



Product Service Manual--Level 2

Service Manual for BenQ:
G2010W
P/N: 9H.0CALN.IXX

Applicable for All Regions



Version: 001
Date:2008/5/8

Notice:

- For RO to input specific "Legal Requirement" in specific NS regarding to responsibility and liability statements.

- Please check BenQ's eSupport web site, <http://esupport.benq.com>, to ensure that you have the most recent version of this manual.

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Abbreviations & Acronyms

1. About this manual

This manual contains information about maintenance and service of BenQ products. Use this manual to perform diagnostics tests, troubleshoot problems, and align the BenQ product.

1.1 Trademark

The following terms are trademarks of BenQ Corporation:

BenQ

Importance

Only trained service personnel who are familiar with this BenQ Product shall perform service or maintenance to it. Before performing any maintenance or service, the engineer MUST read the “Safety Note”

2. Precautions & Safety Notices

2.1 Safety Precaution

This monitor is manufactured and tested on a ground principle that a user's safety comes first. However, improper used or installation may cause damage to the monitor as well as to the user.

WARNINGS:

- This monitor should be operated only at the correct power sources indicated on the label on the rear of the monitor. If you're unsure of the power supply in you residence, consult your local dealer or Power Company.
- Do not try to repair the monitor by yourself, as it contains no user-serviceable parts. This monitor should only be repaired by a qualified technician.
- Do not remove the monitor cabinet. There is high-voltage parts inside that may cause electric shock to human bodies.
- Stop using the monitor if the cabinet is damaged. Have it checked by a service technician.
- Put your monitor only in a lean, cool, dry environment. If it gets wet, unplug the power cable immediately and consult your closed dealer.
- Always unplug the monitor before cleaning it. Clean the cabinet with a clean, dry cloth. Apply non-ammonia based cleaner onto the cloth, not directly onto the class screen.
- Do not place heavy objects on the monitor or power cord.

2.2 Product Safety Notice

Many electrical and mechanical parts in this chassis have special safety visual inspections and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Before replacing any of these components read the parts list in this manual carefully. The use of substitute replacement parts, which do not have the same safety characteristics as specified in the parts list, may create shock, fire, or other hazards.

2.3 Service Notes

- When replacing parts or circuit boards, clamp the lead wires around terminals before soldering.
- Keep wires away from high voltage, high temperature components and sharp edges.
- Keep wires in their original position so as to reduce interference.
- Adjustment of this product please refers to the user' manual.

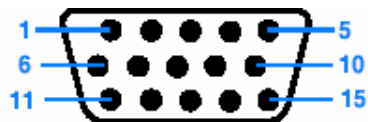
3. Product Overview

3.1 Power Supply

Item	condition	Spec	OK	NA	Remark
Input Voltage range	Universal input full range	100~240VAC	√		
Input Current range	100Vac 240Vac	1.5A (max.) 0.7A (max.)	√		
Power consumption	without Audio, normal “on” operation	≤55W	√		LED: Green
DMPS		<2W	√		LED: Orange
In rush Current	100Vac,cold star,25°C; 240Vac,cold star,25°C	40A (max) 60A(max)	√		To be determined by the business country.
Earth Leakage Current					
Hi-pot					
Power Line Transient					
CCFL Operation range					
Power cord			√		

3.2 Signal Interface

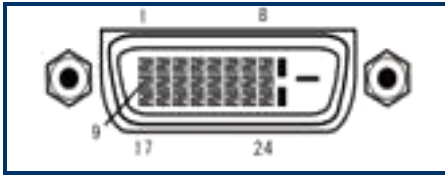
VGA:



Pin	Symbol	Pin	Symbol	Pin	Symbol
1	Red+	6	Red_GND	11	GND
2	Green+	7	Green_GND	12	DDC_DAT
3	Blue+	8	Blue_GND	13	Hsync
4	NC	9	5V_VGA	14	Vsync

5	Cable Detect	10	GND	15	DDC_CLK
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DVI:



1	2	3	4	5	6	7	8
TMDS 數據 2-	TMDS 數據 2+	TMDS 數據 2/4 屏蔽	TMDS 數據 4-	TMDS 數據 4+	DCC 時鐘	DCC 數據	模擬垂直 同步
9	10	11	12	13	14	15	16
TMDS 數據 1-	TMDS 數據 1+	TMDS 數據 1/3 屏蔽	TMDS 數據 3-	TMDS 數據 3+	+5V 電源	接地(+5V, 模擬 H/V Sync)	Hot Plug Detect
17	18	19	20	21	22	23	24
TMDS 數據 0-	TMDS 數據 0+	TMDS 數據 0/5 屏蔽	TMDS 數據 5-	TMDS 數據 5+	TMDS 時 鐘屏蔽	TMDS 時 鐘+	TMDS 時 鐘-

3.3 Video Performance

Item	condition	Spec	OK	NA	Remark
Max. support Pixel rate		165MHz	√		
Max. Resolution		1680×1050	√		
Rise time+Fall time		<25% of minimum pixel clock period	√		Refer to VESA VSIS Standard V1R2
Setting Time after overshoot/undershoot		<5% final full-scale value	√		Refer to VESA VSIS Standard V1R2
Overshoot/undershoot		<12% of step function voltage level over the full voltage range	√		Refer to VESA VSIS Standard V1R2

3.4 Scan Range

Item	condition	Spec	OK	NA	Remark
Horizontal	Sync polarity: (+) or (-)	31 ~83KHz	√		

Vertical	Sync polarity: (+) or (-)	55~76Hz	√		
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3.5 Plug & Play DDC2B DDC-CI Support

Item	condition	Spec	OK	NA	Remark
DDC channel type		DDC 2B	√		
EDID		Version 1.3	√		

3.6 Support Timings

Preset	Pixel Format	Horz Freq (kHz)	Horz Polarity	Vert Freq (Hz)	Vert Polarity	Pixel Clk (MHz)	
1	640 x 350	31.47	+	70.09	-	25.18	Preset
2	640 x 350	37.86	+	85.08	-	31.50	Fail safe mode
3	640 x 400	31.47	-	70.09	+	25.18	Non preset
4	640 x 400	37.86	-	85.08	+	31.5	Fail safe mode
5	640 x 480	35.00	-	66.67	-	30.24	Non preset
6	640 x 480	31.47	-	59.94	-	25.17	Preset
7	640 x 480	37.86	-	72.81	-	31.50	Non preset
8	640 x 480	37.50	-	75.00	-	31.50	Preset
9	640 x 480	43.27	-	85.01	-	36.00	fail safe mode
10	720 x 400	31.47	-	70.08	+	28.32	Preset
11	720 x400	37.93	-	85.04	+	35.5	fail safe mode
12	832 x 624	49.71	-	74.53	-	57.27	Preset
13	800 x 600	35.16	+	56.25	+	36.00	Non preset
14	800 x 600	37.88	+	60.32	+	40.00	Preset
15	800 x 600	48.08	+	72.19	+	50.00	Non preset
16	800 x 600	46.88	+	75.00	+	49.50	Preset
17	800 x 600	53.67	+	85.00	+	56.25	fail safe mode
18	848 x 480	31.02	+	60.00	+	33.75	Non preset
19	848 x 480	29.83	-	59.66	+	31.50	Non preset
20	848 x 480	35.00	-	70.00	+	37.52	Non preset
21	848 x 480	36.07	-	72.00	+	39.25	Non preset
22	848 x 480	37.68	-	74.77	+	41.00	Non preset
23	720 x 576	35.83	-	60.00	-	32.71	Non preset
24	1024 x 768-I	35.52	+	43.38	+	44.9	Out of range mode
25	1024 x 768	48.36	-	60.00	-	65.00	Preset
26	1024 x 768	56.48	-	70.07	-	75.00	Non preset
27	1024 x 768	57.67	-	72.00	+	78.43	Non preset
28	1024 x 768	60.24	-	74.93	-	80.00	Preset
29	1024 x 768	60.02	+	75.03	+	78.75	Preset
30	1024 x 768	68.68	+	85.00	+	94.50	fail safe mode
31	1152 x 720	44.86	-	60	+	66.75	Preset
32	1152 x 864	63.85	+	70.01	+	94.50	Non preset

Preset	Pixel Format	Horz Freq (kHz)	Horz Polarity	Vert Freq (Hz)	Vert Polarity	Pixel Clk (MHz)	
33	1152 x 864	67.50	+	75.00	+	108.00	Non preset
34	1152 x 864	77.09	+	85.00	+	121.50	fail safe mode
35	1152 x 870	68.68	-	75.06	-	100.00	Preset
36	1152 x 900	61.80	-	65.95	-	92.94	Preset
37	1152 x 900	71.73	-	76.07	-	105.59	Non preset
38	1280 x 720	45.00	-	59.94	+	74.25	Non preset
39	1280 x 720	44.77	-	59.86	+	74.50	Non preset
40	1280 x 720	56.46	-	74.78	+	95.75	Non preset
41	1280 x 768-R	47.40	+	60.00	-	68.25	Preset
42	1280 x 768	47.78	-	59.87	+	79.50	Non preset
43	1280 x 768	60.29	-	74.89	+	102.25	Non preset
44	1280 x 768	68.63	-	84.84	+	117.50	fail safe mode
45	1280 x 800	61.648	+	59.81	-	83.50	Preset
46	1280 x 800	62.8	-	75	+	106.5	Preset
47	1280 x 960	60.00	+	60.00	+	108.00	Preset
48	1280 x 960	85.94	+	85.00	+	148.50	fail safe mode
49	1280 x 1024	63.98	+	60.02	+	108.00	Preset
50	1280 x 1024	74.88	+	69.85	+	126.99	Non preset
51	1280 x 1024	74.40	-	70.00	-	124.90	Non preset
52	1280 x 1024	77.90	+	72.00	+	134.60	Non preset
53	1280 x 1024	79.98	+	75.02	+	135.00	Preset
54	1280 x 1024	81.18	-	76.16	-	135.09	Non preset
55	1280 x 1024	91.15	+	85.02	+	157.50	fail safe mode
56	1360 x 768	47.71	+	60.01	+	85.50	Preset
57	1400 x 1050-R	64.74	+	59.95	-	101.00	Non preset

