2. Product specification and description

2.1. Product Specification

2.1.1. Product Overview

1) **Speed**
   - Up to 20 ppm in A4 (21 ppm in Letter)
2) **Printing Resolution**
   - Up to 1,200 x 1,200 dpi effective output
3) **Processor**
   - 600 MHz (A1500 CPU)
4) **Printer Language Emulation**
   - SPL
5) **Memory**
   - 128 MB
6) **Interface**
   - High speed USB 2.0
   - 10/100 BaseTX network connector
   - 802.11b/g/n wireless LAN (M2070W / M2070FW)
     - Wireless model supports NFC printing.
7) **Toner cartridge**
   - Initial : 500 pages
   - Sales : 1,000 pages

2.1.2. Specifications

- Product Specifications are subject to change without notice.

2.1.2.1. General Print Engine

Item		Specification
Engine Speed	Simplex	Up to 20 ppm in A4 (21 ppm in Letter)
Warmup time	From Sleep	Less than 30 seconds
FPOT	From Ready	Less than 8.5 seconds
	From Sleep	Less than 15.5 seconds
Resolution		Up to 1,200 x 1,200 dpi effective output

2.1.2.2. Copier

Item		Specification
Copy Speed	Simplex to Simplex	Up to 20 ppm in A4 (21 ppm in Letter)
FCOT (B&W)	From Ready	Less than 14 seconds (from platen)
Copy Resolution	Text	• Scan: 300 x 300 dpi , Printing : 600 x 600 dpi @ ADF • Scan: 600 x 300 dpi , Printing : 600 x 600 dpi @ Platen
	Text/Photo	• Scan: 300 x 300 dpi , Printing : 600 x 600 dpi @ ADF • Scan : 600 x 300 dpi , Printing : 600 x 600 dpi @ Platen
	Photo	• Scan: 600 x 300 dpi , Printing : 600 x 600 dpi @ ADF • Scan: 600 x 600 dpi , Printing : 600 x 600 dpi @ Platen
Original Type	Factory Default	Text/Photo
Max. Original Size	Platen	A4
	ADF	Legal (8.5" x 14")
Basic Copy	Multi Copy	1~99
	Automatic Paper Selection	No
	Manual Paper Selection	No
	Duplex Copy	No
	Darkness Control	11 Levels
	Reduce & Enlarge	25% to 400%

2.1.2.3. Scan Specification

Item		Specification
Scan Method		Color CIS
Compatibility		TWAIN, WIA
Scan Speed	Linearity, Halftone	15 sec on Platen, 15 sec on ADF @ 300dpi
	Gray	23 sec on Platen, 26 sec on ADF @ 300dpi
	Color	• 256 Color 300 dpi : 65 sec on Platen, 70 sec on ADF • True Color 300 dpi : 70 sec on Platen, 70 sec on ADF
Resolution	Optical	1,200 x 1,200 dpi
	Enhanced	4,800 x 4,800 dpi
Halftone		256 levels
Scan Size	Max. Document Width	Max. 216 mm (8.5")
	Effective Scan Width	Max. 208 mm (8.2")
	Max. Document Length	• ADF : 356 mm (14") • Platen : 297 mm (11.7")
	Effective Scan Length	• ADF : 348 mm (13.7") • Platen : 289 mm (11.4")
Scan Depth	Color	Internal: 16 bit x 3, External : 8 bit x 3
	Mono	• 1 bit for Lineart & Halftone • 8 bits for Gray scale
ADF	Capacity	40 sheets @ 75 gsm
	Document Size	• Width : 142 ~ 216 mm • Length : 148 ~ 356 mm

2.1.2.4. Fax

Item		Specification
Compatibility		ITU-T G3, ECM
Communication System		PSTN/PABX
Modem Speed		33.6 Kbps
TX Speed		Approx. 3 sec (Mono/Standard/ECM-MMR, @ ITU-T G3 No.1)
Compression		MH/ MR/ MMR/ JBIG/ JPEG (Tx Only)
Color Fax		Yes (Tx only)
ECM		Yes
Resolution (Mono)	Std	203 x 98 dpi
	Fine	203 x 196 dpi
	S.Fine	300 x 300 dpi
Telephone Features	Handset	No
	On hook Dial	Yes
	Search	Yes (Phone Book)
	Speed Dial	200 locations
	Group Dial	100 Groups
	TAD I/F	Yes
	Tone/Pulse	Yes (Selectable in Tech Mode)
	Pause	Yes
	Auto Redial	Yes
	Last Number Redial	Yes
	Caller ID	Yes
	External Phone Interface	Yes

2.1.2.5. Controller and Software

Item		Specification
Processor		600 MHz (A1500 CPU)
Memory	Std.	128 MB
	Memory expansion	N/A
Printer Languages		SPL
Fonts		Windows Fonts
Print Driver	Default Driver	SPL
	Install	SPL
	Supporting OS	XP(32/64bits)/ Vista(32/64bits)/ 2003 Server(32/64bits)/ 2008 Server(32/64bits)/ 7(32/64bits)/ 2008 Server R2(64bits)/ 8(32/64bits)
		Linux • Red Hat Enterprise Linux 5, 6 • Fedora 11, 12, 13, 14, 15, 16, 17, 18 • openSUSE 11.0, 11.1, 11.2, 11.3, 11.4, 12.1, 12.2, 12.3 • Ubuntu 10.04, 10.10, 11.04, 11.10, 12.04, 12.10 • SUSE Linux Enterprise Desktop 10, 11 • Debian 5.0, 6.0 • Mint 13, 14
		Mac OS X 10.5 ~ 10.8
	WHQL	Vista(32/64bits)/ 7(32/64bits)/ 8(32/64bits)
	Compatibility	XP(32/64bits)/ Vista(32/64bits)/ 2003 Server(32/64bits)/ 2008 Server(32/64bits)/ 7(32/64bits)/ 2008 Server R2(64bits)/ 8(32/64bits)
Scan Driver	TWAIN	Yes
	WIA	Yes
	ICDM	Yes
	Supporting OS	XP(32/64bits)/ Vista(32/64bits)/ 2003 Server(32/64bits)/ 2008 Server(32/64bits)/ 7(32/64bits)/ 2008 Server R2(64bits)/ 8(32/64bits)
		Linux • Red Hat Enterprise Linux 5, 6 • Fedora 11, 12, 13, 14, 15, 16, 17, 18 • openSUSE 11.0, 11.1, 11.2, 11.3, 11.4, 12.1, 12.2, 12.3 • Ubuntu 10.04, 10.10, 11.04, 11.10, 12.04, 12.10 • SUSE Linux Enterprise Desktop 10, 11 • Debian 5.0, 6.0 • Mint 13, 14
		Mac OS X 10.5 ~ 10.8

Item		Specification
Wired Network	Protocol	TCP/IPv4/IPv6, HTTP, SNMPv1/v2c/v3, DNS/WINS, DDNS, DHCP, BOOTP, AutoIP, Standard TCP/IP printing, LPR, IPP, UPnP(SSDP), Bonjour, WSD, SLP, SetIP
	Supporting OS	[Windows] • XP(32/64bits)/ Vista(32/64bits)/ 2003 Server(32/64bits)/ 2008 Server(32/64bits)/ 7(32/64bits)/ 2008 Server R2(64bits)/ 8(32/64bits) [Mac] • Mac OS X 10.5~10.8 [Linux] • RedHat Enterprise Linux WS 4, 5 (32/64 bit) • Fedora 5, 6, 7, 8, 9, 10, 11, 12, 13 (32/64 bit) • SuSE Linux 10.1 (32 bit) • OpenSuSE 10.2, 10.3, 11.0, 11.1, 11.2 (32/64 bit) • Mandriva 2007, 2008, 2009, 2009.1, 2010 (32/64 bit) • Ubuntu 6.06, 6.10, 7.04, 7.10, 8.04, 8.10, 9.04, 9.10, 10.04 (32/64 bit) • SuSE Linux Enterprise Desktop 10, 11 (32/64 bit) • Debian 4.0, 5.0 (32/64 bit)
Wireless Network (M2070W/ M2070FW only)	Protocol	802.11 b/g/n
	Supporting OS	Same as wired network
Application	Samsung Easy Printer Manager Smart Panel Network Management	For Windows and Macintosh For Linux SyncThru Web Service 2.0
Interface	Parallel	N/A
	USB	High speed USB 2.0

2.1.2.6. Paper Handling

Item		Specification
Standard Capacity		150-sheet Multi Purpose Tray @ 80 g/m²
Max. Capacity		150-sheet @ 80 g/m²
Printing	Max. Size	216 x 356 mm (8.5" x 14.02")
	Min. Size	76 x 183 mm (3.0" x 7.2")
Standard Cassette Tray		N/A
Multi-purpose Tray (Bin type)	Capacity	• Plain Paper : 150 sheets @ 80 g/m² • Envelop : 1 sheet @ 80 g/m²
	Media sizes	A4, A5, Letter, Legal, Executive, Folio, Oficio, B5(ISO), B5(JIS), Envelope(Monarch, No.10, DL, C5), Custom
	Media type	Plain ,Thin, Cotton, Recycled, Archive, Colored, Pre-Printed, Label, Bond, Thick, Envelopes, Cardstock
	Media weight	16~43 lb (60 to 163 g/m²)
	Sensing	N/A
Optional Cassette Tray		N/A
Output Stacking	Capacity	• Face-Down : 100 sheets @ 80 g/m²
	Output Full sensing	N/A
Duplex	Supporting	N/A
Printable Area	Non-Printable Area	• 3 mm (0.12") from edge (Top, Bottom, Left, Right)

2.1.2.7. Consumables

Item		Specification
Toner Cartridge	Part name	MLT-D111S
	Average yield	• Average Cartridge Yield 1,000 standard pages (Ships with 500 pages Starter Toner Cartridge) **NOTE** Declared yield value in accordance with ISO/IEC 19752.

