2. Product spec and feature

2.1 Product Specifications

2.1.1 Product Overview

ML- 1915 / 2525 / 2525W

ML- 1910 / 2580N

1. Speed
   - ML- 2525/2525W/2580N : 24 ppm in A4
   - ML- 1910/1915 : 18 ppm in A4

2. Printing Resolution
   - Max. 1200x600 dpi effective output (ML-1910/1915/2525)
   - Max. 1200x1200 dpi effective output (ML-2525W/2580N)

3. Processor
   - Jupiter4e 150 Mhz
   - Chorus3 360 Mhz (Only 2525W, 2580N)

4. Printer Language Emulations
   - SPL , PCL6 (Only 2580N)

5. Memory
   - 8 MB
   - 64 MB (Only 2580N)

6. Interfaces
   - One USB port
   - One 10/100 BaseT network connector (2580N)
   - One IEEE 802.11 b/g wireless LAN (2525W)

7. Control Panel
   - No LCD, 3 keys and 2 LEDs
   - No LCD, 2 keys and 3 LEDs (only 2525W)

8. Toner cartridge
   - Initial : 0.7K (1910/ 1915)
     1K (2525/2525W/2580N)
   - Sales : 1.5K / 2.5K two types

9. Color
   - There are two kinds of colors. (Gray and Black)

2.1.2 Specifications

• Product Specifications are subject to change without notice. See below for product specifications.

2.1.2.1 General Print Engine

Items		ML-1910 / 1915	ML-2525 / 2525W / 2580N
Engine Speed	Simplex	Up to 18 ppm in A4 (19 ppm in Letter)	Up to 24 ppm in A4 (24 ppm in Letter)
	Duplex	Manual	Manual
Warmup time	From Sleep	30 sec	30 sec
FPOT	From Ready	10 sec	9 sec
	From Sleep	less than 28 sec	less than 19 sec
Resolution	-	Up to 1,200 x 600 dpi effective output	- 2525 Up to 1200 x 600 dpi effective output - 2525W/2580N Up to 1200 x 1200 dpi effective outpu

2.1.2.2 Controller & S/W

Items		ML-1910 / 1915	ML-2525 / 2525W / 2580N
Processor		Jupiter4e 150 MHz	- 2525 : Jupiter4e 150 MHz - 2525W/2580N : Chorus3 360 MHz
Memory	Std.	8 MB	- 2525 : 8 MB - 2525W/2580N : 64 MB
	Option	N/A	N/A
Printer Languages	-	SPL(Samsung Printer Language)	- 2525/2525W : SPL(Samsung Printer Language) - 2580N : SPL, PCL6, IBM ProPrinter, EPSON
Fonts	-	Windows Fonts	- 2525/2525W : Windows Fonts - 2580N : 45 scalable, 1 bitmap, 136 PostScript3 fonts
Driver	Default Driver	SPL	SPL
	Install	SPL	- 2525/2525W : SPL - 2580N : SPL, PCL6
	Supporting OS	Windows 2000/XP(32/64bits)/ Vista(32/64bits)/2003 Server(32/64bits)/ 2008 Server(32/64bits)	Windows 2000/XP(32/64bits)/ Vista(32/64bits)/2003 Server(32/64bits)/ 2008 Server(32/64bits)
		Various Linux OS: - Red Hat 8~9, - Fedora Core 1~4 - Mandrake 9.2~10.1 - SuSE 8.2~9.2 Mac OS 10.3~10.6	Various Linux OS: - Red Hat 8~9, - Fedora Core 1~4 - Mandrake 9.2~10.1 - SuSE 8.2~9.2 Mac OS 10.3~10.6
	WHQL	Windows 2000/XP(32/64bits)/ Vista(32/64bits)/2003 Server(32/64bits)/2008 Server(32/64bits)	Windows 2000/XP(32/64bits)/ Vista(32/64bits)/2003 Server(32/64bits)/2008 Server(32/64bits)
	Compatibility	Win 2000/XP(32/64bits)/2003 Server/ Vista(32/64bits),2008 Server(32/64bits)	Win 2000/XP(32/64bits)/2003 Server/ Vista(32/64bits),2008 Server(32/64bits)

Items		ML-1910 / 1915	ML-2525 / 2525W / 2580N
Wired Network	Protocol	N/A	TCP/IP, Ethertalk, SNMP, HTTP 1.1 (Only 2580N)
	Supporting OS	N/A	Windows NT4.0/2000/XP(32/64bits)/ 2003 Server(32/64bits)/ Vista(32/64bits)/2008 Server(32/64bits) Mac OS 8.6~9.2, 10.1~10.4 Various Linux OS including Red Hat 8~9, Fedora Core 1~4, Mandrake 9.2~10.1, and SuSE 8.2~9.2 NetWare 5.x, 6.x (TCP/IP Only) Unix HP-UX
Wireless Network	Protocol	N/A	
	Supporting OS	N/A	
Application	Smart Panel	SmartPanel for Windows/ Macintosh/ LINUX	SmartPanel for Windows/ Macintosh/ LINUX
	Printer Setting	N/A	PSU for Windows/ Macintosh/LINUX (Only 2580N)
	Network Management	N/A	SyncThru Web Admin Service 4.5 (Only 2580N)
	IP Setting	SetIP	SetIP
Interface			
Parallel	-	N/A	N/A
USB	-	Compatible with USB 2.0	Hi-Speed USB 2.0
Wired Network	-	N/A	Ethernet 10/100 Base TX (Internal) : Only 2580N
Wireless Network	-	N/A	N/A
User Interface			
LCD	-	N/A	N/A
LED	-	2 LEDs : Icon, No Text	- 2525/2580N 2 LEDs : Icon, No Text - 2525W 3 LEDs : Icon, No Text
Key	-	3 Keys	3 Keys (2525/2580N) 2 Keys (2525W)

2.1.2.3 Paper Handling

Items		ML-1910 / 1915	ML-2525 / 2525W / 2580N
Standard Capacity	-	250-sheet Cassette Tray@80g/㎡, 1-sheet Manual Tray	250-sheet Cassette Tray@80g/㎡, 1-sheet Manual Tray
Max. Capacity	-	251 sheets @ 80g/㎡	251 sheets @ 80g/㎡
Printing	Max. Size	216 x 356 mm (8.5" x 14")	216 x 356 mm (8.5" x 14")
	Min. Size	76 x 127 mm (3.0" x 5.0")	76 x 127 mm (3.0" x 5.0")
Multi-purpose tray			
Capacity	Plain Paper	1 sheet	1 sheet
	Envelop	1 sheet	1 sheet
Media sizes	-	A4, A5, A6, ISO B5, JIS B5, B6, Statement, Letter, Quarto, Oficio, Folio, Legal, Envelope(No 10, Monarch, DL, C5, C6) Postcard	A4, A5, A6, ISO B5, JIS B5, B6, Statement, Letter, Quarto, Oficio, Folio, Legal, Envelope(No 10, Monarch, DL, C5, C6) Postcard
Media type	-	Plain, Thin, Bond, Punched, Pre-printed, Recycled, Envelope, Transparency, Label, Cardstock, Postcard, Letterhead, Thick, Cotton, Colored, Archive	Plain, Thin, Bond, Punched, Pre-printed, Recycled, Envelope, Transparency, Label, Cardstock, Postcard, Letterhead, Thick, Cotton, Colored, Archive
Media weight	-	16~43lb (60 to 163g/㎡)	16~43lb (60 to 163g/㎡)
Sensing	-	Manual Feed Sensor	Manual Feed Sensor
Standard Cassette Tray			
Capacity	-	250 sheets @ 80g/㎡	250 sheets @ 80g/㎡
Media sizes	-	A4, A5, A6, ISO B5, JIS B5, Executive, Letter, Oficio, Folio, Legal,Custom	A4, A5, A6, ISO B5, JIS B5, Executive, Letter, Oficio, Folio, Legal,Custom
Media types	-	Plain, Thin, Recycled, Thick, Archive	Plain, Thin, Recycled, Thick, Archive
Media weight	-	16~32lb (60 to 120g/㎡)	16~32lb (60 to 120g/㎡)
Sensing	-	Paper Empty	Paper Empty
Optional Cassette Tray			
Capacity	-	N/A	N/A
Media sizes	-	N/A	N/A
Media types	-	N/A	N/A
Media weight	-	N/A	N/A
Sensing	-	N/A	N/A
Output Stacking			
Capacity	Face-Down	80 sheets @ 75g/㎡ NN Condition	80 sheets @ 75g/㎡ NN Condition
	Face-Up	N/A	N/A
Output Full sensing	-	N/A	N/A

Items		ML-1910 / 1915	ML-2525 / 2525W / 2580N
Duplex			
Supporting	-	N/A	N/A
Media sizes	-	N	N
Media types	-	N	N
Media weight	-	N	N
Printable Area			
Non-Printable Area	Envelop	10mm(0.4") from edge(Top, Bottom, Left, Right)	10mm(0.4") from edge(Top, Bottom, Left, Right)
	Other Media	4mm(0.16") from edge(Top, Bottom, Left, Right)	4mm(0.16") from edge(Top, Bottom, Left, Right)

