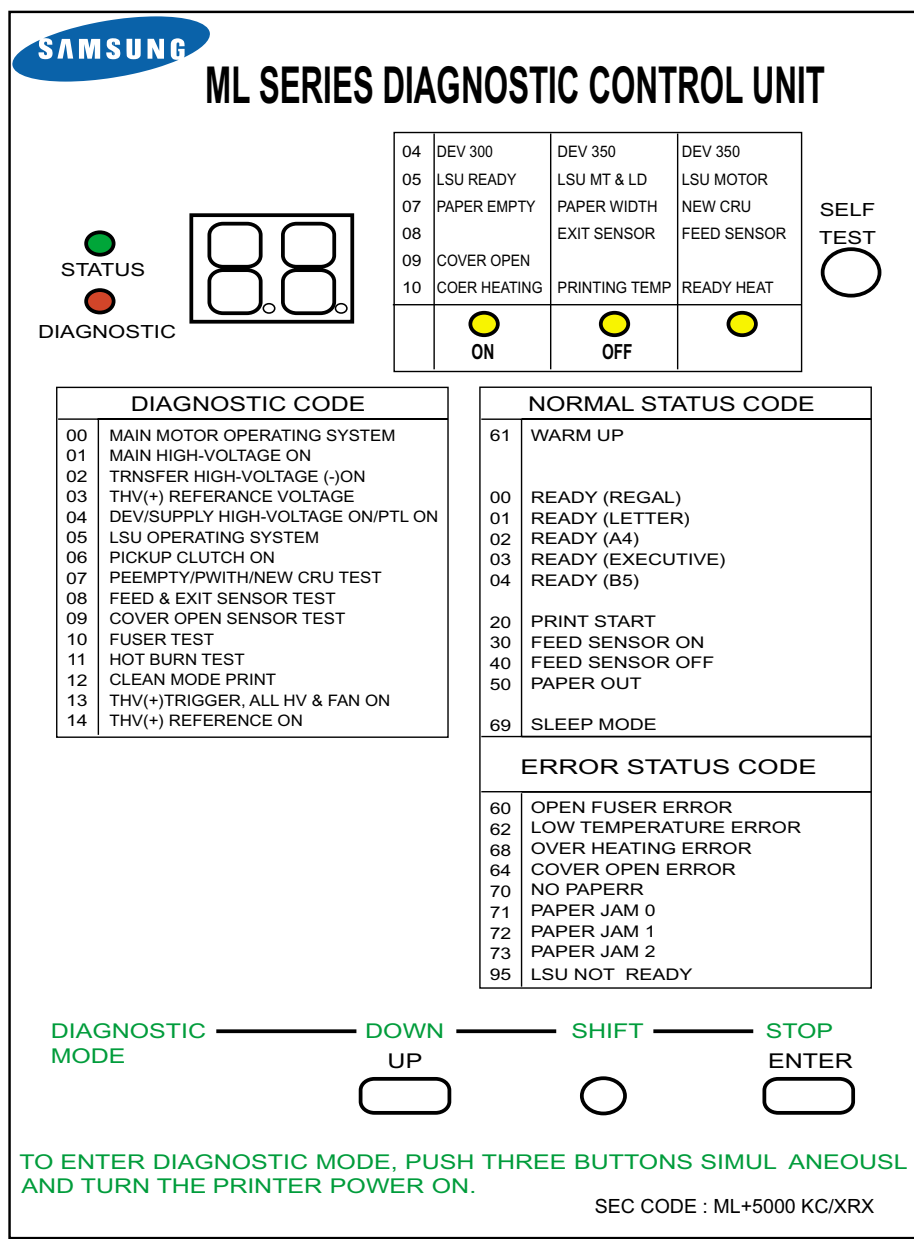# 6. Alignment and Adjustments

This chapter describes some of the main service procedures including:
Using the DCU for diagnostics; Clearing paper jam and test patterns.
Much of this chapter is also included in the user's guide.

