

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	SCX-4824FN	SCX-4828FN
Net Dimension (W x D x H)	445.2 x 410.5 x 395.3mm (17.53 x 16.16 x 15.56 in)	445.2 x 410.5 x 395.3mm (17.53 x 16.16 x 15.56 in)
Packing Dimension (W x D x H)		
Weight with Consumables	13.6Kg(w/o Consumable 12.7Kg)	13.6Kg(w/o Consumable 12.7Kg)
Packing Weight		
LCD	2 line x 16 characters	2 line x 16 characters
System Memory	64 MB	128 MB
Interface	Hi-Speed USB 2.0, Ethernet 10/100 Base TX	Hi-Speed USB 2.0, Ethernet 10/100 Base TX
OS Compatibility *****	Windows 2000(32bit)/XP(32/64bit)/2003 Server(32/64bit)/Vista(32/64bit) Various Linux OS including Red Hat 8~9, Fedora Core 1~4, Mandrake 9.2~10.1, and SuSE 8.2~9.2 Mac 10.3, 10.4, 10.5	Windows 2000(32bit)/XP(32/64bit)/2003 Server(32/64bit)/Vista(32/64bit) Various Linux OS including Red Hat 8~9, Fedora Core 1~4, Mandrake 9.2~10.1, and SuSE 8.2~9.2 Mac 10.3, 10.4, 10.5
WHQL	Windows 2000, XP, 2003 Server, Vista(32/64bits)	Windows 2000, XP, 2003 Server, Vista(32/64bits)
Wired network Protocol	TCP/IP, Ethertalk, SNMP, HTTP 1.1	TCP/IP, Ethertalk, SNMP, HTTP 1.1
Wired network Supporting OS	Windows 2000/XP(32/64bits)/2003 Server/Vista(32/64bits) NetWare 5.x, 6.x 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, SuSE 8.2~9.2 Unix AT&T system V(Rel 4.2), BSD4.3, HP-UX (Rel 9.x & Rel 10.x), SCO 5.x, SUNOS 5.5, Sparc or Solaris 2.5.	Windows 2000/XP(32/64bits)/2003 Server/Vista(32/64bits) NetWare 5.x, 6.x 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, SuSE 8.2~9.2 Unix AT&T system V(Rel 4.2), BSD4.3, HP-UX (Rel 9.x & Rel 10.x), SCO 5.x, SUNOS 5.5, Sparc or Solaris 2.5.
Noise *****	Warm up : Less than 45dBA Stand by : Less than 26 dBA Printing : Less than 49 dBA Coping : Less than 53 dBA	Warm up : Less than 45dBA Stand by : Less than 26 dBA Printing : Less than 50 dBA Coping : Less than 53 dBA
Power Requirement	110 ~ 127 VAC, 50/60 Hz, 9.0A 220 ~ 240 VAC, 50/60 Hz, 4.5A	110 ~ 127 VAC, 50/60 Hz, 9.0A 220 ~ 240 VAC, 50/60 Hz, 4.5A
Operating Conditions	Temperature : 10°C ~ 32°C (50°C ~ 89°C) Humidity : 20% ~ 80% RH	Temperature : 10°C ~ 32°C (50°C ~ 89°C) Humidity : 20% ~ 80% RH

Items	SCX-4824FN	SCX-4828FN
Power Consumption	Ready : Less than 70W Average : Less than 400W Max/Peak : 700W Sleep/power off : Less than 8.5W	Ready : Less than 70W Average : Less than 400W Max/Peak : 700W Sleep/power off : Less than 8.5W
AMPV	592 sheets	592 sheets
Duty Cycle, monthly	Up to 30,000 pages	Up to 50,000 pages
MTBF	Up to 50,000 pages	Up to 50,000 pages
MTTR	30 min.	30 min.
SCANLife Cycle	20,000 sheets or 5 years (whichever comes first)	20,000 sheets or 5 years (whichever comes first)
ADF Life Cycle	20,000 sheets or 5 years (whichever comes first)	20,000 sheets or 5 years (whichever comes first)
SET Life Cycle	100,000 sheets or 5 years (whichever comes first)	100,000 sheets or 5 years (whichever comes first)

2.1.2.2 Print Specifications

Items	SCX-4824FN	SCX-4828FN
Method	Laser Beam Printing	Laser Beam Printing
Speed (Simplex)	Up to 24 ppm (A4)	Up to 28 ppm (A4)
Speed (Duplex)	-	Up to 14 ppm (A4)
F POT	Less than 17s (from sleep mode) Less than 9.5s (from stanby mode)	Less than 16s (from sleep mode) Less than 8.5s (from stanby mode)
Warm-up(from sleep)	Less than 15s	Less than 15s
Resolution	Up to 1200dpi Effective Output (Addressable 1200x1200dpi)	Up to 1200dpi Effective Output (Addressable 1200x1200dpi)
Processor	Chorus3 360MHz	Chorus3 360MHz
Memory	64MB(Max. 320MB)	128MB(Max. 384MB)
Emulation	PCL5e, PCL6, IBM ProPrinter, EPSON	PCL5e, PCL6, IBM ProPrinter, EPSON, PS3
Font	45 scalable, 1 bitmap, 136 PostScript3 fonts	45 scalable, 1 bitmap, 136 PostScript3 fonts
Duplex Print	N/A	Default

2.1.2.3 Copy Specifications

Items	SCX-4824FN	SCX-4828FN
Speed **	SDMC: up to 24 cpm in A4 (25 cpm in Letter) MDSC: up to 12 cpm in A4 (13 cpm in Letter)	SDMC: up to 28 cpm in A4 (30 cpm in Letter) MDSC: up to 12 cpm in A4 (13 cpm in Letter)
Resolution (Optical)	600 x 600dpi Text, Text/Photo : 600 x 600dpi Photo mode : 1200 x 1200dpi	1200 x 1200dpi Text, Text/Photo : 600 x 600dpi Photo mode : 1200 x 1200dpi
Resolution (Enhanced)	4800 x 4800 dpi	4800 x 4800 dpi
FCOT(from Standby mode)	Approx. 15 seconds :Platen Approx. 14 seconds :ADF	Approx. 15 seconds :Platen Approx. 14 seconds :ADF
Zoom Rate	25~400% (platen), 25~100% (ADF)	25~400% (platen), 25~100% (ADF)
Multy Copy	1~99 pages	1~99 pages
Special Copy	N-up copy : 2-up / 4-up Collation Copy : Yes AutoFit Copy : Yes(Platen only) 2-side Copy : Yes(Platen only) Clone : Yes(Platen only) Poster : Yes(Platen only)	N-up copy : 2-up / 4-up Collation Copy : Yes AutoFit Copy : Yes(Platen only) 2-side Copy : Yes(Platen only) Clone : Yes(Platen only) Poster : Yes(Platen only)
Duplex Copy	N/A	N/A

2.1.2.4 Scan Specifications

Items	SCX-4824FN	SCX-4828FN
Compatibility	Twain Standard, WIA Standard	Twain Standard, WIA Standard
Method	Color CIS	Color CIS
Scan Speed through ADF	Linearity : Approx. 20sec Gray : Approx. 20sec Color : Approx. 64sec	Linearity : Approx. 20sec Gray : Approx. 20sec Color : Approx. 64sec
Scan Speed through Platen	Linearity : Approx. 25sec Gray : Approx. 25sec Color : Approx. 65sec	Linearity : Approx. 25sec Gray : Approx. 25sec Color : Approx. 65sec
Resolution(Optical)	600 x 600 dpi	1200 x 1200 dpi(Platen PC SCAN)
Resolution(Enhanced)	4800 x 4800 dpi	4800 x 4800 dpi
Effective Scan Length	297 mm (11.7")	297 mm (11.7")
Effective Scan Width	208mm (8.2")	208mm (8.2")
Color Bit depth	Internal : 24 bit, External : 24 bit	Internal : 24 bit, External : 24 bit
B/W Bit depth	1 bit for Text mode, 8 bit for Gray mode	1 bit for Text mode, 8 bit for Gray mode
Gray Scale	256 Levels	256 Levels

