

INSPECTION

TABLE OF CONTENTS

	Page
1. Electrical inspection	5-2
1.1 Electrical performance	5-2
1.2 Frequency change	5-2
1.3 Performance check	5-2
1.4 Check power manage function	5-2
2. Safety	5-3
2.1 Insulation resistance	5-3
2.2 Dielectric strength	5-3
2.3 Leakage current	5-3
2.4 Ground continuity	5-3
3. Preset timing sheet	5-3
4. Inspection of PLUG & PLAY communication and OSM "MONITOR INFORMATION" for model name/ serial number	5-4
4.1 System connection	5-4
4.2 Input signal	5-4
4.3 Program	5-4
4.4 Operation	5-5
4.4.1 EDID data inspection and writing of a D-SUB connector	5-5
4.4.2 EDID data inspection and writing of a DVI connector	5-8
4.4.3 The check of a model name and a serial number	5-8
4.5 EDID data file	5-8
5. External inspection on the LCD module	5-9
5.1 Inspection condition	5-9
5.2 Standards for display conditions	5-9
5.3 The inspection standard of appearance	5-12
5.3.1 Polarizer defects	5-12
5.3.2 Foreign material	5-12
5.3.3 Line defect	5-12

1. Electrical inspection

1.1 Electrical performance

Function switch check

- 1) Input 1024×768 (75Hz) pattern “Crosshatch”.
- 2) Image should appeared within 4sec after Switch ON.
- 3) LED lighting green.
- 4) It should not appear noise while Switch is turn ON or turn OFF.
- 5) OSM should be indicated by push [Exit] or [<] OR [>] or [-] or [+] button.
- 6) While [-] or [+] button is pushed, the value should change smooth and it should not be appeared noise.
- 7) Check the OSM off when push the [OSM OFF] switch EXIT.

1.2 Frequency change

- 1) Change the preset timing.
- 2) Check the picture and the time when freq. change (less 5 sec).

1.3 Performance check

- 1) Input 1024×768 (75Hz) pattern “RGB 256 GRAY SCAL” PATTERN.
- 2) Press [AUTO CONTRAST] switch.
- 3) Check the color gray scal smoth and not data lost.

1.4 Check power manage function

Mode	Horizontal	Vertical	Power Supply	Input Timing	Power consumption
Normal	On	On	240V	1024×768 (75Hz)	20W±20%
Standby	Off	On	240V	1024×768 (75Hz)	2W
Suspend	On	Off	240V	1024×768 (75Hz)	2W
Off	Off	Off	240V	1024×768 (75Hz)	2W

2. Safety

2.1 Insulation resistance

The resistance of the insulation between the power terminal and the earth ground contact is more than 10M ohms while withstanding a voltage of 500Vdc.

2.2 Dielectric strength

There is no breakdown of the insulators or short circuits when applying an alternating potential of 1000Vac for a duration of 1(one) minute or 1500Vac for a duration of 2(two) second at 50Hz between the metallic chassis and the input power supply active and neutral terminals connected together.

2.3 Leakage current

The current conducted between each of the power supply's contacts is less than 1.5mA at 255Vac (60Hz) and 0.25mA at 100Vac (60Hz).

2.4 Ground continuity

The resistance between the groundside of the power cord and the accessible metal parts located in ground circuit shall not exceed 0.1 ohm at current load of 25mA.

