI command before the JS command.

Table 4 Command Sequence for the newer Method of ESC (D command method of graphics data transmission

Transfer cycle		Details of setting	Items set	Commands used
By document		1. Initialize settings	1.1 Exit Packet Mode 1.2 Enter remote mode Set Printer Timer** Job Start** Set Job Name Paper Feed Setup Set paper path Set Media information Set double paper print Set user setting Other Remote Commands (optional) Exit Remote Mode 1.3 Initialize printer 1.4 Data Processing Setting 1.5 Select graphics mode 1.6 Set unit	ESC SOH @EJL... ESC (R TI JS JH SN PP MI DP US ESC 00H 00H 00H ESC @ ESC (A ESC (G ESC (U
		2. Printing method control	2.1 Turn unidirectional mode on/off 2.2 Select Micro-Weave print mode 2.3 Select Monochrome or Color 2.4 Set Driver Color Mode 2.5 Select Ink Drop Size 2.6 Set resolution of Raster mode	ESC U ESC (i ESC (K ESC (K ESC (e ESC (D
		3. Set print format (single sheet)	3.1 Set page length 3.2 Set page format 3.3 Set paper dimension 3.4 Set Print method	ESC (C ESC (c ESC (S ESC (m
By page	By raster	4. Set vertical position	4.1 Set vertical print position	ESC (V or ESC (v
		5. Transfer data	5.1 Set horizontal print position 5.2 Print raster graphics: repeat above for each color 5.3 Print compulsory*	ESC (/ or ESC (\$ ESC i ESC ACK
		6. Printing method control	6.1 Select Monochrome or Color*** 6.2 Set Driver Color Mode***	ESC (K ESC (K
		7. Form feed	7.1 Form feed	FF
		8. Terminate printing	8.1 Initialize printer 8.2 Enter Remote Mode Load NVR Settings Job End Exit Remote Mode	ESC @ ESC (R LD JE ESC 00H 00H 00H

*In the case of micro weave print mode, ESC ACK command is inserted only when the plural passes are specified with no paper feed.

** It is necessary to send the TI command before the JS command.

4.3 Limitations of Command Settings

- “Exit Packet Mode”, in many circumstances, command **MUST** be called before any communication or printing can occur on any I/F. This command is described in the “Individual Command Specifications”.
- The “Set absolute vertical print position ESC (V)” and “Set relative vertical print position ESC (v)” commands will set the starting print position of the subsequent data to be printed, including whatever white space may exist within that data. To avoid confusion, it is recommended not to embed large null or white space in the data.
- All null raster data should not be sent to the printer.
- For detailed specifications of the commands that are transmitted, refer to CHAPTER 5, "Individual Command Specifications".

4.4 Raster Graphics Data Format

The raster graphics commands that are implemented these printers have a very different data format from the general specification commands. The driver must generate appropriate data taking into account the color nozzle positions in the printer are uniquely vertically aligned.

The parameters for the raster graphics commands used by these printers are as follows.

1)

ESC i r c b nL nH mL mH

For detail on the specification command that is transmitted, refer to CHAPTER 5, "Individual Command Specification".

- Horizontal resolution of 360 dpi (ESC (D))
- Vertical resolution of 180 dpi (ESC (D))
- Vertical dot count of 60 dots (color mode) ***
- Vertical dot count of 180 dots (monochrome mode)
Those commands and parameters are only available.

*** Dot size is select variable.

2)

ESC . 0 20 10 m nL nH **

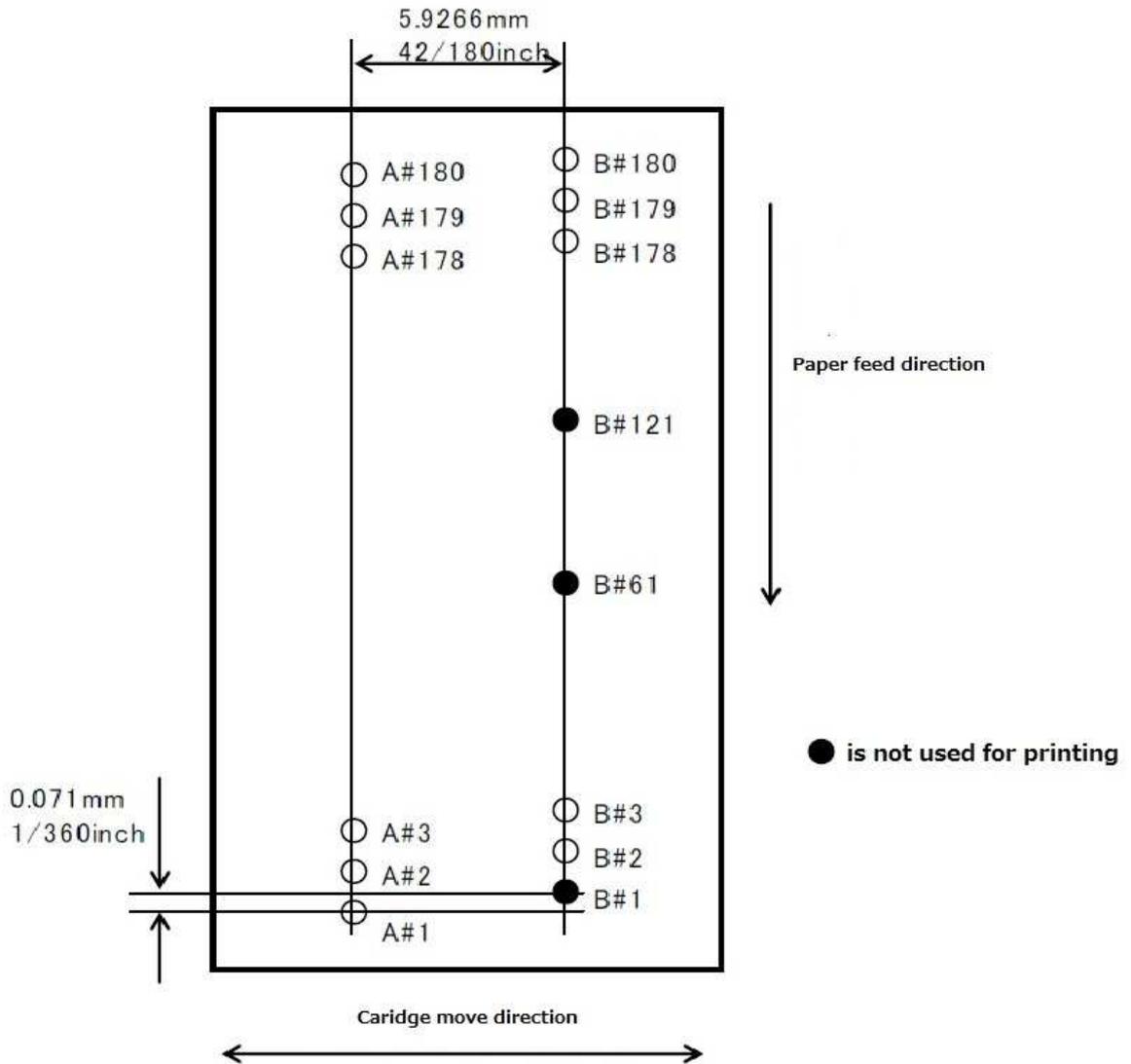
ESC . 1 20 10 m nL nH **

For detail on the specification command that is transmitted, refer to CHAPTER 5, "Individual Command Specification".

- Horizontal resolution of 360 dpi
- Vertical resolution of 180 dpi
- Vertical number of 60 dots (color mode)
- Vertical number of 180 dots (monochrome mode)
Those commands and parameters are only available.

** This command cannot print color data.

The nozzle constitution and each nozzle name are shown below.



Black : 180 Nozzles (A#1~A#180)

Yellow : 59Nozzles (B#2~B#60), Magenta : 59Nozzles (B#62~#120), Cyan : 59Nozzles (B#122~#180)

For monochrome printing, only Black nozzle is used.

For color printing, the Black and Color nozzles are used. The Black nozzle only uses nozzles 121 to 180 and does not need to send NULL data to other nozzle.

When a user changes the printing modes to print in color or to print in monochrome, use ESC (K command).

When a user wants to print the monochrome data, a user selects the monochrome mode.

When a user wants to print the color data, a user selects the color mode and a user must select a variable dot and send the variable data.

For these printers, the data must be configured bearing in mind the vertical positions of the nozzles. EPSON printers are generally having print heads with nozzles for each color structured in the same vertical position, but the head of these printers takes the Color nozzle as a reference point. When transferring data to the printer, these offsets must be taken into consideration.

Correspondence table of raster command row and the nozzle are shown below. (Color printing)

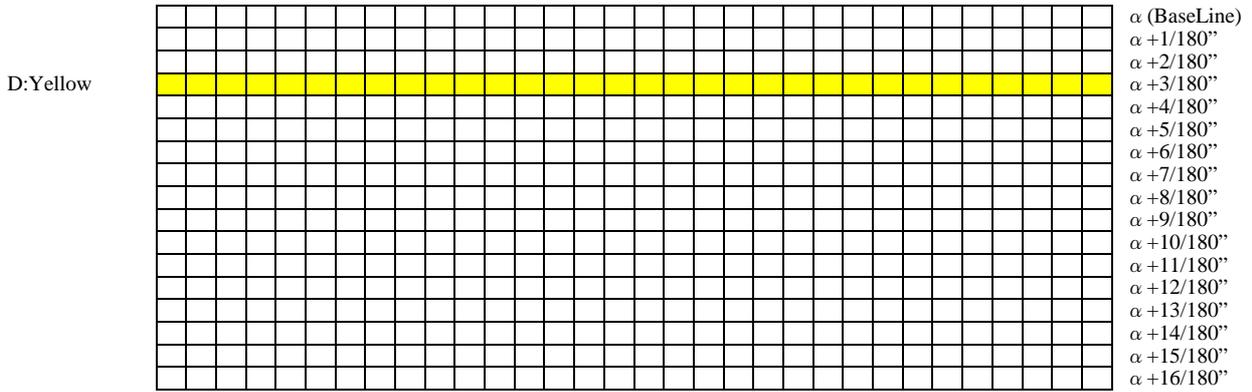
Row ("raster") number	Cyan Vertical position	Magenta Vertical position	Yellow Vertical position	Black Vertical position
1	$\alpha+120/180\text{inch}$	$\alpha+60/180\text{inch}$	$\alpha(\text{base position})$	$\alpha(\text{base position})$
2	$\alpha+121/180\text{inch}$	$\alpha+61/180\text{inch}$	$\alpha+1/180\text{inch}$	$\alpha+1/180\text{inch}$
3	$\alpha+122/180\text{inch}$	$\alpha+62/180\text{inch}$	$\alpha+2/180\text{inch}$	$\alpha+2/180\text{inch}$
4	$\alpha+123/180\text{inch}$	$\alpha+63/180\text{inch}$	$\alpha+3/180\text{inch}$	$\alpha+3/180\text{inch}$
5	$\alpha+124/180\text{inch}$	$\alpha+64/180\text{inch}$	$\alpha+4/180\text{inch}$	$\alpha+4/180\text{inch}$
6	$\alpha+125/180\text{inch}$	$\alpha+65/180\text{inch}$	$\alpha+5/180\text{inch}$	$\alpha+5/180\text{inch}$
7	$\alpha+126/180\text{inch}$	$\alpha+66/180\text{inch}$	$\alpha+6/180\text{inch}$	$\alpha+6/180\text{inch}$
8	$\alpha+127/180\text{inch}$	$\alpha+67/180\text{inch}$	$\alpha+7/180\text{inch}$	$\alpha+7/180\text{inch}$
9	$\alpha+128/180\text{inch}$	$\alpha+68/180\text{inch}$	$\alpha+8/180\text{inch}$	$\alpha+8/180\text{inch}$
10	$\alpha+129/180\text{inch}$	$\alpha+69/180\text{inch}$	$\alpha+9/180\text{inch}$	$\alpha+9/180\text{inch}$
...
51	$\alpha+170/180\text{inch}$	$\alpha+110/180\text{inch}$	$\alpha+50/180\text{inch}$	$\alpha+50/180\text{inch}$
52	$\alpha+171/180\text{inch}$	$\alpha+111/180\text{inch}$	$\alpha+51/180\text{inch}$	$\alpha+51/180\text{inch}$
53	$\alpha+172/180\text{inch}$	$\alpha+112/180\text{inch}$	$\alpha+52/180\text{inch}$	$\alpha+52/180\text{inch}$
54	$\alpha+173/180\text{inch}$	$\alpha+113/180\text{inch}$	$\alpha+53/180\text{inch}$	$\alpha+53/180\text{inch}$
55	$\alpha+174/180\text{inch}$	$\alpha+114/180\text{inch}$	$\alpha+54/180\text{inch}$	$\alpha+54/180\text{inch}$
56	$\alpha+175/180\text{inch}$	$\alpha+115/180\text{inch}$	$\alpha+55/180\text{inch}$	$\alpha+55/180\text{inch}$
57	$\alpha+176/180\text{inch}$	$\alpha+116/180\text{inch}$	$\alpha+56/180\text{inch}$	$\alpha+56/180\text{inch}$
58	$\alpha+177/180\text{inch}$	$\alpha+117/180\text{inch}$	$\alpha+57/180\text{inch}$	$\alpha+57/180\text{inch}$
59	$\alpha+178/180\text{inch}$	$\alpha+118/180\text{inch}$	$\alpha+58/180\text{inch}$	$\alpha+58/180\text{inch}$
60	$\alpha+179/180\text{inch}$	$\alpha+119/180\text{inch}$	$\alpha+59/180\text{inch}$	$\alpha+59/180\text{inch}$
61	-	-	-	$\alpha+60/180\text{inch}$
...
180	-	-	-	$\alpha+179/180\text{inch}$