2.1.2.4 Consumables

Items		ML-1910 / 1915	ML-2525 / 2525W / 2580N
Toner	Black	Standard: Average Cartridge Yield 0.7K standard pages. High Yield: Average cartridge Yield 1.5K/2.5K standard pages. Declared cartridge yield in accordance with ISO/IEC 19752.	Standard: Average Cartridge Yield 1.0K standard pages. High Yield: Average cartridge Yield 1.5K/2.5K standard pages. Declared cartridge yield in accordance with ISO/IEC 19752.
	Key	Electronic key(CRUM) Only	Electronic key(CRUM) Only
	Life detect	Toner gauge sensor by dot count	Toner gauge sensor by dot count
Drum	Yield	N/A	N/A

2.1.2.5 Reliability & Service

Items		ML-1910 / 1915	ML-2525 / 2525W / 2580N
Printing Volume (SET AMPV)	-	121 sheets/month	- 2525 / 2525W : 166 sheets/month - 2580N : 197 sheets/month
Max. Monthly Duty	-	10,000 SHEET/month	12,000 SHEET/month
MPBF	-	10,000 sheets	10,000 sheets
MTTR	-	30 min.	30 min.
SET Life Cycle	-	50,000 sheets or 5 years (whichever comes first)	50,000 sheets or 5 years (whichever comes first)
RDS	Comm. Mode	N/A	N/A
	Operation	N/A	N/A

2.1.2.6 Environment

Items		ML-1910 / 1915	ML-2525 / 2525W / 2580N
Operating Environment	Temperature	10C to 32C	10C to 32C
	Humidity	20% to 80%	20% to 80%
Acoustic Noise Level(Sound Power/Pressure)	Printing	48dBA	48dBA
	Standby	Back Ground Level	Back Ground Level
	Sleep	Back Ground Level	Back Ground Level
Power Consumption	Ready	Less than 60W	Less than 60W
	AVG.	Less than 350W	Less than 350W
	Max/Peak	Less than 400W	Less than 400W
	Sleep / Power Off	Less than 6.5W / Less than 0.8W	Less than 6.5W / Less than 0.8W
Dimension (W x D x H)	SET	389 x 360 x 197 mm	389 x 360 x 197 mm
	SET Packing	460 x 422 x 260 mm	460 x 422 x 260 mm
	Toner	284 x 231.5 x 47.8mm	284 x 231.5 x 47.8mm
	Toner Packing	400 x 366 x 204 mm	400 x 366 x 204 mm
Weight	SET	6.55Kg	6.6Kg
	Toner	0.7Kg	0.7Kg
	Gross	8.81Kg	8.92Kg

2.1.2.7 Packing & Accessory

Items		ML-1910 / 1915	ML-2525 / 2525W / 2580N
In-Box	-	Driver & Network Install CD-ROM Power Cable USB Cable (CIS/China/ Korea/India) Quick Install Guide Warranty Registration Card User's Manual (PDF File)	Driver & Network Install CD-ROM Power Cable USB Cable (CIS/China/ Korea/India) Quick Install Guide Warranty Registration Card User's Manual (PDF File)

2.1.2.8 Options

Items	ML-1910 / 1915	ML-2525 / 2525W / 2580N
Memory	N/A	N/A
Second Cassette	N/A	N/A
Wired Network	N/A	External : Ethernet 10/100 Base TX (Only 2580N)
Wireless Network	N/A	Only 2525W
Hard Disk	N/A	N/A
Duplex Unit	N/A	N/A

2.1.2.9 Others

Items		ML-1910 / 1915	ML-2525 / 2525W / 2580N
Memory	Upgradable Mem. Slot	N/A	N/A
	Upgradable Mem. Type	N/A	N/A
	Upgradable Mem. Unit	N/A	N/A
Sensor	Paper Empty	Yes	Yes
	Paper Size	NO	NO
	Media Type	NO	NO
	Paper Full	Yes	Yes

2.1.2.10 Maintenance parts (FRU)

Item	Image	Part code	Life
Fuser		- 220V : JC91-00945A : JC91-00945B - 110V : JC91-00946A : JC91-00946B	50K
Transfer Roller		JC66-01218A	50K
Pick up Roller		JC93-00087A	50K
Cassette holder pad		JC90-00941A	50K

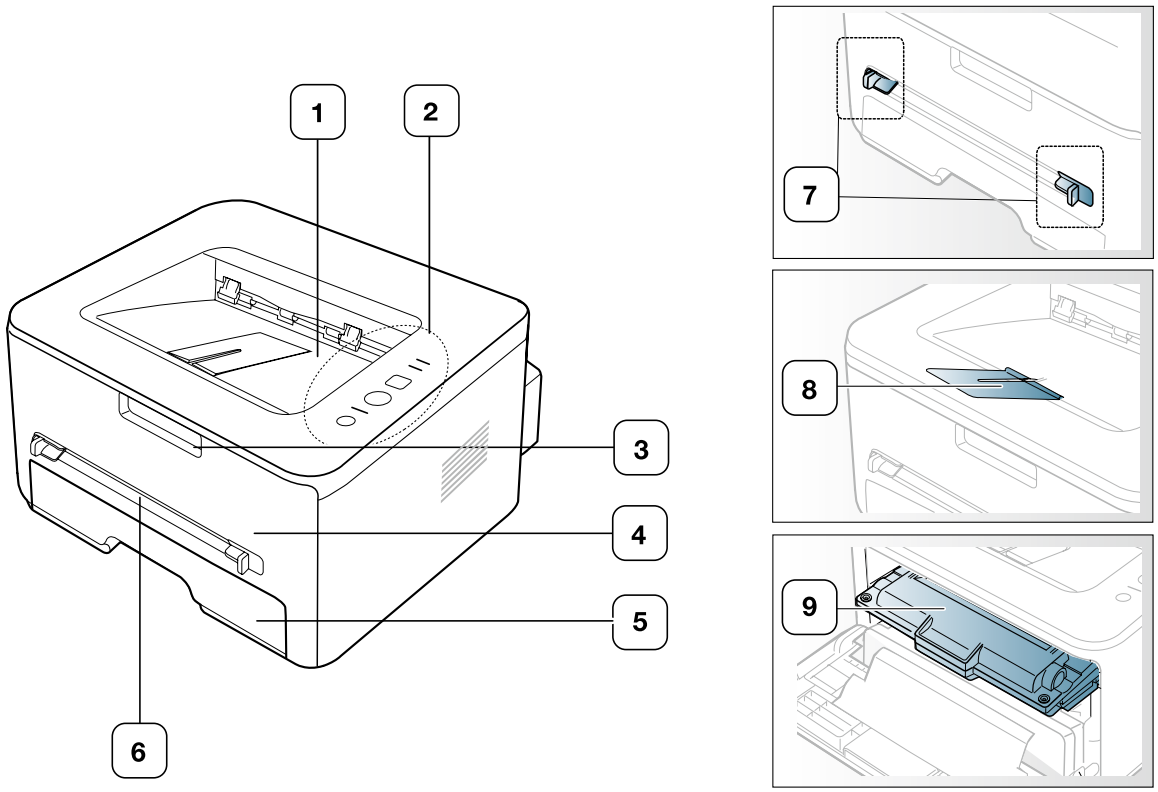
2.1.3 Model Comparison Table

	Samsung ML- 2580N	Samsung ML- 2240	HP P1505n
Image			
Speed	24 ppm (A4)	22 ppm (A4)	23 ppm (A4)
processor	360 Mhz	150 MHz	266 MHz
Memory	64 MB	8 MB	32 MB
Print Language	SPL, PCL6	GDI	PCL5e
Input	250 sheets CST 1 Manual	150 sheets Bin	250 sheets Bin, 10 Manual
Duplex	Manual	Manual	Manual
Interface	USB 2.0	USB 2.0	USB 2.0
Size (mm)	389 x 360 x 197	353 x 298 x 213 mm	379 x 243 x 225 mm
Toner	Standard 1.5K / 2.5K	Standard 1.5K	Standard 2K

2.2 System Overview

This chapter describes the functions and operating principal of the main component.