NOTE

Depending on the options, percentage of image area, and job mode used, the toner cartridge's lifespan may differ.

2.1.2.8. Maintenance Part

Item	Part Code	Life
Fuser Unit	• JC91–01077A (220V) • JC91–01076A (110V)	30,000 Pages
Transfer Roller	JC66–02709A	30,000 Pages
Pick-Up Roller Assy	JC93–00525A	30,000 Pages
Friction Pad	JC93–00522A	30,000 Pages

2.1.2.9. Reliability and Service

Items	Specification
Printing Volume (SET AMPV)	75 sheets/month
MPBF	20,000 sheets
MTTR	30 min.
SET Life Cycle	30,000 sheets or 5 years (whichever comes first)

2.1.2.10. Environment

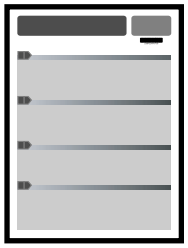
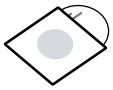
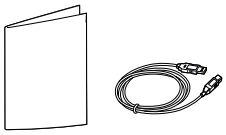
Item		Specification
Dimension (W x D x H)	Machine	• M2070/ M2070W : 389 x 274 x 249 mm (15.3 x 10.8 x 9.8 inches) • M2070F/ M2070FW : 402 x 293 x 296 mm (15.8 x 11.5 x 11.7 inches)
Weight	Machine with consumables	• M2070/ M2070W : 6.65 Kg (14.66 lbs) • M2070F/ M2070FW : 8.0 Kg (17.64 lbs)
Noise Level *	Ready mode	Less than 26 dB (A)
	Print mode	Less than 50 dB (A)
	Copy mode	• Scanner glass : Less than 52 dB (A) • Document feeder : Less than 51 dB (A)
	Scan mode	• Scanner glass : Less than 52 dB (A) • Document feeder : Less than 53 dB (A)
Temperature	Operation	10 ~ 32 °C (50 ~ 90 °F)
Humidity	Operation	20 ~ 80% RH
Power rating **	110 volt models	AC 110 - 127 V
	220 volt models	AC 220 - 240 V
Power Consumption	Average operating mode	Less than 230 W
	Ready mode	Less than 35 W
	Power save mode	Less than 1.0 W
	Power off mode	Less than 0.45 W (0.1 W ***)

* Sound Pressure Level, ISO 7779. Configuration tested: basic machine installation, A4 paper, simplex printing.

** See the rating label on the machine for the correct voltage (V), frequency (hertz) and type of current (A) for your machine.

*** For the machine that has a power switch.

2.1.2.11. Accessories

Image	Item	Remark
	Power cord	
	Quick installation guide	
	Software CD	The software CD contains the printer drivers and software applications.
	Misc. accessories	Miscellaneous accessories included with your machine may vary by country of purchase and specific model.

2.1.3. Model Comparison Table

		Samsung M2070FW	Samsung SCX-3405FW	HP M1212nf
Image				
Speed (A4)		20 ppm	20 ppm	18 ppm
FPOT (from ready)		less than 8.5 sec	less than 8.5 sec	less than 8.5 sec
Processor		600 MHz	433 MHz	400 MHz
Memory		128 MB	64 MB	64 MB
Emulation		GDI	GDI	GDI
Paper Capacity	Input	150 Bin	150 Bin	150 Bin
	Output	100 sheet	100 sheet	100 sheet
	ADF	40 sheet	40 sheet	35 sheet
Noise		50 dBA	50 dBA	51 dBA
Toner Cartridge		1.0K (0.5K)	1.5K (0.7K)	1.6K (0.7K)

2.2. System Overview

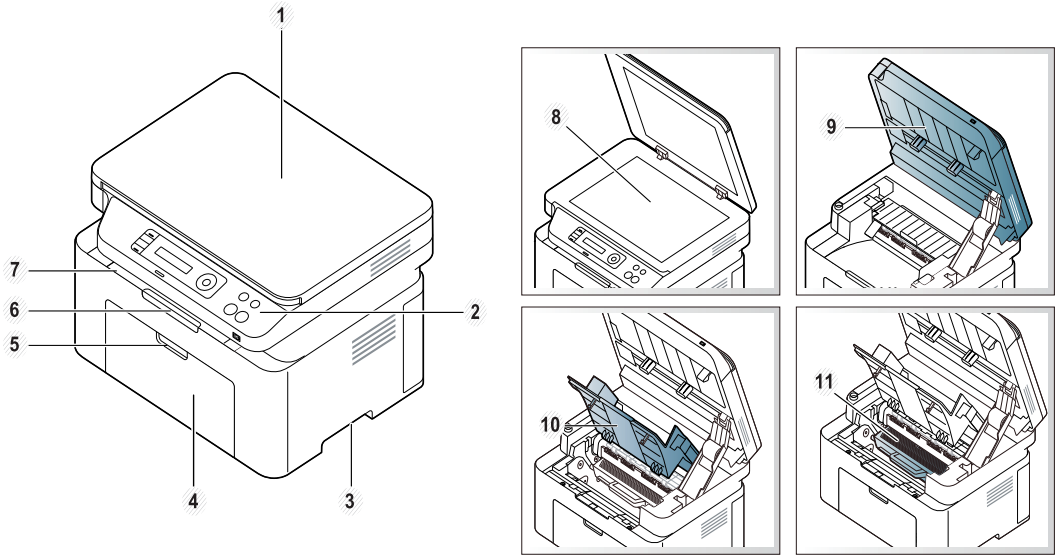
This chapter describes the functions and operating principal of the main component.

2.2.1. Front View

NOTE

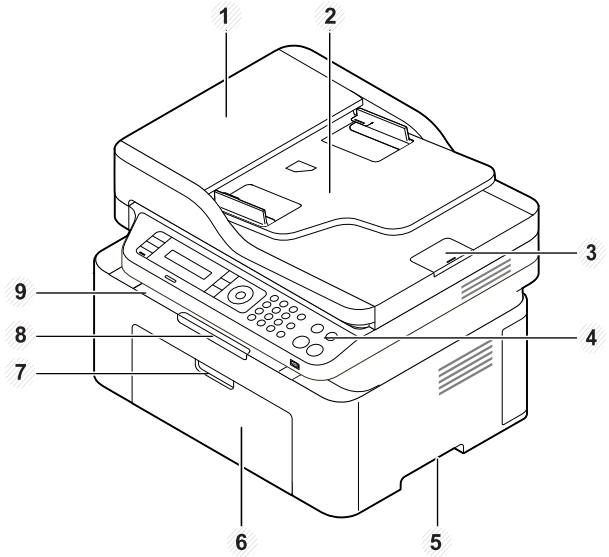
- This illustration may differ from your machine depending on your model. There are various types of machine.
- Some features and optional goods may not be available depending on model or country.

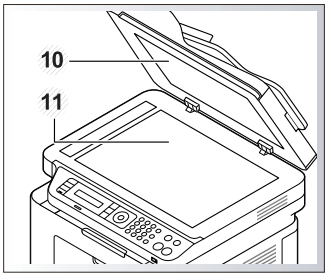
M2070 / M2070W

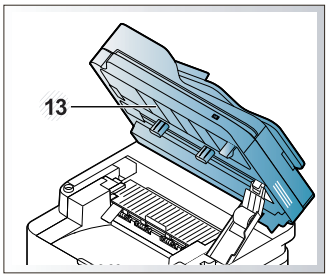


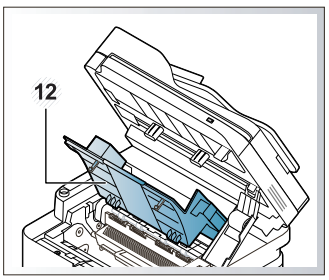
1	Scanner lid
2	Control panel
3	Handle
4	Tray
5	Tray handle
6	Output support
7	Output tray
8	Scanner glass
9	Scan unit
10	Inner cover
11	Toner cartridge

