

Product Service Manual – Level 2

**Service Manual for BenQ:
E900WA
P/N: 9H.0BGLN.I8X**

Applicable for All Regions



Version: 001

Date:07/07/28

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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1. Precautions & Safety Notices

1.1 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.

1.2 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.

1.3 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.

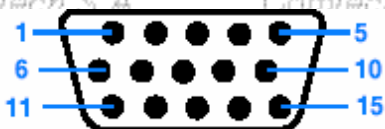
2. Product Overview

2.1 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.) 0.6A (max.)	√		
Power consumption	normal "on" operation	≤38W	√		LED: Green
DMPS		<2W	√		LED: Orange
In rush Current	100Vac,cold	40A (max)	√		

	star,25°C; 240Vac,cold star,25°C	60A(max)			
Earth Leakage Current					
Hi-pot					
Power Line Transient					
CCFL Operation range					
Power cord			√		To be determined by the business country.

2.2 Signal interface



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

2.3 Video Performance

Item	condition	Spec	OK	NA	Remark
Max. support Pixel rate		106.500	√		
Max. Resolution		1440x900	√		
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
Overshot/undershoot		<12% of step function voltage level over the full voltage range	√		Refer to VESA VSIS Standard V1R2

2.4 Scan range

Item	condition	Spec	OK	NA	Remark
Horizontal	Sync polarity: (+) or (-)	31.0~83KHz	√		
Vertical	Sync polarity: (+) or (-)	56~76Hz	√		

2.5 Plug & Play DDC2B DDC-CI Support

Item	condition	Spec	OK	NA	Remark
DDC channel type		DDC2B	√		
EDID		Version 1.3	√		

2.6 Support Timings

Preset	Pixel Format	Horz Freq(kHz)	Horz Polarity	Vert Freq (Hz)	Vert Polarity	Pixel Clk (MHz)
1	640x350	31.47	-	70.09	-	25.18
2	640x400	31.47	-	70.09	-	25.18
3	640x480	35.00	-	66.67	-	30.24
4	640x480	31.47	-	59.94	+	25.17
5	640x480	37.86	+	72.81	+	31.50
6	640x480	37.50	+	75.00	+	31.50
7	720x400	31.47	+	70.08	+	28.32
8	832x624	49.71	±	74.53	±	57.27
9	800x600	35.16	-	56.25	-	36.00
10	800x600	37.88	-	60.32	-	40.00
11	800x600	48.08	-	72.19	+	50.00
12	800x600	46.88	-	75.00	-	49.50
13	848x480	31.02	+	60.00	+	33.75
14	848x480	29.83	-	59.66	+	31.50
15	848x480	35.00	-	70.00	+	37.52
16	848x480	36.07	±	72.00	±	39.25
17	848x480	37.68	±	74.77	±	41.00
18	720x576	35.83	+	60.00	-	32.71
19	1024x768	48.36	+	60.00	-	65.00
20	1024x768	56.48	±	70.07	±	75.00
21	1024x768	57.67	+	72.00	+	78.43
22	1024x768	60.24	+	74.93	+	80.00
23	1024x768	60.02	+	75.03	+	78.75
24	1152x720	44.86		60		66.75
25	1152x864	63.85		70.01		94..50
26	1152x864	67.50		75.00		108.00
27	1152x870	68.68		75.06		100.00
28	1152x900	61.80		65.95		92.94
29	1152x900	71.73		76.07		105.59
30	1280x720	45.00		59.94		74.25
31	1280x720	44.77		59.86		74.50
32	1280x720	56.46		74.78		95.75
33	1280x768-R	47.40		60.00		68.25
34	1280x768	47.78		59.87		79.50

Preset	Pixel Format	Horz Freq(kHz)	Horz Polarity	Vert Freq (Hz)	Vert Polarity	Pixel Clk (MHz)
35	1280x768	60.29		74.89		102.25
36	1280x800	61.648		59.81		83.50
37	1280x800	62.8		75		106.5
38	1280x960	60.00		60.00		108.00
39	1280x1024	63.98		60.02		108.00
40	1280x1024	74.88		69.85		126.99
41	1280x1024	74.40		70.00		124.90
42	1280x1024	77.90		72.00		134.60
43	1280x1024	79.98		75.02		135.00
44	1280x1024	81.18		76.16		135.09
45	1360x768	47.71		60.01		85.50
46	1440x900-R	55.496		59.901		88.75
47	1440x900	55.935		59.887		106.5
48	1440x900	70.6		75		136.75

2.7 Operational &Function Specification

2.7.1 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 1440x900).	Max. resolution 1440x900	√		
Contrast ratio		700:1	√		
Brightness		300 cd/m2 (Typ.)	√		
Response time		5ms(typ.)	√		
Viewing angle	Horizontal: 80/80		√		
	Vertical :70/70		√		
CIE coordinate of white		x--0.313 ± 0.015; y--0.329 ± 0.015	√		
Display colors		16.7M (6bit+Hi-FRC)	√		

2.7.2 Brightness Adjustable Range

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

2.7.3 Acoustical Noise

Item	condition	Spec	OK	NA	Remark
Acoustical Noise	At 1 meter distance& audio function disable	$\leq 40 \text{ dB/A}$	√		

2.7.4 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 80%	√		
	Non-operating	10% to 80%	√		
Altitude	Operating	0 to 3048 M (10000 ft)	√		
	Non-operating	0 to 12192M (40000 ft)	√		

2.7.5 Transportation

Item	condition	Spec	OK	NA	Remark
Vibration	Package, Non-operating	1. Sweep frequency :5~200Hz 2. Acceleration: 1.0 Grms 3. Duration: 30 minute each axis 4. Direction :3 mutually perpendicular axes (x,y,z) 5.Fix Direction:Only fix TOP&BOTTOM	√		
Unpackage vibration	Unpackage , Non-operating			√	
Drop	Package, Non-operating	1. Test Height: 76 cm. 2. Test Frequence: 1C-3E-6F	√		
shock	Wooden package , Non-operating			√	

2.7.6 Electrostatic discharge Requirements

Item	condition	Spec	OK	NA	Remark
Electrostatic discharge	IEC61000-4-2(EN 55024)	Contact discharge : 4KV	√		

2.7.7 Reliability

Items	Condition	Spec	Note
MTBF		≥ 50,000 Hours	Excluding the LCD, CCFL
CCFL Life time	Luminance becomes 50%	≥ 40,000 Hours(min)	

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

2.7.8 Audio performance

Items	Specification
Speaker	1.0W 16Ω X 2
Input impedance	≥ 10K ohm
Frequency response range	200Hz – 10kHz
Signal to noise ratio	≥ 40 dB
Output power	1.0 W + 1.0 W (10%THD) (TYP)

2.8. LCD Characteristics

2.8.1 The physical definition & technology summary of LCD panel

Item	condition	Spec	OK	NA	Remark
LCD panel supplier		InnoLux & CMO	√		
Panel type of supplier		MT190AW01-V.2 & M190A1-L02	√		
Screen diagonal		19 inch diagonal	√		
Display area		408.2x255.1mm	√		
Pixel pitch		0.285(H)*0.285(V)	√		
Pixel arrangement		RGB vertical stripe	√		
Display mode		Normally White	√		
Support color		16.7M (6bit+Hi-FRC)	√		

2.9 User Controls

User's hardware control definition:

Item	condition	Spec	OK	NA	Remark
Monitor power button			√		
Enter button			√		
Right/Inc.button			√		
Left/Dec. button			√		
I-key button			√		
Mode selection button			√		
Input Select key			√		
Mute button				√	
Input source select button			√		

2.10 Mechanical characteristics

2.10.1 Dimension

Item	condition	Spec	OK	NA	Remark
Bezel opening	L* W	412*258 mm	√		
Monitor without stand	L*W*H mm	449.3*388.4*106 mm	√		
Monitor with stand	L*W*H mm	449.3*391.6*179.3 mm	√		
Carton Box(outside)	L*W*H mm	515*455*140 mm	√		
Tilt and Swivel range		Tilt:-5~23degree Swivel: 0 degree	√		

2.10.2 Weight

Item	condition	Spec	OK	NA	Remark
Monitor (Net)		4.4±0.3 Kg (Net)	√		Monitor (Net)
Monitor with packing(Gross)		5.6±0.3Kg(Gross / with packing)	√		Monitor with packing(Gross)

2.10.3 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& polishing6000 Special Texture	√		
Color		BCS-7015A(BLACK)/B CS-T8110C(SILVER)	√		

2.10.4 Carton

Carton:Item	condition	Spec	OK	NA	Remark
Color		Kraft	√		
Material		C Flute	√		
Compression strength		440 KGF	√		
Burst strngth		18KGF/cm2	√		
Stacked quantity		6 Layers	√		

2.11 Pallet &Shipment

2.11.1 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'	792	Pallet A:72 Pallet B:36	Pallet A:10 Pallet B:2
	40'	1656	Pallet A:72 Pallet B:36	Pallet A:22 Pallet B:2
Without Pallet	20'	N/A	N/A	N/A
	40'	N/A	N/A	N/A

2.11.2 Carton Specification

Product:

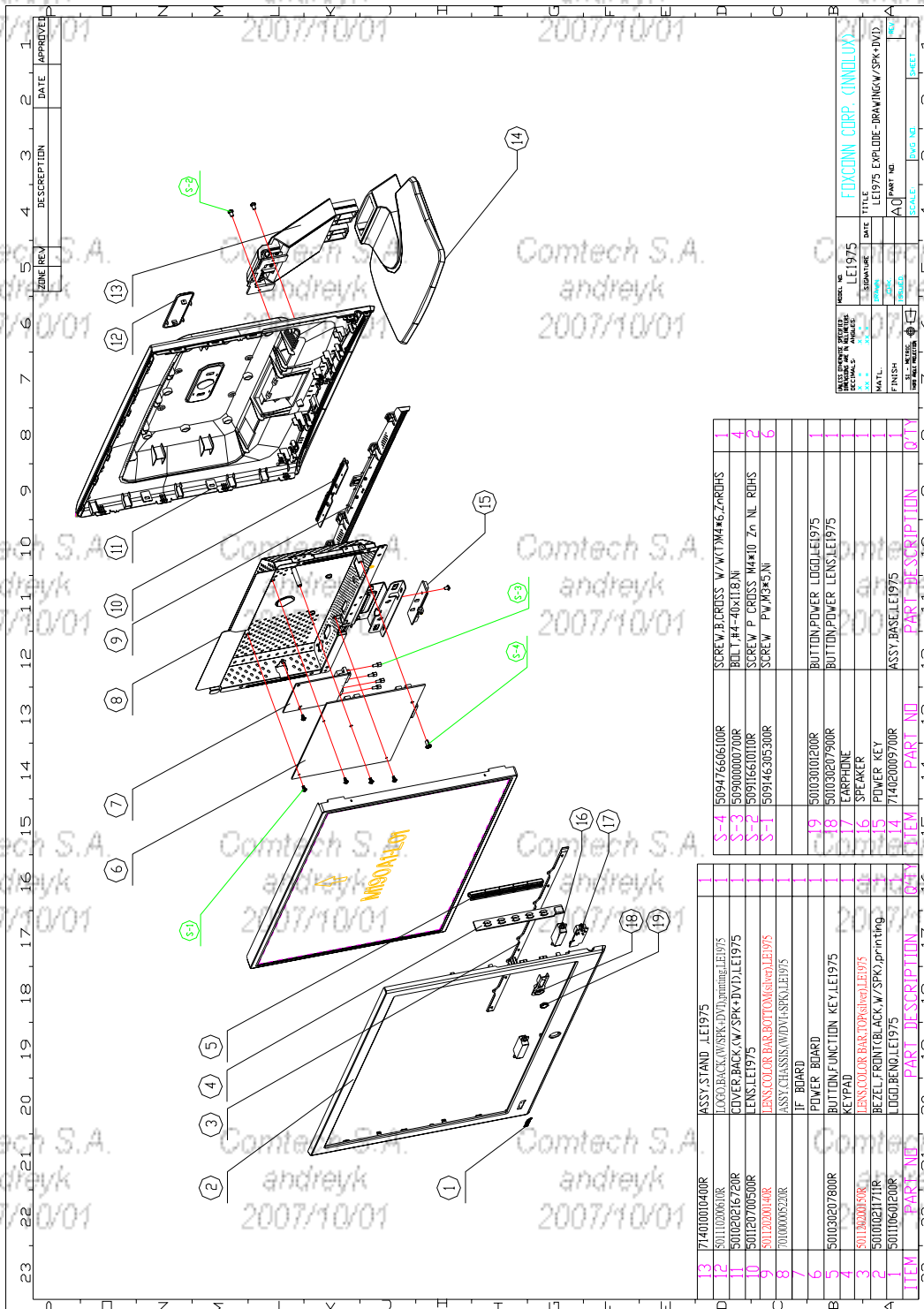
Net Weight (Kg)	Gross Weight(Kg)	Dimension w/o Base LxWxH (mm)	Dimension w/ Base LxWxH (mm)
4.4±0.3 Kg	5.6±0.3Kg	449.3*388.4*106 mm	449.3*391.6*179.3 mm