6.1 How to use DCU

6.1.1   DCU Setup

You can use the DCU test jig as an aid to the diagnosis of printer problems. To connect the DCU to the printer remove the top cover and connect the harness wire (10 pin/4 pin) to CN3 (ML-1750), CN6(ML-1520) or CN2 (ML-1710/1510) on the Main control board.

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ML SERIES DIAGNOSTIC CONTROL UNIT

04	DEV 300	DEV 350	DEV 350
05	LSU READY	LSU MT & LD	LSU MOTOR
07	PAPER EMPTY	PAPER WIDTH	NEW CRU
08		EXIT SENSOR	FEED SENSOR
09	COVER OPEN		
10	COER HEATING	PRINTING TEMP	READY HEAT

STATUS

DIAGNOSTIC

ON   OFF

SELF TEST

DIAGNOSTIC CODE

00	MAIN MOTOR OPERATING SYSTEM
01	MAIN HIGH-VOLTAGE ON
02	TRNSFER HIGH-VOLTAGE (-)ON
03	THV(+) REFERANCE VOLTAGE
04	DEV/SUPPLY HIGH-VOLTAGE ON/PTL ON
05	LSU OPERATING SYSTEM
06	PICKUP CLUTCH ON
07	PEEMPTY/PWITH/NEW CRU TEST
08	FEED & EXIT SENSOR TEST
09	COVER OPEN SENSOR TEST
10	FUSER TEST
11	HOT BURN TEST
12	CLEAN MODE PRINT
13	THV(+)TRIGGER, ALL HV & FAN ON
14	THV(+) REFERENCE ON

NORMAL STATUS CODE

61	WARM UP
00	READY (REGAL)
01	READY (LETTER)
02	READY (A4)
03	READY (EXECUTIVE)
04	READY (B5)
20	PRINT START
30	FEED SENSOR ON
40	FEED SENSOR OFF
50	PAPER OUT
69	SLEEP MODE

ERROR STATUS CODE

60	OPEN FUSER ERROR
62	LOW TEMPERATURE ERROR
68	OVER HEATING ERROR
64	COVER OPEN ERROR
70	NO PAPERR
71	PAPER JAM 0
72	PAPER JAM 1
73	PAPER JAM 2
95	LSU NOT READY

DIAGNOSTIC MODE ———— DOWN ———— SHIFT ———— STOP
UP   ENTER

TO ENTER DIAGNOSTIC MODE, PUSH THREE BUTTONS SIMUL ANEOUSL
AND TURN THE PRINTER POWER ON.

SEC CODE : ML+5000 KC/XRX

6.1.2 Code

The DCU can be used in 2 modes – Status Monitoring and Self Diagnostic.
To use the DCU in Status Monitoring mode connect the DCU and turn the printer power on. The 7 segment LED display will show various codes that show the progress of the print operation.

1) Normal Code

While printing or warming up, it indicate the position of the paper

Code	State	Description
78	System Initialisation	The main processor is starting up
61	Warming up	The printer is on, the cover is open or close.
00~05	Ready (exact code depends on paper size)	The printer is ready. The paper is detected when the first page is printed. 00: Legal, 01: Letter, 02: A4, 03: EXEC, 04: B5
20	Print Start	The engine controller received the print order from the video controller. 20: 1st, 21: MP, 22: SCF
30	Feed Sensor On	The paper is passing out of the Feed Sensor.
40	Feed Sensor off	The paper has passed out of the Feed Sensor.
50	Paper Out	The paper has passed out of Exit Sensor.
69	Sleep Mode	The fuser power is turned off to minimize the power consumption.

2) Error Code

When detecting the malfunction, the printing is stopped to indicate error code.