Presets	Pixel Format	Horz Freq (kHz)	Horz Polarity	Vert Freq (Hz)	Vert Polarity	Pixel Clk (MHz)	
58	1400 x 1050	65.32	-	59.98	+	121.75	Non preset
59	1400 x 1050	82.28	-	74.87	+	179.50	Non preset
60	1400 x 1050	93.88	-	84.96	+	179.50	Non preset
61	1440 x 900-R	55.496	+	59.901	-	88.75	Preset
62	1440 x 900	55.935	-	59.887	+	106.5	Preset
63	1440 x 900	70.6	-	75	+	136.75	Preset
64	1600 x 1200-R	74.01	+	59.92	-	130.25	fail safe mode
65	1600 x 1000-R	61.648	+	59.910	-	108.5	fail safe mode
66	1600 x 1200	75.00	+	60.00	+	162.00	fail safe mode
67	1600 x 1200	81.25	+	65.00	+	175.50	fail safe mode
68	1600 x 1200	87.50	+	70.00	+	189.00	fail safe mode
69	1600 x 1200	93.75	+	75.00	+	202.50	fail safe mode
70	1600 x 1200	106.25	+	85.00	+	229.50	Out of range mode
71	1680 x 1050-R	64.67	+	59.88	-	119.00	Preset
72	1680 x 1050	65.29	-	59.95	+	146.25	Preset
73.	1680 x 1050	75	-	82.3	+	187	Preset
74	1972 x 1344	83.64	-	60.00	+	204.75	fail safe mode
75	1972 x 1344	106.27	-	75.00	+	261.00	Out of range mode
76	1856 x	86.33	-	60.00	+	218.25	Out of range

Preset	Pixel Format	Horz Freq (kHz)	Horz Polarity	Vert Freq (Hz)	Vert Polarity	Pixel Clk (MHz)	
	1392						mode
77	1856 x 1392	112.50	-	75.00	+	288.00	Out of range mode
78	1920 x 1080-R	66.587	+	59.934	-	138.5	fail safe mode
79	1920 x 1080	67.158	-	59.963	+	173	fail safe mode
80	1920 x 1200-R	74.04	+	59.95	-	154.00	fail safe mode
81	1920 X 1200	74.56	-	59.89	+	193.25	fail safe mode
82	1920 X 1200	94.04	-	74.93	+	245.25	Out of range mode
83	1920 X 1200	107.18	-	84.93	+	281.25	Out of range mode
84	1920 X 1440	90.00	-	60.00	+	234.00	Out of range mode
85	1920 X1440	112.50	-	75.00	+	297.00	Out of range mode

3.7 Operational & Function Specification

3.7.1 Video Performance

* All Spec. of monitor need to warm up at lease 1hr

Item	condition	Spec	OK	NA	Remark
Resolution	Any input resolution modes which are list in the timing table (under 1680x1050).	Max. resolution 1680x1050			
Contrast ratio		1000:1			
Brightness		300 cd/m2 (Typ.)			
Response time		5ms(typ.)			
Viewing angle		80			
		80			

CIE coordinate of white		x--0.313 ± 0.020; y--0.329 ± 0.020			
Display colors		16.7M (6bit+Hi-FR C)			

3.7.2 Brightness Adjustable Range

Item	condition	Spec	OK	NA	Remark
Brightness adjustable range	At default contrast level (saturate point)& Full-white color pattern	240 cd/m ² (Setting brightness max. value 100%; Min. brightness value)	√		

3.7.3 Acoustical Noise

Item	condition	Spec	OK	NA	Remark
Acoustical Noise	At 1 meter distance& audio function disable		√		

3.7.4 Environment

Item	condition	Spec	OK	NA	Remark
Temperature	Operating	0°C to 40°C	√		
	Non-operating	-20°C to 60°C	√		
Humidity	Operating	20% to 90%	√		
	Non-operating	10% to 90%	√		
Altitude	Operating	0 to 3048 M (10000 ft)	√		
	Non-operating	0 to 12192M (40000 ft)	√		

3.7.5 Transportation

Item	condition	Spec	OK	NA	Remark
Vibration					

Unpackage vibration					
Drop					
shock					

3.7.6 Electrostatic discharge Requirements

Item	condition	Spec	OK	NA	Remark
Electrostatic discharge					

3.7.7 Reliability

Items	Condition	Spec	Note
MTBF	90% Confidence	60,000 Hours	
CCFL Life time	Luminance becomes 50%	50000(Min)Hours	

Note. Display an all WHITE field at mid Brightness and Contrast settings

3.7.8 Audio performance

Items	Specification
Speaker	
Input impedance	
Frequency response range	
Signal to noise ratio	
Output power	

3.8. LCD Characteristics

3.8.1 The physical definition & technology summary of LCD panel

Item	condition	Spec	OK	NA	Remark
LCD panel supplier		AUO			
Panel type of supplier		M201EW02			
Screen diagonal		20.1 inch diagonal			
Display area		433.44(H)x270.90(V) mm			
Pixel pitch		0.258(H) x 0.258(V)			
Pixel arrangement		RGB vertical stripe			
Display mode		Normally White			
Support color		16.7M (6bit+Hi-FRC)			

3.9 User Controls

User's hardware control definition:

CONTROL KEY	KEYS FUNCTION
[MENU]	A. When OSD displays, press [MENU] to return to previous level menu B. When OSD isn't shown on screen, press [MENU] to enter OSD interface C. Press [MENU] to enter Service Page When OSD isn't shown on screen in Service Page Mode
[Enter]	A. When OSD displays, press [Enter] to perform function of menu icon that is highlight or enter next level menu B. When OSD isn't shown on screen, press [Enter] to change input source
[], []	A. When "MENU OSD" displays, press these keys to change the contents of an adjustment item, or change an adjustment value B. When "MENU OSD" un-displays, press [] to Show Picture Mode Menu, press [] to show Brightness/Contrast Menu
[POWER]	Power on or power off the monitor
[iKey]	press [iKey] to perform auto-adjustment

3.10 Mechanical Characteristics

3.10.1 Dimension

Item	condition	Spec	OK	NA	Remark
Bezel opening	Lx W	435.73x273.19mm	√		
Monitor without stand	L×W×Hmm	472.54x166.66x383.67mm	√		
Monitor with stand	L×W×Hmm	472.73x62.2x373.35mm	√		
Carton Box(outside)	L×W×Hmm	538x134x446mm	√		
Tilt and Swivel range		Tilt:-5~21degree Swivel: 0 degree	√		

3.10.2 Weight

Item	condition	Spec	OK	NA	Remark
Monitor (Net)		4.07±0.0.5 Kg (Net)	√		
Monitor with packing(Gross)		5.12±0.5Kg(Gross / with packing)	√		

3.10.3 Plastic

Item	condition	Spec	OK	NA	Remark
Flammability		94-HB	√		
Heat deflection to	ABS	80°C	√		
UV stability	ABS	Delta E<12	√		
resin		ABS	√		

Texture		MT11000&MT11010& MT11020 & & polishing2000& polishing3000& polishing5000& polishing6000 Special Texture	√		1.BEZEL: MT11000 & polishing5000& polishing2000 2.BACK COVER: MT11000 & MT11020& polishing2000 3.STAND: MT11010& polishing2000 4.POWER KEY BUTTON: polishing2000 5.LED: polishing6000 Others:MT11010
Color		BCS-7015A(BLACK)/B CS-T8110C(SILVER)	√		Bezel painting

3.10.4 Carton

Carton:Item	condition	Spec	OK	NA	Remark
Color		Kraft	√		
Material		C Flute	√		
Compression strength		200 KGF	√		
Burst strrngth		16 KGF/cm2	√		
Stacked quantity		6 Layers	√		

3.11 Pallet & Shipment

3.11.1 Container Specification

Stowing Type	Containter	Quantity of Produces (sets) (Every container)	Quantity of Produces (sets) (Every Pallet)	Quantity of Pallet (sets) (Every container)
With Pallet	20'	780	Pallet A:92 Pallet B:64 Pallet C:--	Pallet A:5 Pallet B:5 Pallet C:--
	40'	1716	Pallet A:92 Pallet B:64 Pallet C:--	Pallet A:11 Pallet B:11 Pallet C:--

Without Pallet	20'	N/A	N/A	N/A
	40'	N/A	N/A	N/A

3.11.2 Carton Specification

Product:

Net Weight (Kg)	Gross Weight(Kg)	Dimension w/o Base LxWxH (mm)	Dimension w/ Base LxWxH (mm)
4.07±0.5 Kg (Net)	5.12±0.5Kg	472.54X62.2X373.5mm	472.54X166.66X383.67mm

Package:

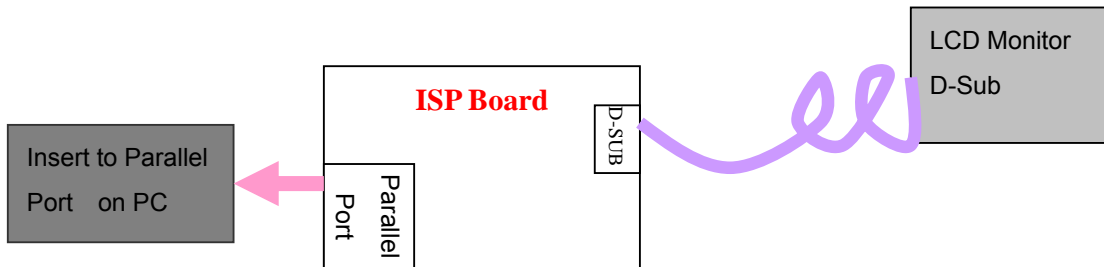
Carton Interior Dimension (mm) LxWxH	Carton External Dimension (mm) LxWxH
528X124X428mm	538X134X446mm

4 Level 1 Cosmetic / Appearance / Alignment Service

4.1 Software / Firmware Upgrade Process

Upload firmware to MCU via VGA Cable

1. Connect ISP board between monitor and PC as below configuration.



2. Press the “connect” button in ISP.exe, and select the device type, which is used in this monitor. Choose the corresponding firmware version, and load to MCU.
3. After finish, please plug out power cable and re-start monitor again.

4.2 Alignment Procedure (for function adjustment)

4.2.1 Preparation:

1. Setup input timing VESA to 1680*1050@60Hz,32-Grays pattern.
2. Setup units and keep it warm up for at least 30 minutes.

4.2.2 Timing adjustment

1. Enter to factory mode setting area (by pressing “ENTER”+ “MENU” + “POWER” at the same time during power off).
2. Check the settings to following values:
 - Contrast =50;
 - Brightness=90;
 - Color enhancement=general;
3. Then turn off the monitor power.