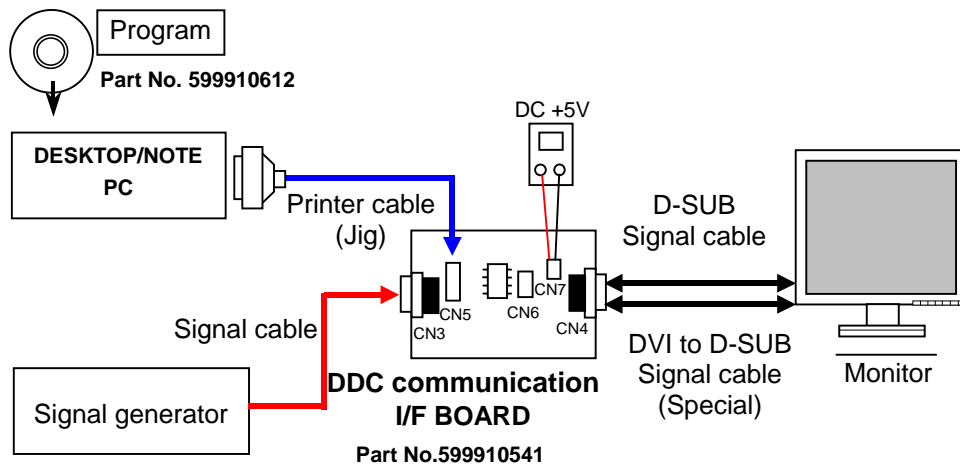
3. Preset timing sheet

No	Timing	Dot Clock (MHz)	Horizontal						Vertical						HS,VS
			Freq. (KHz)	Total	Active	Pulse	Back	Front	Freq. (Hz)	Total	Active	Pulse	Back	Front	
1	640x350	25.175	31.469	800	640	96	48	16	70.087	449	350	2	60	37	P,N
2	PC98 640x400	21.053	24.827	848	640	64	85	59	56.424	440	400	8	25	7	N,N
3	VGA 720x400 70Hz	28.322	31.47	900	720	108	54	18	70.087	449	400	2	35	12	N,P
4	VGA 640x480 60Hz	25.175	31.47	800	640	96	48	16	59.992	525	480	2	33	10	N,N
5	MAC 640x480 66Hz	30.24	34.97	864	640	64	96	64	66.61	525	480	3	39	3	N,N
6	VESA 640x480 72Hz	31.5	37.861	832	640	40	128	24	72.809	520	480	3	28	9	N,N
7	VESA 640x480 75Hz	31.5	37.5	840	640	64	120	16	75.00	500	480	3	16	1	N,N
8	VESA 800x600 56Hz	36	35.156	1024	800	72	128	24	56.25	625	600	2	22	1	P,P
9	VESA 800x600 60Hz	40	37.879	1056	800	128	88	40	60.317	628	600	4	23	1	P,P
10	VESA 800x600 75Hz	49.5	46.875	1056	800	80	160	16	75	625	600	3	21	1	P,P
11	VESA 800x600 72Hz	50	48.077	1040	800	120	64	56	72.188	666	600	6	23	37	P,P
12	MAC 832x624 75Hz	57.283	49.725	1152	832	64	224	32	74.55	667	624	3	39	1	N,N
13	VESA 1024x768 60Hz	65	48.363	1344	1024	136	160	24	60.004	806	768	6	29	3	N,N
14	SUN 1024x768 65Hz	70.49	53.7	1344	1024	136	160	24	65.57	806	768	6	29	3	N,N
15	VESA 1024x768 70Hz	75	56.476	1328	1024	136	144	24	70.069	806	768	6	29	3	N,N
16	VESA 1024x768 75Hz	78.75	60.023	1312	1024	96	176	16	75.029	800	768	3	28	1	P,P

4. Inspection of PLUG & PLAY communication and OSM "MONITOR INFORMATION" for model name/ serial number

4.1 System connection

This system should be connected as shown below.



DDC Communication I/F BOARD (Part No.:599910541)



DVI to D-SUB Signal Cable (Special)
(Part No. : 599910604)



The pins of there points cuts it.

4.2 Input signal

Horizontal synchronization frequency : Not specified.

Vertical synchronization frequency : Not specified.

