

# SHARP

color plotter printer

## #CE-515P

operating instructions

Warranty card  
(SEND WITH WARRANTY CARD)

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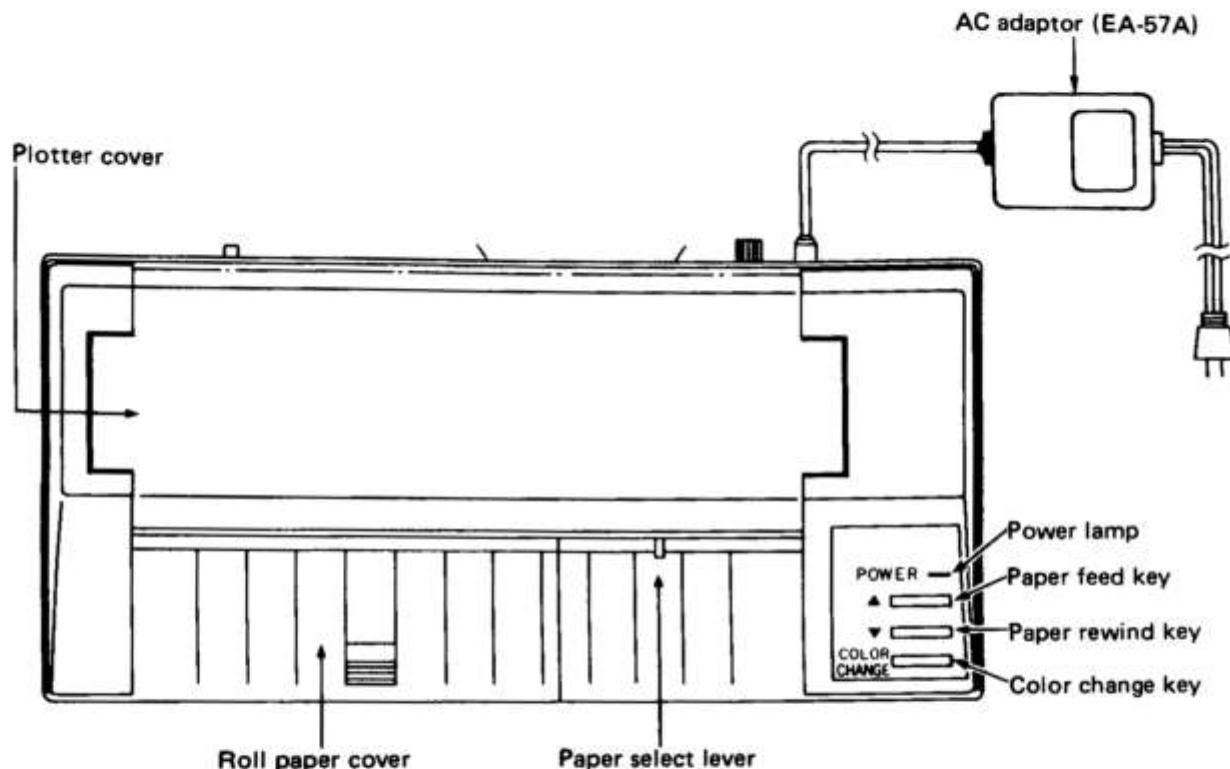
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**NOTE:**

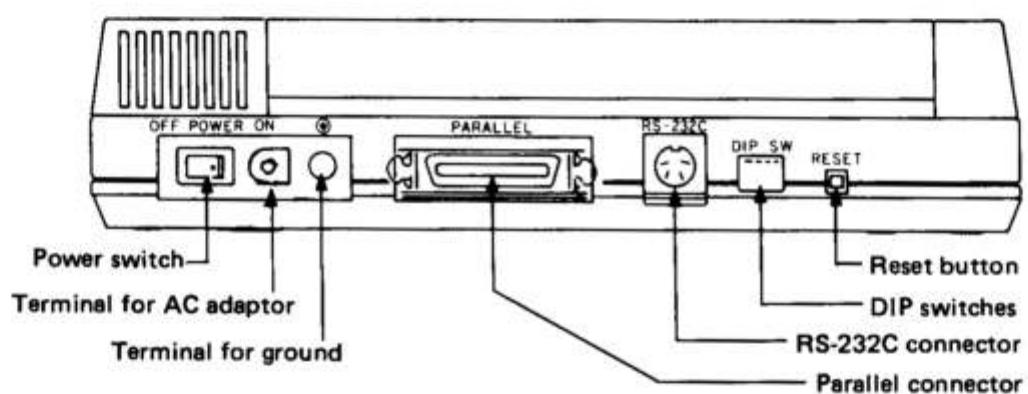
- In this manual, the plotter represents the CE-515P COLOR PLOTTER PRINTER.
- This unit prints as moving the paper. For pretty printing, refer to "SETTING THE PAPER."

# PARTS AND FUNCTIONS

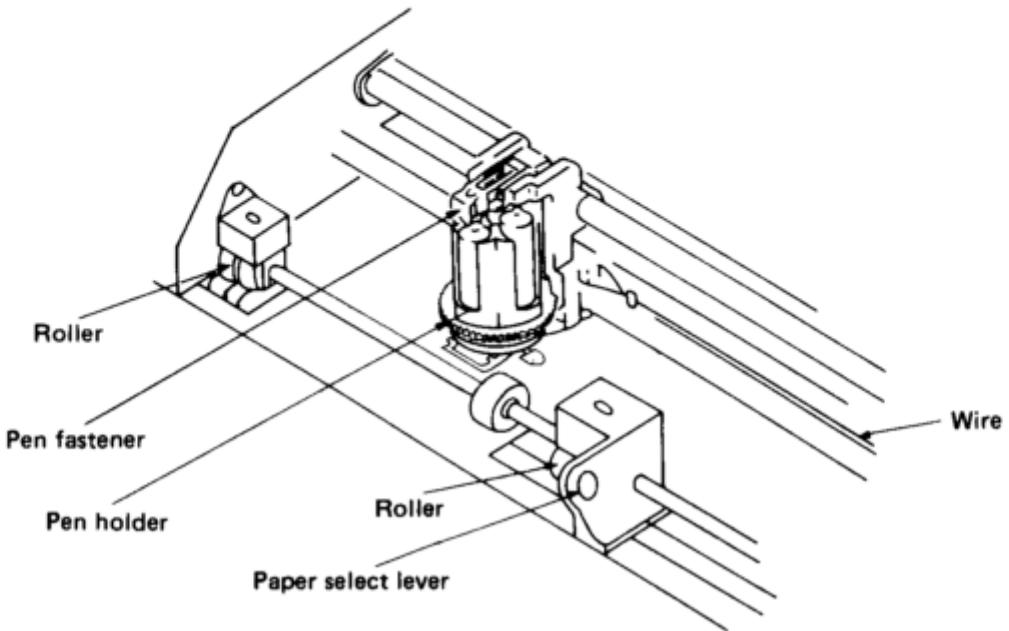
(Top of the unit)



(Rear of the unit)



(Plotter printer unit)



POWER

: **Power lamp (green)**

Lights when the power switch is turned on.

▲

: **Paper feed key**

Paper is fed for one second at one-tenth the normal paper feed speed whenever this key is pressed. If this key is held down, paper will be fed at normal speed.

▼

: **Paper rewind key**

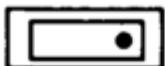
When this key is pressed, paper is rewound for one second at one-tenth the normal speed. If this key is held down, the paper will be rewound at the normal speed.

COLOR  
CHANGE

: **Color change key**

When this key is pressed, the pen holder rotates and changes the color of the pen. This key can be used with the paper feed key to demonstrate or test the model. For details, refer to page 13.

OFF POWER ON



: **Power switch**

When this switch is turned on, the power lamp lights and the Plotter Pen holder slides all the way to the left. The pen holder then rotates until the black pen is in position to print. The Plotter Pen assembly then moves to the left margin.

**Reset button**

The plotter may temporarily malfunction if subjected to strong static electricity or electrical "noise." In this case, press this button to restore the unit to normal operation.

**Parallel connector**  
**RS-232C connector**  
**DIP switch**

Refer to the section titled "Connections" on page 4.

# CONNECTIONS

## 1. To Connect the AC Adaptor

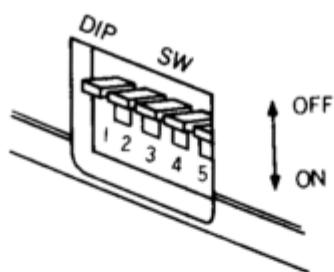
Before connecting the power cord, check that the AC adaptor (EA-57A) matches the voltage of the power source. If the voltage does not match, the plotter may malfunction.

- 1) Make sure that the main power switch of the plotter is turned off. Then connect the AC adaptor with the main unit's AC adaptor terminal.
- 2) Plug the AC adaptor into the wall socket.

