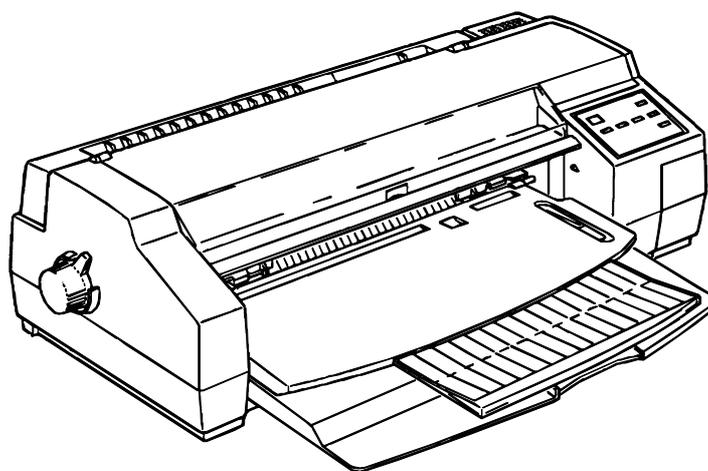


EPSON COLOR INKJET PRINTER

Stylus 1500

SERVICE MANUAL



EPSON

4005452

REVISION SHEET

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PREFACE

This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of Stylus 1500.

The instructions and procedures included herein are intended for the experience repair technician, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

CHAPTER 1. GENERAL DESCRIPTION

Provides a general product overview, lists specifications, and illustrates the main components of the printer.

CHAPTER 2. OPERATING PRINCIPLES

Describes the theory of printer operation.

CHAPTER 3. DISASSEMBLY AND ASSEMBLY

Includes a step-by-step guide for product disassembly and assembly.

CHAPTER 4. ADJUSTMENTS

Includes a step-by-step guide for adjustment.

CHAPTER 5. TROUBLESHOOTING

Provides Epson-approved techniques for adjustment.

CHAPTER 6. MAINTENANCE

Describes preventive maintenance techniques and lists lubricants and adhesives required to service the equipment.

APPENDIX

Describes connector pin assignments, circuit diagrams, circuit board component layout and exploded diagram.

The contents of this manual are subject to change without notice.

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Chapter 1 Product Description

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1.1 FEATURES

The Stylus 1500 is a business-use, high-speed, and high-quality color ink jet printer. The main features of this printer are:

- High print quality for color graphics
 - 720 dpi printing
 - High Speed semi 720 dpi printing
- Large capacity black ink cartridge
 - 3 million characters (LQ mode)
- High-speed printing
 - LQ printing at 200 cps
 - Draft printing at 400 cps
- Built-in auto sheet feeder and push tractor
 - This holds:
 - Envelope to A2 size portrait
 - 100 cut sheets, using 14 lb (55 g/m²) paper
 - 10 envelopes
 - 50 transparency sheets
 - 70 sheets of special paper
- Two built-in interfaces
 - Bidirectional parallel I/F (IEEE-P1284 compatible)
 - Type-B I/F
- Easy setup
 - Multilingual messages (five languages), selected using the control panel
 - No DIP switches
- Four scalable fonts, five LQ fonts, and one draft font installed
 - Scalable fonts: Roman T, Sans Serif H, Roman, Sans Serif
 - LQ bitmap fonts: Roman, Sans Serif, Courier, Prestige, Script
- Useful character tables
 - Standard: Italic, PC437, PC850, PC860, PC861, PC863, PC865, BRASCII, Abicomp, Roman 8, ISO Latin 1
 - NLSP: Italic, PC437, PC437 Greek, PC850, PC852, PC853, PC855, PC857, PC866, PC869, MAZOWIA, Code MJK, ISO 8859-7, ISO Latin 1T, Bulgaria, Roman 8, PC774, Estonia, ISO Latin 1, ISO Latin 2, PC866 LAT

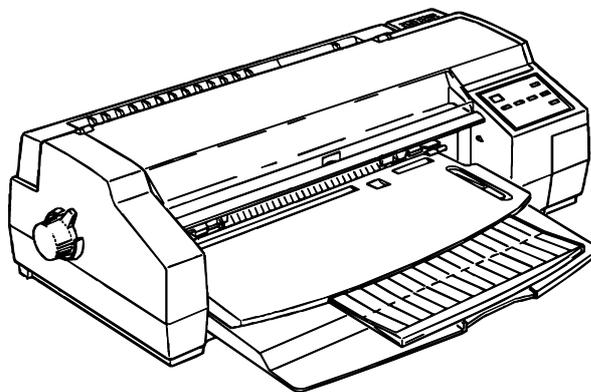


Figure 1-1. Stylus 1500 Exterior View

Table 1-1. Options and Consumables

Model	Description
C83216*	Color upgrade kit
C823071 / C823081	32 KB serial interface card
C82310*	32 KB parallel interface card
C82313*	32 KB IEEE-488 interface card
C82315*	TWAIN interface card
C82312*	Coax interface card
C82312*	LocalTalk™ interface card
C82331*	Ethernet interface card
C836021 / C836022	Parallel interface cable (from D-SUB 25-pin to Amphenol 57)
C836031 / C836061	Serial interface cable (from D-SUB 25-pin to D-SUB 25-pin)
C836051 / C836061	Serial interface cable (from D-SUB 9-pin to D-SUB 25-pin)
S020062	Monochrome ink cartridge
S020049	Color ink cartridge
S041059	Exclusive paper (360 dpi) A4
S041060	Exclusive paper (360 dpi) Letter
S041065	Exclusive paper (360 dpi) A3
S041066	Exclusive paper (360 dpi) Super A3 / B
S041077	Exclusive paper (360 dpi) A2
S041066	Exclusive paper (720 dpi) A4
S041062	Exclusive paper (720 dpi) Letter
S041067	Exclusive paper (720 dpi) Legal
S041068	Exclusive paper (720 dpi) A3
S041069	Exclusive paper (720 dpi) Super A3 / B
S041070	Exclusive paper (720 dpi) B
S041076	Exclusive paper (720 dpi) A2
S041071	High quality glossy paper A4
S041072	High quality glossy paper Letter
S041073	High quality glossy paper A3
S041074	High quality glossy paper Super A3 / B
S041075	High quality glossy paper B
S041063	Transparency A4
S041064	Transparency Letter
S041054	Super coated index card for 720 dpi A6

