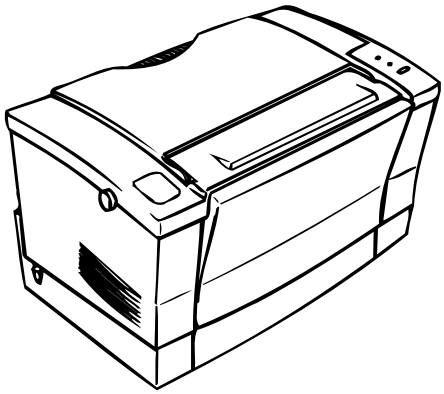
EPSON TERMINAL PRINTER

EPL-5500W

SERVICE MANUAL



EPSON

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NOTICE

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

All efforts have been made to ensure the accuracy of the contents of this manual. However, should any errors be detected, SEIKO EPSON would greatly appreciate being informed of them.

The above notwithstanding SEIKO EPSON can assume no responsibility for any errors in this manual or the consequence thereof.

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General Notice: Other product names used herein are for identication purposes only and may be trademarks of their respective campanies.

PRECAUTIONS

Precautionary notations throughout the text are categorized relative to 1) personal injury and 2) damage to equipment.

DANGER Signals a precaution which, if ignored, could result in serious or fatal personal injury. Great caution should be exercised in performing procedures preceded by DANGER Headings.

WARNING Signals a precaution which, if ignored, could result in damage to equipment.

The precautionary measures itemized below should always be observed when performing repair/ maintenance procedures.

DANGER

1. ALWAYS DISCONNECT THE PRODUCT FROM BOTH THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURE.

2. NO WORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.

3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS.

WARNING

1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.

2. MAKE CERTAIN THAT THE SOURCE VOLTAGE IS THE SAME AS THE RATED VOLTAGE, LISTED ON THE SERIAL NUMBER/RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.

3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS.

4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.

5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS BY THE MANUFACTURE; INTRODUCTION OF SECOND-SOURCE ICs OR OTHER NONAPPROVED COMPONENTS MAY DAMAGE THE PRODUCT AND VOID ANY APPLICABLE EPSON WARRANTY.

SAFETY INFORMATION

This printer is a page printer which operates by means of a laser. There is no possibility of danger from the laser, provided the printer is operated according to the instructions in this manual provided.

Since radiation emitted by the laser is completely confined within protective housings, the laser beam cannot escape from the machine during any phase of user operation.

For United States Users;

[Laser Safety]

This printer is certified as a Class 1 Laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

[CDRH Regulations]

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. Compliance is mandatory for products marketed in the United States. The label shown below indicates compliance with the CDRH regulations and must be attached to laser products marketed in the United States.

WARNING : Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

[Internal Laser Radiation]

Maximum Radiation Power: 5.0×10^{-4} (W)
Wave Length: 790 $\pm$ 20 nm

This is a Class IIIb Laser Diode Assay that has an invisible laser beam. The print head unit is NOT A FIELD SERVICE ITEM. Therefore, the print head unit should not be opened under any circumstances.

For Other Countries Users;

WARNING: Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

This is a semiconductor laser. The maximum power of the laser diode is 5.0×10^{-4} W and the wavelength is 790 $\pm$ 20 nm.

For Denmark Users;

ADVARSEL
Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.

Klasse 1 laser produkt der opfylder IEC825 sikkerheds kravene.

For Finland, Sweden Users;

VAROITUS
Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteiylle.

VARNING
Om apparaten används på annat sätt än i denna bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laser klass 1.

For Finland, Sweden Service People

VAROITUS
Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle laser-säteilylle. Älä katso säteeseen.

VARNING
Osynlig laserstrålning när denna del är öppnad och spärren är urkopplad. Betrakta ej strålen.

For Norway Users;

ADVARSEL
Dersom apparatet brukes på annen måte enn spesifisert i denne bruksanvisning, kan brukeren utsettes for unsynlig laserstråling som overskrider grensen for laser klasse 1.

Dette er en halvleder laser. Maksimal effeckt til laserdiode er 5.0×10^{-4} W og bølgelengde er 790 ± 20 nm.