Code	State	Description
60, 62, 68	Fuser Error	An error has occurred in the fuser. See section 4.3.5.9. • 60: Open Fuser Error • 62: Low Heat Error • 68: Over Heat Error
64	Cover Open	The Printer Cover is open.
65	CRU Error	The Toner Cartridge is not installed,
70	No Paper	No paper in the paper cassette.
71	Paper Jam 0	The front part of paper is jammed between pickup unit and Feed sensor.
72	Paper Jam 1	The front part of paper is jammed between the Exit sensor and Feed sensor.
73	Paper Jam 2	The front part of paper is jammed just after passing through the Exit sensor.
95	LSU Not Ready	LSU Scanner Motor not ready or Hsync signal not output.

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6.1.3 Self Diagnostic Mode

If Error code is displayed use the Self Diagnostic Mode to assist in solving the problem. Only use the Self Diagnostic mode for fault finding as many safety features are disabled.
To enter the Self Diagnostic mode connect the DCU and hold down the [Down], [Shift] and [Stop] at the same time. Whilst holding these buttons turn the printer power on.
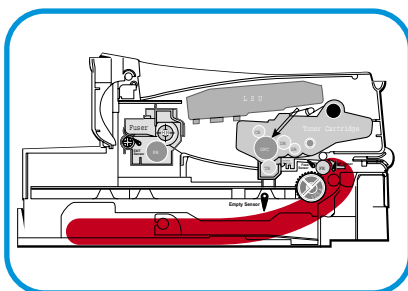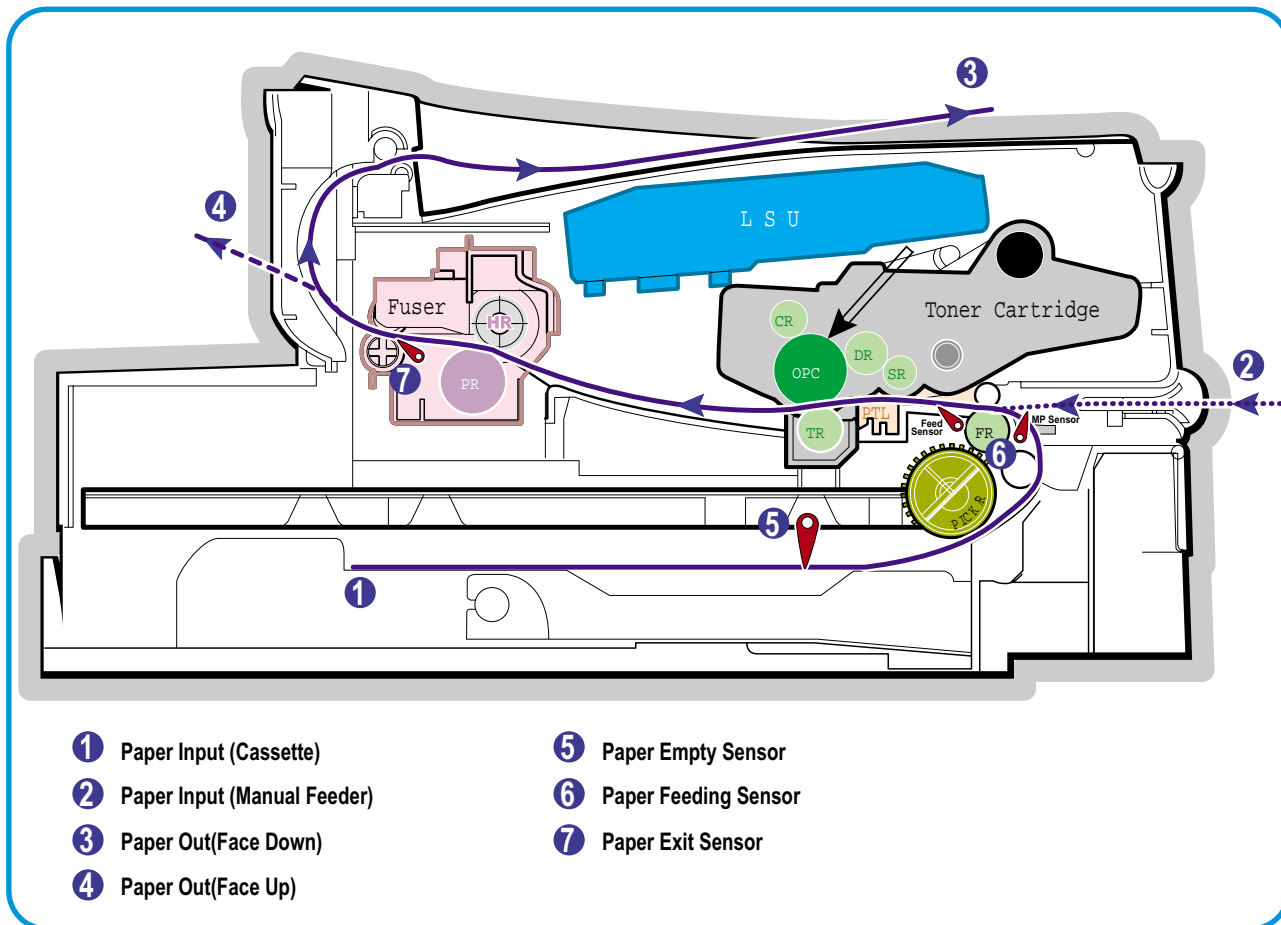Code 78 will appear in the display. Continue to hold the buttons for approximately 3 seconds until 00 appears then release the buttons.
Use the [Up] or [Shift][Up] buttons to select the required test. To start the test press the [Enter] button. To stop the test press the [Shift] and [Enter] buttons together.