*: The asterisk mean substitute for the last digit, which varies by each destinations.

1.2 SPECIFICATIONS

This section provides detailed information about the Stylus 1500.

1.2.1 Printing Specifications

Printing method:

On-demand ink jet

Nozzle configuration:

Monochrome: 64 nozzles (32 x 2 staggered)

Color: 60 nozzles (20 x 3, magenta, cyan, yellow)

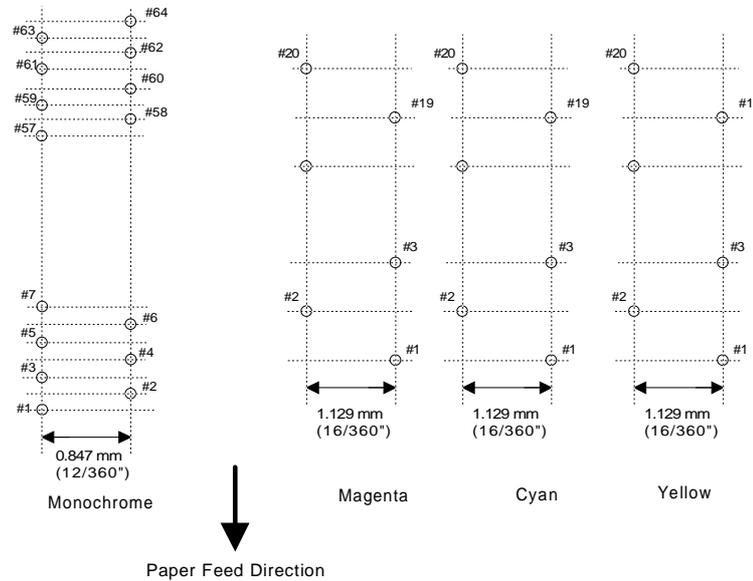


Figure 1-2. Nozzle Configuration

Printing direction:

Bidirectional with logic-seeking

Table 1-2. Print Speeds and Printable Columns

Character Pitch	Printable Columns	LQ Speed	Draft Speed
10 cpi (pica)	136	200 cps	400 cps
12 cpi (elite)	163	240 cps	480 cps
15 cpi	204	300 cps	600 cps
17 cpi (pica condensed)	233	343 cps	686 cps
20 cpi (elite condensed)	160	400 cps	800 cps

Control codes:

ESC/P2 and extended raster graphics codes
 EPSON remote commands
 IBM XL24E emulation

Fonts:

Bitmap LQ fonts:	EPSON Roman	10 cpi, 12 cpi, 15 cpi, Proportional
	EPSON Sans Serif	10 cpi, 12 cpi, 15 cpi, Proportional
	EPSON Courier	10 cpi, 12 cpi, 15 cpi
	EPSON Prestige	10 cpi, 12 cpi, 15 cpi
	EPSON Script	10 cpi, 12 cpi, 15 cpi
Scalable fonts:	EPSON Roman	10.5 pt., 8 pt. - 32 pt. (in units of 2 pt.)
	EPSON Sans Serif	10.5 pt., 8 pt. - 32 pt. (in units of 2 pt.)
	EPSON Roman T	10.5 pt., 8 pt. - 32 pt. (in units of 2 pt.)
	EPSON Sans Serif H	10.5 pt., 8 pt. - 32 pt. (in units of 2 pt.)

Note: Each typeface has four variations (normal, bold, italic, and bold italic).

Table 1-3. Character Tables and Fonts

Character Tables		Bitmap Fonts	Scalable Fonts	
		EPSON Roman EPSON Sans Serif EPSON Courier EPSON Prestige EPSON Script	EPSON Roman EPSON Sans Serif	EPSON Roman T EPSON Sans Serif H
Standard Version	Italic PC437 (U.S., Standard Europe) PC850 (Multilingual) PC852 (Portuguese) PC861 (Icelandic) PC863 (Canadian-French) PC865 (Nordic) BRASCII Abicomp Roman 8 ISO Latin 1	Supported	Supported	Supported
NLSP Version	Italic PC437 (U.S., Standard Europe) PC437 (Greek) PC850 (Multilingual) PC852 (East Europe) PC853 (Turkish) PC855 (Cyrillic) PC857 (Turkish) PC866 (Russian) PC869 (Greek) MAZOWIA (Poland) Code MJK (CSFR) ISO 8859-7 (Latin/Greek) ISO Latin 1T (Turkish) Bulgaria Roman 8 PC774 Estonia ISO Latin 1 ISO Latin 2 PC866 LAT	Supported	Supported	None supported