4.3 Program

Service tool Ver. 3.14 (Parameter ver. 2.0-S2) (Part No. 599910612)

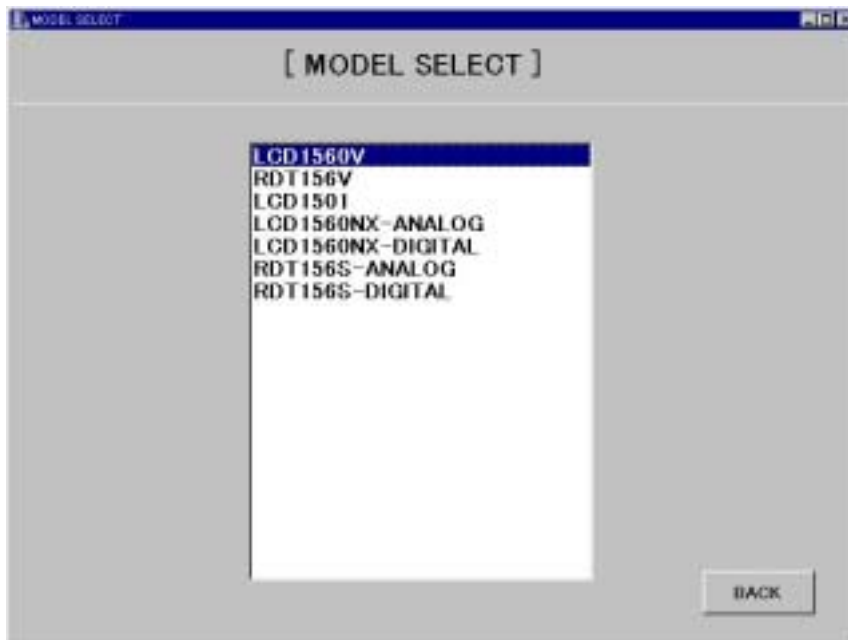
4.4 Operation

4.4.1 EDID data inspection and writing of a D-SUB connector.

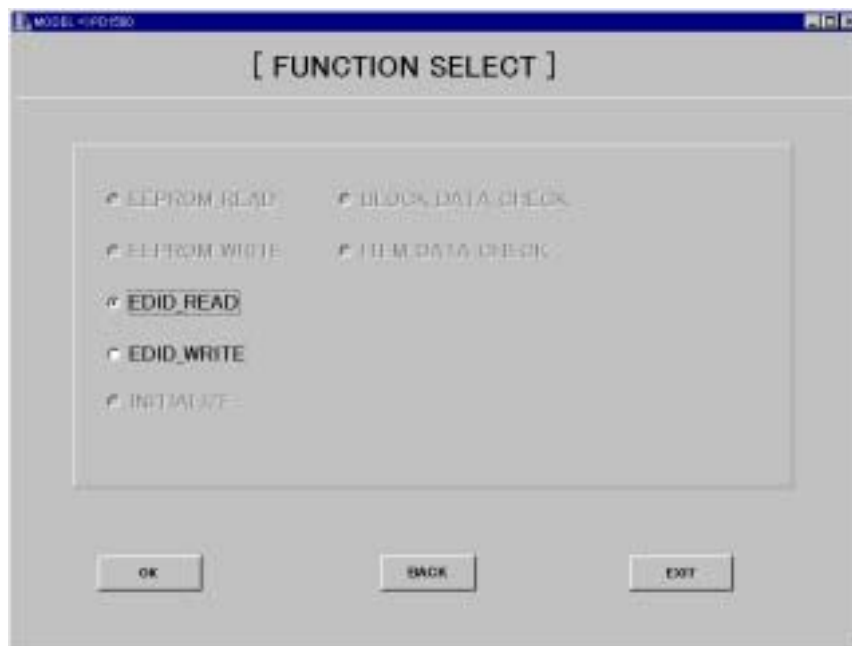
- 1) Connect the EDID data writing unit with jigs, etc. (D-SUB connector is connected.)
- 2) Copy all the files of the service tool Ver. 3.14 (Parameter ver. 2.0-S2) in a proper directory.
- 3) Start [Service2.EXE] of the service tool Ver. 3.14.
- 4) When the screen as shown below appears, give a check to [LCD] of [Monitor Type] and press the [START] button.