Command transmission

Command transmission example and printing result of easy ESC/P Raster data are the following.

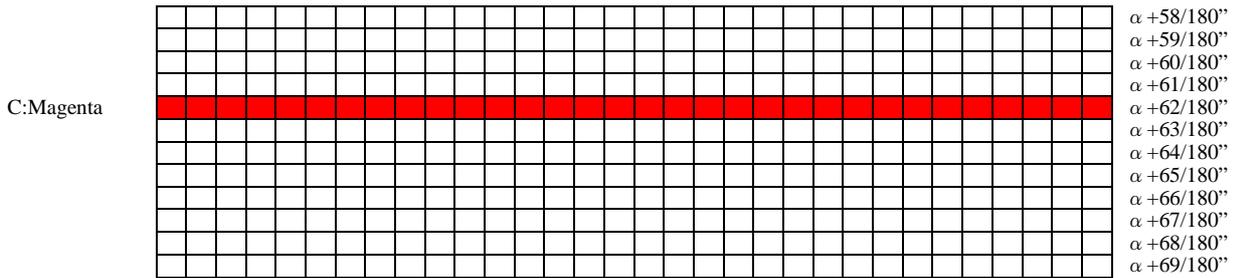
ESC @	initialization
ESC (G 01 00 01	Set unit (1/180 inch)
ESC (U 01 00 14	Select dot size(variable1)
ESC (e 02 00 00 10	Set resolution of Raster mode (180 x 360 DPI)
ESC (D 04 00 A0 05 08 04	A: Black 1line
ESC i 00 00 02 08 00 01 00 FF FF FF FF FF FF FF FF	carriage return
CR	relative vertical print position (1/180 inch)
ESC (v 02 00 01 00	B: Cyan 1line
ESC i 02 00 02 08 00 01 00 FF FF FF FF FF FF FF FF	carriage return
CR	relative vertical print position (1/180 inch)
ESC (v 02 00 01 00	C: Magenta 1line
ESC i 01 00 02 08 00 01 00 FF FF FF FF FF FF FF FF	carriage return
CR	relative vertical print position (1/180 inch)
ESC (v 02 00 01 00	D: Yellow 1line
ESC i 04 00 02 08 00 01 00 FF FF FF FF FF FF FF FF	carriage return
CR	relative vertical print position (1/180 inch)
ESC (v 02 00 01 00	E: Black 1line
ESC i 00 00 02 08 00 01 00 FF FF FF FF FF FF FF FF	carriage return
CR	relative v print position (1/180 inch)
ESC (v 02 00 01 00	paper eject
0Ch	initialization
ESC @	

Print result.



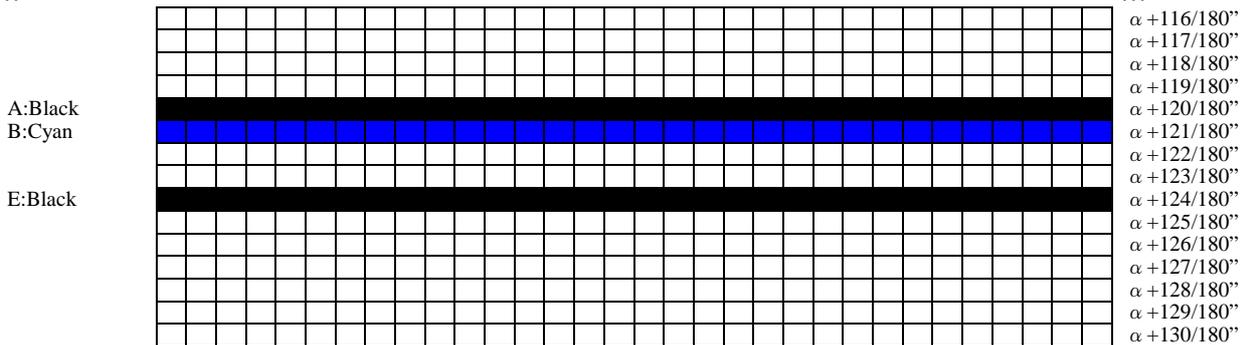
...

...



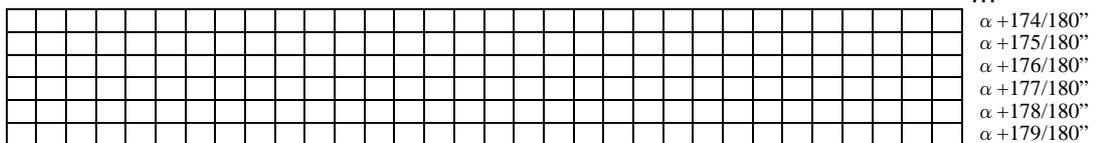
...

...



...

...



CHAPTER 5: INDIVIDUAL COMMAND SPECIFICATIONS

5.1.1 Exit Packet Mode

00H 00H 00H ESC 01H “@EJL” 20H “1284.4” 0AH “@EJL” 20H 20H 20H 20H 20H 0AH **Ver 1.00**

[Name]	EPSON packet mode exit command (special command)	[Setting]
[Format]	00H,00H,00H,1BH,01H,40H,45H,4AH,4CH,20H,31H,32H,38H,34H,2EH,34H,0AH, 40H,45H4AH,4CH,20H,20H,20H,20H,20H,0AH	
[Range of Definition]	---	
[Function]	1) If the system is in packet mode, this command must be sent before any other commands can be successfully transferred over either USB or Parallel Port, including the basic ESC @ printer initialization command. 2) Packet communication protocol (EPSON packet mode) is cancelled. The command for entering packet mode and the commands utilized in packet mode are EPSON proprietary.	
[Initial State]	The initial state of the printer, unused and unopened, new from the EPSON box, may or may not be in packet mode. However, once the printer has received any print job from any other source (especially a Windows OS printer driver) it will most likely be in packet mode. If the printer is in EPSON packet mode; no typical USB and possibly Parallel Port transmissions can be received or recognized.	
[Related Commands]	---	

5.1.2 Initialize printer ESC @

ESC @

Ver 1.00

[Name]	Initialize printer	[Setting]
[Format]	1BH, 40H	
[Range of Definition]	-	
[Function]	<ol style="list-style-type: none">1) The various settings are returned to their initial values.2) The Y axis origin of the page management coordinate system and the position management coordinate system are set to the current printing position on the Y axis.3) The present printing position on the X axis is set to the origin upon the X axis.4) Text mode printing is selected.	
[Initial State]	-	
[Related Commands]		
	[Setting] Commands whose settings are affected by this command. The settings for all commands are returned to their initial states.	
	[Setting] Commands that change the effects of this command. None	
	[Operation] Commands whose functionality is affected by this command. None	
	[Operation] Commands that change the effects of this command. None	

[Name]	Line feed	[Operation]
[Format]	0AH	
[Range of Definition]	-	
[Function]	<ol style="list-style-type: none"> 1) Advances the current printing position in the positive Y direction by an amount equal to the current line separation amount. Sets the printing position in the X direction to the starting point (the left margin position) on the X axis of the position management coordinate system. 2) If this command sets the Y direction printing position into the non-printable area, then the page is ejected. The position management coordinate system is set to the next page. In addition the printing position is set to the origin of the position management coordinate system for the new page. 	
[Initial State]	-	
[Related Commands]	<p>Related Command [Setting]s that apply an effect. None</p> <p>Related Command [Setting]s that receive an effect. None</p> <p>Related Command [Operation]s that apply an effect. None</p> <p>Related Commands [Operation]s that receive an effect. The amount of advancement per line is set by the ESC + command. The non-printable area is set by the ESC (c command). The amount of advancement per line, the non-printable area, and the left margin position are reset to their initial state by the ESC @ and ESC (G commands).</p>	

5.1.4 Form feed FF

FF

Ver 1.00

[Name]	Form feed	[Operation]
[Format]	0CH	
[Range of Definition]	-	
[Function]	1) The contents of the print buffer are printed. The current page is ejected. The position management coordinate system is set to the next page. The printing position is set to the origin of the position management coordinate system for the new page. 2) This command is ignored if the printer is out of paper.	
[Initial State]	-	
[Related Commands]	[Setting] Commands whose settings are affected by this command. None [Setting] Commands that change the effects of this command. None [Operation] Commands whose functionality is affected by this command. None [Operation] Commands that change the effects of this command. The page length is set by the ESC (C command). The page length and the left margin position are reset to their initial states by the ESC @ and ESC (G commands).	

