Product Service Manual--Level 1

Service Manual for BenQ:
M2700HD

Applicable for All Regions

Version: 001
Date:2009/11/27

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.

First Edition (November, 2009)

BenQ M2700HD Service Manual

Content Index

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

Items	Condition	Spec	Note
AC Input Voltage range	Universal input full range	90~264Vac	
AC Input Voltage rating	Universal input full range	100~240Vac	
AC input frequency range	90~264Vac	47~63Hz	
AC input frequency rating	100~240Vac	50~60Hz	
AC Input Current	100Vac	1.5A(max)	
	240Vac	0.8A(max)	
Inrush Current	100Vac,cold star,25°C	40A (max)	See Note2
	240Vac,cold star,25°C	60A(max)	
Power Factor	240V Input Full Load	>80%	
AC-DC power Efficiency	DC output full loading	≥75%	

Note2. Before each test, the buck capacitor need to be discharged.
Before each test, it must be 10 minutes at least after the latest test.
Hot star not component be damaged.

3.2 Signal Interface

Input Connector	Analog : D-sub 15 Digital: DVI-D&HDMI＊2 S-Video Component Compsite PC Audio RCA Audio USB : 4Port
Default Input Connector	Defaults to the first detected input
Video Cable Strain Relief	Equal to twice the weight of the monitor for five minutes
Video Cable Connector DB-15 Pin out	Compliant DDC 2B / CI
Video Signals	1. Video RGB (Analog): Separate 2. DVI (Digital) 3.HDMI(Digital) 4.S-Video 5.Component 6.Compsite
Video Impedance	75 Ohms (Analog), 100 Ohms (Digital)
Maximum PC Video Signal	950 mV with no damage to monitor
Maximum Mac Video Signal	1250 mV with no damage to monitor
Sync Signals	TTL
DDC 1/2B	Compliant with Revision 1.3
Sync Compatibility	Separate Sync/Composite Sync/Sync on Green /HDMI
Video Compatibility	Shall be compatible with all PC type computers, Macintosh computers, and after market video cards

3.3 Scan Range

Item	condition	Spec	OK	NA	Remark
Horizontal	Sync polarity: (+) or (-)	24~83 KHz	√		
Vertical	Sync polarity: (+) or (-)	50~76Hz	√		

3.4 Support Timings

BenQ customer preset Tmings are as below:

P: Preset Mode

NP: Non Preset Mode

FS: Fail Save Mode(show “Out of Range”, but still can see picture)

O: Out of Range(only show “Out of Range”, without picture)

27W	Resolution	Pixel clock	H-sync	V-sync	H-Pol	V-Pol
1920x1080		(unit:MHz)	(unit:KHz)	(unit:Hz)		
P	640x350	25.18	31.47	70.09	P	N
O	640x350	31.50	37.86	85.08	P	N
NP	640x400	25.18	31.47	70.09	N	P
FS	640x400	31.5	37.86	85.08	N	P
NP	640x480	30.24	35.00	66.67	N	N
P	640x480	25.17	31.47	59.94	N	N
NP	640x480	31.50	37.86	72.81	N	N
P	640x480	31.50	37.50	75.00	N	N
FS	640x480	36.00	43.27	85.01	N	N
NP	640x500	25.25	31.00	57.76	N	N
P	720x400	28.32	31.47	70.08	N	P
FS	720x400	35.5	37.93	85.04	N	P
P	832x624	57.27	49.71	74.53	N	N
NP	800x480	29.5	29.74	59.476	N	P
NP	800x600	36.00	35.16	56.25	P	P
P	800x600	40.00	37.88	60.32	P	P
NP	800x600	50.00	48.08	72.19	P	P
P	800x600	49.50	46.88	75.00	P	P
FS	800x600	56.25	53.67	85.06	P	P
NP	848x480	33.75	31.02	60.00	P	P
NP	848x480	31.50	29.83	59.66	N	P
NP	848x480	37.52	35.00	70.00	N	P
NP	848x480	39.25	36.07	72.00	N	P
NP	848x480	41.00	37.68	74.77	N	P
NP	720x576	32.71	35.910	59.950	N	P
P	1024x576	46.966	35.82	60	N	P
P	1024x600	48.964	37.32	60	N	P
FS	1024x768-I	44.9	35.52	43.48	P	P
P	1024x768	65.00	48.36	60.00	N	N
NP	1024x768	75.00	56.48	70.07	N	N
NP	1024x768	78.43	57.67	72.00	N	P
P	1024x768	80.00	60.24	74.93	N	N

P	1024x768	78.75	60.02	75.03	P	P
FS	1024x768	94.50	68.68	85.00	P	P
P	1152x720	66.75	44.86	60	N	P
NP	1152x864	94.50	63.85	70.01	P	P
P	1152x864	108.00	67.50	75.00	P	P
FS	1152x864	119.651	77.09	85.00	N	P
P	1152x870	100.00	68.68	75.06	N	N
P	1152x900	92.94	61.80	65.95	N	N
NP	1152x900	105.59	71.73	76.07	N	N
P	1280x720	74.25	45.00	59.94	N	P
P	1280x720	74.50	44.77	59.86	N	P
P	1280x720	95.75	56.46	74.78	N	P
P	1280x768-R	68.25	47.40	60.00	P	N
NP	1280x768	79.50	47.78	59.87	N	P
NP	1280x768	102.25	60.29	74.89	N	P
FS	1280x768	117.50	68.63	84.84	N	P
NP	1280x800	71	49.31	59.91	P	P
P	1280x800	83.50	49.702	59.81	N	P
NP	1280x800	98.894	58.3	70	N	P
NP	1280x800	102.8	60.048	72	N	P
P	1280x800	106.6	62.795	74.934	N	P
FS	1280x800	122.5	71.55	84.88	N	P
P	1280x960	108.00	60.00	60.00	P	P
FS	1280x960	148.50	85.94	85.00	P	P
P	1280x1024	108.00	63.98	60.02	P	P
NP	1280x1024	126.99	74.88	69.85	P	P
NP	1280x1024	124.90	74.40	70.00	N	N
NP	1280x1024	134.60	77.90	72.00	P	P
P	1280x1024	135.00	79.98	75.02	P	P
NP	1280x1024	135.09	81.18	76.16	N	N
FS	1280x1024	157.50	91.15	85.02	P	P
P	1360x768	85.50	47.71	60.01	P	P
P	1366x768	85.50	47.71	59.79	P	P
NP	1400x1050-R	101.00	64.74	59.95	P	N
NP	1400x1050	121.75	65.32	59.98	N	P
NP	1400x1050	156.00	82.28	74.87	N	P
FS	1400x1050	179.50	93.88	84.96	N	P
P	1440x900-R	88.75	55.496	59.901	P	N
P	1440x900	106.5	55.935	59.887	N	P
P	1440x900	136.75	70.6	75	N	P
P	1600X900-R	97.75	55.54	59.98	P	N
P	1600x1000-R	108.5	61.648	59.910	P	N
NP	1600x1000	132.25	62.14	59.87	N	P
NP	1600x1000	169.25	78.356	74.83	N	P
NP	1600x1200-R	130.25	74.01	59.92	P	N
P	1600x1200	162.00	75.00	60.00	P	P
NP	1600x1200	175.50	81.25	65.00	P	P
NP	1600x1200	189.00	87.50	70.00	P	P

NP	1600x1200	202.50	93.75	75.00	P	P
O	1600x1200	229.50	106.25	85.00	P	P
NP	1680x1050-R	119.00	64.67	59.88	P	N
P	1680x1050	146.25	65.29	59.95	N	P
P	1680x1050	187	82.306	75	N	P
NP	1600x1280	171.75	79.5	59.9	N	P
FS	1792X1344	203.25	83.57	59.9	N	P
O	1792X1344	257.75	105.290	75.00	N	P
O	1856X1392	217.25	86.485	59.934	N	P
O	1856X1392	277.5	109	74.918	N	P
O	1800x1440	218.25	89.4	59.9	N	P
P	1920x1080-R	138.5	66.587	59.934	P	N
P	1920x1080	173	67.158	59.963	N	P
P	1920x1080	148.5	67.5	60	P	P
FS	1920X1200-R5	127.750	61.418	49.974	P	N
FS	1920X1200-R	154.00	74.04	59.95	P	N
FS	1920X1200	193.25	74.56	59.89	N	P
O	1920X1200	245.25	94.04	74.93	N	P
FS	1920X1440-R	184.75	88.822	59.9	P	N
O	1920X1440	233.500	89.532	59.968	N	P
O	1920X1440	298	112.50	74.9	N	P
FS	2048x1152-R	156.75	70.992	59.9	P	N
FS	2048x1152	197	71.584	59.9	N	P
O	2048x1536-R	209.25	94.7	59.9	P	N
O	2048x1536	267.25	95.4	59.9	N	P
O	2560x1600-R	268.5	98.713	59.972	P	N
O	2560x1600	348.5	99.4	59.9	N	P

3.5 Operational & Function Specification

3.5.1 Video Performance

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

Features	Specifications
Maximum resolution	1920x1080 @ 60Hz
Back light system	4 CCFL
Actual Resolution display	WUXGA (1920x1080)
Pixel pitch	311.25(H) x 311.25(V)
Display area	597.6(H) x 336.15(V)
Contrast ratio/	For AUO Panel: 600:1 (min.), 1000:1 (Typ.)
Dynamic contrats ratio(typ)	DCR : 50000:1(typ)

Brightness	240 nits (min) 300 nits (Typ)---For AUO Panel
Response time (Tr +Tf)	AUO Panel: 5ms (Typ.) 8ms (Max.) OD: 2ms
NTSC ratio	72%
Viewing angle (H/V)	Hor:170°,Ver:160° (Typ.,CR≥10)--For AUO
Input interface	Analog (D-sub 15 pin);DVI-D;HDMI＊2,S-Video,Component,Composite
Power management	Compatible with Energy Star, DPMS
Plug & Play	VESA DDC2B / CI
University AC power supply	100V – 240VAC, 50Hz – 60Hz
OSD language	17 Languages (English / Francais / Deutsch / Italiano / Espanol / Polish / Czech / Hungarian / Serbo-croatian / Romanian / Netherlands / Russian / Swedish / Protuguese / Japanese / Chinese / S-Chinese)

3.5.2 Brightness Adjustable Range

The test to verify specifications in this section shall be performed under the following standard conditions unless otherwise noted.

Temperature : 25 ± 5°C
Test pattern : white
Video Resolution : 1920x1080@60HZ
Video input level : 700 mV ± 2%
Warm-up time : 30 minutes

Warm-up time : 30 minutesItem	Condition	SPEC
Luminance Range	Brightness=0%	NA
	Contrast = 0%	
	Brightness=100%	≥ 250 cd/m^2
	Contrast = 100%	
	Brightness=90%	NA
	Contrast = 50%	

3.5.3 Acoustical Noise

Item	condition	Spec	OK	NA	Remark
Acoustical Noise	At 1 meter distance& audio function disable	≦28dB/A	√		

3.5.4 Environment

Operating	Specification
Temperature range	0°C to 50°C
Relative humidity	5% to 90%
Altitude	0 to 10000 feet
Storage	
Temperature range	-20°C to 60°C
Relative humidity	5% to 90%
Altitude	0 to 30000 feet

3.5.6 Electrostatic discharge Requirements

Item	Condition	Spec		Remark
Electrostatic Discharge	BenQ SPEC	Contact discharge : 4KV		VGA cable pin need test 8KV, DVI cable pin need test 4KV
		Contact discharge : 8KV	●	
		Air discharge : 8KV		
		Air discharge : 15KV	●	

3.5.7 Reliability

Items	Condition	Spec	Note
MTBF	90% Confidence	≧ 50,000 Hours	Excluding Panel
CCFL Life time	Luminance becomes 50%	AUO M270HW01 V0: 50,000 Hours(TYP.)	Note1

Note1. More details of CCFL life time please refer to Panel SPEC.

3.6 LCD Characteristics

3.6.1 The physical definition &technology summary of LCD panel

Supplier	AUO
Model name	AUO M270HW01 V0:
Display Area	597.6(H)x336.15(V)
Pixel Pitch	311.25(H)x311.25(V)
Display Colors	16.7M(6 Bit+Hi-FRC)
Number of Pixel	1,920(H) X 1,080(V),
Brightness	Min: 240cd/m^2; Typical: 300cd/m^2
Contrast Ratio	**Min: 600:1**
Viewing Angle	Hor: 170°, Ver: 160° (Typical, CR=10)
Display Mode	Normally White
Frame rate	50~75Hz
Response Time	Typical: 5ms; Max: 8ms
Surface Treatment	Anti-glare, 3H
Lamp	4 CCFL
Outline Dimension	630 (W) X 368.2 (H) X 15.9 (D) (typ.)
Brightness uniformity	Min: 75%; Typical: 80% / 9 points.

3.7 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 Volume Menu press [▼] to Show Picture Mode Menu. C. Press [▲] for 3 sec. will display the "mute " message for 3 sec. when audio at mute status, press the [▲] for 3 sec again, will release Audio Mute D. Press [▲]to show Volume Hot Key Menu, this Menu elapsed time depend on the Display Time of OSD
[POWER]	Power on or power off the monitor
[Auto]	press [Auto] to perform auto-adjustment

3.8 Mechanical Characteristics

3.8.1Dimension

Item	condition	Spec	OK	NA	Remark
Bezel opening	Lx W	599.652x338.202mm	√		
Monitor without stand	L×W×H mm	657.91*463.66*64.91mm	√		
Monitor with stand	L×W×H mm	657.91*463.66*241.92mm	√		
Carton Box(outside)	L×W×H mm	774x592x310mm	√		
Tilt and Swivel range		Tilt:-5~20degree Swivel: 0 degree	√		

3.8.2 Weight

Dimension (Monitor with Stand)	Spec
Width	657.91mm
Height	463.66mm
Depth	241.92mm
Monitor Weight	9.4±0.5 Kg (Net) 13.4±0.5Kg(Gross / with packing)

3.8.3 Plastic

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

Texture		Polishing #10000 拋光 噴涂 MTI1010 Special Texture	√		1.BEZEL: Polishing #10000 2. MID BEZEL: Polishing #10000 3. BACKCOVER: Polishing #10000 4. STAND BACK Texture MT11010 5. BASE COVER Polishing #10000 6. FUNCTION KEY Polishing #10000 7.POWER BUTTON Polishing #10000 8. LED LENS Polishing #10000 9. CLIP Texture MT11010 10. HINGE COVER Polishing #10000 11.LOGO BACK AL CD 紋 12. STAND FRONT COVER MT11010
Color		BCS-7015A(BLACK)	√		

3.8.4 Carton

Carton:Item	condition	Spec	OK	NA	Remark
Color					
Material		BC Flute	√		
Compression strength		450 KGF	√		
Burst strength		18 KGF/cm2	√		For JP:19.4 KGF/cm2
Stacked quantity		6 Layers	√		

3.9 Pallet & Shipment

3.9.1 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'SEA	132	Pallet A:12 Pallet B:--	Pallet A:11 Pallet B:--
	40'SEA	300	Pallet A:12 Pallet B:--	Pallet A:25 Pallet B:--
	40H'SEA		Pallet A:-- Pallet B:--	Pallet A:-- Pallet B:--
	20'AIR	88	Pallet A:8 Pallet B:--	Pallet A:11 Pallet B:--
	40'AIR	200	Pallet A:8 Pallet B:--	Pallet A:25 Pallet B:--
EU Pallet	20'	120	Pallet A:12	Pallet A:10
	40'	252	Pallet A:12	Pallet A:21

3.9.2 Carton Specification

Product:

Net Weight (Kg)	Gross Weight(Kg)	Dimension w/o Base LxWxH (mm)	Dimension w/ Base LxWxH (mm)
4.9±0.3 Kg (Net)	6.1±0.3Kg	512.39x348.35x99.63mm	512.39x348.35x163.35 mm

Package:

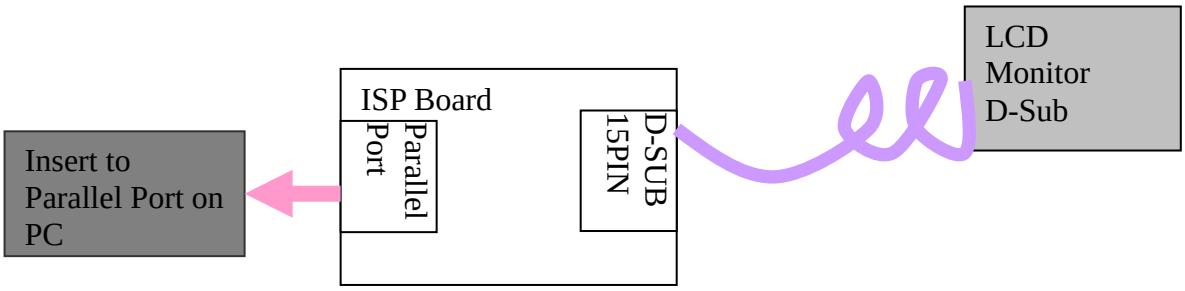
Carton Interior Dimension (mm) LxWxH	Carton External Dimension (mm) LxWxH
760X578X280mm	774X592X310mm

4 .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 press “Read” button to load BIN file, then press “Auto” button to enter ISP page, finally, press “Run” Icon to start ISP.