2.1.2.5 Fax Specifications

Items	SCX-4824FN	SCX-4828FN
Compatibility	ITU-T Group 3, ECM	ITU-T Group 3, ECM
Applicable line	Public Switched Telephone Network (PSTN) or behind PABX	Public Switched Telephone Network (PSTN) or behind PABX
Modem Speed	33.6 Kbps	33.6 Kbps
Transmission Speed ***	Approx. 3 seconds per page	Approx. 3 seconds per page
Compression Mode	MH/ MR/ MMR/ JBIG/ JPEG	MH/ MR/ MMR/ JBIG/ JPEG
Scan Speed ****	Std : Approx. 2.5 seconds per page (LTR) Fine/S.Fine : Approx. 5 seconds per page (LTR)	Std : Approx. 2.5 seconds per page (LTR) Fine/S.Fine : Approx. 5 seconds per page (LTR)
Resolution	Max. 300 x 300 dpi Standard : 203 x 98 dpi Fine : 203 x 196 dpi Super Fine : 300 x 300 dpi Photo : 203 x 196 dpi Color : 200 x 200 dpi	Max. 300 x 300 dpi Standard : 203 x 98 dpi Fine : 203 x 196 dpi Super Fine : 300 x 300 dpi Photo : 203 x 196 dpi Color : 200 x 200 dpi
Memory	3.2 MB (Approx. 260 pages at ITU-T #1 Chart) Max locations to store to 1 Group Dial : 199 locations Fax Forward : Yes(On/Off) Broadcasting : up to 209 locations Cover page : Yes Delayed fax : Yes Memory RX : Yes	3.2 MB (Approx. 260 pages at ITU-T #1 Chart) Max locations to store to 1 Group Dial : 199 locations Fax Forward : Yes(On/Off) Broadcasting : up to 209 locations Cover page : Yes Delayed fax : Yes Memory RX : Yes
Functions	Voice Request : No TTI : Yes RTI : Yes Polling :No Earth/Recall :No Auto Reduction : Yes F/W Remote upgrade :Yes	Voice Request : No TTI : Yes RTI : Yes Polling :No Earth/Recall :No Auto Reduction : Yes F/W Remote upgrade :Yes
Junk Fax barrier	Yes	Yes
Secure Receive	Yes	Yes
Memory Back-up	Yes, Max. 72hours	Yes, Max. 72hours
Auto Dial	Up to 200 Locaions	Up to 200 Locaions

2.1.2.6 Paper Handling

Items	SCX-4824FN	SCX-4828FN
Standard Capacity	250-sheet Cassette Tray, 1-sheet Multi Purpose Tray @80g/m ²	250-sheet Cassette Tray, 1-sheet Multi Purpose Tray @80g/m ²
Maximum Capacity	501 sheets @ 80g/m ²	501 sheets @ 80g/m ²
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")
1st Tray Capacity	250 sheets @ 80g/m ²	250 sheets @ 80g/m ²
Media Sizes	A4, A5, Letter, Legal, Executive, Folio, Oficio, ISO B5, JIS B5	A4, A5, Letter, Legal, Executive, Folio, Oficio, ISO B5, JIS B5
Media types	Plain paper, Thick Paper, Thin Paper, Recycled Paper, Archive Paper	Plain paper, Thick Paper, Thin Paper, Recycled Paper, Archive Paper
Media weight	16~28lb (60 to 105g/m ²)	16~28lb (60 to 105g/m ²)
Sensing	Paper empty sensor	Paper empty sensor
2nd Tray Capacity	250 sheets @ 80g/m ²	250 sheets @ 80g/m ²
Media Sizes	A4, Letter, Legal, Folio, Oficio	A4, Letter, Legal, Folio, Oficio
Media types	Plain paper, Thick Paper, Thin Paper, Recycled Paper, Archive Paper	Plain paper, Thick Paper, Thin Paper, Recycled Paper, Archive Paper
Media weight	16~28lb (60 to 105g/m ²)	16~28lb (60 to 105g/m ²)
Sensing	Paper empty sensor	Paper empty sensor
Manual Tray Capacity	1 sheets @ 80g/m ²	1 sheets @ 80g/m ²
Media Sizes	A4, A5, A6, Letter, Legal, Folio, Oficio, Executive, ISO B5, JIS B5, 3"x5", Monarch, No.10, DL, C5, C6	A4, A5, A6, Letter, Legal, Folio, Oficio, Executive, ISO B5, JIS B5, 3"x5", Monarch, No.10, DL, C5, C6
Media types	Plain paper, Thick Paper, Thin Paper, Recycled Paper, Archive Paper, Transparency, Envelope, Labels, Post Card, Card stock	Plain paper, Thick Paper, Thin Paper, Recycled Paper, Archive Paper, Transparency, Envelope, Labels, Post Card, Card stock
Media weight	16~43lb (60 to 163g/m ²)	16~43lb (60 to 163g/m ²)
Sensing	NA	NA
Output Stacking	100 sheets @ 75g/m ² (Base Line Paper : Samsung Premium/Xerox4200) NN Condition	150 sheets @ 75g/m ² (Base Line Paper : Samsung Premium/Xerox4200) NN Condition
Duplex Media sizes	-	A4, Letter, Legal, Folio, Oficio
Media Types	-	Plain paper, Thick Paper, Thin Paper, Recycled Paper, Archive Paper
Media weight	-	20~24lb (75 to 90g/m ²)
Printable Area	Envelop : 10mm(0.4") from edge(Top, Bottom, Left, Right)	Envelop : 10mm(0.4") from edge(Top, Bottom, Left, Right)
Non-Printable Area	Other Media : 4mm(0.16") from edge(Top, Bottom, Left, Right)	Other Media : 4mm(0.16") from edge(Top, Bottom, Left, Right)
ADF Capacity	30 sheets (Letter / A4, 20 lb / 75 g/m ²)	50 sheets (Letter / A4, 20 lb / 75 g/m ²)

Items	SCX-4824FN	SCX-4828FN
ADF Document Size	Width: 142 ~ 216mm (5.6"~8.5") Length : 148 ~ 356mm (5.8" ~ 14.0")	Width: 142 ~ 216mm (5.6"~8.5") Length : 148 ~ 356mm (5.8" ~ 14.0")
Media Size (for Fax and Copy)	Letter, A4, Legal	Letter, A4, Legal

2.1.2.7 Consumables (CRU)

Items	SCX-4824FN	SCX-4828FN
Type	Single Cartridge	Single Cartridge
Yield	Standard: Average Cartridge Yield 2K standard pages. High Yield: Average cartridge Yield 5K standard pages. Declared cartridge yield in accordance with ISO/IEC 19752.	Standard: Average Cartridge Yield 2K standard pages. High Yield: Average cartridge Yield 5K standard pages. Declared cartridge yield in accordance with ISO/IEC 19752.
Life Detect	Toner gauge sensor by dot count	Toner gauge sensor by dot count
Key	Electronic key(CRUM) Only	Electronic key(CRUM) Only
Code	MLT-D209S/MLT-D209L	MLT-D209S/MLT-D209L

2.1.2.8 Consumables (FRU)

Image	Items	Life	Part code
	Transfer roller	50K	JC66-01218A
	Fuser	50K	JC96-05132A(220V) JC96-05133A(110V)
	Pick up rubber	50K	JC97-03062A
	Friction Pad (Cassette)	50K	JC96-04743A
	Friction Pad (ADF)	20K	JC97-01940A
	Pick up Assy(ADF)	20K	JC97-01962A

2.1.2.9 Options

Items	SCX-4824FN	SCX-4828FN
Network	N/A	N/A
Memory	128MB / 256MB (CLP-MEM101/ CLP-MEM102)	128MB / 256MB (CLP-MEM101/ CLP-MEM102)
SCF	Option (SCX-S4824A)	Option (SCX-S4824A)
PS	N/A	Standard

* Print speed will be affected by Operating system used, computing performance, application software, connecting method, media type, media size and job complexity.

