

Recommended Test Equipment

Samsung recommends the following equipment when servicing the Laser Printer.

Digital Multimeter	A digital multimeter with attached LED or LCD 4-digit Panel.
Oscilloscope	A digitizing oscilloscope which can measure more than 100MHz
High Voltage probe	A high voltage probe which can measure about less than 10KV
DCU (Diagnostic Control Unit)	DCU can be supplied from Samsung which can easily shows the Engine's error status.

Table 2-4-1 Equipment List

SAMSUNG

Model :




DCU-ML

ML-80 DIAGNOSTIC CONTROL UNIT QUICK REFERENCE


STATUS


DIAGNOSTIC



04	BIAS 3	BIAS 1	BIAS 0
05	LSU READY	LSU MF & LD	LSU MOTOR
07	PAPER EMPTY		
08		EXIT SENSOR	FEED SENSOR
09	COVER OPEN		
10	OVER HEAT	PRINT HEAT	STANDBY HEAT
	 ON	 OFF	

SELF
TEST



DIAGNOSTIC CODE

00	MAIN MOTOR OPERATING SYSTEM
01	MAIN HIGH VOLTAGE ON
02	TRANSFER HIGH VOLTAGE(-) ON
03	THV(+) REFERENCE VOLTAGE
04	DEV/SUPPLY HIGH VOLTAGE ON
05	LSU OPERATING TEST
06	PICKUP CLUTCH ON
07	PAPER EMPTY SENSOR TEST
08	FEED&EXIT SENSOR TEST
09	COVER OPEN SENSOR TEST
10	FUSER TEST
11	HOT BURN TEST
12	CLEAN(MESSAGE)PRINT
13	THV TRIGGER&THV ON DUTY
14	THV PLUS DUTY

GREEN STATUS CODE


88	GREEN MODE READY
99	GREEN MODE WARM UP

*** THE CONTROL CODES 13 &14
ARE USEFUL FROM THE EPROM
VERSION 5.X.X FOR THE
ENGINE BOARD.**

STATUS CODE

00	READY(REGAL)
01	READY(LETTER)
02	READY(A4)
03	READY(EXECUTIVE)
04	READY(B5)
20	PRINT START
21	PRINT START(MANNUAL)
23	PRINT START(2'nd PAPER)
30	FEED SENSOR 1st ON
31	FEED SENSOR 1st OFF
33	FEED SENSOR 1st ON(2'nd PAPER)
34	FEED SENSOR 1st OFF(2'nd PAPER)
40	FEED SENSOR 2'nd ON
43	FEED SENSOR 2'nd ON(2'nd PAPER)
47	FEED SENSOR 2'nd OFF
50	PAPER OUT
60	OPEN FUSER ERROR
62	LOW HEAT ERROR
68	OVERHEAT ERROR
61	WARM UP
64	COVER OPEN ERROR
69	SLEEP MODE
70	NO PAPER or CASSETTE
71	PAPER JAMO
72	PAPER JAM1
73	PAPER JAM2
90	MANUAL PRINT MODE
95	LSU NOT READY

DCU MODE — **DOWN** — **SHIFT** — **STOP**
UP **ENTER**



IF YOU WANT TO ENTER THE DCU MODE.
TURN THE POWER SWITCH ON WITH HOLDING THREE KEYS DOWN.

Figure 2-4-1 DCU

DCU Control

1 DCU Setup

The DCU is used to diagnose Printer malfunctions.

The DCU harness wire(10pin-to-4pin) is connected to the Printer engine via:

- 1) Engine Board connector, CN2 (4pins)**
- 2) (Video) Controller Board connector, J6 (4pins)**

Open the Printer's side cover(=SIMM Cover) and remove the shield cover and connect the DCU to connector J6 on the Controller Board.

2 DCU Error messages (LED Display)

If an error occurs, connect the DCU to the Printer. DCU messages will indicate malfunctioning areas of the machine.