3. Waiting for “PASS”, then 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 1920*1080@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 rear side of monitor

CONTROL KEY	KEYS FUNCTION

[MENU]	D. When OSD displays, press [MENU] to return to previous level menu E. When OSD isn't shown on screen, press [MENU] to enter OSD interface F. Press [MENU] to enter Service Page When OSD isn't shown on screen in Service Page Mode
[Enter]	C. When OSD displays, press [Enter] to perform function of menu icon that is highlight or enter next level menu D. 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 Volume Menu press [▼] to Show Picture Mode Menu. C. Press [▲] for 3 sec. will display the "mute " message for 3 sec. when audio at mute status, press the [▲] for 3 sec again, will release Audio Mute D. Press [▲]to show Volume Hot Key Menu, this Menu elapsed time depend on the Display Time of OSD
[POWER]	Power on or power off the monitor
[Auto]	press [Auto] to perform auto-adjustment

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)	-	非 Eco Mode:90 Eco Mode:25
	Contrast	(0~100)	-	50
	Sharpness	(0~10)	-	3
	Gamma	(Gamma 1.8~Gamma 2.6)		Preset Gamma 2.2 (Gamma 1.8,2.0,2.2,2.4,2.6)
	Color	*Color Temperature	Normal(6500K)	Normal
			Bluish(9300K)	-
			Reddish(5800K)	-
			User Mode ➢ Red (0~100) ➢ Green (0~100) ➢ Blue (0~100)	Adjustment 0-100 (preset 100)

		Hue	0~100		50
		Saturation	0~100		50
		(1)VGA/DVI: can't adjust (2)HDMI:YUV Domain can adjust, RGB Domain can't adjust (3)Component/S-Video/Compositec can adjust			
		Reset Color	(YES/NO)		
	AMA	(ON/OFF)			OFF
PICTURE ADVANCED	Picture Mode	Standard	Sharpness can adjust		Standard
		Movie	Sharpness can't adjust	1. If Senseye Demo set ON at any mode and it should be set ON automatically at the other two modes 2. If Senseye Demo set ON and it should turn to Off by pressing Auto	
		Game	Sharpness can't adjust		
		Photo	Sharpness can't adjust		
		sRGB	Sharpness can't adjust		
		Eco	Sharpness can't adjust		
	Senseye Demo	(ON/OFF)			OFF
	Dynamic Contrast	(1)0->1show opt menu (2)1->0 not show opt menu (3)0:DCR close;1-5:DCR open, mean(10000~50000):1 (4) DCR only can adjust on Movie/Game/Photo Mode		Default: 0 (Enabled only for Photo, Movie, Game)	
	Display Mode	Overscan	ON/OFF		
			VGA/DVI		OFF(can't adjust)
			HDMI		OFF(can adjust)
			Component/S-Video/Composite		ON(can adjust)
		Full			Full
		Aspect	 BenQ Aspect Ratio PC mode define V1.4.		Aspect
		1:1	can't adjust		1:1

	HDMI RGB PC Range	RGB(0~255)/ RGB(16~235) (RGB Domain can adjust)	Default: RGB(0~255)	
AUDIO	Audio Mode	Standard/Movie/Game/POP/Rock		Standard
		(1) When EmbracingSound off, Audio Mode can't adjust (2) When connect Line in/Line out/Earphone can't adjust		
	Volume	0~100		30
		When Line Out at the back of monitor, Volume can't adjust, OSD is 30; When Line Out at the left of monitor, Volume can adjust.		
	Mute	(ON/OFF)		OFF
	Audio Advanced	Treble	0~6	3
		Bass	0~6	3
		EmbracingSound ON+Audio Standard Mode+ disconnected Line out Earphone can adjust		
	Audio Select	Auto Detect/ PC Audio/ HDMI Audio1/ HDMI Audio2/ Component Audio / Composite/S-Video Audio	When adjust OSD, it should pass some item if certain Audio didn't exist	Auto Detect
	EmbracingSound	(ON/OFF)	(1) When connect earphone,Line out and speaker didn't sound. Audio Mode/Audio Advanced/ EmbracingSound can't adjust in OSD (2) When disconnect earphone and EmbracingSound OFF, Audio Advanced can't adjust	ON
SYSTEM	Input	VGA/DVI/HDMI1/HDMI2/S-Video/Composite/Component		
	OSD Settings	Language	17 languages English/日本語/简体中文/繁體中文 /Français/Deutsch/Italiano/Español/Polski/Česky/Magyar/(SiCG / BiH / CRO)/Română/ Nederlands/Русский/Svenska /Português	English
		H. Position	(0~100)	50
		V. Position	(0~100)	50
		Display Time	(5, 10, 15, 20, 25, 30)	15
		OSD Lock	(ON/OFF)（Press Menu 15s can release lock）	OFF

	DDC/CI	(ON/OFF)	-	ON
	CEC	(ON/OFF)	HDMI source can choose/other source can't choose	OFF
	Source Auto Search	(ON/OFF)	Auto Source On in OSD, search automatically among VGA/DVI/HDMI1/HDMI2, S-Video/Composite/Component on or off can't adjust	OFF
	Information	Input	-	
		Current Resolution		
		Optimum Resolution	(1)Video Mode (2)non-Video Mode (3)Component/S-Video/Composite	(1) 1080P (2)1920 x1080 @60Hz (3)Show (NTSC/ PAL/SECAM)
		Model Name -		M2700 HD
	Reset All	(YES/NO)	Can't reset language	NO

4.2.3.3. Factory Mode Introduction

Press[MENU], [Enter]& [POWER] at the same time, when Monitor is Power On OSD menu will be shown with "F" on the left top. Select "F" for entering factory mode.

AUTO Level: Automatically calibrate chip ADC parameter by using chip internal DAC.
GAIN: ADC gain value
OFFSET: ADC offset value
C1-Blue: Set color temperature 9300K
C2-Red: Set color temperature 5800K
C3-Normal: Set color temperature 6500K
C5-User: Set user preferred color temperature
Lang type: 17
Reset BL Hr: the time of backlight
Reset Total Hr: the total time when connect power
Return: Escape from 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 1920×1080@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 1920×1080@60Hz 2. Set Pattern to 32 gray shades 3. Set brightness/contrast to the max. The brightest 4~8 shades brightness cannot be distinguished.	Chroma Signal Generator

Color Temperature	1. Do “Auto Color Balance” at 1920×1080@60Hz, 32gray shades 2. Measure color temperature, check it complies with the following temperature : 5800K x=0.326 +/- 0.02, y = 0.342+/-0.02 6500K x = 0.313 +/- 0.02, y = 0.329+/-0.02 9300K x = 0.283 +/- 0.02, y = 0.297+/-0.02 dsfdfdfdfdfdfddfdf			Chroma Signal Generator and color analyzer
Modes switching check	1. Use Chroma Pattern Generator to make sequence. VESA (640x480 800x600 1024x768 1440x900 1920x1080), and power saving signal,etc. 2. Confirm the above timing modes must be full screen and the picture must be normal. 3. LED is amber at power saving mode.			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: 1920×1080@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: 1920×1080@60Hz 2. Pattern: full white 3. Brightness: Max. 4. Contrast: Default 5. Check power consumption	at each mode		Chroma signal generator

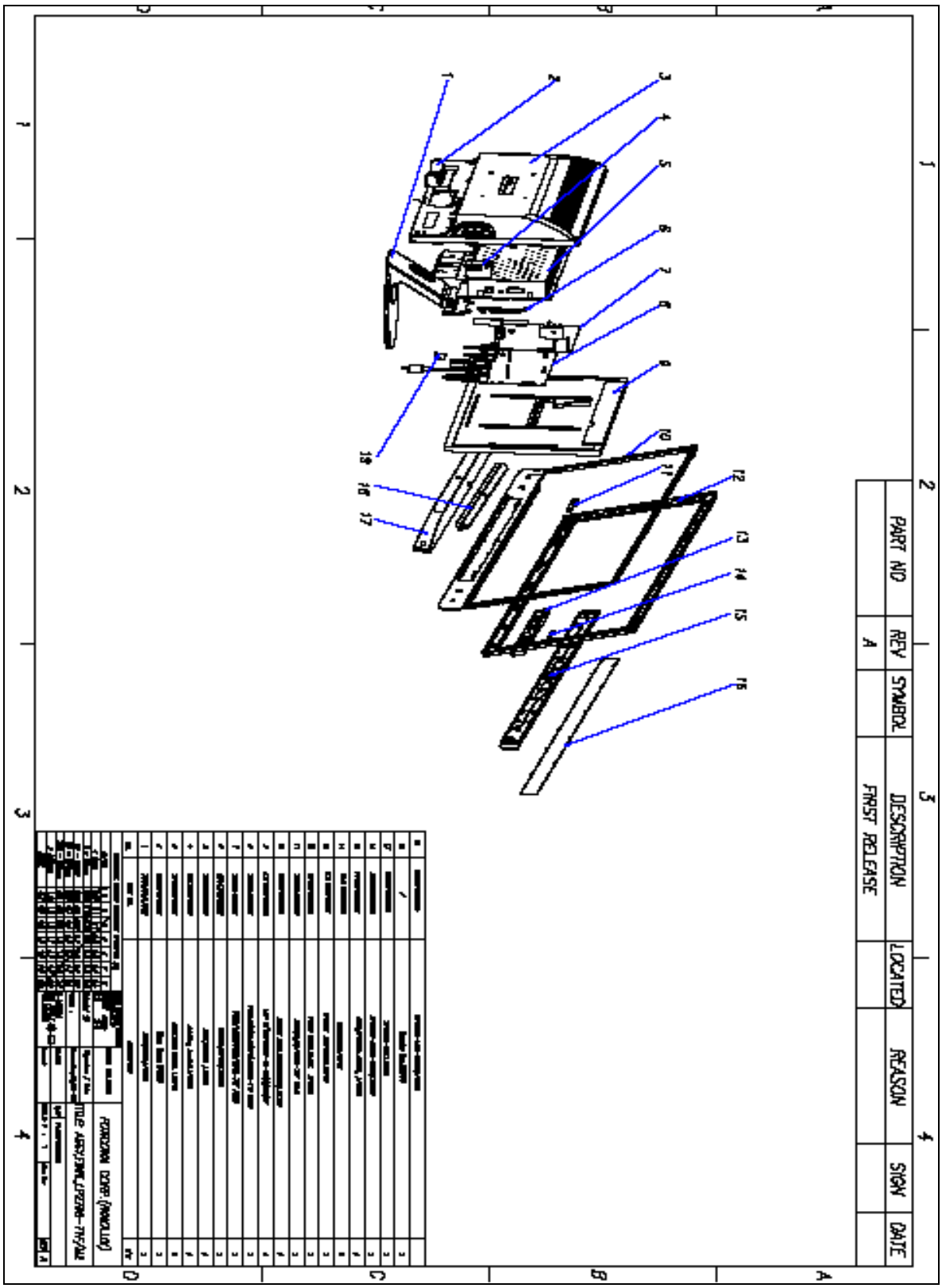
Status	H-sync	V-sync	Video	Power	LED
Power On	on	on	active	≤ 85W	Green
Power Saving	off	on	blanked	< 1W	Amber
	on	off	blanked	< 1W	Amber
	off	off	blanked	< 1W	Amber
Power Off	--	--	--	< 0.5W	Off

Remark:

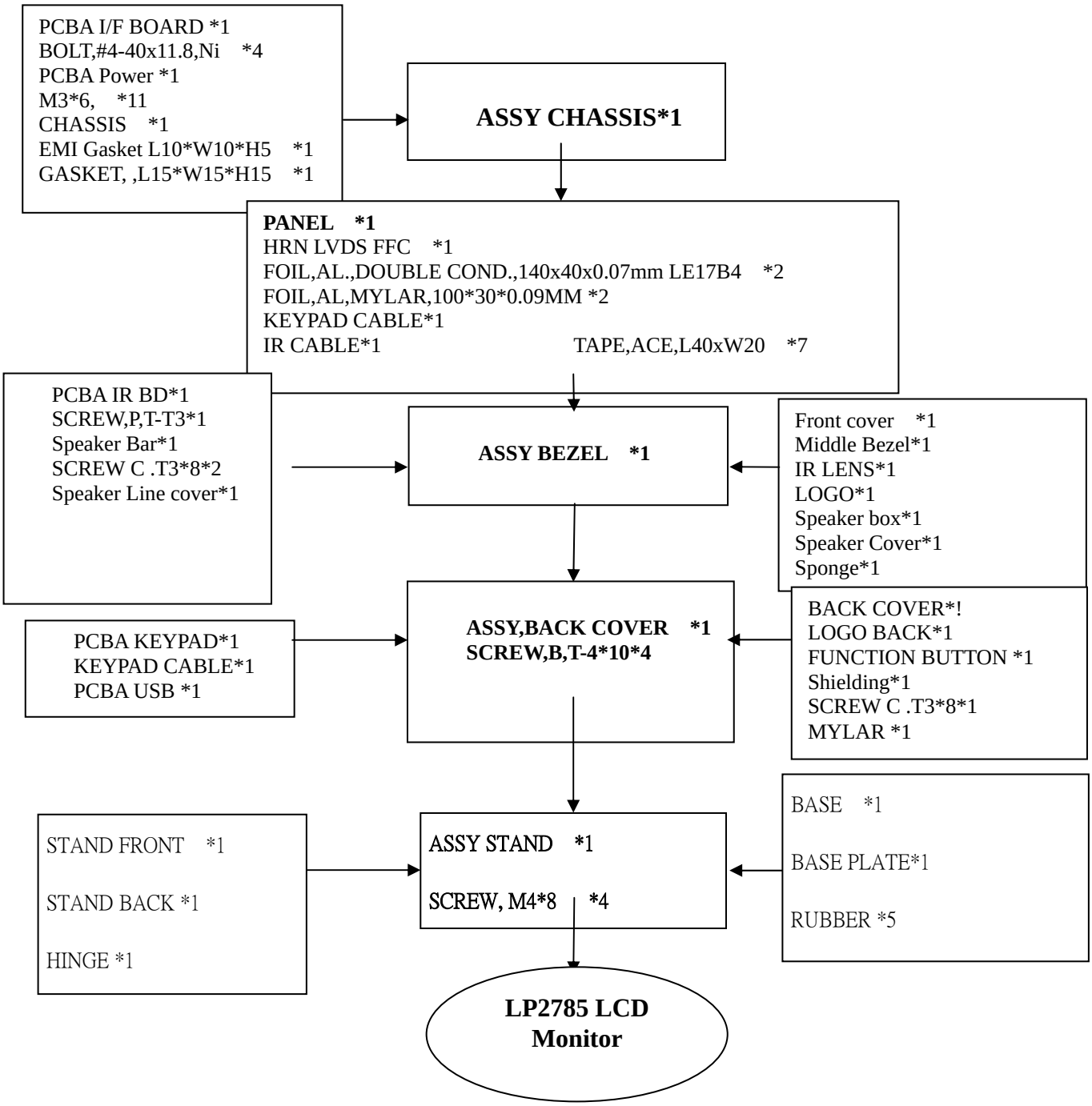
the table is for VGA,DVI and HDMI. But for S-Video, composite and component: power off < 0.5W. the three ports will not go in power saving.

5. Level 2 Disassembly/Assembly/Circuit Board/Standard Parts Replacement

5.1 Exploded Diagram



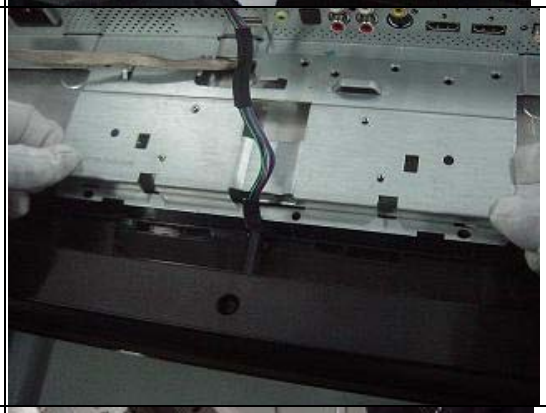
5.2 Assembly Block

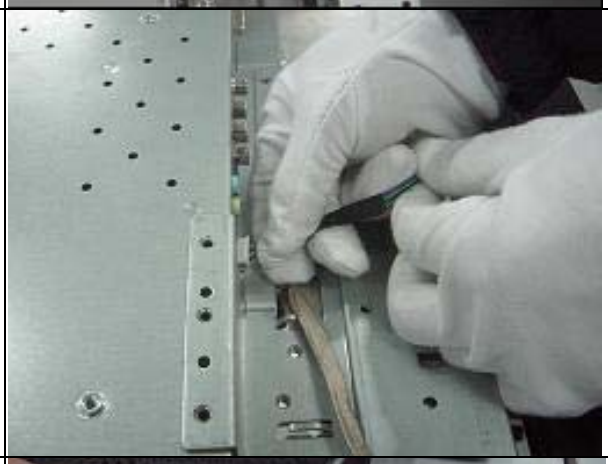


Note:

The assembly direction please following direction of arrowhead

I

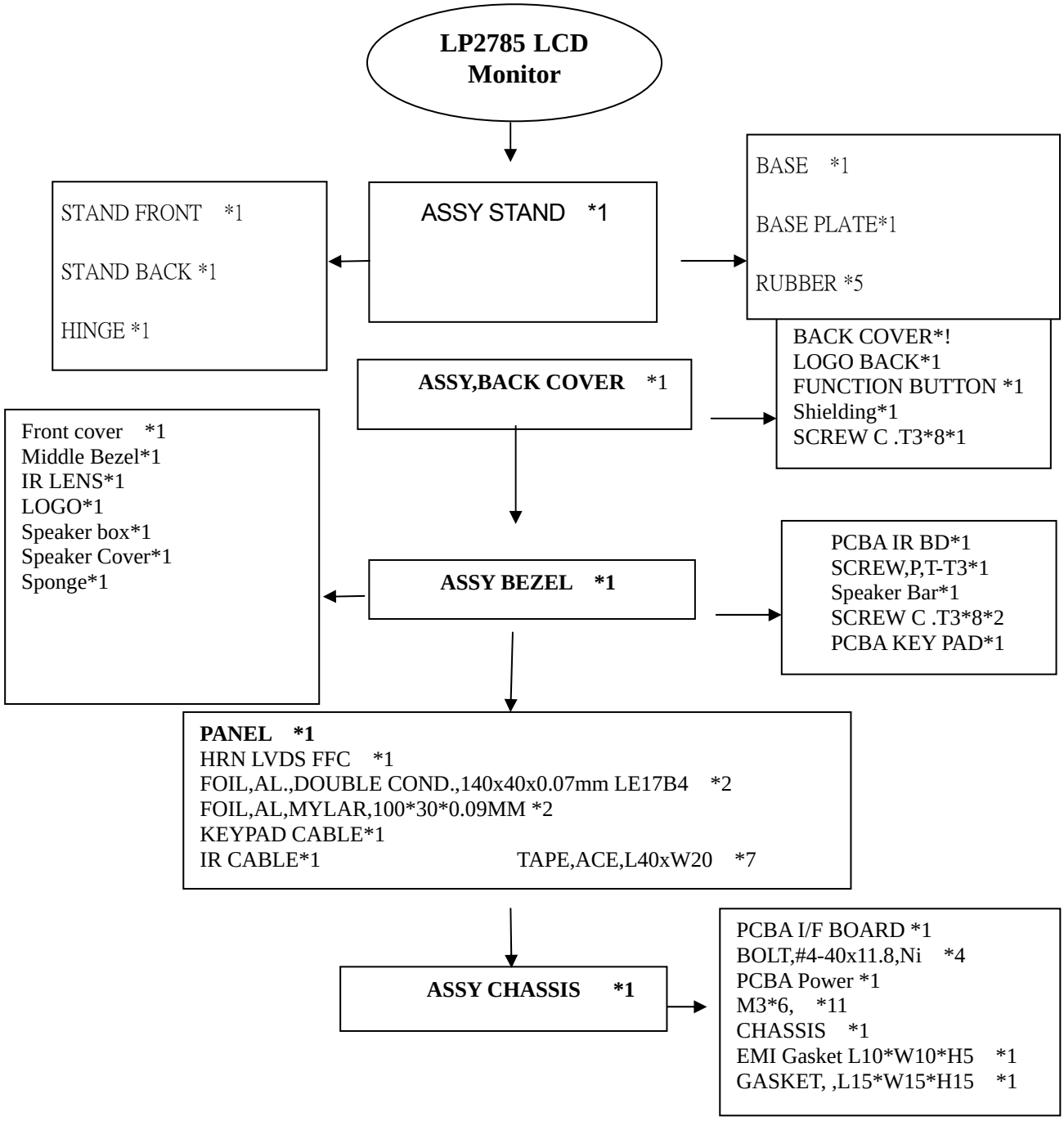
1	Assemble the panel with front-bezel		
2	Assemble chassis & Plug in the LVDS		
3	Assemble the IR BD		
4	Plug in the lamp lines		

5	Stick the foil			
6	Plug in the speaker line			
7	Assemble the keypad &keypad cable			
8	Assemble USB Cable& USB BD			

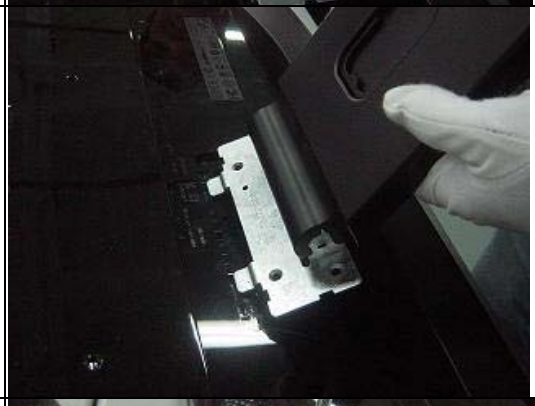
9	Connect the USB cable &KP Cable with IF BD			
10	Assemble the back-cover with screw			
11	Assemble the stand			
12	screw the stand with 4pcs screws			

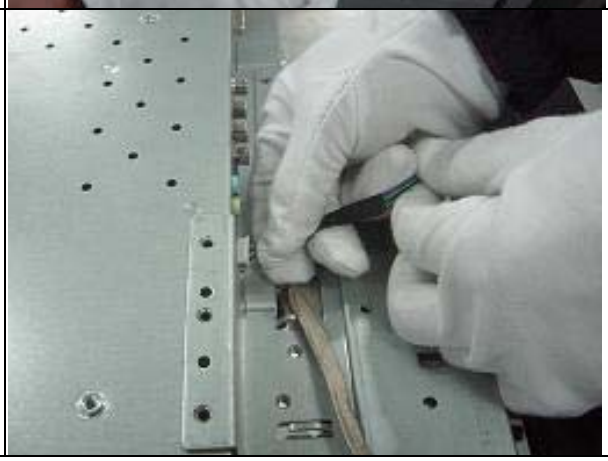
13	Assemble the hinge-cover			

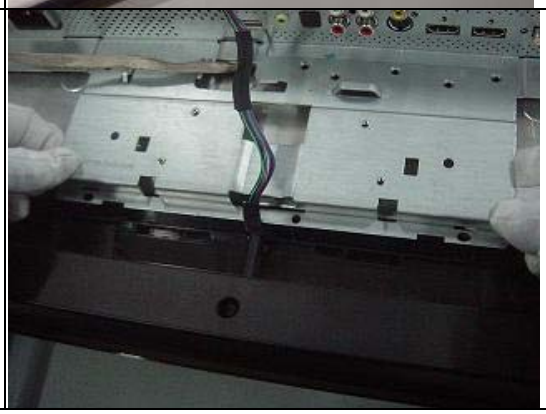
5.3 Disassembly Block



1	Remove the hinge-cover			

2	Remove 4pcs screws			
3	Remove the stand			
4	Disassemble the screw in the corners of back-cover			
5	Disassemble the three edge of front bezel and Remove the back cover			

6	Disconnect the USB cable &KP Cable with IF BD	
7	Disassemble USB Cable& USB BD	
8	Remove the keypad &keypad cable	
9	Pull out the speaker Cable	

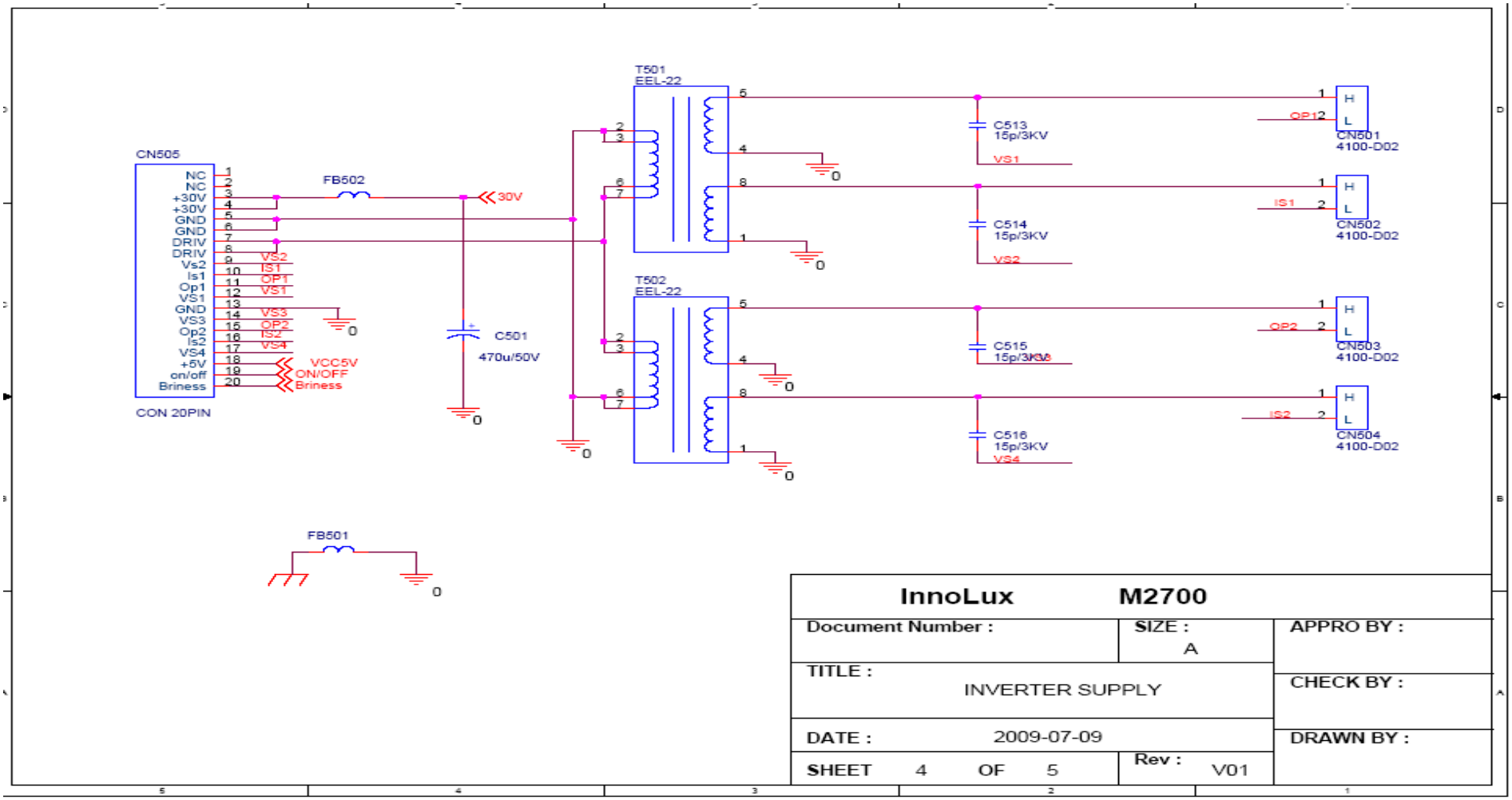
10	Remove the foil		
11	Pull out the lamp lines		
12	Disassemble the IR BD		
13	Disassemble chassis & Plug in the LVDS		

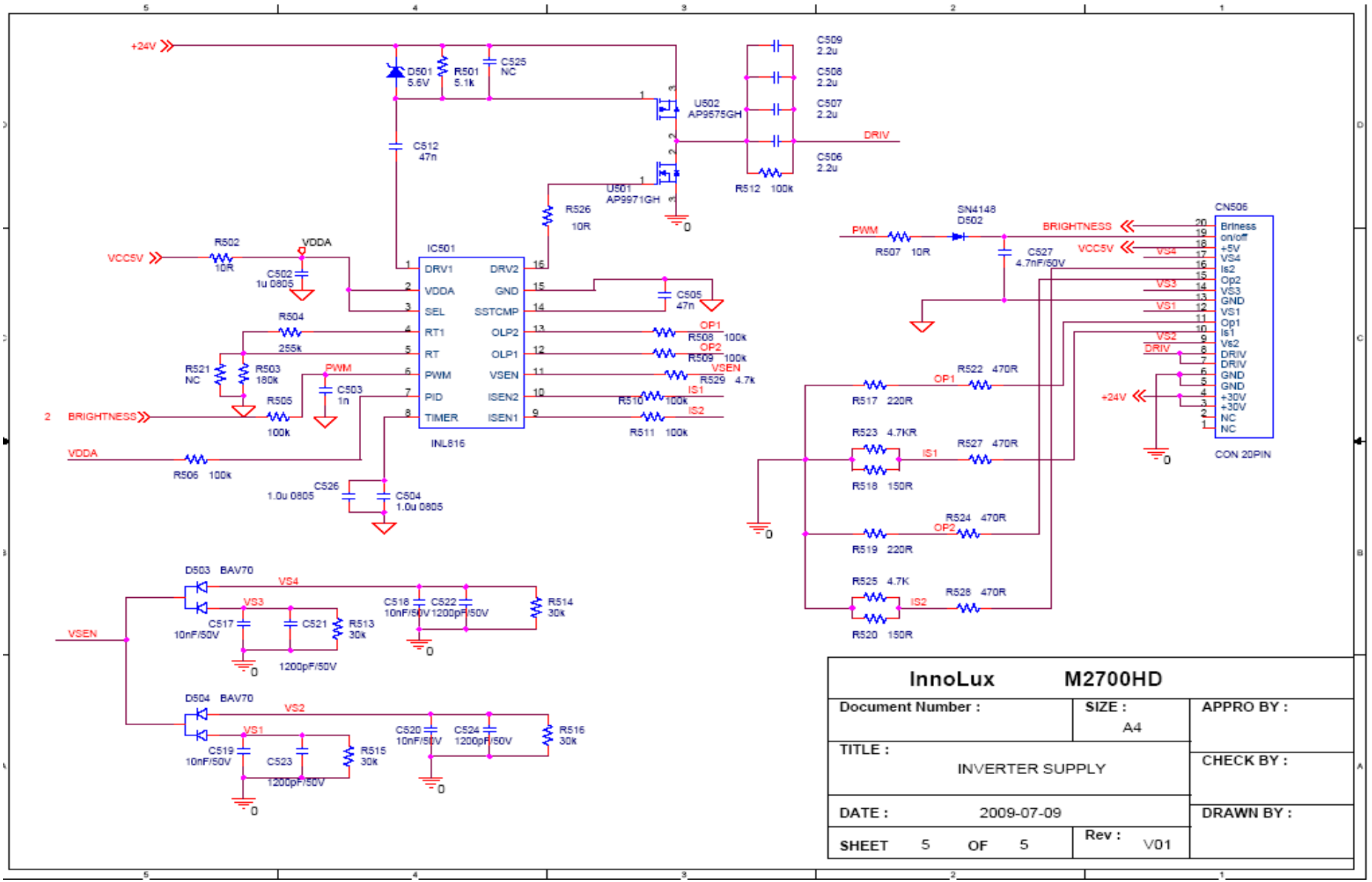
14	Remove the panel			

5. Circuit Board and Standard Parts Replacement

5.1. Block diagram

Power Board





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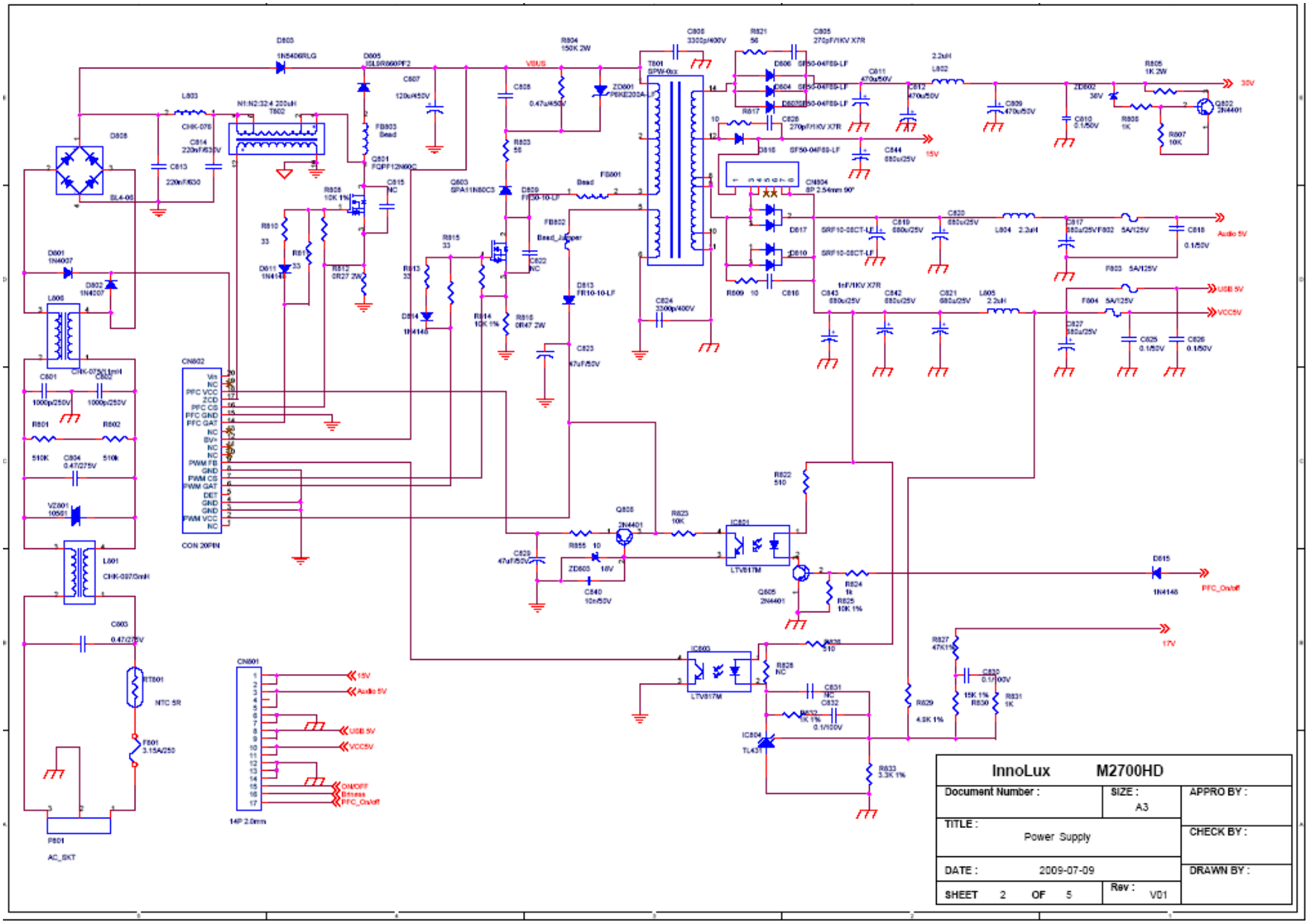
DATE : 2009-07-09		DRAWN BY :
SHEET 5 OF 5	Rev : V01	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APPRO BY :
TITLE : Power Supply
CHECK BY :
DATE : 2009-07-09
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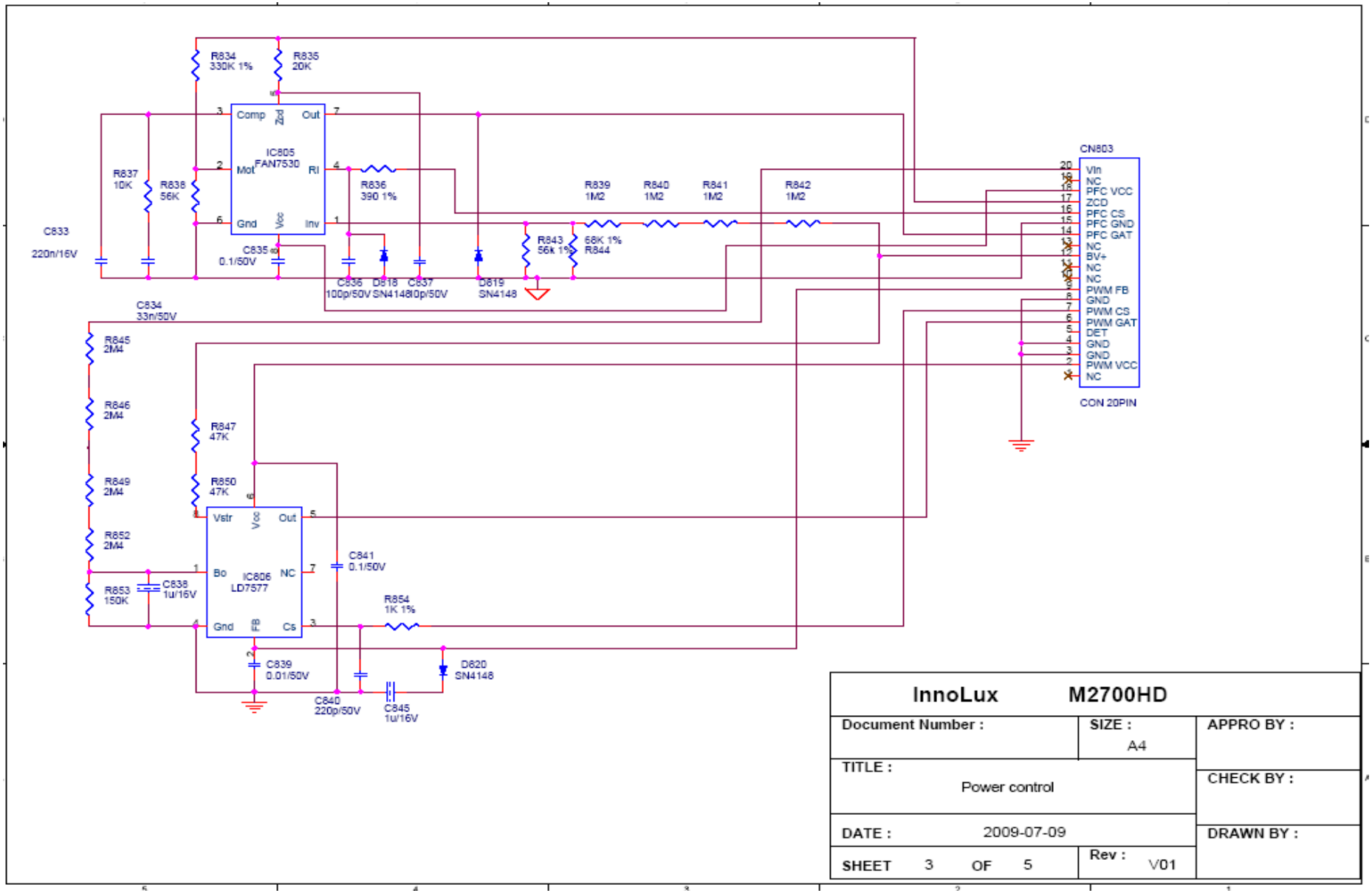
SHEET 2 OF 5
Rev : V01