- 5) When the screen as shown below appears, adjust the cursor to [LCD1560NX-ANALOG] and make a double click.

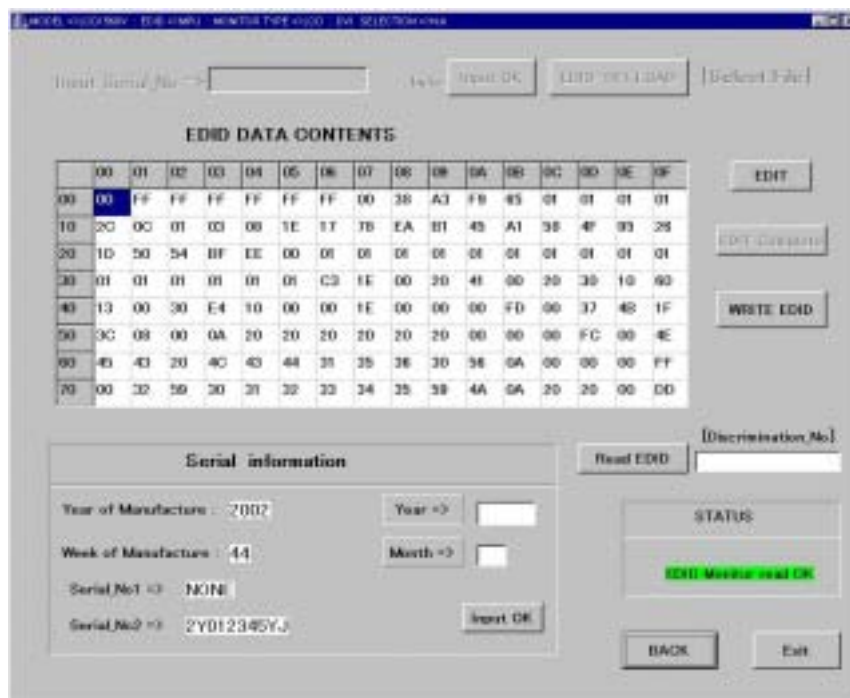


6) When the screen as shown below appears, give a check to [EDID_READ] and press the [OK] button.



7) When the screen as shown below appears, confirm that the correct data are displayed in the columns of EDID DATA CONTENTS and Serial information.

If all the displayed data are [FF] or the like, or if the serial number is different from that of the corresponding unit, then EDID data writing should be carried out.



8) When a screen of Item 6 is displayed by pressing the [BACK] button, give a check to [EDID_WRITE] and press the [OK] button.

- 9) When the screen as shown below appears, examine the serial number of the unit, enter an input in the column of [Input Serial No.] through the keyboard, and press the [Input OK] button.

Enter an input in the column of [.Year=>] in manufactured year(A.D. four digits) and [Month=>] in manufactured month through the keyboard, and press the [Input OK] button.

Input Serial No. = 10 byte Input OK EDD-TEXT LOAD [Select File]

EDID DATA CONTENTS EDID CODE => LCD1560V

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	FF	FF	FF	FF	FF	FF	00	28	A3	F8	83	01	01	01	01
10	28	0C	01	03	08	1E	17	7B	EA	01	43	A1	38	4F	03	28
20	1D	50	54	BF	EE	00	00	00	00	00	00	00	00	00	00	00
30	00	00	00	00	00	00	C3	1E	00	20	41	00	20	30	10	00
40	13	00	30	E4	10	00	00	1E	00	00	00	FD	00	37	48	1F
50	3C	08	00	0A	20	20	20	20	20	20	00	00	00	FC	00	4E
60	4B	43	20	4C	43	44	31	35	36	30	56	0A	00	00	00	FF
70	00	32	58	30	30	30	30	30	31	38	4A	0A	20	20	00	FD

Serial information

Year of Manufacture : 2002 Year =>

Week of Manufacture : 40 Month =>

Serial No1 => NONE

Serial No2 => 2X000001YJ Input OK

[Discrimination No.]