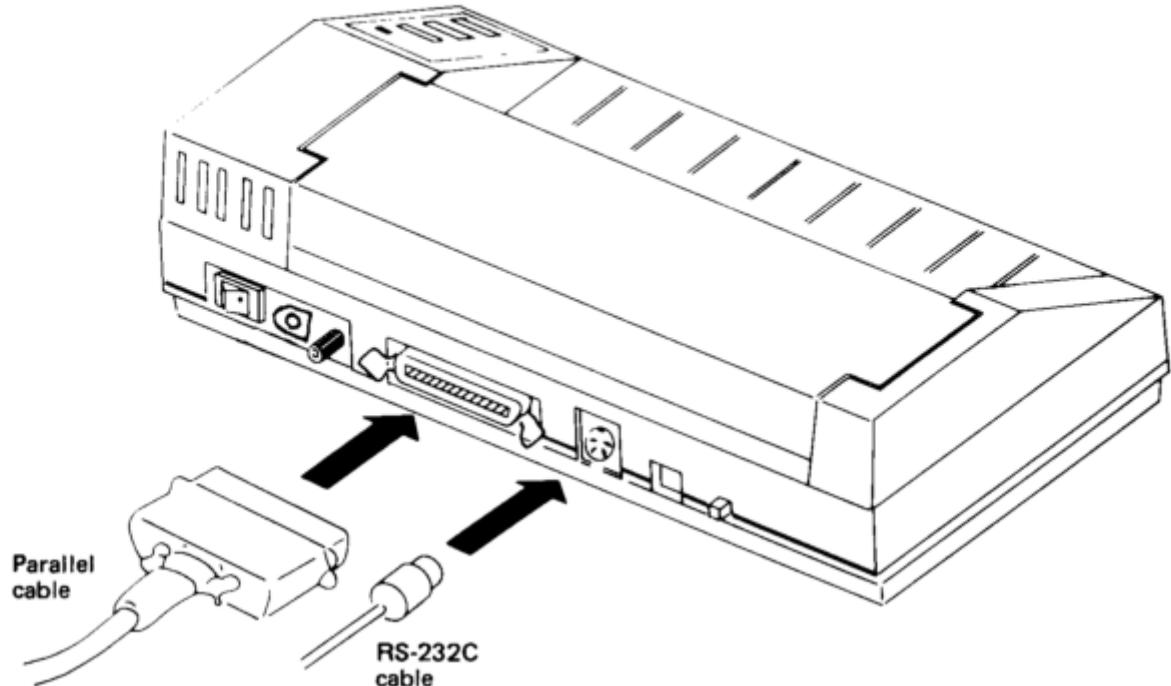
## 2. To Set the DIP Switches

The DIP switches are used to match the plotter's functions with those of the computer or other devices connected. The functions shown below can be selected.

Switch number	ON	OFF
SW1	7 bits	8 bits
SW2	Parallel	RS-232C
SW3		
SW4	CR/LF	CR
SW5	L1	L2



- SW1 Sets the length of the data to be received by the RS-232C interface at either 7 or 8 bits.  
SW2 Sets the interface to Parallel or RS-232C.  
SW3 This switch should always be set at the ON position.  
SW4 Specifies whether CR+LF or CR is executed when CR codes are received.  
SW5 Sets the input signal level of the RS-232C Interface to the RS-232C (L1) or TTL (L2) level.
- Before you set the DIP switches, be sure to turn the power switch off.
  - SW6 is not used with this plotter.



### 3. To Connect the Cables

To connect the plotter to a computer or other device, use the cables specified below.

Model	Cable	Setting the SW2 DIP switch
PC-5000	CE-515L	OFF
PC-1500 (1500A) + CE-158	CE-515L	OFF
	EA-158C	ON
IBM-PC	PN. 1111019	ON

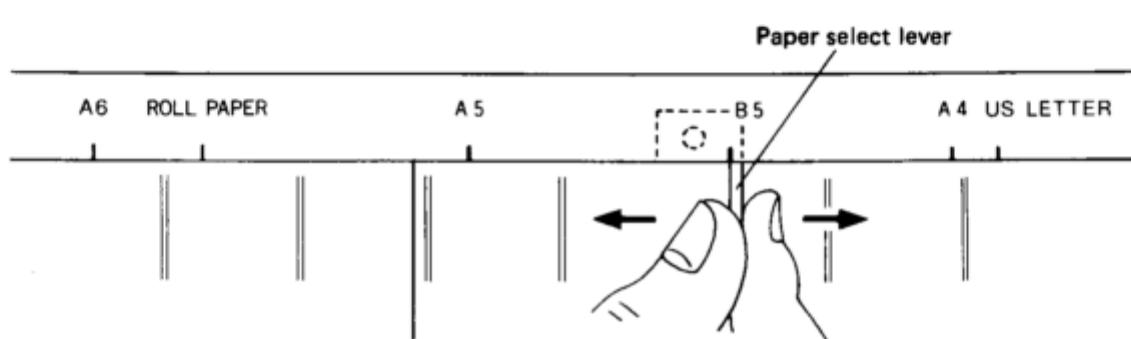
- The RS-232C cable is connected to the RS-232C connector on the rear of the unit.
- The parallel cable is connected to the parallel connector on the rear of the unit.
- Check that the setting of the SW2 DIP switch matches the cable it is connected with.
- Before you connect the cables, turn off both the plotter and the computer, etc.

# SETTING THE PAPER

## 1. To feed cut sheet paper

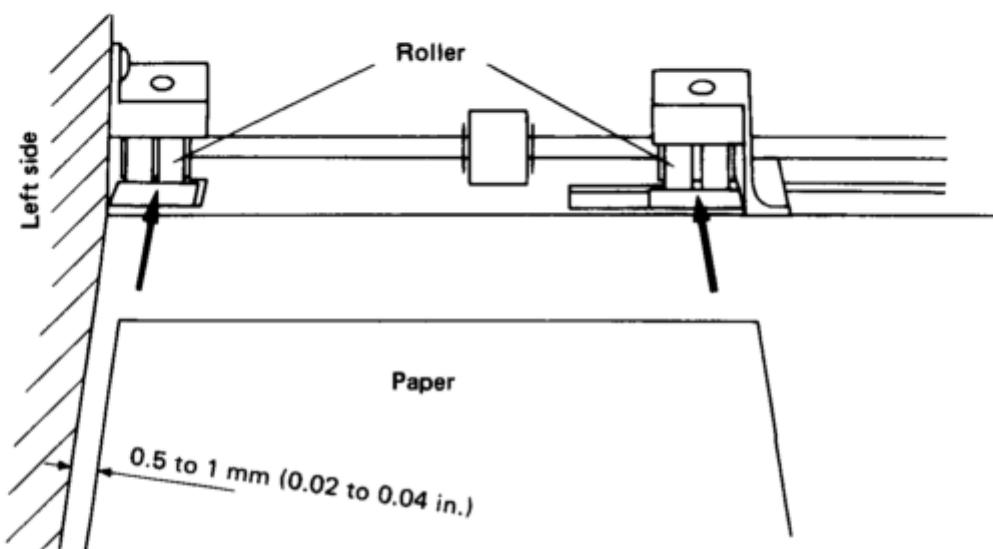
- ① In accordance with the instructions on the plotter cover, set the paper select lever for the size of the paper to be used.

(The exact size of the paper may be affected by temperature and humidity, so finely adjust the paper select lever to the width of the paper used.)



- ② Hold the paper only along its edges. If the paper is soiled by grease or sweat, the plotter characters may be blurred.

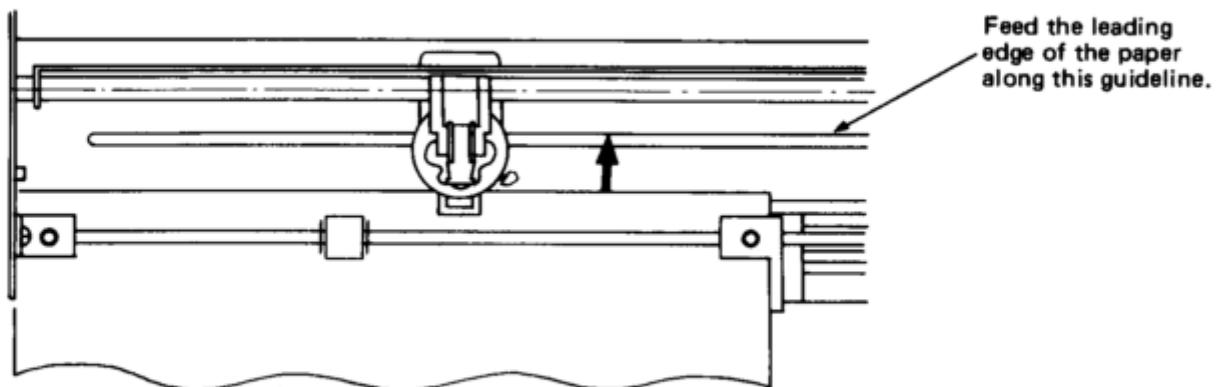
③



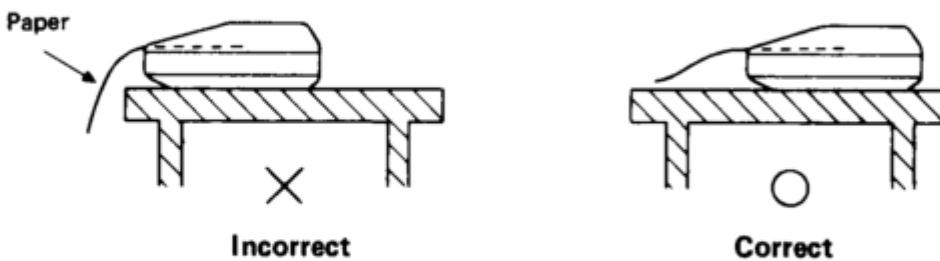
The left wall inside the unit serves as the paper guide. When inserting paper, position the paper so that it is parallel with this wall. Allow a slight clearance between the paper edge and the wall, between 0.5 and 1 mm (0.02 to 0.04 in.).