R834 330K 1%
R835 20K
IC805 FAN7530
Comp
Zcd
Out
Mot
RI
Gnd
Vcc
Inv
R836 390 1%
R837 10K
R838 56K
C833 220n/16V
C835 0.1/50V
C836 100p/50V
D818 SN4148
C837 0p/50V
D819 SN4148
R839 1M2
R840 1M2
R841 1M2
R842 1M2
R843 56k 1%
R844 56K 1%
CN803
Vin
NC
PFC VCC
ZCD
PFC CS
PFC GND
PFC GAT
NC
BV+
NC
NC
PWM FB
GND
PWM CS
PWM GAT
DET
GND
GND
PWM VCC
NC
CON 20PIN
C834 33n/50V
R845 2M4
R846 2M4
R847 47K
R849 2M4
R850 47K
R852 2M4
R853 150K
C838 1u/16V
IC806 LD7577
Vstr
Vcc
Out
Bo
NC
Gnd
FB
Cs
C841 0.1/50V
R854 1K 1%
C839 0.01/50V
C840 220p/50V
C845 1u/16V
D620 SN4148
InnoLux M2700HD
Document Number :
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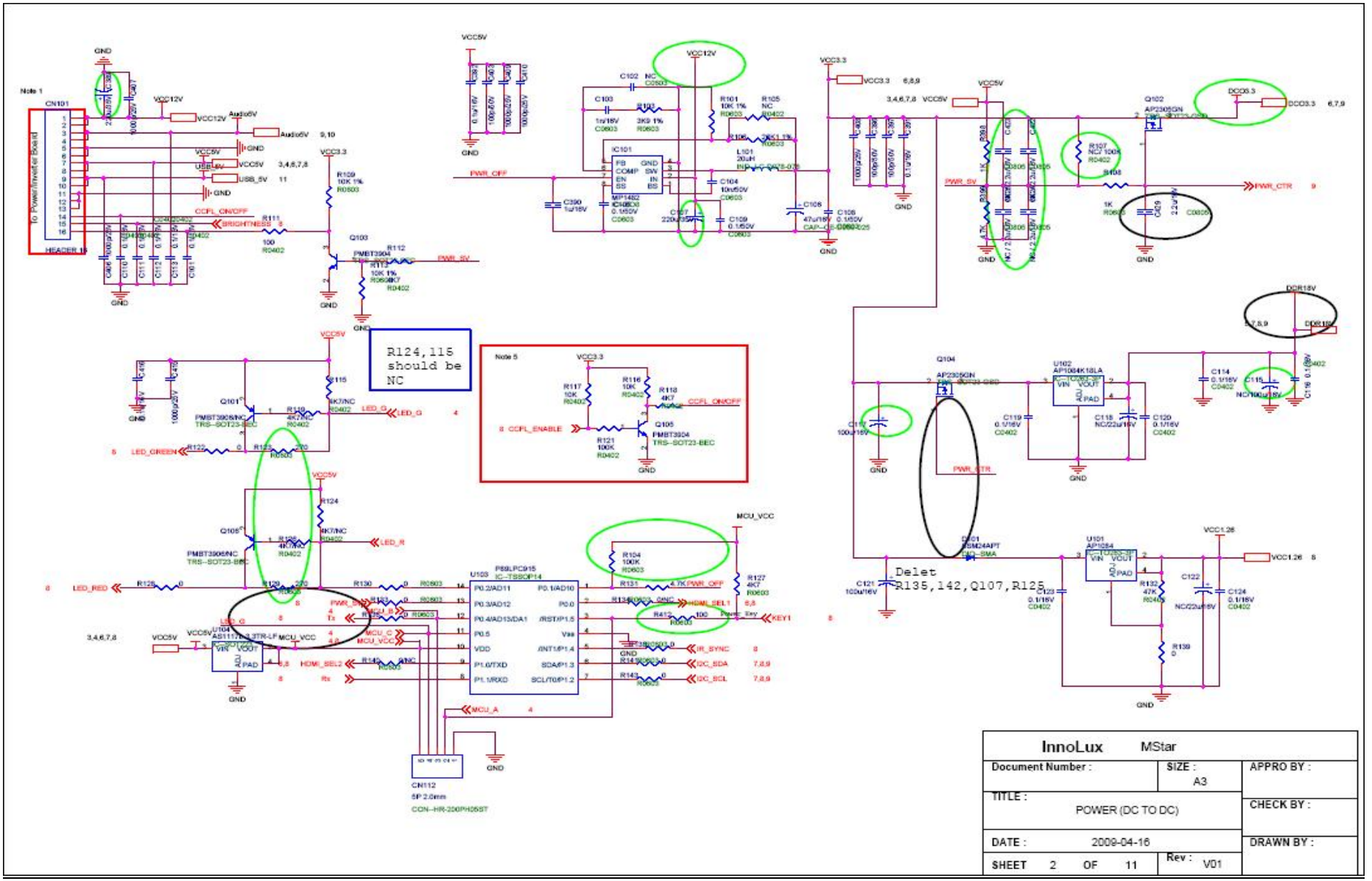
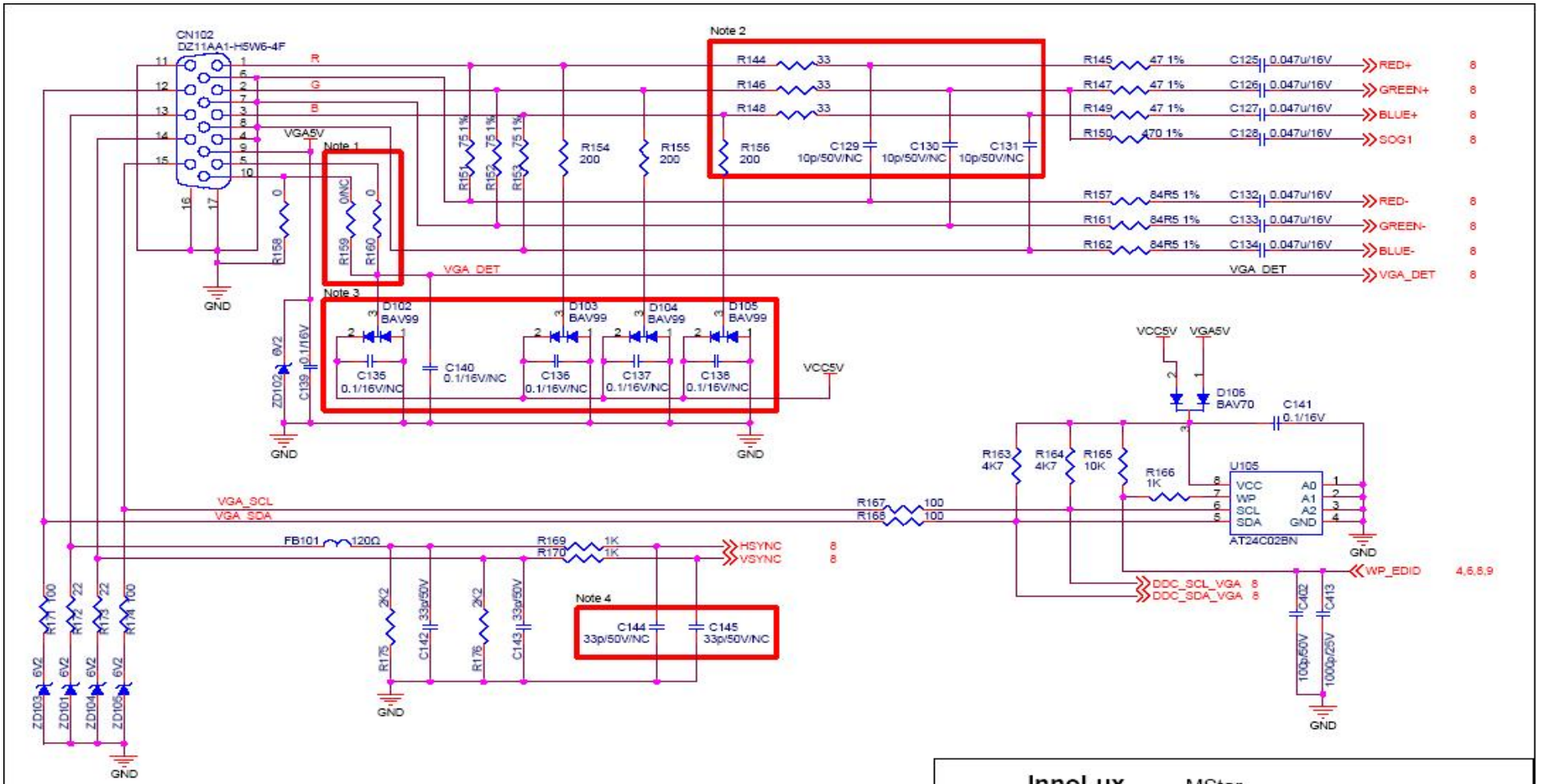
APPRO BY :
TITLE : Power control
CHECK BY :
DATE : 2009-07-09
DRAWN BY :
SHEET 3 OF 5
Rev : V01

IF Board


R124,115 should be NC
Delet R135,142,Q107,R125
InnoLux
MStar
Document Number :
SIZE : A3
APPRO BY :
TITLE : POWER (DC TO DC)
CHECK BY :
DATE : 2009-04-16
DRAWN BY :
SHEET 2 OF 11
Rev : V01



Note:
1. R120 is reserved for Samsung model.
2. R0603 package for Bead. C116,C117,C118 are reserved for EMI or performance issue.
3. C122,C123,C124,C125 are reserved for ESD or EMI issue.
4. C131,C132 are reserved for tuning performance issue.

InnoLux MStar		
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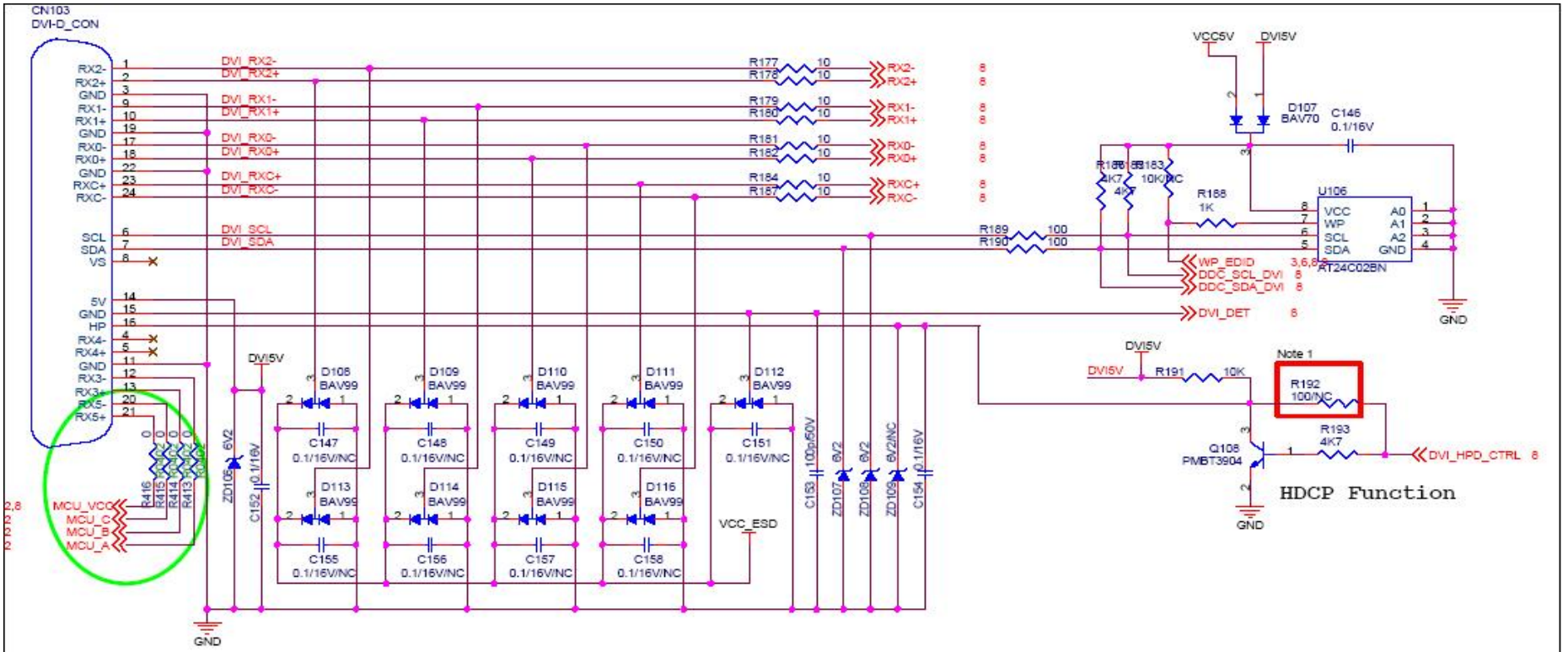
TITLE : VGA-INPUT		**CHECK BY :**
DATE : 2009-4-16		**DRAWN BY :**
SHEET 3 OF 11	**Rev :** V01	



Note:
1. R218 is reserved for some model.

