

## 2. Product spec and feature

### 2.1.1 Product Overview

**Concept**

The smallest & quietest C-MFP in the world

**Target**

Home & SOHO



**CLX-3170 series**



**CLX-3175 series**

- 1.Speed
  - . Mono : Up to 16 ppm in A4 (17 ppm in Letter)
  - . Color : Up to 4 ppm in A4 (4 ppm in Letter)
- 2.Printing Resolution
  - . Max. 2400x600 dpi effective output
- 3.Processor
  - . CHORUS3 (360Mhz), Proprietary SOC
- 4.Printer Language Emulations
  - . SPL-Color
- 5.Memory
  - DDR2 SDREAM 128 MB
- 6.Interfaces
  - . USB Device 2.0
  - . One 10/100 Base Tx network connector
  - Wireless N/W (317xFW)
7. Toner cartridge
  - . Black : 1K (initial) / 1.5K (sales)
  - . Color : 0.7K (initial) / 1K (sales)
8. 150 Cassette, ADF
9. Color
  - Dark gray : CLX-3170 series
  - Black : CLX-3175 Series

## 2.1.2 Product Specification

Specifications are correct at the time of printing. Product specifications are subject to change without notice. See below for product specifications.

### 2.1.2.1 General Specifications

Item		CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Major Features		Multi-Pass Color Laser	Multi-Pass Color Laser
		2400dpi class	2400dpi class
		USB2.0	USB2.0
		Ethernet 10/100 Base-Tx	Ethernet 10/100 Base-Tx
			Wireless LAN(IEEE 802.11b/g) : Only CLX-317xFW
Size (W*D*H)		415 x 360 x 311 mm	415 x 373 x 342mm
Net Weight (Including Toner Cartridge)		14.3kg	15.2kg
MPU		CHORUS3-360MHz	CHORUS3-360MHz
Power Consumption	Ready	Less than 160WH	Less than 160WH
	Average	Less than 350W (Current:8A(110V)/3.5A(220V))	Less than 350W (Current:8A(110V)/3.5A(220V))
	Max/Peak	700W/1KW	700W/1KW
	Sleep/Power off	Less than 30W	Less than 30W
Power Supply	Input Voltage	Low Voltage : 110 ~ 127VAC High Voltage : 220 ~ 240VAC	Low Voltage : 110 ~ 127VAC High Voltage : 220 ~ 240VAC
	Input Frequency	50 / 60Hz(+/- 3Hz)	50 / 60Hz(+/- 3Hz)
Noise	Printing	Mono : 48dBA Color : 47dBA	Mono : 48dBA Color : 47dBA
	Copy	50dBA	Platen: 50dBA
			ADF: 52dBA
Warm up time	From Cold Status (At rated volt)	Less than 35 seconds	Less than 35 seconds
Max Monthly Volume (Duty Cycle)		Color(50%) 4,000 pages Mono(50%) 4,000 pages	Color(50%) 4,000 pages Mono(50%) 4,000 pages
Average Monthly Volume		Color(50%) 130 pages Mono(50%) 130 pages	Color(50%) 130 pages Mono(50%) 130 pages
Machine Life		100k images (Color 25K or Mono 100K Pages or 5 years whichever comes first)	100k images (Color 25K or Mono 100K Pages or 5 years whichever comes first)
Temperature	Operating	10~32.5℃	10~32.5℃
	Storage (Un-Packed)	5~35 ℃	5~35℃
	Storage (Packed)	-20~40℃	-20~40℃

Item		CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Humidity	Operating	30~80% RH	30~80% RH
	Storage (Un-Packed)	30~80% RH	30~80% RH
	Storage (Packed)	30~85% RH	30~85% RH
Memory	Standard / Max.	128MB / 128MB	128MB / 128MB
	Type	DDR2 SDRAM	DDR2 SDRAM
	Expand Memory Slot	N/A	N/A
	Compression Technology	YES	YES

Item		CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Print Speed	Simplex	B&W : 17ppm@Letter /16ppm@A4 Color : 4ppm@A4,.Letter	B&W : 17ppm@Letter /16ppm@A4 Color : 4ppm@A4,.Letter
	Duplex	N/A	N/A
Print Emulation		SPL-C	SPL-C
Auto Emulation Sensing		N/A	N/A
Font	Type	N/A	N/A
	Number	N/A	N/A
Power Save		Yes (5/10/15/30/60/120min.)	Yes (5/10/15/30/60/120min.)
Resolution	Normal	Up to 2400X600dpi Class (Default 1200x600 dpi) Optical: 600x600 Dpi	Up to 2400X600dpi Class (Default 1200x600 dpi) Optical: 600x600 Dpi
Toner Save		N/A	N/A
FPOT	From Ready	Less than 26 sec ( Color ) Less than 14 sec ( B&W )	Less than 26 sec ( Color ) Less than 14 sec ( B&W )
	From Idle	Less than 57 sec ( Color ) Less than 45 sec (B&W)	Less than 57 sec ( Color ) Less than 45 sec (B&W)
	From Cold Boot	Less than 57 sec ( Color ) Less than 45 sec (B&W)	Less than 57 sec ( Color ) Less than 45 sec (B&W)
Duplex Print		NA	NA
Printable Area		210 x 297 mm (A4) 216 x 279 mm (Letter) 216 x 355.6 mm (Legal)	210 x 297 mm (A4) 216 x 279 mm (Letter) 216 x 355.6 mm (Legal)
Print Margin		Side Margin: 4.23±2mm Top Margin: 4.23±3mm	Side Margin: 4.23±2mm Top Margin: 4.23±3mm

Item		CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Scan Method		Color CIS	Color CIS
Scan Speed through ADF	B/W	N/A	Approx. 18sec
	Gray	N/A	Approx. 25sec
	Color	N/A	Approx. 35sec
Scan Speed through Platen	B/W	Approx. 15sec	Approx. 15sec
	Gray	Approx. 20sec	Approx. 20sec
	Color 75dpi/300dpi	Approx. 30sec	Approx. 30sec
Resolution	Optical	1200*1200dpi	1200*1200dpi
	Enhanced	4800dpi	4800dpi
Halftone		256 levels	256 levels
Scan Size	Max. Document Width	Max.216mm(8.5")	Max.216mm(8.5")
	Effective Scan Width	Max 208mm(8.2")	Max 208mm(8.2")
Scan-to		Scan-to-Application	Scan-to-Application
		Scan-to-USB	Scan-to-USB
Scan Depth	Color	24 bits	24 bits
	Mono	1bit for Line, Halftone , 8 Bit for Gray scale	1bit for Line, Halftone , 8 Bit for Gray scale
Scan to email		Yes	Yes
Compatibility		Microsoft Windows: 2000/XP(Include 64bit) Vista Linux OS: Red Hat 8~9, Fedora Core 1~4 Mandrake 9.2~10.1 SuSE 8.2~9.2	Microsoft Windows: 2000/XP(Include 64bit) Vista Linux OS: Red Hat 8~9, Fedora Core 1~4 Mandrake 9.2~10.1 SuSE 8.2~9.2

Item		CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Copy Quality Selection or Original Image type selection Mode: (Color)	Text (Platen & ADF)	600x600dpi(Optical: 300x300dpi) for Platen	600x600dpi(Optical: 300x300dpi)
	Mixed (Platen & ADF)	600x600dpi(Optical: 300x300dpi) for Platen	600x600dpi(Optical: 300x300dpi)
	Magazine	600x600dpi(Optical: 300x300dpi) for Platen	600x600dpi(Optical: 300x300dpi) for Platen
		N/A	600x600dpi(Optical: 300x300dpi) for ADF
	Film Photo	1200x1200dpi(Optical: 600x600dpi) for Platen	1200x1200dpi(Optical: 600x600dpi) for Platen
Copy Quality Selection or Original Image type selection Mode: (Black & White)	Text (Platen & ADF)	600x600dpi(Optical: 300x300dpi) for Platen	600x600dpi(Optical: 300x300dpi)
	Mixed (Platen & ADF)	600x600dpi(Optical: 300x300dpi) for Platen	600x600dpi(Optical: 300x300dpi)
	Photo	1200x1200dpi(Optical: 600x600dpi)	1200x1200dpi(Optical: 600x600dpi)
		N/A	600x600dpi(Optical: 300x300dpi)
	Magazine	600x600dpi(Optical: 300x300dpi) for Platen	600x600dpi(Optical: 300x300dpi) for Platen
		N/A	600x600dpi(Optical: 300x300dpi) for ADF
FCOT	From Ready	Mono : Less than 18 sec Color : Less than 34 sec	Mono : Less than 18 sec Color : Less than 34 sec
Copy Speed	SDMC* at all mode	16cpm/A4(Mono), 17cpm/Ltr(Mono), 4cpm/A4,Ltr(Color)	16cpm/A4(Mono), 17cpm/Ltr(Mono), 4cpm/A4,Ltr(Color)
Origin Alignment	Platen	REAR LEFT	REAR LEFT
	ADF	N/A	Center
Zoom Range		25% to 400% for Platen	25% to 400% for Platen 25% to 100% for ADF
Number of Copies(Multi Copy)		1~99	1~99
Preset		Original(100%) A4 ( A5(71%) A4 ( LTR(94%) EXE ( LTR(94%) A5 ( A4(141%) 50%, 150%, 200% Custom 50%~200%	Original(100%) A4 ( A5(71%) A4 ( LTR(94%) EXE ( LTR(94%) A5 ( A4(141%) 50%, 150%, 200% Custom 50%~200%
Contrast Levels		3 level	3 level

Item		CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Copy Mode(=Quality)		Text, Mixed, Magazine, Film Photo	Text, Mixed, Magazine, Film Photo
Auto return to default mode		Yes	Yes
Changeable Default mode		Contrast, Image, Reduce/Enlarge, No. of Copies	Contrast, Image, Reduce/Enlarge, No. of Copies
Special Copy	Auto Fit Copy	Yes	Yes(Platen only)
	ID Copy	Yes	Yes(Platen Only)
	Clone	Yes	Yes(Platen only)
	Poster	Yes(X9 Only)	Yes(Platen only, X9 Only)
Special Copy	2-up,4-up	Yes	Yes