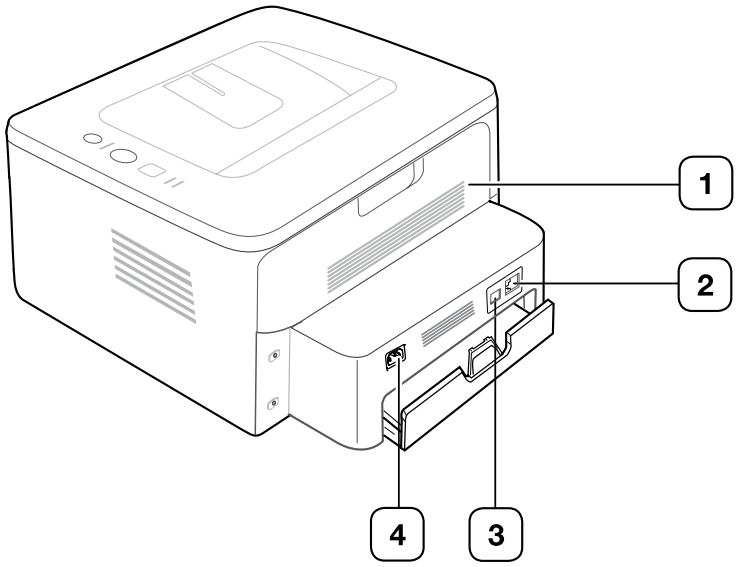
2.2.1 Front View



This illustration may differ from your machine depending on its model.

1	Document output tray	**6**	Manual feeder
2	Control panel	**7**	Manual feeder guide
3	Front cover handle	**8**	Output support
4	Front cover	**9**	Toner cartridge
5	Tray 1		

2.2.2 Rear View



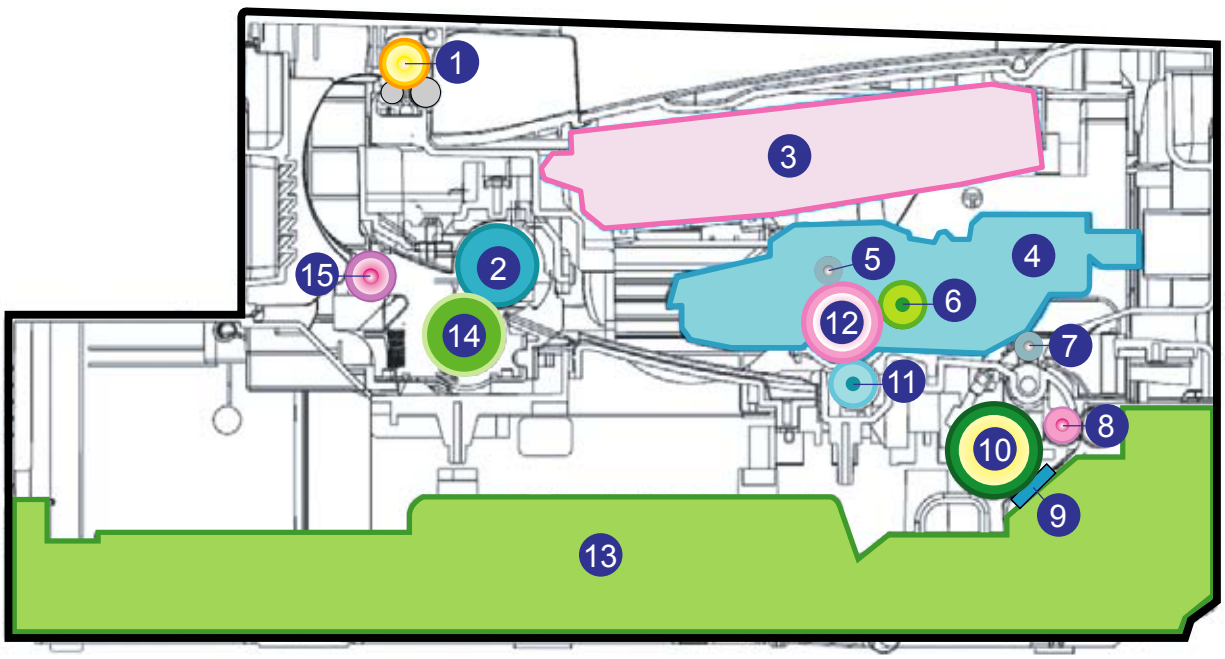
This illustration may differ from your machine depending on its model.

1	Rear cover	**3**	USB port
2	Network Port[a]	**4**	Power receptacle

a. ML-2580 Series only.

2.2.3 System Layout

This model is consisted of the Engine parts and F/W, and said engine parts is consisted of the mechanical parts comprising Frame, Feeding, Developing, Driving, Transferring, Fusing, Cabinet and H/W comprising the main control board, power board, operation panel, PC Interface.



1	Top out-bin delivery roller
2	Fusing roller
3	LSU
4	Toner Cartridge
5	Primary charging roller
6	Developer roller
7	Registration/Multipurpose pick up roller
8	Feed roller

9	Separation Pad
10	Pick up roller
11	Transfer roller
12	OPC
13	Cassette
14	Pressure roller
15	Fuser Exit roller

2.2.3.1 Feeding Part

It is consists of a basic cassette, an MP tray for supplying different types of media (envelope, label, special paper) and parts related to paper transferring.

1) Separation method

Paper is separated by the friction pad mounted to the center of the cassette.

2) Basic cassette

It takes a center loading method and applies 'friction pad separating method.'
Both the side guide and the rear guide can be adjusted for for various types of papers from A6 to legal size paper.
It has a paper existence sensing function (Capacity: 250 sheets (75g/㎡ paper standard), paper arranging function, various size papers accepting function.
In the front side, there is a paper level indicator.

3) Pick- up roller

It has functions such as a paper pickup function, driving control function, paper feeding function, and removing electronic static function. Pick up roller is drive by solenoid.

4) Registration roller

It has a paper arranging function, paper transferring function, paper detecting function, jam removing function, and so on.

5) MP tray

It has a paper arranging function, paper transferring function, jam removing function, and so on.
It uses manual feed method to feed 1 sheets of general papers and 1 envelops.

2.2.3.2 Transfer Roller

- The transfer roller delivers the toner of the OPC drum to the paper.
- There is no PTL Ass'y.
- Life Span : Print over 50,000 sheets (in15~30℃)

2.2.3.3 Driver Assy

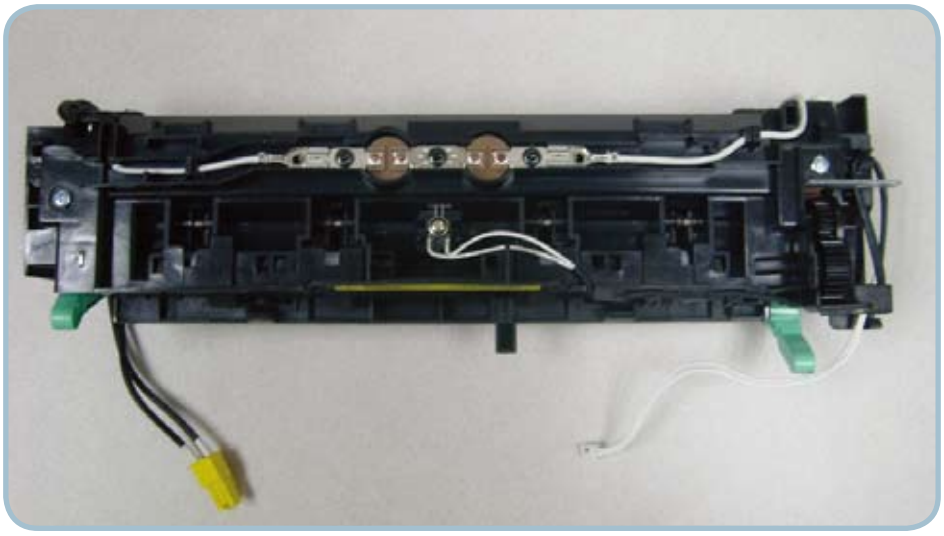
- In ML- 1910- 2525/2580N, the driving device is consisted of BLDC or Step motor (BLDC : 2580 / Step : 1910), OPC, Pick- up, Feed, Gear- Train connected with Mounting member.

  • Driving Frequency: BLDCΦ55 Motor : 2400rpm(1800 Clock)

  • It is a power delivery unit by gearing: BLDCΦ55 Motor - >Pickup/Feeder/Developer/Fuser/Duplex

2.2.3.4 Fuser

It is consisted of a halogen lamp, heat roller, pressure roller, thermistor and thermostat. It sticks the toner on a paper by heat and pressure to complete the printing job.



1) Thermostat

When a heat lamp is overheated, a Thermostat cuts off the main power to prevent over- heating.

- Thermostat Type : Non- Contact type THERMOSTAT
- Control Temperature : 170℃ ± 5 ℃

2) Thermistor

It is a temperatrue detecting sensor.

- Temperature Resistance : 7 kΩ (180 ℃)

3) Heat roller

The heat roller transfers the heat from the lamp to apply a heat on the paper.
The surface of a heat roller is coated with Teflon, so toner does not stick to the surface.

4) Pressure roller

A pressure roller mounted under a heat roller is made of a silicon resin, and the surface also is coated with Teflon. When a paper passes between a heat roller and a pressure roller, toner adheres to the surface of a paper permanently.