InnoLux MStar		
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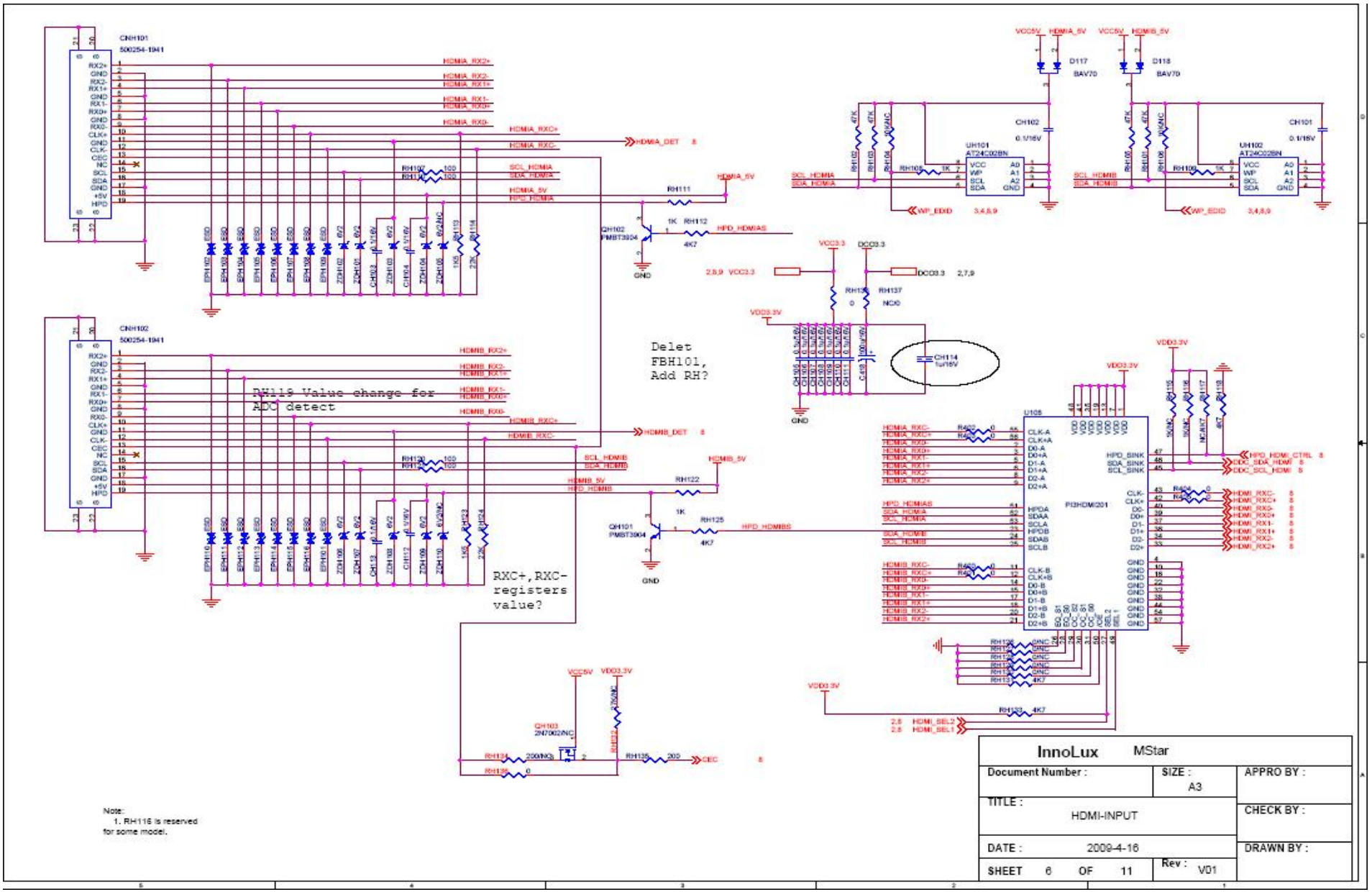
DATE : 2009-4-16		DRAWN BY :
SHEET 4 OF 11	Rev : V01	


CNH101
500254-1941
HDMIA_RX2+
HDMIA_RX2-
HDMIA_RX1+
HDMIA_RX1-
HDMIA_RX0+
HDMIA_RX0-
HDMIA_RXC+
HDMIA_RXC-
HDMIA_DET
SCL_HDMIA
SDA_HDMIA
HDMIA_5V
HPD_HDMIA
RH111
QH102
PMBT3904
HPD_HDMIAS
CNH102
500254-1941
HDMIB_RX2+
HDMIB_RX2-
HDMIB_RX1+
HDMIB_RX1-
HDMIB_RX0+
HDMIB_RX0-
HDMIB_RXC+
HDMIB_RXC-
HDMIB_DET
SCL_HDMIB
SDA_HDMIB
HDMIB_5V
HPD_HDMIB
RH122
QH101
PMBT3904
HPD_HDMIBS
RH119 Value change for ADC detect
Delet FBH101, Add RH?
RXC+,RXC- registers value?
VCC5V
HDMIA_5V
HDMIB_5V
D117
D118
BAV70
CH102
0.1/16V
UH101
AT24C02BN
UH102
AT24C02BN
WP_EDID
VCC3.3
DCC3.3
VDD3.3V
CH114
1u/16V
U105
PI3HDMI201
HPD_SINK
SDA_SINK
SCL_SINK
HPD_HDMI_CTRL
DDC_SDA_HDMI
DDC_SCL_HDMI
HDMI_SEL2
HDMI_SEL1
QH103
2N7002NC
CEC
Note:
1. RH116 is reserved for some model.
InnoLux
MStar
Document Number :
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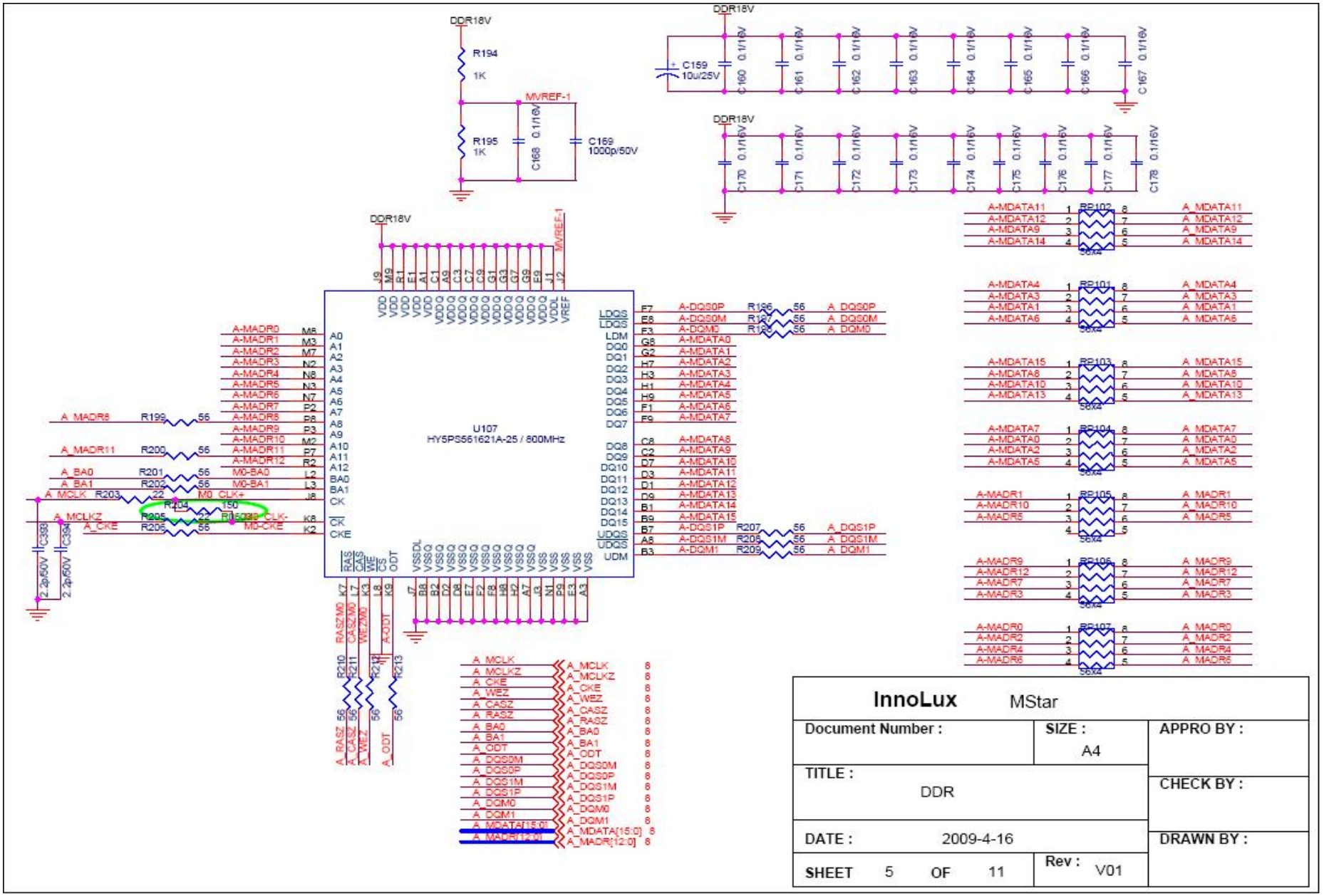
TITLE :
HDMI-INPUT
CHECK BY :
DATE :
2009-4-16
DRAWN BY :
SHEET 6 OF 11
Rev : V01


DDR18V
R194
1K
R195
1K
MVREF-1
C168 0.1/16V
C169
1000p/50V
C159
10u/25V
C160 0.1/16V
C161 0.1/16V
C162 0.1/16V
C163 0.1/16V
C164 0.1/16V
C165 0.1/16V
C166 0.1/16V
C167 0.1/16V
C170 0.1/16V
C171 0.1/16V
C172 0.1/16V
C173 0.1/16V
C174 0.1/16V
C175 0.1/16V
C176 0.1/16V
C177 0.1/16V
C178 0.1/16V
U107
HY5PS561621A-25 / 800MHz
A-MADR0
A-MADR1
A-MADR2
A-MADR3
A-MADR4
A-MADR5
A-MADR6
A-MADR7
A-MADR8
A-MADR9
A-MADR10
A-MADR11
A-MADR12
M0-BA0
M0-BA1
M0_CLK+
M0_CLK-
M0-CKE
A_MADR8
A_MADR11
A_BA0
A_BA1
A_MCLK
A_MCLKZ
A_CKE
R199 56
R200 56
R201 56
R202 56
R203 22
R204 150
R205 22
R206 56
C393 2.2p/50V
C394 2.2p/50V
A-DQS0P
A-DQS0M
A-DQM0
A-DQS1P
A-DQS1M
A-DQM1
R186 56 A_DQS0P
R187 56 A_DQS0M
R188 56 A_DQM0
R207 56 A_DQS1P
R208 56 A_DQS1M
R209 56 A_DQM1
A-MDATA0
A-MDATA1
A-MDATA2
A-MDATA3
A-MDATA4
A-MDATA5
A-MDATA6
A-MDATA7
A-MDATA8
A-MDATA9
A-MDATA10
A-MDATA11
A-MDATA12
A-MDATA13
A-MDATA14
A-MDATA15
RP102 A-MDATA11 A-MDATA12 A-MDATA9 A-MDATA14 A_MDATA11 A_MDATA12 A_MDATA9 A_MDATA14
RP101 A-MDATA4 A-MDATA3 A-MDATA1 A-MDATA6 A_MDATA4 A_MDATA3 A_MDATA1 A_MDATA6
RP103 A-MDATA15 A-MDATA8 A-MDATA10 A-MDATA13 A_MDATA15 A_MDATA8 A_MDATA10 A_MDATA13
RP104 A-MDATA7 A-MDATA0 A-MDATA2 A-MDATA5 A_MDATA7 A_MDATA0 A_MDATA2 A_MDATA5
RP105 A-MADR1 A-MADR10 A-MADR5 A_MADR1 A_MADR10 A_MADR5
RP106 A-MADR9 A-MADR12 A-MADR7 A-MADR3 A_MADR9 A_MADR12 A_MADR7 A_MADR3
RP107 A-MADR0 A-MADR2 A-MADR4 A-MADR6 A_MADR0 A_MADR2 A_MADR4 A_MADR6
RASZM0
CASZM0
WEZM0
A-ODT
R210 56
R211 56
R212 56
R213 56
A_RASZ
A_CASZ
A_WEZ
A_ODT
A_MCLK
A_MCLKZ
A_CKE
A_WEZ
A_CASZ
A_RASZ
A_BA0
A_BA1
A_ODT
A_DQS0M
A_DQS0P
A_DQS1M
A_DQS1P
A_DQM0
A_DQM1
A_MDATA[15:0]
A_MADR[12:0]
InnoLux
MStar
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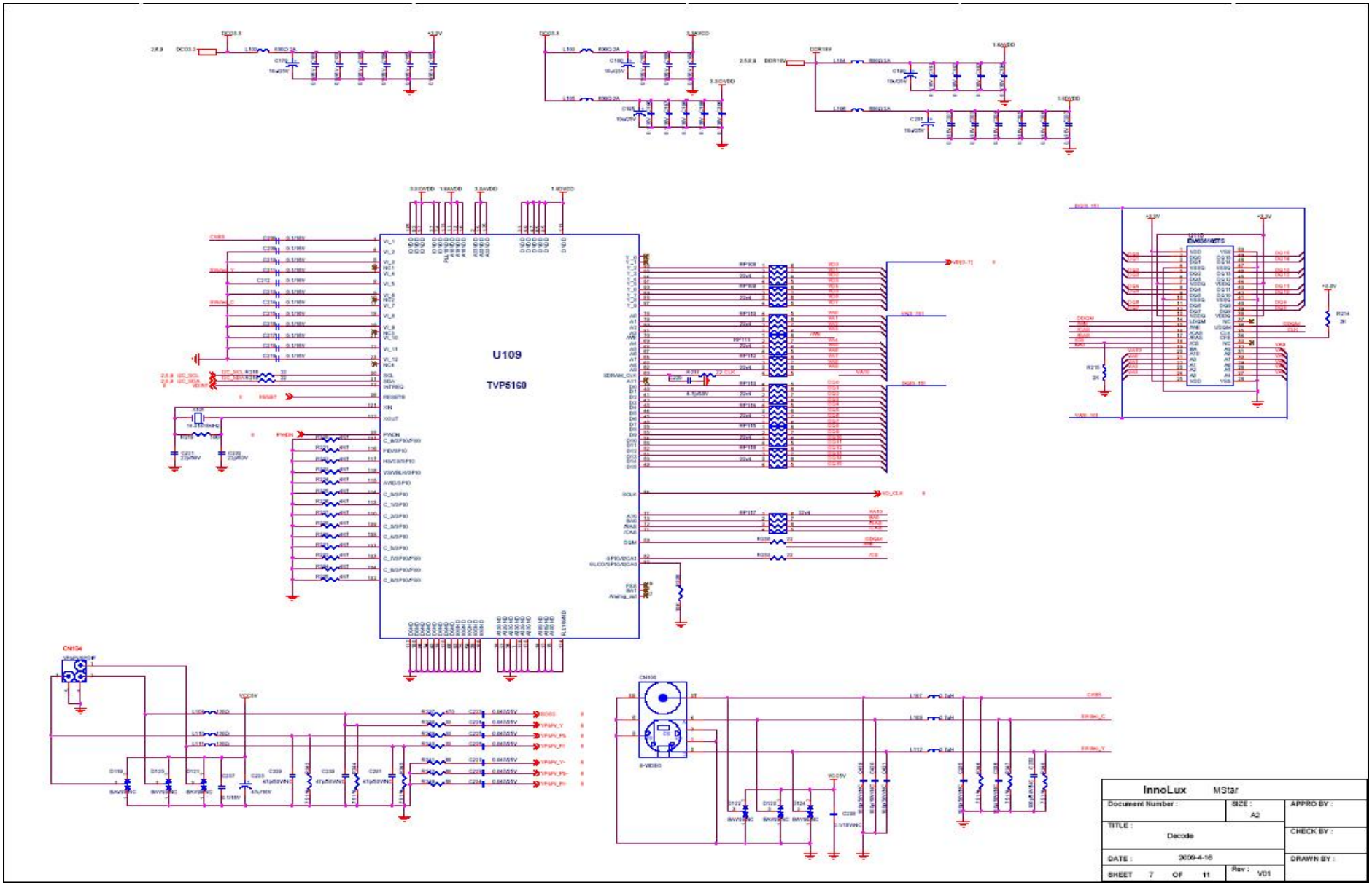
TITLE : DDR
CHECK BY :
DATE : 2009-4-16
DRAWN BY :
SHEET 5 OF 11
Rev : V01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TVP5160
InnoLux
MStar
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Decode
CHECK BY :
DATE :
2009-4-16
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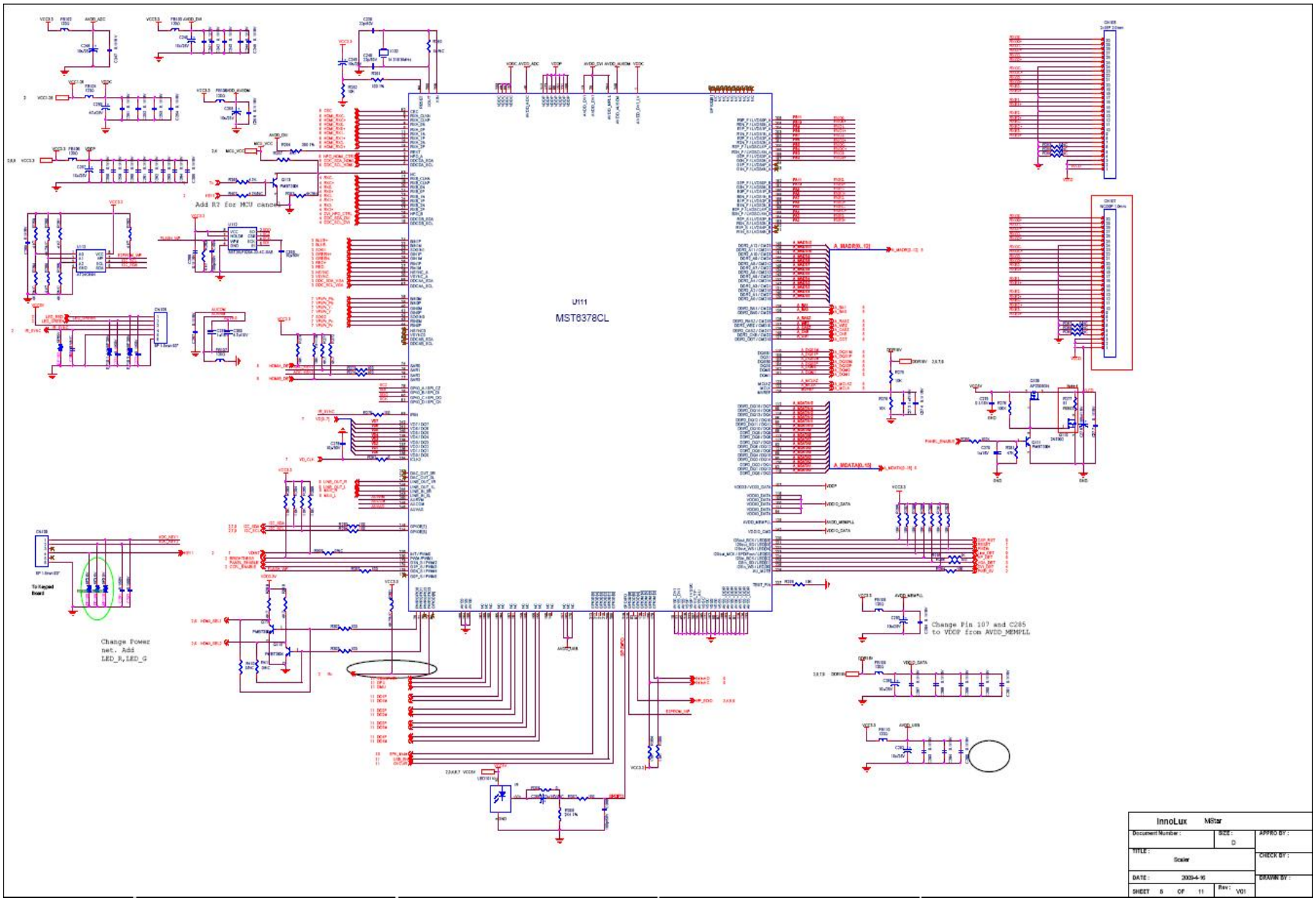
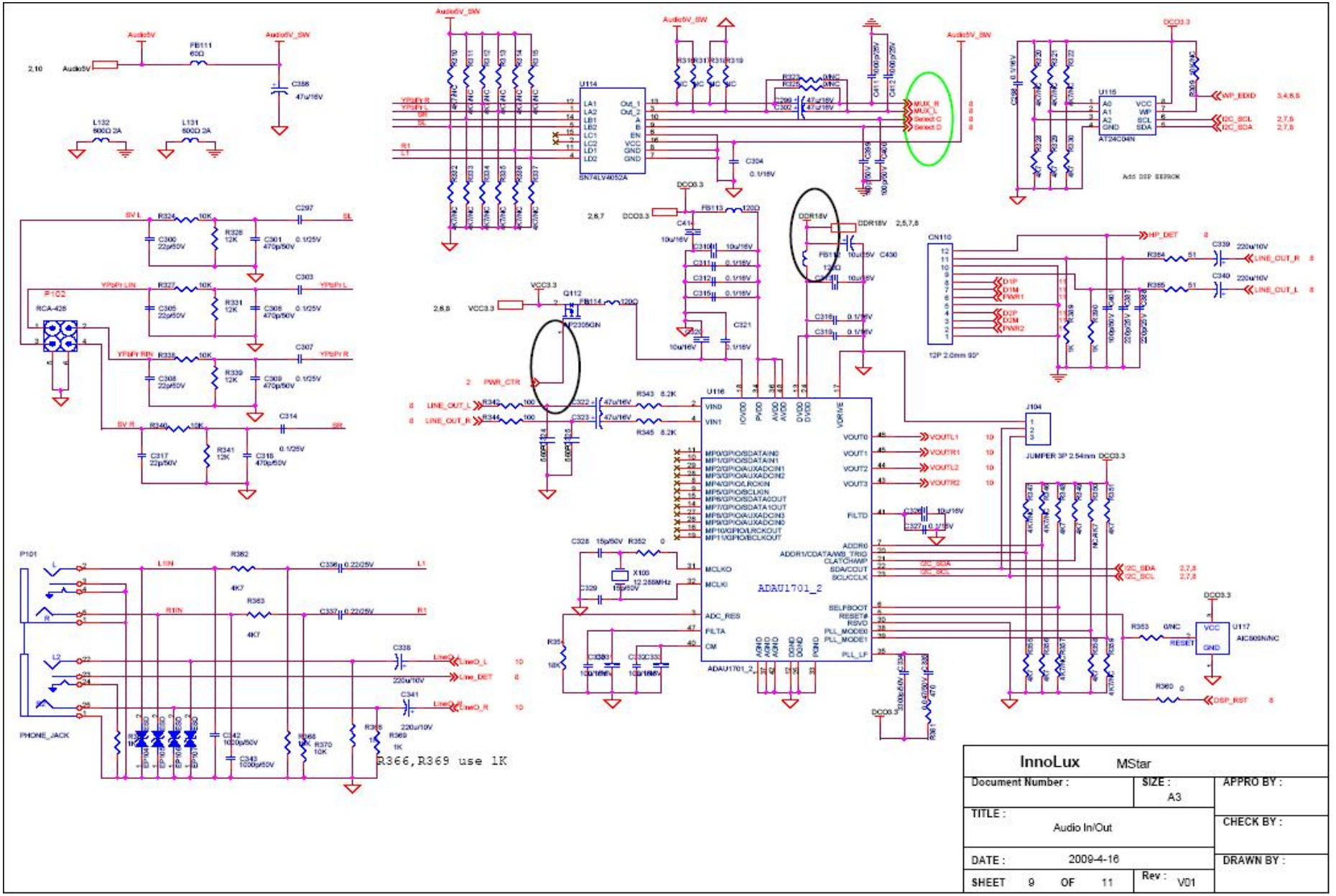
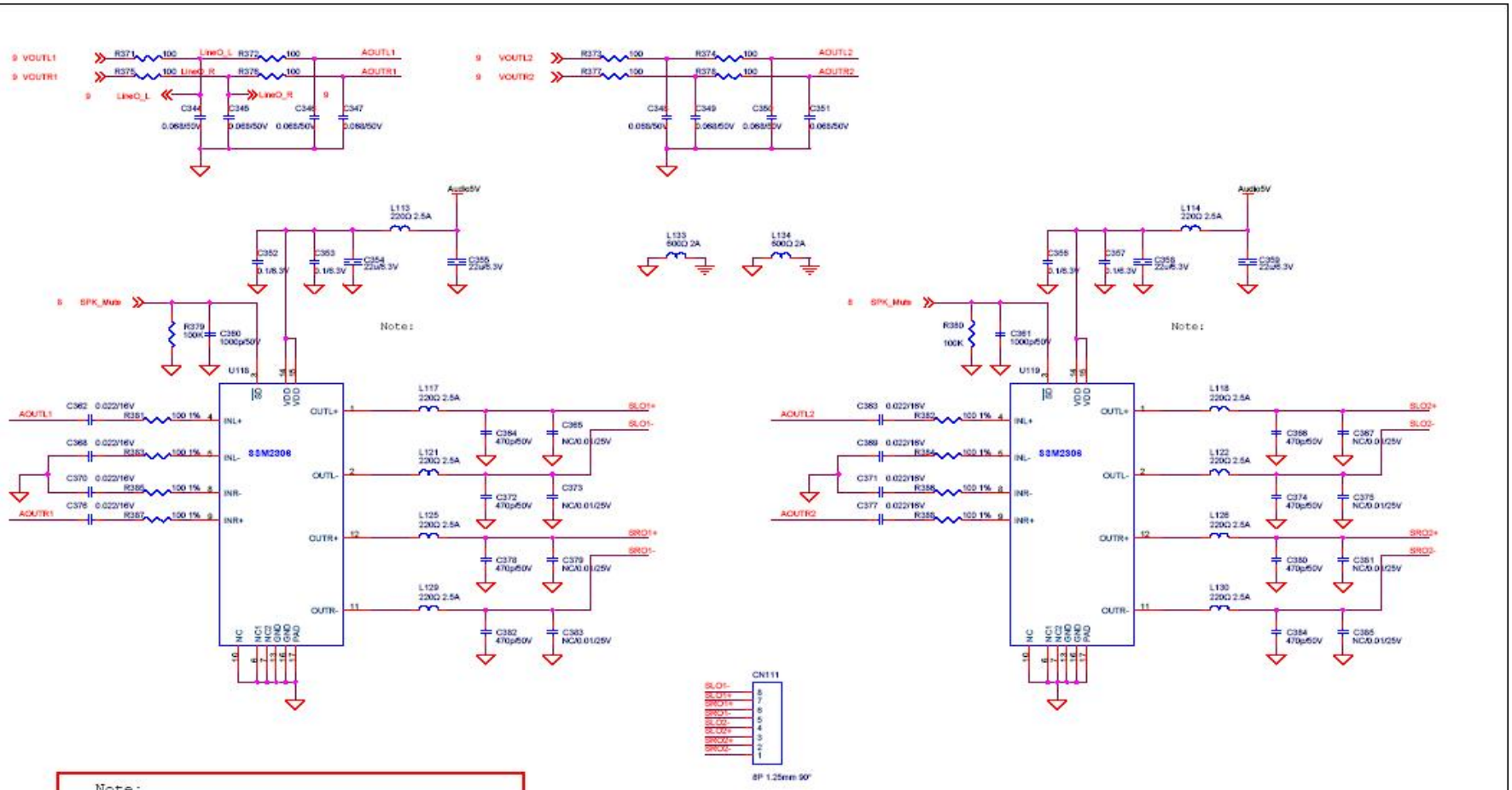
Rev : V01