\*SDMC : Single Document Multiple Copy

Item		CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Handset		N/A	No
On hook Dial		N/A	Yes
1-Touch Dial		N/A	No
Speed Dial		N/A	240 locations
TAD I/F		N/A	Yes
Tone/Pulse		N/A	Selectable in Tech mode
Pause		N/A	Yes
Auto Redial		N/A	Yes
Last Number Redial		N/A	Yes
Distinctive Ring		N/A	Yes
Caller ID		N/A	No
External Phone Interface		N/A	Yes
Report & List Print out	Tx/Rx Journal	N/A	Yes
	Confirmation	N/A	2 Types available (with Image TCR, W/O Image TCR. Mono Only)
	Help List	N/A	No
	Auto Dial List	N/A	Yes
	System Data List	N/A	List all user setting
Sound Control	Ring Volume	N/A	Yes(Off, Low, MED, HIGH)
	Key Volume	Yes	Yes
	Alarm Volume	Yes	Yes
	Speaker	N/A	Yes(On, Off)

Item		CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Compatibility		N/A	ITU-T G3
Communication System		N/A	PSTN/PABX
Modem Speed		N/A	33.6Kbps
TX Speed		N/A	3sec(Mono/Standard/ECM-MMR. ITU-T G3 No1.standard)
Compression		N/A	MH/MR/MMR/JPEG/JBIG
Color Fax		N/A	Yes
ECM		N/A	Yes
Resolution	Mono.Std	N/A	203*98dpi
	Mono.Fine	N/A	203*196dpi
	Mono.S.Fine	N/A	300*300dpi
	Color	N/A	200*200dpi
Scan Speed(ADF)	Std	N/A	3 sec/ LTR
	Fine	N/A	5 sec/ LTR
	S.Fine	N/A	6 sec/ LTR
Rx fax duplex print out		N/A	No
Multiple page scan speed		N/A	17ppm/LTR, Std mode (203*98dpi, ITU-T #1)
Receive Mode		N/A	Fax, TEL, Ans/Fax, DRPD
Memory	Capacity	N/A	2MB
	Optional Memory	N/A	No
	Max locations to store to 1 Group Dial	N/A	240 locations
	Fax Forward	N/A	Yes(On/Off), both Sent and Received
	Broadcasting	N/A	up to 200 locations
	Cover page	N/A	No
	Delayed fax	N/A	Yes (Mono only)
	Memory RX	N/A	Yes
Functions	Voice Request	N/A	No
	TTI	N/A	Yes
	RTI	N/A	Yes
	Polling	N/A	No
	Earth/Recall	N/A	No
	Auto Reduction	N/A	Yes (On,Off)
	SMS	N/A	No
	RDS	N/A	N/A

Item	CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Junk Fax barrier	N/A	Yes
Secure Receive	N/A	Yes
Memory Back-up	N/A	Yes(Flash Memory)
Battery Backup	N/A	Yes
Rx FAX Duplex Print Out	N/A	No
Receive Mode	N/A	Fax, TEL, Ans/Fax
Capacity	N/A	2MB(100 Pages) (Mono)
Optional Memory	N/A	No
Max locations to store to	N/A	240 Locations
1 Group Dial		
Fax Forward to FAX	N/A	Yes(On/Off), both Sent and Received, Mono Only
Fax Forward to e-mail	N/A	No
Broadcasting	N/A	up to 249 locations, Mono Only
Cover page	N/A	No
Delayed fax	N/A	Yes (Tx only, Mono Only)
Memory RX	N/A	Yes
Mail Box(Electronic)	N/A	No

### 2.1.2.7 Paper Handling

Item		CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Capacity (20lbs)	Cassette	150sheets@75g/m2 (Max)	150sheets@75g/m2 (Max)
		Envelop : 5 Sheets	Envelop : 5 Sheets
		Transparency : 1 Sheets	Transparency : 1 Sheets
		Label , thick paper : 5 Sheets	Label , thick paper : 5 Sheets
	MP Tray	N/A	N/A
Output Capacity		Face Down: 100Sheets/20lb Envelop : 5 Sheets Transparency : 1 Sheet Label , thick paper : 5 Sheets GlossyPhoto160 g/m2 : 1 Sheets	Face Down: 100Sheets/20lb Envelop : 5 Sheets Transparency : 1 Sheet Label , thick paper : 5 Sheets GlossyPhoto160 g/m2 : 1 Sheets
Output Full Sensing		No	No
Duplex		N/A	N/A
Paper Type	Cassette	A4, A5, A6, Letter, Legal, Executive, Folio, ISO B5, JIS B5	A4, A5, A6, Letter, Legal, Executive, Folio, ISO B5, JIS B5
		Transparency : (Mono Print Only)	Transparency : (Mono Print Only)
		GlossyPhoto160 g/m2	GlossyPhoto160 g/m2
	MP Tray	N/A	N/A



Item		CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Paper Weight	Cassette	16~43 lb. (60 to 163g/m <sup>2</sup> )	16~43 lb. (60 to 163g/m <sup>2</sup> )
Paper Path	Standard output	Bottom to Top Front (FIFO)	Bottom to Top Front (FIFO)
	Straight Through	N/A	N/A
Paper Size	Max	216 x 355.6mm(8.5"x14")	216 x 355.6mm(8.5"x14")
	Min	76 x 160mm(3"x6.3")	76 x 160mm(3"x6.3")
ADF	Paper Weight	N/A	
	Capacity	N/A	15 pages

### 2.1.2.8 Driver


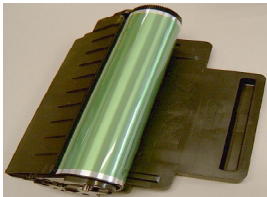




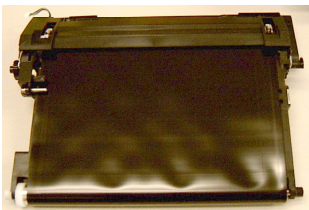
Item	CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Supporting OS	Microsoft Windows: 2000/2003/XP(Include 64bit), Vista MacOS:10.3, 10.4 Linux(Printer only)OS: Red Hat 8~9, Fedora Core 1~4 Mandrake 9.2~10.1 SuSE 8.2~9.2	Microsoft Windows: 2000/2003/XP(Include 64bit), Vista MacOS:10.3, 10.4 Linux(Printer only)OS: Red Hat 8~9, Fedora Core 1~4 Mandrake 9.2~10.1 SuSE 8.2~9.2
Default Driver	SPL-C	SPL-C
Driver feature	Microsoft Windows: - Watermark - N-up printing - Poster printing - Manual Duplex - Quality(Best, Normal, Draft) - Color mode(Color, Gray scale) - Device Color Support - Color Management Support [Mac] - N-up printing - Quality(Best, Normal, Draft) - Color mode(Color, Gray scale) - Color Management Support [Linux] - N-up printing - Quality(Best, Normal, Draft) - Color Management Support - Color mode(Color, Gray scale) [Common] - N/W Install during driver install	Microsoft Windows: - Watermark - N-up printing - Poster printing - Manual Duplex - Quality(Best, Normal, Draft) - Color mode(Color, Gray scale) - Device Color Support - Color Management Support [Mac] - N-up printing - Quality(Best, Normal, Draft) - Color mode(Color, Gray scale) - Color Management Support [Linux] - N-up printing - Quality(Best, Normal, Draft) - Color Management Support - Color mode(Color, Gray scale) [Common] - N/W Install during driver install
WHQL	Windows 2000 including vista	Windows 2000 including vista

Item	CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
Language Localization	[Windows] - Korean, English, French, German, Italian, Spanish, Russian, Dutch, E.Portuguese, B.Portuguese, Finnish, Swedish, Norwegian, Danish, S.Chinese, T.Chinese, Polish, Hungarian, Greek, Czech, Turkish [Mac] - Korean, English, French, German, Italian, Spanish, Dutch, Portuguese, S.Chinese, T.Chinese [Linux] - English Only	[Windows] - Korean, English, French, German, Italian, Spanish, Russian, Dutch, E.Portuguese, B.Portuguese, Finnish, Swedish, Norwegian, Danish, S.Chinese, T.Chinese, Polish, Hungarian, Greek, Czech, Turkish [Mac] - Korean, English, French, German, Italian, Spanish, Dutch, Portuguese, S.Chinese, T.Chinese [Linux] - English Only
Smart Panel	USB	USB/Network
	Default Install	Default Install
Network Management	Set IP.SWAS &SWS (Linux, Mac not support, SWAS&SWS need I explorer 5.0 or Higher)	Set IP.SWAS &SWS (Linux, Mac not support, SWAS&SWS need I explorer 5.0 or Higher)
Smart Thru	Smart Thru 4	Smart Thru 4
TWAIN	Yes	Yes

### 2.1.2.9 Interface





Item	CLX-317x/CLX-317xN	CLX-317xFN/CLX-317xFW
USB	USB Device 2.0 USB Host 2.0(Scan to USB, Direct Print, PictBridge)	USB Device 2.0 USB Host 2.0(Scan to USB, Direct Print, PictBridge)
Network	Ethernet 10/100 base Tx	Ethernet 10/100 base Tx
Wireless	No	IEEE 802.11b/g (CLX-3175FW only)
Protocol	TCP/IP,IPP,SNMPv2	TCP/IP,IPP,SNMPv2
Network OS	- Microsoft Windows: 2000/XP(32/64Bit)/2003 Server(32/64Bit) Vista - Mac OS: 10.3~10.5(Printing Only TCP/IP) - Linux OS: Red Hat 8~9, Fedora Core 1~4 Mandrake 9.2~10.1 & Suse 8.2~9.2 - Unix HP-UX, Solaris,SunOS SCO UNIX	- Microsoft Windows: 2000/XP(32/64Bit)/2003 Server(32/64Bit) Vista - Mac OS: 10.3~10.5(Printing Only TCP/IP) - Linux OS: Red Hat 8~9, Fedora Core 1~4 Mandrake 9.2~10.1 & Suse 8.2~9.2 - Unix HP-UX, Solaris,SunOS SCO UNIX

## 2.1.2.10 Consumables

Item	Image	Pages Printed	Part number	Remark
Black Toner cartridge		Approx. Initial : 1,000 Pages* Sales : 1,500 Pages*	CLT-K409S(Black)	CRU
Color Toner cartridge		Approx. Initial : 700 Pages* Sales : 1,000 Pages*	CLT-C409S(Cyan) CLT-M409S(Magenta) CLT-Y409S(Yellow)	
Imaging unit		Approx. 24000 images*	CLT-R409	
Waste Toner		Approx. 10000 images	CLT-W409	
Pick-up roller		Approx. 50,000 pages	JC97-03028A	FRU
Fuser unit		Approx. 100,000 black pages or 25,000 color pages	JC96-04781A (110V)	
			JC96-04780A (220V)	
Transfer Unit		Approx. 100,000 pages	JC97-03046A	
ITB		Approx. 100,000 black pages or 25,000 color pages	JC96-04840C	
ADF Rubber Pad		Approx.20,000 Images	JC97-03188A	
ADF Pick up roller		Approx.20,000 Images	JC97-03186A	

\* Average A4-/letter-sized page count based on Std. ISO 19752 of individual colors on each page.  
Usage conditions and print patterns may cause results to vary.