1.2.2 Paper Feeding

Feeding method:	Friction feed with built-in auto sheet feeder (ASF) and push tractor feed
<i>Note : Reverse feeding beyond 9.5 mm (0.38") is not allowed.</i>	
Line spacing:	1/6 inch, 1/8 inch, or programmable in units of 1/360 inch
Paper path:	Cut sheet front entry / front exit by ASF Single sheet rear entry / front exit and continuous paper rear entry / front exit
Feeding speed:	71 ms (1/6 inch) 3 inches/second (continuous feeding)

1.2.3 Input Data Buffer

Capacity:	256 KB
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1.2.4 Electrical Specifications

120 V Version

Rated voltage:	120 VAC
Input voltage range:	103.5 - 132 VAC
Rated frequency range:	50 - 60 Hz
Input frequency range:	49.5 - 60.5 Hz
Rated current:	0.7 A
Power consumption:	Approximately 23 W (self-test with 10-cpi LQ characters)
Insulation resistance:	10 M Ω minimum (500 VDC between AC line and chassis)
Dielectric strength:	1000 VAC RMS - 1 minute or 1200 VAC RMS - 1 second (between AC line and chassis)

220 V Version

Rated voltage:	220 - 240 VAC
Input voltage range:	198 - 264 VAC
Rated frequency range:	50 - 60 Hz
Input frequency range:	49.5 - 60.5 Hz
Rated current:	0.4 A
Power consumption:	Approximately 20 W (self-test with 10-cpi LQ characters)
Insulation resistance:	10 M Ω minimum (500 VDC between AC line and chassis)
Dielectric strength:	1000 VAC RMS - 1 minute or 1200 VAC RMS - 1 second (between AC line and chassis)

1.2.5 Environmental Conditions

Temperature:	Operating:	10 to 35° C
	Non-operating:	-20 to 40° C
	Non-operating: *1	-20 to 60° C
		1 month at 40° C
		120 hours at 60° C
Humidity:	Operating: *2	20 to 80% RH
	Non-operating: *1, *2	5 to 80% RH
Resistance to shock:	Operating:	1G, within 1 ms
	Non-operating: *1	2 G, within 2 ms
Resistance to vibration:	Operating:	0.15 G
	Non-operating: *1	0.50 G

Notes: *1 In shipment container. *2 Without condensation.

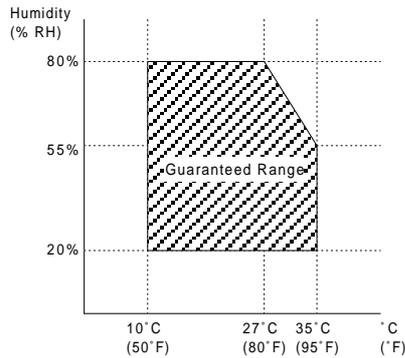


Figure 1-3. Environmental Conditions

1.2.6 Reliability

Total print volume:	75,000 pages (letter or A4)
Printhead life:	1,000 million dots/nozzle

1.2.7 Safety Approvals

120 V Version

Safety standards:	UL 1950 with D3 CSA 22.2 950 with D3
EMC:	FCC part 15 subpart B class B

220 - 240 V Version

Safety standards:	EN 60950 (TÜV, SEMKO, DEMKO, NEMKO, FIMKO)
EMC:	EN 55022 (CISPR Pub. 22) class B EN 50082-1

1.2.8 CE Marking

220 - 240 V Version

Lower Voltage Directive 73/23/EEC:	EN60950
EMC Directive 89/336/EEC:	EN55022 Class B
	EN50082-1
	IEC801-2
	IEC801-3
	IEC801-4

1.2.9 Acoustic Noise

Noise level: Approximately 45 dB(A) (according to ISO 7779)

1.3 INTERFACES

1.3.1 Hardware Interfaces

This section describes the Stylus 1500 interfaces. The printer is standard-equipped with a parallel interface.

1.3.1.1 Parallel Interface

Forward Channel

Transmission mode:	8 bit parallel, IEEE-P1284 compatibility mode
Synchronization:	<u>STROBE</u> pulse
Handshaking:	<u>BUSY</u> and <u>ACKNLG</u> signal
Signal level:	TTL-compatible level (IEEE-P1284 Level 1 device)
Adaptable connector:	57-30360 (Amphenol or equivalent)

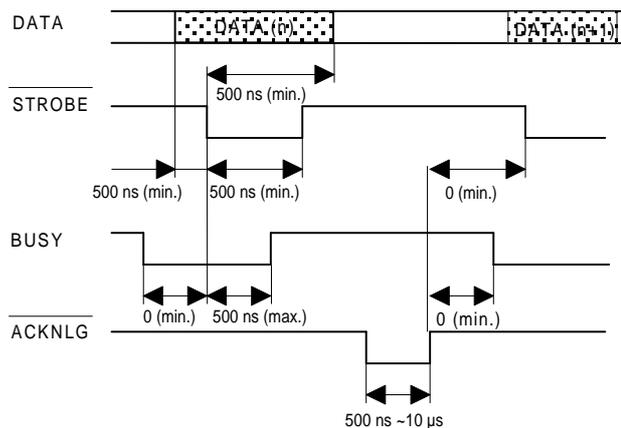
The BUSY signal is set HIGH before either ERROR is set LOW or PE is set HIGH, and BUSY is held HIGH until all these signals return to the inactive state. The BUSY signal goes HIGH in the following cases:

- o During data entry (See Figure 1-4 below.)
- o When the input data buffer is full.
- o When the INIT signal is LOW or during hardware initialization.
- o During a printer error condition (See the ERROR signal description below.)
- o During self-test printing.
- o In default setting mode.
- o When the parallel interface is not selected.