4.2.3 Function key Definitions

4.2.3.1 Control buttons on the Back bezel

- “MENU”
 - When OSD displays, press [MENU] to return to previous level menuView the next function in the OSD Main menu
 - When OSD isn’t shown on screen, press [MENU] to enter OSD interface
 - Press [MENU] to enter Service Page When OSD isn’t shown on screen in Service Page Mode
- “ENTER”

- When OSD displays, press [Enter] to perform function of menu icon that is highlight or enter next level menu Activate the OSD Main menu
- When OSD isn't shown on screen, press[Enter] to change input source
- “[], []”
 - When “MENU OSD” displays, press these keys to change the contents of an adjustment item, or change an adjustment value View the previous function in the OSD Main menu
 - When “MENU OSD” un-displays, press [] to Show Picture Mode Menu.press [] to show Brightness/Contrast Menu
- “iKey”
 - press [iKey] to perform auto-adjustment
- “POWER”
 - Turn on/off the monitor

4.2.3.2 OSD Control

The On-Screen Display (OSD) shall be an easy to use icon based menu through keypad OSD buttons or remote control unit. The unit shall leave the factory with all OSD controls set to their default values

First level	Second level	Third level	Fourth level	Default
DISPLAY	Auto Adjustment	-	-	-
	H. Position	(0~100)	-	50
	V. Position	(0~100)	-	50
	Pixel Clock	(0~100)	-	50
	Phase	(0~63)	-	-
PICTURE	Brightness	(0~100)	-	90
	Contrast	(0~100)	-	50
	Sharpness	(1~5)	-	3
	Color	*Color temperature	Normal	Normal
			Bluish	-
			Reddish	-
			User Mode ➤ Red (0~100) ➤ Green (0~100) ➤ Blue (0~100)	100
	Reset Color	(YES/NO)		
Dynamic Contrast	*Dynamic Contrast	(YES/NO)		
PICTURE ADVANCED	**Picture Mode	Standard		Standard
		Movie	Sharpness 不可调节	1.任一项模式下 Senseye Demo 设为
		Dynamics	Sharpness 不可调节	ON 另外两个模式

		Photo	Sharpness 不可调节	下的 Senseye Demo 自动变为 ON 2. Senseye Demo 处于 ON 时,做 Auto 自动变为 OFF	
		sRGB	Sharpness 不可调节		
	Senseye Demo	(ON/OFF)			OFF
	Display Mode	Full			full
		Aspect			
	Input	(D-sub/DVI)			
SYSTEM	OSD Settings	Language	-EU version: 14 languages (English/Français/Deutsch/Italiano/Espanol/Polish/Czech/Hungarian/Serbo-croatian/Romanian/Netherlands/Russian/Swedish/Portuguese) -Asian version: 8 languages (English/Français/Deutsch/Italiano/Espanol/日本語/繁體中文/簡體中文)		English
		H. Position	(0~100)		50
		V. Position	(0~100)		50
		Display Time	(5, 10, 15, 20, 25, 30)		15
		OSD Lock	(ON/OFF) (按 Menu 鍵 15s 即可解除鎖定)		OFF
	DDC/CI	(ON/OFF)	-		ON
	Information	-	-		
	Reset All	(YES/NO)	-		

4.2.3.3. Factory Mode Introduction

When signal is input, press “power key” to turn off the monitor. Press “ENTER”+“MENU” +“Power” together to turn on the monitor. After power on, press “MENU” to call out Main Menu, then press “-“for select the “F” item, then press “Enter”, you can go into Factory mode.

AUTO: Automatically calibrate chip ADC parameter by using chip internal DAC.

GAIN: ADC gain value

OFFSET: ADC offset value

9300K: Set color temperature 9300K

5800K: Set color temperature 5800K

6500K: Set color temperature 6500K

USER: Set user preferred color temperature

LANGUAGE: Country language

Reset BL Hr: the time of backlight

Reset Total Hr: the total time when connect power

Return: exit the factory menu

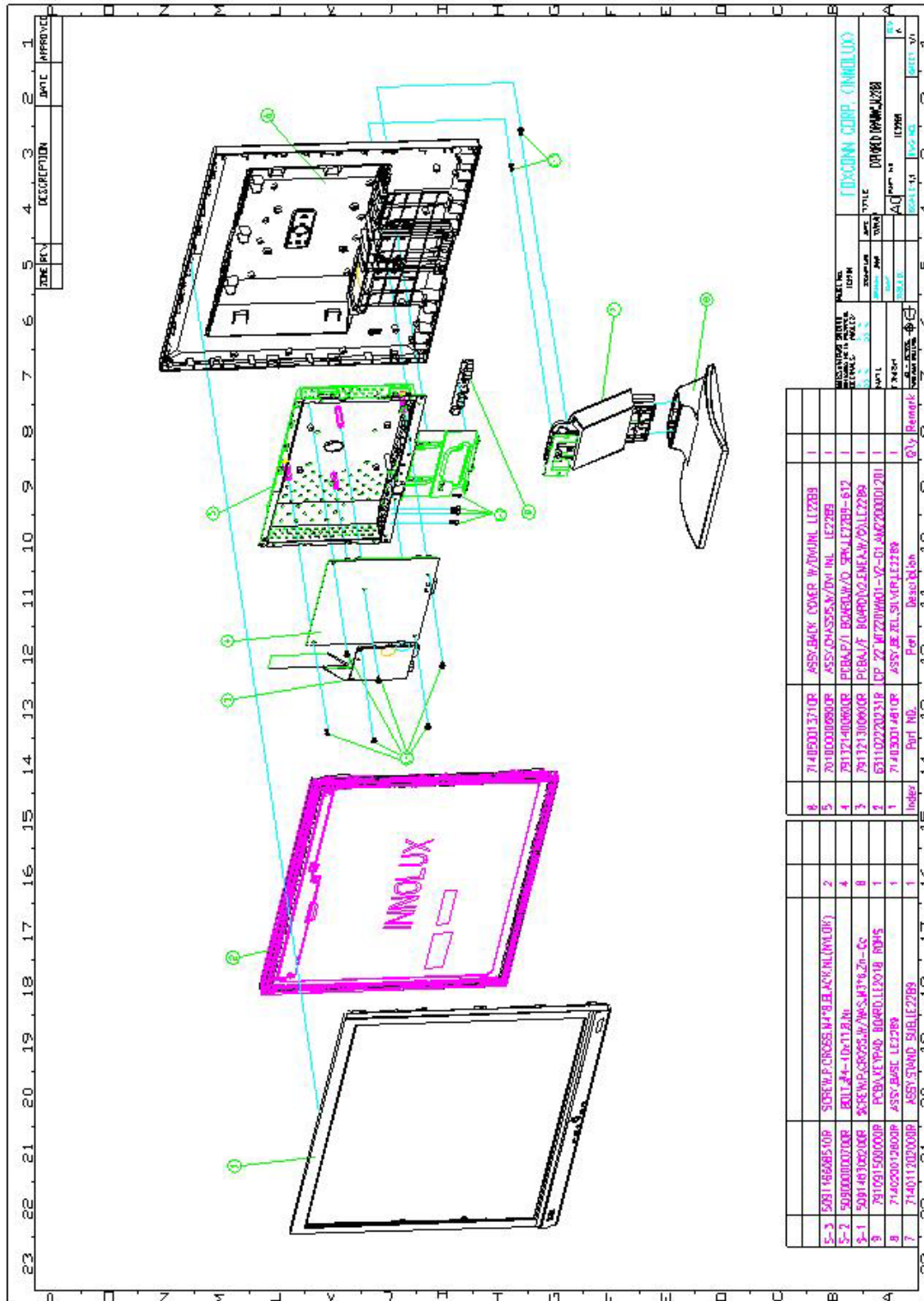
4.2.3.4 After repair, to ensure the quality you should do the following test and adjustment

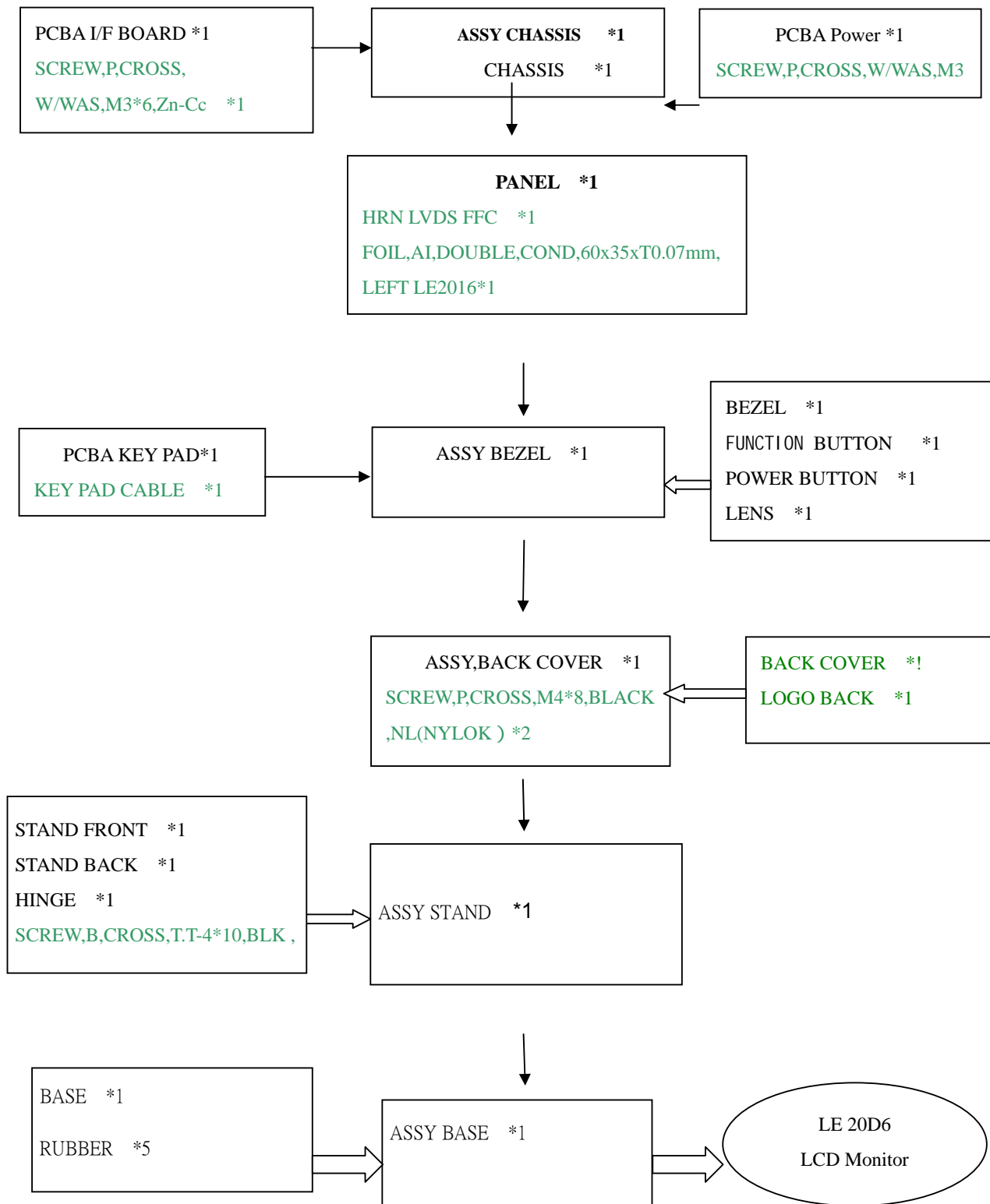
Item	Content			Equipment
Test OSD function	1.Signal is set as 1680×1050@60Hz under General-1 2. Checking whether each single function key and compound function key can be worked.			Chroma Signal Generator
Contrast Check	1. Set input mode to 1680×1050@60Hz 2. Set Pattern to 32 gray shades 3. Set contrast to the max. The brightest 5~8 shades brightness cannot be distinguished.			Chroma Signal Generator
Color Temperature	1. Do "Auto color Balance" at 1680×1050@60Hz, 32gray shades 2. Measure color temperature, check it complies with the following temperature : $6500K \ x = 0.313 \ +/- \ 0.03, \ y = 0.329 \ +/- \ 0.03$			Chroma Signal Generator and color analyzer
Modes switching check	1. Use Chroma Pattern Generator to make sequence. VESA (640x480 800x600 1024x768 1680x1050), and power saving signal, etc. 2. Confirm the above timing modes must be full screen and the picture must be normal.			Chroma Signal Generator
VGA cable detector	When VGA cable is not plugged, the monitor will work in power saving mode.			Visual check Chroma Signal Generator
Panel Flicker check	1. Mode: 1680×1050@60Hz 2. Set Brightness & contrast to default value 3. Do "Auto Adjustment" 4. Shut down PC to check whether there's glitter on the center of the picture.			Chroma signal generator & PC
Power saving	1. Mode: 1680×1050@60Hz 2. Pattern: full white 3. Brightness: Max. 4. Contrast: Default	at each modes		Chroma signal generator
	State	Power Consumption	LED color	
	Normal		green	
	Stand By		amber	