Package:

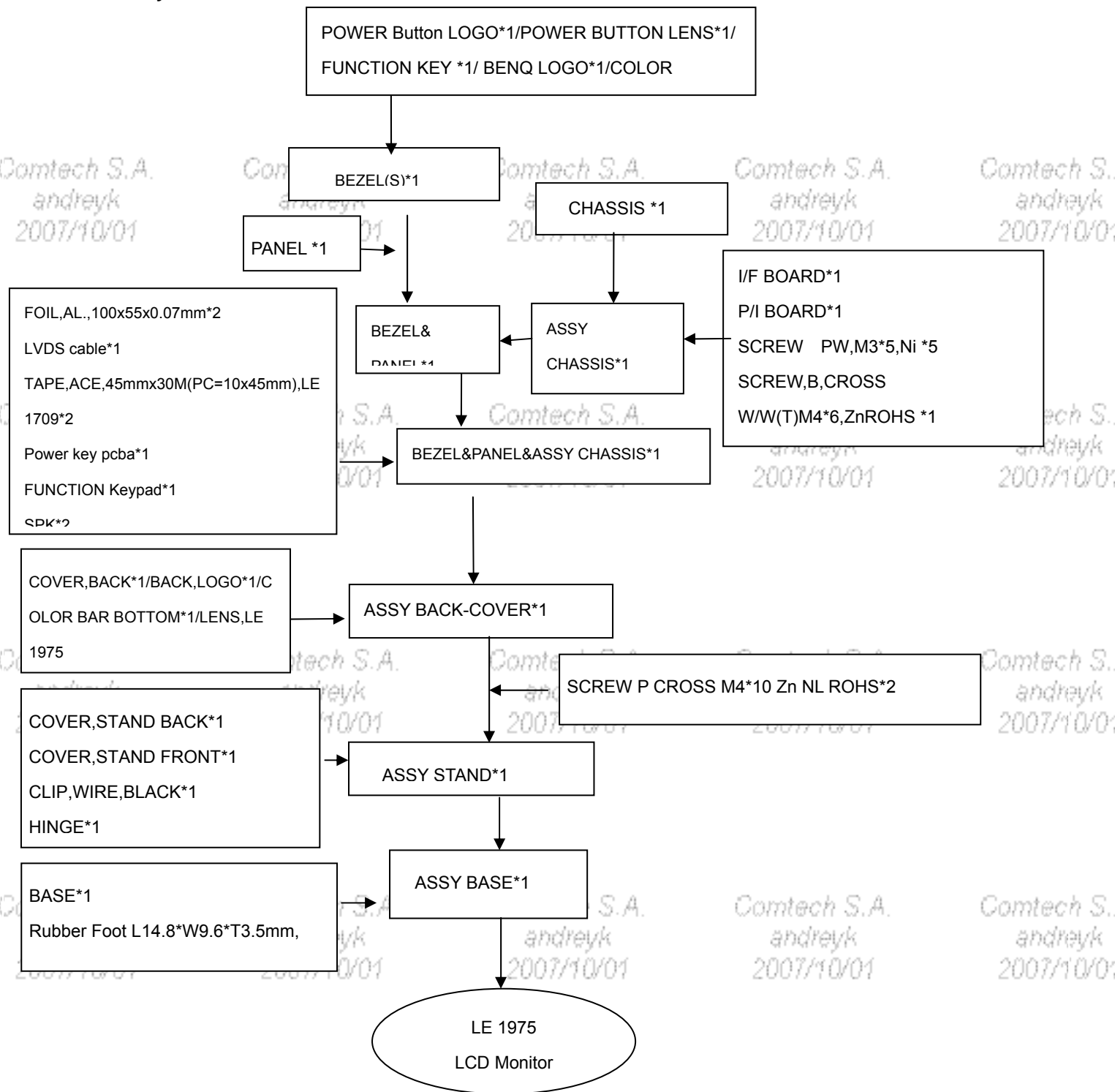
Carton Interior Dimension (mm)	Carton External Dimension (mm)
LxWxH	LxWxH
507*435*132 mm	515*455*140 mm

3. Disassembly & Assembly

3.1 Exploded Diagram




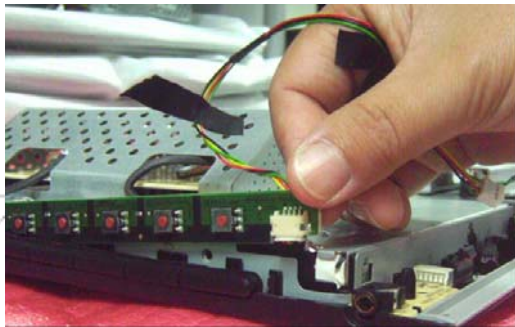
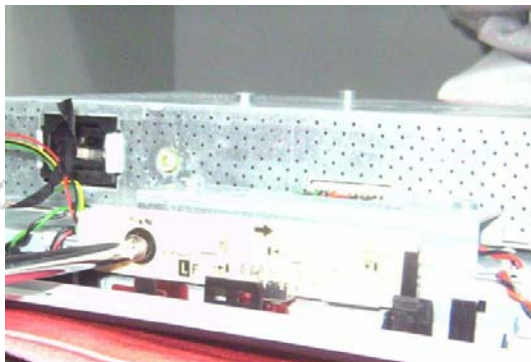


3.2 Assembly Block

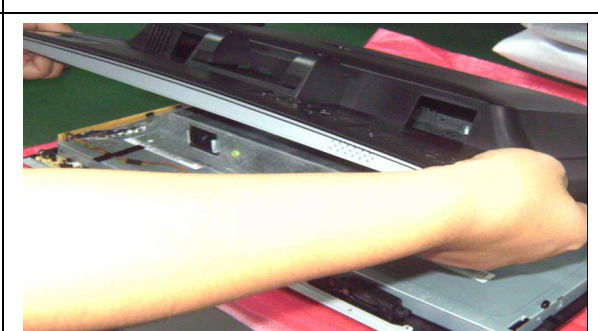
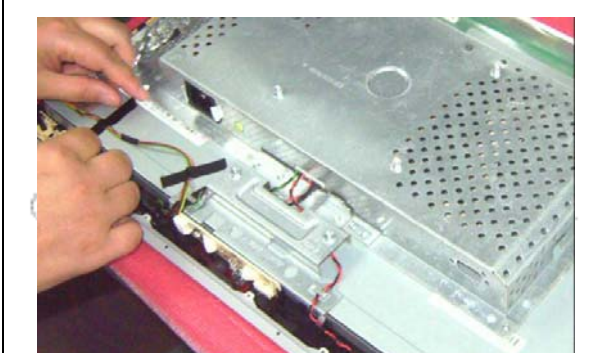
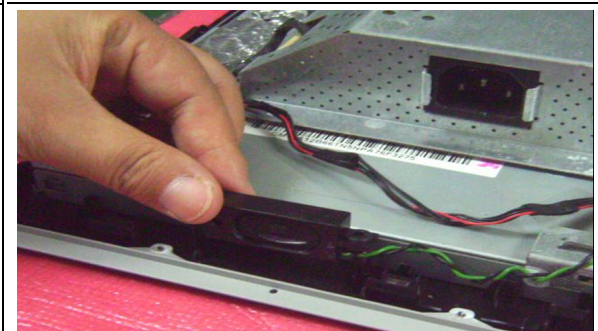


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1	Assemble the panel with front-bezel	
2	Assemble chassis & Plug in LVDS	
3	Insert lamp lines	
4	Keypad assembly	
5	Assemble LED board	

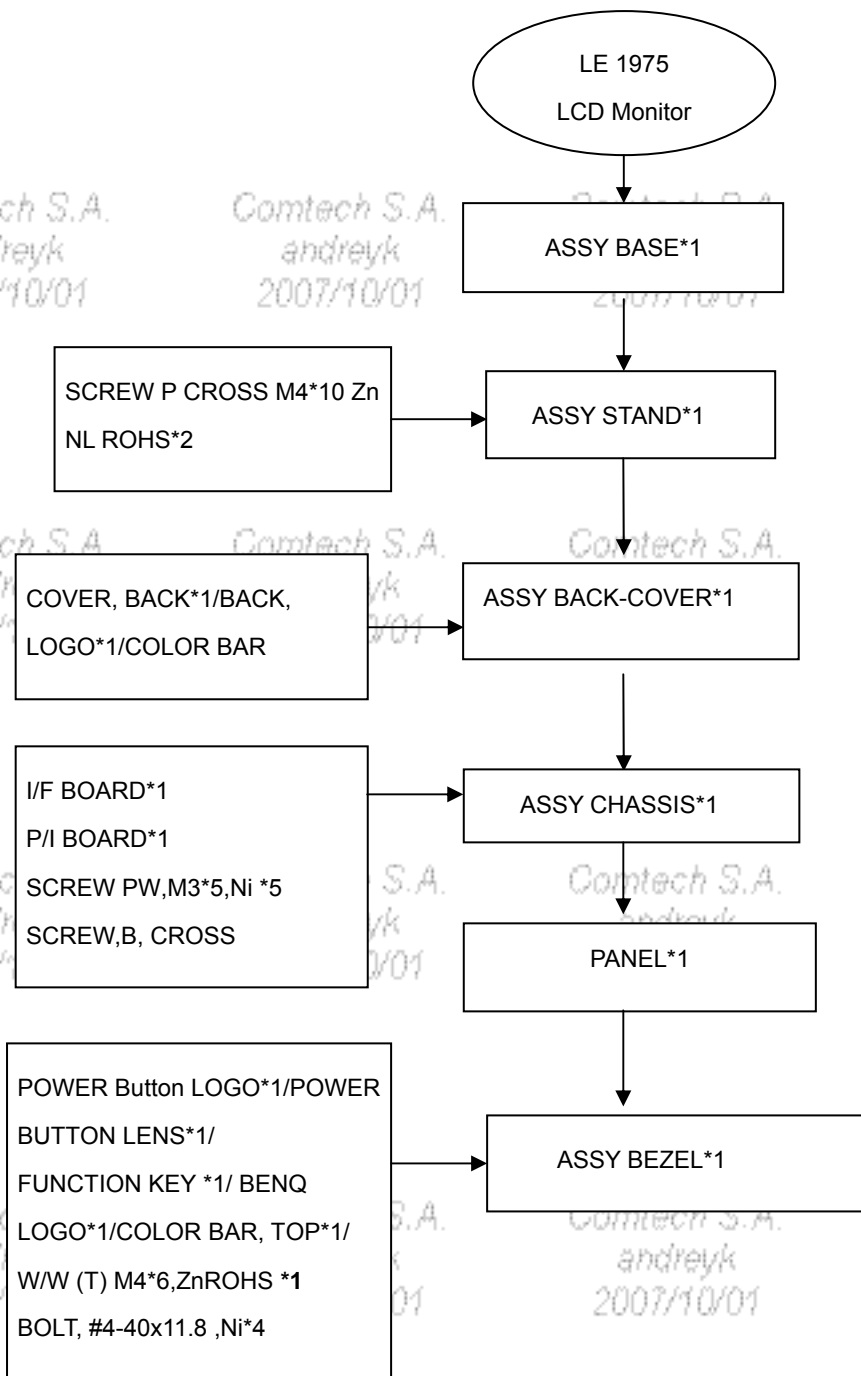
6	Earphone board assemble
7	Fasten speaker
8	Put cables in order and fix them
9	Back cover assemble
10	Lock screw to assemble stand