U11
MST6378CL
Add R2 for MCU cancel
Change Power net, Add LED_R,LED_G
Change Pin 107 and C285 to VDDP from AVDD_MEMPLL
To Keypad Board
InnoLux
MStar
Document Number :
SIZE :
D
TITLE :
Scaler
DATE :
2009-4-16
SHEET 5 OF 11
Rev: V01
APPRO BY :
CHECK BY :
DRAWN BY :


R366,R369 use 1K
ADAU1701_2
SN74LV4052A
AT24C04N
PHONE_JACK
RCA-4P
12P 2.0mm 90°
JUMPER 3P 2.54mm
InnoLux
MStar
Document Number :
SIZE : A3
APPRO BY :
TITLE : Audio In/Out
CHECK BY :
DATE : 2009-4-16
DRAWN BY :
SHEET 9 OF 11
Rev : V01



Note:

The choke must be co-layed with the bead.

InnoLux MStar			
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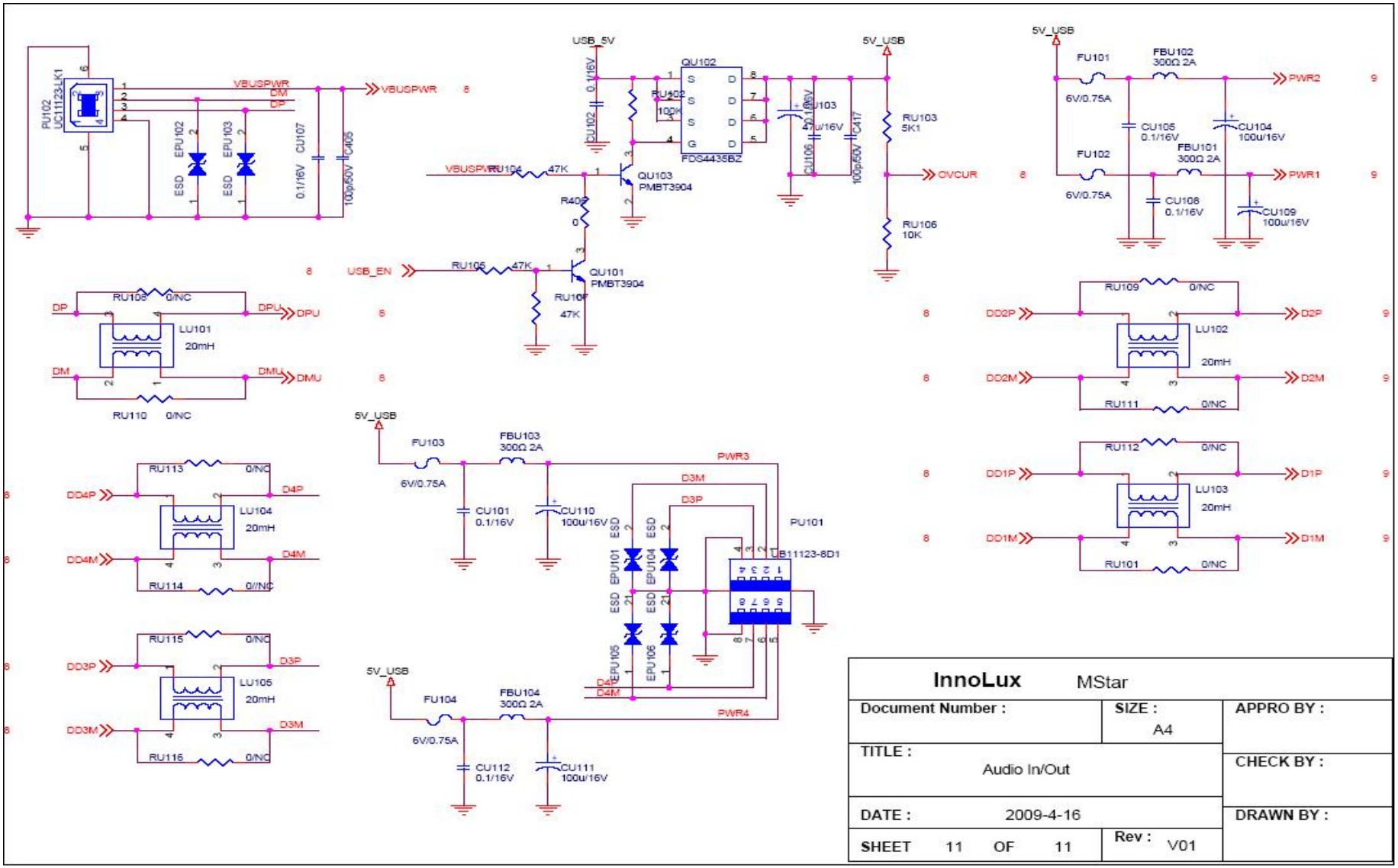
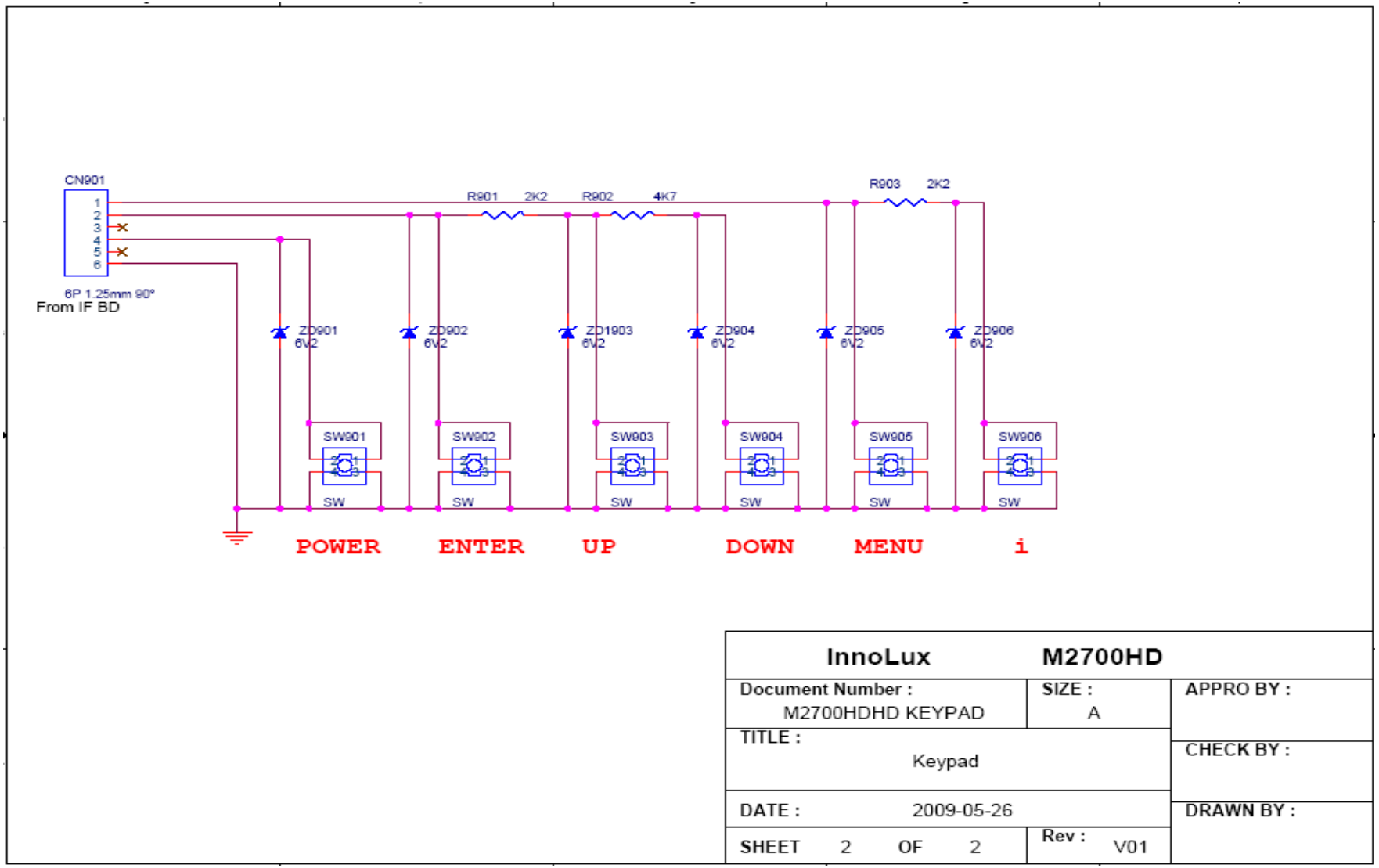
TITLE : Audio Input			CHECK BY :
DATE : 2009-4-16			DRAWN BY :
SHEET 10 OF 11		Rev : V01	


PU102
UC11123-LK1
VBUSPWR
DM
DP
EPU102
EPU103
ESD
CU107
0.1/16V
C405
100p/50V
USB_5V
CU102
0.1/16V
QU102
FDS4435BZ
RU102
100K
RU104
47K
QU103
PMBT3904
R402
0
RU105
47K
QU101
PMBT3904
RU107
47K
USB_EN
5V_USB
CU103
47u/16V
CU106
C417
100p/50V
RU103
5K1
RU106
10K
OVCUR
FU101
FBU102
300Ω 2A
6V/0.75A
CU105
0.1/16V
CU104
100u/16V
FU102
FBU101
300Ω 2A
CU108
0.1/16V
CU109
100u/16V
PWR2
PWR1
RU108
0/NC
DP
DPU
LU101
20mH
DM
DMU
RU110
0/NC
RU109
0/NC
DD2P
D2P
LU102
20mH
DD2M
D2M
RU111
0/NC
RU112
0/NC
DD1P
D1P
LU103
20mH
DD1M
D1M
RU101
0/NC
RU113
0/NC
DD4P
D4P
LU104
20mH
DD4M
D4M
RU114
0/NC
RU115
0/NC
DD3P
D3P
LU105
20mH
DD3M
D3M
RU116
0/NC
FU103
FBU103
300Ω 2A
6V/0.75A
CU101
0.1/16V
CU110
100u/16V
PWR3
D3M
D3P
PU101
UB1123-8D1
EPU101
EPU104
EPU105
EPU106
FU104
FBU104
300Ω 2A
6V/0.75A
CU112
0.1/16V
CU111
100u/16V
PWR4
InnoLux
MStar
Document Number :
SIZE :
A4
APPRO BY :
TITLE :
Audio In/Out
CHECK BY :
DATE :
2009-4-16
DRAWN BY :
SHEET 11 OF 11
Rev : V01