** Copy Speed is based on Single Document Multiple Copy

*** Condition: Standard resolution, MMR(JBIG), Maximum modem speed, Phase "C" by ITU-T No.1 Chart, Memory Tx, ECM

**** Condition: ITU-T No.1 Chart, Standard Resolution

***** Please visit www.samsungprinter.com to download the latest software version.

***** Sound Pressure Level, ISO7779

***** May be affected by operating environment, printing interval, media type and media size

2.1.3 Model Comparison

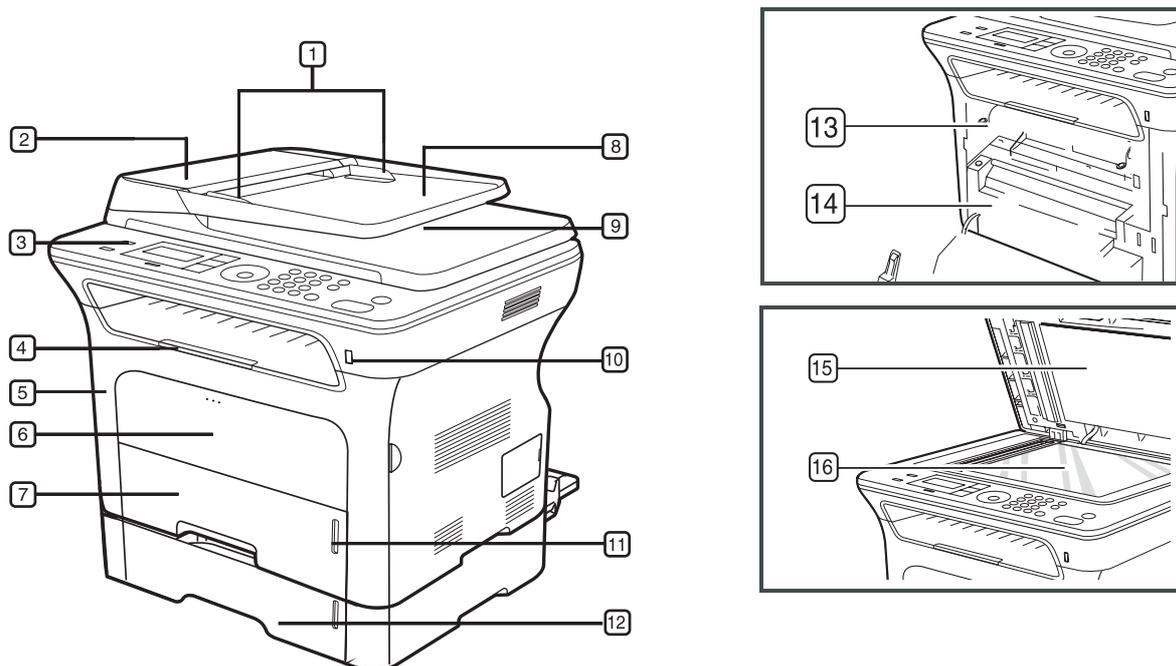
		Samsung SCX-4824FN	Samsung SCX-4728FN	HP M2727nf
Image				
Printer	Speed	24 ppm (A4)	28 ppm (A4)	26 ppm (A4)
	FPOT	17 sec	16 sec	10 sec
	Cassette	250 sheets	250 sheets	300 sheets
	Duplex Module	N/A	Default	N/A
	Cartridge	2K/5K	2K/5K	Sales : 3K/7K
	Processor	360MHz	360MHz	450MHz
	Memory	64MB(Max.320MB)	128MB(Max.384MB)	64MB(Max. 320MB)
	Interface	USB 2.0 / 10/100 TX	USB 2.0 / 10/100 TX	USB 2.0 / 10/100 TX
	Emulation	PCL6,PCL5e	PCL6,PCL5e,PS	PCL6,PCL5e,PS
FAX	Modem Speed	33.6 kbps	33.6 kbps	33.6 kbps
Scan	Resolution (Scan)	600*600 dpi	1200*1200 dpi	1200 dpi
	Input capacity (ADF)	30 sheets	50 sheets	50 sheets
Copy	Copy Speed	SDMC: up to 24cpm MDSC: up to 12cpm	SDMC: up to 24cpm MDSC: up to 12cpm	26 cpm
USB HOST		NA	Direct USB support	
Dimension		445.2 x 410.5 x 395.3mm	445.2 x 410.5 x 395.3mm	500x406x457mm
Weight		13.6Kg	13.6Kg	17.2Kg

2.2 Summary of Product

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

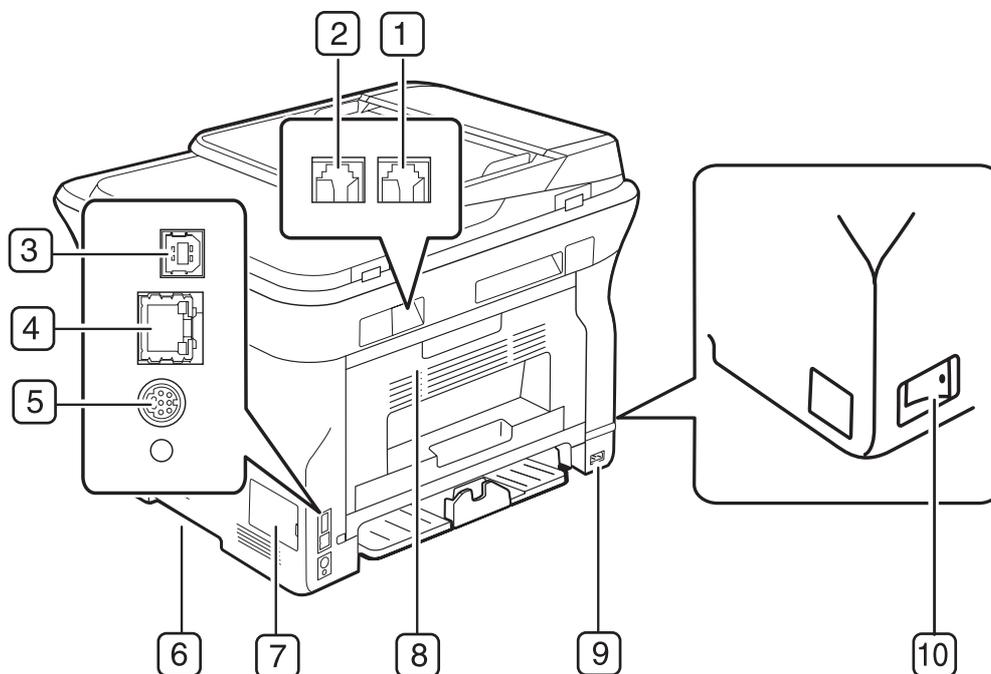
2.2.1 Printer Components

2.2.1.1 Front View



1	Document width guides	9	Document output tray
2	ADF cover	10	USB memory port
3	Control panel	11	Paper level indicator
4	Output support	12	Optional tray 2
5	Front cover	13	Toner cartridge
6	Manual tray	14	Manual tray paper width guides
7	Tray 1	15	Scanner lid
8	Document input tray	16	Scanner glass