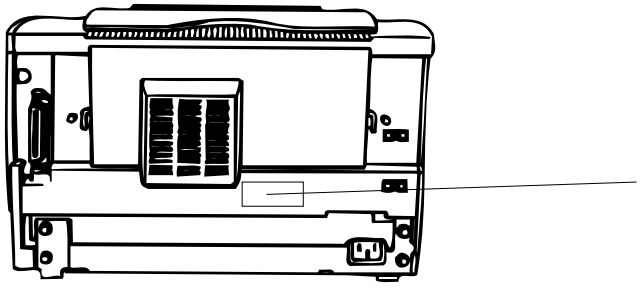
Laser Safety Labels

[Label on rear printer case]

A laser safety labels is attached on the outside of the printer shown below.

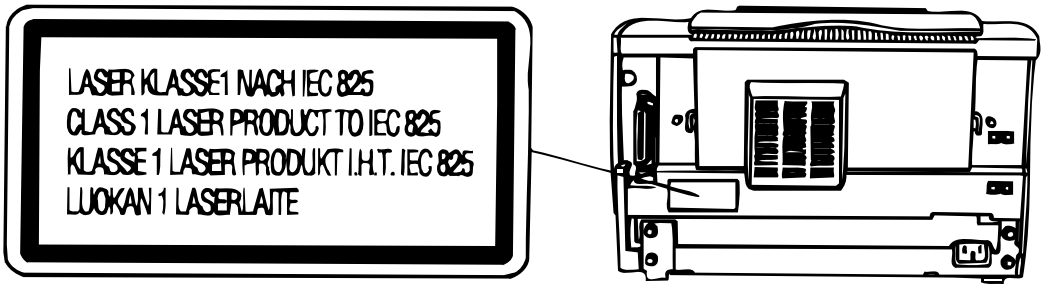
For United State

For Europe



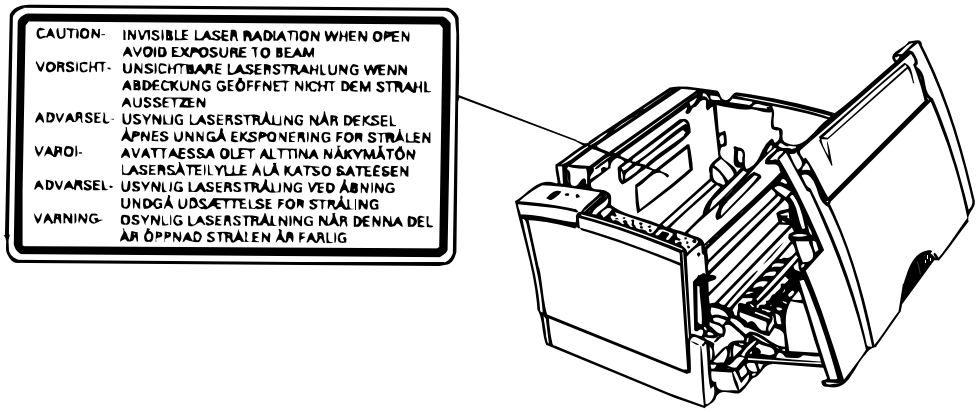
This laser product conforms to the applicable requirement of 21 CFR Chapter I, subchapter J.
SEIKO EPSON CORP.
Hirooka Office
80 Hirooka, Shiojiri-shi, Nagano-ken, Japan
MANUFACTURED:

[Label inside printer]



The following laser safety label will be attached inside the printer as shown below.

For Denmark, Finland, Sweden, and Norway



PREFACE

This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of EPL-5500W.
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.

REVISION SHEET

Revision	Issue Date	Revision Page
Rev. A	November 24, 1995	1st issue

TABLE OF CONTENTS

Chapter 1 General Description

Table of Contents

List of Figures

List of Tables

1.1 FEATURES

The EPSON® EPL-5500W laser printer has a 300/600 dots per inch (dpi) resolution and 6 pages per minute (ppm) printing speed in a dedicated Microsoft® Windows® Printing System. It works under Microsoft Windows 3.1x and Windows 95, achieving very high performance due to the recent advances in PC technology. The main features are:

- ❑ No ozone
- ❑ Printing speed — 6 ppm
- ❑ Resolution — 600/300 dpi
- ❑ Light weight — about 5 kg (11 lb)
- ❑ Small footprint
- ❑ Low running cost: separation of the development/toner cartridge and photoconductor unit
- ❑ Ease of use with Microsoft Windows Printing System (WPS)
- ❑ PCL4 software emulation mode
- ❑ High throughput, especially with fine-pitch halftone image output
- ❑ Freedom from the memory overflow
- ❑ Freedom from document incompatibility, True WYSIWYG
- ❑ Bidirectional parallel interface (ECP and Microsoft Peppy modes)
- ❑ Achieves high throughput with a very high-speed parallel interface. Maximum transmission speed is approximately 2 MB/sec. (under ECP mode) or 600 KB/ sec. (under Peppy mode).