Feed the paper into the rollers and press the paper feed key. The paper is now inserted.

- ④ Use the paper feed key and the paper rewind key to feed the leading edge of the paper along the guideline.

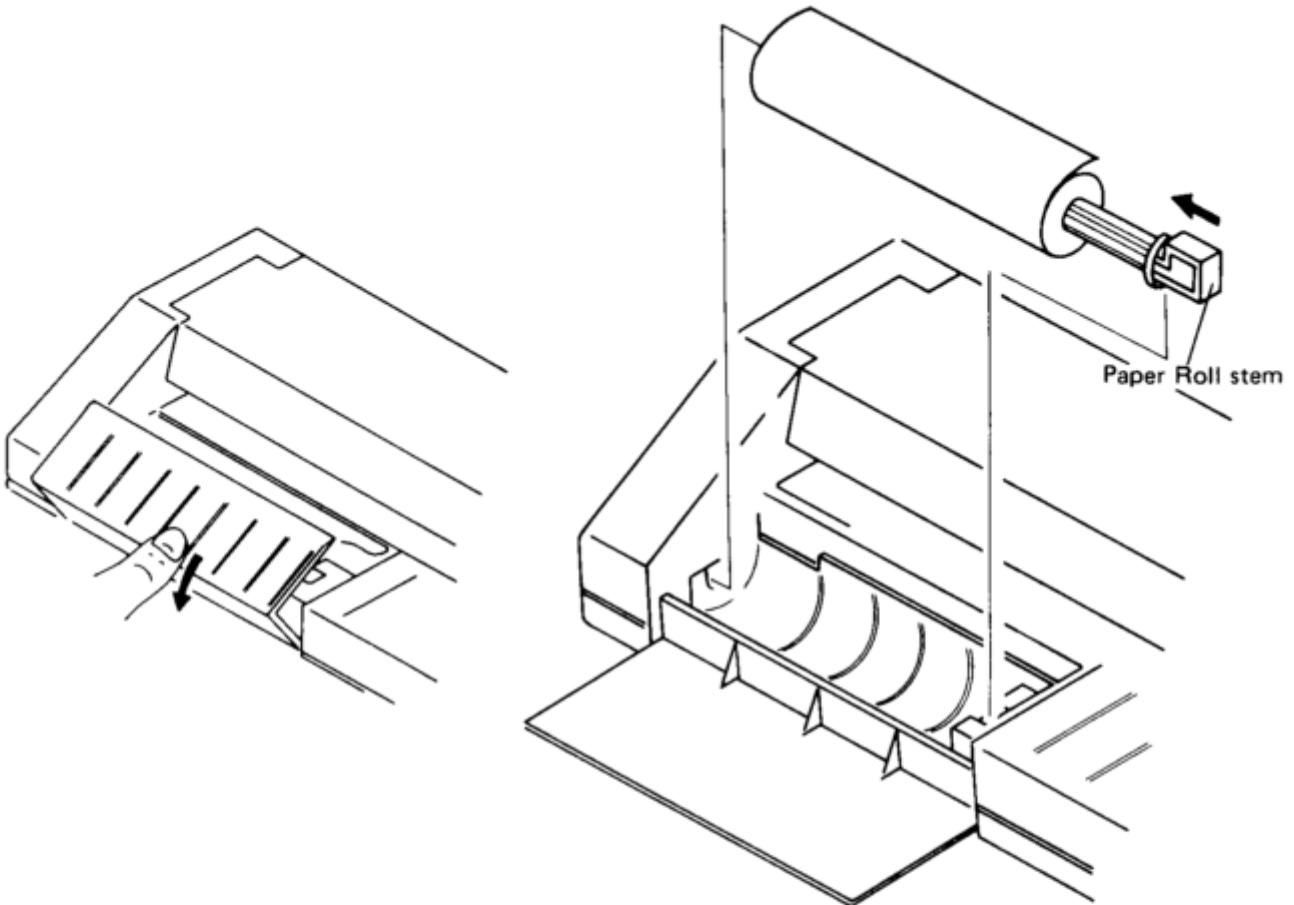


- When using sheet paper, keep the paper roll inside the paper case with the cover closed. If the cover tends to open during operation, simply remove the paper roll from the case.
- Paper which curves may cause dots or lines to be inadvertently plotted. Use only paper which is straight and which does not curve.
- Plotting quality will suffer if the paper is not perfectly square or if the edges of the paper are uneven. So make sure the paper is square and recut it if necessary.
- If improperly inserted paper falls down as shown below on the left, the surface of the paper may rise and cause dots or lines to be inadvertently plotted. Try to position the unit as shown below on the right to prevent this.



## 2. Inserting Roll Paper

- Set the paper select lever at the "Roll Paper" position.
- Open the roll paper cover by pressing it as shown below. When using roll paper, keep the cover open. If you plot while the cover is closed, the paper may catch between the cover and the unit and cause improper plotting.
- Cut the leading edge of the roll paper with scissors to make it straight.
- Slide the paper roll stem inside the paper roll and insert the roll into the paper case.
- Feed the leading edge of the paper into the roller just as sheet paper is fed. Then press the paper feed key to advance the paper.



Note: Creases or folds in the paper may cause irregular feeding and improper plotting.

- If the leading edge of the paper is not straight or if the paper is inserted at an angle, the paper may misfeed or catch.
- If paper misfeeds or catches, press the paper rewind key to rewind the paper.

### 3. Paper

Either sheet paper or roll paper can be used with this plotter.

#### (1) Sheet paper

Paper quality: Normal smooth white paper or postcard-type stock

Paper thickness: 70 to 400 micrometers (2.8 to 15.8 mils thick)

Size: Letter size 216 (W) x 280 (H) mm (8.5 x 11 in.)

A4 size 210 (W) x 297 (H) mm (8.3 x 11.7 in.)

B5 size 182 (W) x 257 (H) mm (7.2 x 10 in.)

A5 size 148 (W) x 210 (H) mm (5.8 x 8.3 in.)

A6 size 105 (W) x 148 (H) mm (4.1 x 5.8 in.)

Any kind of smooth paper or postcard-type stock can be used. However, the life of the pens and plotting quality will vary according to the media used, which should be free of loose fibers and any accumulation of dust.

Ink may bleed, blur, or wick depending on the absorption characteristics of the paper. Keep this in mind when selecting paper.

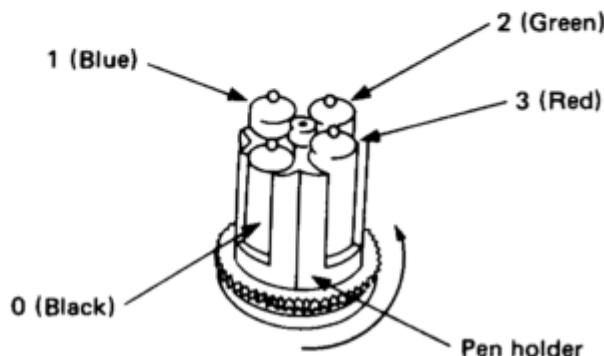
**(2) Roll paper**

Paper quality: Smooth white paper  
Paper thickness: About 70 micrometers (2.8 mils)  
Paper width: About 114.5 mm (4.5 in.)  
Paper length: About 6 meters (19.2 feet)

- \* Only EA-515P Roll Paper sold by Sharp dealers should be used with the CE-515P plotter.  
(Do not use other types of roll paper.)
  - EA-515P (3 rolls per set)

# SETTING AND CHANGING THE PENS

Different colors of SHARP approved pens can be used with this plotter. The pens are set in the positions indicated below.