The ERROR signal is LOW when the printer is in one of the following conditions:

- o Printer hardware error (fatal error).
- o Paper-out error.
- o Release lever operation error.

The PE signal is HIGH during a paper-out error.



* : The rise and fall time of every output signal must be less than 120 ns.
The rise and fall time of every input signal must be less than 200 ns.

Figure 1-4. Data Transmission Timing

Table 1-4 shows the connector pin assignments and signals for the forward channel of the parallel interface. Table 1-5 shows this information for the reverse channel.

Table 1-4. Connector Pin Assignments and Signals (Forward Channel)

Pin No.	Signal Name	Return GND Pin	I/O	Description
1	$\overline{\text{STROBE}}$	19	I	Reading of data is performed at the falling edge of this pulse.
2 - 9	DATA 0 - 7	20 - 27	I	Signals DATA0 - DATA7 represent data bits 0 to 7, respectively. Each signal is HIGH when the data is logical 1 and LOW when the data is logical 0.
10	$\overline{\text{ACKNLG}}$	28	O	This signal is a negative pulse indicating that the printer can accept more data.
11	BUSY	29	O	When this signal is HIGH, the printer cannot receive data.
12	PE	28	O	When this signal is HIGH, the printer detects a paper-out error.
13	SLCT	28	O	This signal is always HIGH when the printer is powered on.
14	$\overline{\text{AFXT}}$	30	I	
15	NC	—	—	Not connected.
31	$\overline{\text{INIT}}$	30	I	The falling edge of a negative pulse or a LOW signal on this line causes the printer to initialize. A 50 μs (minimum) pulse is necessary.
32	$\overline{\text{ERROR}}$	29	O	When this signal is LOW, the printer detects an error.
36	$\overline{\text{SLIN}}$	30	I	Not used.
18	Logic H	—	O	Pulled up to +5 V via a 3.9 K Ω resistor.
35	+5 V	—	O	Pulled up to +5 V via a 3.3 K Ω resistor.
17	Chassis GND	—	—	Chassis ground.
16, 33 19 - 30	GND	—	—	Signal ground.
15, 34	NC	—	—	Not used.

Note: The I/O column indicates the direction of the signal as viewed from the printer.

Reverse Channel

Transmission mode:	IEEE-P1284 nibble mode
Adaptable connector:	See the Forward Channel section earlier in this manual.
Synchronization:	Refer to the IEEE-P1284 specification.
Handshaking:	Refer to the IEEE-P1284 specification.
Data transmission timing:	Refer to the IEEE-P1284 specification.
Signal level:	Refer to the IEEE-P1284 specification.
Extensibility request:	The printer responds affirmatively when the extensibility request values are 00H or 04H, as follows: 00H: Request nibble mode reverse channel transfer 04H: Request device ID Return data using nibble mode channel transfer
Device ID:	The printer sends following device ID string when requested:
ESC/P2	00H 36H MFG: EPSON; CMD: ESCPL2-00; MDL: Stylus 1500; CLS: PRINTER;
XL24E	00H 37H MFG: EPSON; CMD: PRPXL24-00; MDL: Stylus 1500; CLS: PRINTER;

Note: 00H denotes a hexadecimal value of zero.

Table 1-5. Connector Pin Assignments and Signals (Reverse Channel)

Pin No.	Signal Name	Return GND Pin	I/O	Description
1	Host Clk	19	I	Host clock signal.
2 - 9	DATA 0 - 7	20 - 27	I	Signals DATA0 - DATA7 represent data bits 0 to 7, respectively. Each signal is HIGH when the data is logical 1 and LOW when the data is logical 0. These signals are used to transfer the extensibility request values (described in IEEE-P1284) to the printer.
10	PtrClk	28	O	Printer clock signal.
11	Ptr Busy / Data Bits 3, 7	29	O	Printer busy signal and reverse channel transfer data bit 3 or 7.
12	Ack Data Req / Data Bits 2, 6	28	O	Acknowledge data request signal and reverse channel transfer data bit 2 or 6.
13	Xflag / Data Bits 1, 5	28	O	X-flag signal and reverse channel transfer data bit 1 or 5.
14	Host Busy	30	I	Host busy signal.
31	$\overline{\text{INIT}}$	30	I	Not used.
32	$\overline{\text{Data Avail}}$ / Data Bits 0, 4	29	O	Data available and reverse channel transfer data bit 0 or 4.
36	1284-Active	30	I	Active signal for IEEE-P1284 mode.
18	Logic-H	—	O	Pulled up to +5 V via a 3.9 K Ω resistor.
35	+5 V	—	O	Pulled up to +5 V via a 3.3 K Ω resistor.
17	Chassis GND	—	—	Chassis ground.
16, 33 19 - 30	GND	—	—	Signal ground.
15, 34	NC	—	—	Not connected.

Note: The I / O column indicates the direction of the signal as viewed from the printer.

1.3.1.2 Optional Interface

The Stylus 1500 supports an optional Type-B interface with the following characteristics:

Reply Message: ESC/P2 is selected:

Main type: MTP48p, PW136c110cpi, PRG(L0xxxx)rev,AP800ma

Product name: Stylus 1500

Emulation type: ESCPL2-00

Entity type: EPSON LQ2

 XL24E is selected:

Main type: MTP48p, PW136c110cpi, PRG(L0xxxx)rev,AP800ma

Product name: Stylus 1500

Emulation type: PRPXL24-00

Entity type: EPSONPRPXL24

1.3.2 Printer Languages and Control Codes

Printer languages and control codes:

- ESC/P2
- IBM 24XL
- EPSON Remote

1.4 OPERATIONS

This section describes the controls, settings, and adjustments used to operate the Stylus 1500.