Figure 1-1 shows an exterior view of the EPL-5500W.

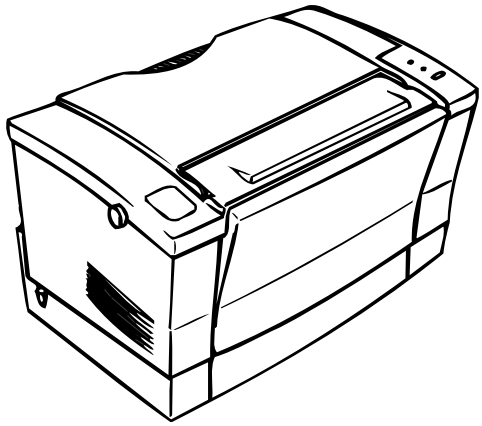


Figure 1-1. Exterior View of the EPL-5500W

Table 1-1 lists the optional units available for the EPL-5500W.

Table 1-1. Options for the EPL-5500W

Cat. No.	Description	Note
S050005	Developer cartridge	Developer and toner cartridge
S051029	Photoconductor unit	—

1.2 SPECIFICATIONS

This section provides statistical data for the EPL-5500W.

1.2.1 Basic Specifications

Printing method: Laser beam scanning and dry electrophotography

Resolution: 600/300 dpi

Printing speed: 6 ppm (letter/A4)

First printing time (A4/LT): Less than 20 seconds (face-up output)

Warm-up time: Less than 35 seconds
(at rated current and 23° C (73° F) temperature)

Paper supply: See Table 1-2.

Table 1-2. Paper Feed Methods

Paper Supply	Capacity Using 20 lb. (75 g/m^2) Paper	Paper Sizes	Usage Thickness (Ream Weight)
Standard built-in paper tray	150	B5, A4, LT, EXEC, LGL	16 to 24 lb. (60 to 90 g/m^2)
	5 to 10	Monarch, DL, C5, Env #10, 11, 12, 14	Envelopes made of 20 to 24 lb. (75 to 90 g/m^2) paper
Manual feed slot	1	Any size feedable (Note 2)	16 to 42 lb. (60 to 157 g/m^2)

Notes:

1. The weight in pounds (lb) is determined by the weight of 500 sheets cut to 17 × 22 inches; 1 g/m^2 = 0.2659763 lb.
2. Paper size range: width 3 to 8.5 inches (76 to 216 mm)
   length 5 to 14.0 inches (127 to 356 mm)

Paper types: See Table 1-3.

Table 1-3. Paper Types

Standard paper	Xerox® 4024 DP paper 20 lb (75 g/m^2)
Normal paper	Regular photocopier paper Bond paper Recycled paper 16 to 24 lb (60 to 90 g/m^2)
Special papers	Card stock (90 to 157 g/m^2) Envelopes Labels Letterhead Transparency (OHP) sheets Colored paper

Usability of special papers: See Table 1-4.

Table 1-4. Usability of Special Papers

Input	OHP	Envelopes	Labels	Card Stock	Letterhead
Standard built-in paper tray	P	P	P	P	R
Manual feed slot	P	P	P	P	R

R: Reliable feeding and good image quality.
P: Possible, but better avoided.
N: Not supported.

Paper feed alignment and direction: Center alignment for all sizes

Paper ejection: Face down

Output tray capacity: 100 sheets (face down)

Printable area (standard paper): See Figure 1-2.