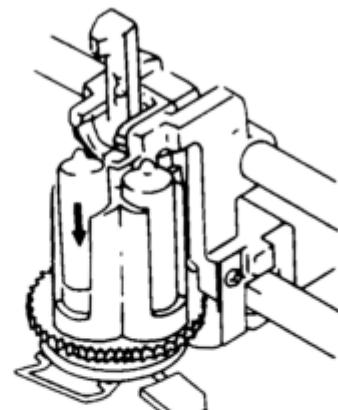
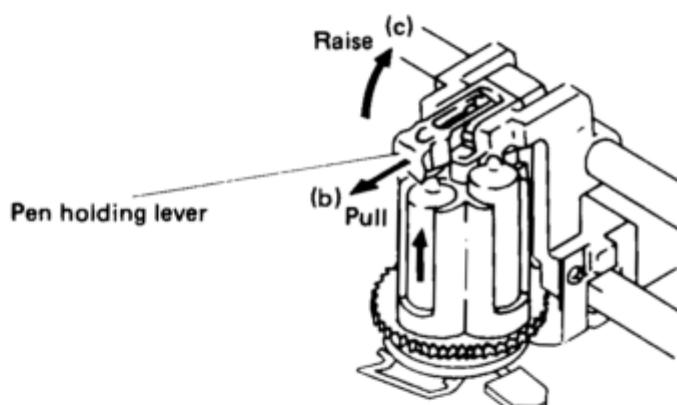
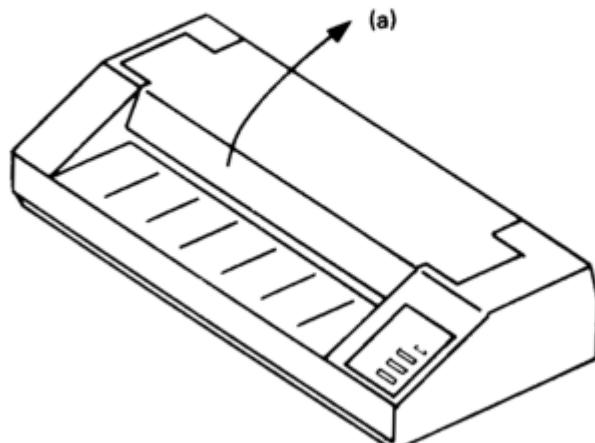


Set the pens in place in accordance with the colors on the pen holder.

The pen holder moves in a counter-clockwise direction to position the pen which has been specified by an ESC instruction.

To set or change the pens, follow the directions below.

- (1) Open the plotter cover by pressing it in the direction of the arrow (a) in the diagram.
- (2) To remove a pen, pull the pen holding lever out straight in the direction of arrow (b) then gently lift it up in the direction of arrow (c).  
**Be careful not to touch any other parts of the unit.**
- (3) Set the new pen in place.



(4) To replace a different pen, press the color change key.

The pen holder will rotate and a different pen will come to the front. Then replace the pens as you did in steps (2) and (3).

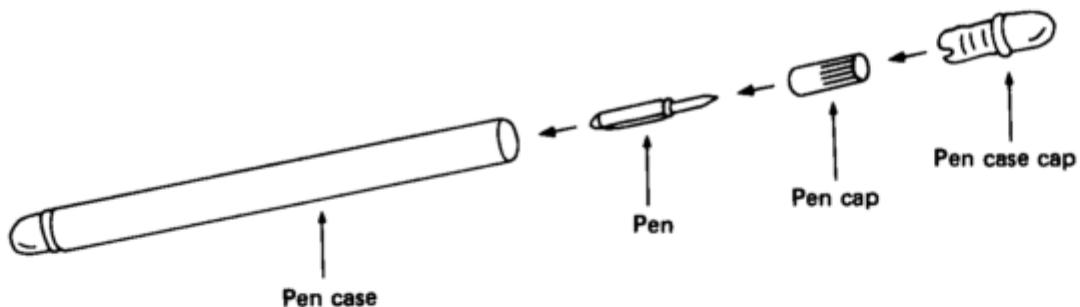
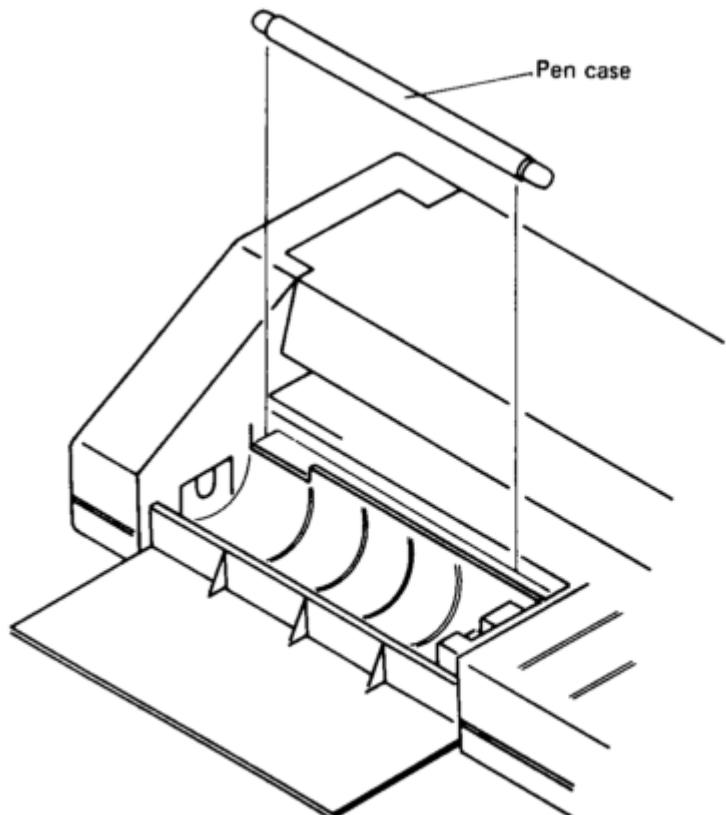
(5) When the new pen has been properly set in place, restore the pen holding lever and plotter cover to their original positions by gently bending the holding lever down and pushing it horizontally until latches in place.

**Note:**

If the pen holder does not rotate properly when the color change key is pressed, press the reset button on the rear of the unit.

**Precautions**

- When handling the plotter, never touch the pen holder or the gears. If they are touched, the plotter's high precision may be impaired. It could also cause the pens to slip out of position.
- Before and after pens are used, be sure to keep them in their pen case with the caps on. If not, the pens may dryout and become useless.
- Take care to keep the paper dry. Otherwise, the water-soluble ink used by this plotter may bleed on the paper.
- Pens should be stored in the pen case provided which fits inside the plotter housing's roll paper compartment.



- \* When you want to plot drawings, move the Pen holder vertically as little as possible. That will ensure a more precise plotting. In case of drawings, there may be a shear of about 0.25 mm (0.01 inch) in the X axis direction. The shear in the Y axis direction may increase to about 1.0% in case of roll paper or 70-micrometer sheet paper and to about 5.0% in case of sheet paper thicker than 70-micrometers if the pen holder is moved vertically.
- \* When you purchase ballpoint pens, specify the CE-515P Ballpoint Pens from your local Sharp dealer.
  - EA-850B (a set of four black pens)
  - EA-850C (a set of four pens: black, blue, green, and red)

### Range of the Pen and the paper movement

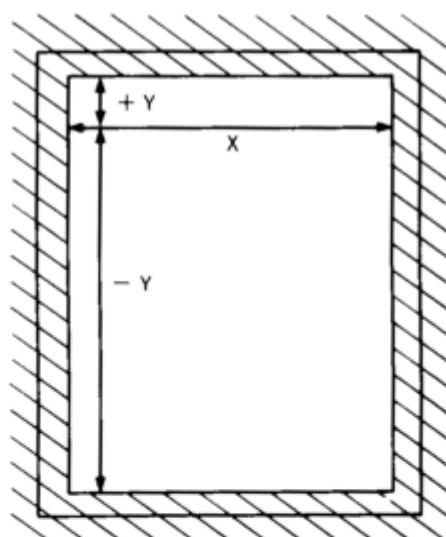
The size of the drawing to be plotted is limited in width since the maximum size of the paper to be used on this plotter is A4. If you wish to plot only one part of a drawing, it is sometimes best to create a program for the entire drawing and then specify the part that you want. It is also possible to make very large drawings by creating pieces of the drawing on different sheets and then assembling the sheets to form one large drawing. In such cases, the scissoring function is useful. If you use this function, you can draw the part of the drawing which will be plotted on the paper and draw other parts of the drawing as if the pen could move to those parts.

Be careful that the plotting ranges vary according to the type of the paper as is shown below.

Paper type Steps	A6	ROLL PAPER	A5	B5	A4 US LETTER
X direction	410	480	650	820	960
+Y direction	30	999	30	30	30
-Y direction	601	999	919	1149	1354

(1 step = 0.2 mm (0.008 in.))

- Roll paper can be cut only in the X axis direction.
- With sheet paper, if you proceed more than 30 steps in the Y axis direction, you will enter the "scissoring area." Therefore if you plot large letters on the first line, the upper parts of the letters might not be plotted. In these cases, feed the paper beforehand using the LF command (instead of the Paper Feed Key) and then run the plotting instruction.
- Although the scissoring function is useful, you must be careful when using it. If you make a mistake in creating the program, the whole drawing may be drawn in the scissoring area and nothing will show on the paper.