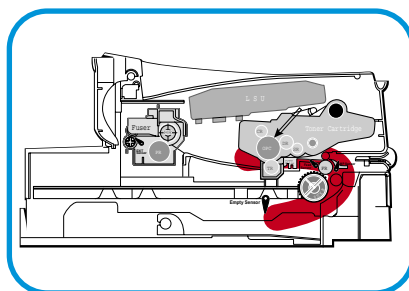| Code	Description
00	**Main Motor Operating System** The main motor is tested.
01	**Main High Voltage On (MHV-)** -1550 volts output to MHV terminal. *Caution : High voltage probe should be used.*
02	**Transfer High Voltage (-) On (THV-)** -1000 volts output to THV terminal. *Caution : High voltage probe should be used.*
03	**Transfer High Voltage (+) Reference on (THV+)** +1300 volts output to THV terminal. *Caution : High voltage probe should be used.*
04	**DEV/Supply High Voltage** : DEV/Supply High Voltage Test. The leftmost of the three LEDs in the self-test panel is on and the DEV high voltage supply is output to the Supply HV terminal (-580V). Press the [Up] button to switch the voltage. The middle and right LEDs are on and -430 volts is output to the DEV HV terminal. *Caution : High voltage probe should be used.*
05	**LSU Operating System** When you select the test the 'OFF' LEDs will be lit. When you press ENTER the 'ON' LED will light and after a few seconds the Righthand LED will be lit and the 'ON' LED will go out. This indicates that the motor is up to speed. Pressing the 'UP@ button will turn the laser LED ion and the 'ON' and 'OFF' LEDs will be lit to show the status of the laser LED.
06	**Pickup clutch on** The main cassette solenoid is tested.

Code	Description
07	Paper Empty Sensor Test : The 'ON' LED indicates the status of the main cassette Paper Empty sensor.
08	Feed & Exit Sensor Test The 'OFF' LED indicates the status of the Exit sensor The 3 rd LED indicates the status of the Feed Sensor **Note** the Feed sensor also detects the presence of the toner cartridge
09	Cover Open Sensor Test The 'ON' LED indicates the status of the Cover Open sensor.
10	Fuser Test When {Enter] is pressed the Heat lamp is turned on. The 'ON' and 'OFF' LEDS indicate the lamp status
11	Hot Burn Test When the [Enter] button is pressed the printer continuously prints without detection. Turn the power off to stop this test.
12	Cleaning Mode Print Mode Causes the 'Cleaning' cycle to be repeated continuously Turn the power off to stop this test..
13	THV(+) TRIGGER. ALL HV : All high voltage are output to each HV terminal. TheLSU and the fan are started. In this Mode the electronic resistance of the transfer roller is detected and the THV is checked.
14	PTL Test : Tests the PTL lamp The 'ON' and 'OFF' LEDS indicate the lamp status.
15	Fan Test : Tests the Fan The 'ON' and 'OFF' LEDS indicate the fan status.
16	MP Pickup Test : Tests the MP pickup clutch. The 'ON' and 'OFF' LEDS indicate the clutch status.
17	MP Sensor Test : Tests the MP Paper sensor The 'ON' LED indicates the sensor status.