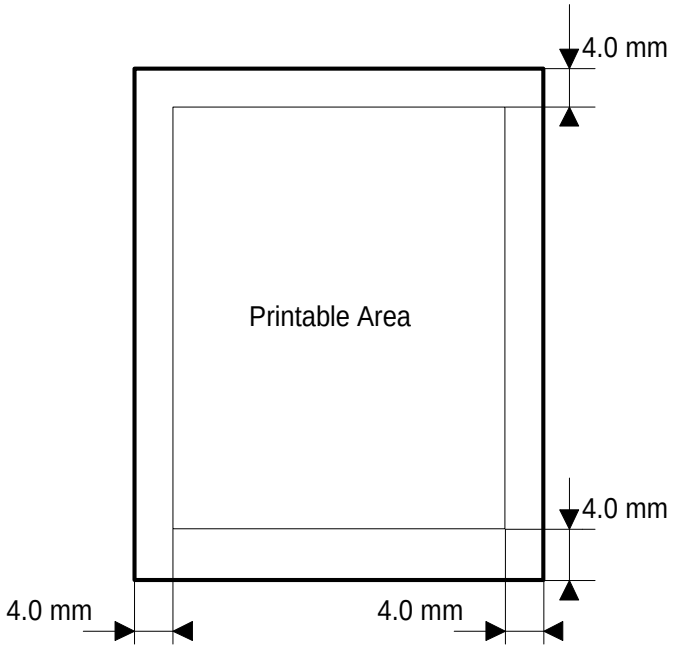


Figure 1-2. Printable Area

Note: The actual printable area depends on the printer mode.

Noise: Less than 35 dB(A), standby
Less than 47 dB(A), operating

Ozone density: Less than 0.01 ppm

Toxicity: No toxicity exists in organic photoconductor (OPC), toner, or plastic materials

1.2.2 Electrical Specifications

Table 1-5. Electrical Requirements and Ranges

Description	100 V Version	200 V Version
Rated voltage	100 ~ 120 VAC	220 ~ 240 VAC
Input voltage range	90 ~ 132 VAC	198 ~ 264 VAC
Rated frequency range	50 ~ 60 Hz	
Input frequency range	47 ~ 63 Hz	
Power consumption	Less than 500 W	Less than 600 W
Power consumption while in standby mode	Less than 15 W (without option)	

1.2.3 Reliability Specifications

MPBF (Mean Prints Between Failures): Over 25,000 sheets

Note: MPBF indicates the average number of pages printed before an occurrence of a problem requiring replacement or service.

MTBF (Mean Time Between Failures): 3000 power on hours (POH)
Jam rate: 1 out of 2,000 sheets or less (excluding multiple-sheet feeding)
Feed failure: 1 out of 2,000 sheets or less (excluding multiple-sheet feeding)
Multiple paper feeds: 1 out of 500 sheets or less
Paper curl height: 30 mm (1.2 inches) or less
Leading edge bending (1 cm or more): 1 out of 1,000 sheets
MTTR (Mean Time To Repair): 30 minutes or less
Durability: 5 years or 1,800,000 sheets

1.2.4 Environmental Conditions for Operation (Including Imaging Cartridge)

Temperature:	10 to 35° C (50 to 95° F)
Humidity:	15 to 85% RH
Altitude:	2,500 m (8,200 feet) or lower
Levelness:	1°
Illuminance:	3,000 lux or less (Must not be exposed to direct sunlight.)
Surrounding space:	Printer should have at least 100 mm (4") of clearance on its sides and rear.

1.2.5 Environmental Conditions for Storage and Transportation

Temperature:	0 to 35° C (32 to 95° F)
Humidity:	30 to 85% RH
Drop test:	Clear to JIS Z0200-1987 Level 1
Vibration:	Vibration frequency 5 to 100 Hz and 100 to 5 Hz Acceleration 1 G Acceleration direction 3 directions
Resistance to atmospheric pressure:	More than 61.3 KPa
Storage life:	18 months (following date of manufacture)

1.2.6 Applicable Standards

Safety Standards

120 VAC model:	UL 1950, CSA 22.2 No. 950 Deviation 3
220/240 VAC model:	EN 60950 (IEC950), NEMKO (IEC950), SETI (IEC950), SEMKO (IEC950), DEMKO (IEC950)

Safety Regulations (Laser Radiation)

120 VAC model:	FDA (NCDRH) Class 1
220/240 VAC model:	VDE 0837 (Laser Class 1) (IEC825), SETI (IEC825), SEMKO (IEC825), DEMKO (IEC825)

EMI

120 VAC model:	FCC Part 15 Subpart B Class B, DOC Class B
220/240 VAC model:	Vfg 243 (VDE 0878 Part 3,30) EN55022 Class B (CISPR Pub. 22 Class B) CE marking, EMC

Others

Toner:	No effect on human health (OSHA-TSCA, EINECS)
OPC:	No effect on human health (OSHA)
Ozone:	Less than 0.01 mmp other UL478 (5th edition)
Materials:	SWISS environmental law (must contain no CdS)

1.2.7 Specifications for Consumables

Life:	Developer and toner cartridge: 3,000 pages Photoconductor unit: 20,000 pages

Note: In continuous printing mode with A4/letter paper at a 5% image ratio (black/white ratio). The life varies, depending on the printing mode (continuous or intermittent) and/or the image ratio.