(Consult Service Manual for detailed troubleshooting information)

Display	Error messages
60	OPEN FUSER ERROR
62	LOW HEAT ERROR
64	COVER OPEN ERROR
68	OVERHEAT ERROR
70	NO PAPER OR CASSETTE
71	PAPER JAM0 (CASSETTE PICK-UP TO REGISTER SENSOR)
72	JAM1 (REGISTER SENSOR TO EXIT SENSOR)
73	JAM2 (EXIT SENSOR TO FUSER)
95	LSU NOT READY

3 DCU diagnostic messages (LED Display)

After receiving an error message, use the DCU to locate the malfunction unit.

(Consult Service Manual for detailed troubleshooting information)

Display	Diagnostic messages
0	MAIN MOTOR OPERATING SYSTEM
1	MAIN HIGH VOLTAGE ON (-1.4kV)
2	TRANSFER HIGH VOLTAGE(-) ON
3	THV(+) REFERENCE VOLTAGE (+900V)
4	DEV/SUPPLY HIGH VOLTAGE ON
5	LSU OPERATING TEST
6	PICKUP CLUTCH ON
7	PAPER EMPTY SENSOR TEST
8	FEED & EXIT SENSOR TEST
9	COVER OPEN SENSOR TEST
10	FUSER TEST
11	HOT BURN TEST
12	CLEAN(MESSAGE) PRINT
13	THV TRIGGER & THV ON DUTY
14	THV PLUS DUTY

4 DCU Diagnostic Mode

- 1) Connect DCU to Controller or Engine Board
- 2) To apply power, simultaneously press and hold the 'DOWN', 'SHIFT', and 'STOP' keys. 78 will display.
- 3) After 2 ~ 3 seconds, release the keys. 00 will display.
- 4) Press 'UP' or 'SHIFT'+ 'DOWN' keys until the desired number is displayed in the DCU Display.
- 5) Press 'ENTER' to begin operating.
- 6) Example

Select numbers 13 and 14 to adjust the Electrophotography trigger voltage.

- 1: Turn power on by simultaneously pressing 'DOWN', 'SHIFT', and 'STOP' for 2~3 seconds.
- 2: Press 'SHIFT+DOWN' until diagnostic code #14 is displayed.
- 3: Set Electronic Photograph voltage to 900V and press 'ENTER'.
- 4: Press 'SHIFT' and 'STOP' to exit routine.
- 5: Press 'SHIFT' and 'DOWN' to display diagnostic code #13.
- 6: Display will alternate between electronic photography trigger voltage and On duty voltage.
- 7: To end operation, press 'SHIFT' and 'STOP' keys.

7) DCU Error Messages

a) Error message '60', 'THERMISTOR OPEN ERROR'

Error message '62', 'LOW TEMPERATURE ERROR'

Error message '68', 'OVERHEAT ERROR'

Action:

- 1) Measure Fuser's Thermistor resistance.
Normal Thermistor resistance is 2 ~ 3 $\text{k}\Omega$ (110V), 6 ~ 10 $\text{k}\Omega$ (220V).
- 2) Confirm Fuser Lamp operation
- 3) Measure Engine Board resistances at Q101 (Triac Thyristor)
- 4) Replace Engine Board Q101
- 5) Replace Engine Board Q3(KSC1008-Y)
- 6) Replace Engine Board PC151(Triac Photo Coupler)

b) Error message '70', 'PAPER EMPTY'

Action:

- 1) Check for paper in cassette tray
- 2) Replace OP2 Sensor(Photo Interrupter)
- 3) Confirm Feed Clutch operation (mode '06')
- 4) Replace Feed Clutch or Engine Board's Q4(KSC1008-Y)

c) Error message '71', 'PAPER JAM-1'

Action:

- 1) Check for paper in cassette tray
- 2) Check for Pick-up unit wear
- 3) Replace OP1 Sensor(Photo Interrupter)

d) Error message '72', 'PAPER JAM-2'

Error message '73', 'PAPER JAM-3'

Action:

- 1) Confirm that normal paper is being used
- 2) Check for Paper Jam in Fuser
- 3) Replace sensor 'SW1' on Engine Board
- 4) Check for Fuser Roller contamination