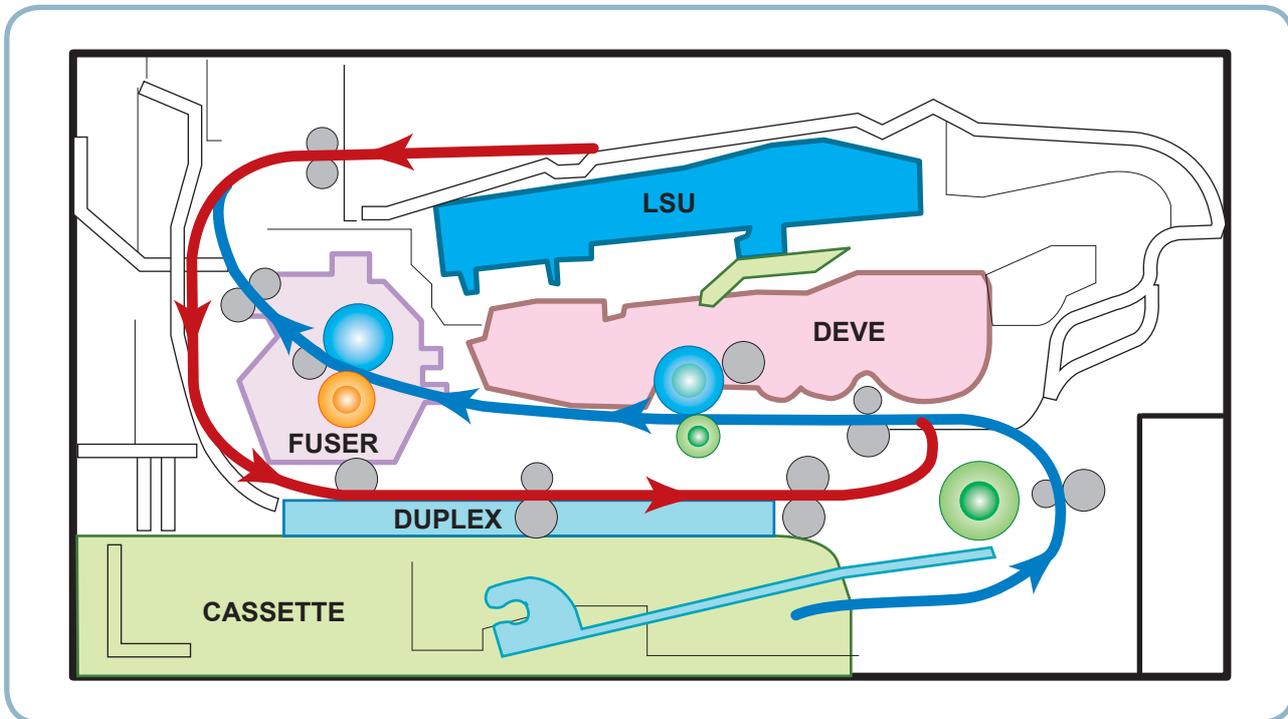
2.2.1.2 Rear View



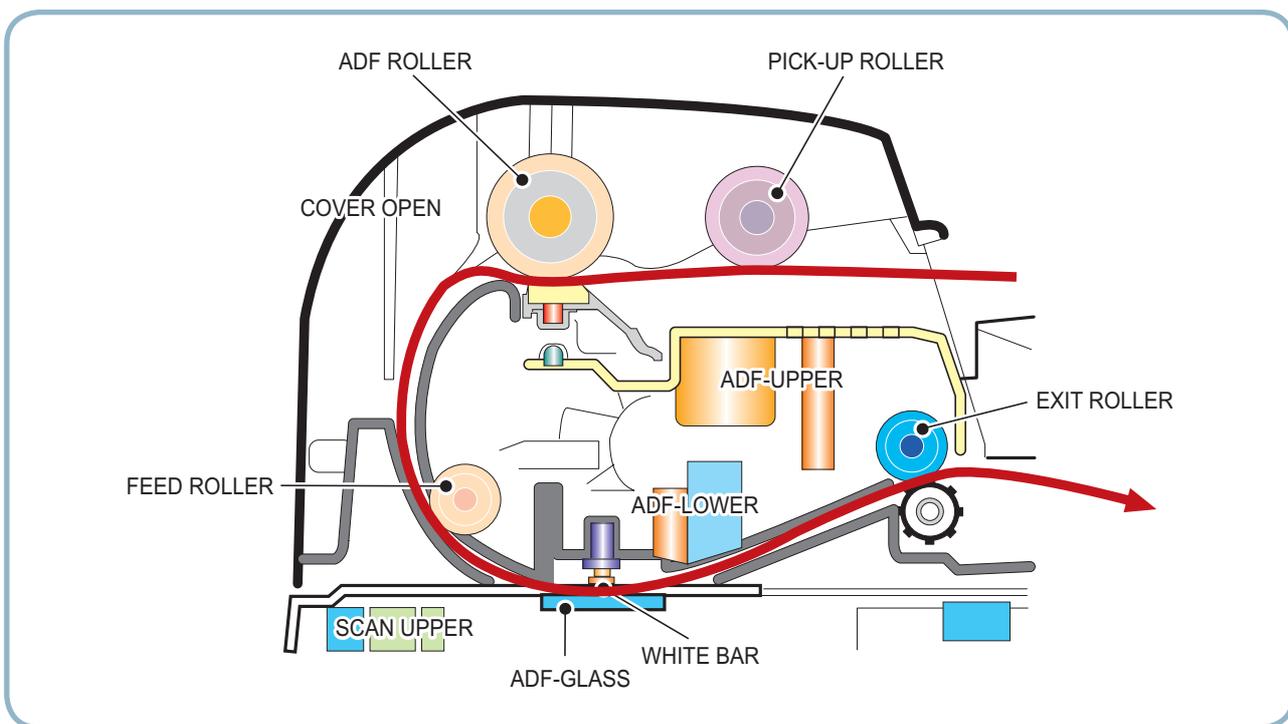
1	Extension telephone socket (EXT)	6	Handle
2	Telephone line socket	7	Control board cover
3	USB port	8	Rear cover
4	Network port	9	Power receptacle
5	15-pin optional tray connection	10	Power switch

2.2.2 System Layout

- Engine Layout



- Scanner (ADF) Layout



2.2.2.1 Feeding

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

1) Separation method

Separate it from 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 various types of papers from A5 to legal size paper.

It has a paper existence sensing function (Capacity: 250 sheets of general paper), paper arranging function, various size papers accepting function, SCF paper path function, and displaying function of paper remaining amount.

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.

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 rubbing pad method to feed 1 sheets of general papers and 1 envelopes.

6) Duplex unit

It has paper transferring function, paper guide function, jam removing function, paper sensing function, and main board supporting function.

It is designed for basic attachment, and the duplex feeding takes a side feeding method. Usable papers are A4, letter, and legal size paper.

For removing a jam occurred in a front part, it is designed to open a cassette and a guide.

It is designed to open a rear cover to remove a jam in a rear part.

7) SCF (Second Cassette Feeder)

It is the same method with the main cassette, and the capacity is 250 sheets.

It has a separate driving mechanism. It is designed for a common use with a main cassette.

2.2.2.2 Transfer

A transfer roller transfers toner on an OPC drum to the paper.

Life span: Print over 50,000 sheets (In 16~27°C)

2.2.2.3 Driver Ass'y

By driving the motor, the system takes power. It consists of a main motor for feeding fuser and duplex reverse turn.

- Main Motor : DC 24V, Rated RPM : 2170rpm

2.2.2.4 Fuser

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

- Halogen lamp : 750 Watt \pm 5%

1) Thermostat

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

- Non-Contact type Thermostat

2) 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.

3) 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.

4) 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.

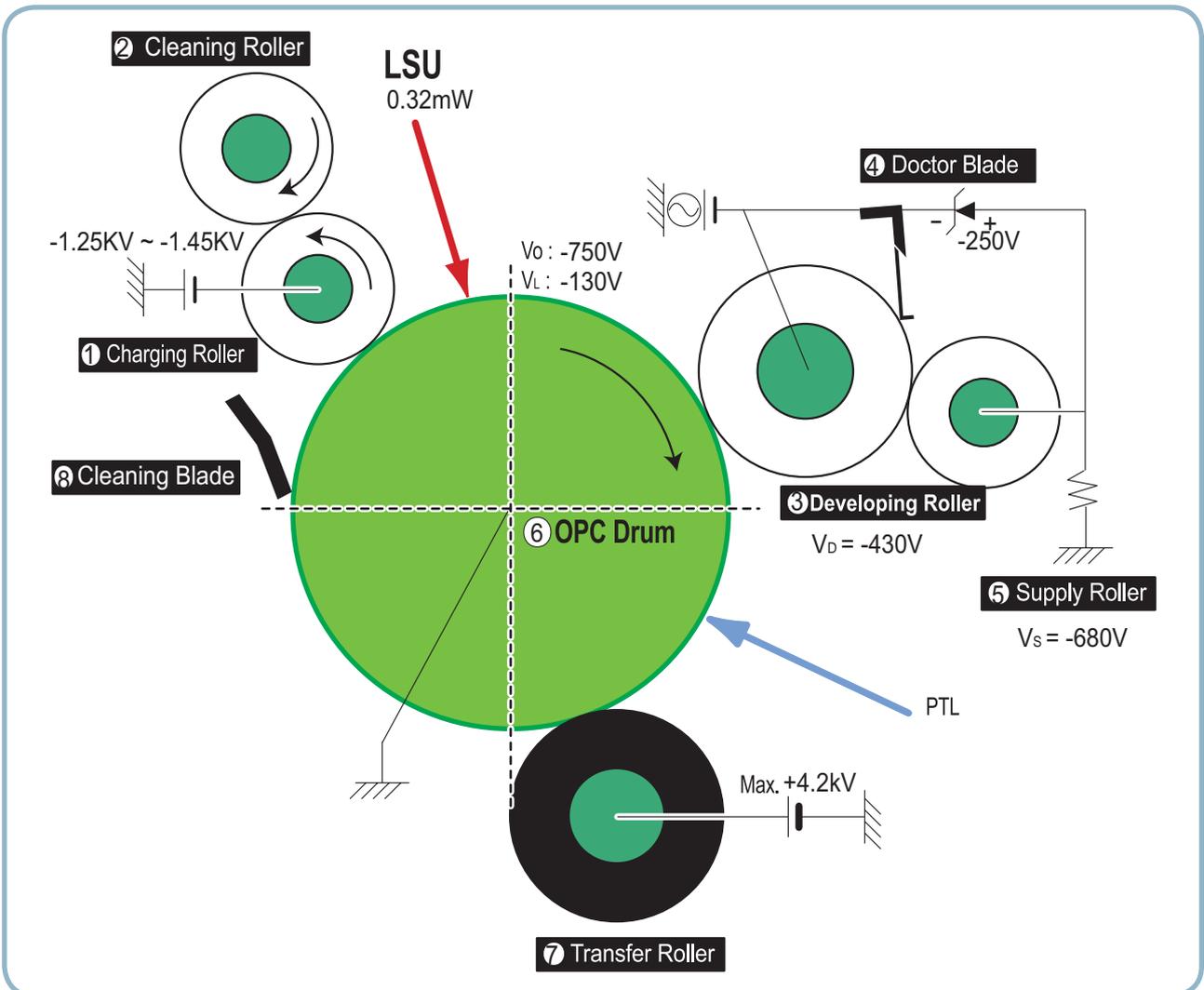
2.2.2.5 LSU (Laser Scanner Unit)