Environmental Conditions for Storage and Transportation

Temperature:	0 to 35° C (32 to 95° F)
Humidity:	30 to 85% RH
Drop test:	Height 76 cm (30.4 inches)
Vibration:	Same as printer
Resistance to atmospheric pressure:	More than 74 Kpa
Storage term:	18 months (following date of manufacture)

1.2.8 Physical Specifications

Dimensions (Width × Depth × Height):

Printer:	352 × 264 × 299 mm (13.9 × 10.4 × 11.8 inches)
Weight:	Approx. 5 kg (11 lb), with consumables, excluding all options

1.2.9 Software Specifications

Built-in modes:	Microsoft Windows Printing System PCL4 (software emulation)

1.3 INTERFACE SPECIFICATIONS

The EPL-5500W is equipped with the following external interfaces:

- ❑ Parallel interface

1.3.1 Parallel Interface

The parallel interface has the following two modes:

- ❑ ECP mode
- ❑ Microsoft Peppy mode

Pin assignments:	Fully IEEE-1284 compliant
Connector type:	P90-25027-1 (Amphenol) receptacle
Applicable plug:	57-30360 (Amphenol or equivalent)

1.4 OPERATING INSTRUCTIONS

This section describes printer functions, including control panel operation and messages.

1.4.1 Control Panel

The printer control panel gives you easy control over most common printer operations. The panel consists of the indicator lights described below.

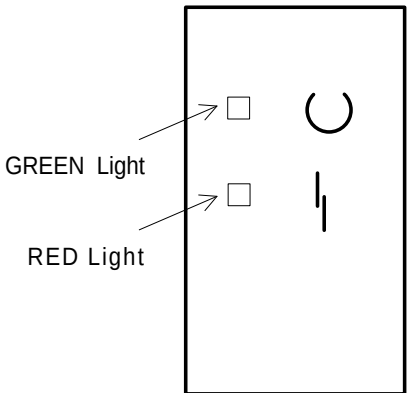


Figure 1-3. Control Panel

Indicator Lights

❑ GREEN light

ON: Printer is ready or idle.

Blinking: Printer is currently receiving data.

❑ RED light

ON: Printer has detected errors.

1.4.2 Display of Messages

This printer indicates two types of messages with the status message window for the printer driver on the PC.

1.4.2.1 Status Messages

This section describes the status messages.

Table 1-6. Status Messages

Message	Status
Printer ready	Printer is ready.
Printing	Printer is printing.
Manual feed	Printer is loading paper from manual feed slot.
Paused	Printer is in pause mode.
Printing stopped	Printer is stopping during printing of a job.
Please wait	Printer is in the wait condition.
Paused printer warming up	Printer is warming up.
Printer warming up	Printer is warming up.

1.4.2.2 Error Messages

This section describes error messages, what they indicate, and what measures to take to eliminate the error.

Table 1-7. Error Messages

Message	Status	Measures
Configuration error	The user is unable to redirect a port, or system software cannot find a file to complete a request.	Check the printer connection port, and reinstall the driver.
Low memory	Memory in PC has run out.	Add the memory to the PC.
No local printer	The printer is not connected to the local port when you are using PCL emulation.	PCL emulation does not support a network.
Status not available	The printer does not return status information.	Check the printer connection.
Check printer/ cable	The printer does not return status information.	Check the printer connection.
Service error	Printer is damaged.	Service required.
Clear paper jam	A paper jam occurred.	Open the cover and remove the jammed paper. Then close the cover.

Table 1-7. Error Messages (Continued)

Message	Status	Measures
Check Toner & Cover	Printer is cover open or no toner cartridge is installed.	Check the cover and toner cartridge.
Wrong paper loaded	Paper in the tray to be fed into the printer is different from the specified paper size.	Check the paper size.
Change paper	Paper settings are wrong.	Check the paper size settings.