5.1.5 Carriage Return CR

CR

Ver 1.00

[Name]	Carriage Return	[Operation]
[Format]	ODH	
[Range of Definition]	-	
[Function]	1) The printing position in the X direction is set to the origin (the left margin) on the X axis of the position management coordinate system.	
[Initial State]	-	
[Related Commands]		
	[Setting] Commands whose settings are affected by this command.	
	None	
	[Setting] Commands that change the effects of this command.	
	None	
	[Operation] Commands whose functionality is affected by this command.	
	None	
	[Operation] Commands that change the effects of this command.	
	None	

5.1.6 Control paper loading/ejecting ESC EM n

ESC EM n

Ver 1.00

[Name]	Control paper loading/ejecting	[Setting]
[Format]	1BH, 19H, n	
[Range of Definition]	n=52H (="1", "R")	
[Function]	<ol style="list-style-type: none">1) The CSF (cut sheet feeder) receives the following commands, according to the value of n: n=52H eject paper2) If n has any value other than the above, this command is ignored.3) The ESC EM "R" will only eject paper fed from the CSF. If the paper being fed was not fed by the CSF, this command is ignored.4) Bin selection settings apply to the next and subsequent paper feedings.5) After the ESC EM "R" command ejects the paper, the printing position in the X direction is set to the origin on the X axis.	
[Initial State]	-	
[Related Commands]	[Setting] Commands whose settings are affected by this command. None [Setting] Commands that change the effects of this command. Bin selection is reset to its initial state by the ESC @ command. [Operation] Commands whose functionality is affected by this command. None [Operation] Commands that change the effects of this command. None	

5.1.7 Set absolute horizontal print position ESC \$ nL nH

Ver 1.00

ESC \$ nL nH

[Name] Set absolute horizontal print position [Operation]

[Format] 1BH, 24H, nL, nH

[Range of Definition] $0 \leq nL \leq 255$

$0 \leq nH \leq 127$

[Function] 1) The printing position in the positive X direction is set to:
 $0 \leq \frac{(256 \times nH + nL) \times 2880}{(\text{absolute horizontal position setting value})} \leq 209.973 \text{ mm}$

OR

$0 \leq \frac{(256 \times nH + nL) \times 2880}{(\text{absolute horizontal position setting value})} \leq \frac{23808}{2880} \text{ inch}$

from the origin (the left margin position) on the X axis of the position management coordinate system.

2) If (current left margin position)+((256 x nH + nL) x (absolute horizontal position setting value)) is passed the right margin position, then this command is ignored.

[Initial State] -

[Related Commands]

[Setting] Commands whose settings are affected by this command.
None

[Setting] Commands that change the effects of this command.
None

[Operation] Commands whose functionality is affected by this command.
None

[Operation] Commands that change the effects of this command.
The “absolute horizontal position setting value” is set by the ESC (U command).
The “absolute horizontal position setting value” is restored to its initial state by the ESC @ and ESC (G commands).
The printer settings are restored to their initial state to by the ESC @ command.

5.1.8 Set absolute horizontal print position ESC (\$ nL nH m1 m2 m3 m4

Ver 1.00

ESC (\$ nL nH m1 m2 m3 m4

[Name]	Set absolute horizontal print position	[Operation]
[Format]	1BH, 28H, 24H, nL, nH, m1, m2, m3, m4	
[Range of Definition]	nL=04H, nH=00H $0 \leq \frac{(m4 * 1000000H + m3 * 10000H + m2 * 100H + m1) * 2880}{2880} \leq 209.973 \text{ mm}$ (absolute horizontal position setting value) OR $0 \leq \frac{(m4 * 1000000H + m3 * 10000H + m2 * 100H + m1) * 2880}{2880} \leq \frac{23808}{2880} \text{ inch}$ (absolute horizontal position setting value)	
[Function]	<ol style="list-style-type: none"> The printing position in the X direction is set to the following positive value from the origin (left margin position) on the X axis of the position management coordinate system: $((m4 \times 256^3 + m3 \times 256^2 + m2 \times 256 + m1) \times (\text{absolute horizontal position setting value}))$ If Left margin + $((m4 \times 256^3 + m3 \times 256^2 + m2 \times 256 + m1) \times (\text{absolute horizontal position setting value}))$ is beyond the right margin position, then this command is ignored. This Command is only effective in graphics mode. 	
[Initial State]	-	
[Related Commands]	[Setting] Commands whose settings are affected by this command. None [Setting] Commands that change the effects of this command. None [Operation] Commands whose functionality is affected by this command. None [Operation] Commands that change the effects of this command. The absolute horizontal position setting units are set by the ESC (U command). The absolute horizontal position setting units are reset to their initial state by the ESC @ and ESC (G commands). The absolute horizontal print position is restored to its initial, default setting by the ESC @ command.	

5.1.9 Set page length in defined unit (extended) ESC (C nL nH m1 m2 m3 m4

ESC (C nL nH m1 m2 m3 m4

Ver 2.00

[Name]	Set page length in defined unit(extended)	[Operation]
[Format]	1BH, 28H, 43H, nL, nH, m1, m2, m3, m4	
[Range of Definition]	nL=04H, nH=00H	
	$0 <= (m4 * 1000000H + m3 * 10000H + m2 * 100H + m1) * 1440 / (\text{defined value}) <= 1FFFFFFFH$	
[Function]	<ol style="list-style-type: none">1) The page length is set to $((mH \times 256) + mL) \times (\text{page management value}) * 25.4\text{mm}$.2) If the formula applied values of mH and mL produces a value outside the Range of Definition, this command is ignored.3) The Y axis origin of the page management coordinate systems and position management coordinate systems are set to the current Y direction printing position. The origin on the X axis is not changed at this time.4) The top margin position is set to the origin on the Y axis. The bottom margin position is set to the position positive Y page length from the top margin.	
[Initial State]	The page length is set to 558.8mm(22 inches).	
[Related Commands]	<p>[Setting] Commands whose settings are affected by this command. The top and bottom margin position settings set by the ESC (c commands are cleared.</p> <p>[Setting] Commands that change the effects of this command. The page length, the page management value, and the top and bottom margin positions are reset to their initial states by the ESC @ and ESC (G commands.</p> <p>[Operation] Commands whose functionality is affected by this command. New page processing by the FF command is affected (the amount of movement is changed). New lines generated by the LF command that go outside the printable area are affected. Processing by the ESC (v command is affected. Processing by the ESC (V command is affected.</p> <p>[Operation] Commands that change the effects of this command. The page management value is set by the ESC (U command.</p>	

5.1.10 Select graphics mode ESC (G nL nH m

Ver 1.00

ESC (G nL nH m

[Name]	Select graphics mode	[Operation]
[Format]	1BH, 28H, 47H, nL, nH, m	
[Range of Definition]	nL=01H, nH=00H m=01H or 31H	
[Function]	<ol style="list-style-type: none">1) Shifts to graphics mode.2) If m has any value other than the above, this command is ignored.3) Printing of lines up to the present line is started, and the printer waits until the printing is completed.4) The various settings are the same as when the power is turned on.5) The page management coordinate system and the position management coordinate system are set by taking the printing position in the Y direction at the time of setting as the origin on the Y axis.6) The printing position in the X direction is set to the origin upon the X axis.7) The microweave printing mode selection command becomes effective.	
[Initial State]	Character mode.	
[Related Commands]	[Setting] Commands whose settings are affected by this command. Default character mode selection made by the ESC @ command is changed.	
	[Setting] Commands that change the effects of this command. The graphics mode is cancelled by the ESC @ command.	
	[Operation] Commands whose functionality is affected by this command. In graphics mode, only the following commands are valid:	
	LF ESC (C	
	FF ESC (\	
	CR ESC (U	
	ESC EM ESC (V	
	ESC. ESC (r	
	ESC + ESC (v	
	ESC @ ESC \	
	ESC (c ESC (\$	
	ESC (i ESC r	
	ESC (K ESC U	
	ESC (e	
	[Operation] Commands that change the effects of this command. None	

5.1.11 Set unit (extended) ESC (U nL nH P V H mL mH

Ver 2.00

ESC (U nL nH P V H mL mH

[Name]	Set unit(extended)	[Setting]
[Format]	1BH, 28H, 55H, nL, nH, P, V, H, mL mH	
[Range of Definition]	nL=05H, nH=00H $P=(mH * 256 + mL) = 90, 120, 180, 360, 720, 1440, 2880$ $V=(mH * 256 + mL) = 120, 180, 360, 720, 1440, 2880, 5760$ $H=(mH * 256 + mL) = 90, 180, 360, 720, 1440, 2880, 5760$	
[Function]	<p>1) Set the following standard values in units of $b / (mH * 256 + mL) * 25.4mm$:</p> <p>The H parameter determines the horizontal position setting units The V parameter determines the vertical position setting units The P parameter determines the page management units</p> <p>2) This Command is only effective in graphics mode.</p>	
[Initial State]	<p>Page management value: 0.071mm(1/360 inch)</p> <p>Relative horizontal position setting value: 0.141mm(1/180 inch) units</p> <p>Absolute horizontal position setting value: 0.423mm(1/60 inch) units</p> <p>Relative vertical position setting value: 0.071mm(1/360 inch) units</p> <p>Absolute vertical position setting value: 0.071mm(1/360 inch) units</p>	
[Related Commands]	<p>[Setting] Commands whose settings are affected by this command. None</p> <p>[Setting] Commands that change the effects of this command. None</p> <p>[Operation] Commands whose functionality is affected by this command. The relative horizontal position setting value used by the ESC \ and ESC(/ commands is set. The absolute horizontal position setting value used by the ESC \$ and ESC(\$ commands is set. The relative vertical position setting value used by the ESC (v command is set. The absolute vertical position setting value used the ESC (V command is set. The unit page length specification value used by the ESC (C command is set. The paper format specification value used by the ESC (c command is set. The paper dimension specification value used by the ESC (S command is set.</p> <p>[Operation] Commands that change the effects of this command. The printer settings are restored to their initial state to by the ESC @ command.</p>	

5.1.12 Set absolute vertical print position (extended) ESC (V nL nH m1 m2 m3 m4

ESC (V nL nH m1 m2 m3 m4

Ver 2.00

[Name]	Set absolute vertical print position(extended)	[Operation]
[Format]	1BH, 28H, 56H, nL, nH, m1, m2, m3, m4	
[Range of Definition]	nL=04H, nH=00H (Vertical position set) = (mL + mH x 256) x (units set) $0 \leq (m4*1000000H + m3*10000H + m2*100H + m1) \times 1440 \leq 1FFFFFFFH$ (absolute vertical print position value)	
[Function]	<ol style="list-style-type: none"> 1) The printing position in the Y direction is set to a position spaced in the positive direction by $(m4*256*256*256 + m3*256*256 + m2*256 + m1) \times$ (absolute vertical print position value) from the Y axis of the position management coordinate system. 2) If the printing position in the Y direction has been set by this command to a non-printable area, then the paper is ejected. The position management coordinate system is set to the next page. In addition, the printing position in the Y direction is reset to the origin upon the Y axis of the new position management coordinate system. 3) Settings made in the negative direction are ignored. 	
[Initial State]	-	
[Related Commands]		
	[Setting] Commands whose settings are affected by this command. None	
	[Setting] Commands that change the effects of this command. None	
	[Operation] Commands whose functionality is affected by this command. None	
	[Operation] Commands that change the effects of this command. The absolute vertical position value is set by the ESC(U commands. The range of unprintable areas are set by the ESC(c, ESC N and ESC O commands. The relative vertical position setting value, the non-printable area and the printing position in the Y direction are reset to their initial states by the ESC @ and ESC (G commands.	