11 Assemble base





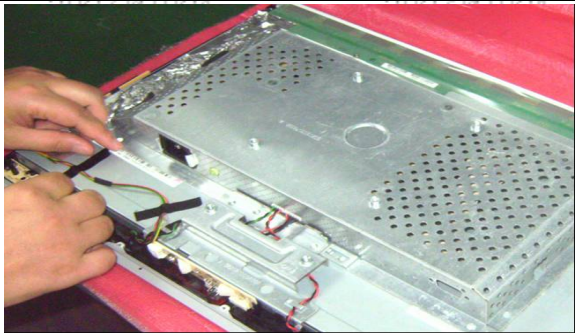


3.3 Disassembly Block



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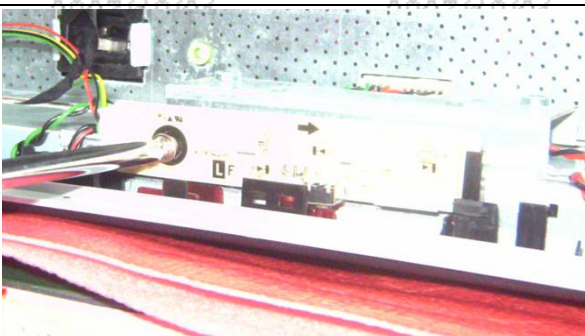
Service Manual

1	Disassemble the base (press two pins as photo showing)	
2	Take out screw	
3	Disassemble the stand	
4	Disassemble the back cover	
5	Tear open the tape	

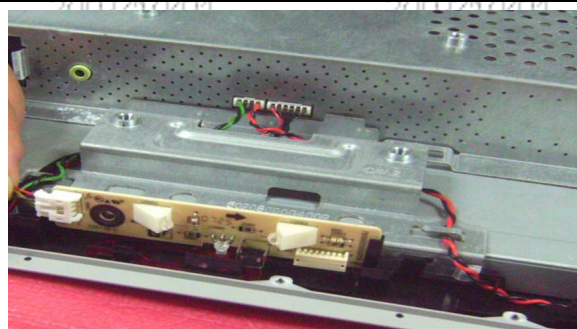
6 Disassemble keypad



7 Take out screw



8 Disassemble LED board



9 Disassemble earphone board



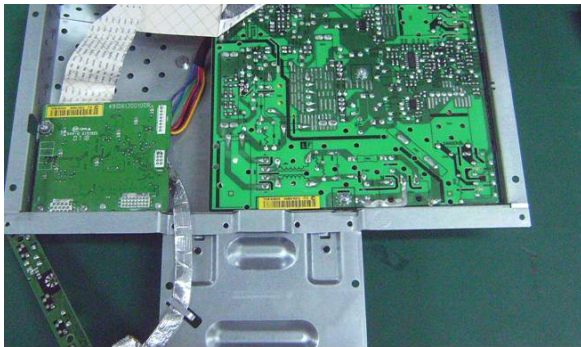



10 Move out speaker



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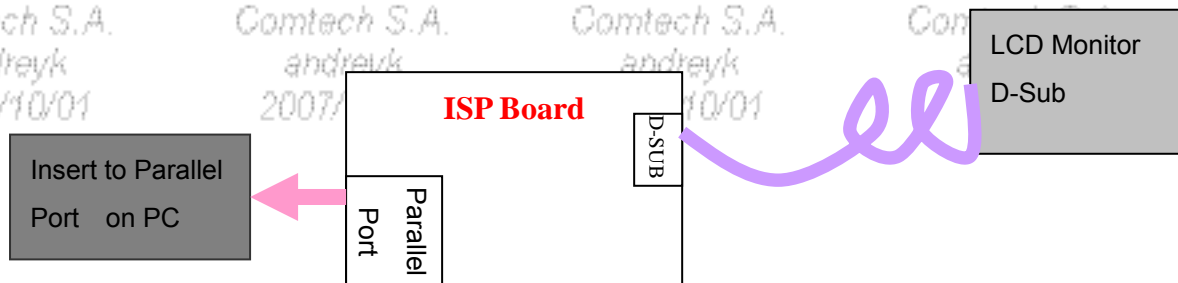
11	Move out lamp lines	
12	Move out LVDS	
13	Put chassis aside	
14	Disassemble front bezel	

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 1440*900@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=100;

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

“UP”

- Activate the Brightness/Contrast Control menu
- View the next function in the OSD Main menu
- Increase the value of the specific function which has been selected

• “MENU”

- Activate the Control Button Description menu
- Activate the OSD Main menu

- View the next function in the OSD Main menu
- “DOWN”
 - Activate the Theme Mode menu
 - View the previous function in the OSD Main menu
 - Decrease the value of the specific function which has been selected
- “AUTO”
 - Activate the Auto Adjustment function
 - Go back to the OSD Main menu from the sub-menus
 - Exit from the OSD Main menu
- “ENTER”
 - Perform function of menu icon that is highlight or enter next level menu
 - Enter the OSD item
 - Change the source input
- “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	100
			➤ Red (0~100) ➤ Green (0~100) ➤ Blue (0~100)	
		Reset Color	(YES/NO)	
	Dynamic Contrast	*Dynamic Contrast	(YES/NO)	
PICTURE ADVANCED	**Picture Mode	Standard		Stand ard

		Movie	Sharpness 不可调节	1.任一项模式下 Senseye Demo 设为 ON 另外两个模式下的 Senseye Demo 自动变为 ON 2. Senseye Demo 处于 ON 时,做 Auto 自动变为 OFF	
		Dynamics	Sharpness 不可调节		
		Photo	Sharpness 不可调节		
		sRGB	Sharpness 不可调节		
	Senseye Demo		(ON/OFF)		OFF
Audio	Volume	0~100			30
	Mute	(ON/OFF)			off
SYSTEM	Input	(D-sub/DVI)			
	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/Francais/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	(YES/NO)	No	
	DDC/CI	(ON/OFF)	-	Yes	
	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 “power/menu”, you can go into Factory mode.

EXIT: Escape from Factory menu.

PANEL: Display panel information.

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

GAIN: ADC gain value

OFFSET: ADC offset value

9300K: Set color temperature 9300K

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

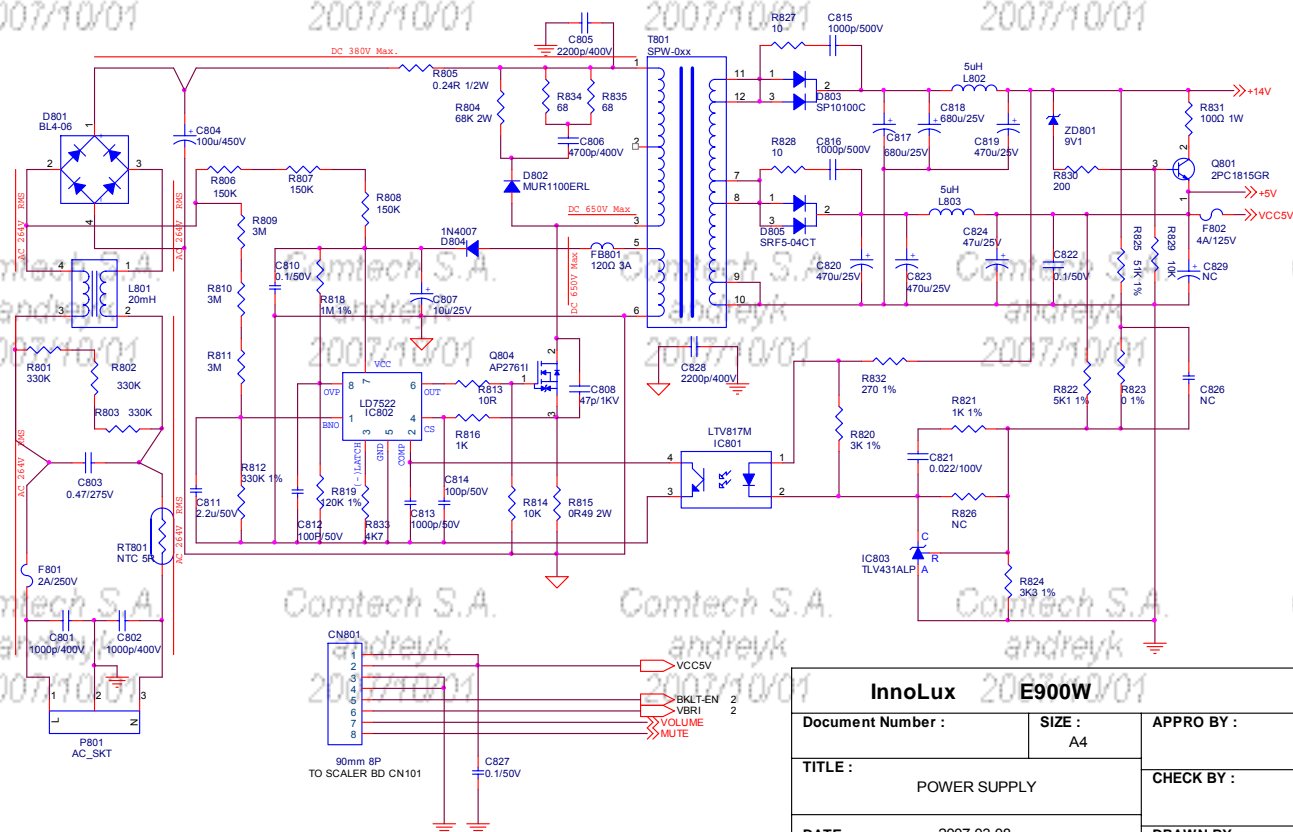
Item	Content	Equipment
Test OSD function	1.Signal is set as 1440×900@60Hz under General-1 2.Checking whether each single function key and compound function key can be worked.	Chroma Signal Generator
Contrast Check	1. Set input mode to 1440×900@60Hz 2. Set Pattern to 32 gray shades 3. Set contrast to the max. The brightest 5~8 shades brightness cannot be distinguished.	Contrast Check
Color Temperature	1. Do "Auto color Balance" at 1440×900@60Hz, 32gray shades 2. Measure color temperature, check it complies with the following temperature : $6500K \ x = 0.313 \ +/- \ 0.03, \ y = 0.329 \ +/- \ 0.03$	Color Temperature
Modes switching check	1. Use Chroma Pattern Generator to make sequence. VESA (640x480 800x600 1024x768 1280x1024), 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: 1440×900@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:1280×1024@60Hz 2. Pattern: full white 3. Brightness: Max. 4. Contrast: Default	at each modes	Power saving	at each modes
Power Key Off				