8) Error message '95', 'LSU READY ERROR'

a) Confirm normal readings at Engine Board's Q5(KSC1008-Y)

b) Replace LSU

3. Product Trouble Solutions

<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 10px; margin-right: 20px;"> <p style="text-align: center;">DIAGNOSTIC CONTROL UNIT</p> <div style="display: flex; justify-content: space-between;"> <div> <p>STATUS</p> <p>DIAGNOSTIC</p> </div> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 10px auto;"></div> <div> <p>ON OFF</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <p>UP</p> <p>ENTER</p> </div> <div style="display: flex; justify-content: space-around;"> <p>OWN</p> <p>SHIFT</p> <p>STO</p> </div> </div> <div> <p>SELF TEST</p> <p>1.NORMAL MODE : No key press when power on</p> <p>2.GREEN MODE Press SELF TEST key when power on</p> <p>3.DIAGNOSTIC MODE :Press the 3 buttons (UP+SHIFT+ENTER KEY) simultaneously one time when the printer power on</p> </div> </div>				
NO	MODE	Main Function	CODE	REMARK
1	NORMAL MODE	WARMING UP	61	WARMING UP
		READY AND PAPER	00	LEGAL PAPER
			01	LETTER PAPER
			02	A4 PAPER
			03	EXECUTIVE PAPER
			04	B5 PAPER
		MANUAL READY	90	MANUAL READY
		PAPER EMPTY	70	PAPER EMPTY
		PRINTING PROCED	20	PICK UP;æ FEED 1ST ON
			30	FEED 1ST ON;æ FEED 1ST OFF
			31	FEED 1ST OFF;æ FEED 2ND ON
			21	MANUAL
			40	PRINTING
			50	EXIT PAPER
		HEAT ERROR CODE	60	THERMISTER OPEN ERROR
			62	LOW HEAT ERROR (TEMPERATURE)
			68	OVER HEAT ERROR
		LSU NOT READY	95	LSU NOT READY
		COVER OPEN	64	COVER OPEN ERROR
		JAM	71	PAPER JAM0
			72	PAPER JAM1
			73	PAPER JAM2
		SLEEP MODE	69	SLEEP MODE
2	GREEN MODE	GREEN MODE	99	GREEN MODE WARMING UP
			88	GREEN MODE READY
3	DIAGNOSTIC M	DIAGNOSTIC MODE	00	MAIN MOTOR
			01	MHV
			02	THV NEG
			03	THV
			04	DEV BIAS
			05	LSU
			06	PICK UP CLUTCH
			07	PAPER EMPTY SENSOR
			08	FEED SENSOR & EXIT SENSOR
			09	COVER OPEN SENSOR
			10	FUSER
			11	HOT BURNING MODE
			12	CLEAN(MESSAGE) PRINT
			13	THV TRIGGER & THV ON DUTY
			14	THV PLUS DUTY

3. Product Trouble Solutions

3.1 DCU (Diagnostic Control Unit)

3.1.1 DCU Setup

The DCU (Diagnostic Control Unit) is used to diagnose Printer malfunctions.

The DCU is connected to the Printer via A490 :

- 1) Engine Board Connector, CN2
- 2) (Video) Controller Board connector, J6

Open the Printer's side cover and remove the shield cover and connect the DCU to connector J6 on the Controller Board.

3.1.2 DCU Error messages (LED Display)

If an error occurs, connect the DCU to the Printer. DCU messages will indicate malfunctioning areas of the machine.

(Consult Service Manual for detailed troubleshooting information)

Display Error messages

- | | |
|----|---|
| 60 | THERMISTOR OPEN ERROR |
| 61 | WARMING UP |
| 62 | LOW TEMPERATURE ERROR |
| 64 | COVER OPEN |
| 68 | OVERHEAT ERROR |
| 69 | SLEEP MODE |
| 70 | PAPER EMPTY |
| 71 | JAM_0 (CASSETTE PICK-UP TO REGISTER SENSOR) |
| 72 | JAM_1 (REGISTER SENSOR TO EXIT SENSOR) |
| 73 | JAM_2 (EXIT SENSOR TO FUSER) |
| 95 | LSU READY ERROR |

3. Product Trouble Solutions

3.1.3 DCU diagnostic messages (LED Display)

After receiving an error message, use the DCU to locate the malfunction unit.