Read EDID

STATUS

EDID File Read OK

BACK Exit

- 10) When the [WRITE EDID] button is pressed, writing of the EDID data only is carried out. Upon the completion of correct writing, a display of [EDID Monitor Write OK] is presented in the column of [STATUS].

Input Serial No. = 10 byte Input OK EDD-TEXT LOAD [Select File]

EDID DATA CONTENTS EDID CODE => LCD1560V

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	FF	FF	FF	FF	FF	FF	00	28	A3	F8	83	01	01	01	01
10	28	0C	01	03	08	1E	17	7B	EA	01	43	A1	38	4F	03	28
20	1D	50	54	BF	EE	00	00	00	00	00	00	00	00	00	00	00
30	00	00	00	00	00	00	C3	1E	00	20	41	00	20	30	10	00
40	13	00	30	E4	10	00	00	1E	00	00	00	FD	00	37	48	1F
50	3C	08	00	0A	20	20	20	20	20	20	00	00	00	FC	00	4E
60	4B	43	20	4C	43	44	31	35	36	30	56	0A	00	00	00	FF
70	00	32	58	30	31	32	33	34	35	36	4A	0A	20	20	00	FD

Serial information

Year of Manufacture : 2002 Year =>

Week of Manufacture : 40 Month =>

Serial No1 => NONE

Serial No2 => 2X0112345YJ Input OK

[Discrimination No.]

Read EDID

STATUS

EDID Monitor Write OK

BACK Exit

4.4.2 EDID data inspection and writing of a DVI connector.

- 1) Connect the EDID data writing unit with jigs, etc. (DVI connector is connected.)
- 2) The "BACK" button is pushed twice and the [MODEL SELECT] screen is displayed. Cursor is united and double-clicked to [LCD1560NX-DIGITAL].
- 3) 6) to 10) is carried out in the same procedure as 4.4.1 "D-SUB connector EDID data inspection and writing."

4.4.3 The check of a model name and a serial number.

- 1) Let the Power switch of the writing unit be turned OFF/ON, and display "MONITOR INFORMATION" of the OSM, and confirm that the model name (LCD1560NX) and serial number have been correctly written.
- 12) Upon the normal completion of EDID data writing, press the [Exit] button to close the program.

4.5 EDID data file

EDID date: LCD1560NX_A.edi

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	38	A3	FA	65	01	01	01	01
10	23	0C	01	03	0E	1E	17	78	EA	B1	45	A1	58	4F	95	26
20	1D	50	54	BF	EE	00	01	01	01	01	01	01	01	01	01	01
30	01	01	01	01	01	01	C3	1E	00	20	41	00	20	30	10	60
40	13	00	30	E4	10	00	00	1E	00	00	00	FD	00	37	4B	1F
50	3C	08	00	0A	20	20	20	20	20	20	00	00	00	FC	00	4E
60	45	43	20	4C	43	44	31	35	36	30	4E	58	00	00	00	FF
70	00	32	38	30	30	30	30	30	31	59	41	0A	20	20	00	D1

EDID date: LCD1560NX_D.edi

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	38	A3	FA	65	01	01	01	01
10	23	0C	01	03	80	1E	17	78	EA	B1	45	A1	58	4F	95	26
20	1D	50	54	BF	EE	00	01	01	01	01	01	01	01	01	01	01
30	01	01	01	01	01	01	C3	1E	00	20	41	00	20	30	10	60
40	13	00	30	E4	10	00	00	1E	00	00	00	FD	00	37	4B	1F
50	3C	08	00	0A	20	20	20	20	20	20	00	00	00	FC	00	4E
60	45	43	20	4C	43	44	31	35	36	30	4E	58	00	00	00	FF
70	00	32	38	30	30	30	30	30	31	59	41	0A	20	20	00	5F

Note 1: address 10h

Week of manufacture = Month of manufacture × 4

Note 2: address 11h

Year of manufacture - 1990

Note 3: address 71h ~ 7Dh

Serial Number (ASCII coded)

If less than 13 char, terminate with 0Ah and fill the rests with 20h.