Keypad



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Document Number : M2700HDHD KEYPAD	SIZE : A	APPRO BY :
TITLE : Keypad		CHECK BY :
DATE : 2009-05-26		DRAWN BY :
SHEET 2 OF 2	Rev : V01	

IF board layout

LAYER	SILKSCREEN TOP			
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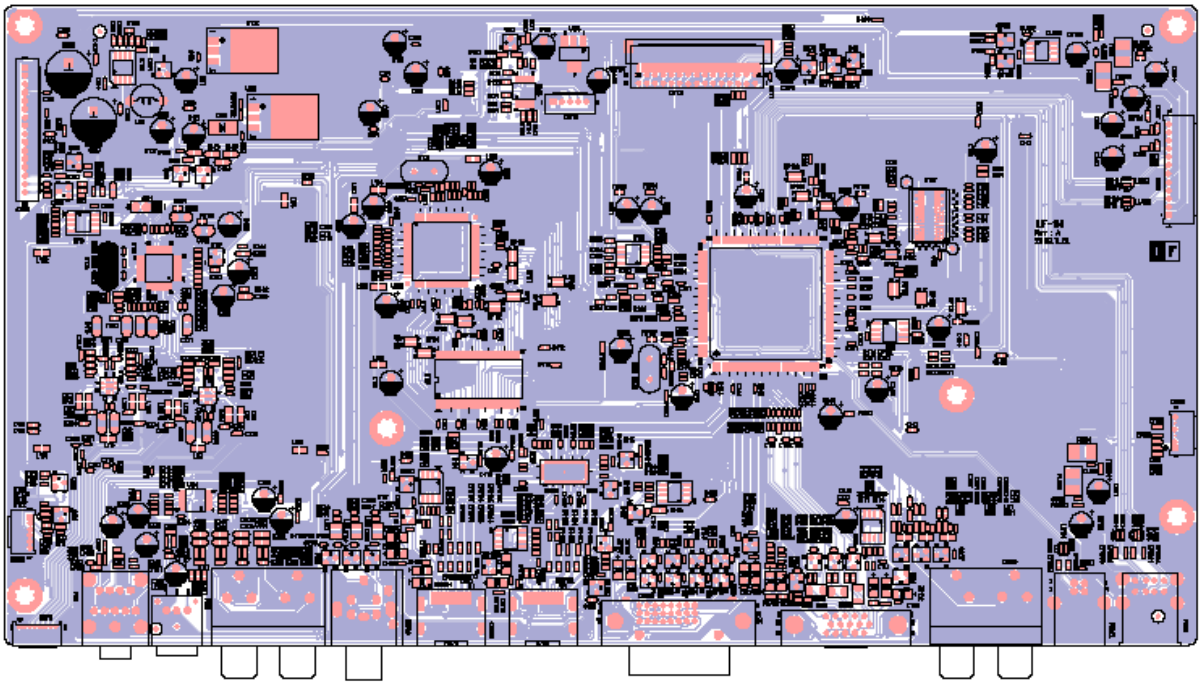
FILE NAME :	ILIF-188.PCB	DATE :	20099.11.19.	



Keypad board layout

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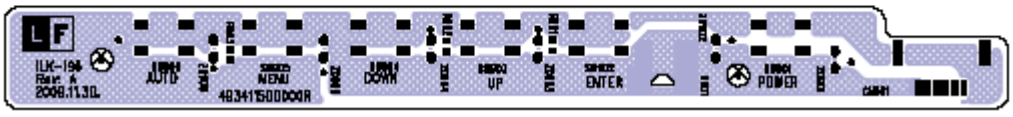
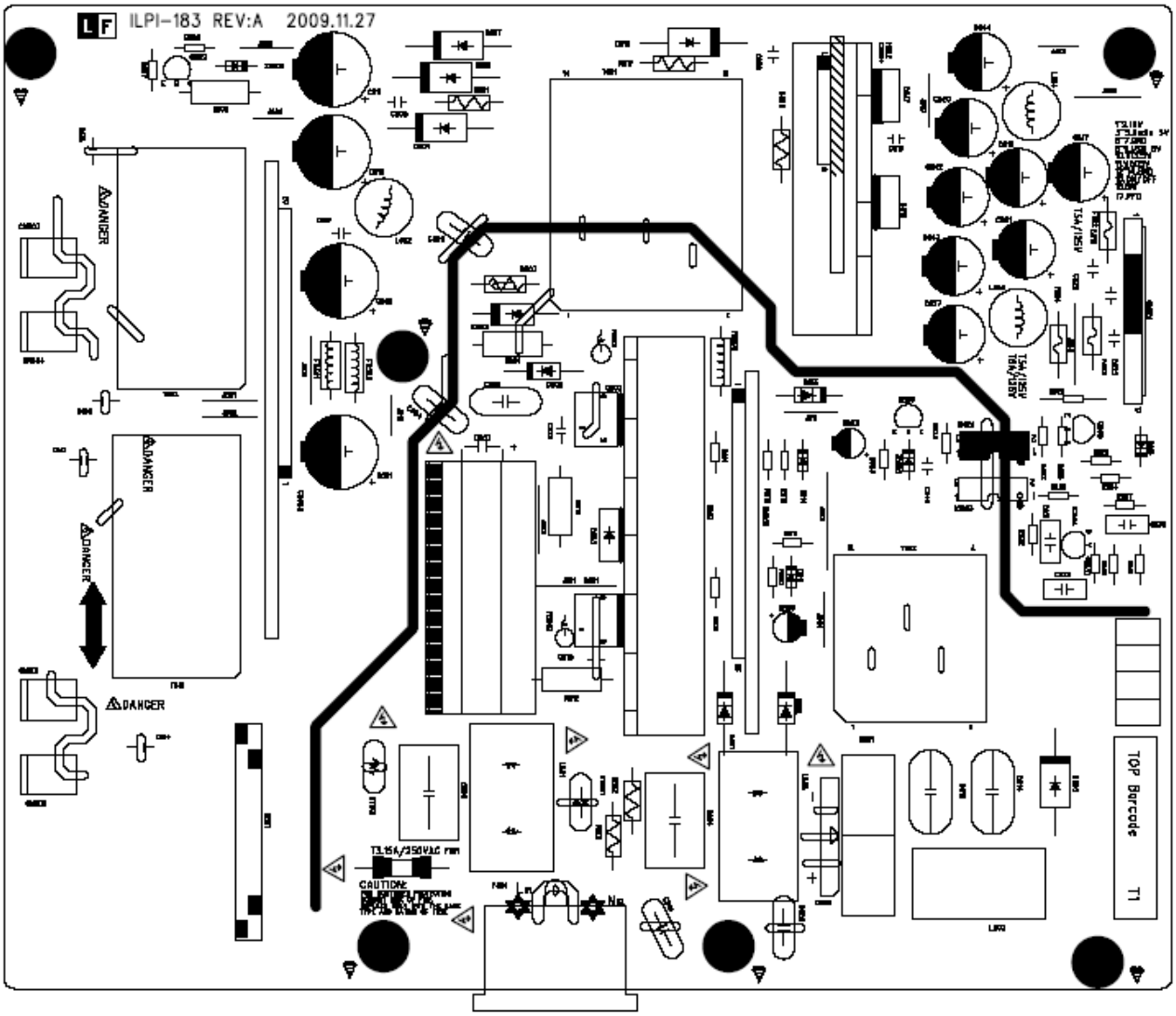
FILE NAME :	ILK-196.PCB	DATE :	2009.11.30.	



PI board layout

LAYER	SILKSCREEN TOP			
PCB NO :	ILPI-183.PCB	REV :	A	DESIGNER: Song Wen
FILE NAME :	493411400100R	DATE :	2009.11.27	



5.5 Circuit Operation Theory

Operation theory

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.D808 rectify AC in put to DC voltage, L801, L806,L803, C801, c802, C803, C804 ,c813, c814 formed a low frequency filter net for EMI and EMC.

High Voltage to Low Voltage Control Circuit

C807 is used to smooth the wave from rectifier. IC806 is a highly integrated PWM controller. When rectified DC high voltage is applied to the HV pin during start-up, the MOSFET Q803 is initially off befor the

Vcc pin capacitor is charged. When the Vcc pin voltage reaches approximately 16.5V, the control circuitry is activated and the soft-start begins. The soft-start circuit gradually increases the duty cycle of the MOSFET from zero to the maximum value over approximately 5ms. a stably output voltage Will be increase about 20ms later, and then feedback a continue current through the IC803 which control the output of the PWM IC. If no external feedback/supply current is feed into the FB pin by the end of the soft-start, the current Set point will be above the fault level, FAULT flag is raised, if the FAULT duration exceeds 56ms, the output controller disable,

Resistor R845, R846, R849, R52, are for line over voltage shutdown(OVP) and Brown Out Protection (BOP)

When PWM is turned off, the main current flow will be consumed through R803,R804,ZD801, C808 and D802, This will prevent MOSFET Q803 from being damaged under large current impulse and voltage spike.

D813 and C823 to provide internal Auxiliary voltage to Vcc pin during normal operation.

DC_5V and DC_16V Output Circuit

For DC VCC 5V, D817,D810 is used to rectify the inducted current. R809 and C816, are used to store energy when current is reversed. The parts including C819, C820,C821,C842,C843,C827 and c817 are used to smooth the current waves.

For DC Audio 17V, D805 is used to rectify the inducted current. R812 and C813, are used to store energy when current is reversed. The parts including C823, C824,L803 are used to smooth the current waves.

For DC 30V, D804,D806,D807 is used to rectify the inducted current. R817 and C828 are used to store energy when current is reversed. The parts including C844 is used to smooth the current waves.

Feedback Circuit

Pin R of IC803 is supplied 2.5-v stable voltage. It connects to 5V and 17V output through R833, R829,R827 and R830, they are output voltage sampling resistor. When the sampling voltage more than 2.5V or less than 2.5V, current of FB IC802 will change, this can change the voltage from T801.

5.6 I/F Circuit

5.6.1.1 RGB CAPTURE

- Signal RED,GREEN,BLUE input through CN102 #1,#2,#3, Stop DC via R145&C125, R147&C126 and R149&C127 and then enter into U111 (scaler) analog input terminal #36,#34,#31, and then scaler deals with signal internally.
- Signal DDC_SCL (series clock) inputs via CN102#15, and then passes through R167, goes into U111#67.
- Signal DDC_SDA (series data) inputs via CN102#12, and then passes through R168, goes into U111 #66.
- Signal TTL vertical sync. (Vsync) inputs via CN102 #14, and then clamped by ZD104 Zener, passes through R170, and then goes into IC U111 (scaler) #30.

- Signal TTL horizontal sync. (Hsync) inputs via CN102 #13, and then clamped by ZD101 Zener, passes through FB101,R169, and then goes into IC U111 (scaler) #29.
- CN102#5 is defined as cable detect pin, this detector realize passes through R290 Pull high, go into U111#225.

5.6.1.2 Buttons Control

- Button “Power” in right of bezel connects to U103 #3 through R412, via CN109#4.
- Button “UP” “DOWN ““MENU” “ENTER” in the bottom of bezel connects to U111 #75,#76, through R273,R274, via CN109 #1, #2
- U113 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 #11 sends out a high potential, via R129, flow to CN108 #2 on IR board, LED Green ON.
  b. When press button “power”, U103 #14 sends out a high potential, via R123, flow to CN108 #1 on IR board, LED Red ON.
  c. When in “Suspend” mode, U103 #14，#11 sends out a high potential, via R129,R123 flows to CN108 #1, #2 on IR board, LED Amber ON.

5.6.1.3 Mstar CHIP U111 (scaler)

- U111 (MST6378UCL) #183~#192 and #197~#206 output 8 bit LVDS digital data to panel control circuit through CN107.
- U111 (MST6378UCL) #230 outputs Brightness “PWM” signals to control CCFL brightness.
- U111 (MST6378UCL) #173 output PANEL_ENABLE to make Q111 conducted, and then make Q109 conducted, +5V flow to CN107#1~#3 as Panel VDD .
- U111 (MST6378UCL) #174 output CCFL_ON/OFF ”H” and “L” potential to control Inverter on/off.

Please refer to MST6378UCL Pin Assignments table in page

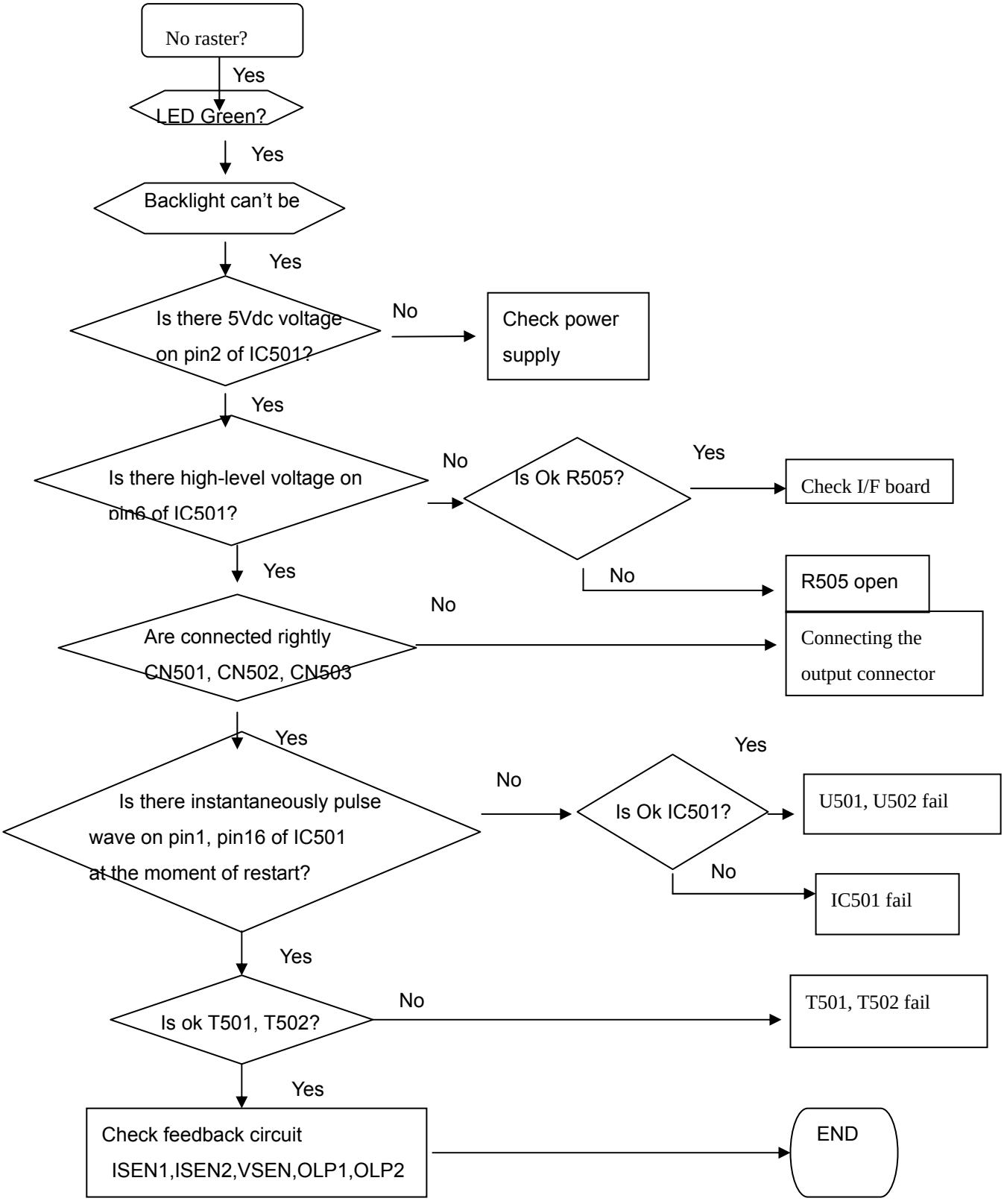
5.6.1.4 Regulator Circuit

- VCC5V is from power board supply for Panel, LED, MCU used.
- VCC3.3V generates from VCC16V through IC101 which is output +3.3V for U102 and U101 used.
- DDR18V generates from VCC3.3V through U102 which is output +1.8V.
- VCC1.26 generates from VCC3.3V through U101 which is output +1.26V.