5.1.13 Set page format (extended) ESC (c nL nH t1 t2 t3 t4 b1 b2 b3 b4

ESC (c nL nH t1 t2 t3 t4 b1 b2 b3 b4

Ver 2.00

[Name]	Set page format(extended)	[Setting]
[Format]	1BH, 28H, 63H, nL, nH, t1, t2, t3, t4, b1, b2, b3, b4	
[Range of Definition]	nL=08H, nH =00H $0 < t1, t2, t3, t4, b1, b2, b3, b4 \leq 255$ $0 \leq \frac{(t4 * 1000000H + t3 * 10000H + t2 * 100H + t1) * 1440}{(\text{defined unit})} \leq 1FFFFFFFH$ $0 \leq \frac{(b4 * 1000000H + b3 * 10000H + b2 * 100H + b1) * 1440}{(\text{defined unit})} \leq 1FFFFFFFH$ $(t4 * 1000000H + t3 * 10000H + t2 * 100H + t1) < (b4 * 1000000H + b3 * 10000H + b2 * 100H + b1)$	
[Function]	<ol style="list-style-type: none"> The origin on the Y axis of the position management coordinate system is set to: $(t4 * 256 * 256 * 256 + t3 * 256 * 256 + t2 * 256 + t1) \times (\text{defined unit})$ from the origin on the Y axis of the page management coordinate system. The bottom margin is set at a position spaced in the positive direction to: $(b4 * 256 * 256 * 256 + b3 * 256 * 256 + b2 * 256 + b1) \times (\text{defined unit})$ from the origin on the Y axis of the position management coordinate system. The printing position in the Y direction is shifted to the origin of the position management coordinate system. At this time, the origin on the X axis is not changed. If the distance from the origin on the Y axis of the position management coordinate system to the bottom margin position is greater than the page length, then this distance from the origin on the Y axis to the bottom margin position is set as the new page length. If the paper inserted for printing is cut sheet paper, then the distance from the top margin position to the bottom margin position is set as the page length. This command is only effective in graphics mode. 	
[Initial State]	The top margin position is set to 8.382mm(0.33 inches) . The bottom margin position is set to the page length. The page length is set to 558.8mm(22 inches).	
[Related Commands]	[Setting] Commands whose settings are affected by this command. The set page length is changed by the ESC (C command). [Setting] Commands that change the effects of this command. The top margin and the bottom margin are set by the ESC commands. The page length and the bottom margin position are returned to their initial states by the ESC @ and the ESC (G commands). [Operation] Commands whose functionality is affected by this command. New page processing by the FF command is affected (the amount of movement is changed). New lines generated by the LF command which go outside the printable area are affected. Processing by the ESC (v command is affected). Processing by the ESC (V command is affected). [Operation] Commands that change the effects of this command. The page management units are set by the ESC (U command).	

ESC (K nL nH m n

[Name]	Monochrome Mode / Color Mode Selection	[setting]
[Format]	1BH, 28H, 4BH, nL, nH, m, n	
[Range of Definition]	nL=02H, nH=00H m=00H, 01H, 02H n=00H, 01H, 02H nH is MSB mask.	
[Function]	In the case of "m=00H", 1) Monochrome mode or color mode is selected. n=00H: Default mode n=01H: Monochrome mode(Pure Black) n=02H: Color mode(Composite Black or Color) 2) When monochrome mode is selected, the color selection commands ESC r and ESC (r are ignored. Furthermore, the results of color raster commands which have been dispatched in monochrome mode are unpredictable. 3) If n has any value other than the above, this command is ignored. 4) If BK printing warning, The State becomes print-impossible. In the case of "m=01H", The processing at the BK printing mode is controlled according to the value of 'n'. 1) n=00H: Not BK printing mode In the case of "m=02H", Monochrome mode or color mode on each page are selected according to the value of 'n'. n=00H: Color mode n=01H: Grayscale mode(Pure black or Composite Black mode) n=02H: Color mode	
[Initial State]	Default mode.	
[Supplementary Note]	Higher throughput speeds may be obtained for printing monochrome data when monochrome mode is selected rather than color mode. For printing in color, the color mode must be selected.	
[Related Commands]	[Setting] Commands whose settings are affected by this command. When monochrome mode is selected, color setting modes using the ESC r and ESC (r commands are ignored. [Setting] Commands that change the effects of this command. The default mode is selected by the ESC @ command. [Operation] Commands whose functionality is affected by this command. None. [Operation] Commands that change the effects of this command. None.	

5.1.15 Select MicroWeave printing mode ESC (i)

Ver 1.00

ESC (i)

[Name]	Select MicroWeave printing mode	[Operation]
[Format]	1BH, 28H, 69H, 01H, 00H, n	
[Range of Definition]	n=00H, 01H, 30H, 31H	
[Function]	1) Selects / deselects the MicroWeave mode. all parameters : deselects	
[Initial State]	Non-MicroWeave mode	
[Related Commands]	[Setting] Commands whose settings are affected by this command. This command changes the non-selected state set by either the ESC (G or ESC @ commands. [Setting] Commands that change the effects of this command. The ESC (G command sets the non-selected state. The ESC @ command sets the non-selected state. [Operation] Commands whose functionality is affected by this command. None [Operation] Commands that change the effects of this command. None	

5.1.16 Selects dot size ESC (e nL nH m d

Ver 1.00

ESC (e nL nH m d

[Name]	Selects dot size	[Setting]
[Format]	1BH, 28H, 65H, nL, nH, m, d	
[Range of Definition]	nL=02H, nH=00H m=00H, d=00H, 11H, 12H, 13H	
[Function]	1) The dot size is set according to the value of d. 2) The d parameter has the following meaning: d=00H: VSD1 1bit (for DOS) d=11H: VSD1 2bit d=12H: VSD2 2bit d=13H: VSD3 2bit 3) Default dot sizes are specific to each printer model. 4) Dot control is valid irrespective of printing mode or printing density. 5) If the dot size is changed part way through a page, the results are unpredictable. 6) If n has any value other than the above, this command is ignored.	
[Initial State]	Default	
[Related Commands]	[Setting] Commands whose settings are affected by this command. Use of the ESC . command requires this command to be sent as follows: ESC (e 2 0 0 0 [Setting] Commands that change the effects of this command. Default dot size is automatically selected by the ESC @ or ESC (G commands. [Operation] Commands whose functionality is affected by this command. None [Operation] Commands that change the effects of this command. None	

5.1.17 Select color ESC (r nL nH m n

Ver 1.00

ESC (r nL nH m n

[Name] Select color [Setting]

[Format] 1BH, 28H, 72H, nL, nH, m, n

[Range of Definition] nL=02H, nH=00H

m=00H, 01H

n=00H, 01H, 02H, 04H

[Function] 1) The print color is selected according to the values of m and n.

m	N	Print color
00H	00H	Black
00H	01H	Magenta
00H	02H	Cyan
00H	04H	Yellow

2) If either m or n has a value other than those above, this command is ignored.

3) This command is only effective in graphics mode.

[Initial State] Black is selected.

[Related Commands]

[Setting] Commands whose settings are affected by this command.

None

[Setting] Commands that change the effects of this command.

The ESC @ command selects black.

[Operation] Commands whose functionality is affected by this command.

None

[Operation] Commands that change the effects of this command.

The ESC (G command puts the printer in graphics mode.

5.1.18 Set relative vertical print position (extended) ESC (v nL nH m1 m2 m3 m4

Ver 2.00

ESC (v nL nH m1 m2 m3 m4

[Name]	Set relative vertical print position(extended)	[Setting]
[Format]	1BH, 28H, 76H, nL, nH, m1, m2, m3, m4	
[Range of Definition]	nL=04H, nH=00H $0 \leq (m4*100000H + m3*10000H + m2*10H + m1) \times 1440 \leq 1FFFFFFFH$ (relative vertical print position value)	
[Function]	<ol style="list-style-type: none">1) The printing position in the Y direction is set to positive: ($m4*256*256 + m3*256*256 + m2*256 + m1$) x (relative vertical print position value) from the present Y printing position.2) If the position set by this command is higher than the top margin position on the current page, this command is ignored.3) If the Y direction printing position set by this command extends to a non-printable area, then the position management coordinate system is set to the next page; and the printing position in the Y direction is reset to the origin on the Y axis of the new position management coordinate system.	
[Initial State]	-	
[Related Commands]	<p>[Setting] Commands whose settings are affected by this command. None</p> <p>[Setting] Commands that change the effects of this command. None</p> <p>[Operation] Commands whose functionality is affected by this command. None</p> <p>[Operation] Commands that change the effects of this command. The relative vertical position setting value is set by the ESC (U command). The non-printable area is set by the ESC (c commands). The relative vertical position setting value, the non-printable area, and the printing position in the Y direction are reset to their initial states by the ESC @ and ESC (G commands).</p>	

5.1.19 Print raster graphics ESC . c v h m nL nH d1...dk (c=0,1)

ESC . c v h m nL nH d1...dk (c=0,1)

Ver 1.00

[Name]	Print raster graphics	[Operation]
[Format]	1BH, 2EH, c, v, h m, nL, nH, d1...dk	
[Range of Definition]	c=0, 1, 2 (a description of the behavior of this function when c == 2 is in the next section) v=10 (v/3600 dpi) h=10 (h/3600 dpi) 0 ≤ nL ≤ 255 0 ≤ nH ≤ 127 0 ≤ d ≤ 255 m=1, 8, 24, (color mode)	

[Function] This function prints raster graphics at c style compression, with v/3600 dpi vertical density, and h/3600 dpi horizontal density, to print out m raster lines, or scan lines, or rows of dots in the vertical direction, covering (nH * 256) + nL total dots, using k subsequent bytes of data.

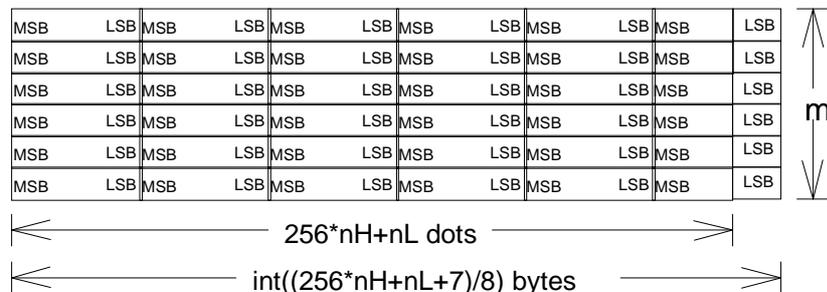
- 1) If c has any value other than those specified above, this command terminates at the instant that c is processed.
If either v or h has any value other than the above, this command is ignored.
- 2) The actual image pattern is generated according to a raster method determined by the following parameters:

- c: printing mode
 - 00H: full graphics mode (non-compressed mode)
 - 01H: run-length encoded compression mode
 - 02H: TIFF compression mode

If TIFF compression mode is used, then m must be equal to 1.
Explanation of this function where c == 2 is in the next section
- v: printing density in the vertical direction v/3600 (dpi)
- h: printing density in the horizontal direction h/3600 (dpi)
- m: number of dots (rows) in the vertical direction, number of raster or scan lines
- nL, nH: number of dots covered in the horizontal direction = ((256 * nH) + nL)
- k: number of items of data = m x int((nH * 256 + nL + 7)/8) for uncompressed data
= undeterminable amount for compressed data
- d: data

Full graphics mode (non-compressed mode)

In full graphics mode, all of the data is transferred in raster format. Raster data that extends beyond the ((256 * nH) + nL) dot area boundary will be automatically clipped or discarded. The total amount of data sent is k = int((256 * nH + nL + 7)/8) x m bytes.



Run-length encoding compression mode

In run-length encoding compression mode, the data to be printed is always transferred in the format (counter) + (data), where counter represents one byte of information.

If $0 \leq \text{counter} \leq 127$, then the data following the counter is non-compressed data, and the length of the compressed data is (counter)+1 bytes.

If $128 \leq \text{counter} \leq 255$, then the data following the counter will be one byte of compressed data, . This single compressed byte of data is thereafter to be repeated $257 - (\text{counter})$ times..

- 3) This function also increments the X printing position relative to the current X printing position by the amount: $(256 \times nH + nL) \times h / 3600 \times 25.4\text{mm}$.
If this command specifies an X position in the non-printable area (right margin), the right margin position is automatically reset to the X value of the new printing position.
- 4) If image data is designated for a non-printable area, then the image data designated for that area is ignored.