(Consult Service Manual for detailed troubleshooting information)

Display Diagnostic messages

- | | |
|---|--|
| 0 | MAIN MOTOR DRIVE |
| 1 | CHARGER VOLTAGE OUT (-)1.4 kV |
| 2 | CLEANING VOLTAGE OUTPUT (-)1.2 kV |
| 3 | TRANSFER VOLTAGE OUTPUT (+ 900 V) |
| 4 | DEVELOPER BIAS VOLTAGE OUTPUT (-)250 to (-)450 V |
| 5 | LSU DRIVE |
| 6 | CLUTCH DRIVE |
| 7 | PAPER EMPTY SENSOR DRIVE |
| 8 | PICK & EXIT SENSOR DRIVE |

3.1.4 DCU Diagnostic Mode

- 1) Connect DCU to Controller or Engine Board
- 2) To apply power, simultaneously press and hold the 'DOWN', 'SHIFT', and 'STOP' keys. 78 will display.
- 3) After 2 ~ 3 seconds, release the keys. 00 will display.
- 4) Press 'UP' or 'SHIFT'+ 'DOWN' keys until the desired number is displayed in the DCU Display.
- 5) Press 'ENTER' to begin operating.
- 6) Example

Select numbers 13 and 14 to adjust the ElectroPhotography trigger voltage.

- 1: Turn power on by simultaneously pressing 'DOWN', 'SHIFT', and 'STOP' for 2 ~ 3 seconds.
- 2: Press 'SHIFT+DOWN' until diagnostic code #14 is displayed.
- 3: Set Electronic Photograph voltage to 900V and press 'ENTER'.
- 4: Press 'SHIFT' and 'STOP' to exit routine.
- 5: Press 'SHIFT' and 'DOWN' to display diagnostic code #13.
- 6: Display will alternate between electronic photography trigger voltage and On duty voltage.
- 7: To end operation, press 'SHIFT' and 'STOP' keys.

3. Product Trouble Solutions

7) DCU Error Messages

a) Error message '60', 'THERMISTOR OPEN ERROR'

Error message '62', 'LOW TEMPERATURE ERROR'

Error message '68', 'OVERHEAT ERROR'

Action:

- 1) Measure Fuser's Thermistor resistance.

Normal Thermistor resistance is 2 ~ 3 Ω (110V), 6 ~ 10 Ω (220V).

- 2) Confirm Fuser Lamp operation

- 3) Measure Engine Board resistances at Q101(Triac Thyrister)

- 4) Replace Engine Board Q101

- 5) Replace Engine Board Q3(KSC1008-Y)

- 6) Replace Engine Board PC151(Triac Photo Coupler)

b) Error message '70', 'PAPER EMPTY'

Action:

- 1) Check for paper in cassette tray

- 2) Replace OP2 Sensor(Photo Interrupter)

- 3) Confirm Feed Clutch operation (mode '06')

- 4) Replace Feed Clutch or Engine Board's Q4(KSC1008-Y)

c) Error message '71', 'PAPER JAM-1'

Action:

- 1) Check for paper in cassette tray

- 2) Check for Pick-up unit wear

- 3) Replace OP1 Sensor(Photo Interrupter)

d) Error message '72', 'PAPER JAM-2'

Error message '73', 'PAPER JAM-3'

Action:

- 1) Confirm that normal paper is being used

- 2) Check for Paper Jam in Fuser

- 3) Replace sensor 'SW1' on Engine Board

- 4) Check for Fuser Roller contamination

8) Error message '95', 'LSU READY ERROR'

- 1) Confirm normal readings at Engine Board's Q5(KSC1008-Y)

- 2) Replace LSU