Slanting lines represent the  
"scissoring area"

## Self-Test Mode

This is an instruction to check the color specifications and the amount of ink and drying quality of the ink. By the following key operations, it draws squares 5 x 5 mm in size (0.2 x 0.2 in.) in any color.

While pushing the color change key, press the paper feed key.

(0)    (1)    (2)    (3)

- (0) The color of position 0
- (1) The color of position 1
- (2) The color of position 2
- (3) The color of position 3

# INTERFACE SPECIFICATIONS

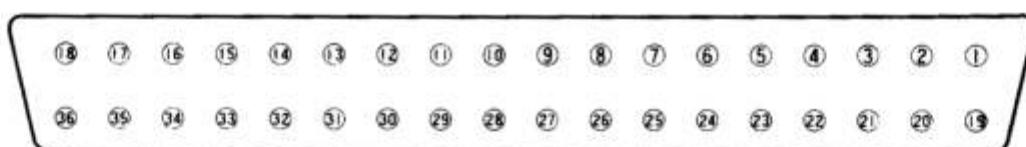
This plotter offers two interface functions: a parallel interface based on a Centronics-style standard and a serial interface based on the RS-232C standard.

Though this plotter contains an interface based on the RS-232C standard, it doesn't always offer a good exchange of informations with all systems that employ an RS-232C interface. When you use a parallel or RS-232C interface, carefully read this manual and the manual of the device to be connected.

## 1. Parallel Interface

(1) **Input method:** TTL level 8 bit parallel (based on Centronics standard)

(2) **Input connector**



### (3) Connector signals and descriptions

PIN number.	Name	Direction	Description
1	<u>DSTB</u>	Input	Data strobe signal Signal for reading data. When this signal is "LOW" data (DATA 1-8) is read.
2 ~ 9	<u>DATA 1</u> ~ <u>DATA 8</u>	Input	Data bus 8 bit data signal. When the data is "1," this signal is "HIGH."
10	<u>ACKNLG</u>	Output	Acknowledge signal This signal is sent when the plotter completes reading data. It can be used as a data request signal of the plotter.
11	<u>BUSY</u>	Output	Busy signal This signal indicates the processing status of the plotter. When it is "HIGH," no more input data can be read.
12	<u>SIGNAL GND</u>	—	Signal Ground
13	<u>SELECT</u>	Output	This signal is always "HIGH" when the plotter is powered on.
14 15	<u>NC</u>	—	Non-Connection
16	<u>SIGNAL GND</u>	—	Signal Ground
17	<u>F.G.</u>	—	Frame Ground
18	<u>+5V</u>	—	A power source of +5V used in the plotter.
19 ~ 30	<u>SIGNAL GND</u>	—	Signal Ground
31	<u>EXPRM</u>	Input	Signal for initializing the plotter. When this signal falls from "HIGH" to "LOW," initialization will take place.
32	<u>FAULT</u>	Output	This signal is always "HIGH" when the plotter is powered on.
33 ~ 36	<u>NC</u>	—	Non-Connection

#### (4) Electronic Signal conditions

	Name	Composition
Input	DATA 1 ~ 8	 SN74LS373 or the equivalent
	DSTB	 2SC1317 or the equivalent
	EXPRM	 2SC1317 or the equivalent
Output	BUSY	 2SC1317 or the equivalent
	ACKNLG	 LB1247 or the equivalent
	SELECT FAULT	

#### (5) Input Signal level

HIGH level: 2.4 to 5.0V

LOW level: 0.0 to 0.4V

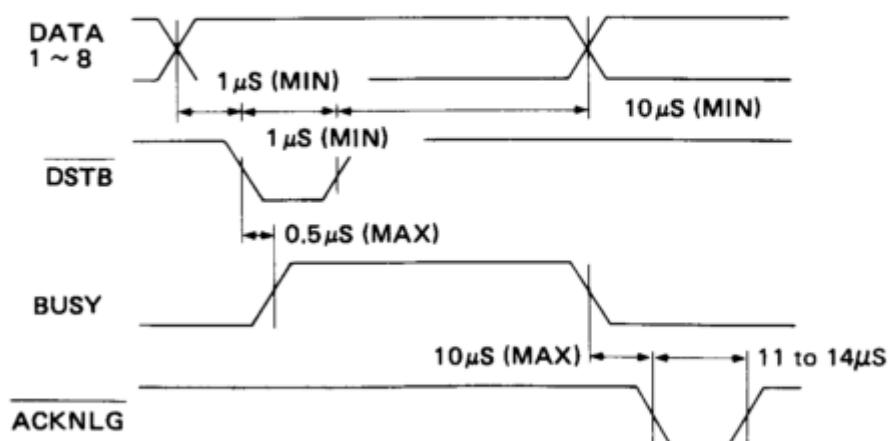
#### (6) Output signal level

HIGH level: 2.0 to 5.0V

LOW level: 0.0 to 0.8V

#### (7) Input/Output timing chart

Parallel DATA Timing chart

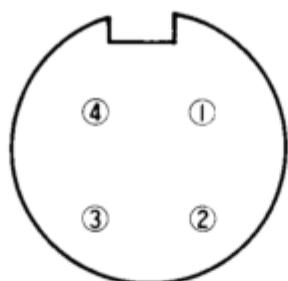


## 2. RS-232C Interface

### (1) Specifications

Communication mode:	Start-stop synchronous (asynchronous) mode
Standard:	EIA RS-232C
Baud rate:	1200 bps
Data:	7/8 bits (switched by the SW1 DIP switch)
Parity bit:	None parity
Stop bit:	When data is in 7 bits; 2 stop bits When data is in 8 bits; 1 stop bit

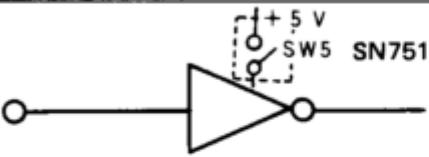
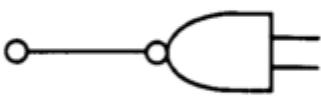
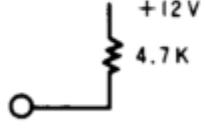
### (2) Input connector



### (3) Connector signals and descriptions

Pin number	Name	Direction	Description
1	+12V	-	
2	<u>BUSY</u>	Output	Busy signal
3	SIGNAL GND	-	Signal Ground
4	<u>DATA</u>	Input	Data signal

### (4) Electrical Signal conditions

	Name	Composition
Input	<u>DATA</u>	
Output	<u>BUSY</u>	
	+12V	

## (5) Input signal level

HIGH level: 3 to 15 V

LOW level: -3 to -15 V

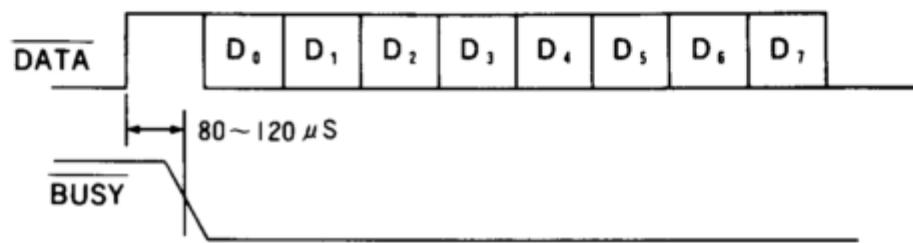
## (6) Output signal level

HIGH level: 5 to 10 V (Load 3 to 7 KΩ)

LOW level: -5 to -10 V (Load 3 to 7 KΩ)

## (7) Input/Output timing chart

RS-232C Data timing chart



### Note:

- With this plotter, you can switch the input signal level from the RS-232C level (L1) to the TTL level (L2) only by setting the SW5 DIP Switch. High level and low level of each signal area as shown in the table below.

	L1 (RS-232C)	L2 (TTL)
HIGH level	+3 to +15V	+3 to +15V
LOW level	-3 to -15V	+0.8 to -15V

# COMMANDS

Use SHARP BASIC commands to send data to the plotter. If the BASIC commands are expressed as described in the form of [ H] in the following sections.

1. Model Selection Instruction and
2. Commands in the TEXT mode,

use the CHR\$ ( ) command.

Example:

An instruction for creating commands in the TEXT mode takes the form below.

ESC [1BH] + "a" ⇒ CHR\$(27) + "a"

## 1. Mode Selection Instruction

The plotter can be used in either of two modes: TEXT or GRAPH. In the TEXT mode, it functions as a pen printer. In the GRAPH mode, it functions as a plotter. It is in the TEXT mode when the power is turned on (initial state), when the reset button is pressed, or when the EXPRM signal (parallel interface) is received.