5) Halogen Lamp

- Voltage 120 V : 115 ± 5 %
  220 V : 230 ± 5 %
- Capacity : 750 Watt ± 25 W

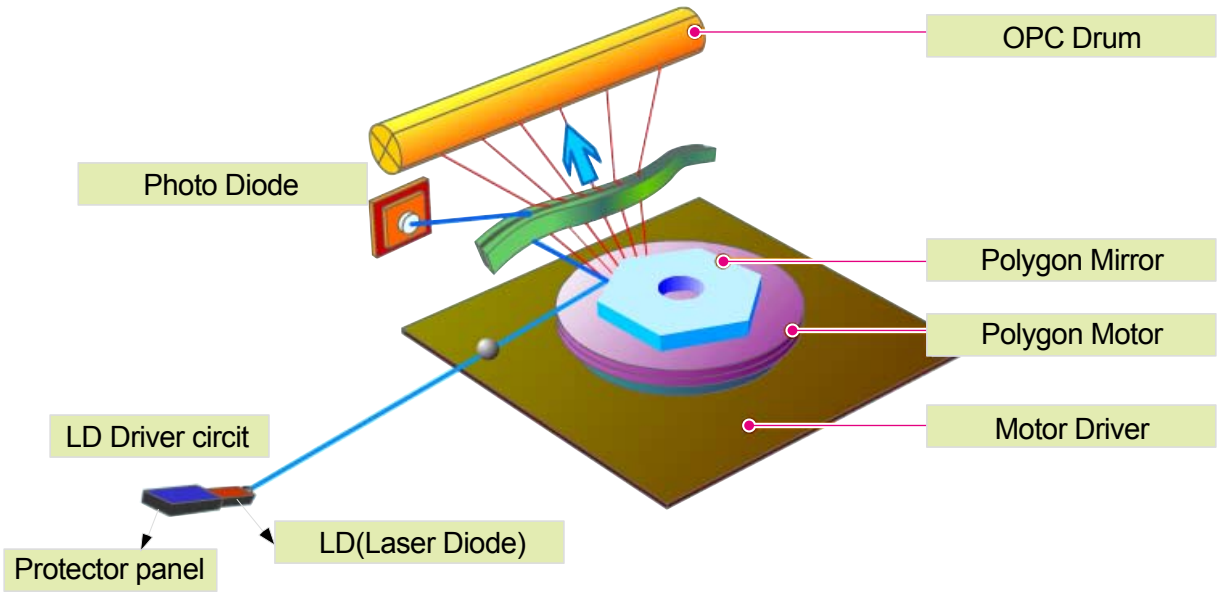
6) Items for safety

Protecting device for overheating
- 1st protection device: Hardware cuts off when overheated
- 2nd protection device: Software cuts off when overheated
- 3rd protection device: Thermostat cuts off main power.

Safety device
- A fuser power is cut off when a front cover is opened
- Maintain a temperature of fuser cover's surface under 80(C for user, and attach a caution label at where customer can see easily when customer open a rear cover.

2.2.3.5 LSU (Laser Scanner Unit)

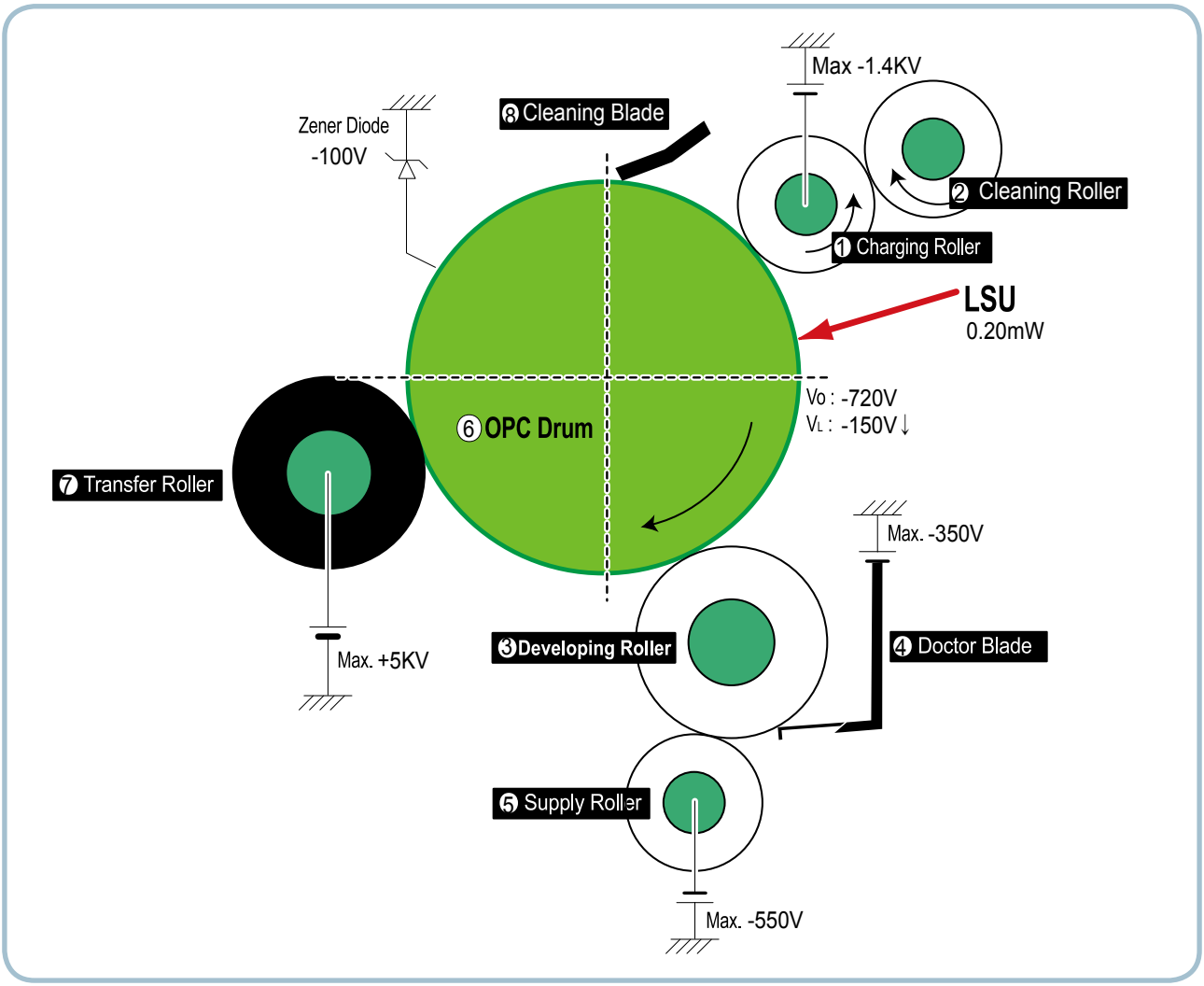
It is the core part of the LBP which switches from the video data received to the controller to the electrostatic latent image on the OPC drum by controlling laser beam, exposing OPC drum, and turning principle of polygon mirror. The OPC drum is turned with the paper feeding speed. The /HSYNC signal is created when the laser beam from LSU reaches the end of the polygon mirror, and the signal is sent to the controller. The controller detects the /HSYNC signal to adjust the vertical line of the image on paper. In other words, after the /HSYNC signal is detected, the image data is sent to the LSU to adjust the left margin on paper. The one side of the polygon mirror is one line for scanning.



2.2.3.6 Toner Cartridge

By using the electronic photo process, it creates a visual image. In the toner cartridge, the OPC unit and the developing unit are in a body. The OPC unit has OPC drum and charging roller, and the toner cartridge unit has toner, supply roller, developing roller, and blade (Doctor blade)

- Developing Method : Non magnetic 1 element contacting method
- Toner : Non magnetic 1 element shatter type toner
- Charging capacity : - 39.1 ± 3 μC/g
- Average OD : 8.0 ± 0.5㎛ (Toner)
- The life span of toner (ISO 19752 pattern / A4 standard)
  - → Initial toner
    - 0.7K : ML-1910/1915
    - 1K : ML-2525/2525W/2580N
  - → Sales toner
    - 1.5K / 2.5K
- Toner Residual Sensor : Dot count with CRUM(CRU Monitor)
- OPC Cleaning : Collect the toner by using cleaning blade
- Handling of wasted toner : Collect the wasted toner in the cleaning frame by using cleaning blade
- OPC Drum Protecting Shutter : None
- Classifying device for toner cartridge: ID is classified by CRUM.