The following parameter combinations are supported by this command:

These printers doesn't have printer microweave mode.

1. Case of non-microweave mode

Mode (V x H)	Parameter				ESC(e	Used Nozzle number
	c	v	h	m	d	
360x360	0/1/2	10	10	1/8/24	00h	180Nozzles

2. Case of printer microweave mode

No support.

*1 In these circumstances, it is recommended that m be set equal to 1.

*2 Whenever the ESC . command is used, the Normal (ESC (e 2 0 0 0)) size must be selected.

[Initial State]

[Related Commands]

Character mode

[Setting] Commands whose settings are affected by this command.

None

[Setting] Commands that change the effects of this command.

None

[Operation] Commands whose functionality is affected by this command.

None

[Operation] Commands that change the effects of this command.

None

ESC (S nL nH w1 w2 w3 w4 l1 l2 l3 l4

[Name] Set paper dimension

[Format] 1BH, 28H, 53H, nL, nH, w1, w2, w3, w4, l1, l2, l3, l4

[Range of Definition]

nL=08H, nH=00H

 $0 \leq (w4 * 1000000H + w3 * 10000H + w2 * 100H + w1) * 1440 / (\text{defined unit}) \leq 7FFFFFFFH$ $0 \leq (l4 * 1000000H + l3 * 10000H + l2 * 100H + l1) * 1440 / (\text{defined unit}) \leq 7FFFFFFFH$

[Function]

- 1) Set paper length (from top-edge to bottom-edge) and paper width (from left-edge to right-edge) in the defined unit.
- 2) This command is used to expand the bottom-margin (3mm) of printer.
- 3) Paper length and width is defined by the following formula:

$$\text{physical paper length} = (l4 * 1000000H + l3 * 10000H + l2 * 100H + l1) * (\text{defined unit})$$

$$\text{physical paper width} = (w4 * 1000000H + w3 * 10000H + w2 * 100H + w1) * (\text{defined unit})$$
- 4) This command can be used only during graphics mode, entered by sending the ESC (G command.
- 5) This command will work effectively only when the defined paper length is the same as the physical paper length measured by the printer.
- 6) If some portion of an image extends beyond the bottom edge of the page, then that extended portion of the image is deleted.
 Also, if the defined paper length is shorter than the actual paper length, the portion of an image beyond the defined paper length will be deleted.
- 7) Paper width is ignored by the printer.

[Initial State] -

[Related Commands]

[Setting] Commands whose settings are affected by this command.

None

[Setting] Commands that change the effects of this command.

The page control setting unit is set by the ESC (U command.

[Operation] Commands whose functionality is affected by this command.

None

[Operation] Commands that change the effects of this command.

The initial state is returned to by the ESC @ command.

The initial state is returned to by the ESC(G command.

ESC (D nL nH rL rH v h

[Name]	Set the raster image resolution
[Format]	1BH, 28H, 44H, nL,nH, rL, rH, v,h
[Range of Definition]	nL=04H, nH=00H 0 <= v <= 127 0 <= h <=127
[Function]	1) Sets the raster image resolution (ESC i). Vertical resolution : (rH*256 + rL) / v dpi Horizontal resolution : (rH*256 + rL) / h dpi 2) Available resolutions are : 120, 360, 720dpi 3) Following parameters are supported.

These printers doesn't have printer microweave mode.

1. In case of microweave mode off

1. Case of Driver microweave mode

Case of Driver microweave mode Black Mode

Mode (H x V)	ESC (D		ESC i	ESC(e	Used Nozzle number
	h / r	v / r	mH*256+mL	n2	
360x180	4/1440	12/1440	180	11h/12h/13h	180Nozzles

Case of Driver microweave mode Color Mode

Mode (H x V)	ESC (D		ESC i	ESC(e	Used Nozzle number
	h / r	v / r	mH*256+mL	n2	
360x180	4/1440	12/1440	60	11h/12h/13h	60Nozzles ^{*1)}

Case of Driver microweave mode Color Mode Black Image Only

Mode (H x V)	ESC (D		ESC i	ESC(e	Used Nozzle number
	h / r	v / r	mH*256+mL	n2	
360x180	4/1440	12/1440	60	11h/12h/13h	60Nozzles ^{*1)}

*1) The first nozzle data of each color must be zero

2. Case of printer microweave mode

No support.

[Initial State] -

[Related Commands]

[Setting] Commands whose settings are affected by this command.

The Resolution set of Raster image exerts the influence on the processing by the ESC i command .

[Setting] Commands that change the effects of this command.

The Resolution setting of Raster image is returned to the initial states by the ESC @ and the ESC (G commands.

[Operation] Commands whose functionality is affected by this command.

None

[Operation] Commands that change the effects of this command.

None

ESC i r c b nL nH mL mH d1.....dk

[Name] Transfer Raster image
 [Format] 1BH,69H, r, c, b, nL, nH, mL, mH, d1, d2, ..., dk
 [Range of Definition]

r = 00H, 01H, 02H, 04H, 05H, 06H
 c = 00H, 01H
 b = 01H, 02H
 0000H <= (nH*256 + nL) <= 7FFFH
 0001H <= (mH*256 + mL) <= 7FFFH

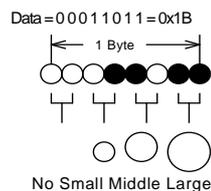
[Function]

- 1) Prints dot graphics in raster format.
- 2) Parameters are used as described below:
 - r : color of ink
 - 00H:black1 01H:magenta
 - 02H:cyan 04H:yellow
 - 05H:black2 06H:black3
 - c : compression method
 - 00H:non-compressed
 - 01H:Run Length Encoding
 - b : bit length required for each pixel of image data
 - 01H:1bit/pixel (for Micro, Normal x 1 x 2 dot
 - For every 1 bit of data:
 - 0 no dot
 - 1 a normal size dot for the current dpi
 will be printed at the pixel location for that one bit.
 - 02H:2bits per pixel (for dot sizes requiring 2 bits to designate the size)
 - For every 2 bits of data:
 - 00 no dot
 - 01 a small dot
 - 10 a medium size dot
 - 11 a large size dot
 will be printed at the pixel location for those 2 bits.
 Sample bits of data (for 4 pixels of an image), and the results of that data, are displayed in the upcoming diagram.

nL, nH: Horizontal byte count, according to the following formula:
 $nH = INT(\text{horizontal byte count} / 256)$
 $= INT(((\text{horizontal dot count}) * (\text{bit length of each pixel}) + 7) / 8) / 256$
 $nL = MOD(\text{horizontal byte count} / 256)$
 $= MOD(((\text{horizontal dot count}) * (\text{bit length of each pixel}) + 7) / 8) / 256$
 mL, mH: Vertical dot count (rows of dot graphics), according to the following formula:
 $mH = INT(\text{vertical dot count} / 256)$
 $mL = MOD(\text{vertical dot count} / 256)$
 k : Total numbers of data bytes, according to the following formula:
 $k = (nH*256 + nL) * (mH*256 + mL)$

**** Sample bits of data for 4 pixels of an image using 2 bits data/pixel:**

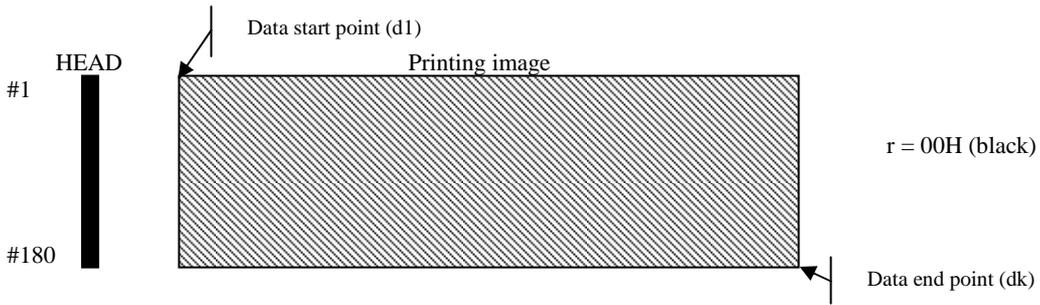
The size of the dot is designated with a binary number, using 2 bits for every 1 picture element.
 No Dot: 00, small dot: 01, medium dot: 10, large dot: 11



[Initial State] -

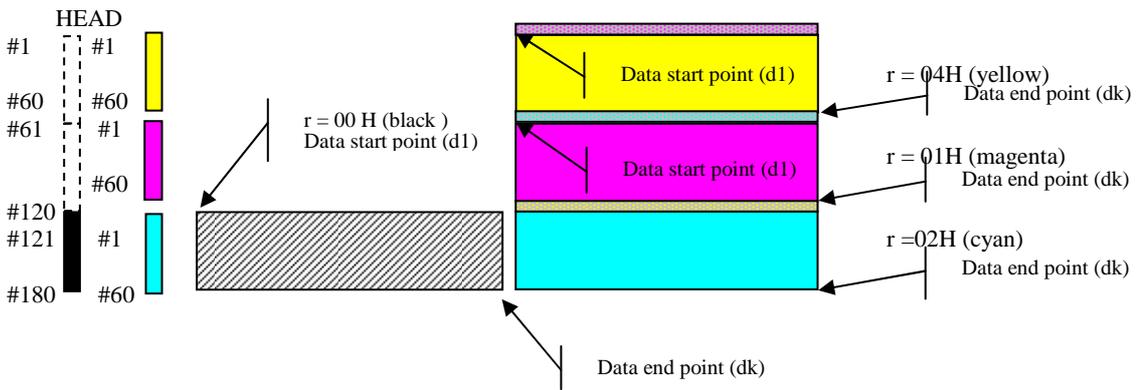
***The parameter using high speed black printing in color non M/W mode.

Black mode(using 180 nozzles)



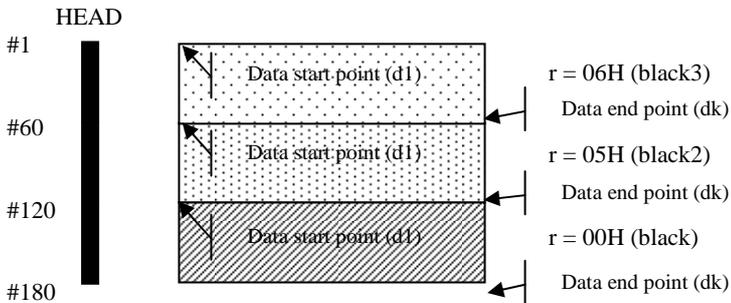
This black print mode using black head 180 full nozzles.

Color mode(using each 60 nozzles) *



Full nozzles(180 nozzles) print is not supported.
Each of the first nozzle data must be zero

Color mode Black image only (Total 180 nozzles)



Full nozzles(180 nozzles) print is not supported.
To utilize all 180 black nozzle, combination of Black, Black2, and Black3 must be used.