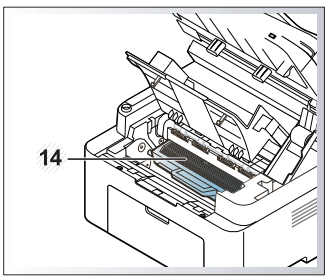
M2070F / M2070FW











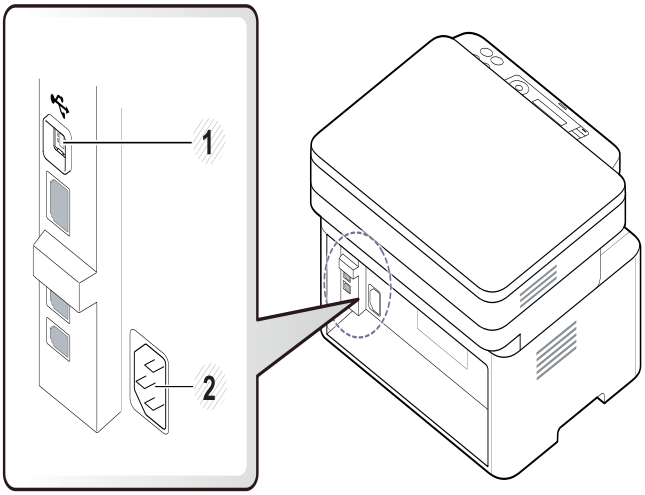
1	Document feeder cover
2	Document feeder guide cover
3	Document feeder output support
4	Control panel
5	Handle
6	Tray
7	Tray handle
8	Output support
9	Output tray
10	Scanner lid
11	Scanner glass
12	Inner cover
13	Automatic Document Feeder (ADF)
14	Toner cartridge

2.2.2. Rear view

NOTE

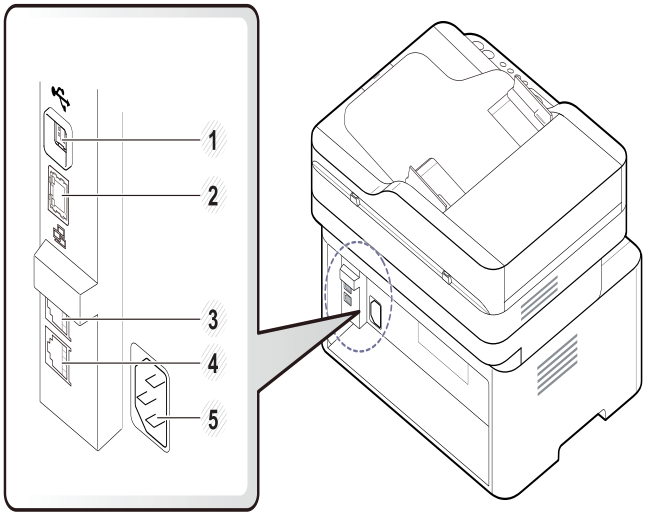
- This illustration may differ from your machine depending on your model. There are various types of machine.
- Some features and optional goods may not be available depending on model or country.

M2070 / M2070W



1	USB port
2	Power receptacle

M2070F / M2070FW

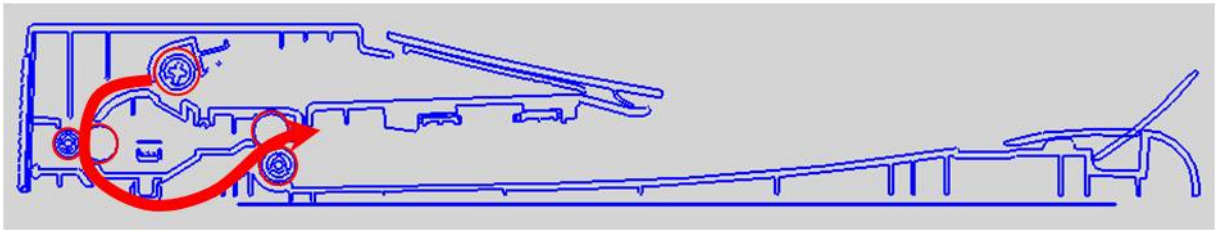


1	USB port
2	Network port **NOTE** M207xFW Series only.
3	Extension telephone socket (EXT.)
4	Telephone line socket (LINE)
5	Power receptacle

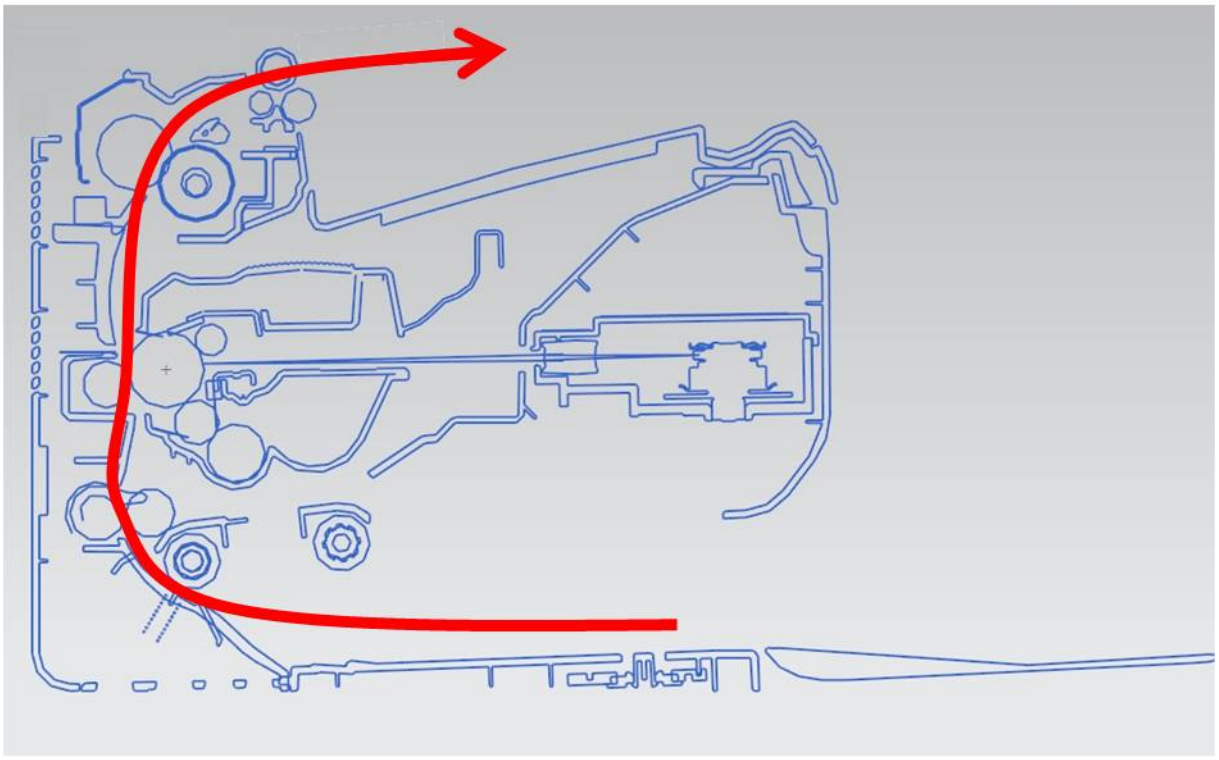
2.2.3. Paper Path

The following diagram displays the path the paper follows during the printing process.

[ADF]



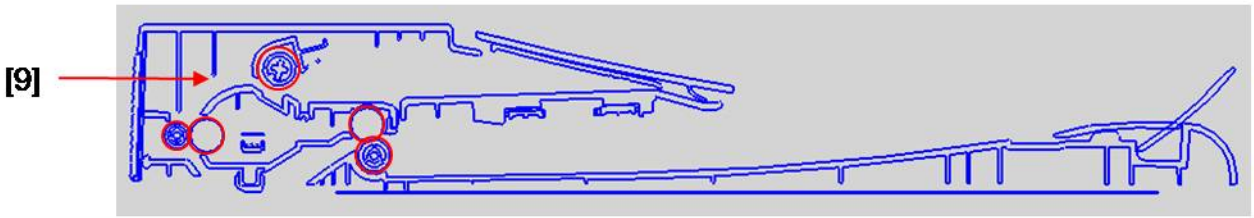
[Engine]