### 2.1.3 Model Comparison Table

	<b>Samsung CLX-317xFN, 4-in-1</b>	<b>Samsung CLX-2160N</b>	<b>HP CM1015</b>	<b>HP LJ 3052</b>
Image				
Function	4-in-1, N/W	3-in-1, N/W	3-in-1	3-in-1, N/W
Print Speed	16/4 ppm	16/4 ppm	8/8 ppm	18 ppm
Copy Speed	16/4 ppm	16/4 ppm	8/8 ppm	18 ppm
Resolution	2,400 x600 dpi	2,400 x600 dpi	2,400 x600 dpi	1,200 x1,200 dpi
Scan Resolution	1,200 X 1,200 (Max.4,800)	1,200 X 1,200 (Max.4,800)	1,200 X 1,200 (Max.19,200)	600 dpi
(Max. 19,200)	Manual	Manual	Manual	Manual
FPOT	less than 26 sec (Color, From ready )	less than 26 sec (Color, From ready )	20.7 sec	8 sec
Processor	360 MHz	300 MHz	300 MHz	-
Memory (Max.)	128MB/128MB	128MB/128MB	96MB/224MB	64MB/64MB
Emulation	SPL-C	SPL-C	PCL, PS	PCL,PS
Interface	USB 2.0, N/W	USB 2.0, N/W	USB 2.0	USB 2.0, N/W
Paper Input	150 CST ADF 15 sheets	150 CST, 1 Manual	250 CST, 1 Manual SCF 250 sheets	250 CST, 10 MP ADF 50 sheets
Toner	1.5K/1K	2K/1K	2.5K/2K	2 K
Dim. (WDH)	454x380.5x355.4	413.2x364.5x333	437x508x525mm	497x406x393mm

## 2.2 System Overview

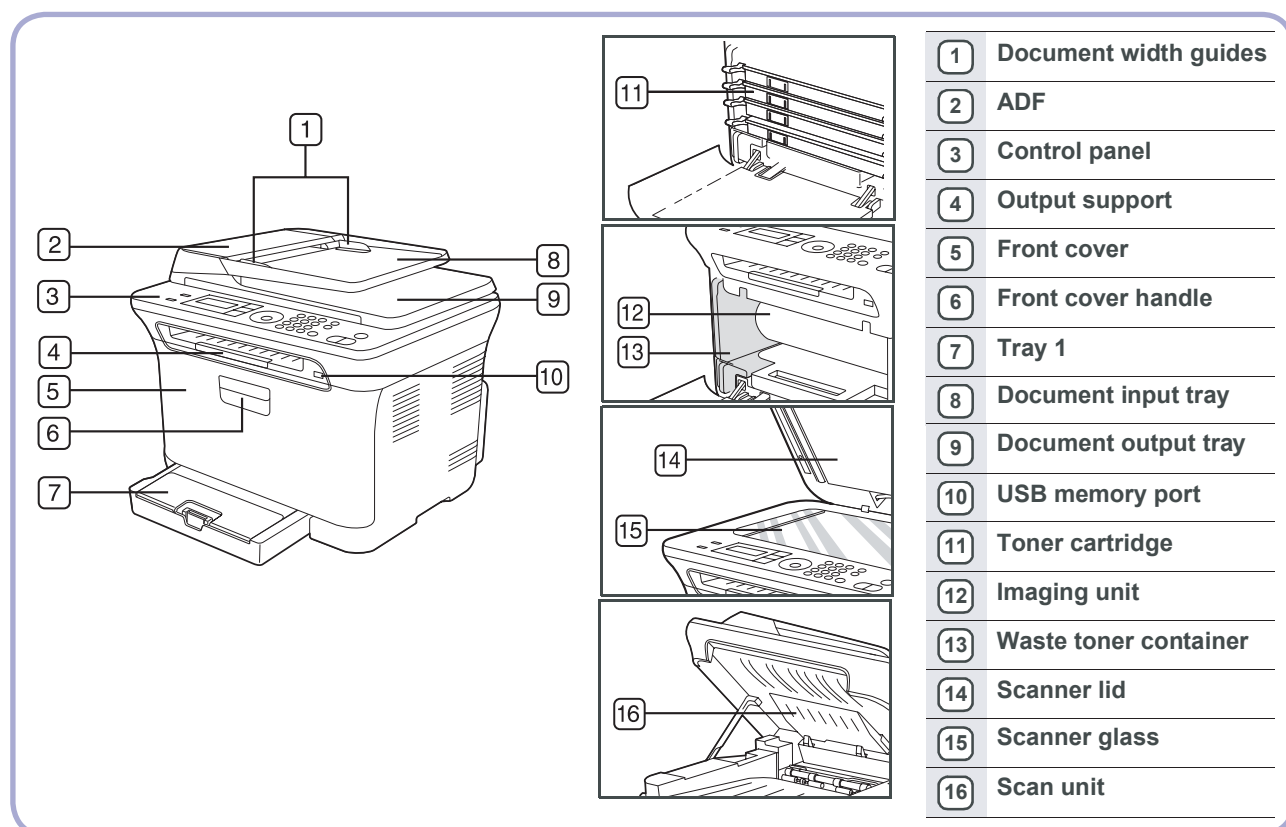
This chapter describes the functions and operating principles of the main components.

### 2.2.1 System Structure

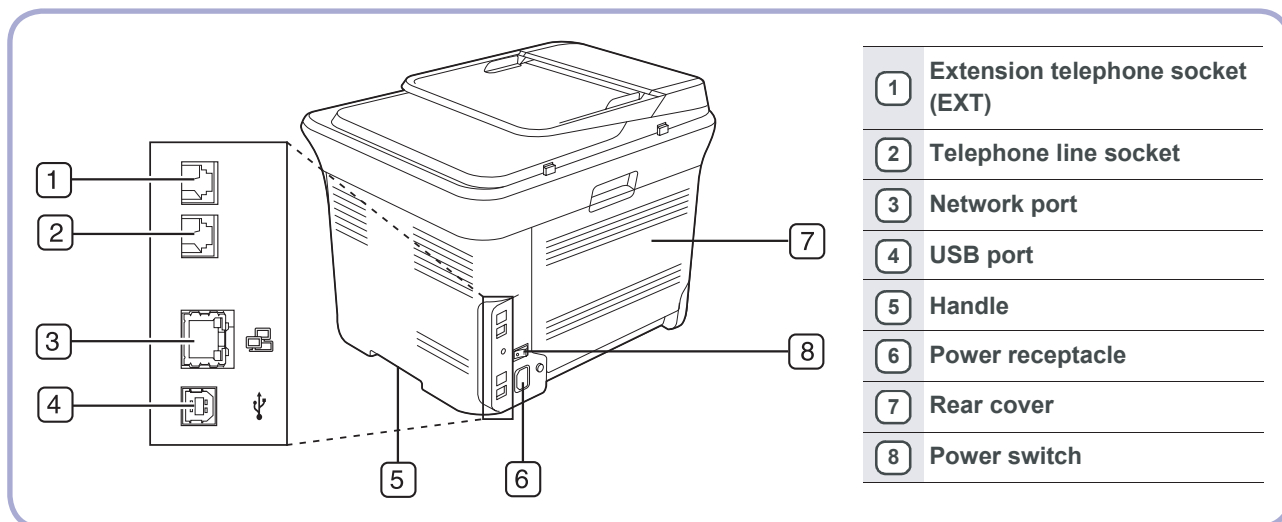
The CLX-317x series is roughly made up a Main Controller part (Main PBA), an Operation Panel part, a Scanner part, a Fax part, and a Power part. Each part is separated modules which focus on common and standard design of different kind products. The Main controller part is composed of one CPU and one Board and works to control all the parts for printing, copying, scanning and faxing. The Operation Panel part is for User's interface. The Scanner part is composed of an ADF and a Platen and is connected with the Main Controller by Harnesses. The Fax part and the ADF scanner part are not populated in the Model of CLX-317x and CLX-317xN.