5.1.23 Turn unidirectional mode on/off ESC U n

Ver 1.00

ESC U n

[Name]	Turn unidirectional mode on/off	[Setting]
[Format]	1BH, 55H, n	
[Range of Definition]	n=00H, 01H, 02H, 30H, 31H, 32H	
[Function]	1) The printing direction is selected according to the value of n in the following manner: n=00H or 30H: selects bi-directional printing n=01H or 31H: selects unidirectional printing (0 to 80 column) n=02H or 32H: selects automatic printing direction control n=03H or 33H: selects unidirectional printing (80 to 0 column) 2) If n has any value other than the above, this command is ignored.	
[Initial State]	Bi-directional printing	
[Related Commands]	[Setting] Commands whose settings are affected by this command. ESC @ initialized values may be cancelled by this command. [Setting] Commands that change the effects of this command. ESC @ command will return the printer to its Initial State values. [Operation] Commands whose functionality is affected by this command. None [Operation] Commands that change the effects of this command. None	

5.1.24 Set relative horizontal print position ESC (/ nL nH n1 n2 m1 m2

Ver 1.00

ESC (/ nL nH n1 n2 m1 m2

[Name]	Set relative horizontal print position	[Operation]
[Format]	1BH, 28H, 2FH, nL, nH, m1,m2,m3,m4	
[Range of Definition]	nL=04H, nH=00H $0 \leq \frac{(m4 * 100000H) + (m3 * 10000H) + (m2 * 100) + m1}{2880} \leq 323.074 \text{ mm} = \frac{36632}{2880} \text{ inches}$ <p style="text-align: center;">(relative horizontal position setting value)</p> <p style="text-align: center;">If bit 7 of m4 is 1, then m4 will be a negative value.</p>	
[Function]	<p>1) If bit 7 of m4 is 1, then m4 will be a negative value. Negative values are expressed in two's complement.</p> <p>2) The printing position in the X direction is incremented from the current X position by the following amount</p> $(m4 \times 256 \times 256 \times 256 + m3 \times 256 \times 256 + m2 \times 256 + m1) \times (\text{relative horizontal position setting value})$ <p style="text-align: center;">OR</p> $((m4 \times 256^3) + (m3 \times 256^2) + (m2 \times 256) + m1) \times (\text{relative horizontal position setting value})$ <p>The relative horizontal position setting value is set with the ESC (U command). The defined default value for this command is 0.423mm(1/60inch).</p> <p>3) If the position set by this command is within the non-printable area, it is ignored. However, it is possible to shift to a position in the right margin area.</p> <p>4) This command is only effective in graphics mode.</p>	
[Initial State]	-	
[Related Commands]	<p>[Setting] Commands whose settings are affected by this command. None</p> <p>[Setting] Commands that change the effects of this command. None</p> <p>[Operation] Commands whose functionality is affected by this command. None</p> <p>[Operation] Commands that change the effects of this command. The relative horizontal position setting value is set by the ESC (U command). The relative horizontal position setting value is reset to its initial state by the ESC @ or the ESC (G commands.</p>	

5.1.25 Set Print method ID ESC (m n

Ver 1.00

ESC (m nL nH n

[Name]	Set Print method ID	[Setting]
[Format]	1BH, 28H, 6DH, nL, nH, n	
[Range of Definition]	nL=01H,nH=00H n=10H, 11H, 20H, 21H, 30H, 31H, 50H, 51H, 52H, 53H, 70H, 71H, A0H	
[Function]	1) The print mode is selected according to the values of n. 2) If n have a value other than those above, this command is ignored. 2) This command is only effective in graphics mode. 3) The value of setting refers to CHAPTER3.	
[Initial State]	-	
[Related Commands]	[Setting] Commands whose settings are affected by this command. None [Setting] Commands that change the effects of this command. The ESC @ command selects black. [Operation] Commands whose functionality is affected by this command. None [Operation] Commands that change the effects of this command. The ESC (G command puts the printer in graphics mode.	

CHAPTER 6: REMOTE MODE

This section of the Programming Note will provide an overview of EPSON's Remote Mode. The following commands are useful for these printers driver development:

Enter Remote Mode "ESC (R",
Set Meca Sequence "SN",
Exit Remote Mode "ESC NUL"

These Remote Mode commands were used in Chapter 4: Command Sequence – 4.2 Command Transfer Sequence. Individual explanations for these commands, and other remote mode commands referenced in this paper, are provided hereafter.

6.1 Remote Mode Language Description

In addition to EPSON's ESC/P and its extension ESC/P2 serial printer languages, most EPSON printers also implement another EPSON serial printer language that is bi-directional. That language is called Remote Mode. It is entered from ESC/P or ESC/P2 mode.

Remote Mode commands should not be sent to the printer in between consecutive ESC/P2 commands.

The primary purposes for EPSON Remote Mode printer control language are to provide the host with the following:

- 1) Current printer status
- 2) Printer identification
- 3) Capability of setting the printers front panel operations remotely (print the nozzle check pattern, clean print heads, set hardware adjustments for paper size and thickness, save current settings into NVR (non-volatile RAM, print the dot alignment test pattern, etc.)

The Remote Mode command architecture is as follows:

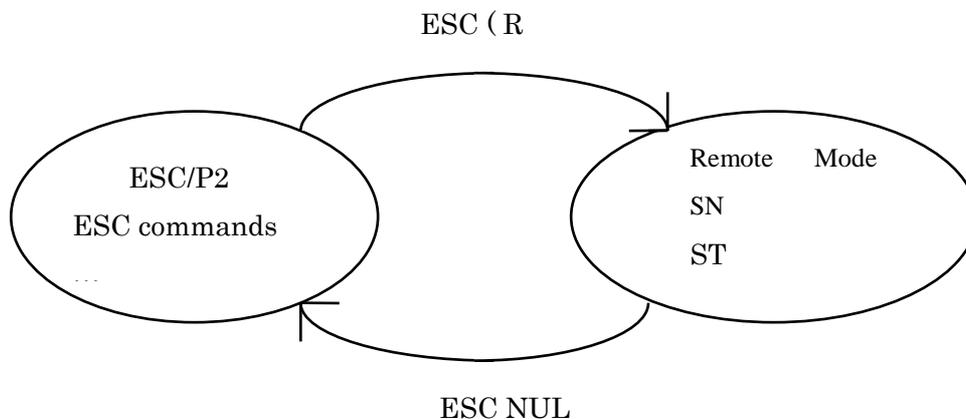
Enter Remote Mode (leave ESC/P or ESC/P 2)

- change printer settings (model dependent) via Remote Mode Set commands and/or
- request printer settings (model dependent) via Remote Mode Reply commands

Exit Remote Mode (enter ESC/P or ESC/P 2)

Printer State Reply (printer state is automatically sent to the host if enabled by the Remote Mode command "ST" 02h 00h 00h m1 Turn printer state reply on/off)

The ESC/P2 - Remote Mode command architecture can be represented by the following simplified State Diagram.



All of the Remote Mode commands, except Enter Remote Mode, are available only in Remote Mode.

The Enter Remote Mode and Exit Remote Mode commands begin with the ESC code, (as do many ESC/P2 commands). Excluding these commands, Remote Mode commands generally follow the following format:

“XX” $n_L n_H < 256 \times n_H + n_L$ - number of parameter bytes>

The “XX” represents 2 ASCII characters that indicate the Remote Mode command primary function, and $n_L + (n_H \times 256)$ indicates the number of subsequent parameters.

If the first parameter following the length count is 00H then the Remote Mode command makes a setting.

Set printer settings: “XX” $n_L n_H$ 00H m1...mx

6.1.1 Enter Remote Mode (Remote Mode) ESC (R 08H 00H 00H "REMOTE1"

ESC "(R" 08H 00H 00H "REMOTE1"

Enter Remote Mode

[Format]

ESC (R 08H 00H 00H "REMOTE1"

[Function]

- * 1) The current emulation mode is terminated
 - * 2) Print data present in the buffer is sent to the printer to be printed
 - * 3) The printer enters remote mode.
 - * Remote mode continues until the "Exit Remote Mode" command is received.
 - * In the remote mode, XX [nL] [nH] [00H] [m1] ... [mx] type control codes are available.
-
- * This command is only valid in text mode.

6.1.2 Load Power-On Default NVR into RAM (Remote Mode) "LD" 00H 00H

[Format]

"LD" 00H 00H

[Function]

Loads the power-on default from a non-volatile memory into RAM, and begins using these values as the current printer operating system settings. This command is only available in Remote Mode.

6.1.3 Set printer timer (Remote Mode) " TI" 08H 00H 00H YYYY MM DD hh mm ss

[Format]

"TI" 08H 00H 00H YYYY MM DD hh mm ss

- * Each of the parameters YYH,YYL,MM,DD,hh,mm and ss is a one byte binary format parameter, and their definitions are as follows:

Parameter	meaning	Range
YYH	Year	0-xxxx
YYL	(YYL+YYH*256)	
MM	Month	1-12
DD	Day	1-31
hh	hour	0-23
mm	minute	0-59
ss	second	0-59

[Function]

- * If the parameter is out of range, this command is ignored, and the previous setting is maintained.

6.1.4 Set horizontal print position (Remote Mode) "FP" 03H 00H 00H m1 m2

[Format]

"FP" 03H 00H 00H m1 m2:

[Function]

* The parameter "m1" , "m2" are each one byte binary data that indicate the below condition according to the following formula.

* The unit of print start position is 1/360 inch.

(print start position) = ((m2 * 256) + m1)

Horizontal Print Start Position	m1	m2
Standard position	00H	00H

* If the parameter is out of range, this command is ignored, and the previous setting is maintained.

6.1.5 Turn printer state reply on/off (Remote Mode) “ST” 02H 00H 00H m1

[Format]

“ST” 02H 00H 00H m1

[Parameters]

- Parameter m1 is a one byte binary parameter, and indicates the setting as follows:

m1	Printer State Reply
10H	Binary state reply Off
11H	Binary state reply On

[Function]

- The default environment status transmission is set. See the paragraph of status transmission for the status transmission.
- This setting depends on interfaces that receive this command. For example, this command is received with the built-in Macintosh serial interface; the status transmission for the built-in Macintosh serial interface is set.
- If the parameter m1 is out of range, or if setting of parameter m1 is not supported by the product, this command is ignored, and the existing setting is maintained.
- This command will be ignored if this command is not supported.
- This command is only available in Remote Mode.

Auto interface select function

- If the status transmission is ON, the interface transmits the status whether the interface is selected or the interface is deselected by the auto interface select function.

6.1.6 Job name set “JH” nL nH 00H m1 m2 m3 m4 m5 <job name>

[Format]

“JH” nL nH 00H m1 m2 m3 m4 m5 <job name>

nL = (length of <job name>) + 6
nH = 00H

[Parameters]

The parameter “m1” is one byte binary data that indicates types of job name information. The parameters “m2”, “m3”, “m4”, “m5” are each one byte binary data that indicate Job ID. “<job name>” is a maximum of 32 bytes of binary codes that describe a job name.
m1=00h:<job name>=Host name(Max 32byte)
m1=01h:<job name>=Product ID
m1=02h:<job name>=Document name
m1=03h:<job name>=User name

[Function]

Set the job name of the job specified by “JS” command.
This command will be ignored and skipped if the product does not support this command.
This command is available only in Remote.

6.1.7 Start job "JS" nn 00H 00H <job name> m1
6.1.8 End job "JE" 01H 00H 00H

[Format]

"JS" nL nH 00H <job name> m1
"JE" 01H 00H 00H

nL = (length of <job name>) + 2
nH = 00H

[Parameters]

The parameter "m1" is one byte binary data that fixed to zero.

[Function]

Construct a print job. Then turn page and line position reply on/off, and set the position reply repeat rate if the position reply is enabled. If the host uses the cancel job command or it needs the page and line position reply, it must send print data as a print job.

The print job is started with the "JS" command and terminated with the "JE" command. After starting a job with the "JS", if the "JS" is sent again without the "JE", the previous print job will be terminated with the second "JS".

After power-on initialization, the print job is not defined, and position reply is disabled.

This command will be ignored and skipped if the product does not support this command.
This command is available only in Remote.

6.1.9 Paper Feed Setup "SN" 01H 00H 00H

[Format]

"SN" 01H 00H 00H

[Parameters]

None

[Function]

- * Changes the mechanical sequence from the default environment to the values specified by the below command. If the below command is not sent, the printer selects the plain paper mechanical sequence.