	Power Key Off		no	
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5. Level 2 Disassembly/Assembly/Circuit Board/Standard Parts Replacement





5.1 Exploded Diagram



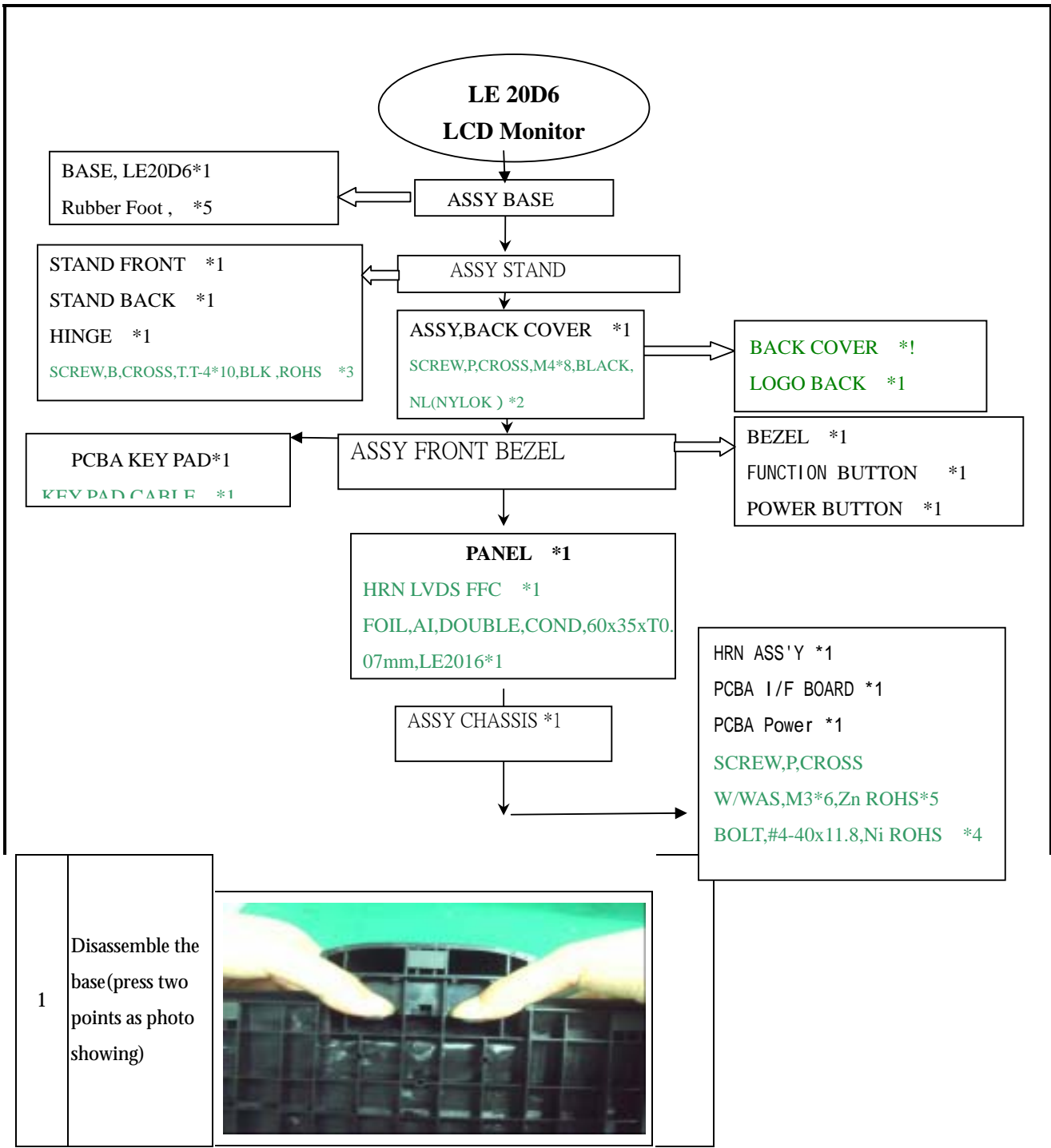







5.2 Assembly Block



1	Assemble the panel with front-bezel		
2	Assemble chassis & Plug in the LVDS		
3	Keypad assembly		
4	Plug in the lamp lines		

5	Back cover assembly		
6	Assemble the stand		
7	Lock screw		
8	Base assembly		

5.3 Disassembly Block

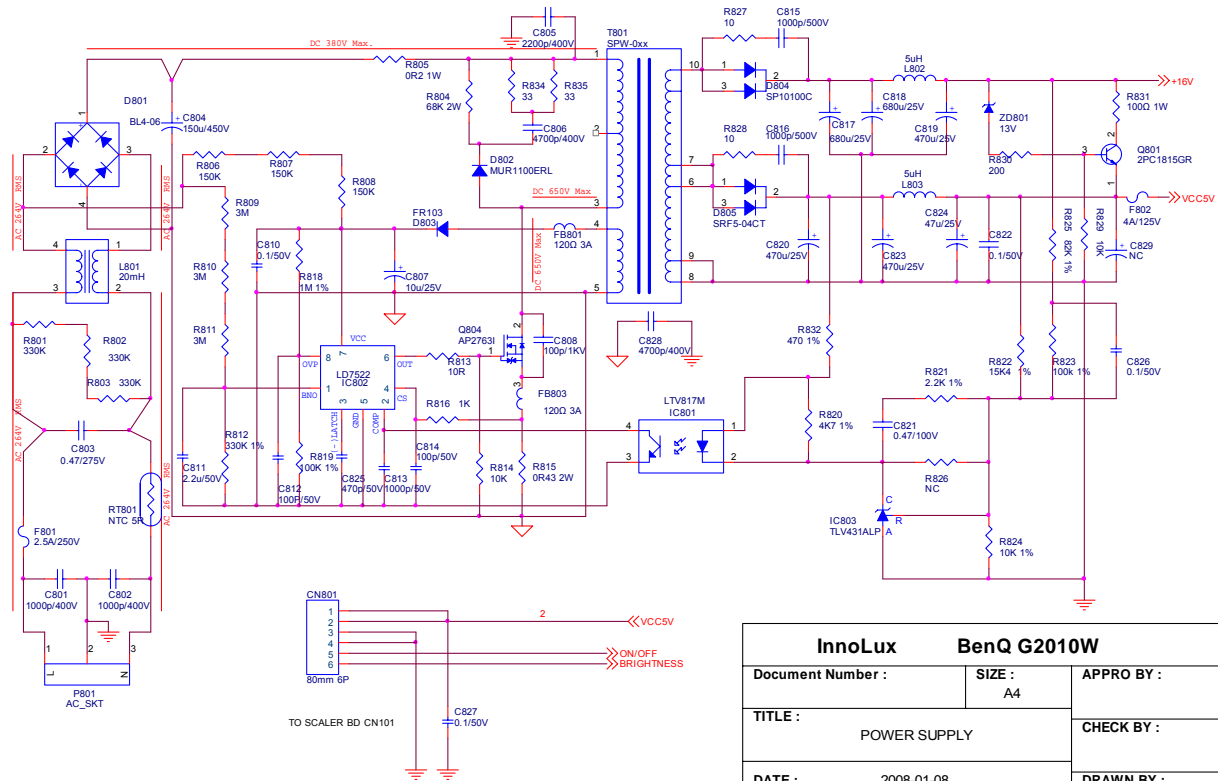


2	Disassemble the stand (take out screw)		
3	Move out the stand		
4	Disassemble back cover		
5	Move out LVDS		
6	disassemble keypad		