5. Level 2 Circuit Board and Standard Parts Replacement

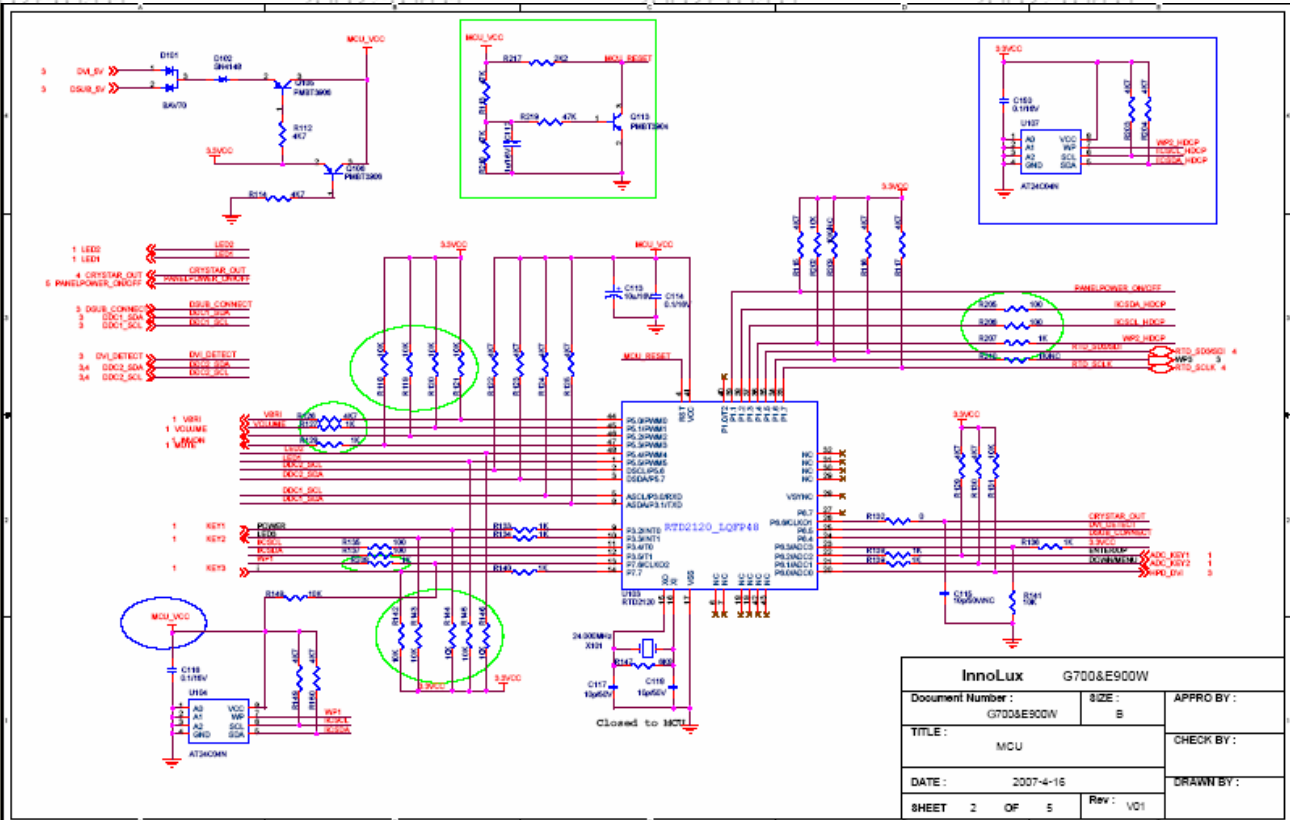
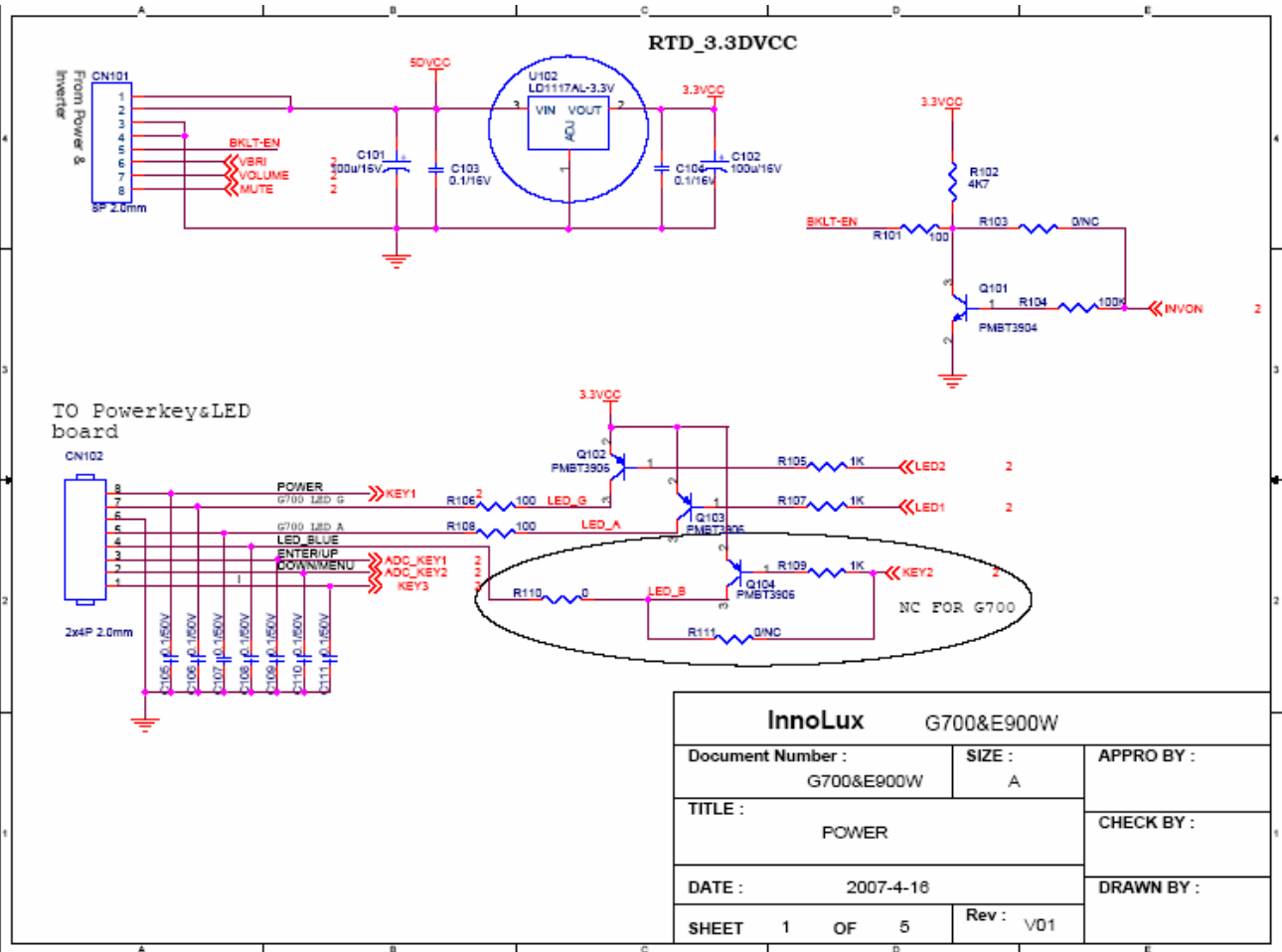
5.1. Block diagram

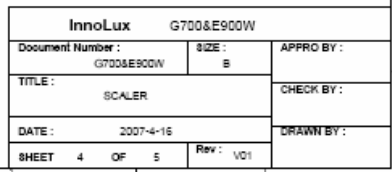
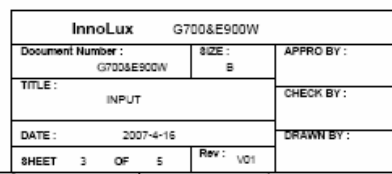
Power Board

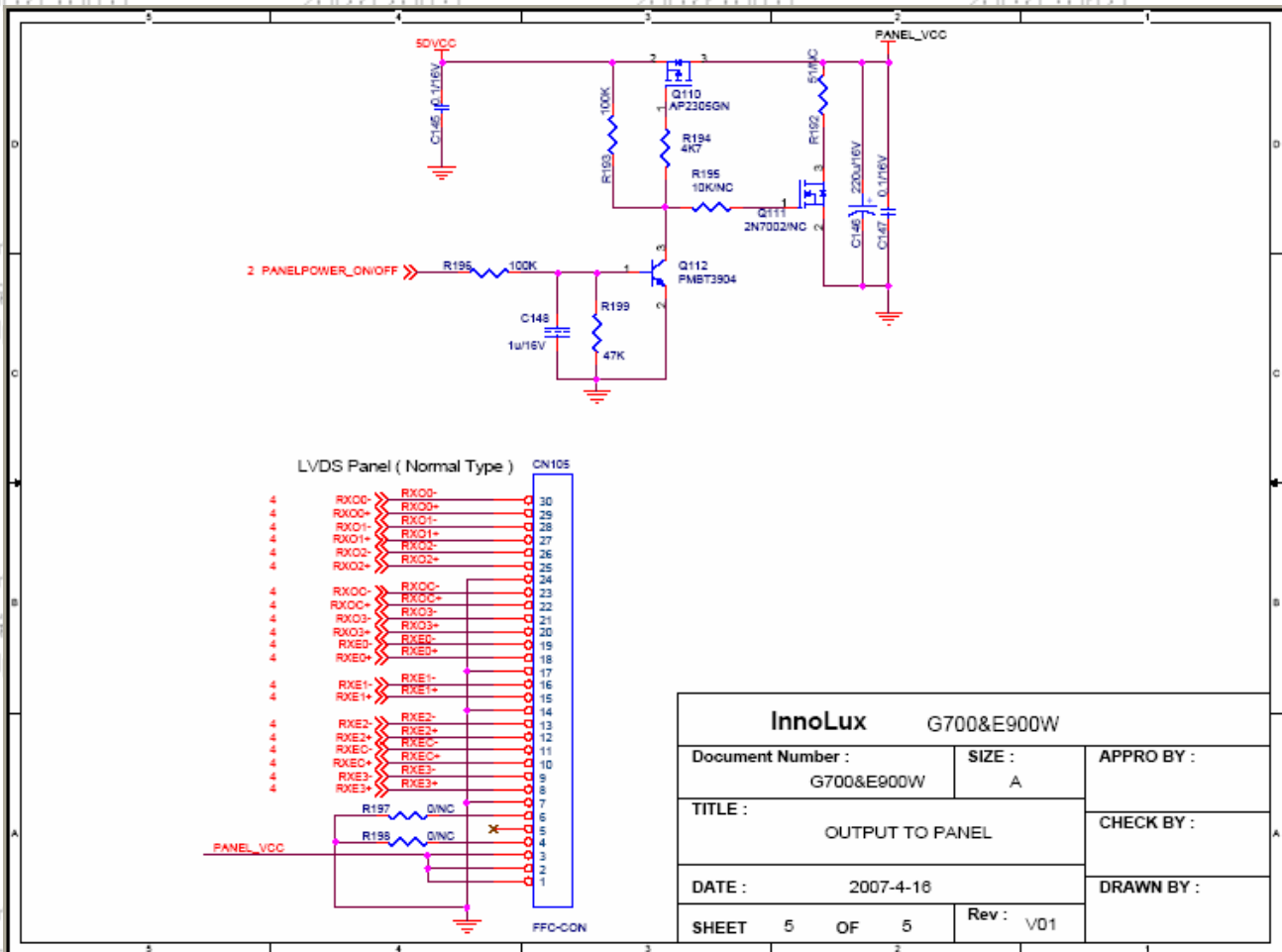


InnoLux E900W		
Document Number :	SIZE : A4	APPRO BY :
TITLE :	POWER SUPPLY	CHECK BY :
DATE :	2007-03-08	DRAWN BY :
SHEET 2 OF 4	Rev : V01	

IF Board







5.2 Circuit operation theory

5.2.1. Electronic Circuit Theory

(A) Switching Mode Power Supply theory

2.1 . 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.