1.4.1 Control Panel

The control panel for this printer is in the center of the upper case. The panel has 1 lock-type and 6 non-lock-type pushbuttons, and 10 LED indicators for easy operation of the various print functions.

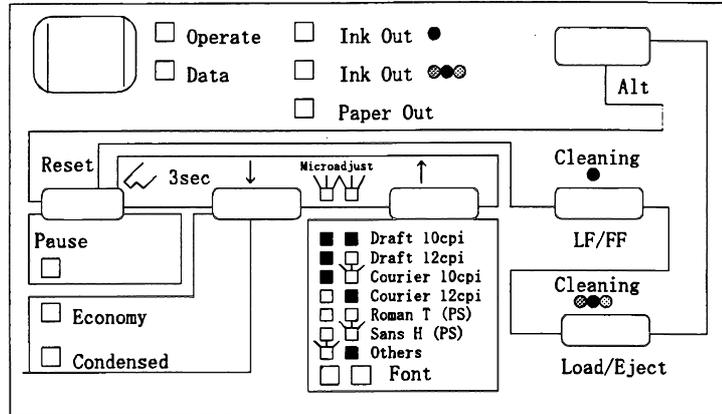


Figure 1-5. Control Panel Appearance

1.4.1.1 Buttons

Power

This button turns the printer on or off.

ATTENTION

The power button controls the secondary power supply circuit. Therefore, the primary circuit is hot after power off. Do not connect the interface cable even if the printer power is off while the AC inlet is connected. Otherwise, the circuit board or interface may be damaged.

Pause

This button alternates between printing and non-printing states when there is data in the print buffer. In the pause state, printing stops but communication with the I/F does not stop. Therefore, even in the pause state, the printer receives data from the host until the input data buffer is full.

- Pressing the Pause button while holding down the Alt button resets the printer.

Alt

This button is usually used with another button.

- o Holding down Alt for 3 seconds moves the printer carriage to the ink cartridge installation position. Pressing Alt again returns the carriage to the home position.

LF/FF

This button feeds one line or a page.

- o Pressing LF/FF while holding down Alt starts the black printhead cleaning cycle.

Economy/Condensed

This button selects economy or condensed printing mode.

Font

This button selects the desired font.

- Pressing Font while holding down Alt starts the color printhead cleaning cycle.

Load/Eject

This button loads and ejects the paper.

1.4.1.2 Indicators**Operate (green)**

Lights when the printer power is on.

Data (orange)

- Lights when there is data in the print buffer.
- Blinks with the Pause LED when an error occurs.

Black Ink Out (red)

Lights when there is no ink in the black ink cartridge, and blinks when the cartridge is low.

Color Ink Out (red)

Lights when there is no ink in the color ink cartridge, and blinks when the cartridge is low.

Paper Out (red)

Lights when the printer is out of paper, and blinks when a paper jam occurs.

Pause (orange)

Lights when printing is paused.

Economy (green)

Lights when economy printing mode is selected.

Condensed (green)

Lights when condensed printing mode is selected.

Font (green)

Shows the selected font.

1.4.2 Panel Functions at Power On

The table below describes the functions performed when the indicated buttons are held down while turning on the printer.

Table 1-6. Panel Functions at Power On

Button	Function at Printer Power On
Alt	Starts demonstration printing.
Economy/Condensed	Enters default setting mode.
Pause	Enters print adjustment mode.
Load/Eject	Starts LQ mode self-test printing.
LF/FF	Starts Draft mode self-test printing.
Alt + Pause	Enters ink smudge prevention mode.
LF/FF + Load/Eject	Enters hex dump mode.
Alt + Economy/Condensed + LF/FF + Pause	Enters reset mode for the EEPROM and Timer IC (for factory and service use only).

Notes: 1. "+" means to press one button while holding down the other button(s).
 2. The EEPROM and Timer IC must be reset only by qualified service personnel.

1.4.3 Printer Conditions and Status

The table below shows how the printer LEDs indicate status and operating conditions.

Table 1-7. Indicator Status

Printer Status	LEDs									
	Power	Data	Ink Out (Black)	Ink Out (Color)	Paper Out	Economy	Condensed	Pause	Font L	Font R
Power on	On	—	—	—	—	—	—	—	—	—
Capping after power off	Blink	—	—	—	—	—	—	—	—	—
Data present	—	On	—	—	—	—	—	—	—	—
Economy mode	—	—	—	—	—	On	—	—	—	—
Condensed mode	—	—	—	—	—	—	On	—	—	—
Pause	—	—	—	—	—	—	—	On	—	—
Micro adjust mode	—	—	—	—	—	—	—	—	Blink	Blink
Draft 10 cpi	—	—	—	—	—	—	—	—	Off	Off
Draft 12 cpi	—	—	—	—	—	—	—	—	Off	On
Courier 10 cpi	—	—	—	—	—	—	—	—	Off	Blink
Courier 12 cpi	—	—	—	—	—	—	—	—	On	Off
Roman T Proportional	—	—	—	—	—	—	—	—	On	On
Sans Serif H Proportional	—	—	—	—	—	—	—	—	On	Blink
Ink sequence	—	—	—	—	—	—	—	Blink	—	—
Ink cartridge change mode	—	—	—	—	—	—	—	Blink	—	—
Paper out	—	—	—	—	On	—	—	—	—	—
Paper jam	—	—	—	—	Blink	—	—	—	—	—
No ink cartridge or ink end (black)	—	—	On	—	—	—	—	—	—	—
Ink level low (black)	—	—	Blink	—	—	—	—	—	—	—
No ink cartridge or ink end (color)	—	—	—	On	—	—	—	—	—	—
Ink level low (color)	—	—	—	Blink	—	—	—	—	—	—
Release lever error	—	Blink	—	—	Blink	—	—	—	—	—
Maintenance request	Blink	Blink	Blink	Blink	Blink	Blink	Blink	Blink	Blink	Blink
EEPROM and timer reset	—	On (for 1 second only)								
Fatal error	—	Blink	—	—	—	—	—	Blink	—	—

Note: “—” means that the indicated printer status does not affect the LED.