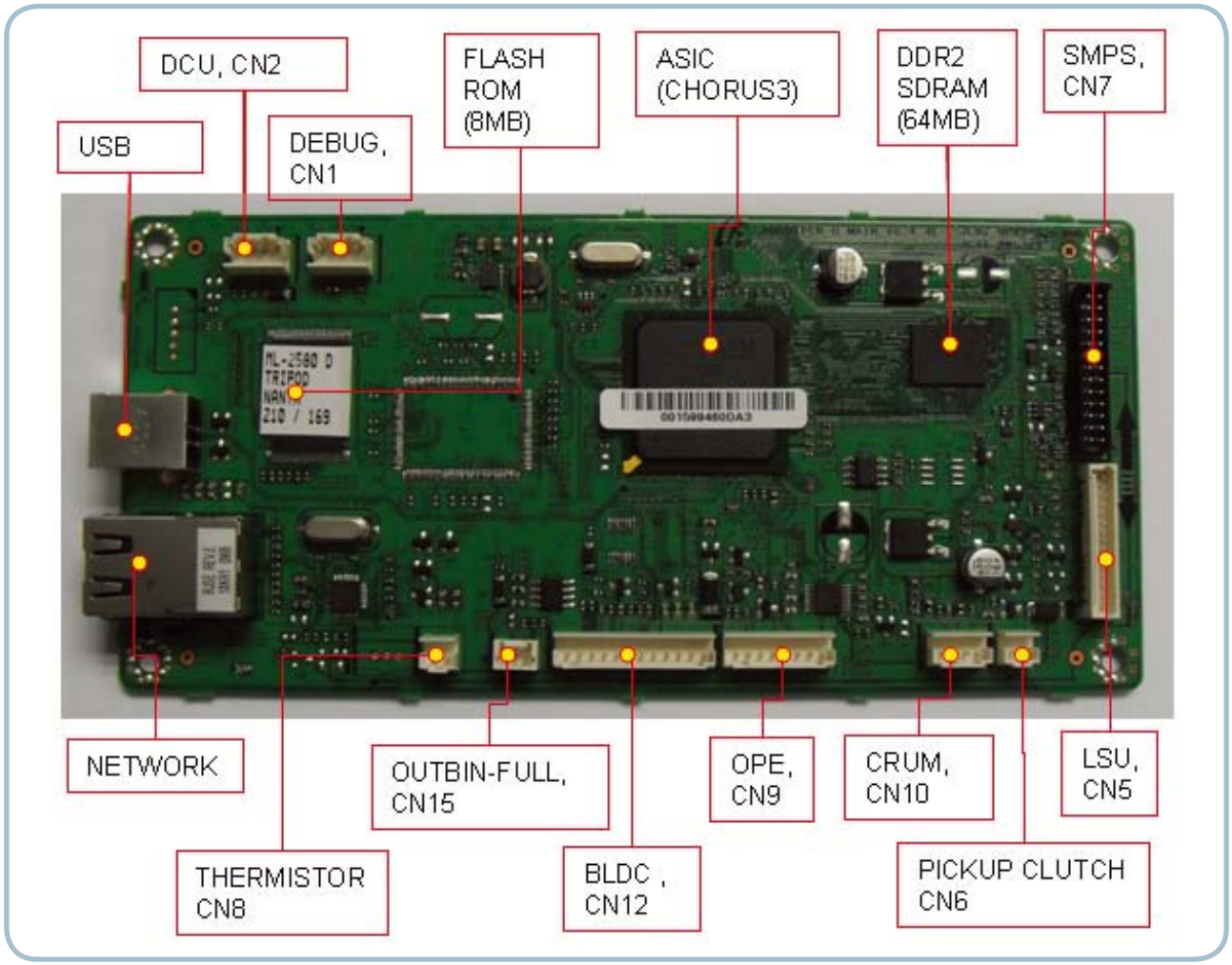
2.2.4 Engine H/W Specifications

2.2.4.1 Main PBA

The Engine Board and the Controller Board are in one united board, and it is consisted of CPU part and print part in functional aspect. The CPU is functioned as the bus control, I/O handling, drivers, and PC interface. The main board sends the Current Image of Video data to the LSU and manages the conduct of Electrophotography for printing. It is consisted of the circuits of the motor (paper feed, pass) driving, clutch driving, pre- transfer lamp driving, current driving, and fan driving.
The signals from the paper feed jam sensor and paper empty sensor are directly inputted to the main board.

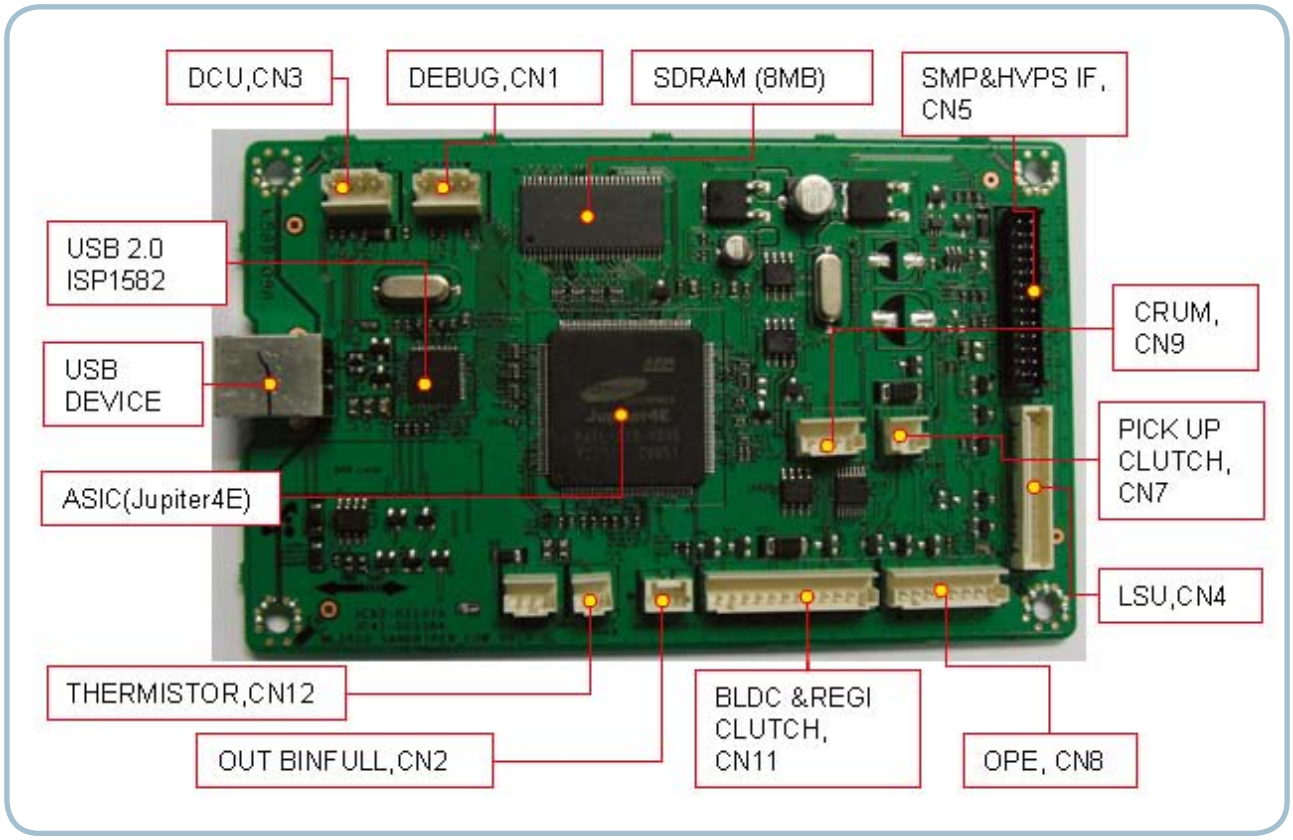
■ ML- 2580N

The Controller for ML-2580N comprises an ARM-based CPU (Chorus3), DDR2 SDRAM and Flash memories, and other drivers for mechanical elements. The Controller also provides the interface with PC by USB2.0 and Network.