2.2 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/14V 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 65W. 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 R835and C806, This will prevent MOSFET Q804 being damaged under large current impulse and voltage spike.

2.3 DC_5V and DC_14V Output Circuit

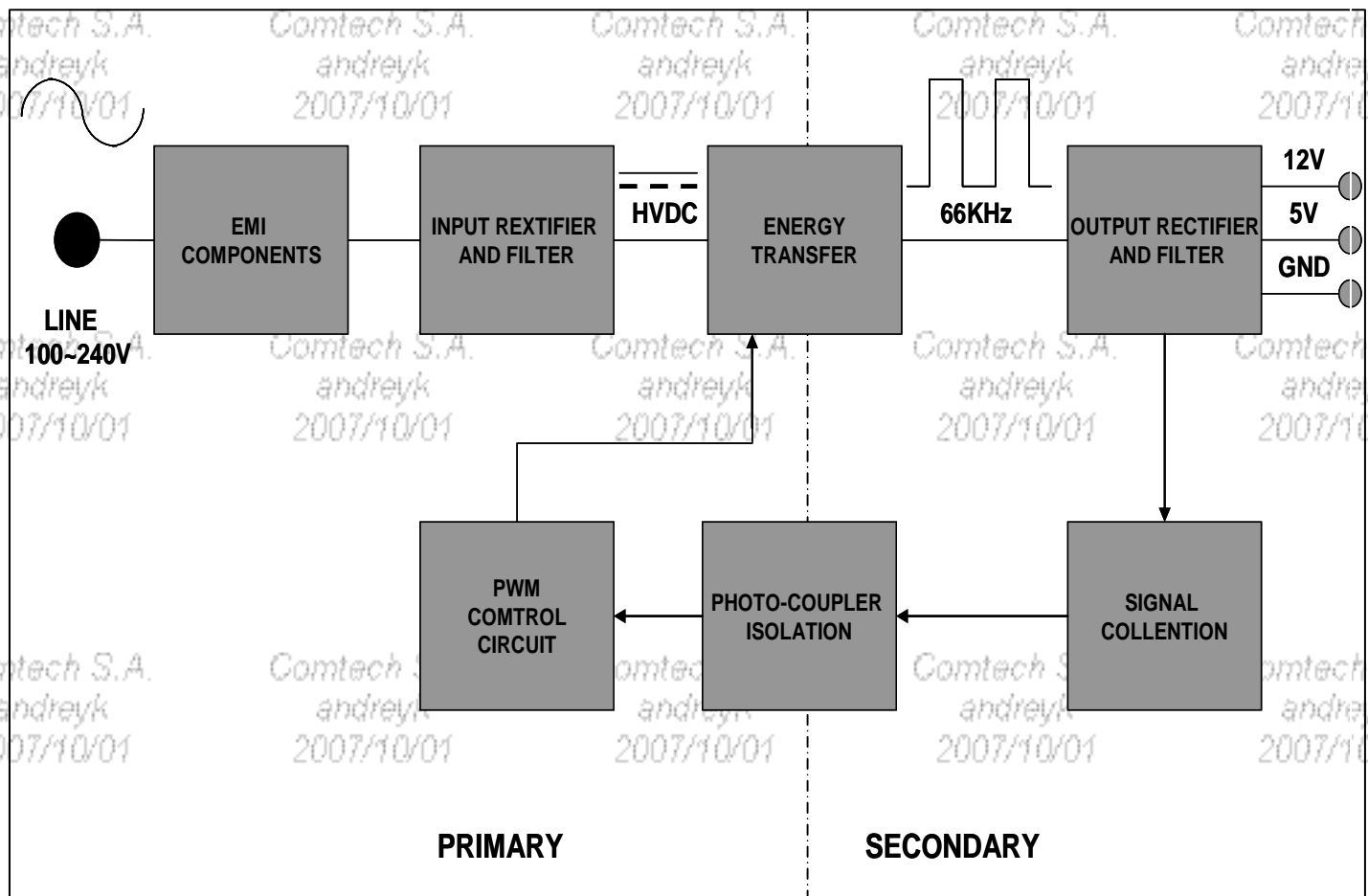
For DC 5V, D805 is used to rectify the inducted current. R828 and C816 are used to store energy when current is reversed. The parts including C820,C823,C824 and L803 are used to smooth the current waves.

For DC 14V, D803 is used to rectify the inducted current. R827 and C815 are used to store energy when current is reversed. The parts including C817,C818,C819 and L802 are used to smooth the current waves.

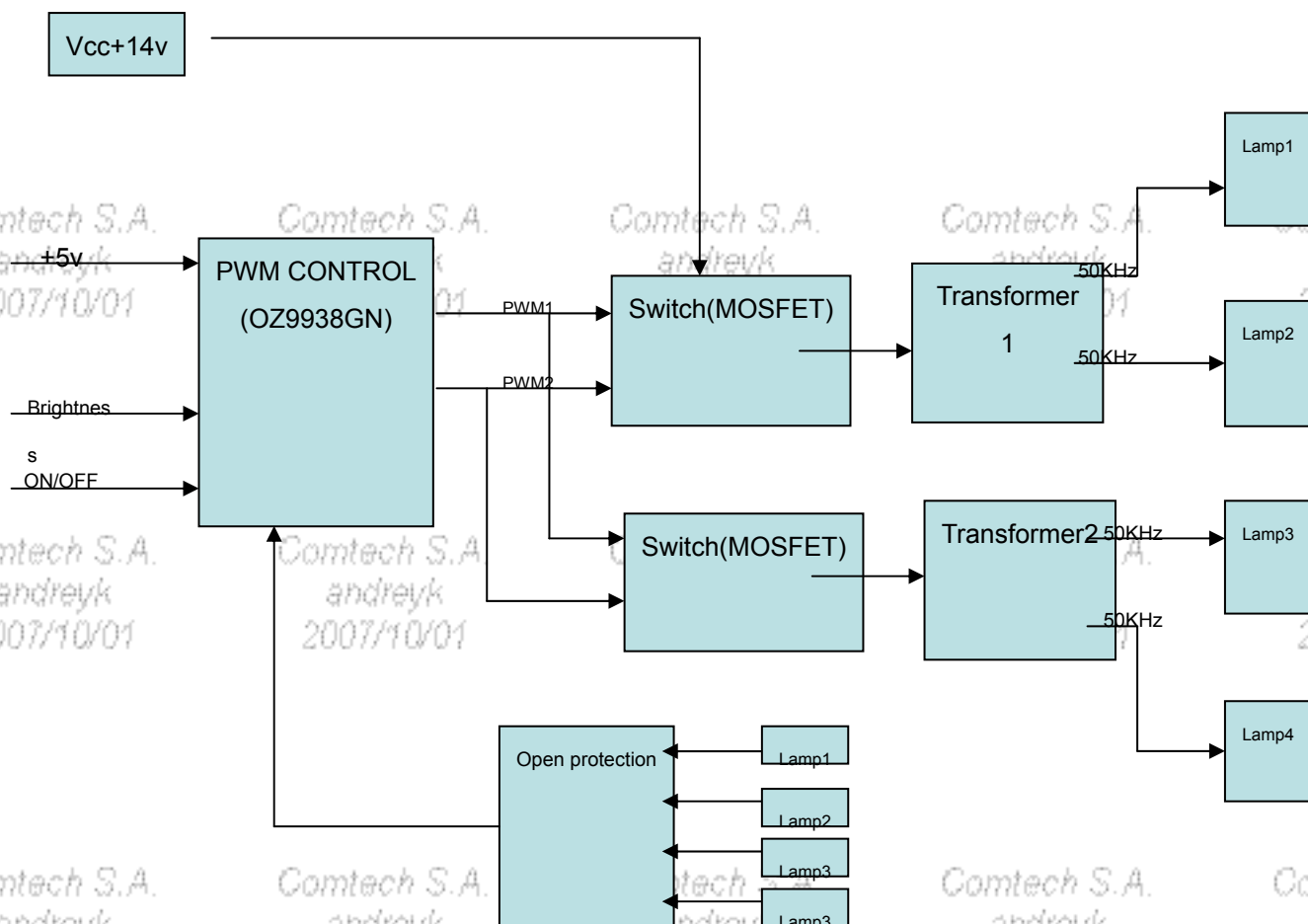
2.4 Feedback Circuit

Pin R of IC803 is supplied 2.5V stable voltage. It is connected to 5V and 14V output through R822, R823 and R825. R822 R823 and R825 are output sampling resistor. When the sampling voltage more than 2.5V or less than 2.5V, feedback current of IC802 will change, this can change the voltage from transformer T801.

5.2.2 Power board diagram:



5.3 Inverter board diagram:



PUSH-PULL INVERTER

1. Low voltage to high voltage circuit

14VDC provides the power for IC501; the control signals Brightness and ON/OFF come from I/F board. ON/OFF signal connect to R505 to control pin1 of IC501 and makes IC501 enable. Brightness signal connect to pin7 of IC501 and regulates the panel brightness, delaying time circuit is setting by the IC501 internal, and R505, R530 make up a divided voltage network, C529 is used to dump noise. The operation frequency is determined by the external Resistor R504 connected to pin2 of IC501. BURST MODE regulated dimming frequency is determined by the external resistor R503 and capacitor C528 connected to pin7 of IC501. C506 is used for soft start and compensation, C505, C529 are used for dump noise.

The output drives, include DRV1, DRV2 (pins5,4 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, Q503 senses the voltage at the transformer secondary. When OVP reaches Q503 OFF 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 R514, R523. The feedback voltage connected to Pin8 (ISEN), then compared with a reference voltage (1.5V) via a current amplifier, resulting in PWM drive outputs to PUSH-PULL switches.

5.3.1 I/F Circuit

5.3.1.1 RGB CAPTURE

- Signal RED, GREEN, BLUE input through CN103 #1, #2, #3, Stop DC via C119, C121 and C123, and then enter into U106 (scaler) analog input terminal #12, #14, #16, and then scaler deals with signal internally.
- Signal DDC_SCL (series clock) inputs via CN103#15, and then passes through ZD101 Zener for ESD protection, goes into U103#5.
- Signal DDC_SDA (series data) inputs via CN103#12, and then passes through ZD104 Zener for ESD protection, goes into U103 #8.
- Signal TTL vertical sync. (Vsync) inputs via CN103 #14, and then clamped by ZD102 Zener, passes through R165, and then goes into IC U106 (scaler) #8.
- Signal TTL horizontal sync. (Hsync) inputs via CN103 #13, and then clamped by ZD103 Zener, passes through FB104, R167, and then goes into IC U106 (scaler) #9.
- CN103#5 is defined as cable detect pin, this detector realize passes through R160 Pull high, go into U103#24.