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No.	Function	Enter	Up/Down		Stop	Remark
00	Motor	Motor Run			Motor Stop	
01	MHV	Mhv On			Mhv Off	-1550V
02	THV(-)	Thv Negative On			Thv Negative Off	-1000V
03	THV(+)	Thv On			Thv Off	+1300V
04	DEV	Dev On	Supply 0 : -580V	DEV 0 : -430V	Dev Off	
05	LSU	LSU Run	● ● ● On Off Ready		LSU Stop	
06	PickUp	Pickup On			Pickup Off	
07	PEmpty		● ● ● Paper Empty			
08	Sensor		● ● ● Exit Feed			
09	Cover		● ● ● Cover Open			
10	Fuser	Fuser On			Fuser Off	
11	HotBurn	HotBurn On				
12	Clean Print	Clean Printing				
13	Thv Reference		● ● ● low adequate high			
14	PTL	PTL On			PTL Off	
15	FAN	Fan On			Fan Off	
16	Manual PickUp	Manual Pickup On			Manual Pickup Off	
17	Manual Sensor		● ● ● Manual Sensor			

6.2 Paper Path

① **Paper Input (Cassette)**
② **Paper Input (Manual Feeder)**
③ **Paper Out(Face Down)**
④ **Paper Out(Face Up)**

⑤ **Paper Empty Sensor**
⑥ **Paper Feeding Sensor**
⑦ **Paper Exit Sensor**

<Jam0>

<Jam1>

<Jam2>

1) After receiving the print command, the printer feeds paper from the main or optional second cassette or manual feeder as required.

2) The paper being fed passes the paper feed sensor. (Jam 0 occurs if the sensor is not operated within a certain time)

3) Having passed the paper feed sensor the paper moves to the paper exit sensor via printing process. (Jam 1 occurs if the sensor is not operated within a certain time)

4) The paper then passes through the paper exit sensor and out of the set. (Jam 2 occurs if the trailing edge of the paper does not pass the exit sensor within a certain time of the paper leading edge activating the exit sensor)

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6.3 Clearing Paper Jams

Occasionally, paper can be jammed during a print job. Some of causes include:
  • The tray is loaded improperly or overfilled.
  • The tray has been pulled out during a print job.
  • The front cover has been opened during a print job.
  • Paper that does not meet paper specifications has been used.
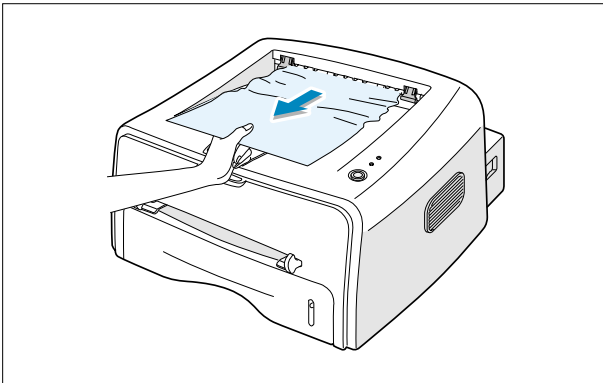 • Paper that is outside of the supported size range has been used.