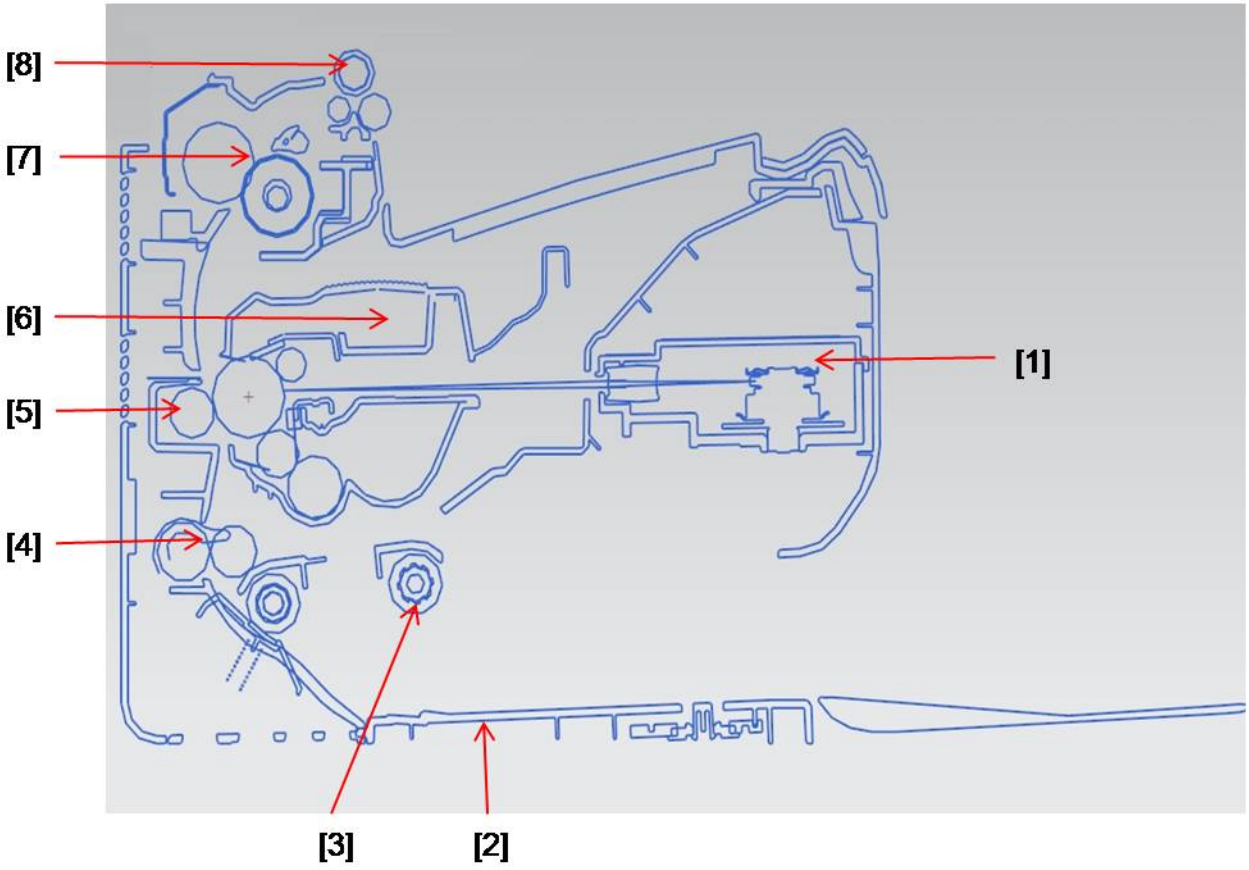
2.2.4. System Layout

This model consists of the scanner parts, engine parts, hardware parts, firmware. The scanner parts consists of ADF and platen. The engine parts consists of the mechanical parts comprising Frame, Toner Cartridge, Drive Unit, Transfer roller, Pick up unit, Fuser, Bin-tray. The hardware parts consists of the main board, SMPS/HVPS board, OPE board, PC interface.

[ADF]



[Engine]



1	LSU
2	Plate-Bottom
3	Pick up roller
4	Feed roller
5	Transfer roller

6	Toner cartridge
7	Fuser unit
8	Exit roller1
9	ADF

2.2.4.1. Feeding Part

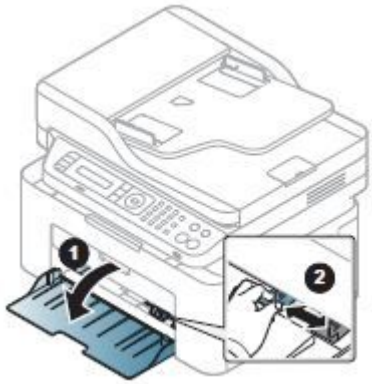
It is consists of a bin-type tray, pick-up roller, friction pad and parts related to paper feed initialization.

1) Input Tray

This model has a bin-type tray.

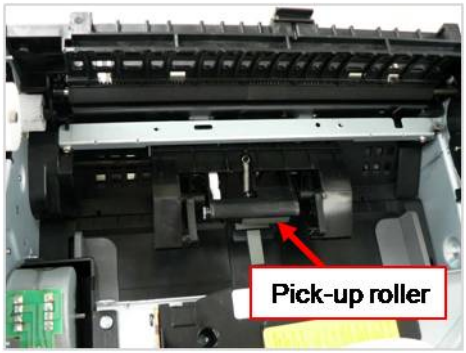
It takes a center loading method and applies ‘friction pad separating method.’

The side guide can be adjusted for various types of papers from A6 to legal size paper. It has a paper detecting function, paper arranging function.



2) 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 driven by clutch.



2.2.4.2. Transfer Roller

The transfer roller delivers the toner of the OPC drum to the paper.

- Life Span : Print over 30,000 sheets (in 15~30°C)

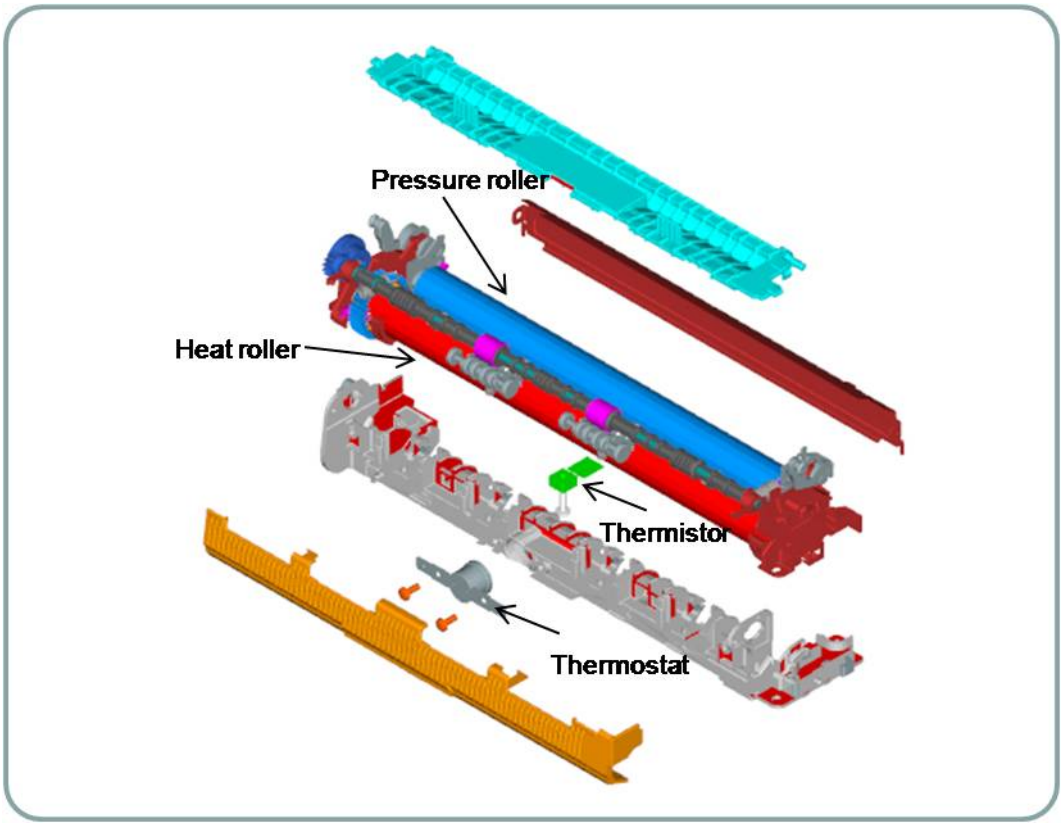
2.2.4.3. Drive Unit

In Xpress M2070 series, the driving device consists of OPC, Pick- up, Feed, Fuser, Gear- Train connected with mounting member. A step motor for driving is assembled to the left frame.

- Driving Frequency: Step Motor 810 PPS (1013 rpm)
- It is a power delivery unit by gearing: Step Motor → Pick-up/ Feeder/ OPC/ Fuser/ Exit

2.2.4.4. Fuser Unit

This unit consists of Heat Roller, a Thermostat, and Thermistor, etc. It fuses the toner that was transferred by the transfer roller onto the paper, by applying heat and pressure to complete fusing process.



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 : 195°C ± 5°C

2) **Thermistor**

It is a temperature detecting sensor.

- Temperature Resistance : 7 kΩ(180°C)

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 and is permanently fused.