7	Disassemble the LVDS		
8	Take apart the chassis aside		

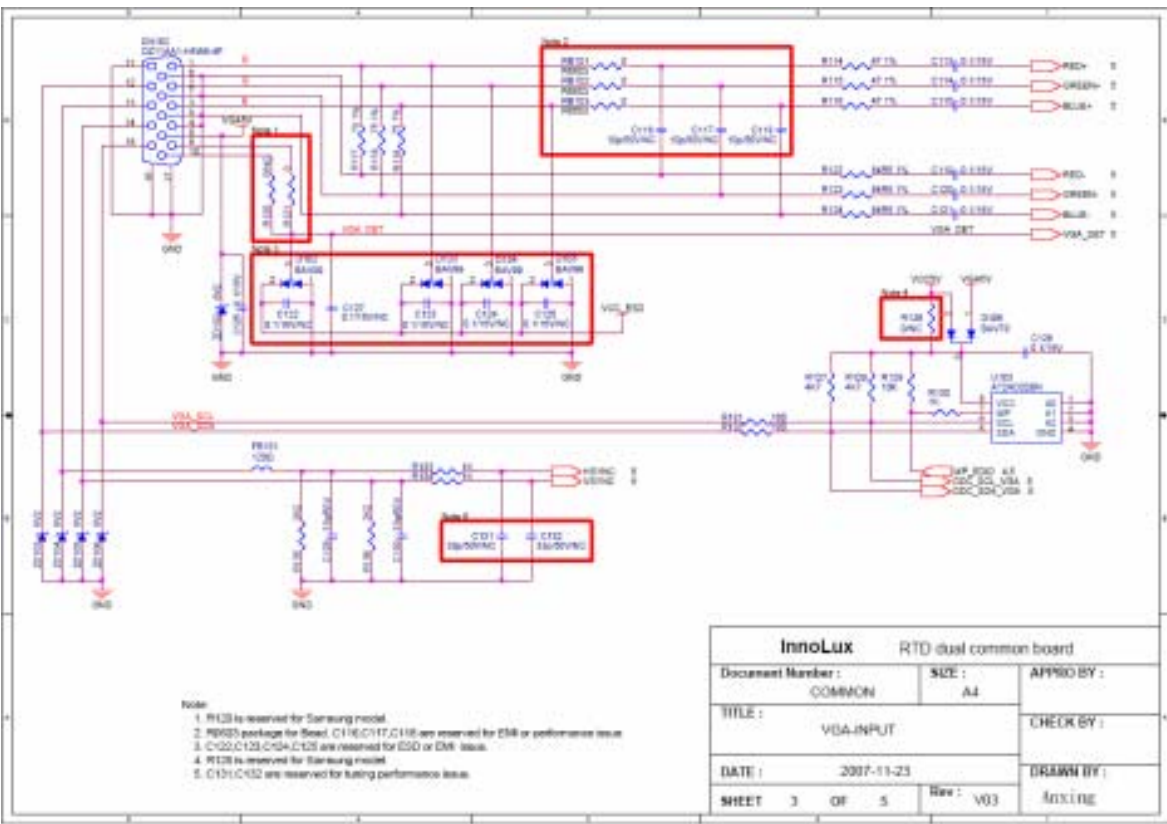
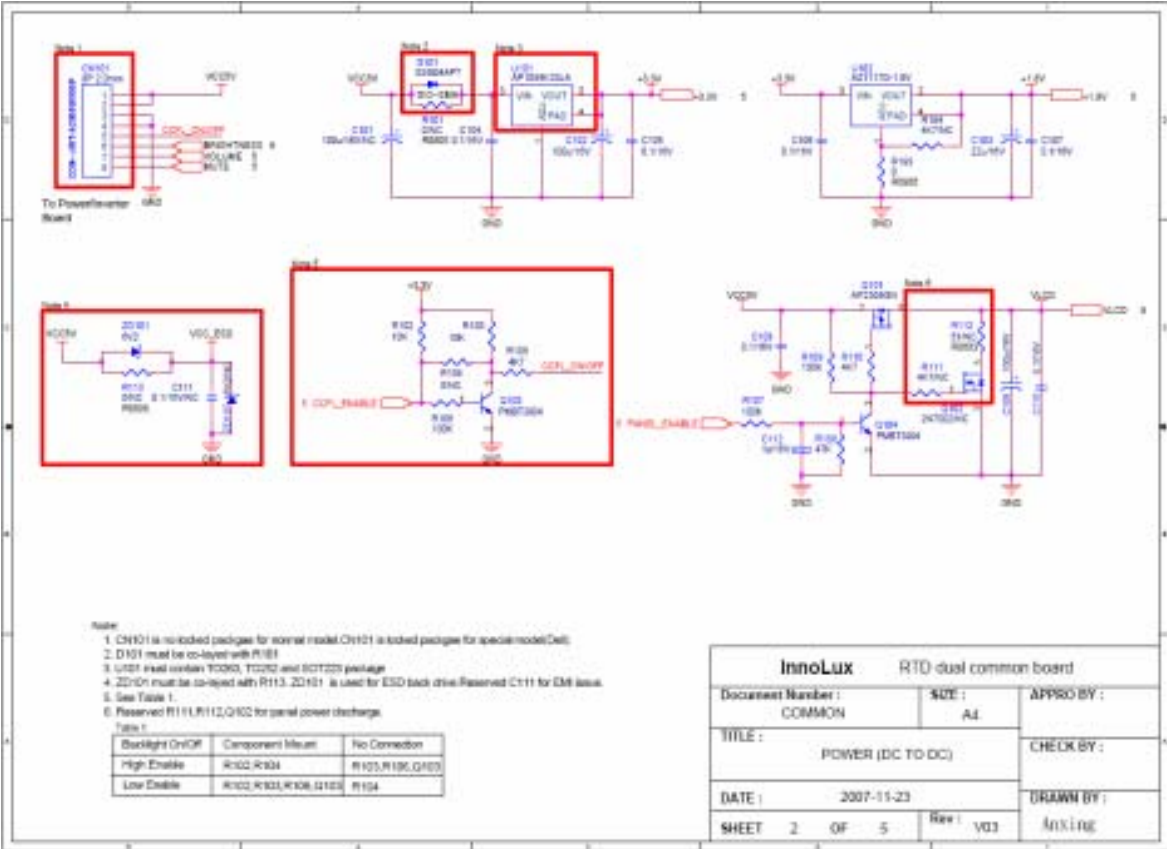
5.4 Block Diagram

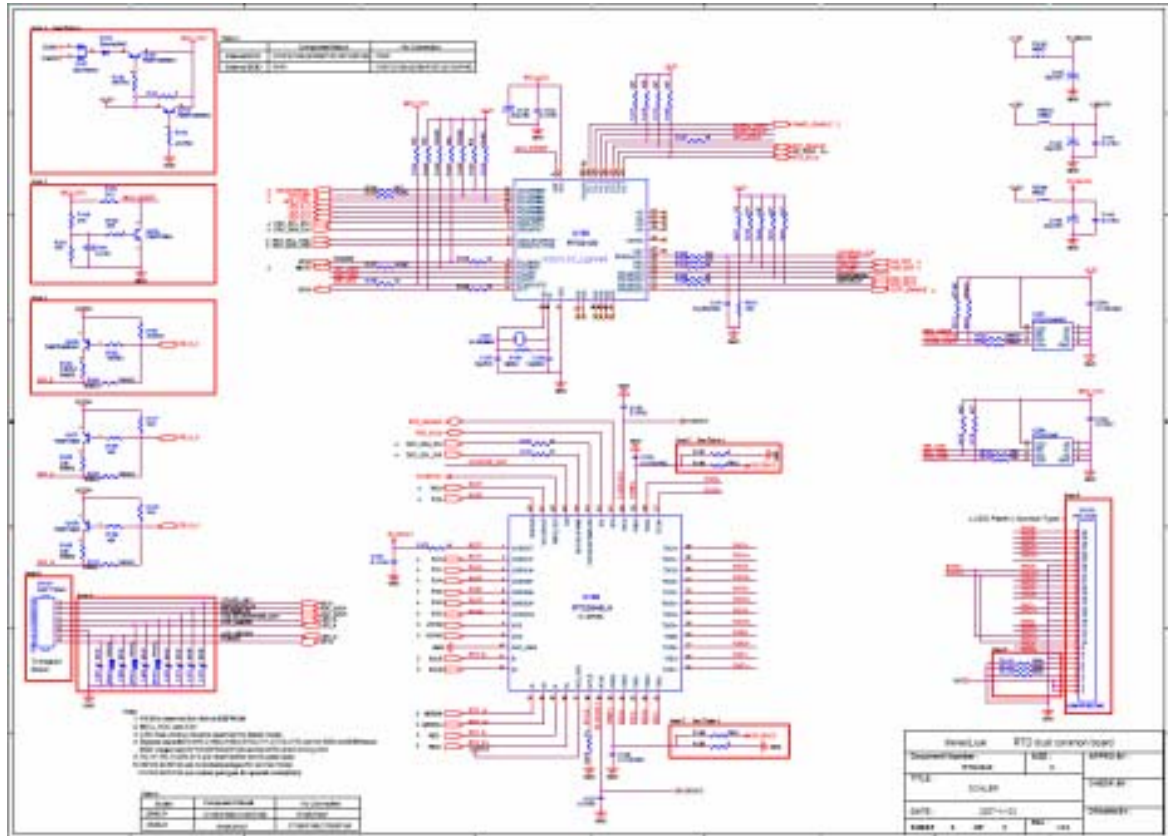
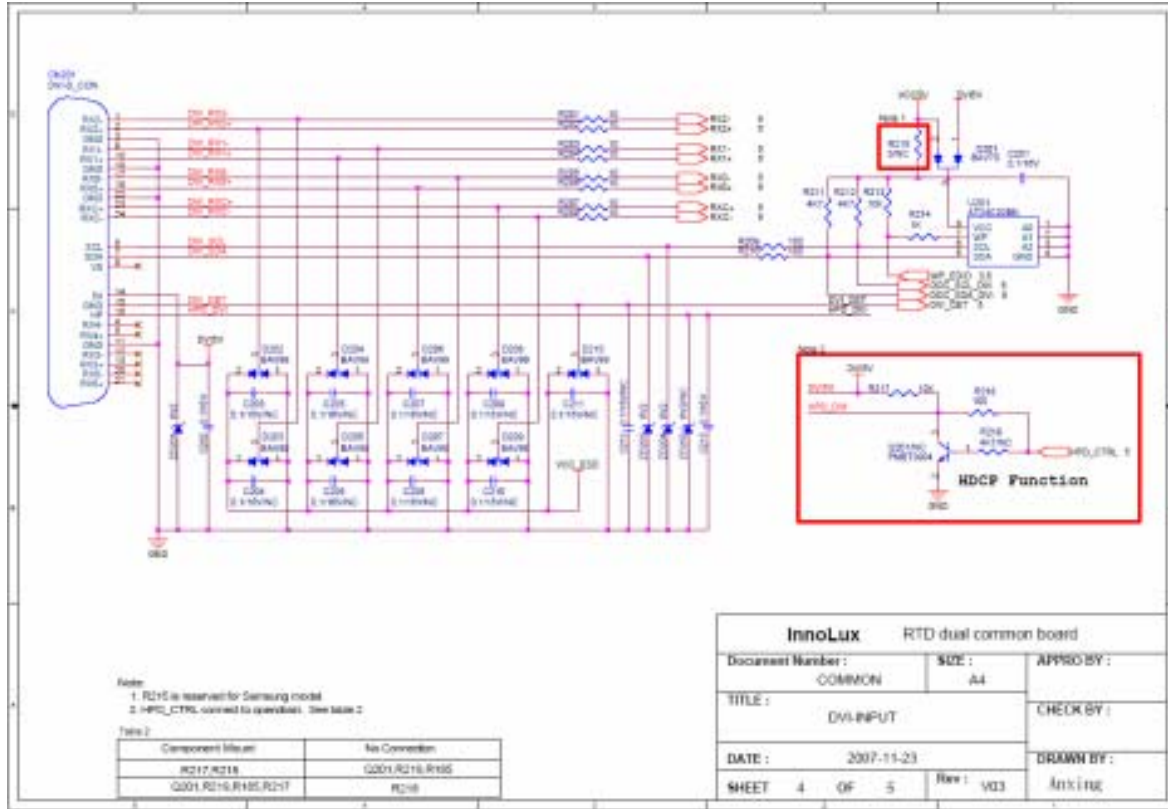
Power Board