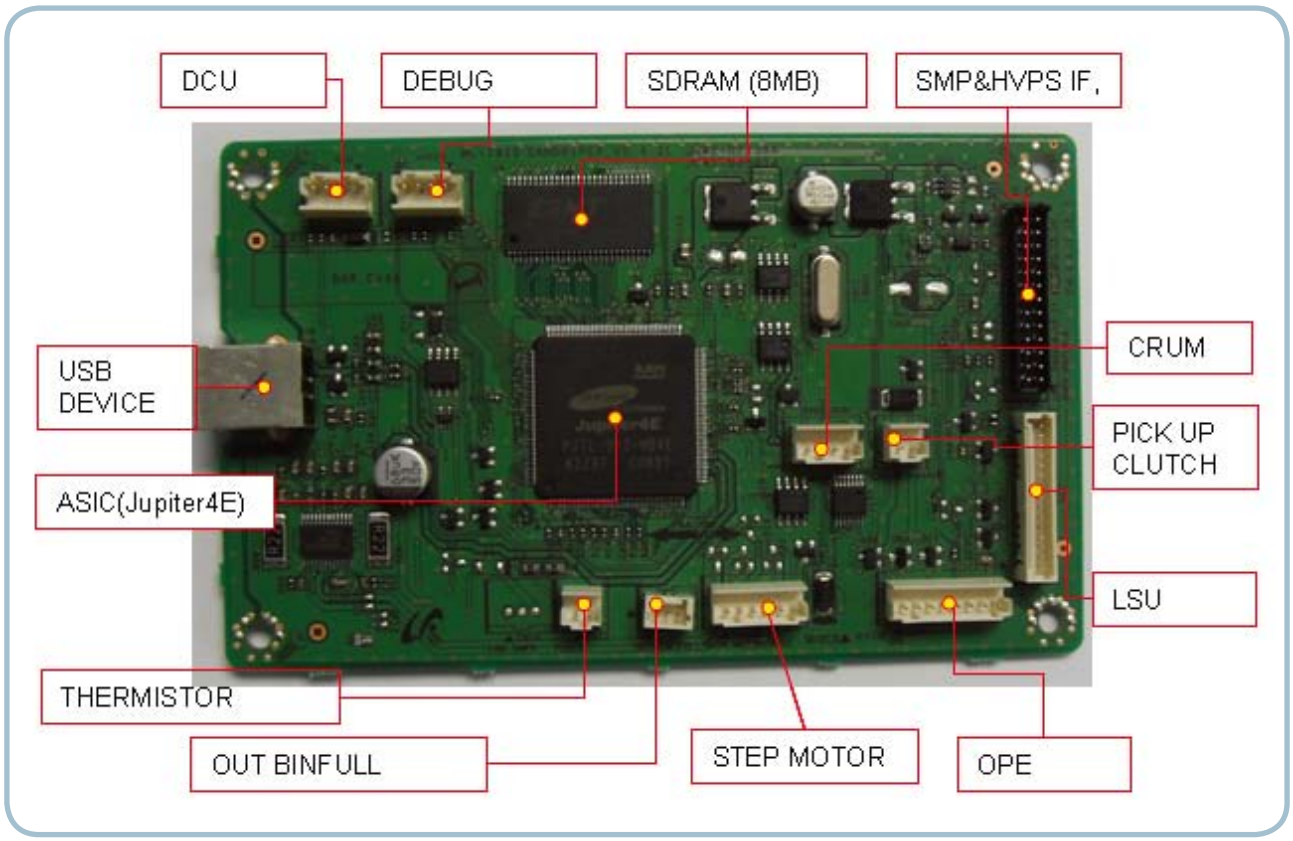
■ ML- 2525

The Controller for ML-2525 comprises an ARM-based CPU (J4e), SDRAM and embedded Flash memories, and other drivers for mechanical elements. The Controller also provides the interface with PC by USB2.0.



■ ML- 1910/1915

The Controller for ML-1910/1915 comprises an ARM-based CPU (J4e), SDRAM and embedded Flash memories, and other drivers for mechanical elements. The Controller also provides the interface with PC by USB1.1.



(a) Asic (Chrous3) – ML-2580N

• CPU Core : ARM1020E
  - 32KB instruction cache and 32KB data cache

• Operating Frequency
  - CPU Core : over 360MHz
  - System Bus : 100MHz

• PCI Controller
  - 32Bits, 33/66MHz
  - PCI Local Bus Specification rev2.2 Complaint
  - Host / Agent Mode (Support 4 Devices in Host Mode)

• NAND Flash Controller
  - 8/16Bits, H/W EEC Generation
  - Auto Boot Mode (Using Internal SRAM, 4KB)

• MAC
  - 10M/100Mbps
  - Full IEEE 802.3 Compatibility

• Engine Controller
  - LSU Interface Unit
  - Step Motor : 2 Channels
  - PWM : 8 Channels
  - ADC : 6 Channels

(b) Memory

• Flash Memory : It stores System Program and downloads the System Program through PC Interface, and in case of model for export it compresses the PCL font, then stores it.
  - Capacity : 8M Byte (NOR Flash)
  - Access Time : 90ns
  - Page read Time : 25ns

• DRAM : It is used as Swath Buffer, System Working Memory Area, etc. when printing.
  It stores Font List, compressed into Flash memory, on DRAM and uses it as PCL font in case of model for export.
  - Capacity : 2580N : 64MB
  - Type : DDR2 SDRAM 166MHz 16bit

(c) Sensor Input Circuit

■ Paper Empty Sensing

The Paper empty sensor on the HVPS detects the state of paper empty and the state of paper width i.e. narrow paper width or not. If the paper width sensor fails to detect paper existence, the fact has two meanings: paper empty or narrow paper installed.
When the printing job comes to CPU, CPU does operate the pickup action regardless of paper empty. If the paper comes through to feed sensor, CPU recognizes the usage of narrow paper, if not, CPU know the state of paper empty and displays the RED on the OPE PBA.

■ Regi Sensing

By the operation of an actuator on the frame, Regi Sensor (Photo interrupter) informs the existence of paper to CPU. CPU recognize papers in Manual Feeder and , feed paper from Manual Feeder if there is.

■ Paper Feeding/With Toner Cartridge Sensing

When paper passes the actuator (feed sensor part), it detects the signal of Photo interrupter, informs the paper feeding state to CPU, and then sprays the image data after certain time.
If it doesn't detect the feed sensor within 1sec. after paper is fed, paper Jam0 is occurred (LED will be display RED color). The fact whether the developer is inserted or not is detected by CRUM. After the developer is mounted, the sub- CRUM can read the information of toner cartridge from contact with CRUM involved in toner cartridge. If the information of toner cartridge is invalid, it will show invalid sign on a LED.

■ Paper Exit Sensing

It detects paper state whether paper gets out from the set with operation of exit sensor and actuator on the fuser assy. Paper detects the on/off time of exit sensor and the normal operation or jam information is informed to the CPU.
The paper JAM2 is informed. (LED will be display RED color)

■ Cover Open Sensing

The Cover open sensor is located on the HVPS. After the front cover is opened, +24VS (DC fan, Solenoid, Main Motor, Polygon motor part of LSU and HVPS), which is supplied to the each unit, is cut off.
In case, the red will be ON for informing the facts to user.

■ DC FAN / SOLENOID Driving

DC Fans and Clutches are driven by turning on TRs, which is controlled by CPU. The diode in the Fan and Clutch driving circuits protects TR driven from the noise pulse, which is occurred when the solenoid and fan are de- energized.

■ Motor Driving

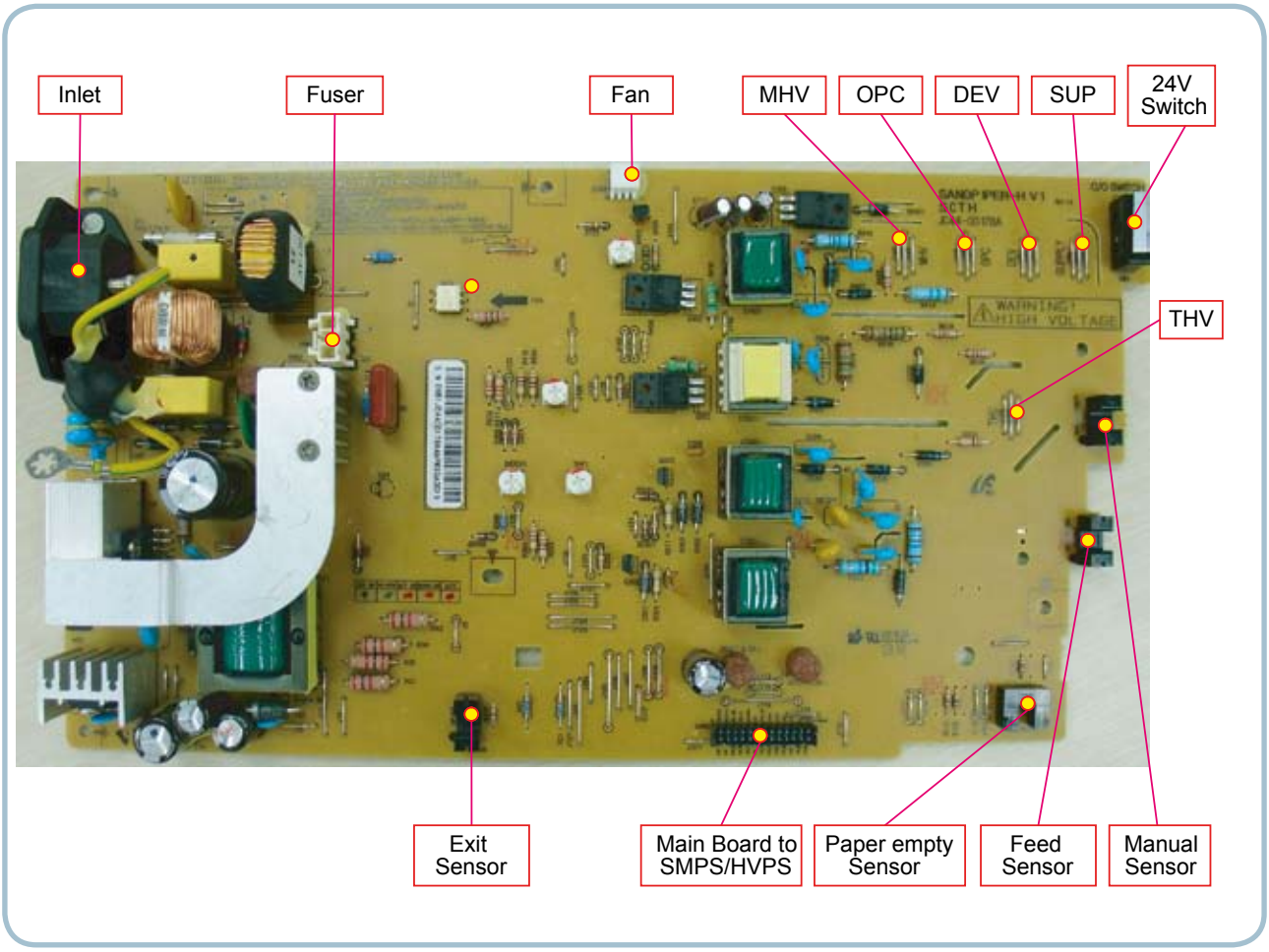
The main motor driving circuits is on the BLDC Motor Ass'y Unit. Main Controller has the interfacing circuits. There is motor driver IC on the motor control board of Motor Ass'y Unit.