5) **Halogen Lamp**

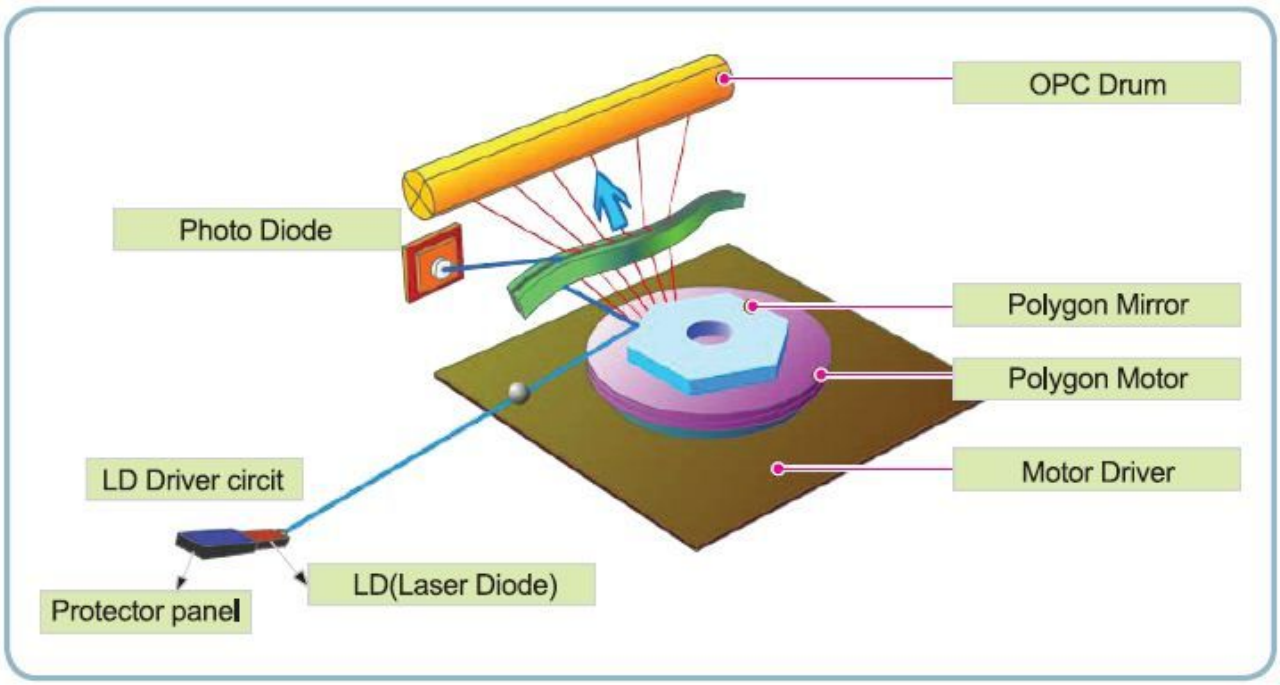
- Voltage : 120 V (115 ± 5 %) / 220 V : 230 ± 5 %
- Capacity : 850 Watt ± 25 W

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.

2.2.4.5. LSU (Laser Scanner Unit)

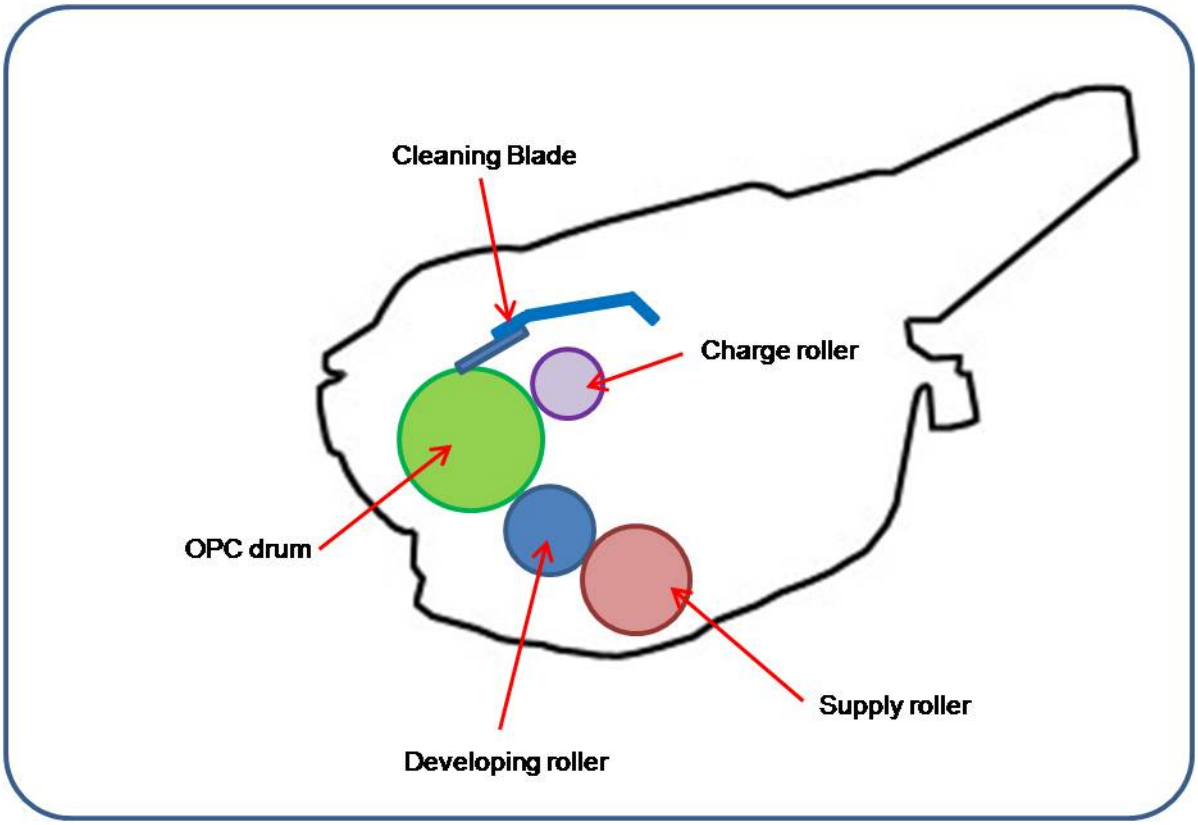
It is the core part of the LBP (Laser Beam Printer) which switches from the video data received to the controller to the electrostatic latent image on the OPC drum by controlling laser beam, exposing OPC drum, and turning principle of polygon mirror. The OPC drum is turned with the paper feeding speed. 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.



2.2.4.6. 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 developing unit has toner, supply roller, developing roller, and blade.

- Developing Method : Non magnetic single component non-contacting method
- Toner : Non magnetic single component pulverized type toner
- The life span of toner (ISO 19752 pattern / A4 standard)
  - Initial toner : 500 pages
  - Sales toner : 1,000 pages
- 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
- Classifying device for toner cartridge: ID is classified by CRUM

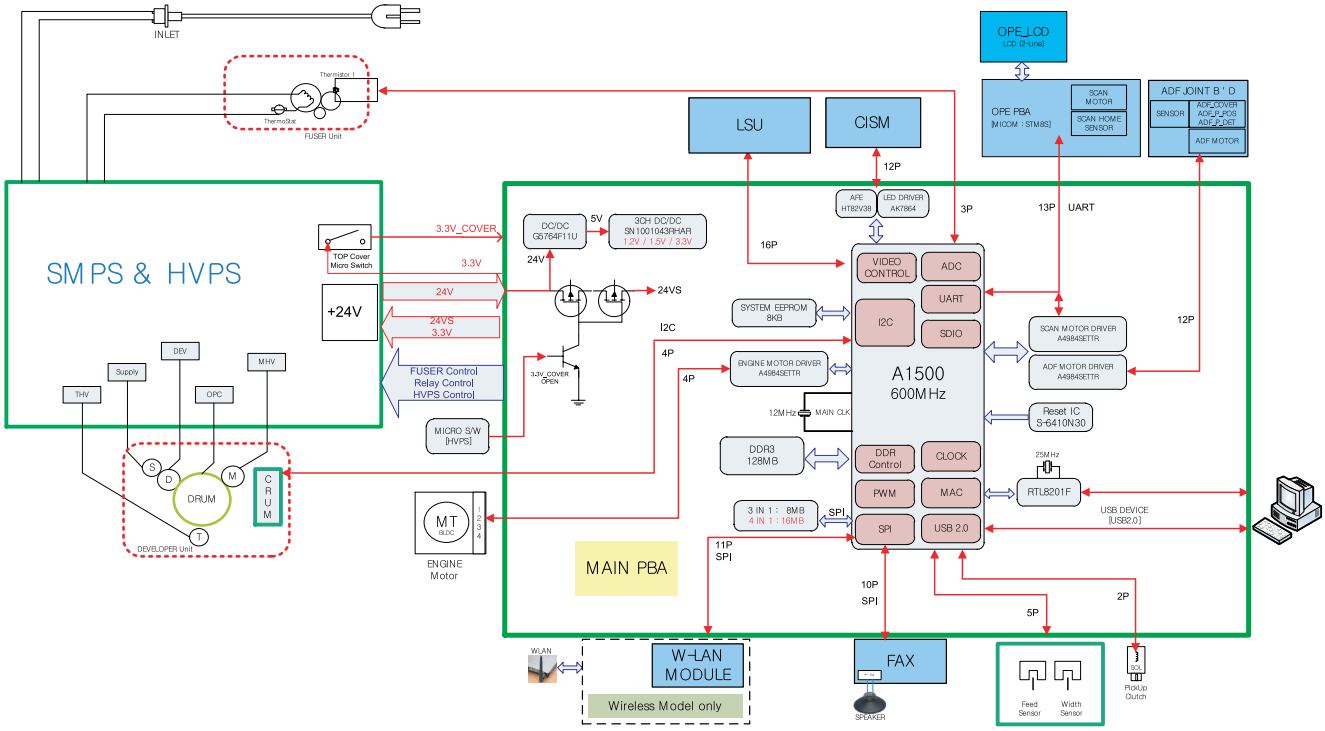


2.2.5. Hardware configuration

Xpress M2070 series Electrical Circuit System consists of the following:

- Main board (System board)
- OPE board
- HVPS/SMPS board
- Wireless board (Only M207xW, M207xFW)
- Fax board

Diagram of the M2070 series Electrical Circuit



M2070 series has a system board of integrated engine controller and video controller.

The engine controller controls all modules required to print, that is, LSU, HVPS/SMPS, Fuser, Motor etc. It communicates with the video control block inside CPU for printing. And it has the interface for all video sync signal to print out the video data.