> If a paper jam occurs, the On Line/Error LED on the control panel lights red. Find and remove the jammed paper. If there is no paper visible look inside the printer.
> Do not use tweezers or other sharp metal tools when removing a jam. You may damage the toner cartridge, fuser rollers or potentially damage wiring insulation leading to an electric shock.
> **Note** If, when removing jammed paper, the paper tears ensure that ALL fragments of paper are removed from the printer otherwise a jam will re-occur.

6.3.1 In the Paper Exit Area (JAM2)

1) If the paper jams as it exits to the output tray and a long portion of the paper is visible, pull the paper straight out.
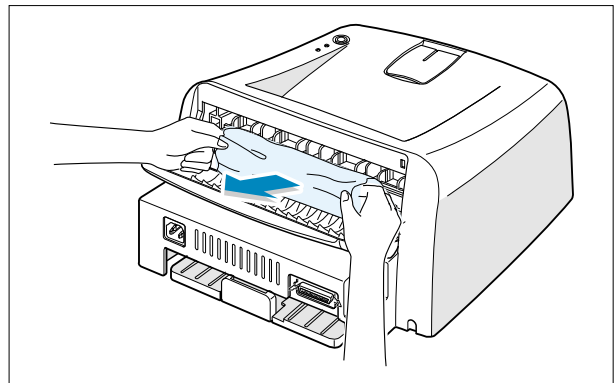

When you pull the jammed paper, if there is resistance and the paper does not move immediately, stop pulling. Continue with the next step.

2) Open the rear output tray.

3) Loosen the paper if it is caught in the feed rollers. Then pull the paper gently out.

Note: Please be careful when you open the rear cover. The inside of the printer is still hot.

4) Close the rear output tray. Open and close the front cover. Printing can be resumed.

Caution: paper jammed in this area is very close to the fuser. This can be extremely hot. Take care not to get burned.

6.3.4 Tips for Avoiding Paper Jams

By selecting the correct paper types, most paper jams can be avoided. If a paper jam occurs, follow the steps outlined in

- Ensure that the adjustable guides are positioned correctly.
- Do not overload the tray. Ensure that the paper is below the paper capacity mark on the right inside of the tray.
- Do not remove the paper from the tray while printing.
- Flex, fan and straighten the paper before loading.
- Do not use creased, damp or highly curled paper.
- Do not mix paper types in the input tray.
- Use only recommended print media.
- Ensure that the recommended print side is facing down when loading paper into the input tray.
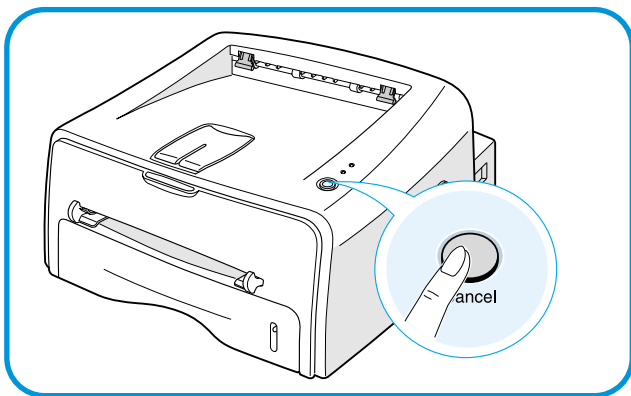
6.4 Sample Pages

This product has the several sample pages for maintenance purposes and to help check the printer's functionality.
Use the sample pages to check for the existence of any printing abnormality.

6.4.1 Printing a Demo Page

Print a demo page or a configuration sheet to make sure that the printer is operating correctly.

1) Hold down the Cancel button for about 2 seconds to print a demo page.
   Hold down the Cancel button for about 6 seconds to print a configuration sheet. (PCL model only)
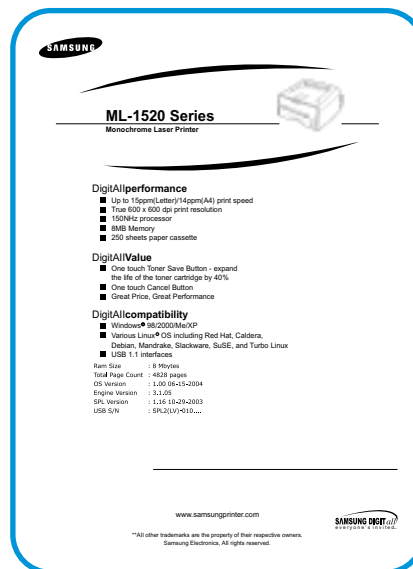

2) The Demo page or the configuration sheet shows the printer's current configuration.