5.3.1.2 Buttons Control

- Button "Power" on bottom side bezel connects to U103 (scaler) #9 through R133, via CN102#8.
- Button "UP" "DOWN" "MENU" "ENTER" on right side bezel connects to U103 (scaler) #21, #22, #14 through R138, R139, R140 via CN102 #1, #2, #3
- U1043 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", U103 (scaler) #48 sends out a low potential, via R105, flow to CN102 #7 on keypad, LED Green ON.
 - b. When in "Suspend" mode, U103 (scaler) #1 sends out a low potential, via R107, flows to CN102 #5 on keypad, LED Amber ON.

5.3.1.3 Realtek CHIP U106 (scaler), U103(MCU)

- U106 (RTD2525LH) #29, #30, #31~#38 output 8 bit even LVDS digital data to panel control circuit through CN104.
- U106 (RTD2525LH) #21~#30 output 8 bit odd LVDS digital data to panel control circuit through CN104.

- U103 (RTD2120_LQFP48) #44 outputs Brightness "PWM" signals to control CCFL brightness.
- U103 (RTD2120_LQFP48) #39 output PANELPOWER ON/OFF to make Q112 conducted, and then make Q110 conducted, +5V flow to CN105#1~#3 as Panel VDD .
- U103 (RTD2120_LQFP48) #46 output CCFL_ON/OFF "H" and "L" potential to control Inverter on/off.

Please refer to TSMU58WHJ Pin Assignments table in IC spec.

5.3.1.4 Regulator Circuit

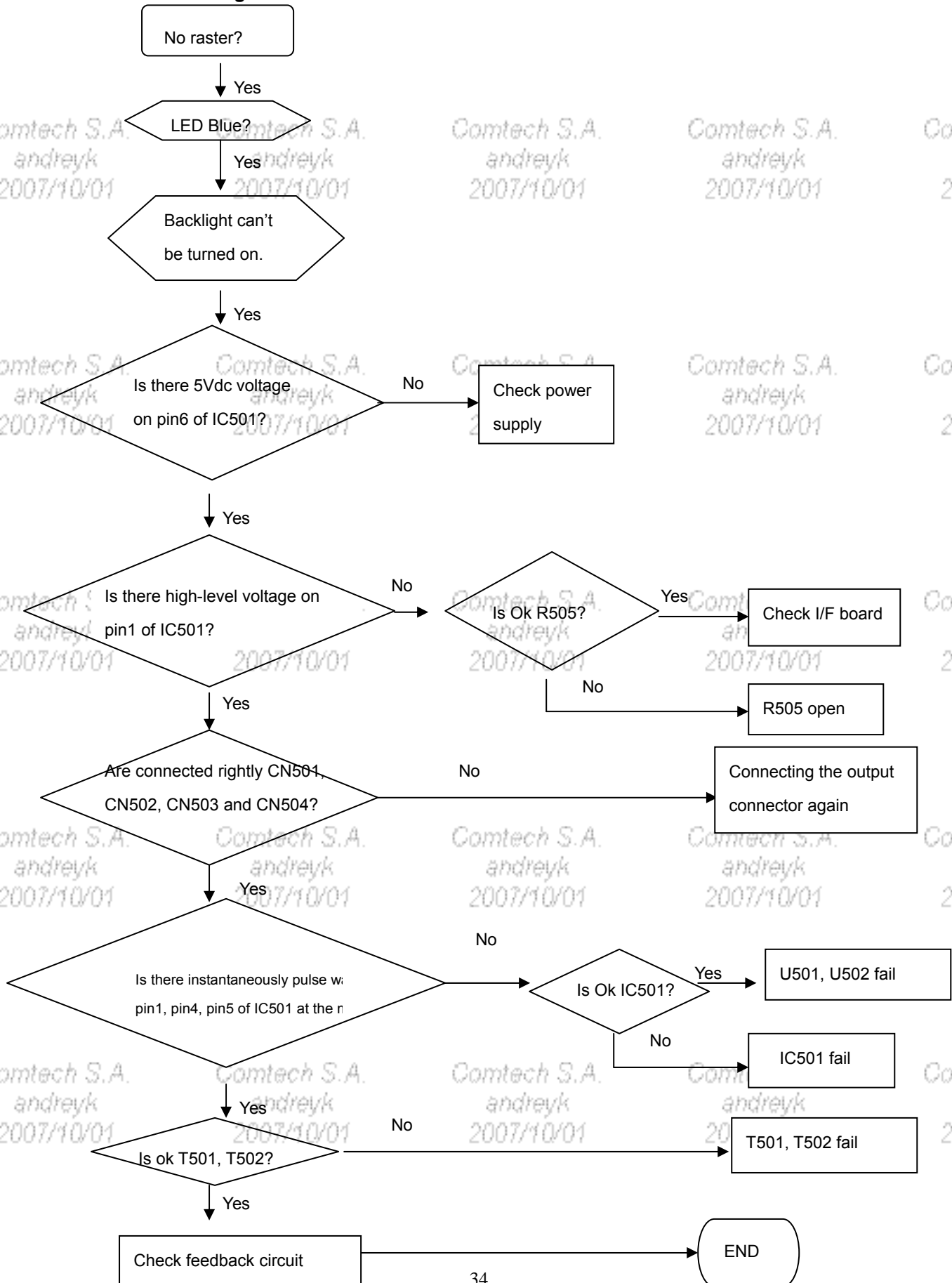
- +5V is from switching mode power supply for Panel used.
- +3. 3V generates from +5V through C103 filtering and U102 which is output +3.3V LDO for U105, U106,U103 and U104 used.
- +1.8V generates from +3.3V through C138 filtering and U105 which is output +1.8V LDO.

5.3.1.5 Audio circuit

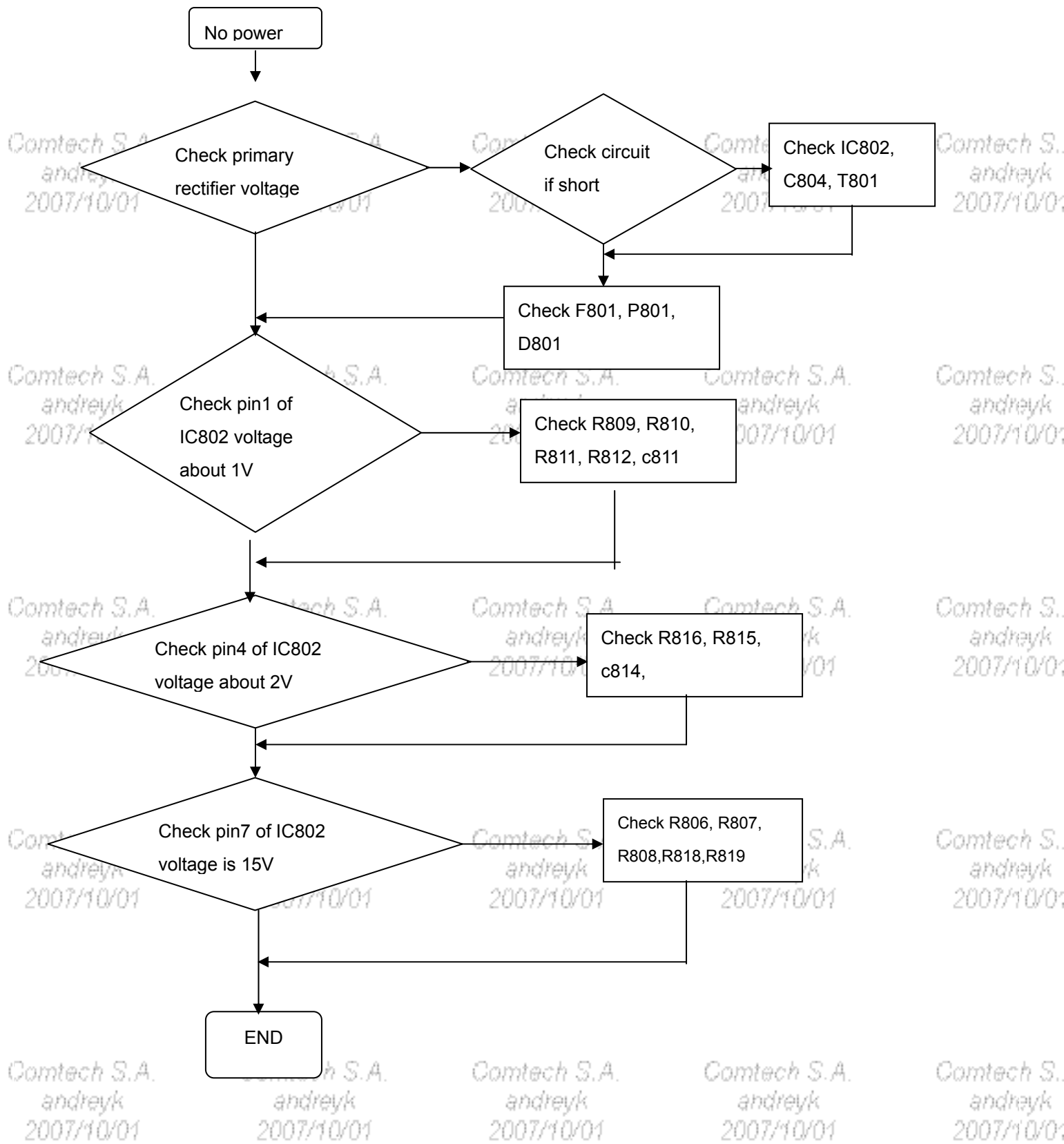
- Audio Signal R,L,GND input through P701,#2,#5,#1, Stop DC via C704, C706, and then enter into U701 (TDA7496L) analog input terminal #4,#9.
- U701 (TDA7496L) #14,#17 output R,L audio data to Speaker through CN701.
- U103 (RTD2120_LQFP48) #47 output MUTE "H" potential to control U701on/off.
- U103 (RTD2120_LQFP48) #45 outputs Volume "PWM" signals to control U701 Volume.