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.

2.2.2.6 Print Cartridge

By using the electronic photo process, it creates a visual image. In the print cartridge, the OPC unit and the toner cartridge 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-contacting method
- Toner : Non magnetic 1 component pulverized type toner
- The life span of toner : 2,000 or 5,000 pages (LSA Pattern/A4 standard)
- Toner remaining amount detecting sensor : Yes
- OPC Cleaning : Cleaning blade type
- Management of disusable toner : Collect the toner by using Cleaning Blade
- OPC Drum protecting Shutter : No
- Classifying device for toner cartridge : ID is classified by CRUM. except for initial cartridge.



2.2.3.1(a) Asic(CHRUS3)

Package	• 412 PBGA (Total pad number : 412[ea])
Voltage	• Core Voltage : 1.0[V] • I/O Pad Voltage: 3.3[V]
CPU Core	• ARM926EJS(16KB I-cache, 16KB D-cache)
Operating Freq.	• 400MHz
DDRC	• DDR 1, 2 Combo • 32 Bits Data Width(Internal), 16 Bits Data Width(External) • 133[MHz] DRAM Interface • 16 to 128[MB] Arrays (Up to 512[MB] totally) • Support 4 AHB Slave Ports for Individual Memory Access • Support 4 Bank DDR1 SDRAM and 4 & 8 Bank DDR2 SDRAM • Support Up to 4 DRAM Ranks(Chip Select Output)
ROMC	• 2 Channel NOR Flash Controller
IOC	• Support 4 Channel External I/O Device, 2 Channel DMA I/O
DMAC	• Contained 3 Channels
HPVC	• Support 32 Bits AHB Master I/F • A4 2400[DPI], A3 1200[DPI] Addressable • 200, 300, 400, 600[DPI] Support, 120[DPI](Vertically 600[DPI]) • Support 4 Channels Single/Dual Beam
UART	• 4 Channels
INTERRUPT	• Support Up to 4 Dedicated External Interrupts • Support 64 Internal Interrupts
TIMER	• 6 System Timers for General Purpose • 1 Watchdog timer • Support RTC
MAC	• 10[Mbps]/100[Mbps] • Full IEEE 802.3, 802.3u compatibility
PPI	• IEEE1284 Compliant Parallel Port Interface
SPI	• 1 Slave Select
USB	• USB 2.0, 1 Channel (Host & Device Selectable) • Support 1,5/12/480[Mbps]
GEU	• Graphic Execution Unit
RSH	• Fully Hardware Rotator / Scaler / Halftoner support
SCAN I/F	• 1200[DPI] CCD Sensor I/F • 1/2 Channels AFE Input(1 Dedicated, 1 Muxed) • Sensor MCLK Half Clock Control
LSU	• 2 Channels for Dual Beam • Test Pattern Generation • FSYNC Generation
JPEG	• Encoder 1 Channel, Decoder 1 Channel

JBIG	• 2 JBIG Compressor & 4 JBIG De-compressor
Codec	• 5 Halftone Compression/Decompression Unit • Support 32 Bits AHB Master I/F • MH/MR/MMR Encoder 1 Channel • MH/MR/MMR Decoder 1 Channel
HCT	• 1 Channel Encoder, 1 Channel Decoder
Engine Controller	• PWM: 12 Channels(Dedicated 8 Channels, Muxed 4 Channels) • Step Motor Controller
I2C Controller	• 2 Channels • I2C bus(SM bus) Slave Device Support (I2C Version 2.1)
PLL	• 3 PLLs (for MAIN / PVC / DDR)
DAC	• 1 Channel, 10 Bits, 2[MSPS]
ADC	• 8 Channel, 10 Bits, 500[KSPS]

2.2.3.1(b) Memory

- Program Memory : This model uses NOR Flash as a Program memory which stores System Program and can be updated via USB Interface.
 - Capacity : 16 MB
 - Max. Access Time : 90ns
- Working Memory : This model uses DDR2 SDRAM which is used as Swath Buffer in Printing, Scan Buffer in Scanning, ECM Buffer in FAX receiving, and System Working Memory Area.
 - Capacity: 128MB or 256MB optional Memories are available.
 - Type : DDR2 SDRAM 667MHz , 16bit

2.2.3.1(C) Interface

The system supports the following standard interfaces:

- High Speed USB 2.0
 - Device
 - Direct USB(SCX-4828FN only)
- Ethernet 10/100 Base TX wired LAN

SCX-4824FN & SCX-4828FN supports an internal Network Interface that can be installed pre-configured on the video controller board at the factory. This supports all of the major Network Operating Systems such as the TCP/IP, etc. Details of the network specification will be provided separately.