#### 2.2.1.1 Main Parts of System

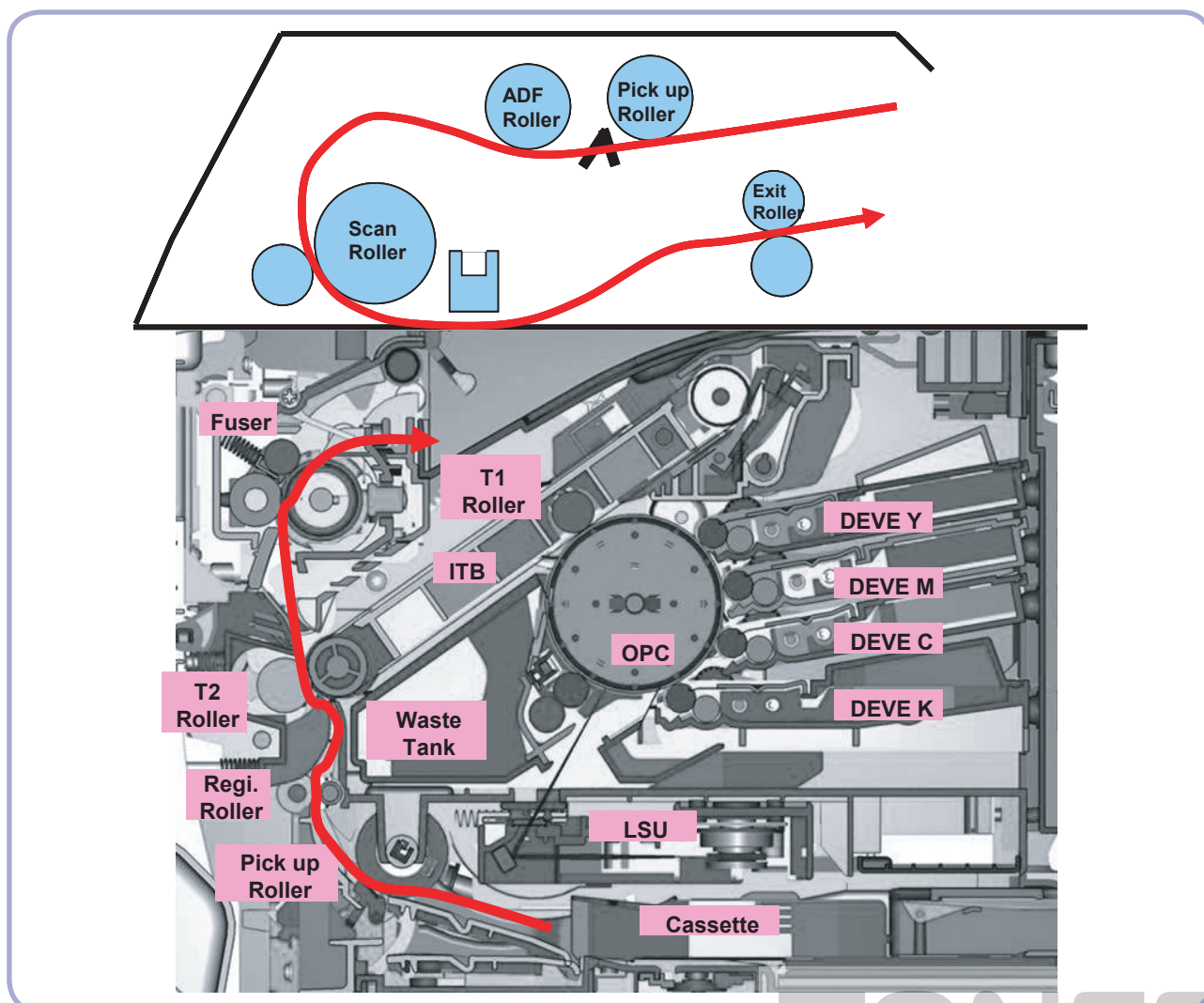
##### - Front view



## - Rear view



## - Inner view





① **Cassette**

- Feeding Method : Cassette Type
- Feeding Standard : Center Loading
- Feeding Capacity : Cassette 150 Sheets(75g/m<sup>2</sup>, 20lb Pa per Standard)
- No Manual Feeder
- Paper Detecting Sensor : Photo Sensor (Empty, Registration, Exit)
- Paper Size Sensor : None

② **LSU(Laser Scan Unit)**

The LSU unit is controlled by video controller. It scans the video data received from video controller with laser beam by using the rotation principle of the polygon mirror to create the latent image on the OPC drum. It is the core part of LBP.

The OPC drum rotates as the same speed as the paper feeding speed. It creates the /HSYNC signal and sends it to the engine when the laser beam of the LSU reaches the end of the polygon mirror, and the engine detects the /HSYNC signal to arrange the vertical line of the image on the paper. After detecting the /HSYNC signal, the image data is sent to the LSU to arrange the its margin on the paper.

- Consisted of LD(Laser Diode) and Polygon Motor Control.

Error	Phenomenon
Polygon Motor Error	The Rotation of Polygon Motor can not reach stable
Hsync Error	Though the rotation of Polygon Motor reach stable, the signal of Hsync is not occurred



③ **2nd Transfer Ass'y**

- The life span: Print over 100,000 sheets (in 15~30 )
- Specification: Similar to CLP-300 Series

④ **Fuser Ass'y**

This unit consists of Heat Roller, a Thermostat and a Thermistor. It melts and fuses the toner, transferred by the transfer roller onto the paper, by applying pressure and high temperature to complete printing job.

- \* Heat Lamp : Kunckle Type
- \* Fusing system : 3-Roll Fusing type
  - Heat roller : Pipe type (Lamp inside)
  - Pressure roller
  - Pressure roller Shaft
- \* Thermistor - Temperature-Measuring Device
- \* Thermostat - Critical Temperature-Detecting Device
- \* The life span – 100k(black)/color(25k)

**Thermostat**

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

**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.

**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 & ⑥ **ITB(Intermediate Transfer Belt) & 1st Transfer Roller**

- The life span: Print over 100,000 Images
- The ITB unit includes 1st Transfer Roller

⑦ **Imaging Unit**

- The life span: Print over 24,000 Images (Both)
- Image Unit includes OPC (Organic Photo-Conductor) Drum



⑧ **Toner cartridges**

- The life span: Color -> 700(initial)/1000(sales) images (Std. ISO 19798 Print-Out)  
Black -> 1000(initial)/1500(sales) images (Std. ISO 19798 Print-Out)
- Each Toner Kit consists of Developer and Deve. Main Frame

⑨ **Driver Ass'y**

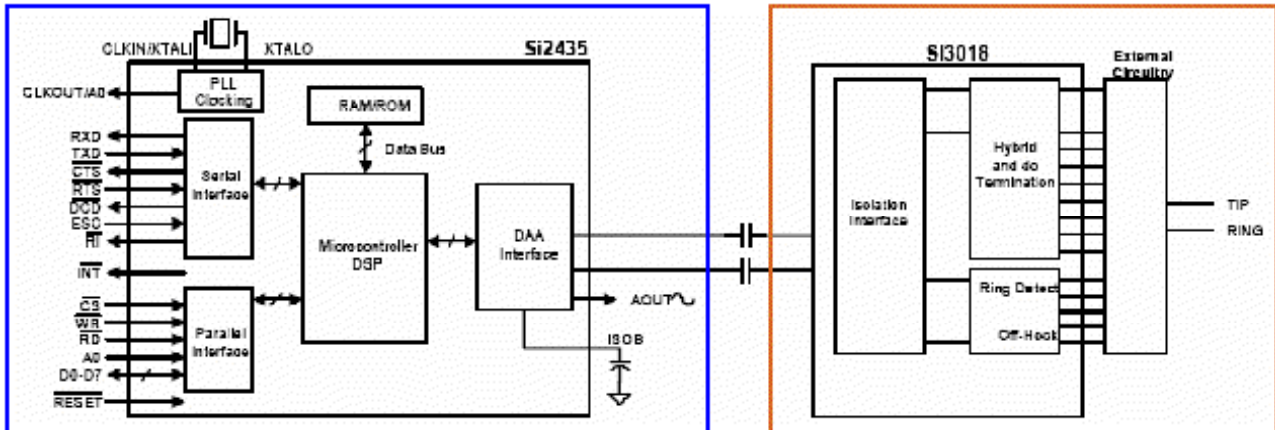
- It is a power delivery unit by gearing
- By driving the motor, it supplies the power to the feeding unit, the fusing unit, and the distributing unit.
- The Main Motor is similar to CLP-300 Series Main Motor.

## ⑪ Fax

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

- Si2435 (Modem) A Modem Chip which embeds SSD (System Side Device) for interfacing between LSD and DIB of Si2435 Core
- Si3018 (DAA) A LIU (Line Interface Unit) Chip which is controlled by SSD and satisfies each PSTN Requirements by modulating internal Configuration with connecting Tel Line.

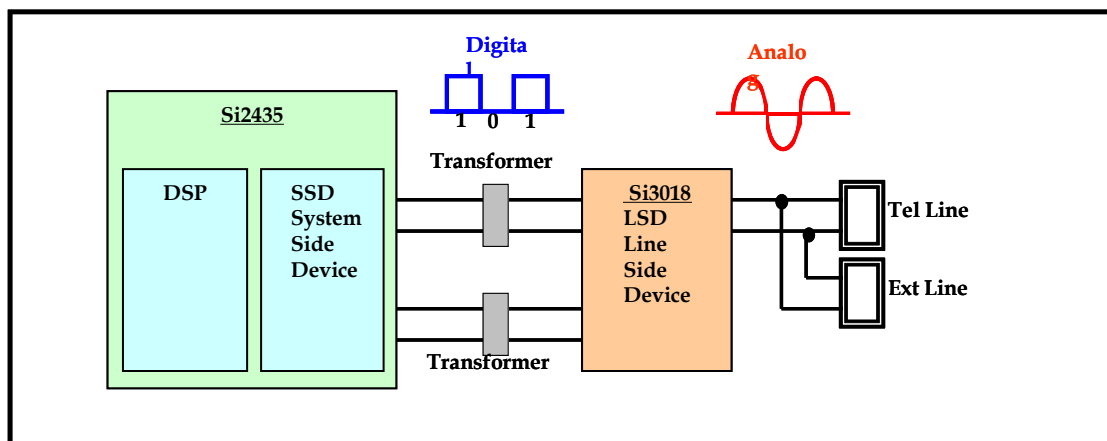
## Block Diagram



(Modem)

## Signal Transition of DAA Solution

Line Interface Signal of Tel Line and LSD is Analog Signal. There are a A/D and a D/A Converter in the LSD, so Analog Signal from Tel Line is converted in Digital through a A/D Converter in the DAA and transferred to the SSD by the DIB Transformer. Digital Signal from the SSD is converted to Analog by a D/A Converter in the DAA and transferred to Tel Line.