5.3.2 Trouble Shooting Guide

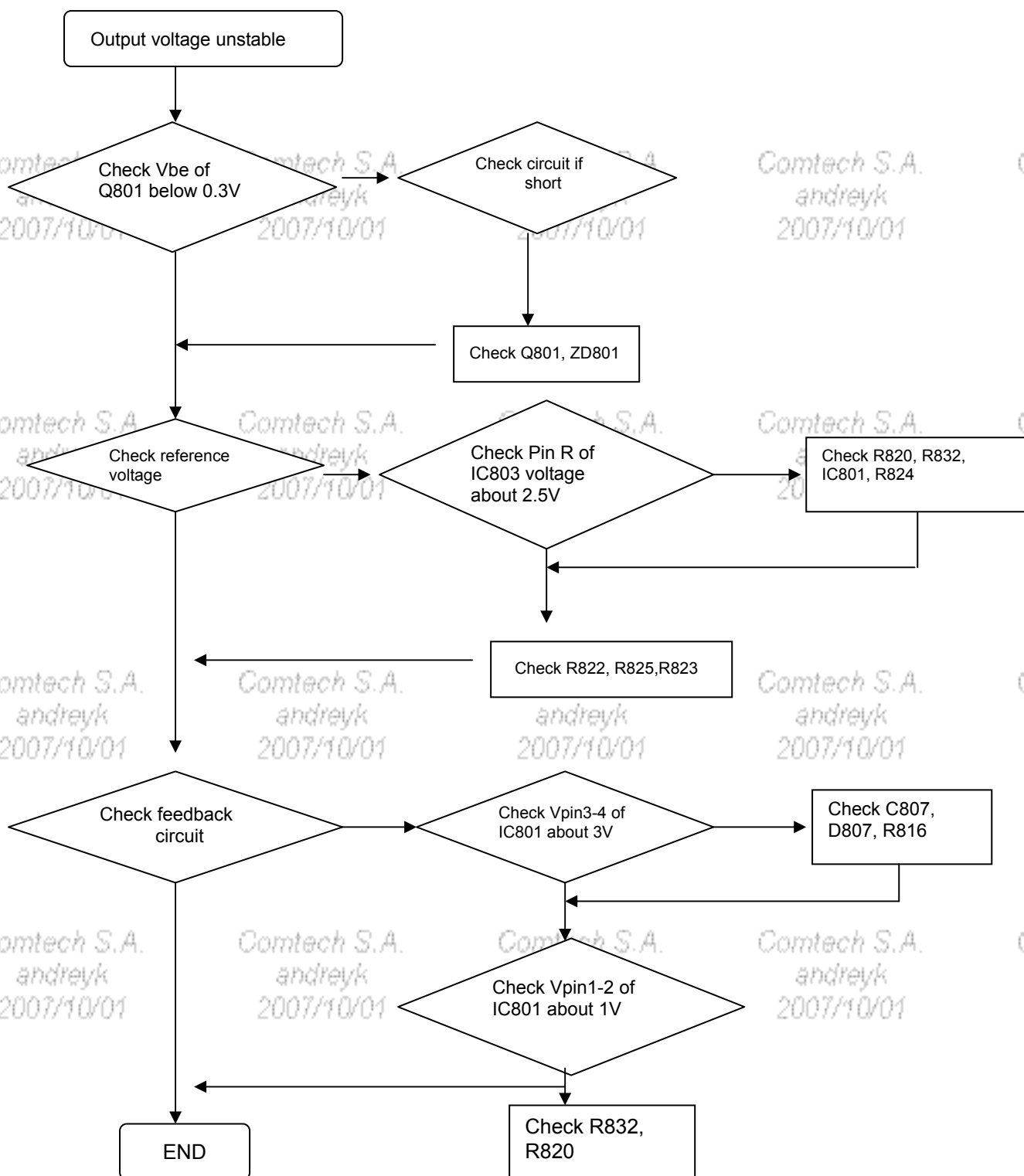
Inverter trouble shooting



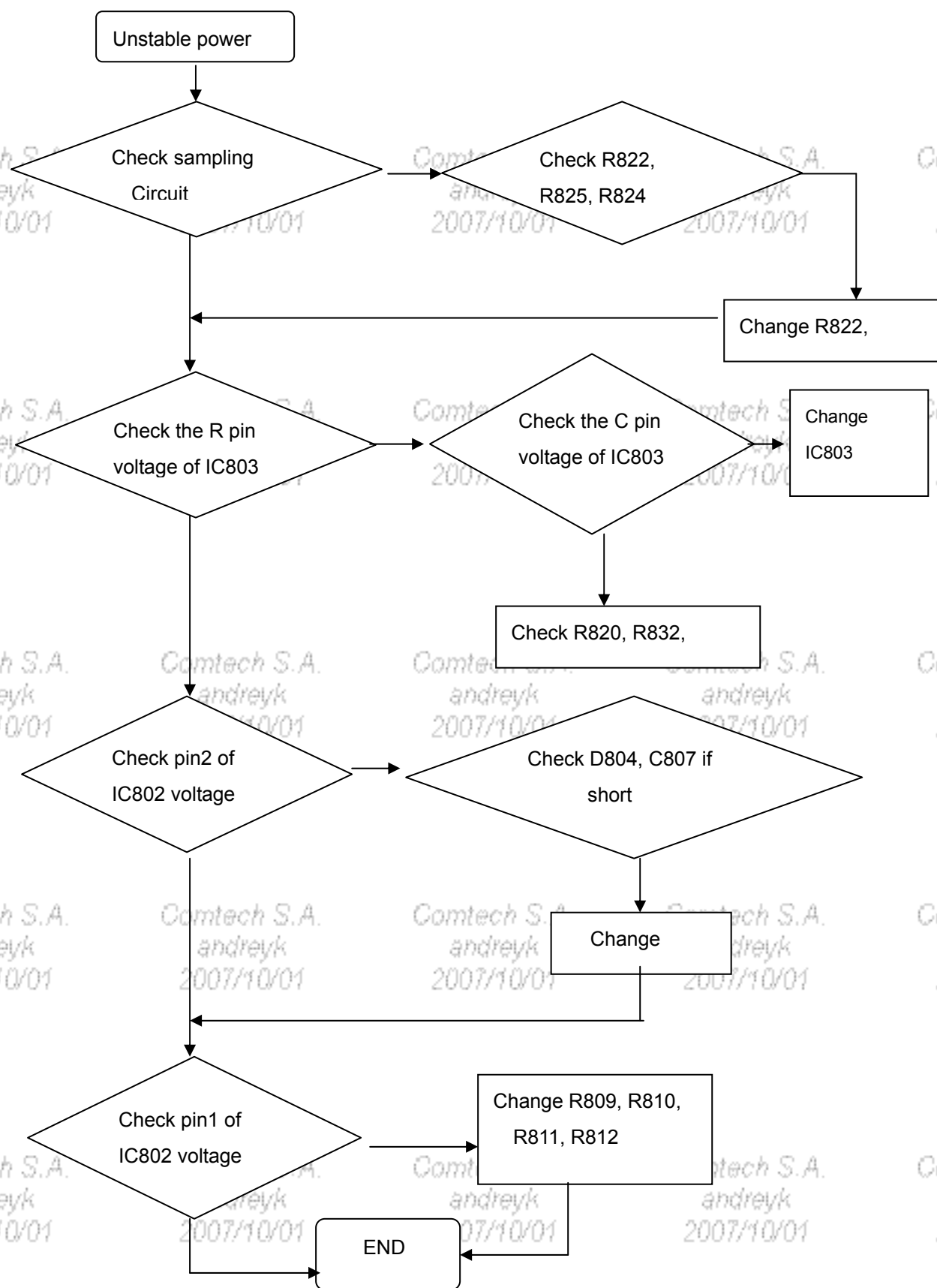
Power trouble shooting_1



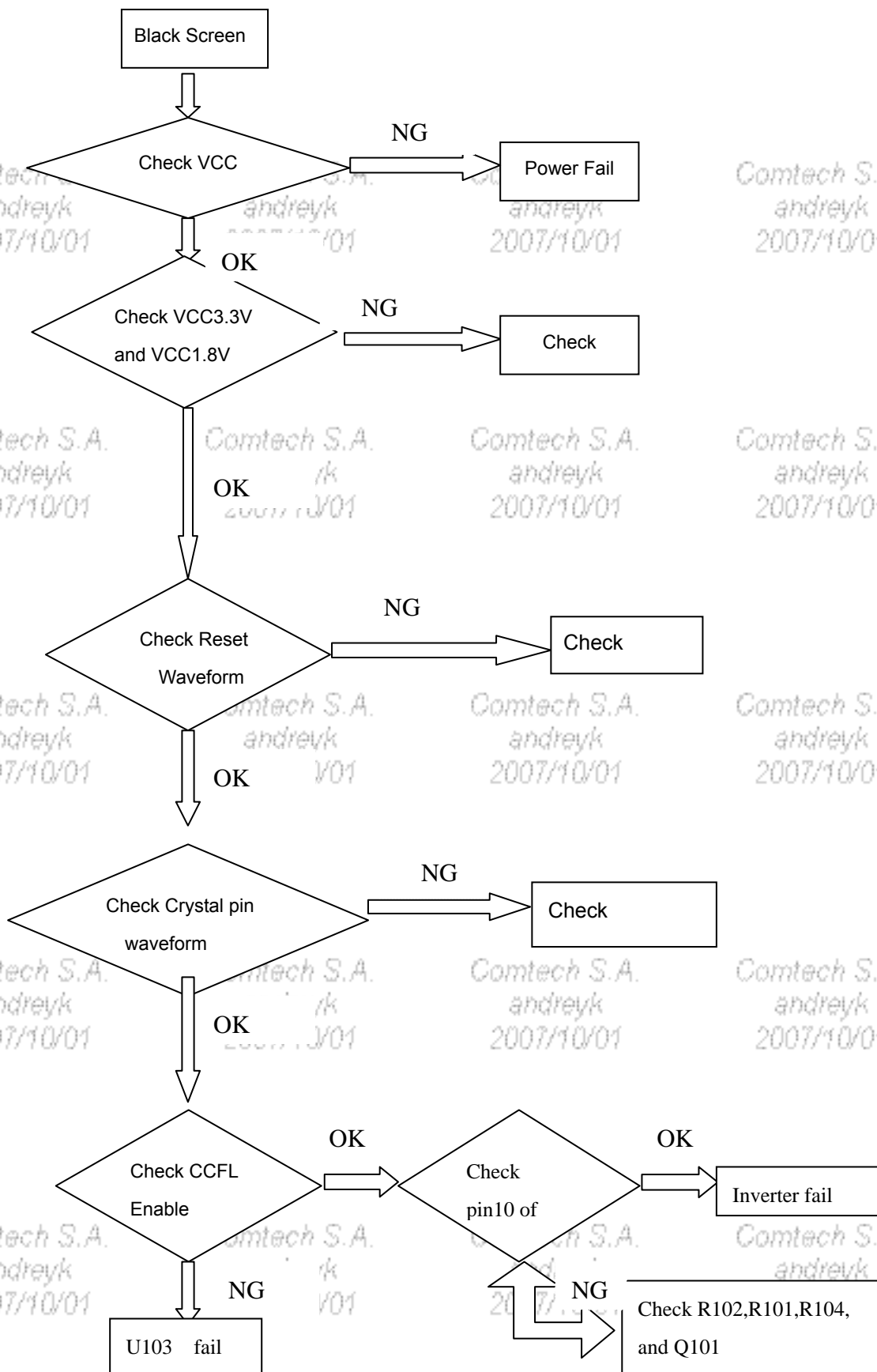
Power trouble shooting_2



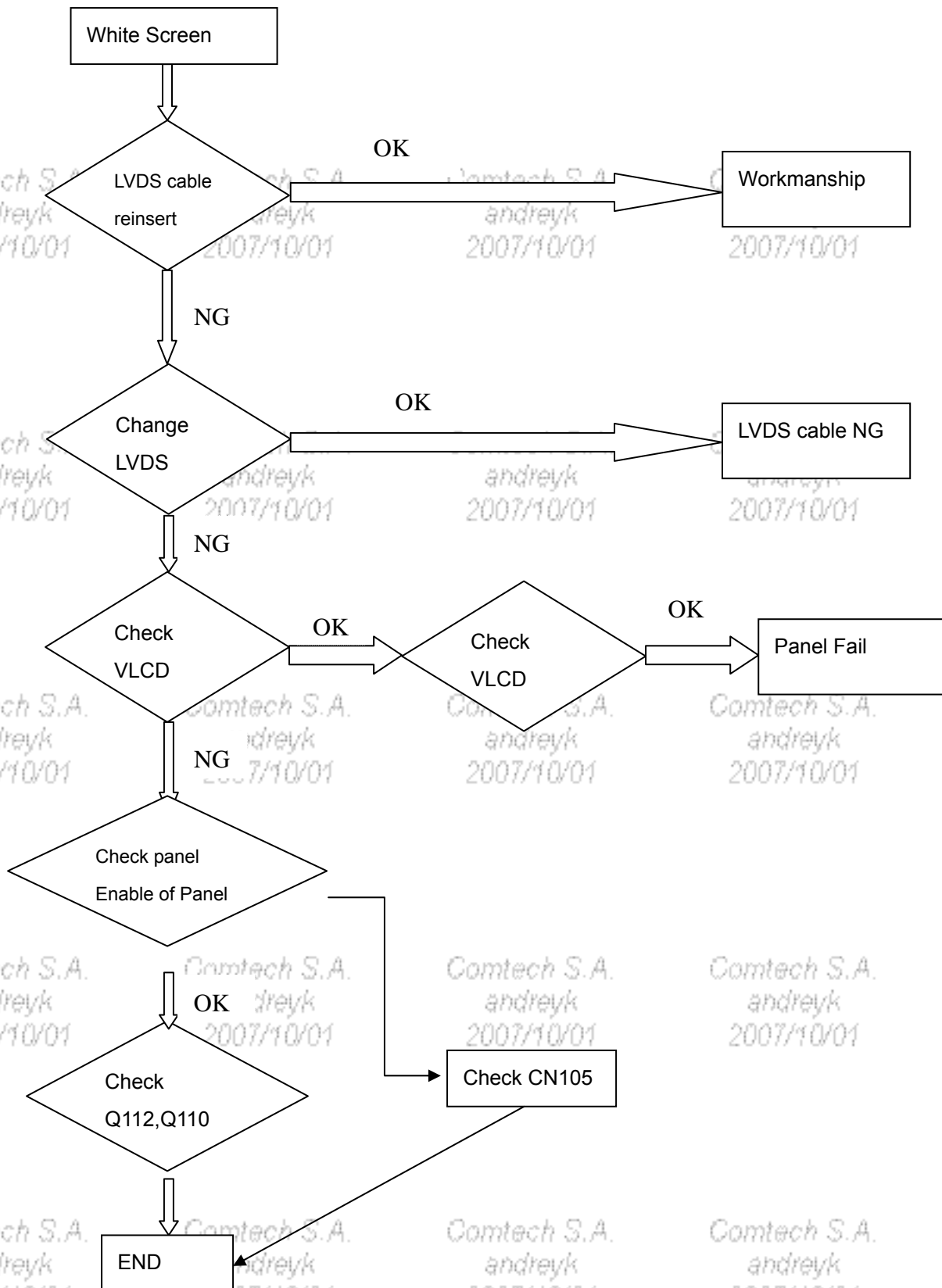
Power trouble shooting_3



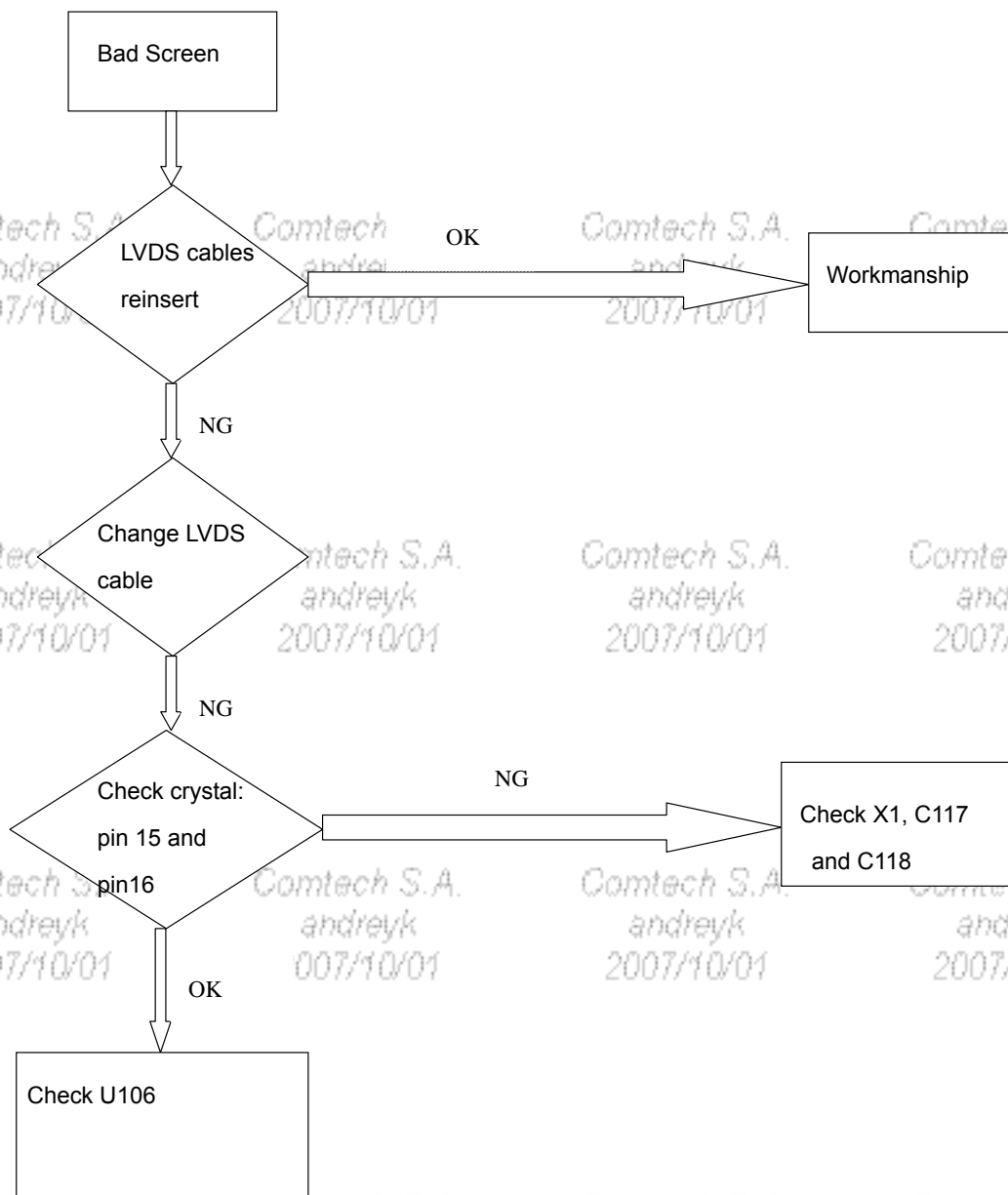
Black Screen



White Screen



Bad Screen



5.4 Spare Parts List

*** THIS PARTS LIST MAY BE SUBJECT TO CHANGE
WITH PRIOR NOTICE BY SPM OF BENQ CC TEAM.**

Site	Innolux	
Released Date	23-Jul-07	
Ship To Area	99 Part Number	Description
EU	9H.0BGLN.I8E	19W LCD MNT E900WA-I8E

Category	BenQ Part Number	BenQ Parts Description
Panel	CS.5F0A9.001	LCDM 19 M190A1-L02(A)(CMO)
	CS.5F0A2.021	LCDM 19 MT190AW01-V2
PCBA	CS.5D0BG.001	PCBA IF/BD CMO PANEL E900W
	CS.5D0BG.011	PCBA IF/BD INNOLUX PNL E900WA
	CS.5D0BH.081	PCBA KEYPAD BD G900W
	CS.5D0BH.091	PCBA LED BD G900W
	CS.5D0BH.101	PCBA EARPHONE BD G900W
	CS.5D0BH.111	PCBA P/I BOARD G900W
Cover	CS.6E0BH.151	ASSY BEZEL (BLACK) G900W