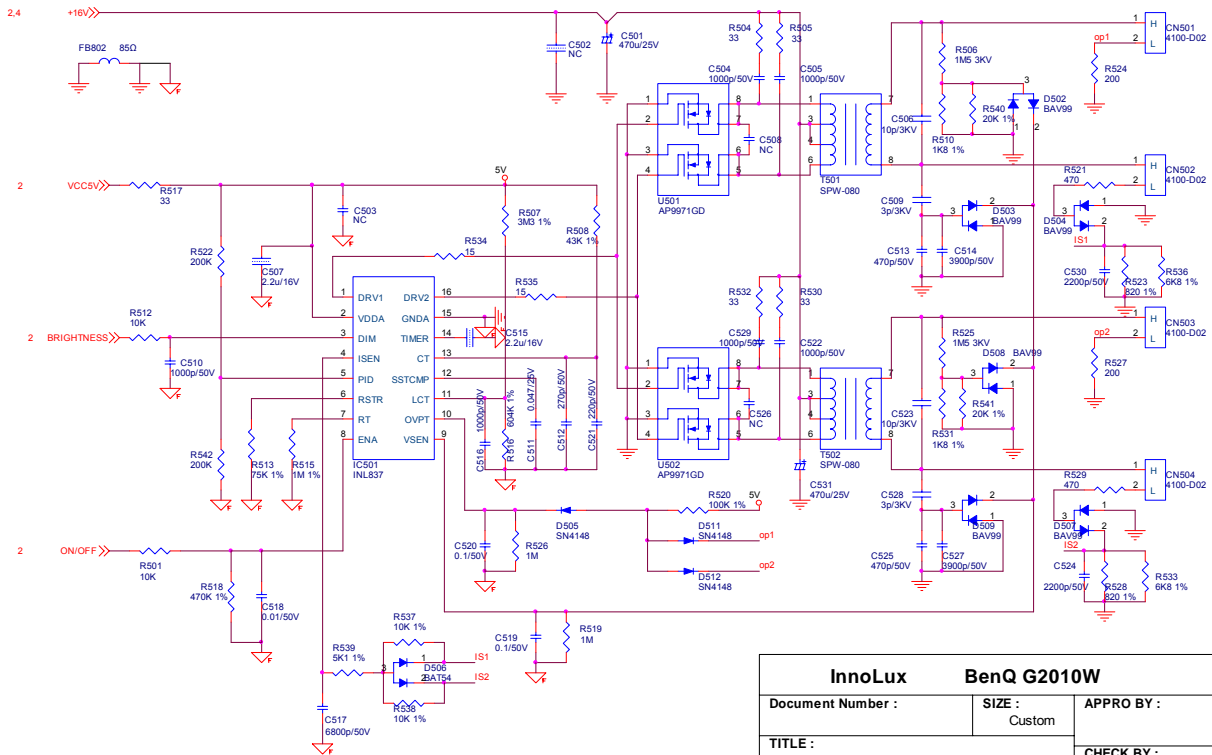
InnoLux BenQ G2010W		
Document Number :	SIZE : A4	APPRO BY :
TITLE :	POWER SUPPLY	CHECK BY :
DATE :	2008-01-08	DRAWN BY :
SHEET 2 OF 3	Rev : V01	

IF Board





Inverter board



InnoLux		BenQ G2010W	
Document Number :	SIZE :	Custom	APPRO BY :
TITLE :		Inverter	CHECK BY :
DATE :	2008-01-08	Rev :	V01
SHEET	3 OF 3		

5.5 Circuit Operation Theory

5.5.1. Electronic Circuit Theory

Low voltage to high voltage circuit

16VDC provides the power for IC501; the control signals Brightness and ON/OFF come from I/F board. ON/OFF signal connect to R501 to control pin1 of IC501 and makes IC501 enable. Brightness signal connect to pin3 of IC501 and regulates the panel brightness, delaying time circuit is setting by the IC501 internal, C510 is used to dump noise. The operation frequency is determined by the external Resistor R508 and Capacitor C512, C521 connected to pin13 of IC501. BURST MODE regulated dimming frequency is determined by the external resistor R516 and capacitor C516 connected to pin11 of IC501. C511 is used for soft start and compensation, C518, C519 are used for dump noise.

The output drives, include DRV1, DRV2 (pins1,16 respectively) output square pulses to drive MOSFET U501, U502, and each of U501, U502, is consist of dual N channel MOSFET. U501, OR U502 work as Push-Pull- topology, it is high efficient, PWM switching.

During start up, R519 senses the voltage at the transformer secondary. When OVP reaches Vense 3v Level, the output voltage is regulated. If no current is sensed approximately 2seconds IC501 shut off.

The current flowing through CCFL is sensed and regulated through sense resistor R528, R523. The feedback voltage connected to Pin4 (ISEN), then compared with a reference voltage (3.3V) via a current amplifier, resulting in PWM drive outputs to PUSH-PULL switches.

5.5.2 Power board diagram:

AC Current Input Circuit

P801 is a connector for connecting AC Power. F801 is a fuse to protect all the circuit. AC input voltage is from 90V to 264V. R801 and R802 joined between two inputting main circuit to prevent man from shock. L801 is used to clear up low frequency wave. C801 and C802 are used to discharge the waves that L801 produced. High frequency waves are damped by C801 and C802. D801 is a rectifier which composed of 4 build-in diodes, it inverts AC to DC.

High Voltage to Low Voltage Control Circuit

C804 is used to smooth the waveform from rectifier. IC802 is a highly integrated PWM controller, which control the power MOSFET Q804. When rectified DC high voltage is applied to the DRAIN pin during start-up, the MOSFET is off initially, when the voltage VCC reaches the threshold level 11V, IC 802 start up and create a PWM signal to control the power MOSFET, then energy is transferred to secondary terminal through the transformer T801, the auxiliary voltage 15V and the output voltage 5V/16V be created, the auxiliary voltage supply a continue current to IC802, the level of output voltage is feedback to FB pin of IC802 through IC801 and IC801 witch control the duty of the PWM signal, then all the convert circuit go to a stable operating station. R809, R810, R811, R812 is the brownout circuit to pin1 of IC802.

Only the input AC voltage over the threshold level approximately 70V AC, the switch can supply a continue current to IC802; R815, R816 Is a over line current protection circuit witch limited the input power under approximately 55W. the current will create a high voltage for CS of IC802 and made IC802 off the PWM waveform; the high voltage spike created by transformer's primary winding during the transistor turn off will be consumed through D802 R804 R834 R835 and C806, This will prevent MOSFET Q804 being damaged under large current impulse and voltage spike.

5.5.3 I/F Circuit

5.5.3.1 RGB CAPTURE

- Signal RED, GREEN, BLUE input through CN102 #1, #2, #3, Stop DC via R114 & C113, R115 & C114 and R116 & C115 and then enter into U105 (scaler) analog input terminal #12, #14, #16, and then scaler deals with signal internally.
- Signal DDC_SCL (series clock) inputs via CN102 #15, and then passes through R131, goes into U108 #5.
- Signal DDC_SDA (series data) inputs via CN102 #12, and then passes through R132, goes into U108 #8.
- Signal TTL vertical sync. (Vsync) inputs via CN102 #14, and then clamped by ZD105 Zener, passes through R134, and then goes into IC U105 (scaler) #8.
- Signal TTL horizontal sync. (Hsync) inputs via CN102 #13, and then clamped by ZD104 Zener, passes through FB101, R133, and then goes into IC U105 (scaler) #9.
- CN102 #5 is defined as cable detect pin, this detector realize passes through R125 Pull high, go into U108 #24.
- U103 power is supplied by PC via CN102 #9, or supplied by Monitor self via D106.
- U103 is an EEPROM IC which is memory and EDID data saved in it.

5.5.3.2 Buttons Control

- Button “Power” in middle of bezel connects to U108 #9 through R156, via CN104#8.
- Button “UP” “DOWN” “MENU” “ENTER” in the bottom of bezel connects to U108 #21,#22,#14 through R189,R188,R159 via CN104 #1, #2,#3
- U106 is an EEPROM IC which memory OSD setting and save the value adjusted by user.
- LED Indicator on Front Bezel
 - a. When press button “power”, U108 #48 sends out a low potential, via R165, flow to CN104 #7 on keypad, LED Green ON.
 - b. When in “Suspend” mode, U108 #1 sends out a low potential, via R168, flows to CN104 #5 on keypad, LED Amber ON.

5.5.3.3 REALTEK CHIP U105 (scaler), U108(MCU)

- U105 (RTD2545LH) #21~#28 output 8 bit even LVDS digital data to panel control circuit through CN103.
- U106 (RTD2545LH) #29~#38 output 8 bit odd LVDS digital data to panel control circuit through CN103.
- U108 (RTD2120_LQFP48) #44 outputs Brightness “PWM” signals to control CCFL brightness.
- U108 (RTD2120_LQFP48) #39 output PANELPOWER ON/OFF to make Q104 conducted, and then make Q101 conducted, +5V flow to CN103#1~#3 as Panel VDD .
- U108 (RTD2120_LQFP48) #20 output CCFL_ON/OFF “H” and “L” potential to control Inverter on/off.
Please refer to RTD2120_LQFP48 Pin Assignments table in page