<Demo Page : ML-1710>   <Demo Page : ML-1750>   <Demo Page : ML-1520>

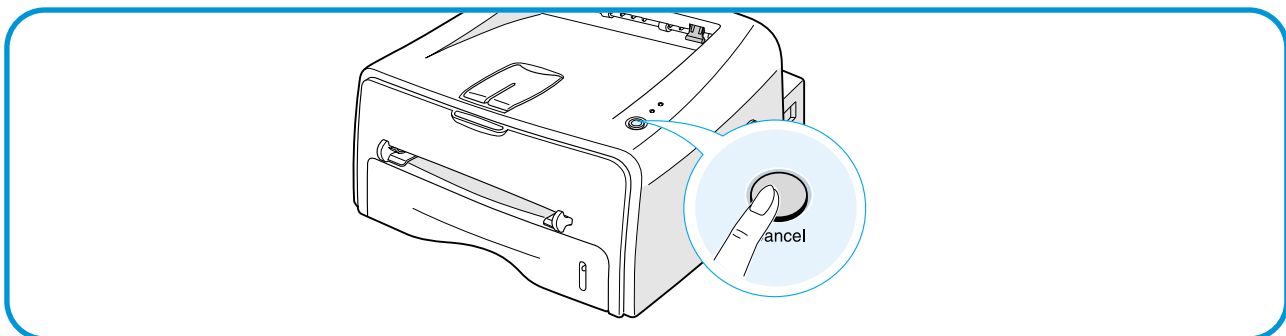Count : 85
n : 0.91H 2-04
rsion : 0.4.6

6.4.2 Printing a cleaning sheet

If you are experiencing blurred, faded or smeared printouts. Printing a cleaning sheet cleans the drum inside the toner cartridge. This process will produce a page with toner debris, which should be discarded.

1) Ensure that the printer is turned on and in the Ready mode with paper loaded in the tray.

2) Press and hold down the Cancel button on the control panel for about 10 seconds.

3) Your printer automatically picks up a sheet of paper from the tray and prints out a cleaning sheet with dust or toner particles on it.

> *Note:* The cartridge cleaning process takes some time. To stop printing, turn the power off.

6.5 Consumables and Replacement Parts

The cycle period outlined below is a general guideline for maintenance.
The example list is for an average usage of 50 printed documents per day.
Environmental conditions and actual use will vary these factors.
The cycle period given below is for reference only.