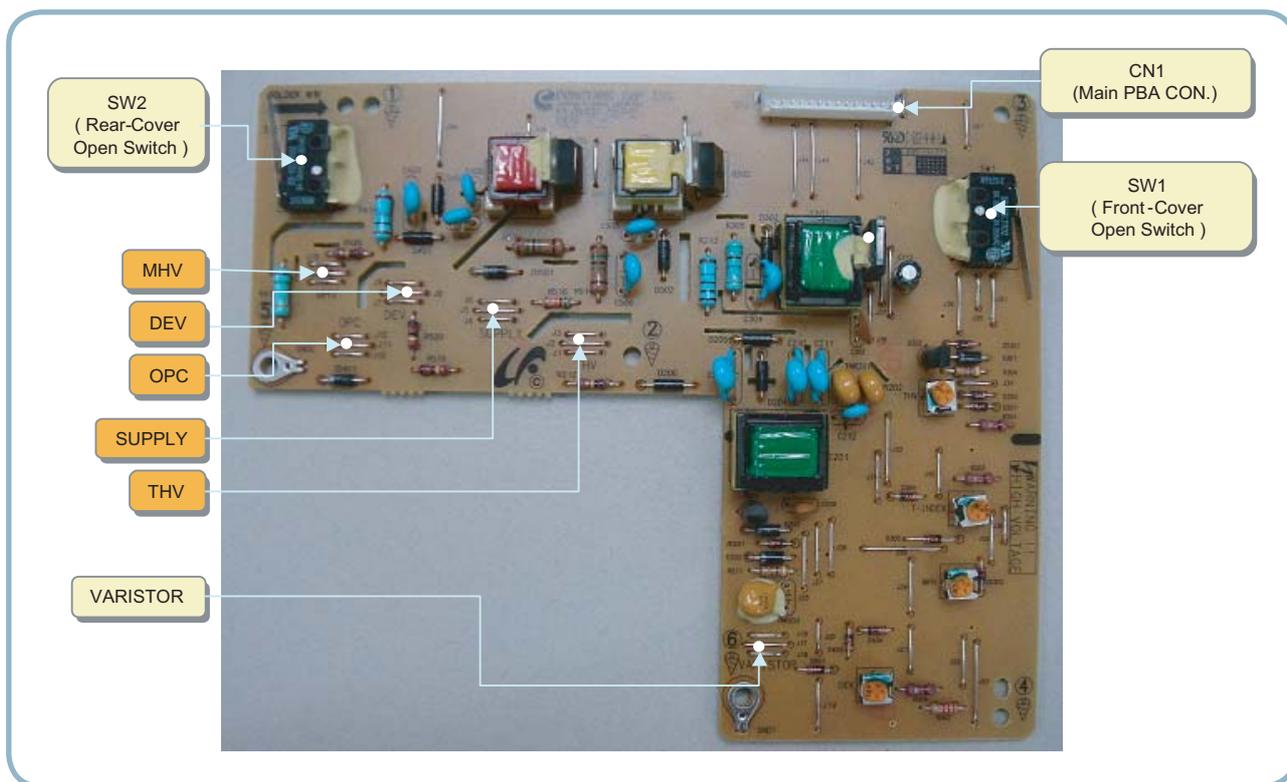
2.2.3.2 SMPS & HVPS board

The SMPS supplies DC Power to the System.

It takes 110V/220V and outputs the +5V, +24V to supply the power to the main board and all other boards. 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

2.2.3.2(a) HVPS (High Voltage Power Supply)

- Transfer High Voltage (THV+)
 - Input Voltage: 24 V DC \pm 15%
 - Output Voltage: MAX +5.0KV(Duty Variable)
 - Line Regulation : under \pm 3% (fluctuation input 21.6V ~ 27.6V)
 - Output Voltage Rising Time 50ms Max
 - Output Voltage Falling Time : 100 ms Max
 - Fluctuating transfer voltage with environmental various : 0 V~ 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 \pm 15%
 - Output Voltage : -1.2KV ~ -1.8KV DC \pm 3%
 - Output Voltage Rising Time : 50 ms Max
 - Output Voltage Falling Time : 50 ms Max
 - Output Control Signal(MHV-PWM) : CPU is HV output when PWM is Low
- Cleaning Voltage (THV-)
 - -1.2KV \pm 15%
 - 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 & connection Resistor.
- Developing Voltage (DEV)
 - Input Voltage : 24 V DC \pm 15%
 - Output Voltage: -200V ~ -600V DC \pm 3%
 - Output Voltage Fluctuation Method : PWM Control
 - Line Regulation : under \pm 3% (fluctuation input 21.6V ~ 27.6V)
 - Load Regulation : Under \pm 3%
 - Output Voltage Rising Time : 50 ms Max
 - Output Voltage Falling Time : 50 ms Max
 - Output Control Signal (BIAS-PWM) : the CPU output is HV output when PWM is low.
- Supply
 - Output Voltage : -300V ~ -800V DC \pm 5% (ZENER using, DEV)
 - Line Regulation : under \pm 3% (fluctuation input 21.6V ~ 27.6V)
 - Load Regulation : Under \pm 3%
 - Output Voltage Rising Time : 50 ms Max
 - Output Voltage Falling Time : 50 ms Max
 - Output Control Signal (BIAS-PWM) : the CPU is HV output when PWM is low



2.2.3.2(b) SMPS (Switching Mode Power Supply)

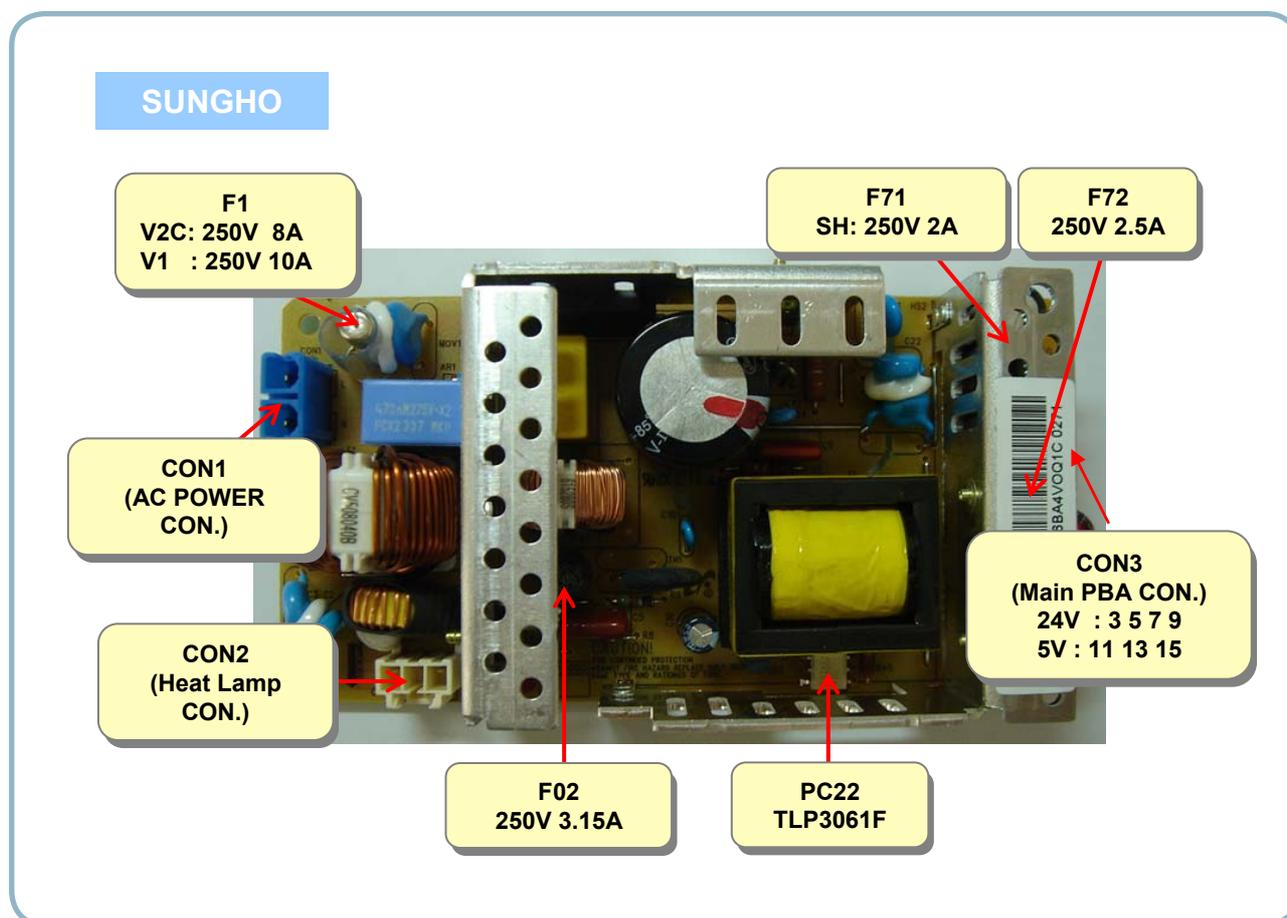
It is the power source of entire system. It is assembled by an independent module, so it is possible to use for common use. It is mounted at the side of the set. It is consisted of the SMPS part, which supplies the DC power for driving the system, and the AC heater control part, which supplies the power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