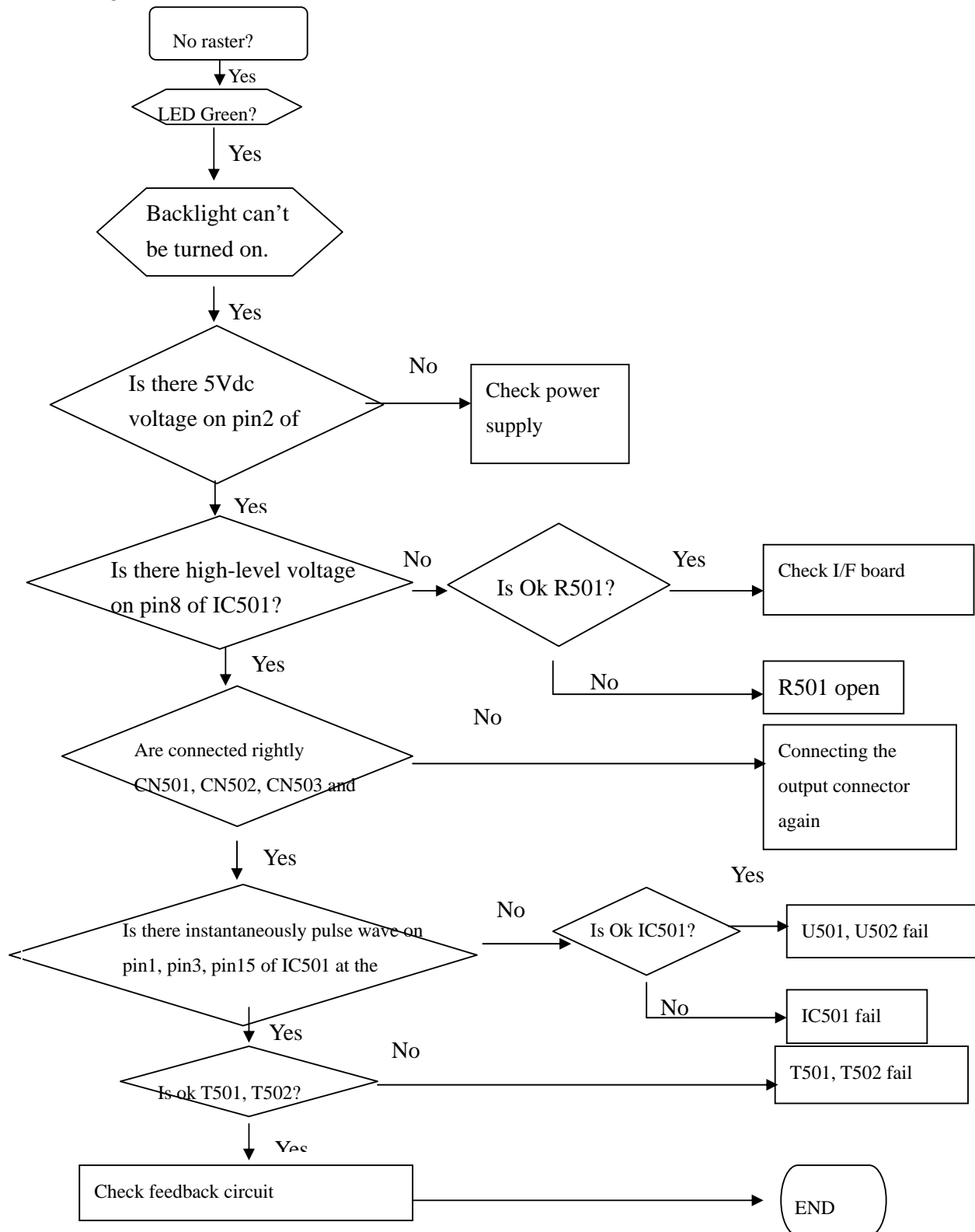
5.5.3.4 Regulator Circuit

- +5V is from switching mode power supply for Panel used.
- +3.3V generates from +5V through C101 filtering and U101 which is output +3.3V LDO for U102, U108 and U202 used.
- +1.8V generates from +3.3V through C138 filtering and U102 which is output +1.8V LDO.