2.2.4.2 HVPS and SMPS Board

The HVPS Board and SMPS Board are in one united board.

The HVPS board creates the high voltage of THV/MHV/Supply/Dev and supplies it to the developer part for making best condition to display the image. The HVPS part takes the 24V and outputs the high voltage for THV/MHV/BIAS, and the outputted high voltage is supplied to the toner, OPC cartridge, and transfer roller

It is the power source of entire system. It is assembled by an independent module, so it is possible to use for common use. It is mounted at the side of the set.
It is consisted of the SMPS part, which supplies the DC power for driving the system, and the AC heater control part, which supplies the power to fuser. SMPS has two output channels. Which are +5V and +24V.



■ HVPS Board

• Transfer High Voltage (THV+)

- Input Voltage : 24 V DC ± 15%
- Output Voltage : MAX +5.0KV ± 5 %,(Duty Variable, no loading)
  -1.2KV ±15% (when cleaning,200 MΩ)
- Input contrast of the Voltage stability degree : under ± 3 % (fluctuating input 21.6V~26.4V)
  Loading contrast : ± 3 % or less
- Output Voltage Rising Time : 50 ms Max
- Output Voltage Falling Time : 100 ms Max
- Fluctuating transfer voltage with environmental various : 0 ~ 5 KV
- Environment Recognition Control Method : The THV- PWM ACTIVE is transfer active signal. It detects the resistance by recognizing the voltage value, F/B, while permits the environmental recognition voltage.
- Output Voltage Control Method : Transfer Output Voltage is outputted and controlled by changing Duty of THVPWM Signal.

• Charge Voltage (MHV)

- Input Voltage : 24 V DC ± 15%
- Output Voltage : - 1.0KV ~ - 1.8KV DC ± 3%
- Output Voltage Rising Time : 50 ms Max
- Output Voltage Falling Time : 50 ms Max
- Output Loading range : 30 MΩ ~ 1000 MΩ
- Output Control Signal(MHV- PWM) : CPU is HV output when PWM is Low

• Cleaning Voltage (THV-)

- The (+) Transfer Voltage is not outputted because the THV PWM is controlled with high.
- The (-) Transfer Voltage is outputted because the THV- Enable Signal is controlled with low
- The output fluctuation range is big because there is no Feedback control.

• Developing Voltage (DEV)

- Input Voltage : 24 V DC ± 15%
- Output Voltage: - 200V ~ - 600V DC ±3%
- Output Voltage Fluctuation range: PWM Control
- Input contrast of the output stability degree : ± 3 % or less
  Loading contrast : ± 3 % or less
- Output Voltage Rising Time : 50 ms Max
- Output Voltage Falling Time : 50 ms Max
- Output Loading range : 10MΩ ~ 1000 MΩ
- Output Control Signal (BIAS- PWM) : the CPU output is HV output when PWM is low.

• Supply

- Output Voltage : - 400 V ~ - 800V DC ±50 V(ZENER using, DEV)
- Input contrast of the output stability degree : under ± 5 %
  Loading contrast : ± 5 % or less
- Output Voltage Rising Time : 50 ms Max
- Output Voltage Falling Time : 50 ms Max
- Output Loading range : 10 MΩ ~ 1000 MΩ
- Output Control Signal (BIAS- PWM) : the CPU is HV output when PWM is low.

■ SMPS Board

◆ Electrical Specifications

Input Rated Voltage	AC 230V(V2) / AC110V(V1)
Input Voltage fluctuating range	180VAC~270VAC / 90VAC~135VAC
Rated Frequency	50/60 Hz
Frequency Fluctuating range	47 ~ 63 Hz

◆ Input / Output Connector

AC Input Connector (INLET1)		
PIN ASSIGN	PIN NO	Description
1	AC_L	AC Input
2	AC_N	

SMPS -> Heater Controller (CON1)		
PIN ASSIGN	PIN NO	Description
1	AC_L	AC output For Heater Controller
2	NC	
3	AC_N	

SMPS/HVPS Output Connector (CON2)			
Pin Name	No.	No.	Pin Name
nSENS_P_FEED	1	2	nSENS_P_EMPTY
GND	3	4	nSENS_P_REGI
+24V	5	6	+24V
GND	7	8	+5VS
+24VS	9	10	+24VS
GND	11	12	+24VS
GND	13	14	GND
+5.0V	15	16	+5.0V
THV READ	17	18	nSENS_P_EXIT
PWM_THV	19	20	nTHV_EN
PWM_DEV_DC	21	22	PWM_MHV
FAN_MAIN	23	24	nRELAY_AC_OFF [High Active]
STANDBY [Low Active]	25	26	FUSER_ON [High Active]

2.2.5 Engine F/W Contol Algorithm

2.2.5.1 Feeding

If feeding from a cassette, the drive of the pickup roller is controlled by controlling the solenoid. The on/off of the solenoid is controlled by controlling the general output port or the external output port. While paper moves, occurrence of Jam is judged as below.

Item	Description
JAM 0	- After picking up, paper cannot be entered due to paper is not fed. - After picking up, paper entered but it cannot reach to the feed sensor in certain time due to slip, etc. - After picking up, if the feed sensor is not on, re-pick up. After re-picking up, if the feed sensor is not on after certain time, it is JAM 0. ** It is a status that the leading edge of the paper doesn't pass the feed sensor.* - Even though the paper reaches to the feed sensor, the feed sensor doesn't be ON. ** It is a status that the leading edge of the paper already passes the feed sensor.*
JAM 1	- After the leading edge of the paper passes the feed sensor, the trailing edge of the paper cannot pass the feed sensor after a certain time. (The feed sensor cannot be OFF) - After the leading edge of the paper passes the feed sensor, the paper cannot reach the exit sensor after certain time. (The exit sensor cannot be ON) ** The paper exists between the feed sensor and the exit sensor.*
JAM 2	- After the trailing edge of the paper passes the feed sensor, the paper cannot pass the exit sensor after certain time.

2.2.5.2 Transfer

The charging voltage, developing voltage and the transfer voltage are controlled by PWM (Pulse Width Modulation). The each output voltage is changeable due to the PWM duty. The transfer voltage admitted when the paper passes the transfer roller is decided by environment recognition. The resistance value of the transfer roller is changed due to the surrounding environment or the environment of the set, and the voltage value, which changes due to the environments, is changed through AD converter. The voltage value for impressing to the transfer roller is decided by the changed value.

2.2.5.3 Fusing

The temperature change of the heat roller's surface is changed to the resistance value through the thermistor. By converting the voltage value, which impressed to the resistance, to the digital value through the AD converter, the temperature is decided. The AC power is controller by comparing the target temperature to the value from the thermistor. If the value from the thermistor is out of controlling range while controlling the fusing, the error stated in the below table occurs.

• Open Heat Error

When the engine operates the warm-up process, if the temperature of the fixing unit is not higher than a specified temperature, the engine defines Open Heat Error. When this error is broken out, the engine stops all functions and keeps the error state. Also, the engine informs the error status of the main system. And then the error message is displayed at LCD window or LED informing the error status of the user.

• Low Heat Error

When the engine is at stand-by, printing or warm-up mode, if the temperature of the fixing unit is lower than the specified temperature at each state and the lower temperature state is maintained during the specified time, the engine defines Low Heat Error. When this error is broken out, the engine stops all functions and keeps it at the error state. Also the engine informs the error status of the main system. And then the error message is displayed at LCD window or LED informing the error status of the user.

• Over Heat Error

For overall engine state, if the temperature of the fixing unit is higher than the specified temperature and the temperature state is kept during the specified time, the engine defines Over Heat Error. When this error is broken out, the engine stops all functions and keeps it at the error state. Also, the engine informs the error status of the main system. And then the error message is displayed at LCD window or LED to inform the error status of the user.