Shift to TEXT mode ..... { ESC [1BH] + "a"  
A instruction

Shift to GRAPH mode ..... ESC [1BH] + "b"

## 2. Text Mode Commands

### (1) BS [08H] ..... Back space

The pen back-spaces by one character. If the pen is at the left margin, this instruction is ignored.

### (2) LF [0AH] ..... Line feed

The paper is fed one line. The pen doesn't move.

### (3) LU [0BH] ..... Line up

The paper is rewound by one line. The pen doesn't move.

### (4) CR [0DH] ..... Carriage return

The pen is moved to the left margin. If the CR-CR/LF of the DIP switch is on the CR/LF, the pen is moved to the left margin of the next line.

### (5) ESC [1BH] + "a" ..... Mode change (to TEXT mode)

The plotter is set to the TEXT mode.

### (6) ESC [1BH] + "b" ..... Mode change (to GRAPH mode)

The plotter is set to the GRAPH mode.

### (7) ESC [1BH] + "?" + "a" to "0" (Character scale set)

Set the size of the characters in the Character Table in APPENDIX 1 (20H to 7FH and A0H to DFH). The size is set as a multiple of the smallest character (ESC + "?" + "a") from x 1 (a) to x 15 (o). The initial value is x 2 (b).

**Example:**

ESC + "?" + "a"

Character size: 0.8 (W) x 1.2 (H) mm or 0.032 x 0.48 in. (4 x 6 steps\*)

Column pitch: 1.2 mm (0.048 in.) (6 steps)

Line pitch: 2.4 mm (0.096 in.) (12 steps)

ESC + "?" + "b"

Character size: 1.6 (W) x 2.4 (H) mm or 0.046 x 0.096 in. (8 x 12 steps)

Column pitch: 2.4 mm (0.096 in.) (12 steps)

Line pitch: 4.8 mm (0.192 in.) (24 steps)

(\* Step . . . 1 step = 0.2 mm. It is defined by the resolution of the plotter.)

**(8) ESC [1BH] + "0" ~ "3" (Color set)**

Sets the color of the characters or drawings.

ESC + 0 Black

ESC + 1 Blue

ESC + 2 Green

ESC + 3 Red

### 3. GRAPH Mode Commands

**(1) L Instruction . . . Definition of dotted lines**

Specifies the type of line.

Lines are defined in the form below.

**L Equation**

Example: "L0" (specifies a solid line)

16 values from 0 to 15 are available for use in the equation to specify the lines listed in the table below.

Value of the equation	Line type
0 (initial status)	—
1	.....
2	- - - - -
3	- - - - -
4	- - - - -
5	- - - - -
6	- - - - -
7	- - - - -
8	- - - - -
9	- - - - -
10	- - - - -
11	- - - - -
12	- - - - -
13	- - - - -
14	- - - - -
15	—

#### (2) A Instruction . . . . mode change (to TEXT mode)

The plotter is set to the TEXT mode.

The same as ESC + "a" which is described in the section that explain Control Codes.

Example: "A"

#### (3) Q Instruction . . . . ROTATE (rotation of characters)

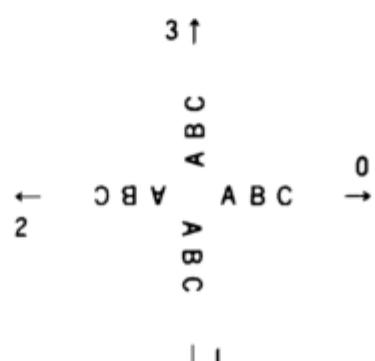
Specifies the printing direction of the characters. The direction is specified in the form below.

##### Q Equation

The direction of the characters is specified by the value of the equation (0 to 3) as shown in the diagram to the right. Characters are plotted in the direction indicated by the arrows.

Example: "Q1"

- If the A Instruction and ESC + "a" are executed, the direction of the characters is automatically set at 0.



#### (4) M Instruction . . . . absolute movement (pen up)

This instruction is used to move the pen in the direction of the X and Y axis starting from the origin. The movement is specified in the form shown below.

##### M X1, Y1, X2, Y2, . . . . Xn, Yn (n = ∞)

The value of X1 and Y1 specifies the amounts of the movements in the X axis and Y axis directions, respectively. X2, Y2, . . . . Xn, Yn can be specified after X1 and Y1. At first, the pen moves to the position of the coordinates (X1, Y1), then moves to coordinates (X2, Y2) and finally to coordinates (Xn, Yn).

Example: "M100, 0, 100, 100"

The pen moves 20 mm (0.8 in.) in the direction of the X axis and 20 mm (0.8 in.) in the direction of the Y axis.

- The values of X and Y are between -999 and +999. The minimum amount of pen movement is 0.2 mm (0.008 in.).

**(5) R Instructions for relative movement (pen up)**

**R X1, Y1, X2, Y2, . . . . . Xn, Yn (n = ∞)**

Moves the pen in the direction of the X and Y axis starting from the current position of the pen.

- Except for the above, this instruction is used in the same way as an M Instruction.

**(6) D Instruction . . . . . absolute movement (pen down)**

**D X1, Y1, X2, Y2, . . . . . Xn, Yn (n = ∞)**

Draws a line from the current position of the paper to the position of the coordinates (X1, Y1).

Example:

"D100, 0, 100, 100, 0, 100, 0, 0" (draws a square 20 x 20 mm or 0.8 x 0.8 inches)

- Except for the above, this instruction is used in the same way as an M Instruction.

**(7) J Instruction . . . . . relative movement (pen down)**

**J X1, Y1, X2, Y2, . . . . . Xn, Yn (n = ∞)**

Draws a line from the current position of the pen to the position of the coordinates (X1, Y1).

Example:

"J100, 0, 0, 100, -100, 0, 0, -100" (draws a square 20 x 20 mm or 0.8 x 0.8 inches)

- Except for the above, this instruction is used in the same way as an M Instruction.

**(8) I Instruction . . . . . defining the origin (Initialized)**

Sets the origin (X = 0, Y = 0) at the current position of the pen. When the GRAPH mode is specified by ESC + "b," the pen returns to the left margin and this position is set as the origin. When you create a drawing, it may be inconvenient if the origin is set at the left edge. In this case, move the pen to any position using an M Instruction and use an I Instruction to set that position as the origin. Then you can draw starting with this position.

Example: "I"

**(9) H Instruction . . . . . return to the origin (Home)**

Return to the origin with the pen lifted up.

Example: "H"

**(10) P Instruction . . . . . for drawing letters**

This instruction is used in the GRAPH mode to plot letters. This is specified in the form shown below.

**P C1C2 . . . Cn (n = ∞)**

Put P at the head of the letters to be plotted; C1C2 . . . Cn

Example: "PABCDEFG" (plots ABCDEFG)

- If the number of the letters exceeds the limit for letters to be plotted on one line, the scissoring function is used at this position.
- The character scale, alternate character scale and color setting specified in the TEXT mode are also effective in the Graph mode.

**Note:**

- (1) The following commands are effective both in the TEXT mode and in the GRAPH mode.

ESC + "?" + "a" to "o"	(character scale setting)
ESC + "0" to "3"	(color setting)
ESC + "a"	(TEXT mode)
ESC + "b"	(GRAPH mode)

When the command ESC + "a" is performed, the value of the Q equation in the Q Instruction is set at 0. This sets the pen at the left margin which then becomes the home, or origin, position. The L Instruction remains effective.

(2) Data reading

- Leading blanks (" ") are ignored.
- If a number has more than four digits, the lower of the three digits are effective.
- A comma (,) or CR code marks the end of each set of data. When characters other than numbers are read, all such values are omitted until the next comma or CR code appears.

Example:      D       -135.    21, 20, .....

↑                                  ↑  
Ignored                              Ignored

(3) TEXT/GRAF setting commands are effective only after a CR or LF code.

- (4) During operation in the GRAPH mode, if you halt the computer, the plotter will wait for data. Therefore, the paper feed key, paper rewind key and color change key will not function. In this case, send a CR code (the GRAPH mode will remain effective at this time,) or press the reset button on the rear of the unit.

- (5) The values that can be specified in M, D, R or J Instructions are between -999 and +999. But if you input more than one R or J Instruction, values between -2048 and +2047 can be specified.

If values outside of these ranges are input, the plotter returns to its initial state just as it does when the reset button is pressed.