1.4.3 Printing Resolution Host PC Capability Dependency

This printer driver calculates the host PC's capability every time Windows starts up, and the driver drops the printing resolution at the beginning of each job automatically if the value it detects will not allow complete printing at the resolution the user has set. This printer can print pages at the resolution if the HOST PC fulfill the following conditions.

Table 1-8. Host PC Conditions

CPU	Installed DRAM Quantity			
	Windows 3.1, WFW 3.11		Windows 95	
	< 8 MB	≥ 8 MB	< 8 MB	≥ 12 MB
80386SX 16/20/25/33 MHz or compatibles	300 DPI (Note 1)	300 DPI (Note 1)	—	—
80386DX 16/20/25/33 MHz or compatibles	300 DPI (Note 1)	300 DPI (Note 1)	300 DPI (Note 1)	300 DPI (Note 1)
80486SX/DX 16/20 MHz or compatibles	300/600 DPI (Note 2)	300/600 DPI (Note 2)	300/600 DPI (Note 2)	300/600 DPI (Note 2)
80486SX/DX 25/33/50 MHz 80486DX2 50/66 MHz 80486DX4 75/100 MHz Pentium 60/66/75/90/100 120/133 MHz	300/600 DPI (Note 2)	300/600 DPI	300/600 DPI (Note 2)	300/600 DPI

Note 1: Some pages may be not be printed completely, depending on complexity of those pages.

Note 2: Some pages may not be printed at 600 DPI depending on complexity of those pages.

1.5 MAIN COMPONENTS

To simplify maintenance and repair, the main components of the EPL-5500W have been designed for easy removal and replacement. The main components are:

- ❏ C180 MAIN Board — Main board
- ❏ PWB-E Board — Power supply circuit board
- ❏ PWB-F Board — High-voltage supply circuit board
- ❏ Optical Unit — Printhead unit
- ❏ Fusing Unit
- ❏ Photoconductor unit
- ❏ Developer cartridge
- ❏ Housing

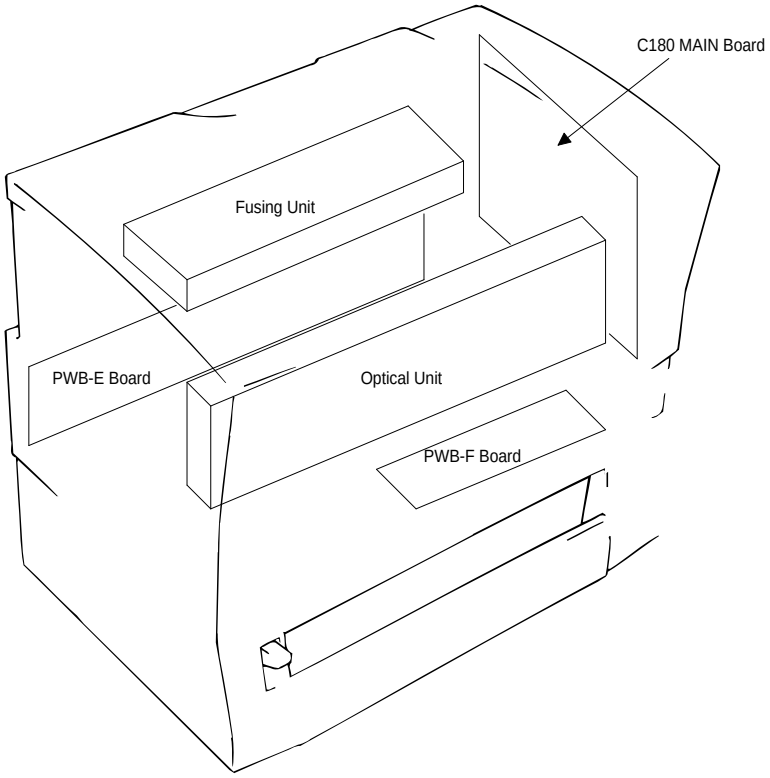


Figure 1-4. Main Components

1.5.1 C180 MAIN Board

The C180 MAIN board contains a parallel interface controller and engine controller board. The primary functions of this board are receiving print data from the host and sending the print image to the engine controller via the video interface.