The video controller receives print data from the host through network or USB Port. It takes this information and generates printable video bitmap data.

The main board is adopted 600MHz (A1500) CPU that is integrated with engine controller, video controller, SDRAM, Flash ROM. It uses SDRAM and Flash ROM inside the ASIC chip.

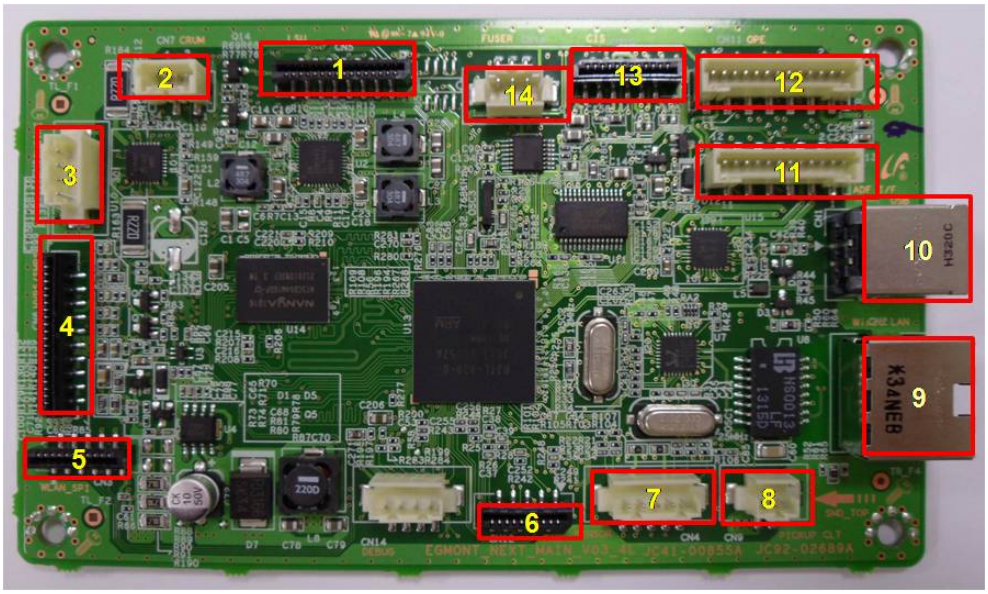
2.2.5.1. Main board

A1500 chip is adopted as the main processor. Its process speed is 600 MHz. It is integrated engine controller, video controller, scan controller.

DDR2 128MB is adopted for high speed data processing.

USB is the embedded type and wired network supports 100M full duplex.

[Main board image]



- **Connection**

1	LSU connector
2	CRUM connector
3	Engine Motor connector
4	SMPS/HVPS interface connector
5	Wireless module interface connector
6	Fax board interface connector
7	Sensor connector

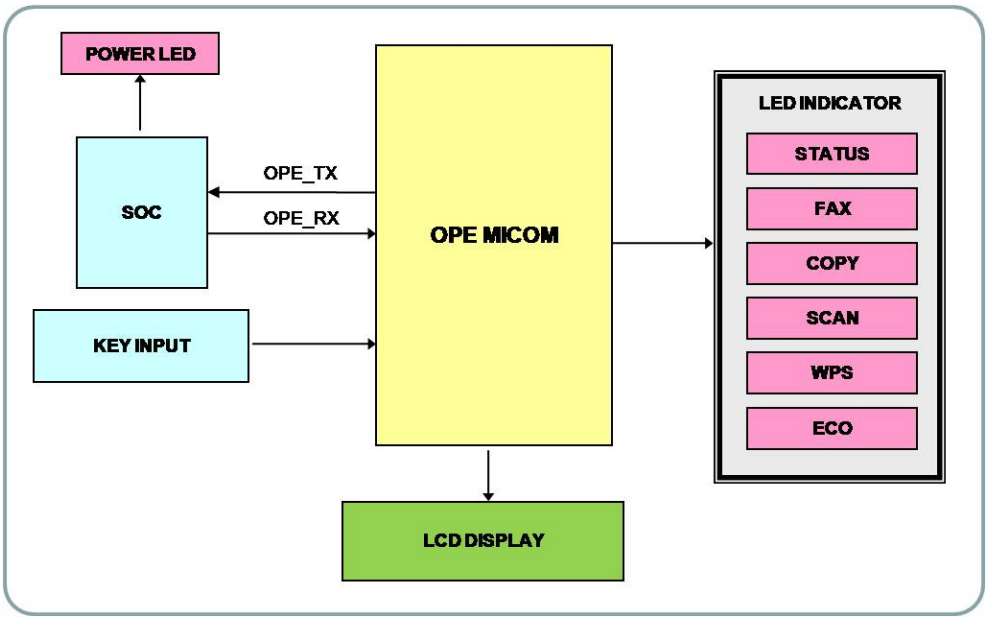
8	Pick up connector
9	Wired network connector
10	USB device connector
11	ADF Module interface connector
12	OPE connector
13	CIS interface connector
14	Fuser thermistor interface connector

- **Information**
  - Part code
    - M2070 : JC92-02688B
    - M2070W : JC92-02688A
    - M2070F : JC92-02689B
    - M2070FW : JC92-02689A
  - Part name : PBA-MAIN

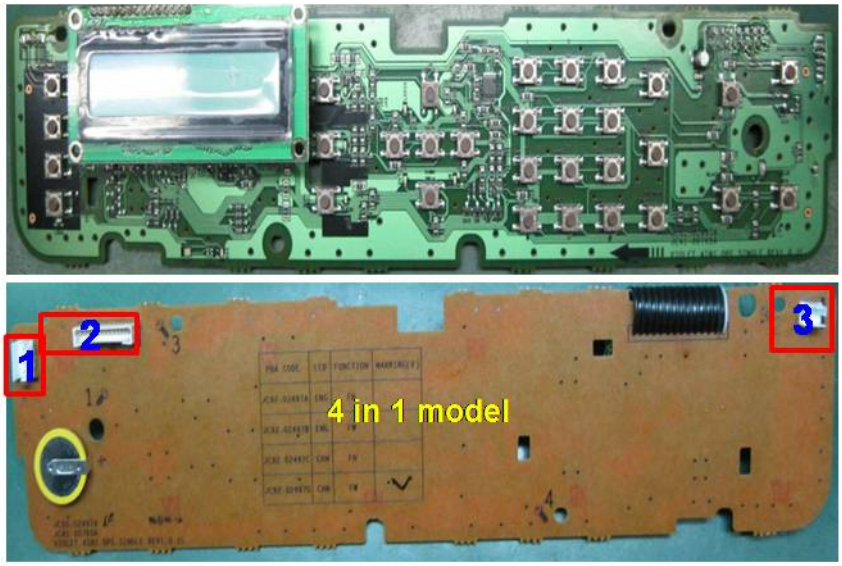
2.2.5.2. OPE board

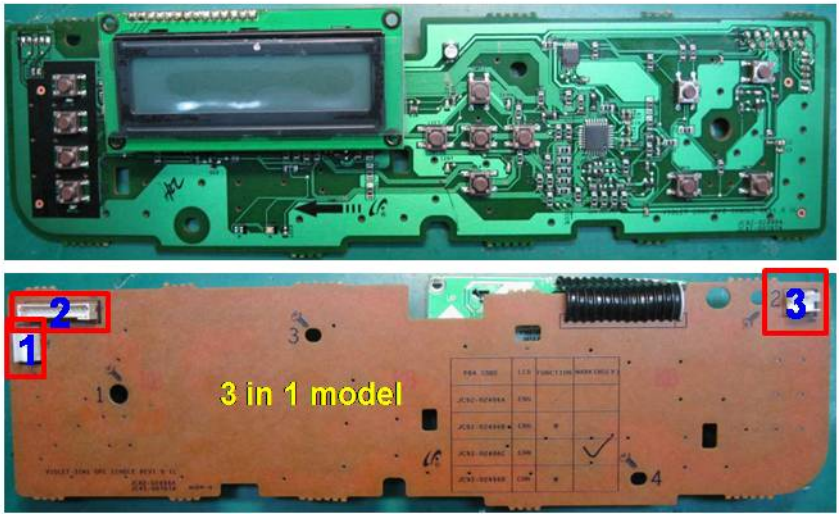
The OPE controller is composed of an OPE MICOM, Status LED, buttons. It communicates with main controller via UART. The power LED is controlled by the main board.

- **OPE board diagram**



- **OPE board image**





- **Information**
  - Part code
    - M2070 : JC92-02496A
    - M2070W : JC92-02496B
    - M2070F : JC92-02497A
    - M2070FW : JC92-02497B
  - Part name : PBA-OPE

- **Connection**

1	Platen step motor connector
2	Interface connector to main board
3	Scan home sensor connector

2.2.5.3. Fax board

Fax controller (FCON) controls the fax sending and receiving. The Connexant DAA (Data Access Arrangement) solution is applied to this board. It consists of three chip solutions : CX82500(SFM336), CX20493(LSD), CX20437(Codec)

- **Information**
  - Part Code : JC92–02569A
  - Part Name : PBA-LIU
- **Connection**

1	Interface connector to main controller
2	Speaker interface

2.2.5.4. Wireless LAN board (wireless model only)

The Wireless LAN Module supports 802.11b/g/n. It communicates with video controller via SPI.