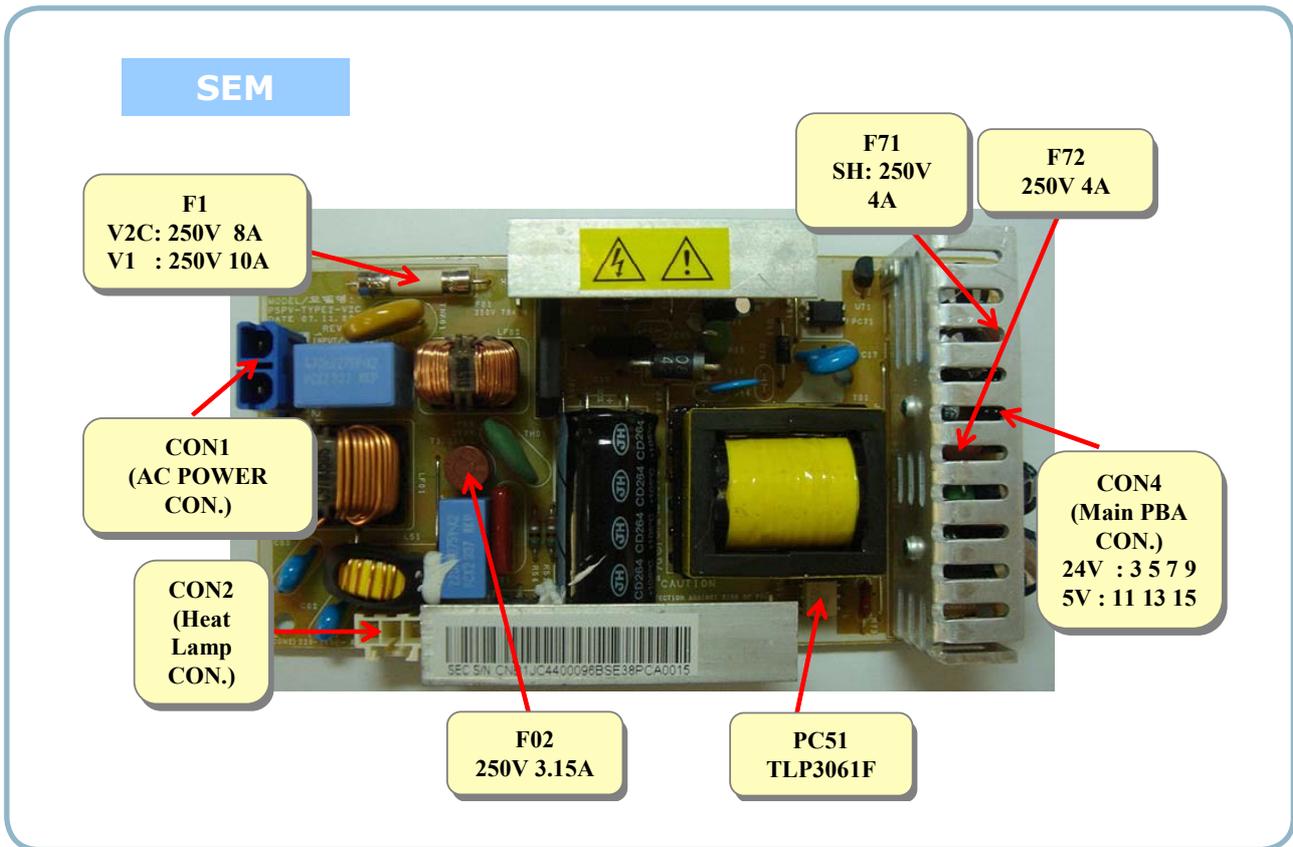
- AC Input

- Input Rated Voltage: AC 110V ~ 127V / AC 220V ~ 240V
- Input Voltage fluctuating range : AC 90V ~ 135V / AC 180V ~ 270V
- Rated Frequency : 50/60 Hz
- Frequency Fluctuating range : 47 ~ 63 Hz
- Input Current : Under 4.0Arms / 2.0Arms (But, the status when lamp is off or rated voltage is inputted/ outputted)

• Rated Output Power

NO	ITEM	CH1	CH2	Remark
1	CHANNEL NAME	+5V	+24.0V	
2	CONNECTOR PIN	CON 4 5V PIN: 11,13,15 GND PIN: 12,14,16	CON 4 24V PIN:3,5,7,9, GND PIN:4,6,8,10	CON 4 24VS PIN: 2
3	Rated Output	+5.1V±2% (5.0~5.2V)	+24V -10%/+10% (21.6~26.4V)	
4	Nor. Output Current	1.6A	1.8 A	
5	Max. Output Current	2.0 A	2.5 A	
6	RIPPLE & NOISE Voltage	Under100mVp-p	Under 500mVp-p	
7	Normal output	8.16W	43.2W	
8	Maximum output	10.2W	60.0W	
9	Protection for loading shortage and overflowing current	Shut down(2.5~5.0A) or Fuse Protection (Under LPS spec)	Shut down(2.8A~5.5A)or Voltage Drop(trip-10%)	





2.2.3.2(c) FUSER AC POWER CONTROL

Fuser(HEAT LAMP) gets heat from AC power. The VA power controls the switch with the Triac, a semiconductor switch. The 'ON/OFF control' is operated when the gate of the Triac is turned on/off by Phototriac (insulating part). In other words, the AC control part is passive circuit, so it turns the heater on/off with taking signal from engine control part.

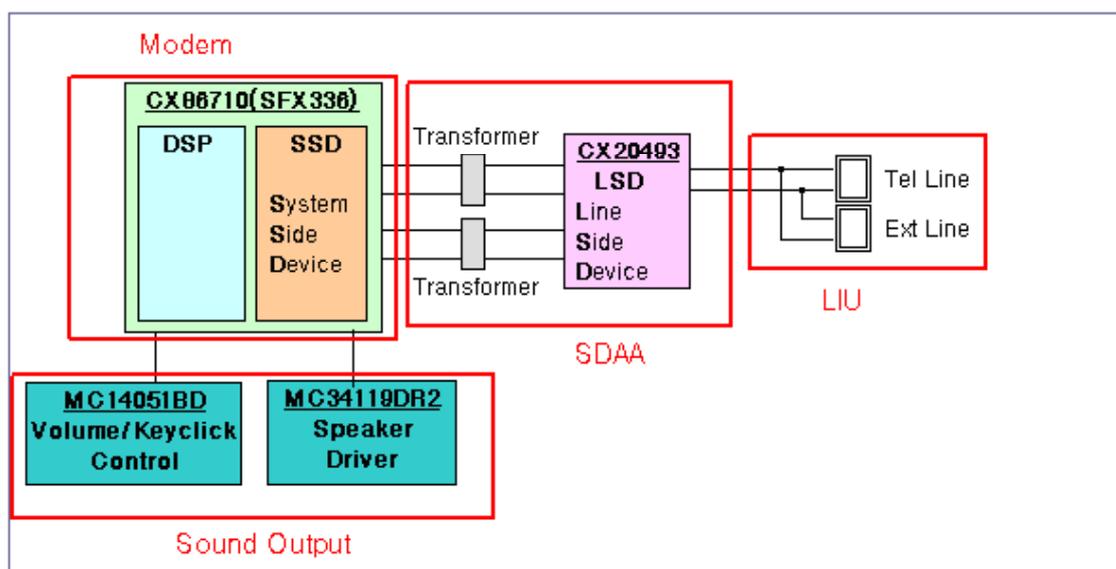
When the 'HEATER ON' signal is turned on at engine, the LED of PC51 (Photo Triac) takes the voltage and flashes. From the flashing light, the Triac part (light receiving part) takes the voltage, and the voltage is supplied to the gate of Triac and flows into the Triac. As a result, the AC current flows in the heat lamp, and heat is occurred. On the other hand, when the signal is off, the PC51 is off, the voltage is cut off at the gate of Triac, the Triac becomes off, and then the heat lamp is turned off.