# SPECIFICATIONS

<b>Model:</b>	CE-515P
<b>Type:</b>	X/Y axis plotter
<b>Printing digit:</b>	up to 160 columns maximum using letter size paper and the smallest font
<b>Number of character size:</b>	15 types from 0.8 mm x 1.2 mm (0.032 x 0.048 in.) to 12 x 18 mm (0.48 x 0.72 in.) (standard characters)
<b>Color plotting:</b>	4 colors (black, blue, green, red standard pen set)
<b>Plotting direction:</b>	4 directions (up, down, left, right)
<b>Minimum pen movement:</b>	0.2 mm (0.008 in.)
<b>Plotting while drawing characters:</b>	Maximum 10 characters/second (this is the average speed when the smallest alphanumeric characters are printed. The plotting speed varies depending on the characters to be drawn.)
<b>Paper:</b>	<b>Roll paper:</b> Outer diameter Less than 25 mm (1 in.) Inner diameter 8 mm (0.3 in.) Width 114 mm (4.5 in.) (EA-515P, offered separately) <b>Sheet paper:</b> Thickness 70 to 400 micrometers (2.8 to 15.8 mils thick)
<b>Power source:</b>	AC adaptor
<b>Power consumption:</b>	14W
<b>Operating temperature:</b>	5 to 40°C (41 to 104°F)
<b>Dimensions:</b>	330(W) x 160(D) x 75(H) mm (13(W) x 6.3(D) x 3(H) in.) (Body size, not including projections)
<b>Weight:</b>	1.4 kg (not including accessories)
<b>Accessories:</b>	AC adaptor (EA-57A), dust cover, roll paper, 10 sheets of paper, 8 pens (2 in each color), instruction manual, paper stem for mounting roll paper

# APPENDIX-1 CHARACTER CODE TABLE

	Upper 4 bits															
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Lower 4 bits	0			SP	0	@	P	'	p							
	1			!	1	A	Q	a	q							
	2			"	2	B	R	b	r							
	3			#	3	C	S	c	s							
	4			\$	4	D	T	d	t							
	5			%	5	E	U	e	u							
	6			&	6	F	V	f	v							
	7			'	7	G	W	g	w							
	8	BS		(	8	H	X	h	x							
	9			)	9	I	Y	i	y							
A	LF		*	:	J	Z	j	z								
B	LU	ESC	+	;	K	[	k	{								
C			,	<	L	¥	l	:								
D	CR		-	=	M	]	m	}								
E	SO		.	>	N	^	n	-								
F	SI		/	?	O	---	o	☒								

- "SP" means space. The pen proceeds to the next position without plotting any characters.
- Blank means "not defined," nothing is plotted.
- When you create a program for the plotter, be sure to use its unique character code commands.
- SO [0EH] and SI [0FH] are for special uses. Do not use them.
- ¥ [5CH] and characters from A0H to DFH are for Japanese letters. (Shaded area)

# APPENDIX-2 CONNECTION TO VARIOUS COMPUTER

## (1) Character code

No character is defined for 00H~1FH, 80H~8FH and E0H~FFH in the Code Table (APPENDIX-1).

Although the characters and graphics shown in the character code table for this plotter will be displayed on the CRT or LCD, some of them may not be drawn by this plotter.

Characters which cannot be plotted will be ignored when sent from the computer. The plotter resumes operation when it receives a character which it can draw.

- Characters from 80H~9FH and E0H~FFH on the PC-5000, will not be plotted.
- Because DATA is transferred from the computer to this plotter by character codes instead of character patterns, in some cases the results appear different from those shown on the computer's display screen.

## (2) Line feed code

The line feed code for this plotter is CR (0DH). If the line feed code for the computer in its initial state is LF (0AH), change it to CR (0DH).

Computer and interface module		Modification from the initial state	DIP SW4
PC-1500 (PC-1500A)	CE-158 (Parallel)	Necessary	ON
	CE-158 (Serial)	Not necessary	ON
	CE-162E (Parallel)	Not necessary	ON
PC-5000	(Serial)	Not necessary	ON

- When using SHARP's PC-1500 (PC-1500A) computer and CE-158, use the Console statement.

## (3) Automatic line feed

During operation in the TEXT mode, when the number of data items from the computer exceeds the specified number of digits, this plotter automatically carries out a CR/LF and continues operation. Therefore, if the end of the output data from the computer coincides with the position of the automatic line feed during list printing or other operations, one line is fed without any printing.

## (4) For connection with a SHARP's PC-1500 (1500A) and CE-158 (or CE-162E) (parallel interface)\*

### ① To draw a program list using standard letters.

```
OPN "LPRT" [ENTER]
CONSOLE 0, 0 [ENTER]
LPRINT CHR $ &1B ; "?b" [ENTER]
LPRINT CHR $ &1B ; "a" [ENTER]
LLIST [ENTER]
```

② To plot "ABCD" using the smallest letters.

```
10 _ OPN _ "LPRT"  
20 _ CONSOLE _ Ø, Ø  
30 _ LPRINT _ CHR $ _ & 1B ; "a"  
40 _ LPRINT _ CHR $ _ & 1B ; "? a"  
50 _ LPRINT _ "ABCD"  
60 _ END
```

③ To print lines in four colors.

```
10 _ OPN _ "LPRT"  
20 _ CONSOLE _ Ø, Ø  
30 _ LPRINT _ CHR $ _ & 1B ; "b"  
40 _ LPRINT _ "I"  
50 _ FOR _ A = Ø _ TO _ 3  
60 _ LPRINT _ CHR $ _ & 1B ; CHR $ (& 30 + A)  
70 _ LPRINT _ "J 1ØØ, Ø"  
80 _ NEXT _ A  
90 _ LPRINT _ "H"  
100 _ END
```

\* To connect with the SHARP's PC-1500 (1500A) and CE-158 by using on RS-232C interface use

```
SETCOM _ 12ØØ, 8, N, 1  
(SETCOM _ 12ØØ, 7, N, 2)  
OUTSTAT _ Ø  
SETDEV _ PO  
instead of  
OPN "LPRT"
```

(5) For connection with SHARP's PC-5000 (RS-232C interface)

① To plot a program list using standard letters.

```
OPEN "COM1 : 12ØØ, N, 8, 1, CSØ, DS65ØØØ, CDØ"  
"AS #2 ✓  
PRINT #2, CHR$ (27) ; "? b" ✓  
PRINT #2, CHR$ (27) ; "a" ✓  
CLOSE #2 ✓  
LIST, "COM1 : 12ØØ, N, 8, CSØ, 1, DS65000, CDØ" ✓
```

② To plot "ABCD" using the smallest letters.

```
10 OPEN "COM1 : 1200, N, 8, 1, CSØ, DS65ØØØ, CDØ" AS #2  
20 PRINT #2, CHR$ (27) ; "? a"  
30 PRINT #2, CHR$ (27) ; "a"  
40 PRINT #2, "ABCD"  
50 CLOSE #2  
60 END
```

# APPENDIX-3 SAMPLE PROGRAM

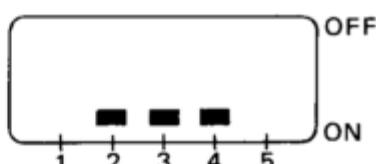
## Overview

This is a sample program to operate the CE-515P Color Plotter Printer using SHARP's PC-1500 (PC-1500A) and a CE-158 interface module (or CE-162E). A RAM module which has a bigger memory capacity than the CE-151 is needed. (However, it is not needed in the case of the PC-1500A.) In this example, a sales result breakdown by different branch offices is illustrated by a pie chart and a table.

## Operation

### 1. Preparation

- i) Use paper which is wider than roll paper (more than 114 mm wide).
- ii) Set the DIP switches on the rear side of the unit as shown below;



1 and 5 may be left in either position.

### 2. Input

- i) Start the program by entering RUN and **[ENTER]**.
- ii) Enter the fiscal year.
- iii) Enter the yearly sales total by each branch office in hundreds of millions of dollars. An integer of up to 5 digits long and a decimal up to 1 digit long should be input for each branch office.

### 3. Output

The breakdown of sales by branch is illustrated by a Pie chart. The sales of each branch and its percentage of the total are also output as numeric values.

## Example

Input the branch office sales of a company in 1985 and illustrate the totals with circular charts and tables.