2.2.5.4 LSU

LSU receives the image data from PVC or HPVC and make the latent image on OPC surface.
It uses the single beam, LD.
The errors related to LSU are as follows:

• By LReady : When the printing is started, the engine drives the polygon motor of LSU. After the specified time is elapsed, if the motor is not in a ready status, the engine detects the error that the polygon motor is not in a ready status. If this error happens, the engine stops all functions and keeps it at the error state. Also, the engine informs the error status of the main system and the error message is displayed at LCD window to inform the error status of the user.

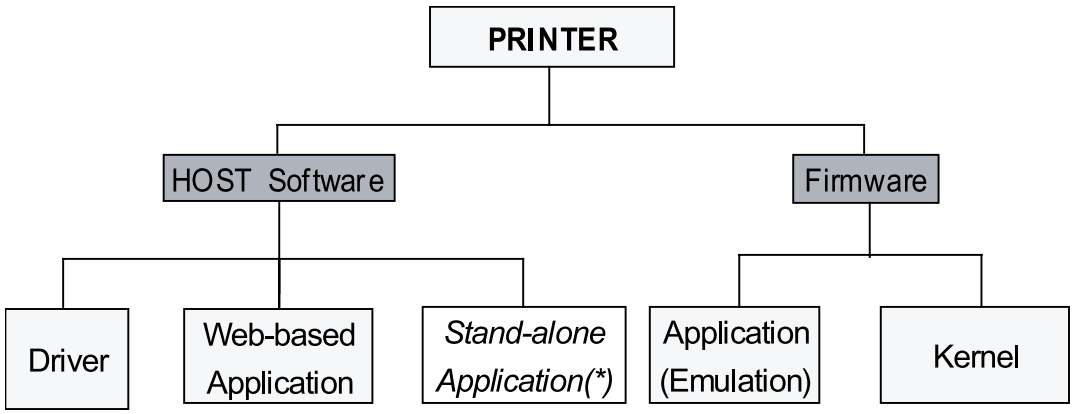
• By Hsync : When the polygon motor is ready, the LSU sends out the signal called Hsync and used to synchronize with each image line. So, if the engine does not detect consecutively the signal for a fixed time, it defines the Hsync Error. If this error happens, the engine stops all functions and keeps it at the error state. Also, the engine informs the error status of the main system and then the error message is displayed at LCD window to inform the error status of the user.
LSU Error Recovery: If the LReady or Hsync error happens, the paper exits out beforehand. The engine mode is changed to recovery mode and the engine informs the main system of the engine mode. And the engine checks the LSU error. If the error doesn't happen, the printing job will be proceeding.

2.2.6 S/W Descriptions

2.2.6.1 Overview

The software of ML-2855ND system is constructed with
1) Host Software part that the application software operated in Window and Web Environment, and
2) Firmware parts that is a Embedded software controls printing job.

2.2.6.2 Architecture

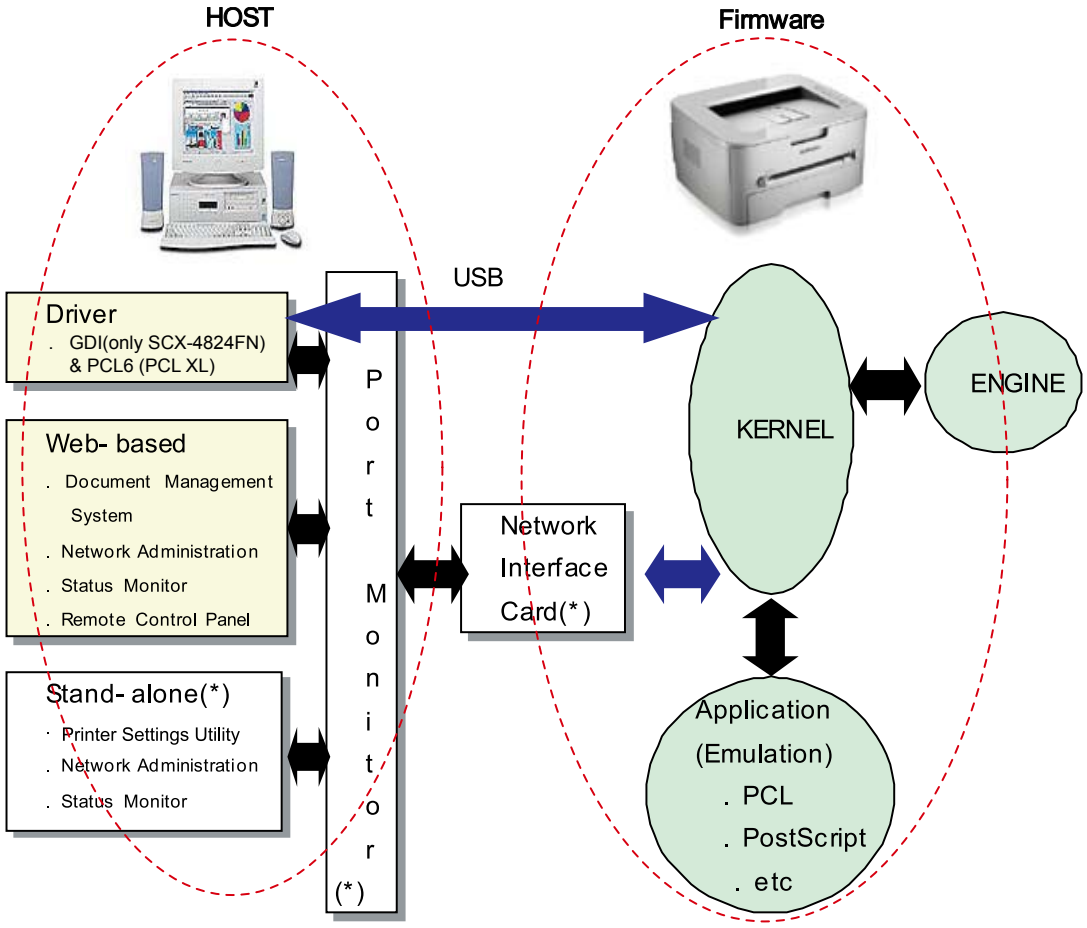


☞ (*) is job for common S/W team

Host Software is made up of
1. Graphic User Interface that offers the various editing functions to user in Host,
2. Driver that translates the received document to a Printing Command language which printer can understand and transfers data to spooler,
3. Stand-alone Application that offers the various printing application, PSU(Printer Settings Utility), Printer Status Monitor, Network Management in Window system,
4. Web-based-Application that offers the same functions as Stand-alone Application and RDC(Remote Diagnosis Control) in Web environment.

Firmware is made up of
1. Application (Emulation) that is a interpreter translate data received from Host to a printing language (PCL, PS, GDI, etc.) to be able to make the user to take same output as originally one what composed in Host.
2. Kernel that control and management the whole procedure include of Control flow and Printing Job before transfer to Engine system.

2.2.6.3 Data and Control Flow



Note: (*) is role of N/W I/F

The above Block Diagram is explained that:

Host Side is made up of

1. Driver that is Windows application software translate printed data to one of printer language and create spooler file.
2. Web-based Application that offer a various printer additional functions, management of printing job, printer administration, Status monitor to monitoring the printer status by real time in Web, independent environment on OS.
3. Stand-alone Application that is a similar Window software as same as above 2,
4. Port Monitor that manages the network communication between spooler and Network Interface Card, or various additional application and Network Interface Card,(this is, at first, make communication logical port, manage the data, transfer them from spooler to network port, and offer the result of printing).

Firmware Side is made up of

1. Network Interface Card is that relay the communication between Host and kernel using various network protocol.
2. Kernel is that manages the flow control of emulation procedure, receiving data from Host or Network card and printing with engine & rendering job,
3. Emulation is that interprets the various output data from selected emulation,
4. Engine is that prints rendered bit-map data to paper with required size and type by Kernel.

And then, for Job Spooling function for Multi-User, Multi-Printing that is occurred in Network printing and various additional printing functions, this Kernel use max. 10 Queuing systems in a memory.

In Printing, the two procedures are

(1) Case of using USB Port
- After user start to print the wanted document to PCL string or compressed GDI bit-map data, Driver translate the all graphic data of it and send data to host spooler. And then the spooler sends the data stream to the printer via USB port.
- Kernel receives this data from Host, and then select emulation fit to data and start selected one. After emulation job end, Kernel sends the output bit-map data to Engine using Printer Video Controller (by clock type for LSU).
- Engine print the received data to required paper with the sequential developing process.

(2) Case of using Network Interface Card
- After user start to print the wanted document to PCL string or compressed GDI bit-map data, Driver translate the all graphic data of it and send data to host spooler.
- If so, Port monitor managing network port receives data from spooler and sends a data stream to the Network Interface Card.
- Network interface card receives it and send to Kernel part.
- Kernel receives this data from Host, and then select emulation fit to data and start selected one. After emulation job end, Kernel sends the output bit-map data to Engine using Printer Video Controller (by clock type for LSU).
- Engine print the received data to required paper with the sequential developing process.

The additional printing function are realized in

(1) Web environment
(2) Window environment.

On addition, Kernel informs a status of printing status and printer status to user made printing job with the Status Monitor.