5.6 Trouble Shooting Guide

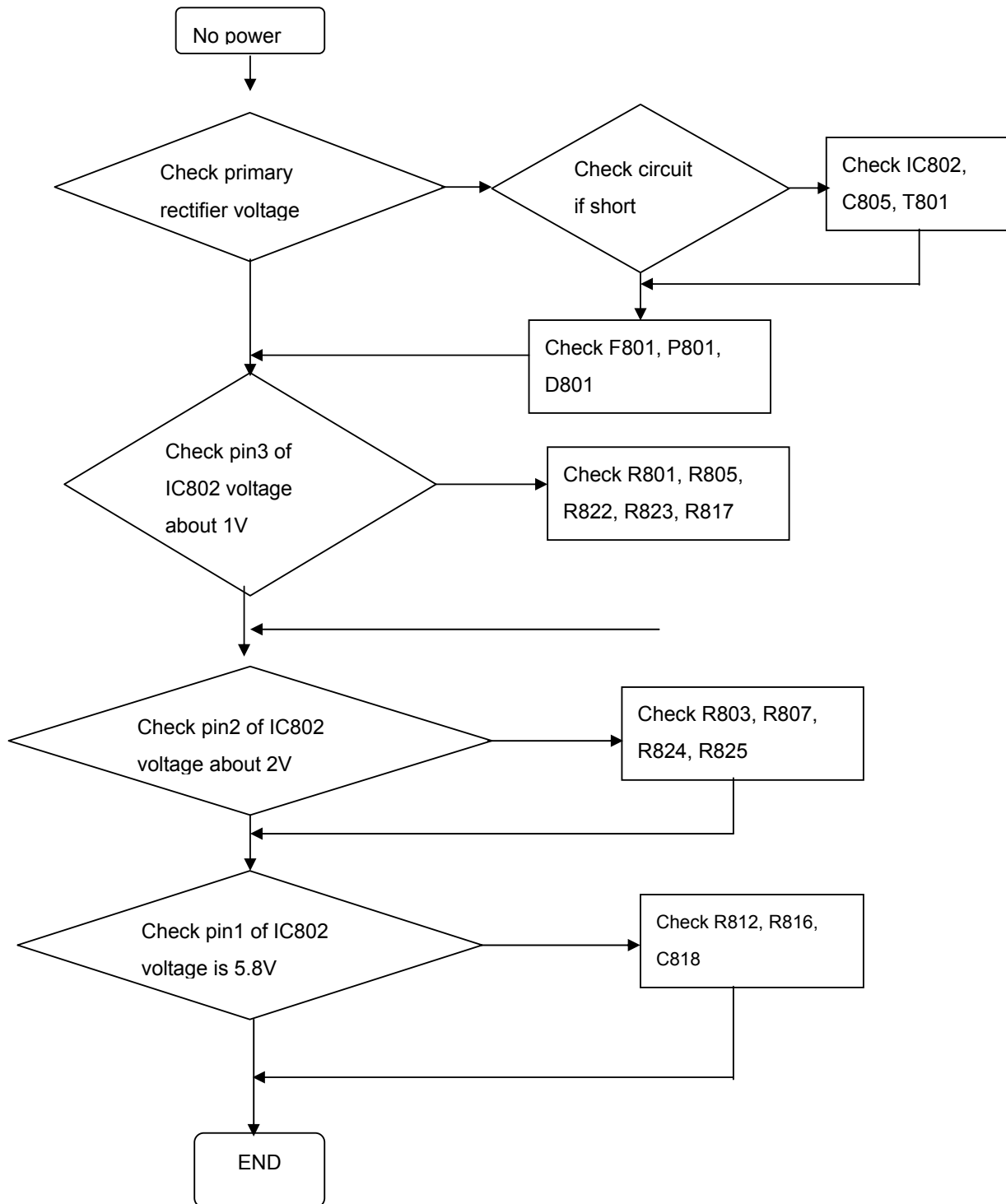
Inverter trouble shooting

Backlight can't be turned on



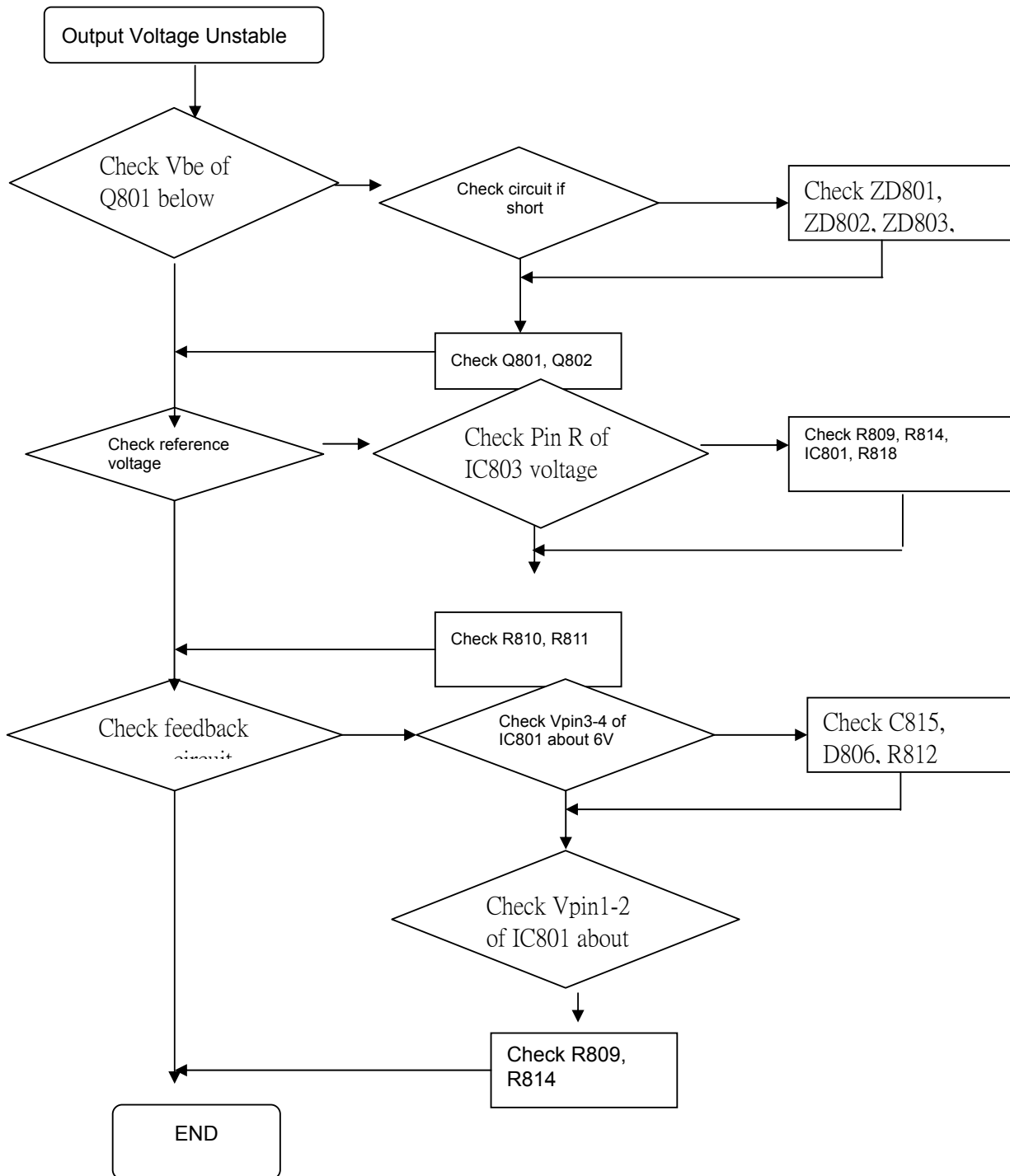
Power trouble shooting_1

No Power & Power LED Off



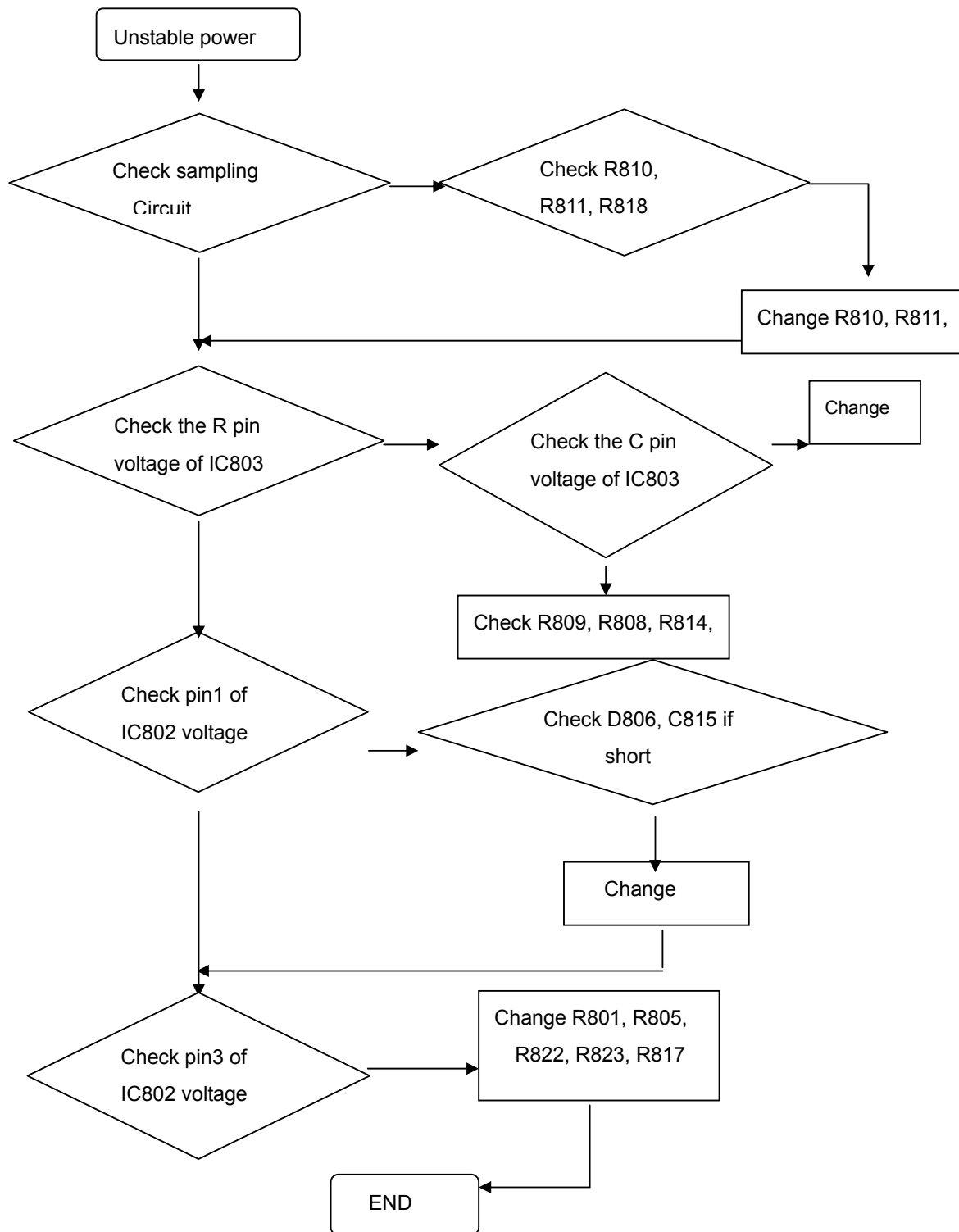
Power trouble shooting_2

DC output voltage is unstable

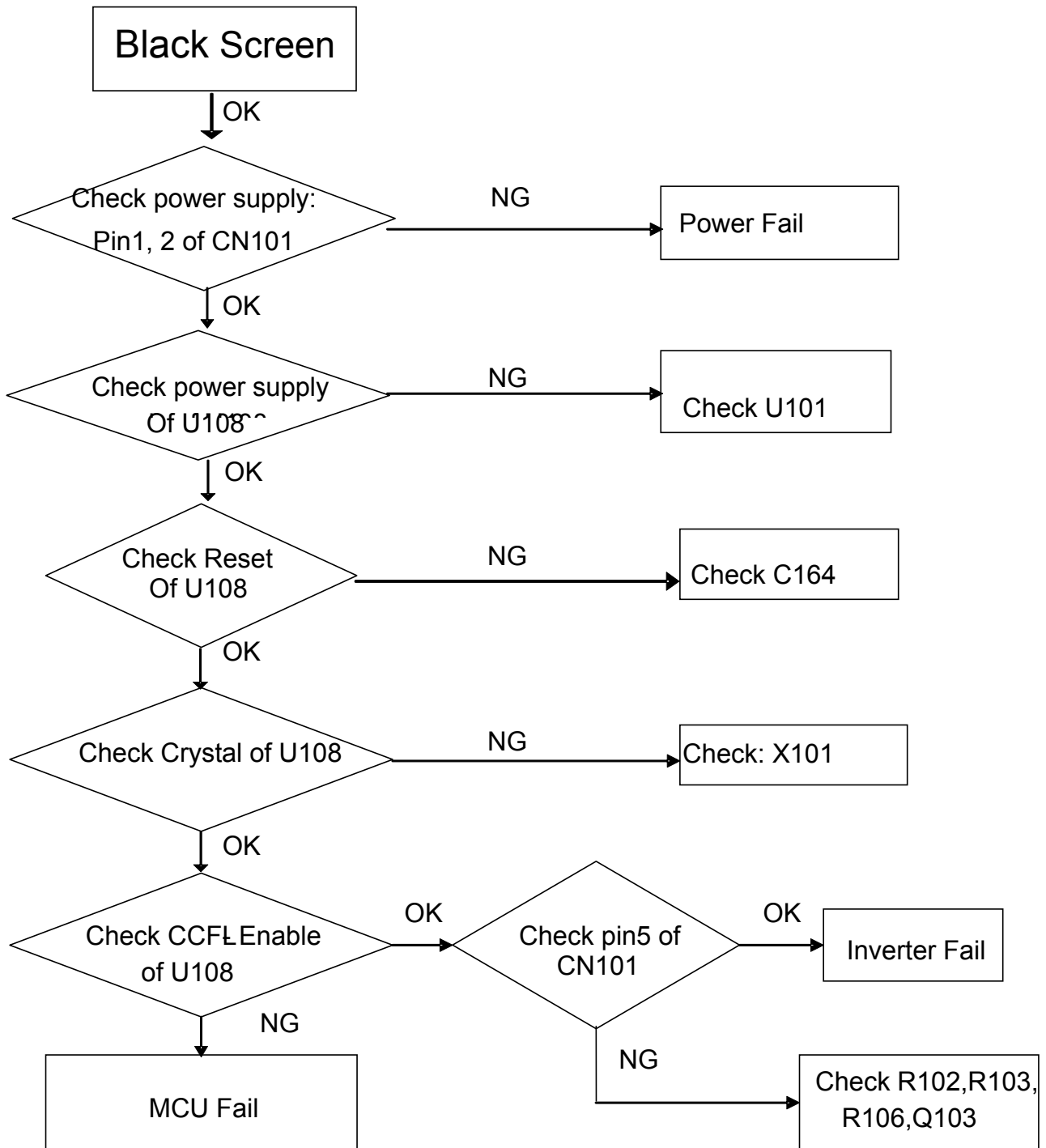


Power trouble shooting_3

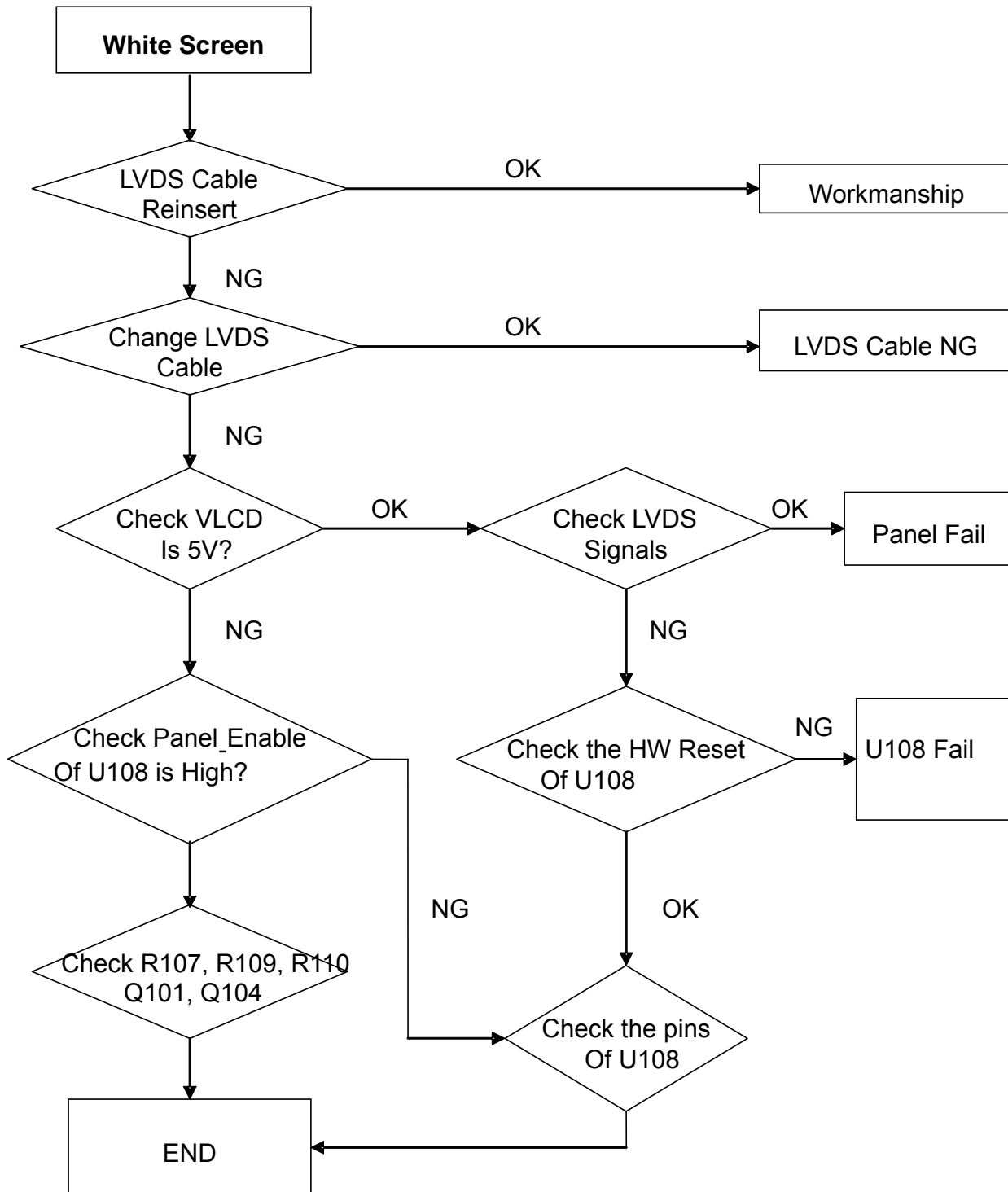
Output power is unstable



Black Screen



White Screen



Bad Screen