1.4.4 Default Settings

This printer has user-selectable default settings to which it refers at initialization. The default settings (and factory settings) are listed in Table 1-8.

1.4.4.1 Setting Method

The method of setting defaults is shown in the flowchart below.

ATTENTION

n Any default value specified is not stored in the EEPROM until the printer is turned off.
n The last default value specified before power-off is stored in the EEPROM.

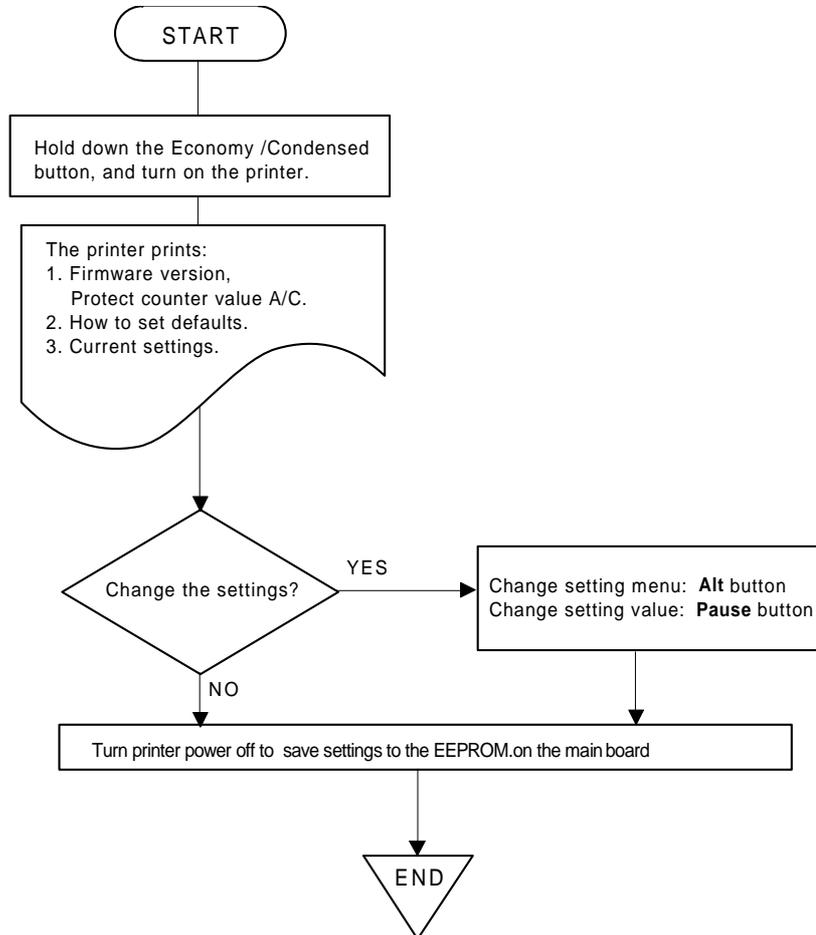


Figure 1-6. Default Setting Flowchart

1.4.4.2 Setting Menus

The default setting menus are described in the table below.

Table 1-8. Default Settings

Menus	Settings (underlines indicate factory default settings)
Print direction *1	<u>Auto</u> / Bi-D / Uni-D
Font	Draft / Roman / Sans Serif / <u>Courier</u> / Prestige / Script / Roman T / Sans Serif H
Pitch	<u>10 cpi</u> / 12 cpi / 15 cpi / 17.1 cpi / 20 cpi / Proportional
<u>I/F mode</u>	Auto / Parallel / Serial
<u>Auto I/F wait mode</u>	10 seconds / 30 seconds
<u>Software</u>	<u>ESC/P2</u> / IBM X24E
Auto CR (IBM mode only)	On / <u>Off</u>
AGM (IBM mode only)	On / <u>Off</u>
Character tables (standard version)	Italic PC 437 PC 850 PC 860 PC 863 PC 865 PC 861 BRASCI I Abicom p Roman 8 ISO Latin 1
Character tables (NLSP version)	Italic PC 437 PC 437 Greek PC 850 PC 853 PC 855 PC 852 PC 857 PC 866 PC 869 MAZOWIA Code MJK ISO 8859-7 ISO Latin 1T Bulgaria Roman 8 PC774 Estonia ISO Latin 1 ISO Latin 2 PC866 LAT
International character set for italic table	<u>Italic U.S.A.</u> Italic France Italic Germany Italic U.K. Italic Denmark Italic Sweden Italic Italy Italic Spain 1
Auto line feed	On / <u>Off</u>
<u>Network I/F mode</u>	Off: Used in standalone environment On: Used in network environment
<u>Zero slash</u>	0 / 0 with slash
<u>Page length for continuous paper</u>	<u>11 inch</u> 12 inch 8.5 inch 70/6 inch Other*2
Skip over perforation	On / <u>Off</u>
Auto tear off	<u>On</u> / Off
Print mode *3	Plain paper (pure black) / Plain paper (composite black) / Exclusive paper / Transparency
Paper roll	On / <u>Off</u>

Notes: *1. Refer to Tables 1-9 and 1-10.