Note 4: address 7Fh

Checksum

The sum of entire 128 byte shall be equal to 00h.

5. External inspection on the LCD module

5.1 Inspection condition

- 1) Temperature : 20~25°C
 - 2) Humidity : 65 ±5% RH
 - 3) Illumination : Single 20W fluorescent lamp non-directive (300 to 700 Lux)
 - 4) Viewing distance : The distance between the LCM and the inspector's eyes shall be at least 35cm.
 - 5) Viewing angle : The inspection shall be conducted within normal viewing angle range.
- * Refer to the CAS for viewing angle.

5.2 Standards for display conditions

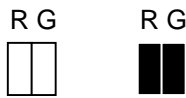
Standard for errors (defects)

Item			Standard		Remarks
Joined defects	(1)	Continuous 2 bright dots	R+G, 2 continued horizontally	≤ 2 pairs	Note 1
	(2)	Continuous 2 black dots		≤ 2 pairs	Note 2
	(3)	Continuous 3 or more bright dots	Both the same color and different colors are counted.	≤ 0 pair	Note 3
	(4)	Continuous 3 or more black dots		≤ 0 pair	
Dot defect	(5)	Dot defects other than (1) and (2)	R.G.B (Black dot + Bright dot)	≤ 4	Note 4
Defective proximity	(6)	Adjacent to same-color bright-dot defect	Distance between defects ≤ 6.5mm	Each color ≤ 2 pairs	Note 5
	(7)	Approach of adjacent defects of (6)	Distance of approach ≤ 15mm	≤ 0 pair	Note 6
	(8)	Defect cluster	A set of 2 or more dot defects in an area of 5×5 pixels [(5) in consideration]	≤ 2 clusters	Note 7
			Approach of adjacent defects of (1) in an area of 5×5 pixels	≤ 0 pair	Note 8
			Approach of adjacent defects of (2) in an area of 5×5 pixels		
	Total No. of defects	Total No. of bright dots (R.G.B) + black dots (R.G.B)			≤ 4
Total No. of bright points in G			≤ 4	-	
Note 9. Every dot herein means sub-pixel (each Red, Green or Blue color)					
Note 10. Bright & Dark Dots are larger than one third of sub-pixel. (Dots smaller than one third of sub-pixel are not counted as a defect dots.)					
Note 11. Do not use the [ND] filter in counting a bright dot.					

 :Bright dot  :Black dot

Note 1: R + G, 2 dots continued horizontally

Counted as an NG

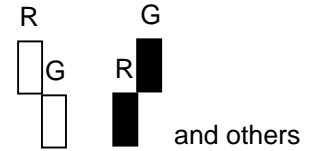


Not counted as NG

Combination of bright and black dots



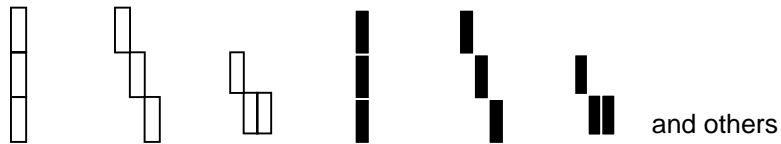
Combination other than 2-horizontal combination



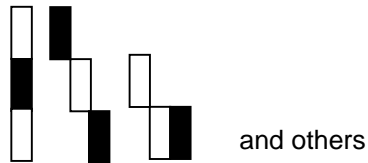
Note 2: (1) + (2) ≤ 3 pairs

Note 3: 3-defect combination

Combination patterns to be counted as NG / Combination of all bright or all black dots



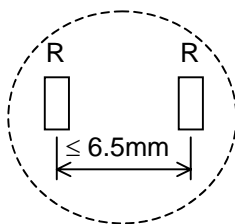
Not counted as NG / Combination of bright and black dots



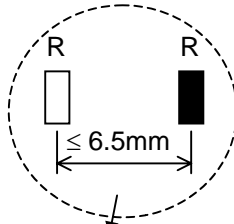
Note 4: The dots for composing 2-horizontal combinations of R + G shall be excluded from counting.