[WLAN board image]

- **Information**
  - Part Code : JC92–02517A
  - PBA name : PBA-WNPC
- **Connection**

1	Interface connector to main board

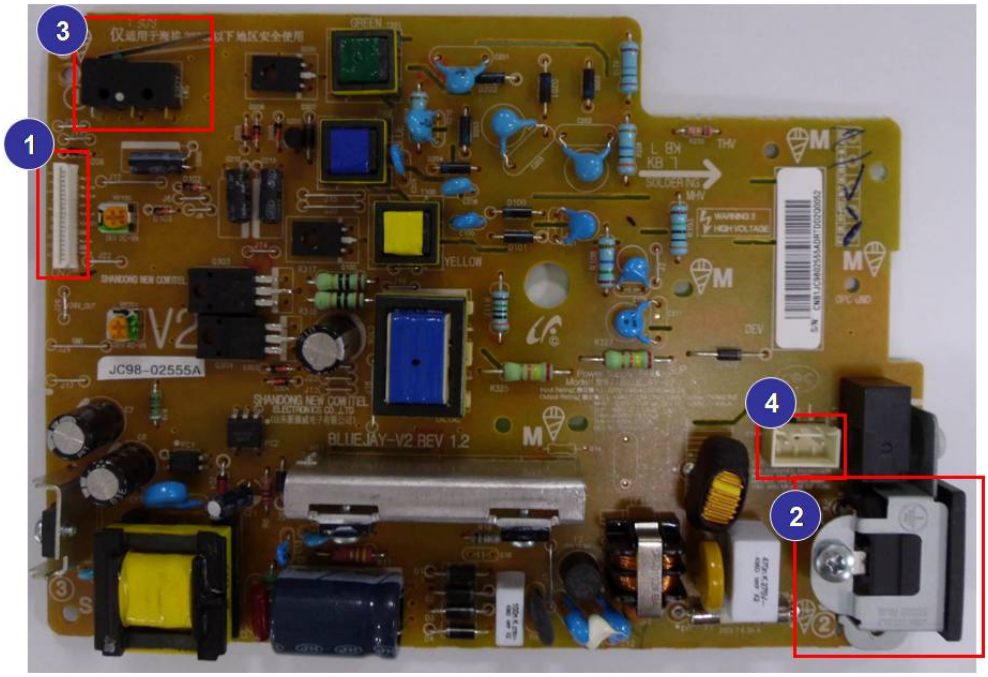
2.2.5.5. SMPS/HVPS board

M2070 series has a power board of integrated SMPS and HVPS.

The SMPS (Switching Mode Power Supply) Board supplies electric power to the Main Board and other boards through a Main Controller. The voltage provided includes +24V from a 110V/220V power input.

The HVPS board generates high-voltage channels which includes MHV, DEV DC, DEV AC, SUPPLY, THV.

[SMPS/HVPS board image]



- **Specification**
  - General Input / Output Voltage
  - AC 110V (110V ~ 127V)
  - AC 220V (220V ~ 240V)
  - Input Current : 8.0A (110V) / 6.3A (220V)
  - Output Power: 43.2W
    - DC 24V : 43.2W

- **Information**

	110V	220V
Part Code	JC44–00208A	JC44–00209A
PBA name	SMPS/HVPS V1	SMPS/HVPS V2

- **Connection**

1	Main Board interface connector
2	AC_Inlet
3	COVER OPEN/CLOSE Switch
4	FUSER_AC Output

- **Input / Output connector**

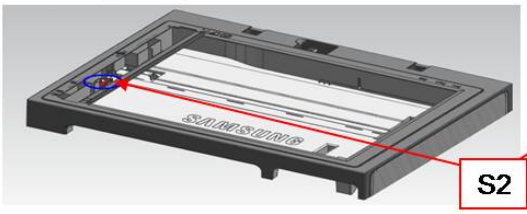
AC Output Connector(CN1)		
Pin Assign	Pin No.	Description
1	AC_L	AC Output for Heater Controller
2	AC_N	

DC Output Connector (CN2)		
PIN NO	PIN ASSIGN	Description
1	THV_READ	HVPS
2	PWM_MHV	HVPS
3	nTHV_EN	HVPS
4	PWM_DEV_DC	HVPS
5	+3.3V OPEN	COVER ON, OFF DETECT
6	PWM_DEV_AC	HVPS
7	+3.3V	COVER ON, OFF DETECT
8	nDEV_EN	HVPS
9	PWM_THV	HVPS
10	VPP_DEV_AC	HVPS
11	GND	Common Ground
12	+24VS1	Relay, Fuser
13	GND	Common Ground
14	GND	Common Ground
15	+24V	SMPS
16	RELAY_ON	AC RELAY ON (ACTIVE HIGH)
17	+24V	SMPS
18	GND	Common Ground
19	+24V	SMPS
20	FUSER_ON	FUSER_ON (ACTIVE HIGH)

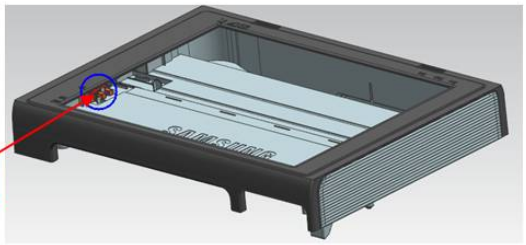
2.2.5.6. Electrical Parts Location

1) Sensors

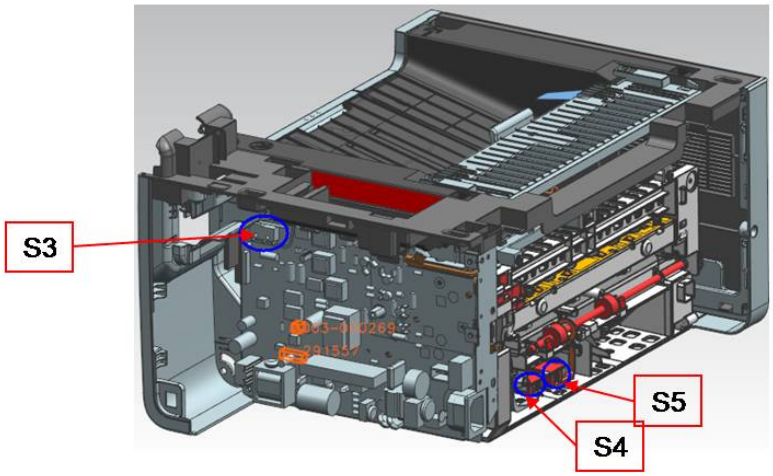
Platen (4 in 1)



Platen (3 in 1)



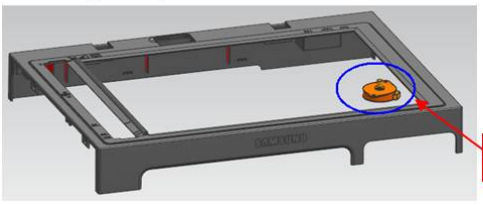
Frame



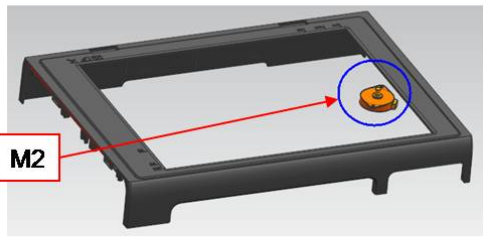
No.	Description	Controller	Function
S2	Photo interrupter (Home Position sensor)	Main board	CIS detection
S3	Switch Front Cover	SMP/HVPS board	Cover open detection
S4	Photo interrupter (width Sensor)	Main board	Paper detection
S5	Photo interrupter (Feed Sensor)	Main board	Paper detection

2) Motor, Clutch

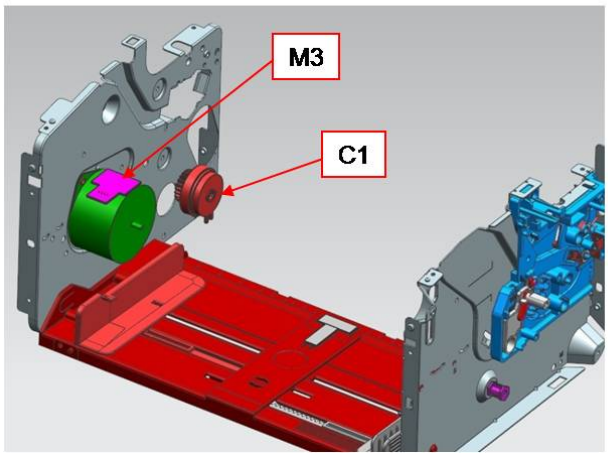
Platen (4 in 1)



Platen (3 in 1)



Frame



No.	Description
M2	Scan motor
M3	Main motor
C1	Pick up Clutch

2.2.5.7. NFC Tag Sticker

Near field communication (NFC) is a set of standards for smartphones and similar devices to establish radio communication with each other by touching them together or bringing them into close proximity, usually no more than a few centimeters. Present and anticipated applications include contactless transactions, data exchange, and simplified setup of more complex communications such as Wi-Fi. Communication is also possible between an NFC device and an unpowered NFC chip, called a "tag". NFC tag sticker stores Mac, PIN, Mobile Print App URL of Printer/MFP.