- ❏ Memory chips

  4M-bit DRAM (U4)

- ❏ Custom ICs

  ASIC E05B23 (U6)

The engine controller consists of an M3807 x 8-bit CPU, including a MASK ROM. It controls laser scanning (the polygon mirror drive motor), image synchronization, laser beam pulse width, and power.

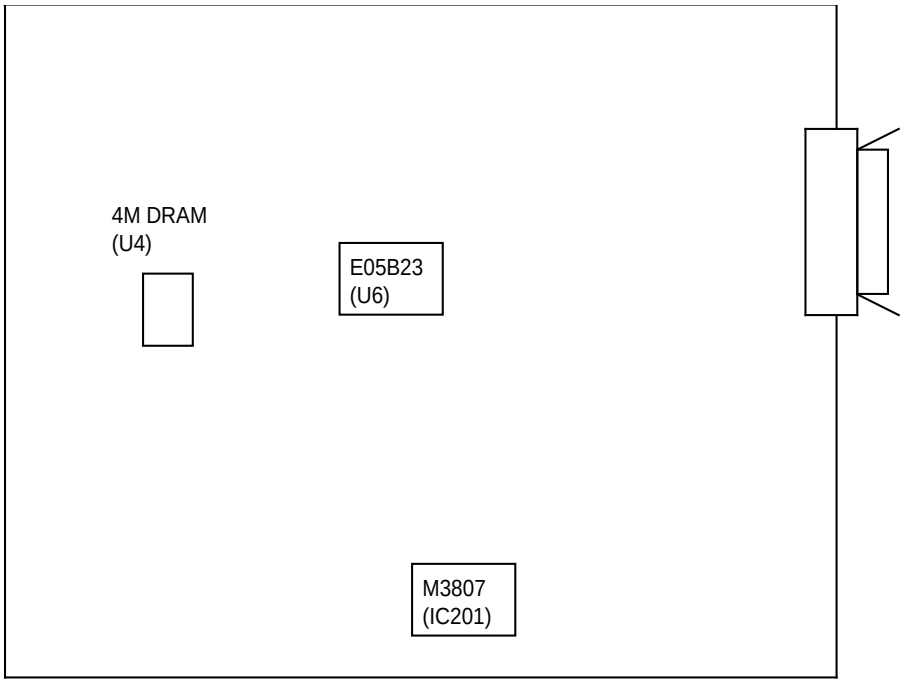


Figure 1-5. C180 MAIN Board

1.5.2 PWB-E Board

The PWB-E is the power supply board, which consists of a switching regulator circuit. It converts the AC line voltage into +24 V and +5 VDC voltages. There are two types of power supply board, the 100/120 V type and 220/240 V type. The difference between the two circuits is only in the input section.

CAUTION

Do not touch VR1 on PWB-E board. This volume is for factory setting only.

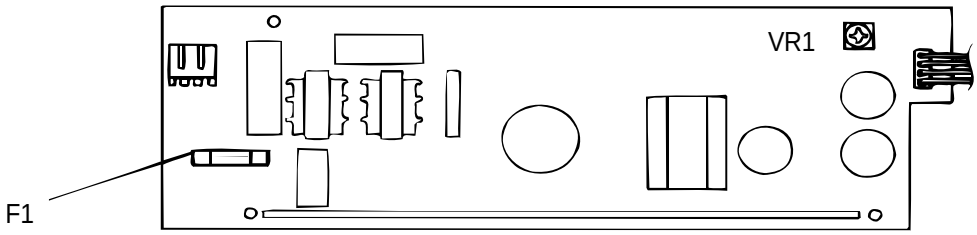


Figure 1-6. PWB-E Board

1.5.3 PWB-F Board

The PWB-F is the high-voltage supply circuit board. It converts the development bias, OPC drum charge bias, and image transfer bias.

CAUTION

Do not touch VR3 on the PWB-F board. These volumes are for factory setting only.