A	Hong Kong	400
B	New York	1,000
C	Singapore	650
D	London	900
E	San Francisco	700
F	Tokyo	800

(in one hundred millions dollar)

## Key operation

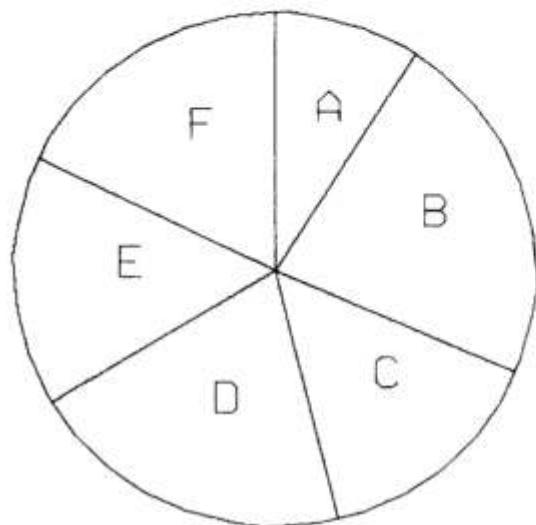
Step	Key input	Display	Remark
1	RUN <b>ENTER</b>	Fiscal Year ?	Prompt for input of the fiscal year.
2	1985 <b>ENTER</b>		Prompt for input of sales totals
3			Prompt for input of the unit (hundreds of million dollars)
4		Hong Kong	Waiting for Input
5	400 <b>ENTER</b>	New York	Waiting for Input
	{	Repeats	
9	700 <b>ENTER</b>	Tokyo	
10	800 <b>ENTER</b>	Tokyo 800	Out put to the printer and completion of the program

```

10 REM ****SALES BREAKDOWN*****
20 REM * SALES BREAKDOWN *
30 REM ****SALES BREAKDOWN*****
40 CLEAR
50 OPN "LPRT":CONSOLE 0,0
60 WAIT 0
70 DIM A(5),B(5),A$(5)
80 A$(0)="Hong Kong"
81 A$(1)="New York"
82 A$(2)="Singapore"
83 A$(3)="London"
84 A$(4)="San Francisco"
85 A$(5)="Tokyo"
100 INPUT "Fiscal Year ? ";Y
110 FOR Z=0TO 5:CLS
120 PRINT A$(Z);:INPUT A(Z):T=T+A(Z)
130 NEXT Z:CLS
140 PRINT "Is this OK ?:BEEP 10
150 FOR Z=0TO 5:PRINT A$(Z);A(Z);"/N"
;
160 INPUT F$:IF F$="Y"THEN 180
170 CLS :PRINT A$(Z);"'change ':;T=T-A(Z):INPUT A(Z):T=T+A(Z)
180 CLS :NEXT Z
190 FOR X=0TO 5:B(X)=A(X)*100/T:NEXT X
;
299 REM *** TITLE PRINT ***
300 LPRINT CHR$(27);"""
310 LPRINT CHR$(27);"?d"
320 LPRINT "SALES BREAKDOWN"
330 LPRINT " in ";Y
400 LPRINT CHR$(27);"""
410 LPRINT "M200,-220":LPRINT "I"
420 GOSUB "C"
430 GOSUB "D"
440 GOSUB "E"
450 LPRINT "M-200,-240"
460 GOSUB "F"
470 GOSUB "G"
480 GOSUB "H"
490 LPRINT "A"
500 FOR A=0TO 40:LPRINT CHR$(11);:NEXT A
510 PRINT "Is this OK (Y/N)";"
520 INPUT F$:IF F$="Y"THEN 540
530 GOTO 150
540 FOR A=0TO 60:LPRINT CHR$(10);:NEXT A
550 END
999 REM *** PRINT CIRCLE ***
1000 "C"DEGREE
1010 LPRINT CHR$(27);"0"
1020 C=COS 10:S=SIN 10
1030 LPRINT "M200,0":X2=200:Y2=0
1040 FOR A=0TO 36
1050 Y1=Y2*C+X2*S:X1=X2*C-Y2*S
1060 LPRINT "0";X2;"";Y2;"";X1;"";Y1

```

## SALES BREAKDOWN in 1985



Branch	Sales	Weight (%)
A,Hong Kong	400.0	8.9
B,New York	1000.0	22.4
C,Singapore	650.0	14.6
D,London	900.0	20.2
E,San Francisco	700.0	15.7
F,Tokyo	800.0	17.9

```

1070 X2=X1:Y2=Y1
1080 NEXT A
1090 RETURN
1099 REM *** CIRCLE DEVICE ***
1100 "D:LPRINT "H":T1=0
1110 FOR A=0TO 5
1120 T1=T1+B(A)
1130 X1=200*SIN (T1*3.6):Y1=200*COS (T1
*3.6)
1140 LPRINT "D";X1;";Y1
1150 LPRINT "H"
1160 NEXT A
1170 RETURN
1199 REM *** PRINT NAME ***
1200 "E":T1=0
1210 FOR A=0TO 5
1220 T1=T1+B(A)/2
1230 X1=120*SIN (T1*3.6):Y1=120*COS (T1
*3.6)
1240 LPRINT "M";X1;";Y1
1250 LPRINT "P";CHR$ (65+A)
1260 T1-T1+B(A)/2
1270 NEXT A
1280 RETURN
1299 REM *** PRINT TABLE ***
1300 "F":LPRINT "I"
1320 LPRINT "J480,0,0,-280,-480,0,0,280

1330 LPRINT "R0,-40"
1340 LPRINT "D480,-40"
1350 LPRINT "M320,0"
1360 LPRINT "D320,-280"
1370 LPRINT "M210,-280"
1380 LPRINT "D210,0"
1399 REM *** PRINT ITEM ***
1400 LPRINT CHR$ (27);"?c"
1410 LPRINT "M20,-30":LPRINT "PBranch"
1420 LPRINT "M220,-30":LPRINT "PSales"
1430 LPRINT "M330,-30":LPRINT "PWeight"

1440 LPRINT CHR$ (27);"?b";:LPRINT "PC%
)"
1499 REM *** PRINT BRANCH ***
1500 LPRINT CHR$ (27);"?b"
1510 FOR Z=0TO 5
1520 LPRINT "M6,";-20-40*Z:LPRINT "P";C
HR$ (65+Z);";";A$(Z)
1530 NEXT Z
1540 RETURN
1599 REM *** PRINT SALES ***
1600 "G":FOR I=0TO 5
1610 LPRINT "M220,";-(70+I*40):LPRINT "
P";USING "#####.##";A(I)
1620 NEXT I
1630 RETURN
1699 REM *** PRINT WEIGHT ***
1700 "H":FOR I=0TO 5
1710 LPRINT "M320,";USING ;-(70+I*40):L
PRINT "P";USING "###.##";B(I)
1720 NEXT I
1730 RETURN

```

# APPENDIX-4 EASY CONNECTIONS TO DIFFERENT MICROCOMPUTERS

This section covers the interface's pin configuration for the SHARP PC-1500 (1500A), PC-5000 and IBM-PC computers.

## ① PC-1500 (1500A) WITH CE-158

### (A) RS-232C INTERFACE (CE-515L Cable)

<u>PC-1500 (1500A)</u>		<u>CE-515P</u>	
Signal Name	Pin. No.	Pin. No.	Signal Name
DSR	6	2	<u>BUSY</u>
SG	7	3	<u>SIGNAL GND</u>
TD	2	4	<u>DATA</u>
RTS	4		
CTS	5		

### (B) PARALLEL INTERFACE (EA-158C Cable)

<u>PC-1500 (1500A)</u>		<u>CE-515P</u>	
Signal Name	Pin. No.	Pin. No.	Signal Name
<u>STROBE</u>	1	1	<u>DSTB</u>
<u>DATA 1</u>	2	2	<u>DATA 1</u>
" 2	3	3	" 2
" 3	4	4	" 3
" 4	5	5	" 4
" 5	6	6	" 5
" 6	7	7	" 6
" 7	8	8	" 7
" 8	9	9	" 8
<u>BUSY</u>	10	11	<u>BUSY</u>
<u>INIT</u>	11	,31	<u>EXPRM</u>
<u>GND</u>	14 to 25	16, 17 19 to 27 29, 30	<u>SIGNAL GND</u>

## ② PC-5000

### (A) RS-232C INTERFACE (CE-515L Cable)

<u>PC-5000</u>		<u>CE-515P</u>	
Signal Name	Pin. No.	Pin. No.	Signal Name
<u>DSR</u>	6	2	<u>BUSY</u>
<u>GND</u>	7	3	<u>SIGNAL GND</u>
<u>TXD</u>	2	4	<u>DATA</u>
<u>RTS</u>	4		
<u>CTS</u>	5		

## (3) IBM-PC

## (A) RS-232C INTERFACE

<u>IBM-PC</u>		<u>CE-515P</u>	
Signal Name	Pin. No.	Pin. No.	Signal Name
Data Set Ready	6	2	<u>BUSY</u>
Signal Ground	7	3	<u>SIGNAL GND</u>
Transmitted Data	2	4	<u>DATA</u>
Request to Send	4		
Clear to Send	5		

## (B) PARALLEL INTERFACE (PN 1111019 Cable)

<u>IBM-PC</u>		<u>CE-515P</u>	
Signal Name	Pin. No.	Pin. No.	Signal Name
Strobe	1	1	<u>DSTB</u>
+ Data Bit 0	2	2	<u>DATA</u> 1
" 1	3	3	" 2
" 2	4	4	" 3
" 3	5	5	" 4
" 4	6	6	" 5
" 5	7	7	" 6
" 6	8	8	" 7
" 7	9	9	" 8
Acknowledge	10	10	<u>ACKNLG</u>
+ Busy	11	11	<u>BUSY</u>
+ Page End	12	12	<u>SIGNAL GND</u>
+ Select	13	13	<u>SELECT</u>
Auto Feed	14	14	<u>NC</u>
Initiate	16	31	<u>EXPRM</u>
Error	15	32	<u>FAULT</u>
Ground	18	33	<u>NC</u>
Selection	17	36	<u>NC</u>
Ground	19 to 25	19, 21, 23 25, 27, 29 30	<u>SIGNAL GND</u>