Item	Command
Paper path	PP command
Duplex Printing	DP command
Color / Monochrome setting	ESC (K command
Set Print method ID	ESC (m command
Paper types	MI command
Platen gap setting	US command
Bottom margin setting	US command
Check paper size	US command

- * This command is only valid in remote mode.

6.1.10 Select paper path “PP” 03H 00H 00H m1 m2

[Format]

“PP” 03H 00H 00H m1 m2

[Parameters]

The parameter “m1” and “m2” are each one byte binary data.
The “m1” describes paper is continuous type or a single sheet in CSF or a manual inserted sheet as shown below.

Paper	m1	m2
Cut Sheet Rear	01H	00H
Auto Select (Choose A4 or Letter)	01H	FEH

[Function]

Select paper path to be used for the temporary default.
The previous setting will be kept if the parameter “m1” and “m2” exceeds its limit.

*1: The printer feeds a paper from 1st Bin first, then feeds from 2nd Bin when there are no papers in 1st Bin.
If 2nd Bin papers run out, the printer status turns to Paper Out Error.

6.1.11 Select paper media “MP” 04H 00H 00H m1 m2 m3

[Format]

“MP” 04H 00H 00H m1 m2 m3

[Parameters]

The parameter “m1”, “m2” and “m3” are each one byte binary data.

“m1” is always 01H.

The “m2” describes paper media as shown below.

m2	Media Type	
0	普通紙 *1	Plain Paper
2	アイロンプリントペーパー	Iron-On Cool Peel Transfer Paper
4	スーパーファイン専用ラベルシート	Photo Quality Self Adhesive Sheets
5	フォトマット紙	Matte Paper-Heavyweight
8	ミニフォトシール	Photo Stickers 4/16
11	写真用紙<光沢>	Premium Glossy Photo Paper
12	写真用紙<絹目調>	Premium Semigloss Photo Paper
13	-----	Premium Luster Photo Paper
15	フォトマット紙/顔料専用	Archival Matte Paper (Enhanced Matte Paper)
16	画材用紙/顔料専用	Watercolor Paper-Radiant White
22	-----	Double Sided Matte Paper
25	-----	Velvet Fine Art Paper
26	PX プルーフ用紙ロール<微光沢>	EPSON Proofing Paper Semimatte
27	郵便ハガキ(再生紙)	-----
28	郵便ハガキ(インクジェット紙)	-----
29	スーパーファイン紙	Photo Quality Ink Jet Paper
30	フォト光沢紙/顔料専用	DURABrite Ink Glossy Photo Paper (for EAI) DURABrite Photo Paper (for EU)
31	両面マット紙(再生紙)	-----
32	ハガキ宛名面	-----
33	フォトアルバムキット	-----
34	フォトスタンドキット	-----
35	-----	RC-B(仮称)
36	写真用紙<光沢 EG>	Premium Glossy Photo Paper
37	封筒	Envelope
38	写真用紙クリスピーア<高光沢>	Ultra Glossy Photo Paper (EU) Ultra Premium Glossy Photo Paper(EAI)
39	Ultra Smooth Fine Art Paper	Ultra Smooth Fine Art Paper
40	スーパーファイン専用はがき	-----
42	郵便光沢はがき	-----
43	写真用紙エントリー<光沢>	Photo Paper Glossy (EAI) Glossy Photo Paper (EUR/ASIA)
44	フォト光沢紙(EGCP)	Photo Paper (EGCP)
45	ビジネスインクジェットプリンタ用コート紙	EPSON Professional Flyer Paper(EBIP)
46	葉袋	-----
47	厚紙	Thick Paper
48	-----	Brochure & Flyer Paper Glossy Double-sided
49	EPSON 両面マット紙	-----
50	EPSON 両面マット名刺用紙	-----
51	3Dメディア	-----
52	写真用紙ライト<薄手光沢>	Photo Paper Glossy
53	印刷済み	Preprinted
54	レターヘッド	Letterhead
55	再生紙	Recycled
56	色つき	Color
57	(仮称)Biz用普通紙	(Temporary)Plain paper for Biz

58	Reserved	-----
91	CD/DVD レーベル	-----
92	高画質対応 CD/DVD レーベル	-----
93	光沢対応 CD/DVD レーベル	-----
99	クリーニングシート	-----
128	PXマット紙<薄手>	Singleweight Matte Paper
129	PX/MC 写真用紙<厚手 微光沢>	Premium semimatte photo paper (250)
130	MC厚手マット紙ロール	Doubleweight Matte Paper
131	Textured Fine Art/コットン画材	Textured Fine Art Paper
132	-----	Canvas
133	PX/MCプレミアムマットボード紙	Enhanced Matte Poster Board
134	MC/PMクロスロール<防炎>	Heavyweight Polyester Banner
135	MCマット合成紙2ロール	Enhanced synthetic paper
136	MCマット合成紙2ロール<のり付き>	Enhanced adhesive synthetic paper
137	エプソン プロフェッショナルフォトペーパー<厚手光沢>	Premium Glossy Photo Paper (250)
138	エプソン プロフェッショナルフォトペーパー<厚手半光沢>	Premium Semigloss Photo Paper (250)
139	エプソン プロフェッショナルフォトペーパー<厚手絹目>	Premium Luster Photo Paper (250)
140	エプソン プロフェッショナルフォトペーパー<薄手光沢>	Premium Glossy Photo Paper (170)
141	エプソン プロフェッショナルフォトペーパー<薄手半光沢>	Premium Semigloss Photo Paper (170)
142	-----	EPSON Proofing Paper White Semimatte
143	-----	EPSON Proofing Paper Publication
144	プロフェッショナルフォトペーパー<厚手微光沢>	Premium Semimatte Photo Paper (260)
145	-----	Photo Paper Gloss 250
146	PXマット紙<薄手> (線画)	Singleweight Matte Paper (line drawing)
147	普通紙 (線画)	Plain Paper (line drawing)
148	プロフェッショナルブルーフィンギンペーパー	Epson Proofing Paper Commercial
149	光沢フィルム2	-----
150	-----	Tracing Paper (M80)
151	トレーシングペーパー (Jトレペ90)	-----
152	Fine Art Paper Ultra Smooth Natural White	Fine Art Paper Ultra Smooth Natural White
153	Fine Art Paper Ultra Smooth Bright White	Fine Art Paper Ultra Smooth Bright White
154	Fine Art Paper Velvet Textured Bright White	Fine Art Paper Velvet Textured Bright White
155	Fine Art Paper Velvet Textured Natural White	Fine Art Paper Velvet Textured Natural White
156		Epson ClearProof Film
157	Epson MetallicProof Film	Epson MetallicProof Film
158	Epson ClearProof Adhesive Film	Epson ClearProof Adhesive Film
159	Epson ClearProof Thin Film	Epson ClearProof Thin Film
160	Epson ShrinkWrap Film	Epson ShrinkWrap Film
254	デフォルトテーブル	-----
255	LFPで使用 (使用禁止)	-----

The “m3” describes paper size as shown below.

0	A4 ※1	補足
1	Letter(8 1/2x11 in)	
2	Legal(8 1/2x14 in)	
3	A5	
4	A6	
5	B5	

6	Executive(7 1/4x10 1/2 in)	
7	Half-Letter(5 1/2x8 1/2 in)	
10	Photo Paper(4 x 6 in)	
11	5x8 in	
12	六切 203.2x254mm (8x10 in)	
15	L 判	
16	ハガキ	
17	往復ハガキ	
22	長形 3号	
23	長形 4号	
24	洋形 1号	
25	洋形 2号	
26	洋形 3号	
27	洋形 4号	
28	5x7 in(2L 判)	
29	Envelope #10(4 1/8x9 1/2 in)	縦
30	Envelope C6	縦
31	Envelope DL	縦
35	カード 54x86mm	
36	名刺 55x91mm	
43	Hi-vision 102x180mm	
44	角形 2号	
45	Envelope	縦
46	B6	
47	角形 20号 縦	
48	A5(スクエア 24 穴)(148X210)	
61	A3 ノビ (Super A3/B)	
62	A3	
63	B4	
64	US B(11x17 in)	
65	11x14 in	
66	B3	
67	A2	
68	US C(17x22 in)	
69	四切 254x305mm (10x12")	
70	12x12" (308.4x308.4 mm)	
99	User-defined	
128	半切 (14"x17")	
129	16"x20"	
130	A1	
131	SuperA1	
132	A0	
133	SuperA0	
134	US_D	
135	US_E	
136	B2	
137	B1	
138	B0	
139	B0+	
140	全紙 18x22"	
141	17x24"	
142	大全 20x24"	
143	全倍 22x36"	
144	24x30"	
145	30x40"	
146	36x44"	
147	50x64"	
148	60x75"	
149	64x80"	

150	30x40cm	
151	40x60cm	
152	60x90cm	
153	ARCH A 9x12in	
154	ARCH B 12x18in	
155	ARCH C 18x24in	
156	ARCH D 36x48in	
157	SuperW A3 329x559mm	
254	Reserved (A4 or letter : status reply paper mismatch error の回答にのみ使用可能とし、"MI" コマンドのパラメータとして指定することはできない。)	
255	Reserved	

*1 : Unknown and Default mean A4 and Plain Paper.

*2 : It includes Photo Quality Ink Jet Paper (for Europe).

[Function]

Set paper type to the temporary default.

The previous setting will be kept if the parameters are out of range.

Also, this command will be ignored and skipped if the product does not support this command.

This command is available only in Remote.

6.1.12 Select Duplex Printing “DP” 02H 00H 00H m1

[Format]

“DP” 02H 00H 00H m1

[Parameters]

The parameter “m1” is one byte binary data that indicates duplex print setting as shown below.

Duplex Printing	m1
Duplex mode off	00H
Duplex mode on	01H

[Function]

m1=01H :

- (1)The printer fixes the I/F that this command is received one .
- (2)The printer switches to the duplex printing mode.
- (3)State Reply is changed.

m1=00H :

- (1)The printer releases the fixed I/F.
- (2)The printer switches to the normal mode.

Select a duplex printing mode to be used for the temporary default.

The previous setting will be kept if the product does not have the character set selected with the parameter “m1”.

Also, this command will be ignored and skipped if the product does not support this command.

This command is available only in Remote.

6.1.13 User Setting “US” 03H 00H 00H m1 m2

[Format]

“US” 03H 00H 00H m1 m2

[Parameters]

The parameter “m1”, “m2” are each one byte binary data that indicates shown as below.

“m1”	Item	“m2”	Setting
00H	Bottom margin setting	00H	0 = Standard
		01H	1 = Max
		02H	2 =borderless
04H	Economy print setting*	00H	Fast-Mode
		01H	Normal-Mode
05H	Load mode setting	00H	Fast-Mode(Default)
		01H	Silent-mode
01H, 03H, 06H - FFH	Reserved		

*This command (Economy print setting) is effective only the following mode.

If this command is not used, the product is actuated with Fast-Mode.

Print mode	Dot Size
Economy(Color)	10H
Economy(Monochrome)	11H

**The ‘Borderless mask position’ command is effective only in borderless printing.

In border printing, the command is ignored.

[Function]

Select a printer setting shown upper to the temporary default.

The previous setting will be kept if the parameters are out of range.

Also, this command will be ignored and skipped if the product does not support this command.

This command is available only in Remote.

[Notes]

When “DP 02 00 00 02”(Auto Duplex Mode) command is received, “US 03 00 00 06 01”(Face Down Mode) command is invalid.