Note 5: Adjacent to same-color bright-dot defect

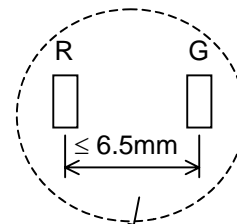
Counted as NG



Not counted as NG

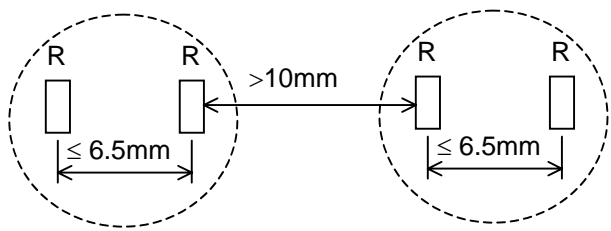


Approach of bright and black dots



Approach of different colors

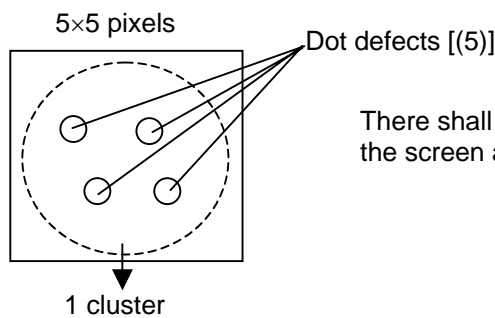
Note 6: Approach of adjacent defects



The distance between adjacent defects shall be longer than 10mm.

Note 7: A set of 2 or more dot defects in an area of 5×5 pixels

If there are two or more dot defects [(5)] in an area of 5×5 pixels, such a set of dot defects shall be counted as one cluster.



There shall be no more than 3 clusters throughout the screen area.

Note 8. Two or more pixels or sub-pixels with more than one fault of 1) or 2) within 5x5 pixels

Count as defect		Do not count as defect
<p>5x5 pixels</p>		<p>5x5 pixels</p>
<p>5x5 pixels</p>	<p>5x5 pixels</p>	

5.3 The inspection standard of appearance

5.3.1 Polarizer defects

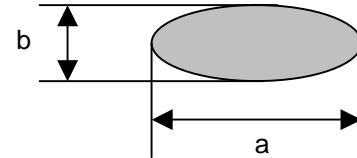
Items		Criteria
Scratch	Linear	$0.05 \leq W \leq 0.2$, $5.0 \leq L \leq 10.0$, $N \leq 4$
Dent	Circular	$0.2 \leq D \leq 0.5$, $N \leq 6$

NOTE: D: Average Diameter $D=(a+b)/2$

W: Width, L: Length, N: Quantity

Linear: $a > 2b$, Circular: $a < 2b$

Unit: mm



a. Extraneous substances that can be wiped out like Finger Print, Particles are not considered as a defect.

b. Defects which is on the Black Matrix (outside of Active Area) are not considered as a defect.

5.3.2 Foreign material

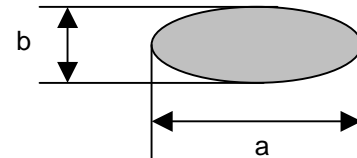
Items		Criteria
Foreign Material	Linear	$0.05 \leq W \leq 0.1$, $0.3 \leq L \leq 4.0$, $N \leq 4$
	Circular	$0.2 \leq D \leq 0.5$, $N \leq 6$

NOTE: D: Average Diameter $D=(a+b)/2$

W: Width, L: Length, N: Quantity

Linear: $a > 2b$, Circular: $a < 2b$

Unit: mm



5.3.3 Line defect

All kinds of line defects such as vertical, horizontal or cross are not allowed.