*2. This is selected when a value other than 11, 12, 8.5, or 70/6 inches has been placed in EEPROM by the **ESC |** command.

*3. This mode is provided only for DOS users and is selected according to paper type. Pure black and composite black are selected according to the printed result.

Table 1-9. Print Direction Mode Characteristics

Item	Monochrome Printing	Color Printing
Auto	Throughput and quality is better.	<ul style="list-style-type: none"> • Throughput is better. • Color quality with special paper is worse. (Color correction depends on the printing direction.)
Bi-D	<ul style="list-style-type: none"> • Throughput is best. • Print quality may be down. 	<ul style="list-style-type: none"> • Throughput is better. • Color quality with special paper is worse. (Color correction depends on the printing direction.)
Uni-D	<ul style="list-style-type: none"> • Throughput is worse. • Print quality is better. 	<ul style="list-style-type: none"> • Throughput is worse. • Color quality is best.

Table 1-10. Printing Direction and ESC U Command

Default Setting Mode	Auto			Bi-D			Uni-D		
	ESC U 0	ESC U 1	None	ESC U 0	ESC U 1	None	ESC U 0	ESC U 1	None
Character mode (for DOS)	Auto	Auto	Auto	Bi-D	Uni-D	Bi-D	Uni-D	Uni-D	Uni-D
Raster graphics mode (for Windows)	Bi-D	Uni-D	Auto	Bi-D	Uni-D	Bi-D	Bi-D	Uni-D	Uni-D

Note: Printing direction is controlled by a driver in the Windows environment.

1.4.5 Printer Adjustment Mode

The Stylus 1500 allows the user to adjust the printing direction and head gap without a special program. The following list shows the adjustments for this printer in order:

- Pattern 1 Uni-D adjustment at 400 cps
- Pattern 2 Bi-D adjustment at 100 cps
- Pattern 3 Bi-D adjustment at 200 cps
- Pattern 4 Bi-D adjustment at 400 cps
- Pattern 5 Head gap adjustment (for the black and color printheads in the carriage movement direction at 100 cps)*
- Pattern 6 Head gap adjustment (for the black and color printheads in the carriage movement direction at 200 cps)*
- Pattern 7 Head gap adjustment (for the black and color printheads in the paper feed direction)*

* These adjustments are performed only when the color upgrade kit is installed in the printer.

Adjustment Method

Use the following steps to perform the adjustments:

1. Hold down the Pause button while turning on the power. The printer enters adjustment mode. "Using this mode" and the pattern 1 are printed.
2. Select the number of the most closely aligned columns by pressing the Alt button. The black Ink Out, color Ink Out, and Paper Out LEDs show the line number currently selected. This selection advances once each time the Alt button is pressed, and the three LEDs change their combination of On /Off / Blinking to indicate the selection.
3. Specify the selected number by pressing the Pause button. The selected number is set, and the next pattern is printed.

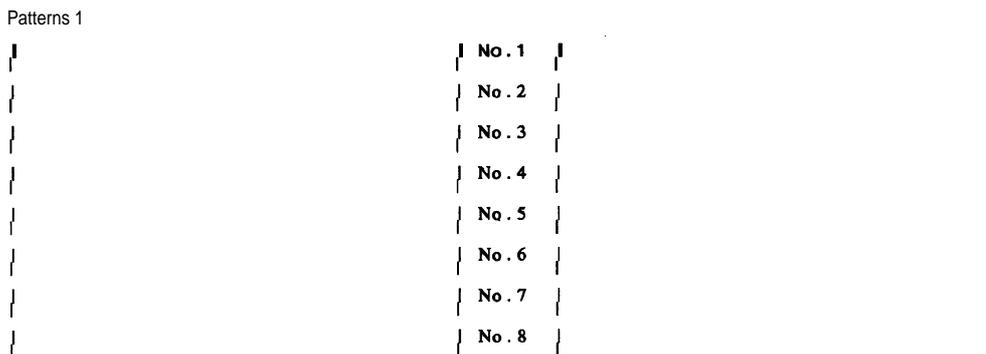


Figure 1-7. Sample Adjustment Pattern

4. Repeat steps 2 and 3 until the pattern No.4 or 7 is printed.

The adjustments are executed in the following order:

- | | |
|-------------|--|
| Pattern 1. | Uni-D adjustment at 400 cps |
| Pattern 2. | Bi-D adjustment at 100 cps |
| Pattern 3. | Bi-D adjustment at 200 cps |
| Pattern 4. | Bi-D adjustment at 400 cps |
| Pattern 5.* | Head gap adjustment (for the black and color printheads in the carriage movement direction at 100 cps) |
| Pattern 6.* | Head gap adjustment (for the black and color printheads in the carriage movement direction at 200 cps) |
| Pattern 7.* | Head gap adjustment (for the black and color printheads in the paper feed direction at 360 dpi.) |

- *: When the optional color kit is not installed, the pattern 4 is the final pattern and the rest adjustments (pattern 5, 6 and 7) are not executed.

ATTENTION

- | |
|--|
| <p>n Any adjustment value specified is not stored in the EEPROM until the printer is turned off.</p> <p>n The last adjustment value specified before power-off is stored in the EEPROM..</p> <p>n Before the whole adjustments are executed, the setting value is not stored in the printer.</p> |
|--|

5. Turn off the power to exit adjustment mode.

1.4.6 Printer Initialization

This printer has three initialization types: hardware, software, and panel.