Front - label

Rear – Inlay & NFC chip

- **Information**
  - Part Code : JC68–03012A
  - Part Name : LABEL ETC-NFC TECTILE STICKER (25x25mm)

2.2.6. Engine F/W Contol Algorithm

2.2.6.1. Feeding

If feeding from a tray, the drive of the pickup roller is controlled by controlling the clutch. The on/off of the clutch 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 or Paper Empty	• After picking up, paper does not reach the Feed Sensor within a predetermined time. • After picking up, if the feed sensor is not on, re-pick up will be initiated. After re-picking up, if the feed sensor is not on after certain time, it is JAM 0 • Even though the paper reaches to the feed sensor, the feed sensor does not detect the lead edge of the paper.
JAM 1	• After the leading edge of the paper passes the feed sensor, the trailing edge of the paper does not clear the sensor the feed sensor after predetermined period of time.

2.2.6.2. 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 conditions. 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 environment, is changed through the AD converter. The voltage value for impressing to the transfer roller is decided by the changed value.

2.2.6.3. Fusing

The temperature change of the heat roller's surface is changed to the resistance value through the use of a thermistor. The Main Board uses the resistance value of the Thermistor and converts it to a voltage value through the use of an AD converter, the temperature is decided based on the voltage value read. The AC power is controlled 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 within a predetermined time, the engine defines Open Heat Error. When this error is detected, the engine stops all functions and keeps the error state. Also, the engine informs the error status of the main system, so it can take appropriate action; 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 detected, the engine stops all functions and keeps it at the error state. Also, the engine informs the error status of the main system, so it can take appropriate action; 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 detected for a specific duration, then the engine defines Over Heat Error. When this error is detected, the engine stops all functions and keeps it at the error state. Also, the engine informs the error status of the main system, so it can take appropriate action; and then the error message is displayed at LCD window or LED informing the error status of the user.

2.2.6.4. 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 or LED informing 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 or LED informing the error status of the user. LSU Error Recovery: If the LReady or Hsync error happens, the paper is exited before the error code is initiated. The engine mode is changed to recovery mode and the engine informs the main system of the engine mode. The engine rechecks the LSU error, if the error does not reoccur printing is resumed.

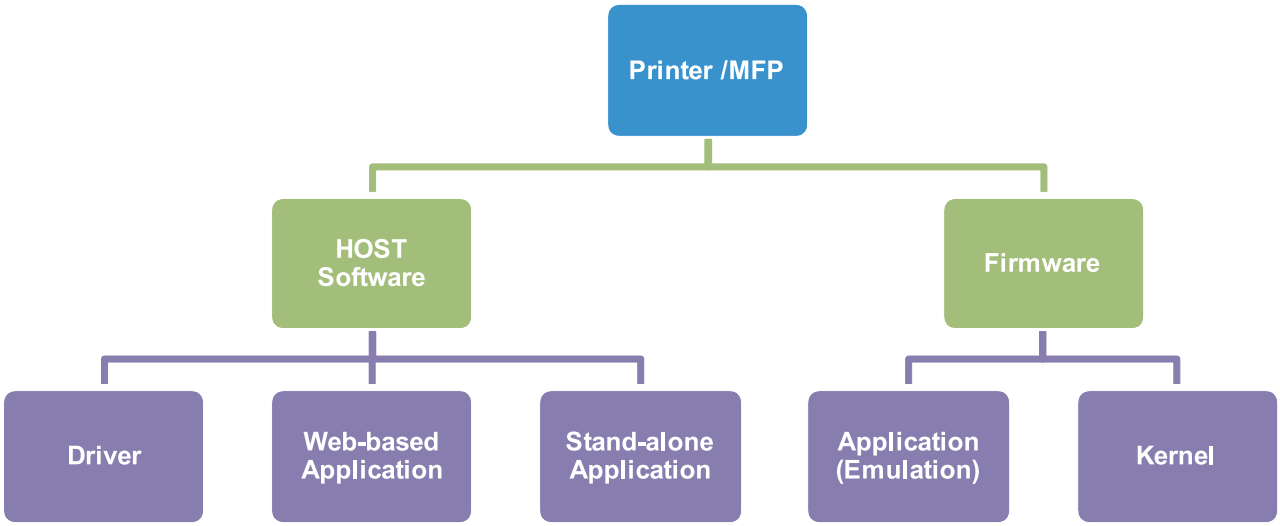
2.2.7. Software Descriptions

2.2.7.1. Software system overview

The software system of this model is constructed with

- Host Software part that the application software operated in Window and Web Environment
- Firmware parts that is a Embedded software controls printing job.

2.2.7.2. Architecture



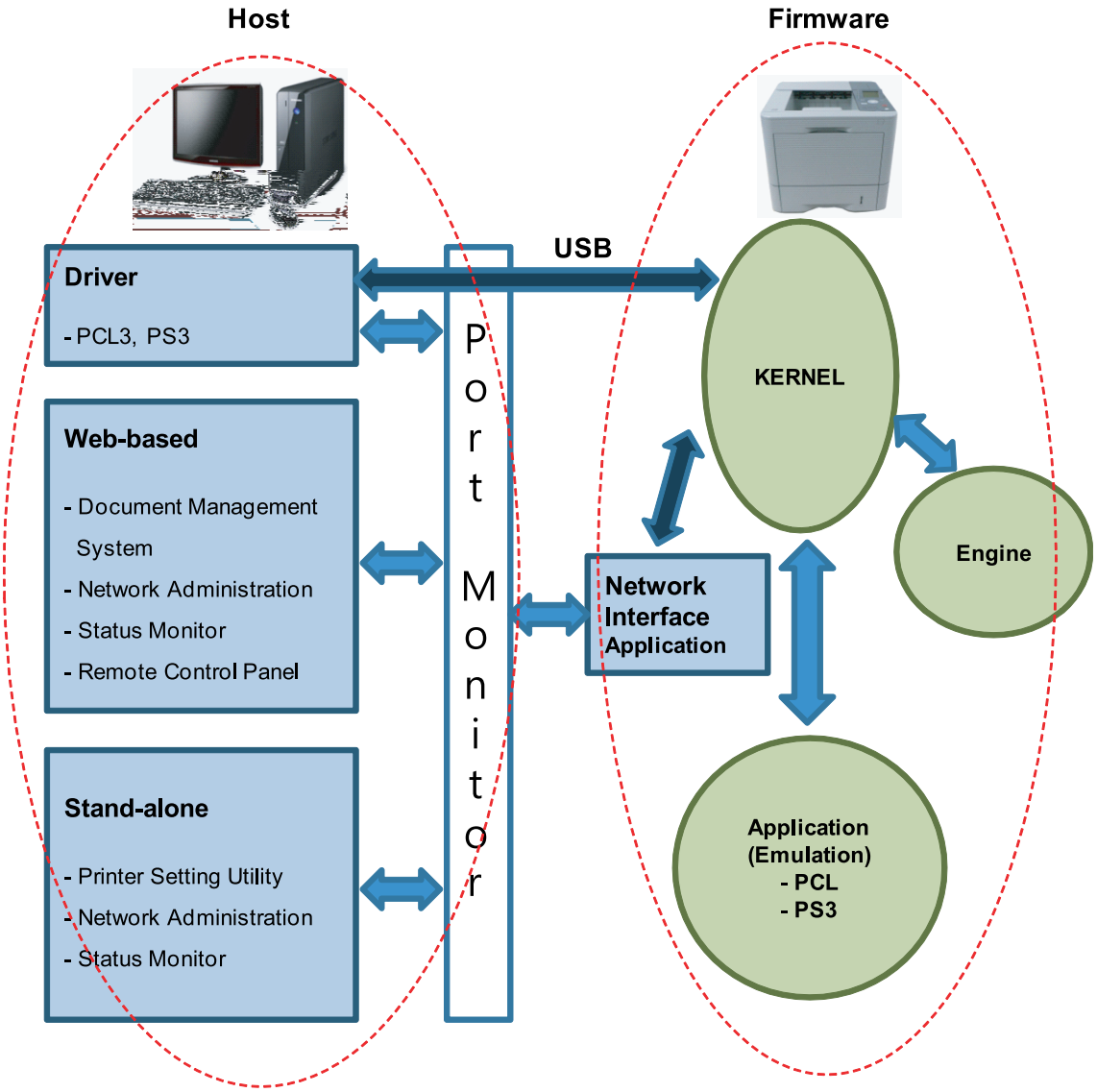
Host Software is made up of

1) Graphic User Interface offers the various editing functions to user in Host.
2) Driver translates the received document to a Printing Command language which printer can understand and transfers data to spooler.
3) Stand-alone Application offers the various printing application such as Easy Printer Manager, Printer Status in Window system.
4) Web-based-Application offers the same functions as Stand-alone Application in Web environment.

Firmware is made up of

1) Application (Emulation) that is a interpreter translates 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 controls and manage the whole procedure including Control flow and Printing Job before transferring to Engine system.

2.2.7.3. Data and Control Flow



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, the Driver translates the all graphic data of the client PC 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.