## ⑫ Scan Part

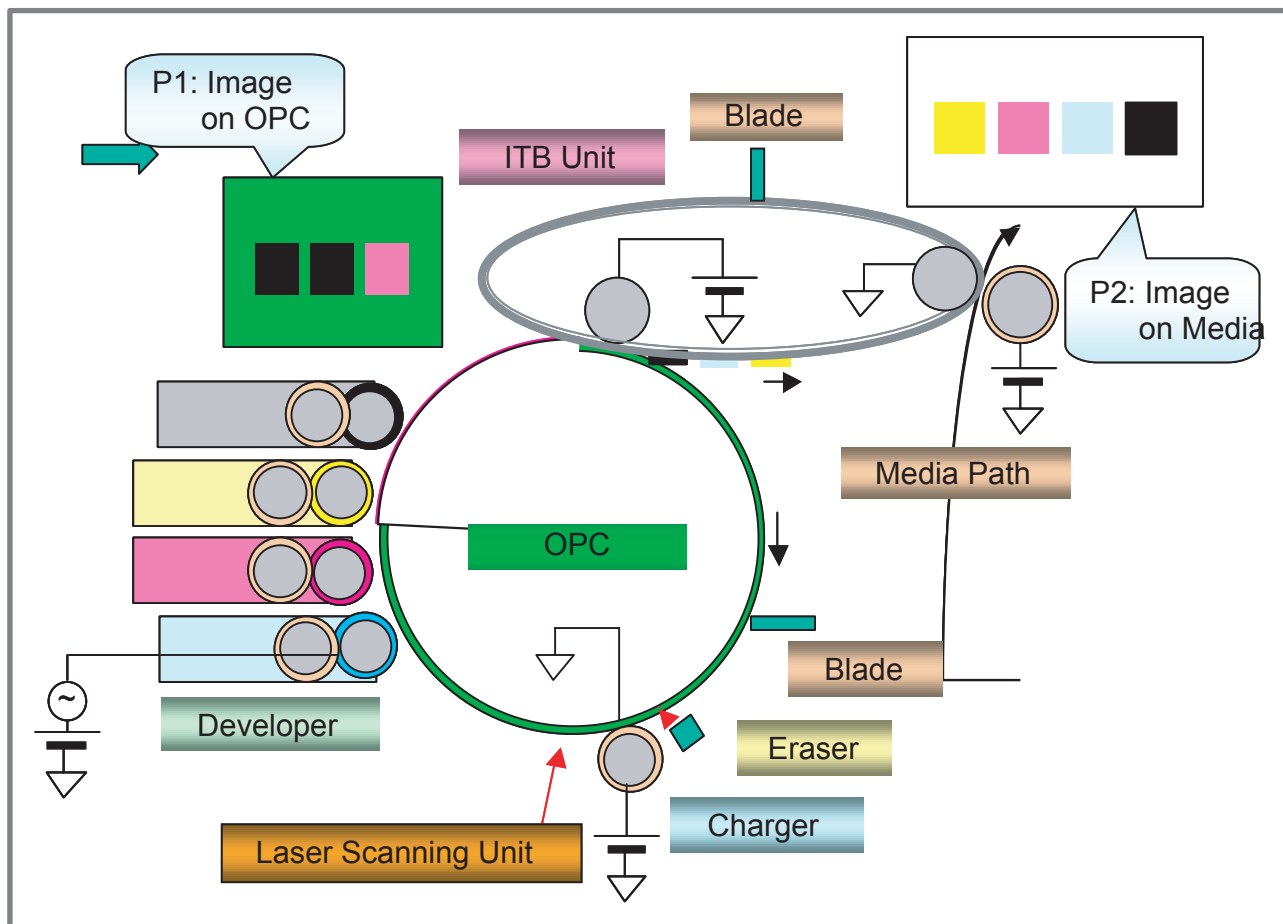
- 1) Pictorial signal input part: output signal of CIS passes through Bypass Cap change to ADC at IP Main and defined signal between AFE and IP Main processes the Image signal. When AFE accept each pixel, CDS (Correlated Double Sampling) technique which samples arm-level twice is used on each pixel by using IP signal.
- 2) Pictorial image processing part: read CIS Pixel data in terms of 1200dpi Line and process LAT algorithm on text mode, Error Diffusion Algorithm on Mixed mode, and 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 Minimum Scan Line Time: 0.5ms @mono 300dpi
  - ② Scan Resolution: Max. 1200\*2400dpi
  - ③ Scan Width: 216mm
  - ④ main function
    - White Shading Correction
    - Gamma Correction
    - CIS Interface
    - 256 Gray Scale
- 3) CIS Operating Part : CMOS Sensor use +3.3V
- CIS Maximum Operating Frequency : 5MHz
  - CIS Line time : 0.75ms @mono 300dpi (TBD)
  - White Data output Voltage : 1.7V -(Mono Copy, 5ms/line)

### 2.2.1.2 EP Process

- Structure of EP Process



### ① Charging

- Conductive Roller charging
- Applied voltage : -1.1kV
- Charge acceptance : -520V
- OPC coating thickness : 21um
- OPC diameter : Φ60mm
- Eraser system

1. Organic Photoconductor is charged to uniform voltage by conductive roll charging method
2. No ozone is produced because corona is not used
3. Charger roll is cleaned with cleaning roll
4. Toner remained on OPC after T1 process is cleaned by cleaning blade and retrieved into waste toner box by auger and belt driving mechanism

### ② Exposing

- One polygon motor ( 6 facet )
- Single beam LD (1ea)
- LD wavelength : 785nm
- Polygon motor rpm : 29685
- LSU energy : 0.25uJ/cm<sup>2</sup>
- OPC exposed potential : -50V

1. Exposing is implemented by laser striking on to OPC with uniform potential
2. Laser beam is modulated according to image to be printed that is from PC
3. Latent Image is formed on OPC, which is developed with toner

### ③ Developing

- Non-magnetic, Single component
- Non-contact development
- Developing bias : DC + AC
- AC peak to peak : 1.5 ~ 2.0kV
- Roller diameter : Φ10mm
- Process speed ratio : 1.2 (OPC=1.0)
- Color order : Y -> M -> C -> K

1. Only latent image formed by exposing process is developed with toner
2. AC + DC Voltage is being used to develop toner into latent image on OPC because non-contact developing method is adopted
3. Y, M, C, and K Images are sequentially developed onto OPC and transferred onto Intermediate Transfer Belt (hereafter ITB) to form a color image on ITB

#### ④ Transfer 1

- Multi-pass transfer
- Indirect transfer
- Transfer voltage : 0.5 ~ 2.0kV (controllable)
- Roller diameter :  $\Phi$ 14mm
- Transfer unit life : 100K images

1. Developed Image on OPC is transferred onto ITB by T1 Process
2. T1 Voltage is positive which attract toner to ITB
3. 4 times of T1 process is required to make a color image on ITB, which means multi-pass process
4. ITB has a hole as a fiducial mark for timing. Engine control for color image is synchronous with it, ITB Home Sensing Signal

#### ⑤ Transfer 2

- Indirect transfer
- Transfer voltage : 1 ~ 4.0kV (controllable)
- Roller diameter :  $\Phi$ 18.6mm
- Transfer unit life : 100 K images

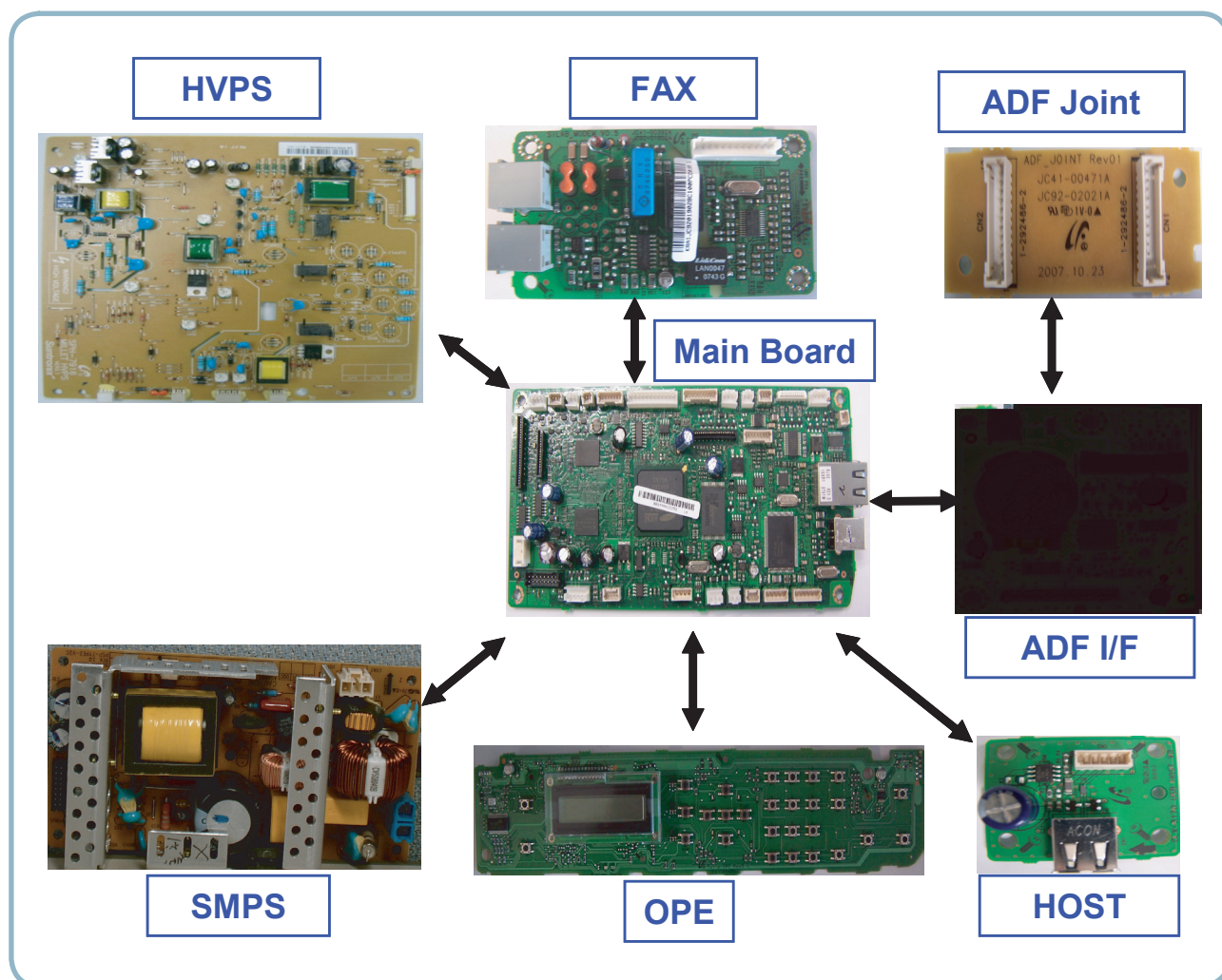
1. Color image formed on ITB is transferred onto media by T2 process
2. T2 voltage is also positive to get color image moved onto media
3. Toner remained on ITB after T2 process is cleaning by ITB cleaning blade and collected and
4. Transported and retrieved into waste toner box by auger and belt driving system
5. T2 Roll is engaged when color image is being transferred onto media. Otherwise it is disengaged. Clutch is used for driving T2 Roll engagement and disengagement