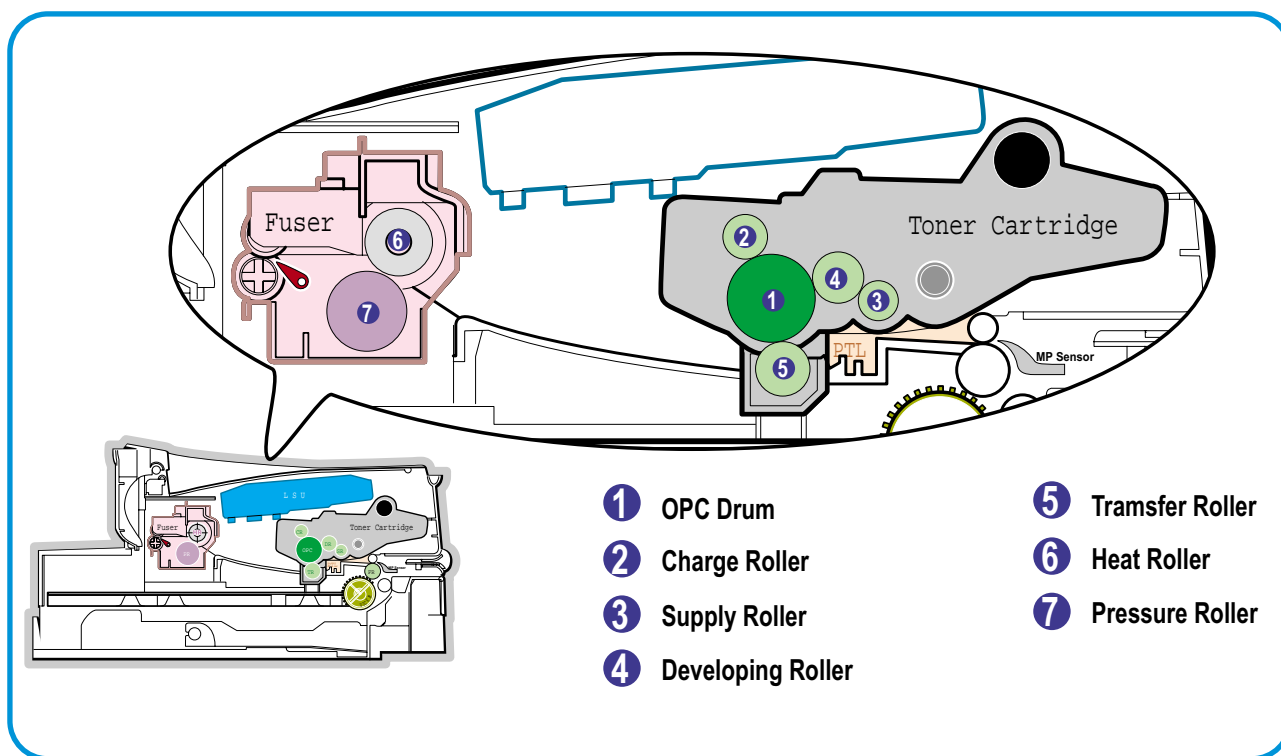| COMPONENT	REPLACEMENT CYCLE
Pick-up Roller	60,000 Pages
Paper Feeding Roller(Friction Pad)	60,000 Pages
Transfer Roller	60,000 Pages
Fuser	60,000 Pages
Toner Cartridge	Starter : 1,000 Pages Replacement : 3,000 Pages

6.6 The LED Status Display by Each Error

ERROR	LED Status	DCU CODE
Open Fuser Error	The [Error] LED (red) and the [Toner Save] LED are simultaneously flashing at 1 second intervals.	60
Over Heat Error	The [Error] LED (orange) and the [Toner Save] LED are simultaneously flashing at 1 second intervals.	68
Low Heat Error	The [Error] LED (red) and the [Toner Save] LED are simultaneously flashing at 4 second intervals.	62
LSU not Ready Error (Pmotor Error)	The [Error] LED (green) and the [Toner Save] LED are simultaneously flashing at 1 second intervals.	95
LSU Not Ready Error (HSYNC Error)	The [Error] LED (green) and the [Toner Save] LED are simultaneously flashing at 4 second intervals	96

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6.7 Periodic Defective Image

If a mark or other printing defect occurs at regular intervals down the page it may be caused by a damaged or contaminated roller. Measure the repetition interval and refer to the table below to identify the roller concerned.

No	Roller	Defective image	Typical defect
1	OPC Drum	75.5mm	white spot on black image or black spot
2	Charge Roller	37.7mm	black spot
3	Supply Roller	47.8mm	light or dark horizontal image band
4	Developing Roller	35.2mm	horizontal image band
5	Transfer Roller	45.3mm	image ghost
6	Heat Roller	57.1mm	Black spot and image ghost
7	Pressure Roller	59.7mm	black spot on the backside

1 OPC Drum
2 Charge Roller
3 Supply Roller
4 Developing Roller
5 Tramsfer Roller
6 Heat Roller
7 Pressure Roller

<Rollers Layout>

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