	CS.6E0BH.161	ASSY BUTTON POWER (BLACK)
	CS.6E0BH.171	ASSY STAND G900W
	CS.6E0BH.181	ASSY BASE G900W
	CS.6E0BG.001	ASSY COVER BACK(W/SPK) LE1975
Cable	2G.02718.051	CORD H05VV-3G 10A250V 1500 EUR
	5K.L9005.501	CABLE SIGNAL15/15P CORE*1 1.5M
	CS.5K0BH.041	CABLE LVDS 30P 180MM G900W
	CS.5K0BH.051	CABLE PWR BD/EAR ND 6P 235MM
	CS.5K0BG.001	CABLE IF BD/LED BD 8P 155MM
	CS.5K0BG.011	CABLE LED BD/KEYPAD 4P 210MM
Package	CS.4D0BG.001	CTN ENGLISH WORLD WILD E900W
	CS.4G0BG.001	CUSHION EPS-L E900W
	CS.4G0BG.011	CUSHION EPS-R E900W

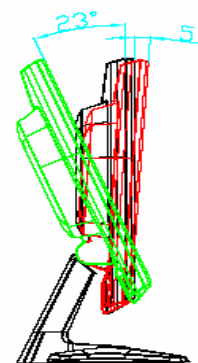
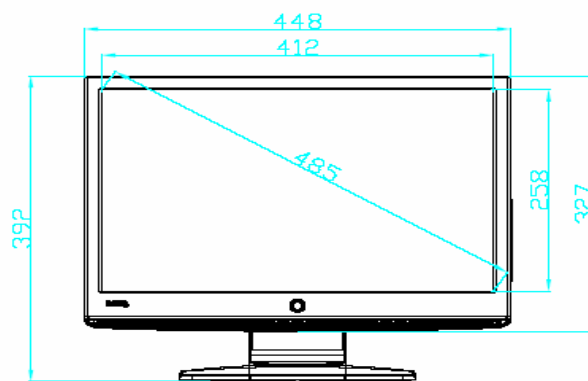
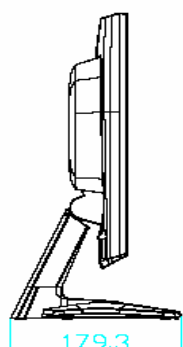
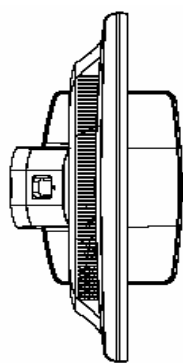
E900WA

Appendix: Dimensional Drawing

Service Manual

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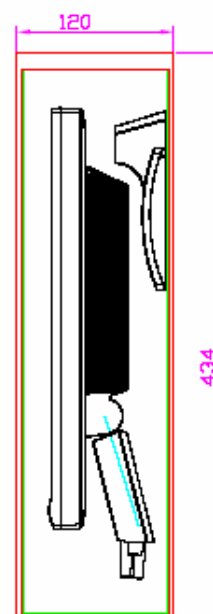
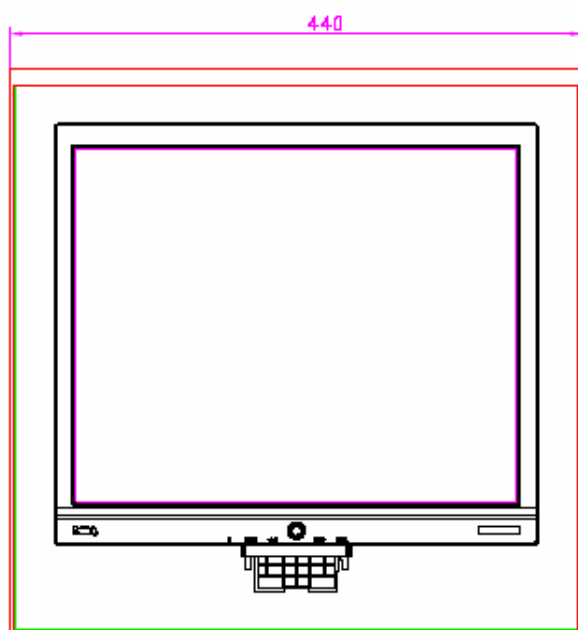
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Carton Box Dimension

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