#### ⑥ Fusing

- 3 Roll system
  - > short warm-up time (35sec)
- Post Pressure Roll

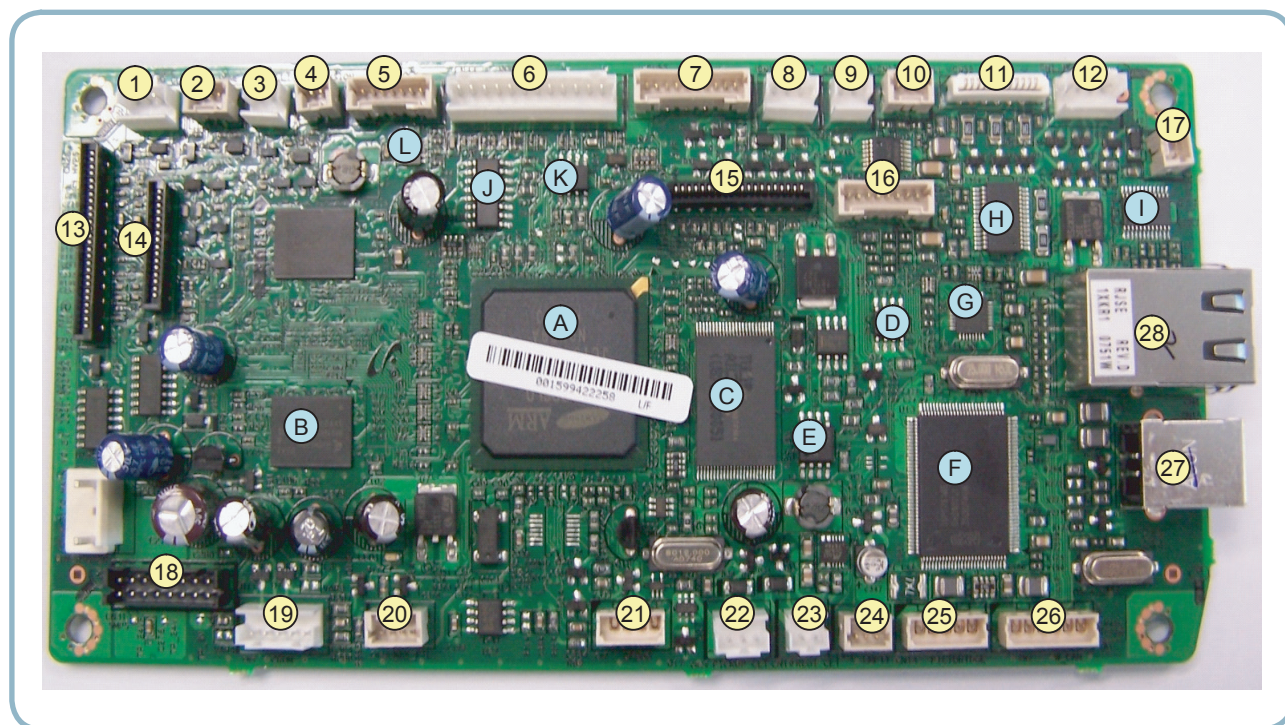
1. Color Image on media is melted down and fixed into media by fusing process

## 2.2.2 H/W description





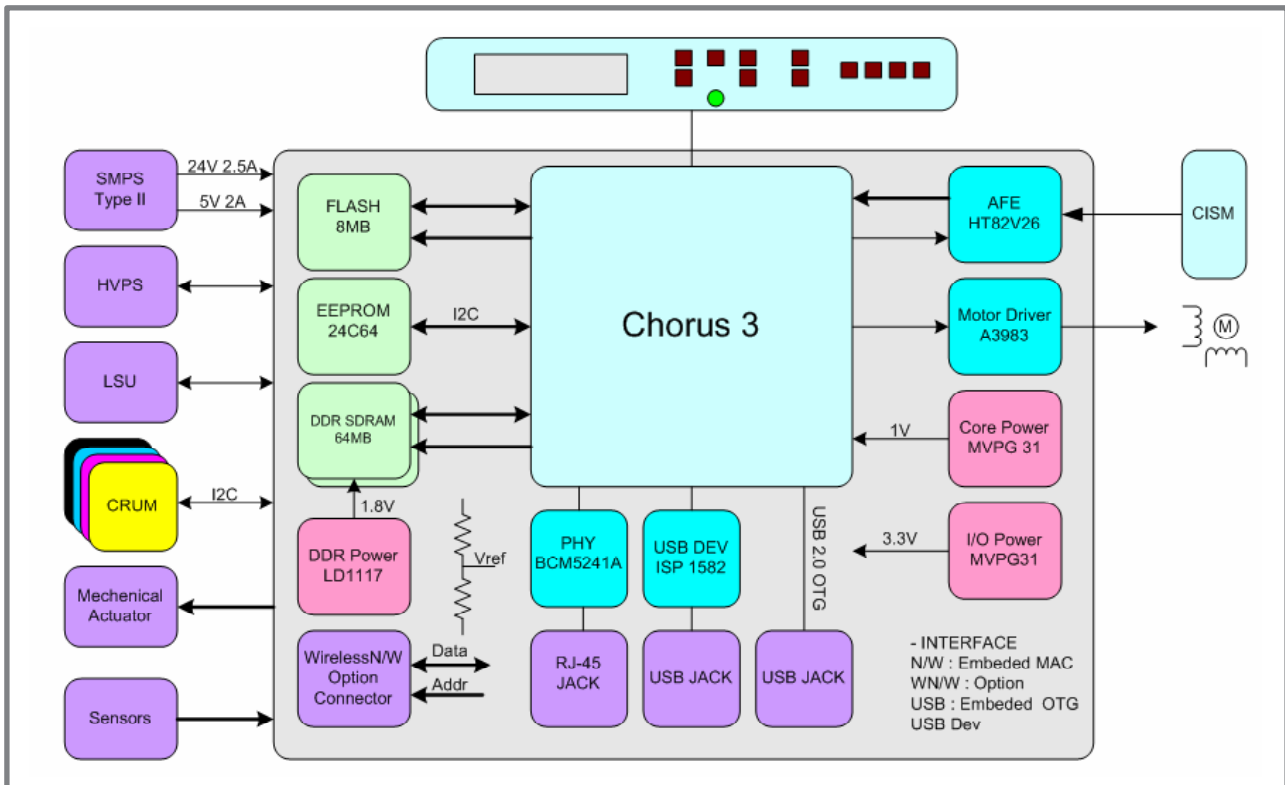
### 2.2.2.2 Main Controller PBA



NO.	NAME	NO.	NAME
1	ITB Clutch Con.(3P)	21	Debug Con.(4P)
2	Deve Home Sen Con.(3P)	22	Pick up Clutch Con.(3P)
3	Deve Clutch Con.(2P)	23	Regi Clutch Con.(2P)
4	ITB Tension Clutch Con.(2P)	24	Empty Sen Con.(3P)
5	ITB HOME Sen & IN Temp & Interlock Con.(7P)	25	USB Host Con.(5P)
6	LIU Con.(12P)	26	Wireless LAN Con.(6P)
7	BLDC Con.(10P)	27	USB Con. (6P)
8	T2 Clutch Con.(3P)	28	Wired N/W Con. (14P)
9	Fuser Thermistor Con.(2P)	A	CPU(Chorus3)
10	BIN Full Sen Con.(3P)	B	DDR2 (64MB) x 2
11	CIS FFC Con.(12P)	C	NOR FLASH(8MB)
12	Scan Motor Con.(4P)	D	EEPROM
13	HVPS FFC Con.(26P)	E	Serial Flash(2MB)
14	LSU FFC Con.(16P)	F	ISP1761(USB Controller)
15	ADF I/F FFC Con.(20P)	G	PHY Chip
16	Panel Con.(8P)	H	ADC
17	Fuser Clutch Con.(2P)	I	A3983(Motor Driver)
18	SMPS Con.(16P)	J	Mux
19	CRUM Joint Con.(5P)	K	Audio Amp
20	KEY & Eraser Con.(4P)	L	Switching Regulator



### 2.2.2.3 Main PBA Description



#### CHORUS 3

A Proprietary SoC, CHORUS3, executes and controls all jobs and functions to be required for printing. To do these all jobs, the CHORUS3 incorporates all H/W blocks as follows.

- CPU Core ARM 926ESJ, I/D-Cache 16/16KB , Up to 400MHz
- System Bus Internally 32-bit width, Up to 120MHz
- MEM Controller DDR1/2, 16-bit width, 166MHz, 4-Bank, 128MB Space/bank
- ROM Controller 16-bit width, 4-bank, 16MB Space/bank
- CODEC Controller JBIG 4-ch Decoder and 2-ch Encoder, 1-ch JPEG
- Image Processor Processing Scan Image
- MAC Controller 10/100Mbps Full IEEE 802.3 Compatibility
- USB Controller USB2.0, Device or Host
- UART Controller
- I2C Controller
- Interrupt Controller
- Misc. Controller ADC, DAC, PWM, Step Motor Control and so on
- Voltage Core 1.0V, I/O 3.3V
- Package 416PBGA

#### Flash Memory

Used to store System Programs including the Operating System.

- Type NOR Flash
- Bus 16-bit width
- Size 8 MB

**System Memory**

Used as a Printing buffer for printing, a Scan buffer for scanning, a ECM Buffer for System Working Area.

- Type DDR2 SDRAM
- Bus 16-bit 166MHz
- Size 128 MB

**CRU Control**

Used to store the printing and operating information into a Security EEPROM in 4 CRUs, Y,M,C and K Imaging Cartridge, respectively by the CHORUS3.

- Access I2C Bus Ch.100 KHz
- Security Size 2K-bit

**System Information Control**

Used to store the system operating information needed at printing into a EEPROM in the Main Controller by the CHORUS3.

- Access I2C Bus Ch.1 400KHz
- EEPROM Size 64Kbit(256Kbit at wireless Model)

**OPE Interface**

Used to control the OPE by the CHORUS 3 and the UART interface is used to communicate between the both.

**I/O Port**

Used to receive or transmit some data from/to the Host.

- USB Device USB2.0 High speed 480Mbps
- Network Ethernet 10/100-Base Tx

(note) The Network only equipped at CLX-3170xN/CLX-317xFN/CLX-317xFW, not CLX-317x.

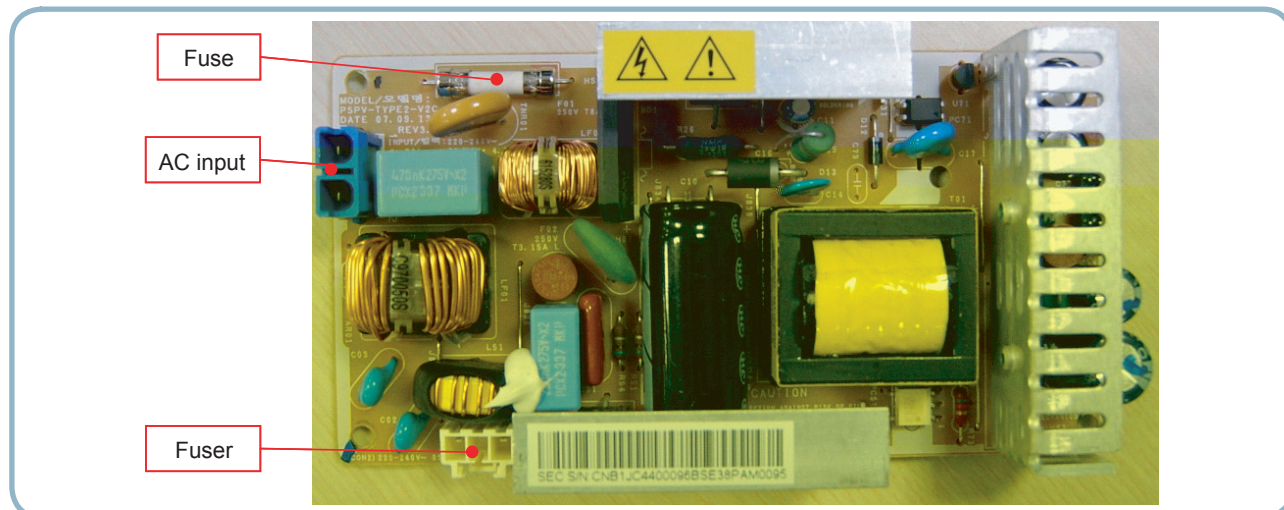
**Engine Control**

Used to control all parts to be required at printing by the CHORUS 3.