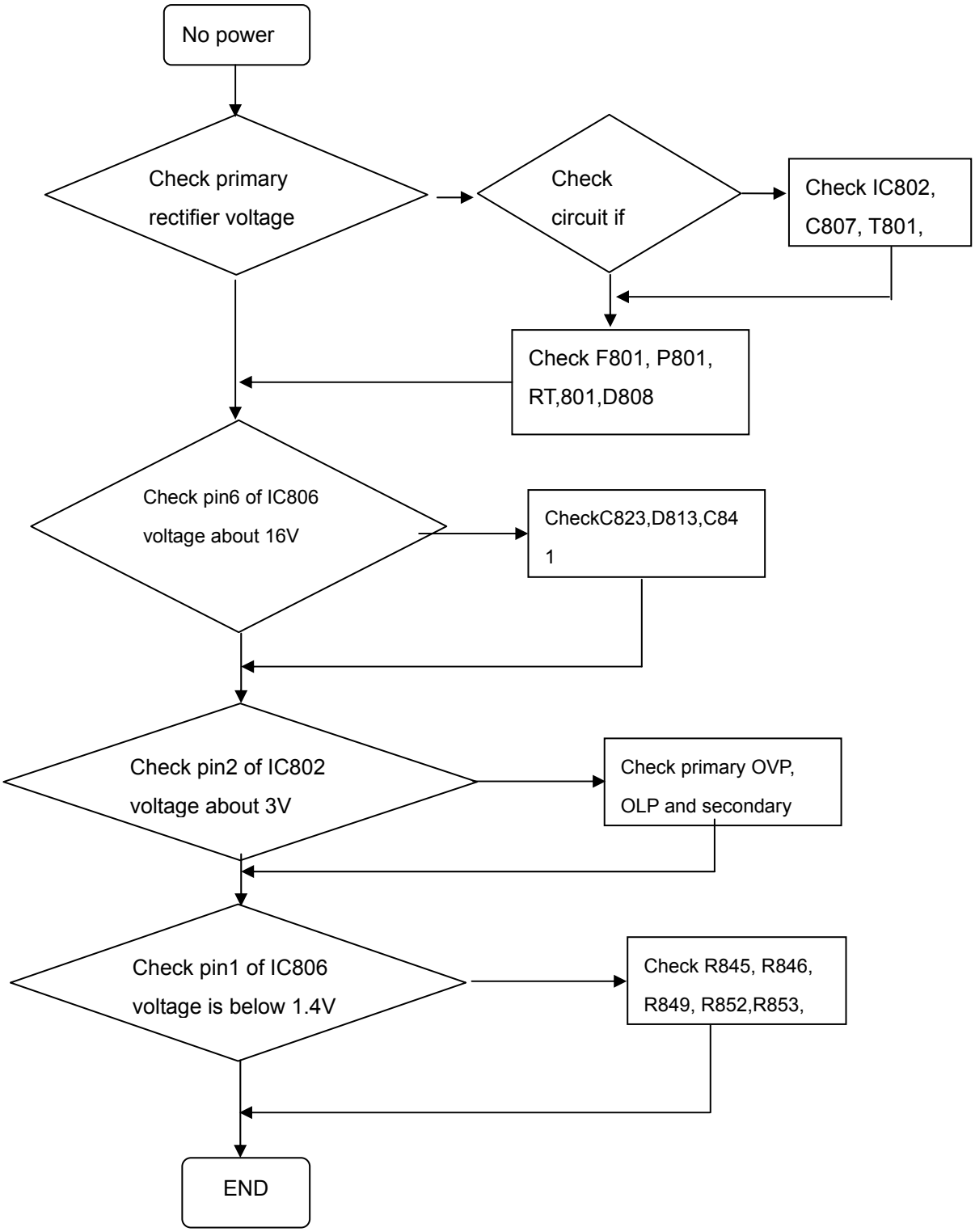
5.7 Trouble Shooting Guide

Inverter trouble shooting

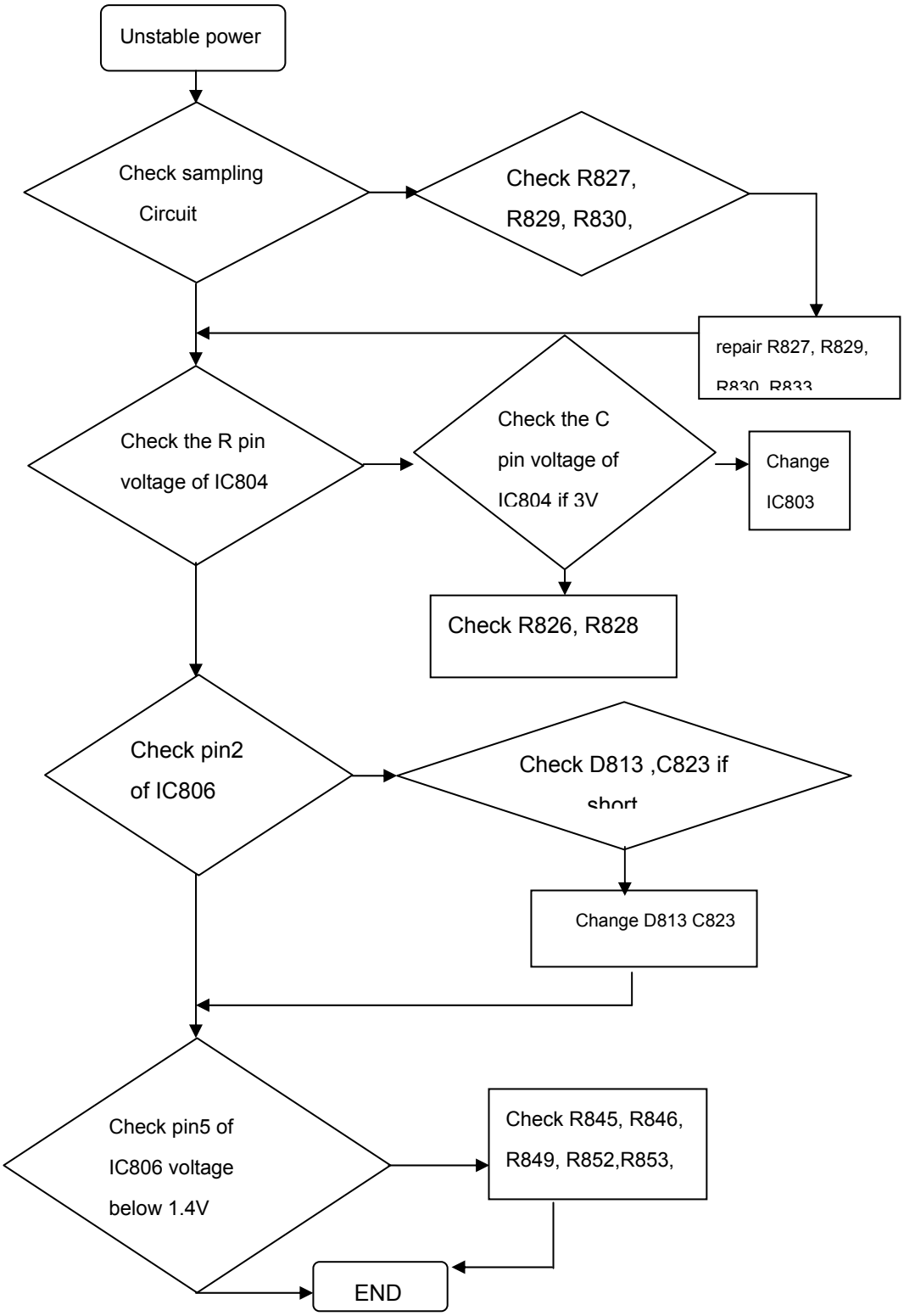
Backlight can't be turned on



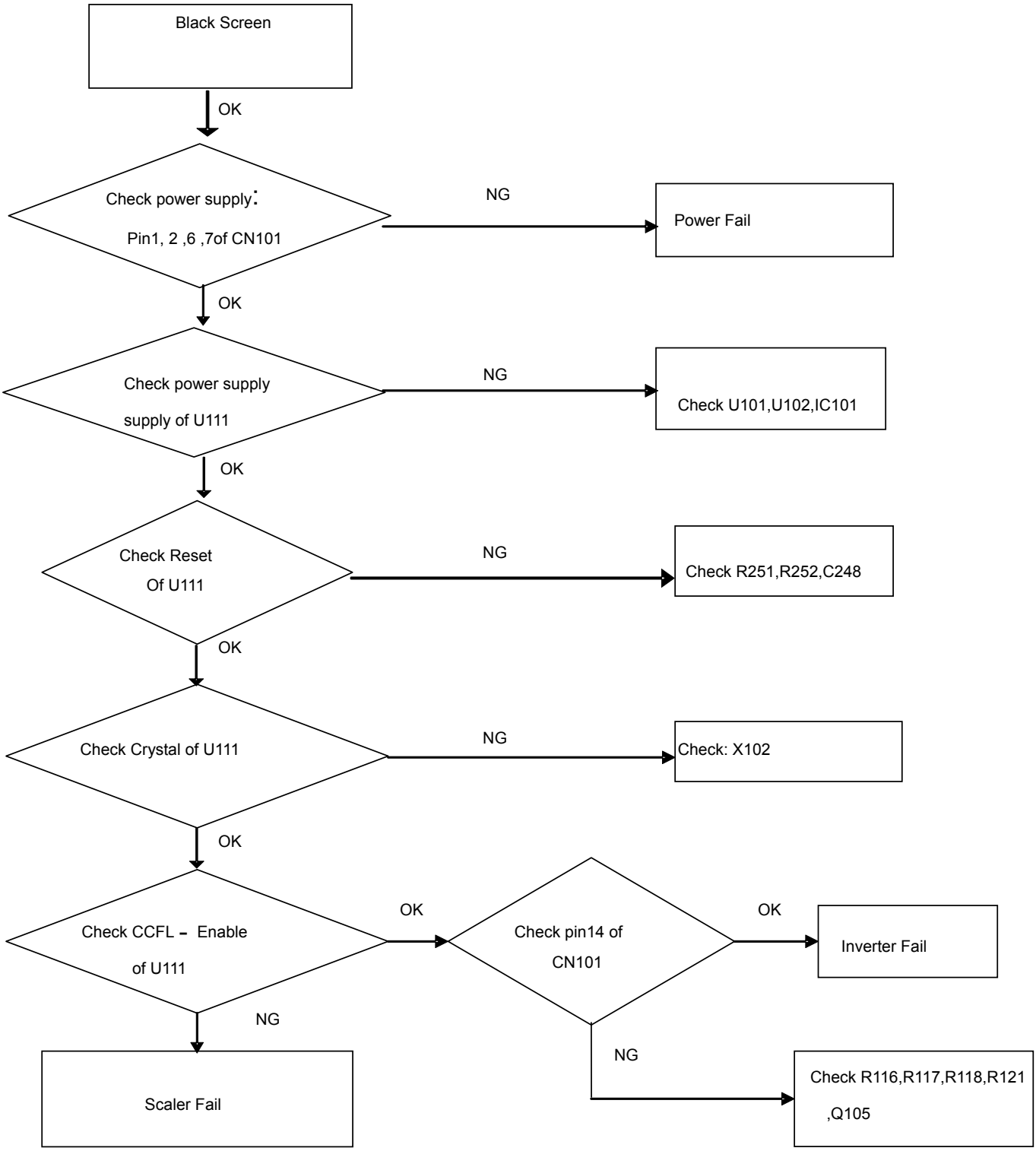
No Power & Power LED Off



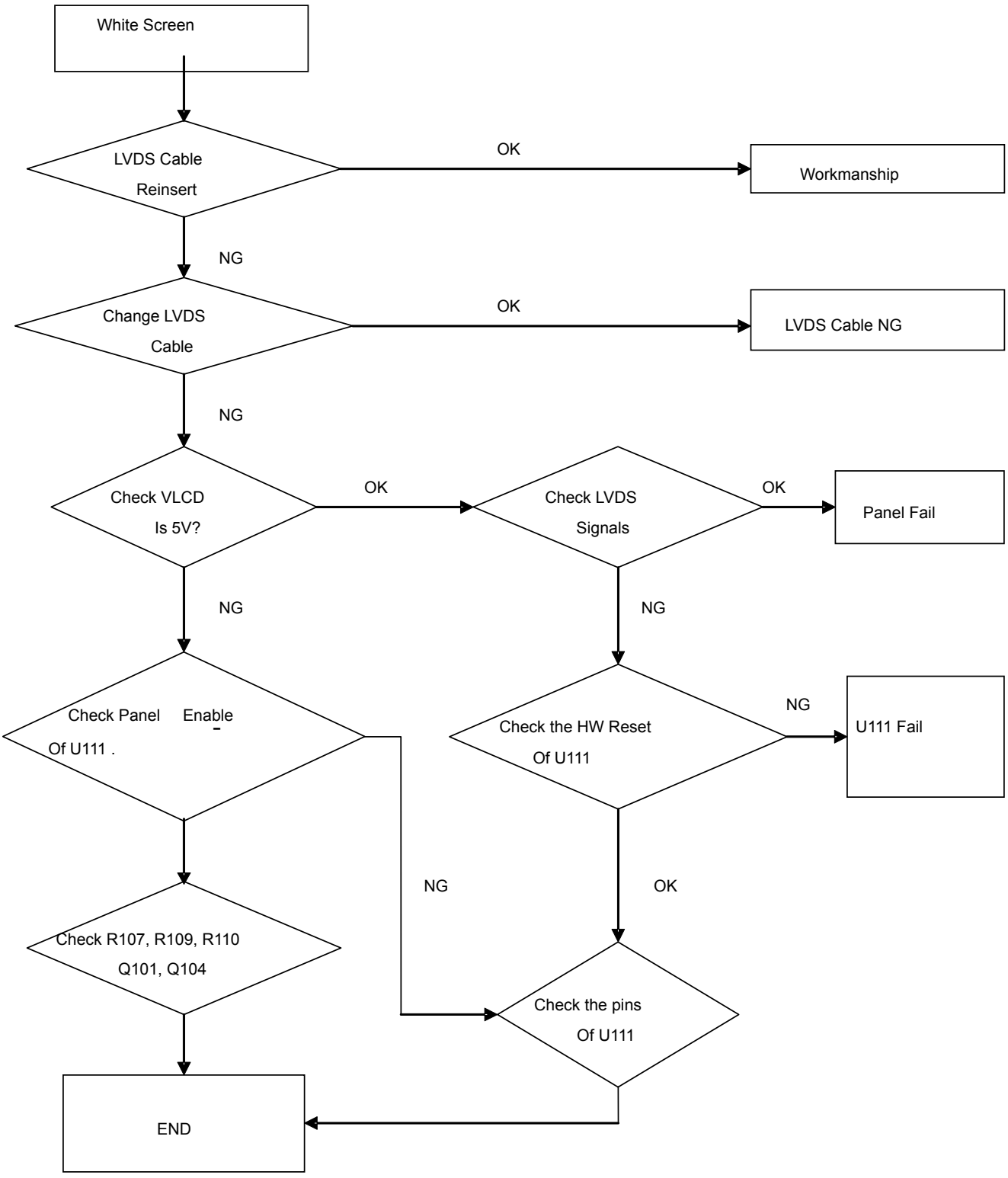
Output power is unstable



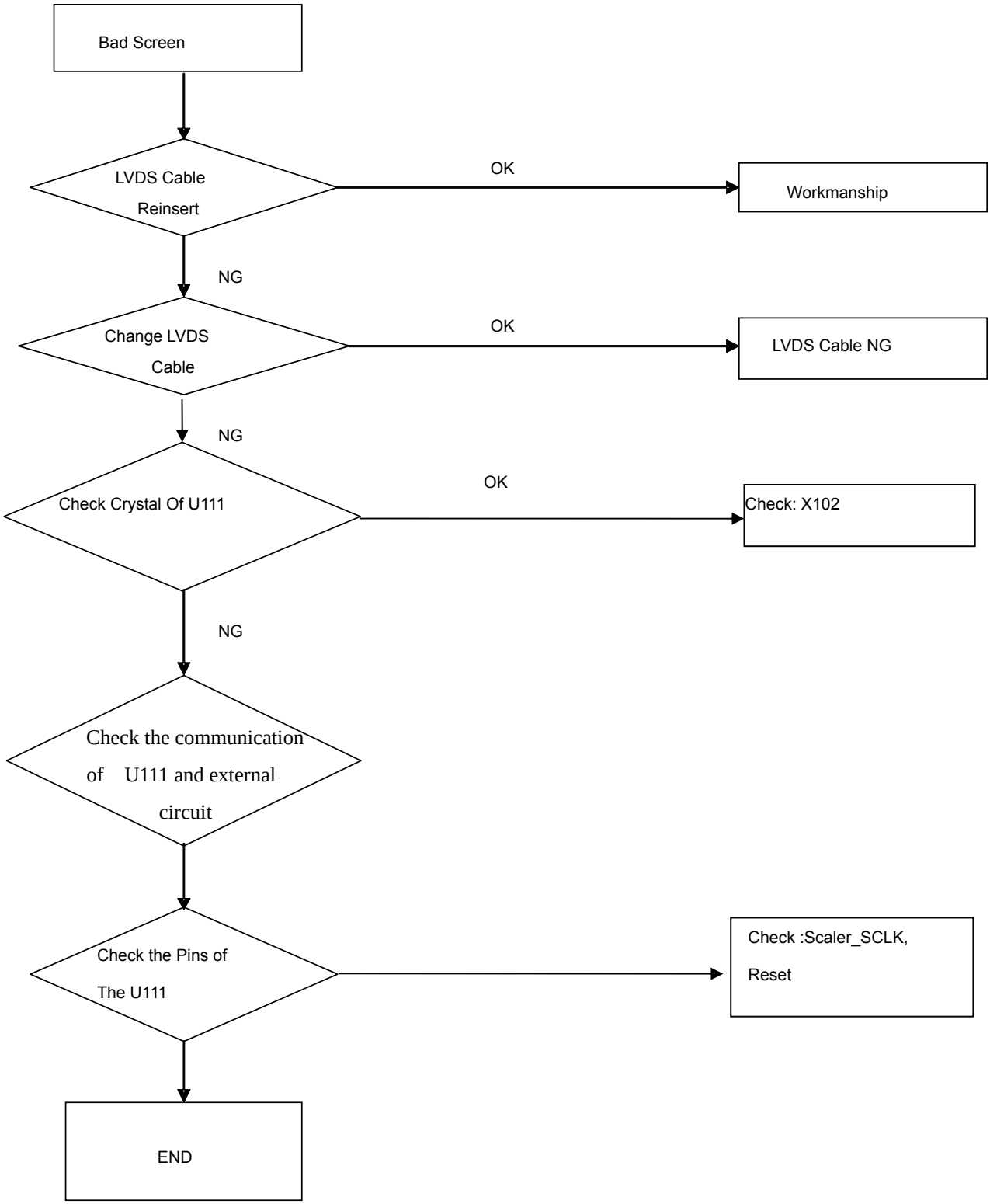
Black Screen



White Screen



Bad Screen


Bad Screen
LVDS Cable Reinsert
OK
Workmanship
NG
Change LVDS Cable
OK
LVDS Cable NG
NG
Check Crystal Of U111
OK
Check: X102
NG
Check the communication of U111 and external circuit
Check the Pins of The U111
Check :Scaler_SCLK, Reset
END