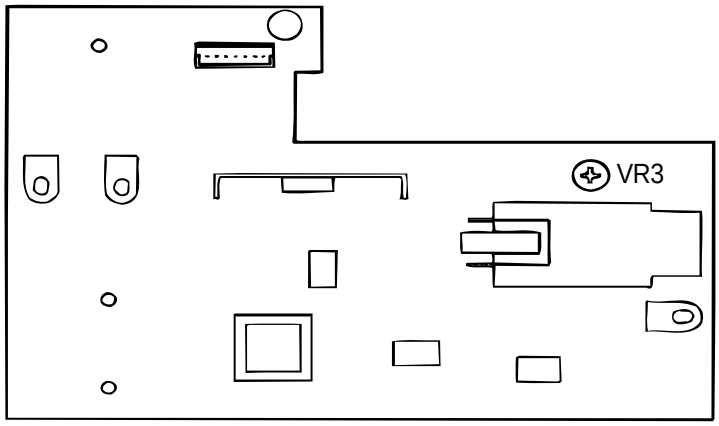


Figure 1-7. PWB-F Board

1.5.4 Optical Unit

The optical unit consists of the laser diode (semi-conductor laser), the mirror motor (scanner motor) which drives the polygon mirror for laser scanning, and several mirrors and lenses. The laser beam generated by the laser diode is conducted to the OPC drum surface by way of the polygon mirror, as well as several mirrors and lenses, to create a latent electro-photographic image on the drum.

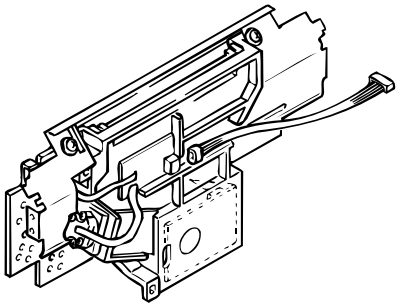


Figure 1-8. Optical Unit

1.5.5 Fusing Unit

The fusing unit fixes the toner to the paper using heat and pressure. This unit has a heater lamp, thermistor, and thermal fuse. There are two types of fusing units, the 120 V type and the 220/240 V type. The only difference between them is the heater lamp.

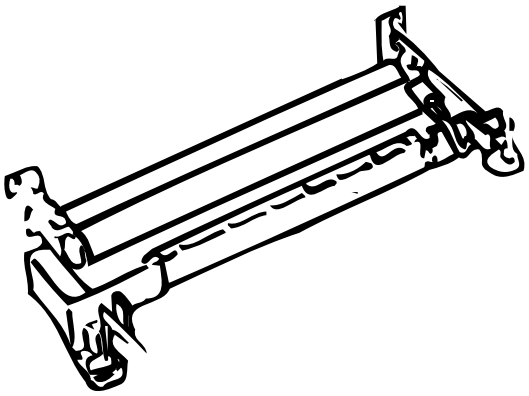


Figure 1-9. Fusing Unit

1.5.6 Photoconductor Unit

Core mechanisms of the printing process, such as charging and imaging, are integrated into this unit.

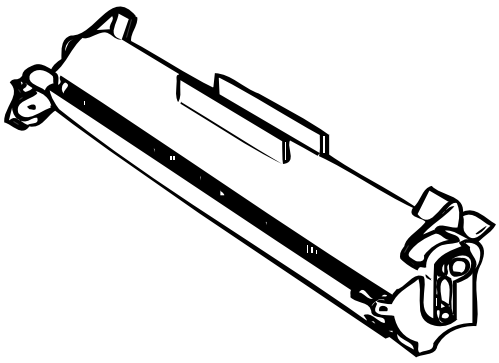


Figure 1-10. Photoconductor Unit

1.5.7 Developing Cartridge

The developing mechanism for the printing process is integrated into this cartridge.

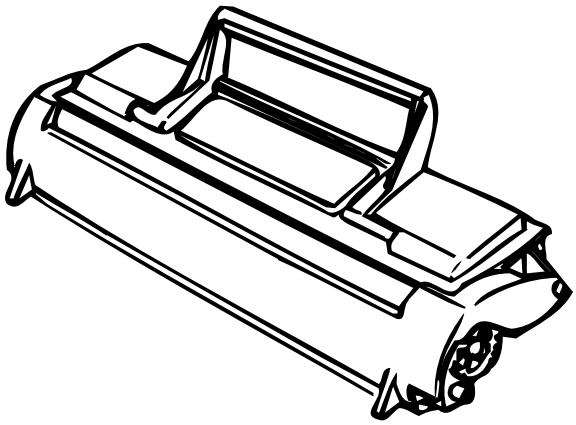


Figure 1-11. Developing Unit

Chapter 2 Operating Principles

Table of Contents

List of Figures