6.1.14 Terminate Remote Mode (Remote Mode) ESC 00H 00H 00H

[Format]

ESC 00H 00H 00H

[Function]

- * Copy the default environment to the current setting.
- * Execute the ESC “@” command in ESC/P2. (Execute software initialization.)
- * Exit from Remote mode and enter to the selected printer control language.

CHAPTER 7: STATUS REPLY CODE SPECIFICATION

These printers can send its current state to the host computer via the USB interface. The printer can be set to update the host every few seconds, or when the printer status changes. The Printer Status Reply consists of the string below. Varying parameters of the string reflect the current printer status. By monitoring this information on the host computer, you can provide users with basic yet very practical information that can make it easier for customers to use your software and these ink jet printers.

These printers supports new binary state reply format.

Format of reply strings:
@BDC [SP] ST [CR] [LF]
Reply count (2byte)
each status information
...

The parameter of total bytes are two byte binary codes that indicate the byte counter from next data to the last data by the little endian

The structure of each information field is as shown.

Item	Byte	explanation
Header	1	Header No.
Parameter count	1	Parameter byte counter
Parameter	n	Parameter value

The Header is one binary code that is shown on the list on next page.

The parameter count is one binary code that indicates the parameter byte counter of each field.

The parameters are binary codes that indicate the information of each field.

The structure of the Ink cartridge information field is as shown.

Item	Byte	explanation
Header	1	Header No.
Parameter count	1	Parameter byte counter
Parameter count of each color	1	Parameter byte counter of each color
Parameter	n	Parameter value

The parameter count of each color is one binary code that indicates the parameter byte counter of each color.

7.1 Status code

Structure

Item	Byte (Hex)	Value (Hex)
Header	1	01
Parameter counter	1	01
Parameter	1	<Status code>

The parameter <Status code> is one byte Binary code that indicates status code as follows.

Status	Status code
In the error state	00h
In the busy state	02h
In the waiting state	03h
In the idle state	04h
In the cleaning state	07h
In the factory shipment state	08h
In the shutdown state	0Ah

7.2 Error code

Structure

Item	Byte (Hex)	Value (Hex)
Header	1	02
Parameter counter	1	01
Parameter	1	<Error code>

The parameter <Error code> is one byte Binary code that indicates error code as follows.

Error	Error code
Fatal error	00h
Other I/F is selected	01h
Paper jam	04h
Ink out	05h
Paper out	06h
Paper size ,Paper type or Paper path error (Logical)	0Ch
Ink overflow error	10h
Double Feed	12h
Maintenance Box near End error	4Ah
Driver mismatch error	4Bh

7.3 Warning code

Structure

Item	Byte (Hex)	Value (Hex)
Header	1	04
Parameter counter	1	Warning kinds
Parameter	n	Occurred all warning code

The parameter <warning code> is one-byte Binary and indicates the warning code as follows,

<warning code> is consisted of the several fields as shown below.

When several warning appears at the same time, reply all the warning codes with the format below.

value [value value].

<warning code> field is recognized in the following warning state. (This field is not recognized in @BDC-ST character string when no warning is received)

For ink low warning, the order depends on the ink cartridge order.

The parameter is as follows.

Warning	Warning code
Ink low (Black)	10h
Ink low (Magenta)	11h
Ink low (Yellow)	12h
Ink low (Cyan)	13h
Cleaning Disable (Cyan)	51h
Cleaning Disable (Magenta)	52h
Cleaning Disable (Yellow)	53h
Cleaning Disable (Black)	54h

7.4 Paper path

Structure

Item	Byte (Hex)	Value (Hex)
Header	1	06
Parameter counter	1	02
Parameter	2	Paper path information

The parameter <paper path> is two bytes Binary code that indicate current paper path.

Following information is replied.

Paper Path	code
Cut Sheet (Auto Select)	0100h

*1: In the case of selecting remote 'PP' command with ASF Large Capacity, code becomes 01FFh irrespective of the paper path.

7.5 Cleaning time information

Structure

Item	Byte (Hex)	Value (Hex)
Header	1	0C
Parameter counter	1	02
Parameter	2	Cleaning time information

The parameter <cleaning time information> is two bytes Binary codes that indicate cleaning time or ink filling time.

The unit is second. (This time is total time not passage time or remains time.)

This parameter is added only when status code ST = 07H.

7.6 Ink information

Structure

Item	Byte (Hex)	Value (Hex)
Header	1	0F
Parameter total counter	1	0D
Parameter counter for 1 I/C	1	3
Parameter	3 per 1 I/C	Ink information

The ink information order is Black, Magenta, Yellow, Cyan.

Each ink cartridge information is consisted of m1, m2, m3.

Ink information	code
m1	※ Ink cartridge name 01h: "Black Ink Cartridge" 03h: "Cyan Ink Cartridge" 04h: "Magenta Ink Cartridge" 05h: "Yellow Ink Cartridge"
m2	Ink color 00H:Black 01H:Cyan 02H:Magenta 03H:Yellow
m3	Ink remain counter: when counter is not 0% (not ink end) : "i" when counter is 0% (ink end) : 00H

7.7 Loading path information

Structure

Item	Byte (Hex)	Value (Hex)
Header	1	10
Parameter counter	1	3
Parameter	3	01094E

7.8 Cancel code

Structure

Item	Byte (Hex)	Value (Hex)
Header	1	13h
Parameter counter	1	01
Parameter	1	Cancel request

The parameter <cancel code> is one byte Binary code that indicates the cancel request.

Cancel request	Code
No request	01
The status during received cancel command and initialize the printer	A1
Request	81

7.9 Job name Information

Structure

Item	Byte (Hex)	Value (Hex)
Header	1	19
Parameter counter	1	n (Max 12)
Parameter	Max 37	Job name information

The parameter <Job name information> is n bytes Binary codes.

It indicates the m1 to m5 parameter and Job name specified by JH command.

If the JH command is not send of printing job, it replies "unknown".

Item	Byte (Hex)	Value (Hex)
Header	1	19
Parameter counter	1	0C
Parameter	0C	0000000000 "unknown"

7.10 Paper Jam error information

Structure

Item	Byte(Hex)	Value(Hex)
Header	1	35h
Parameter counter	1	01
Parameter	1	Paper jam information

The parameter < Paper jam information > is one byte Binary code that indicates the information about paper jam information. This parameter is added only when error code ER = 04H or 06H.

Parameter value	Type	Comment
00h	No jams	---
01h	Paper jam	Paper jammed at ejecting
02h	Non feed or paper jam when any papers exist at Rear ASF	Non feed at Rear ASF or Paper jam in Rear ASF unit
03h – 7Fh	Reserved	---
80h	No papers at Rear ASF	No papers at Rear ASF
81h – FFh	Reserved	---

7.11 Paper Count information

Item	Byte (Hex)	Value (Hex)
Header	1	36h
Parameter counter	1	n
Parameter	n	Paper count information

This field replies printed counts both sheets of pages and faces of printed.

The parameter <Paper count information> is a n-bytes binary code that consists of counts for printed all sheets, printed all faces, color faces, monochrome faces and blank faces.

Note:

Utility prints (Status sheet, Nozzle check pattern and so on) are counted.

'0xFFFFFFFF' is replied if a counter is not supported for a printer.

A cancelled page in a printing job is counted.

< SKU that is not supporting borderless printing, parameter counter is 18h.>

Item	Byte (Hex)	Description
Counts of all sheets to printed (One is counted if two pages are printed in duplex.)	4	Not supported (always 0xFFFFFFFF)
Counts of all faces to printed (Two are counted if two pages are printed in duplex.)	4	Not supported (always 0xFFFFFFFF)
Counts of color faces to printed	4	0 to 0xFFFFFFFFE
Counts of monochrome faces to printed	4	0 to 0xFFFFFFFFE
Counts of blank faces to fed	4	0 to 0xFFFFFFFFE
Counts of all faces to scanned with the Auto Document Feeder(ADF)	4	0 to 0xFFFFFFFFE

< SKU that is supporting borderless printing, parameter counter is 20h. >

Item	Byte (Hex)	Description
Counts of all sheets to printed (One is counted if two pages are printed in duplex.)	4	Not supported (always 0xFFFFFFFF)
Counts of all faces to printed (Two are counted if two pages are printed in duplex.)	4	Not supported (always 0xFFFFFFFF)
Counts of color faces to printed [For borders and borderless printing]	4	0 to 0xFFFFFFFFE
Counts of monochrome faces to printed [For borders and borderless printing]	4	0 to 0xFFFFFFFFE
Counts of blank faces to fed	4	0 to 0xFFFFFFFFE
Counts of all faces to scanned with the Auto Document Feeder(ADF)	4	0 to 0xFFFFFFFFE
Counts of color faces to printed [For borderless printing]	4	0 to 0xFFFFFFFFE
Counts of monochrome faces to printed [For borderless printing]	4	0 to 0xFFFFFFFFE

7.12 Printer I/F Status

Structure

Item	Byte(Hex)	Value(Hex)
Header	1	3Dh
Parameter total counter	1	1
Parameters	1	Printer I/F Status

Printer I/F Status Parameter shows the status of Printer I/F.

Parameter

Item	Byte (Hex)	Description
Printer I/F Status	1	Printer I/F の Status を示す値。 00h : Available of data accept and reply 01h : Not available of data accept 02h - FFh : Reserved

In the case of “Not available of data accept”, This status is inquired.

CHAPTER 8: Device ID

These printers can send its device ID when it is requested.

When IEEE1284.4 can be enabled, (When IEEE1284.4 mode in turning power on is ON or AUTO)

```
@EJL<SP>ID<CR><LF>
MFG:EPSON;
CMD:ESCPL2,BDC,D4,D4PX,ESCPRI,END4;    (*1)
MDL:Model Name;
CLS:PRINTER;
DES:EPSON<SP>Model Name;
CID:EpsonRGB;
FID:FXA,DPN,WFA,ETA,AFA,DAN,WRA;      (*2)
RID:<nn>;                               (*3)
DDS:<size>;                             (*4)
ELG:<groupnum>;                         (*5)
```

When IEEE1284.4 cannot be enabled, (When IEEE1284.4 mode in turning power on is OFF)

```
@EJL<SP>ID<CR><LF>
MFG:EPSON;
CMD:ESCPL2,BDC,ESCPRI,END4;            (*1)
MDL:Model Name;
CLS:PRINTER;
DES:EPSON<SP>Model Name;
CID:EpsonRGB;
FID:FXA,DPN,WFA,ETA,AFA,DAN,WRA;      (*2)
RID:<nn>;                               (*3)
DDS:<size>;                             (*4)
ELG:<groupnum>;                         (*5)
```

***1:** 'END4' means supporting 'The extension for non-D4'.

***2:** FID parameter <mm> is as follows.

FX:FAX, DP:DuplexPrint, WF:WiFi, ET:Ether, AF:ADF, DA:ADF(Duplex), WR:WebRemoteOperation

xxA:Available, xxN:Not available, xxD;Don't Care (This function is divide by the element other than FID.)

***3:** RID parameter:

<nn> is two bytes ASCII code that indicates product region ID in hexadecimal.

For example, if the region ID is F1h, RID description is "RID:F1;".

***4:** DDS parameter:

<size> is six bytes ASCII code that indicates minimum dummy data size for END4 protocol in hexadecimal.

For example, if the size is 20000h, DDS description is "DDS:020000;".

***5:** ELG parameter:

<groupnum> is four bytes ASCII code that indicates a number for Error List Group in hexadecimal.

For example, if the group number is 000Fh, ELG description is "ELG:000F;".

Device ID *Model Name* list

<i>Model Name</i>
ET-4500
L575