- Sensors
  - Paper Empty
  - Paper Registration
  - Waste Toner Bottle
  - Paper Exit
  - Temperature sensors
  - Bin-Full
  - Etc.
- Clutches(Solenoid)
  - Paper Pick Up
  - Paper Registration
  - Etc.
- Motor 1 BLDC
- LSU
- Fuser Control the Fuser's temperature
- HVPS Control the high voltage outputs
- ADC Reading the Fuser's temperature and the high voltage outputs' feedback
- Cover Open Sensing

### 2.2.2.4 SMPS(Switching Mode Power Supply) PBA

SMPS is the power source of the 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 AC Power to the Fuser. The SMPS has two DC output channels, +5V and +24V.



#### AC Input

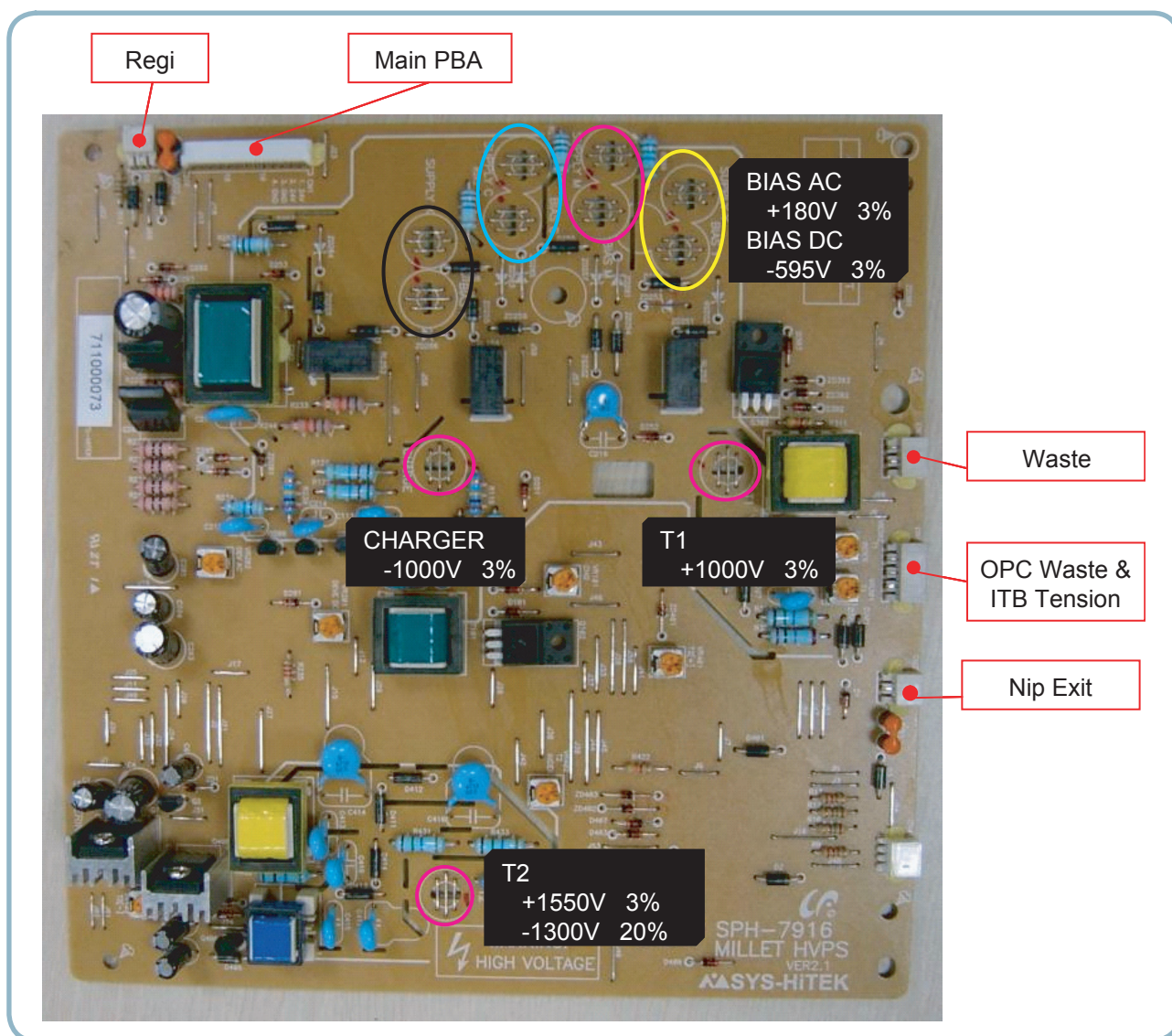
Input Rated Voltage	AC 110V~127V, AC 220V~240V AC 120V/AC 220V(EXP version)
Input fluctuating range	AC 99V~135V, AC 198V~264V
Rated Frequency	50/60 Hz
Frequency Fluctuating	47~63 Hz
Input Current	< 4.0Arms, 2.0Arms

#### Rated Output Power

No	Item	CH1	CH2	Remark
1	Channel Name	+5V	+24.0V	
2	Connector Pin	CON 3 5V Pin: 11,13,15 GND Pin: 12,14,16	CON 3 24V Pin:3,5,7,9 GND Pin:4,6,8,10	
3	Rated Output	+5V $\pm$ 5% (4.75~5.25V)	+24V $\pm$ 10% (21.6~26.4V)	
4	Max. Output Current	2 A	2.4 A	
5	Peak Loading Current	2.2 A	2.7 A	1ms
6	Ripple Noise	<100mVp-p	<500mVp-p	
7	Maximum Output	10.2W	60W	
8	Peak Output	11W	64.8W	1ms
9	Protection for loading shortage and overflowing current	Shut down or Fuse Protection	Shut down or Output Voltage Drop	

### 2.2.2.5 HVPS(High Voltage Power Supply) PBA

The HVPS creates the high voltages for T1(+), T2(+,-), Charger(-), DEV, and SUPPLY and then, supplies these voltages to the Developer part for making best condition to print. The HVPS part takes the 24V and outputs the high voltages and then, the high voltages are supplied to the Toner, OPC Cartridge, and Transfer Belt and Roller.



**1) Charger Voltage : Charger**

- Function: voltage that charges OPC surface up to -500V~ -800V.
- Output voltage: -1.0KV ~ -2.0KV DC 3%
- Error type: if the voltage fails to be output to Charger Roll, OPC surface will not be charged, and the toner on the developer roller will be transferred to OPC Drum, printing black paper.

**2) 1st Transfer High Voltage : T1(+)**

- Function: voltage necessary for transferring toner developed on OPC Drum surface onto ITB.
- Output voltage: Max +2.0KV 3%(Duty variable, no load)
- ERROR type: if T1(+) output fails, the toner on OPC drum will not be transferred to ITB normally and the image will be blurred.

**3) 2nd Transfer High Voltage : T2(+)**

- Function: voltage used to transfer the toner primarily transferred on ITB again onto paper.
- Output voltage: Max +5.0KV 3%(Duty variable, no load)
- ERROR type: if T2(+) output fails, the toner on ITB will not be transferred to paper normally and the image will be blurred.

**4) T2 Cleaning Voltage : Clean : T2(-)**

- Function: prevent reverse side of paper from being dirtied, by recovering the negatively charged toner remaining at Transfer Roller and sending it onto ITB.
- Output voltage: with no feedback control, output fixed voltage(-1300V 15%)
- ERROR type: reverse side of paper will be dirtied.

**5) Supplying Voltage : Supply AC+DC(-)**

- Function: voltage that makes toner to develop on the area exposed by LSU by means of potential difference, output will be the voltage of AC+DC overlapped form.
- Output voltage: AC 600V ~ 2000V p-p 1.5%  
DC -50V ~ -600V DC 3%
- ERROR type: 1. if supply is GND, density will be extremely low.  
2. if supply is floating (for insecure terminal contact), density will be down so slightly that it is impossible to make out with naked eyes.

**6) Developing Voltage : Deve AC+DC(-)**

- Function: voltage that supplies toner to Developing Roller
- Output voltage: AC 250V ~ 1650Vp-p 1.5% (supply voltage is connected to ZENER Diode 350V)  
DC -50V ~ -600V DC 3%
- ERROR type: 1. if Deve is GND, density will be extremely down.  
2. if Deve is floating (for insecure terminal contact), density will be extremely down.



## 2.2.3 CRUM

The CLX-317x series engine will be equipped with electronics that can read and write data into EEPROM otherwise known as CRUMs that reside within 1) C, M, Y, K Toner cartridges.

The CRUM has a company ID, and electronics logo.

The CRUMs contain fixed data such as the low warning point, specified life point and also store the current life count (pages count, pixels count, images count) and % of usage (gas gauge) data.

1) Perception of Refill Cartridge (when power is on or the cover is closed)

End of Life / life span data initialization -> judge to be Refill Cartridge

End of Life / life exhausted (simple refill) -> stop printing caused by life exhaustion

2) Operating

It is impossible to control appropriate development parameters, for there s no toner specification data.

It runs with the setting of default development parameter. (Image quality will be degraded, for the lack of appropriate respond to the change of time and environment.)

1) Record the information of End of Life.

2) Clear some information of Operation Area.

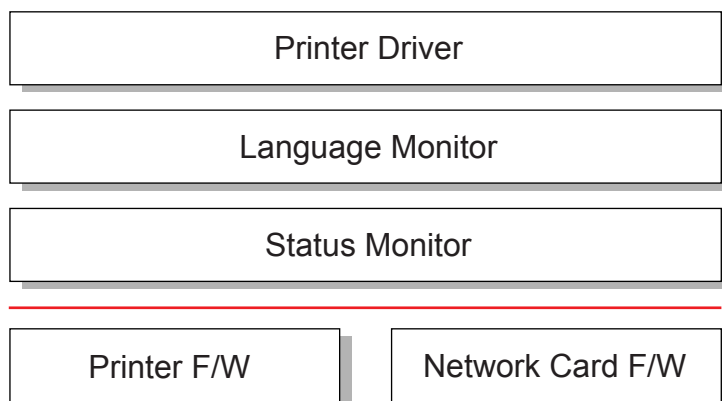
-> Supplier/Model Name/MFC date/Serial Number (Manufacture Information)

-> Let cartridge refiller initialize manufacture information and life span information.