1. Hardware Initialization

Hardware initialization is performed by turning on the printer or sending the **INIT** signal to the parallel interface. The following functions are executed:

- o The printer mechanism is initialized.
- o The input data buffer is cleared.
- o Downloaded character definitions are cleared.
- o The print buffer is cleared.
- o Default values are set.

2. Software Initialization

Software initialization is performed when the printer receives the **ESC @** command. The following functions are executed:

- o The print buffer is cleared.
- o Default values are set.

Note: The last panel settings are kept after software initialization.

3. Panel Initialization

Panel initialization is performed by pressing the Load/Eject button while holding down the Alt button. The following functions are executed:

- o The input data buffer is cleared.
- o The print buffer is cleared.
- o Default values are set.

Note: The last panel settings are kept after panel initialization.

1.4.7 Monochrome Printing Mode

This printer has a monochrome printing function that allows printing to continue with black ink when the color ink cartridge is out or the color upgrade kit is not installed. This function is selected by the printer driver setting. To enter monochrome printing mode, turn the Power button off and back on again.

- Notes:**
1. Once the printer has entered this function, print data must be resent.
 2. The color select command (**ESC r**) is ignored.

1.5 PAPER SPECIFICATIONS

1.5.1 Paper Type Specifications

1. Cut Sheets

Table 1-11. Cut Sheet Specifications

Size	A4: 210 mm (8.3") × 297 mm (11.7") Letter: 215.9 mm (8.5") × 279.4 mm (11.0") B5: 182 mm (7.2") × 257 mm (10.1") Legal: 215.4 mm (8.5") × 355.6 mm (14.0") B4: 257 mm (10.1") × 364 mm (14.3") A3: 297 mm (11.7") × 420 mm (16.5") Ledger: 279.4 mm (13.0") × 431.8 mm (17.0") A3 wide: 329 mm (13.0") × 483 mm (19.0") B3: 364 mm (14.3") × 514 mm (20.2") A2: 420 mm (16.5") × 594 mm (23.4") US C: 431.8 mm (17.0") × 558.8 mm (22") B5 (ISO) 176 mm (6.9") × 250 mm (9.8") B4 (ISO) 250 mm (9.8") × 353 mm (92.6")
Thickness	0.065 mm (0.0025") - 0.11 mm (0.004")
Weight	ASF: 64 g/m ² (17 lb) - 90 g/m ² (24 lb) Manual Insertion: 52 g/m ² (14 lb) - 90 g/m ² (24 lb)
Quality	Exclusive paper, bond paper, PPC, glossy paper

Note : The designated face must be used when printing on exclusive paper.
 : A2 portrait, US-C portrait are used by manual insertion only.

2. Transparencies

Table 1-12. Transparency Specifications

Size	A4: 210 mm (8.3") × 297 mm (11.7") Letter: 215.9 mm (8.5") × 279.4 mm (11.0")
Thickness	0.075 mm (0.003") - 0.085 mm (0.0033")

Notes: 1. Printing on transparencies is supported only at normal temperatures.
 2. The designated face must be used when printing on exclusive paper.

3. Envelopes

Table 1-13. Envelope Specifications

Size	No. 10: 241.3 mm (9.5") × 104.8 mm (4.125") DL: 220 mm (8.7") × 110 mm (4.3") C5: 229 mm (9") × 162 mm (6.4")
Thickness	0.16 mm (0.006") - 0.52 mm (0.02")
Weight	45 g/m ² (12 lb) - 90 g/m ² (24 lb)
Quality	Exclusive paper, bond paper, PPC, glossy paper

Notes: 1. Printing on envelopes is supported only at normal temperatures.
 2. When inserting envelopes, keep the longer side horizontal.
 3. When printing on envelopes, set the adjust lever to the proper position. (Refer to Section 1.5.3, Adjust Lever Position.)

4. Index Cards

Table 1-14. Index Card Specifications

Size	A6: 105 mm (4.1") × 148 mm (5.8")
Thickness	0.23 mm (0.0091") and less

Note: When printing on index cards, set the adjust lever to the proper position. (Refer to Section 1.5.3, Adjust Lever Position.)

5. Labels (Cut Sheet)

Table 1-15. Label (Cut Sheet) Specifications

Size	A4: 210 mm (8.3") × 297 mm (11.7") Letter: 215.9 mm (8.5") × 279.4 mm (11.0")
Thickness	0.2 mm (0.0079") and less (base sheet and label)
Quality	Page printer label

Note: Printing on cut-sheet labels is supported only at normal temperatures.

6. Continuous Paper

Table 1-16. Continuous Paper Specifications

Size	Width: 101.6 mm (4") – 406.4 mm (16") Folding length: 220 mm (8.7") – 110 mm (4.3")
Thickness	0.065 mm (0.0026") - 0.1 mm (0.0039")
Weight	52 g/m ² (14 lb) - 82 g/m ² (22 lb)

7. Labels (Continuous Paper)

Table 1-17. Label (Continuous Paper) Specifications

Size (base paper)	Width: 101.6 mm (4") - 406.4 mm (16") Folding length: 101.6 mm (4")
Size (label)	Width: 63.5 mm (2.5") Folding length: 23.9 mm (0.94")
Thickness (base paper + label)	0.2 mm (0.0079") (The height from the base sheet to the label face is 0.12 mm or less.)
Thickness (label)	0.12 mm (0.0047")
Quality	Plain paper

Note: Printing on continuous-paper labels is supported only at normal temperatures.