- Triac (Q51) feature : 16A-LV model / 12A-HV model, 600V SWITCHING
- Phototriac Coupler (PC51)
 - Turn On If Current : 15mA~50mA(Design: 16mA)
 - High Repetive Peak Off State Voltage : Min 600V

2.2.3.3 Fax

Implemented by based on Conexant DAA (Data Access Arrangement) Solution, and is roughly composed of two kinds Chip Solution

- CX86710 (SFX336): Existing Modem Chip which adds SSD (System Side Device) for interfacing between LSD and DIB of FM336Plus Core
- CX20493 (LSD) : LIU (Line Interface Unit) Chip which is controlled by SSD and satisfies each PSTN Requirements by modulating internal Configuration with connecting Tel Line



2.2.3.4 Scan

- 1) Pictorial signal input part: output signal of CIS passes through MP Cap change to ADC at HT82V26, and defined signal between HT82V26 and CHORUS3 processes the Image signal. When AFE accept each pixel, SHA (Sample and Hold Amplifier) technique which samples arm-level once is used on each pixel by CIS signal.
 - 2) Pictorial image processing part: read CIS Pixel data in terms of 1200dpi Line and process Error Diffusion Algorithm(text,Mixed mode), 1200 dither(photo mode), and then store Data at Scan Buffer on PC Scan mode without algorithm.
On every mode Shading Correction and Gamma Correction are executed ahead, then processing is executed later.
- * Scan Image Control Specification
- ① Scan Line Time : 1.5msec/ch
 - ② Scan Resolution : Max. 1200DPI
 - ③ Scan Width : 216mm
 - ④ main function
 - Internal 12bit ADC
 - White Shading Correction
 - Gamma Correction
 - CIS Interface
- 3) CIS Operating Part : CIS Image sensor use +5V
 - CIS Maximum Operating Frequency : 5MHz
 - CIS Line time : 1.5 msec/ch
 - White Data output Voltage : $0.7V \pm 0.5V$ (Mono Copy, 1.50ms/line)

2.2.3.5 Engine F/W

2.2.3.5(a) Control Algorithm

• 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. If feeding from a manual feeder, decide to insert the paper according to the operation of the Regi sensor, and by driving the main motor, insert the paper in front of the feed sensor. While paper moves, occurrence of Jam is judged as below.

Item	Description
JAM 0	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - After the trailing edge of the paper passes the feed sensor, the paper cannot pass the exit sensor after certain time.
DUPLEX JAM 1	<ul style="list-style-type: none"> - After the trailing edge of the paper passes the exit sensor, the leading edge of the paper cannot reach the Duplex Jam Sensor after certain time.
DUPLEX JAM 0	<ul style="list-style-type: none"> - After the leading edge of the paper passes the Regi sensor, the leading edge of the paper cannot reach the feed sensor after certain time.

2.2.3.5(b) Driver

By gearing, the main motor drives the rollers such as feeding roller, developing roller, fuser roller, and exiting roller. The BLDC motor is controlled for the such acceleration section and steady section. The BLDC main motor is operated by the BLDC clock and the enable signal.

2.2.3.5(c) 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. Each voltage value is controlled according to 3.3.4.2 Timing Chart.

2.2.3.5(d) 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.

• Lamp Method

Error	Description
OPEN HEAT ERROR	- When warming up, it has been lower than 90 over 20 seconds
LOW HEAT ERROR	- Standby has been lower than the Standby Reference Temperature -20 over 10 seconds. - Printing has been lower than the Printing Reference Temperature -20 over 10 seconds. - When WarmUp End Process, it have been lower than the WarmUp Reference Temperature -10 over 10 seconds.
OVER HEAT ERROR	- It has been higher than 220 over 20 seconds - It has been higher than 230 over 3 seconds - It has been higher than the Standby Reference Temperature +10 over 180 seconds.

=>This can be changed in the future.

2.2.3.5(e) LSU

The LSU is consisted of the LD (Laser Diode) and the polygon motor control. When the printing signal occurs, it turns on the LD and drives the polygon motor. When the detector detects the beam, Hsync occurs. When the polygon motor speed becomes strady, Lready occurs. If two conditions are satisfied, the status are not satisfied, the error shown in below occurs.

Error	Description
Polygon Motor Error	Whenthe polygon motor speed doesn t become steady
Hsync Error	The polygon motor speed is steady but the Hsync is not generated

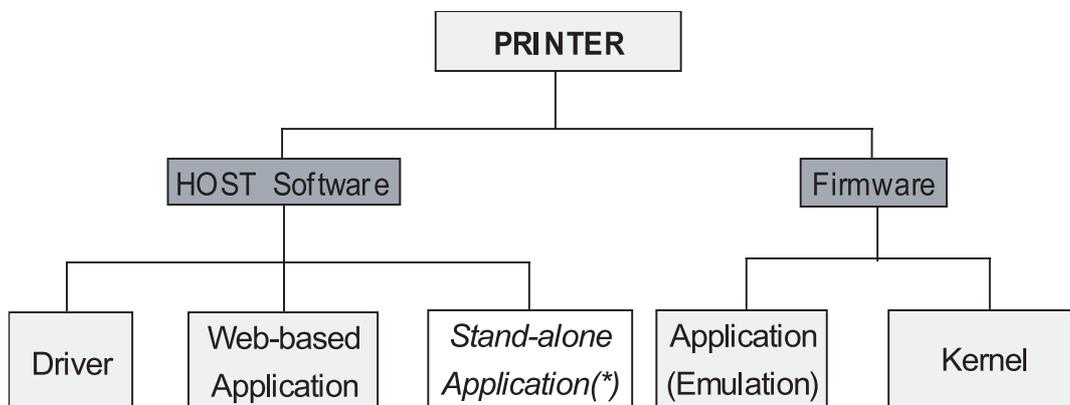
2.2.4 S/W Descriptions

2.2.4.1 Overview

The software of SCX-482x series 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.

2.2.4.2 Architecture



☞ (*) is job for common S/W team

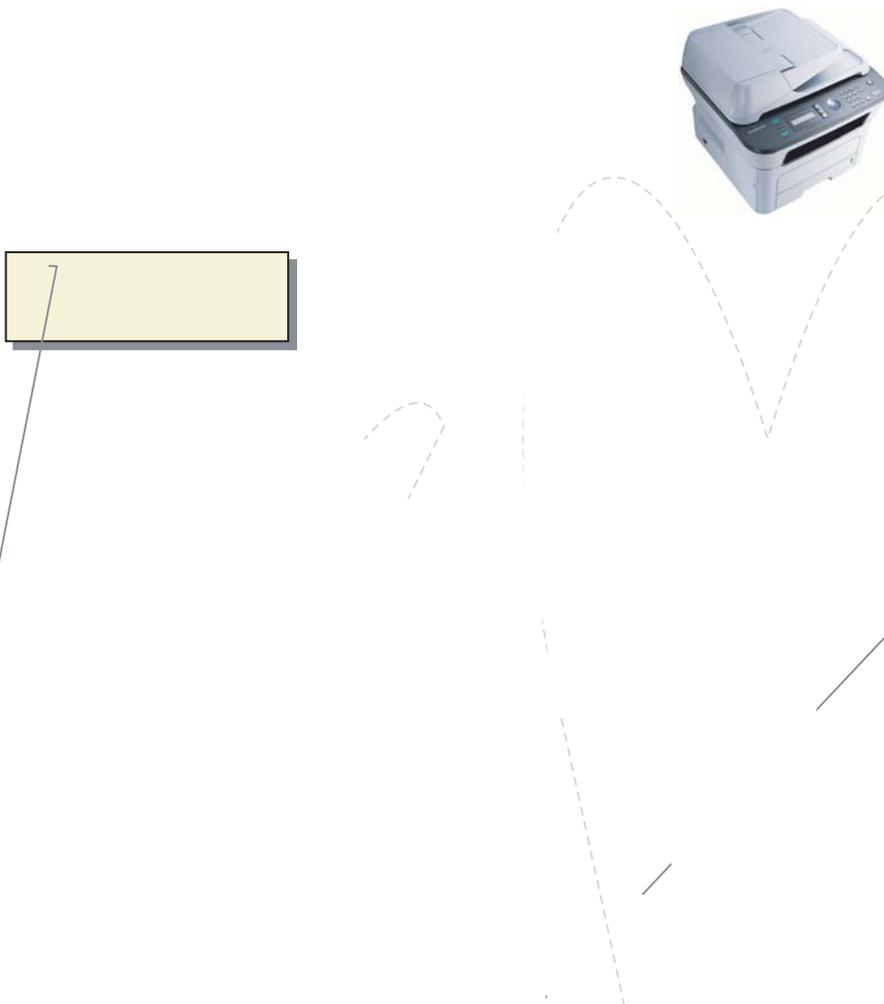
Host Software is made up of

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(only SCX-4824FN), 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.

2.2.4.3 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 spooler file.
2. Web-based Application that offer a various printer printer administration, Status monitor to monitoring environment on OS.
3. Stand-alone Application that is a similar Window s
4. Port Monitor that manages the network communic various additional application and Network Interfac port, manage the data, transfer them from spooler

ita to one of printer language and create
 ncf management of printing job,
 str real time in Web, independent
 sa above 2,
 atwee. oler and Network Interface Card, or
 d,(this is, at first, make communication logical
 atwork 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.