## 2.3 S/W Structure and Descriptions

### 2.3.1 Architecture

The belt CRUM interface board is a transmission belt CRUM interface board of the photoelectric Dry Color Laser Printer, mounted on the printer body, making it possible to physically combine the body and the belt CRUM board.



### 2.3.2 Language Monitor

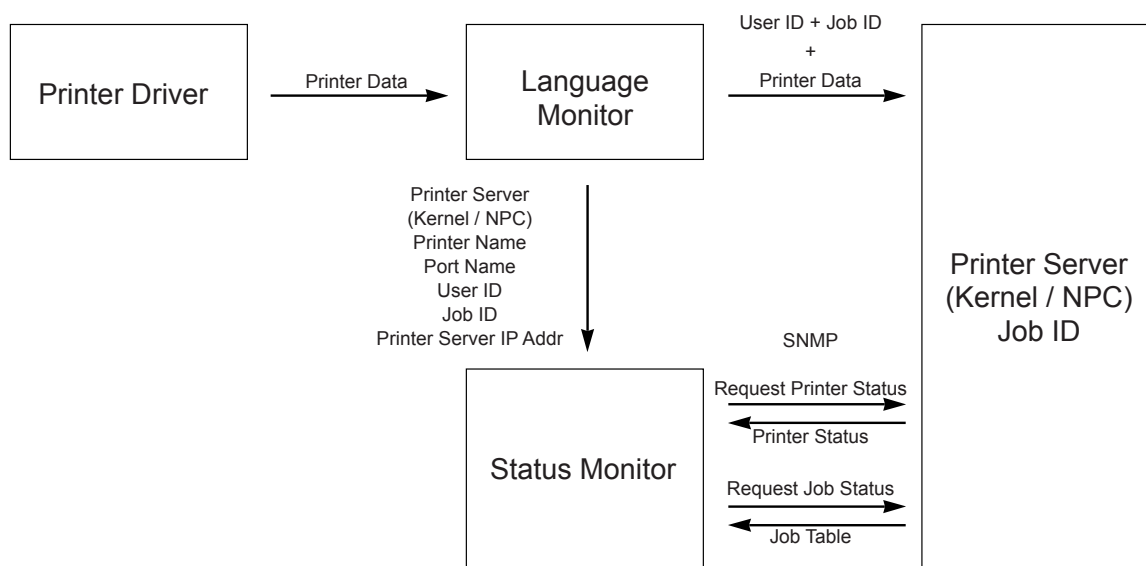
Language Monitor is a part of the Printer Driver and the Windows Spool System. The main roll of the Language Monitor is that sends a job start message to the Status Monitor. Therefore the Status Monitor can start polling to get the printer status.

The second roll is that sends the job information such as User ID and Job ID to the Status Monitor and the Printer F/W. Hence the Status Monitor can stop polling because the Printer F/W informs the Status Monitor that printing job is complete.

### 2.3.3 Status Monitor

Status Monitor has no user interface. It shows only HTML help when any error occurs during printing jobs.

## 2.3.4 Network Interface



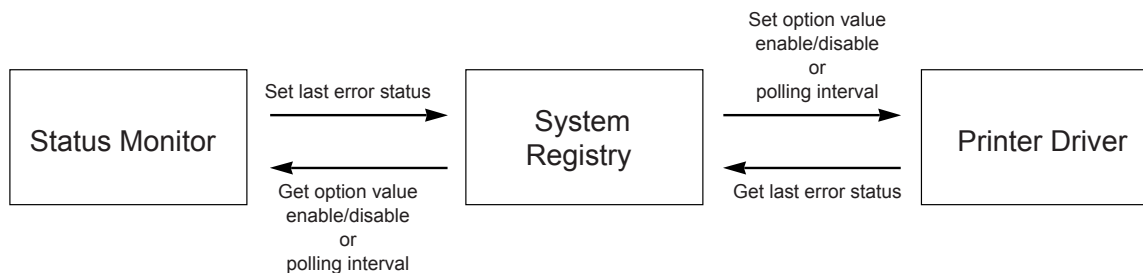
**Status Monitor Data Flow**

After polling is started, Status Monitor has to know when it stops the polling. For this reason, the Network Printer Server should inform of completing job when the printing job is finished. When Status Monitor requests a job status, the Printer Server returns the job table that contains user id, job id, and job status (printing or complete or canceled).

## 2.3.5 Printer Driver <-> Status Monitor

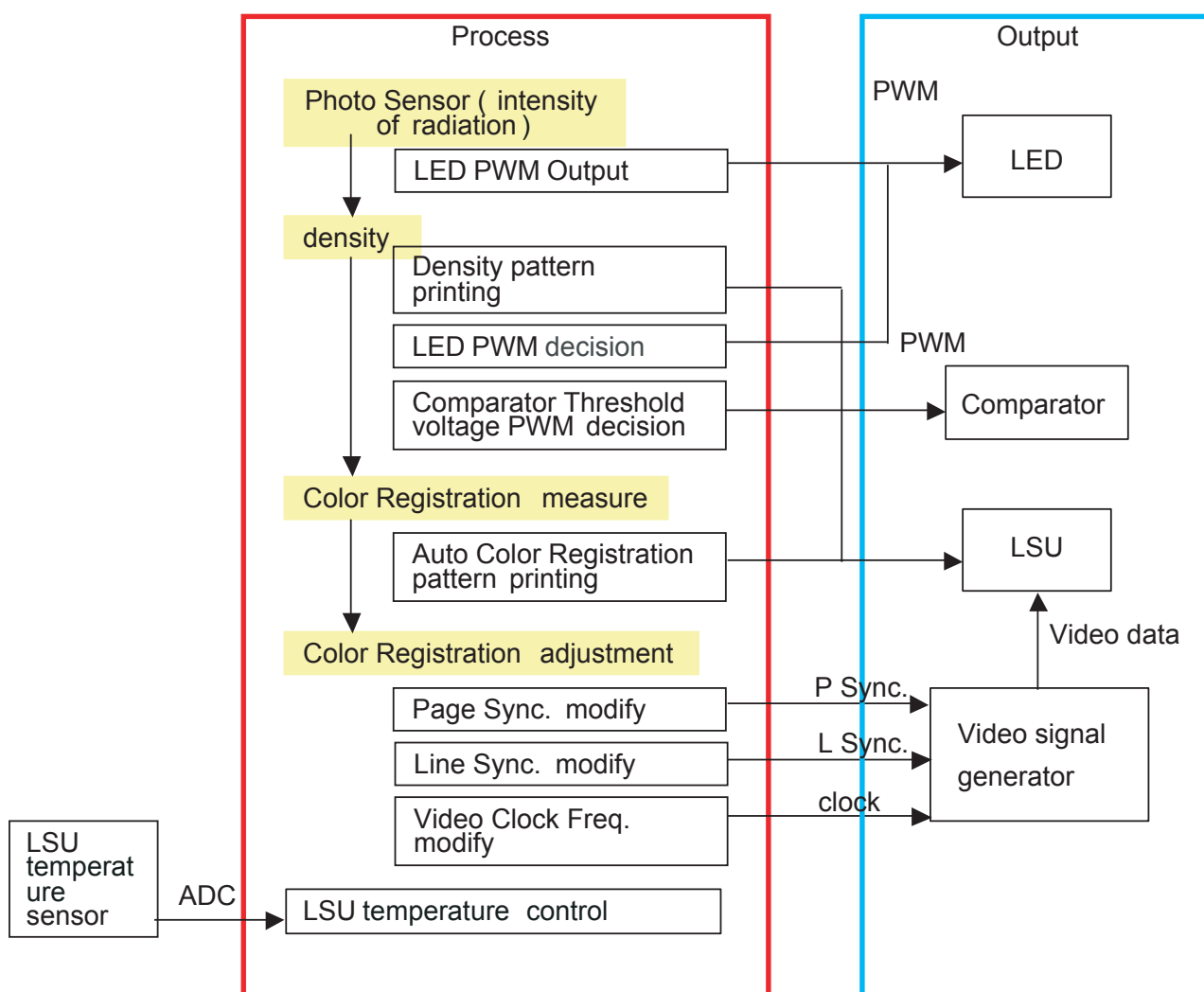
The Printer Driver and the Status Monitor can set/get some data to the system registry to share the Status Monitor information such as the polling interval.

When the user wants to set the option of the Status Monitor manually, he or she can set it using the Printer Driver User Interface. So, if the user set option that the Status Monitor is disabled, the Status Monitor can't show HTML Help to the user although the error has occurred while printing.





## 2.3.6 System F/W Flow



## 2.3.7 Alarm Shortage

	90 ~ 100 %	100 ~ 110 %	110 %~
Toner (C,M,Y,K)	Ready Yellow Toner Low	Replace Yellow Toner	Yellow Toner Exhausted
Transfer Belt	Replace Transfer Belt Soon	Replace Transfer Belt	
Fuser	Replace Fuser Soon	Replace Fuser	
Pickup Rollers (MP/Tray1/Tray2)		Replace MP Pick-Roller	

## 2.3.8 Error status

1. Missing/Invalid Consumables
  - Install Cyan (Magenta, Yellow, Black) Toner
  - Install Transfer Belt
  - Invalid Cyan (Magenta, Yellow, Black) Toner
  - Invalid Transfer Belt
2. Paper JAM
  - Jam 0 In Cassette
  - Jam Inside Printer
  - Jam In Exit Area
3. Cover
  - Cover Open : Message toggles between  
“Cover Open” and “Install Transfer Belt”
  - SCF Cove Open
4. Service Call : Unrecoverable Error
  - Engine LSU Error
  - Main Motor Error
  - Engine Fuser Over(Low) Heat Error + Open Heat Error
  - Transfer Belt Error
5. Others
  - Ready IP Conflict

## 2.3.9 CRUM Overview

- Stands for “Customer Replaceable Unit Monitor”
- EEPROM, SAMSUNG CRUM is used for CRUM Memory.
- CRUM stores various information on consumables (including consumables' life).
- In CLP-31x Series, total four CRUM's are used  
(four on toner cartridges)

### CRUM stores the following information

- Model Name
- Supplier ID
- Serial Number
- Company ID
- MFG Date
- Capacity
- Page Count
  - Toner Cartridge
  - Indicates how many pages are printed by using the consumable
- Dot Count
  - Toner Cartridge Only
  - Indicates how many dots are printed by using the toner cartridge
- Image Count
- Model ID

### 2.3.10 Initailize Flow

