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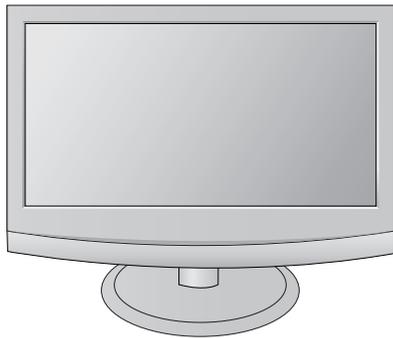
LCD MONITOR TV SERVICE MANUAL

CHASSIS : LP92C

MODEL : M197WAP M197WAP-PMM

CAUTION

BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



P/NO : MFL63261606(1002-REV00)

Printed in Korea

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PRECAUTION

WARNING FOR THE SAFETY-RELATED COMPONENT.

- There are some special components used in LCD monitor that are important for safety. **These parts are marked \triangle on the schematic diagram and the Exploded View** It is essential that these critical parts should be replaced with the manufacturer's specified parts to prevent electric shock, fire or other hazard.
- Do not modify original design without obtaining written permission from manufacturer or you will void the original parts and labor guarantee.

TAKE CARE DURING HANDLING THE LCD MODULE WITH BACKLIGHT UNIT.

- Must mount the module using mounting holes arranged in four corners.
- Do not press on the panel, edge of the frame strongly or electric shock as this will result in damage to the screen.
- Do not scratch or press on the panel with any sharp objects, such as pencil or pen as this may result in damage to the panel.
- Protect the module from the ESD as it may damage the electronic circuit (C-MOS).
- Make certain that treatment person's body are grounded through wrist band.
- Do not leave the module in high temperature and in areas of high humidity for a long time.
- The module not be exposed to the direct sunlight.
- Avoid contact with water as it may a short circuit within the module.
- If the surface of panel become dirty, please wipe it off with a soft material. (Cleaning with a dirty or rough cloth may damage the panel.)

\triangle CAUTION

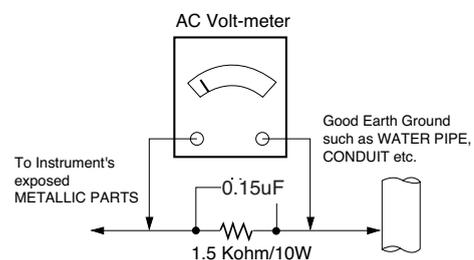
Please use only a plastic screwdriver to protect yourself from shock hazard during service operation.

\triangle WARNING

BE CAREFUL ELECTRIC SHOCK !

- If you want to replace with the new backlight (CCFL) or inverter circuit, must disconnect the AC adapter because high voltage appears at inverter circuit about 650Vrms.
- Handle with care wires or connectors of the inverter circuit. If the wires are pressed cause short and may burn or take fire.

Leakage Current Hot Check Circuit



When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω

*Base on Adjustment standard

• Replaceable batteries

* CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.

DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the SAFETY PRECAUTIONS on page 3 of this publication.

NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
 - a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
 - b. Disconnecting or re-connecting any receiver electrical plug or other electrical connection.
 - c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)
CAUTION: This is a flammable mixture.
Unless specified otherwise in this service manual, lubrication of contacts is not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
Always remove the test receiver ground lead last.
8. Use with this receiver only the test fixtures specified in this service manual.
CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the

unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500°F to 600°F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
 - a. Allow the soldering iron tip to reach normal temperature. (500°F to 600°F)
 - b. Heat the component lead until the solder melts.
 - c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
 - a. Allow the soldering iron tip to reach a normal temperature (500°F to 600°F)
 - b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
 - c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
CAUTION: Work quickly to avoid overheating the circuit board printed foil.
 - d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Remove/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor

Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device

Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor

Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.
CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections

To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. Carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.
CAUTION: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application Range.

This spec sheet is applied to the 47 cm(18.5 inch) LCD Monitor TV used LP92C chassis.

2. Specification

Each part is tested as below without special appointment

- 2.1 Temperature : 25 °C ± 5 °C (77 °F ± 9 °F),
CST : 40 °C ± 5° C
- 2.2 Relative Humidity : 65 % ±10 %
- 2.3 Power Voltage : Standard input voltage
(100 V - 240 V ~, 50 / 60 Hz)
 - Standard Voltage of each products is marked by models
- 2.4 Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM .
- 2.5 The receiver must be operated for about 5 minutes prior to

the adjustment.

3. Test method

- 3.1 Performance : LGE TV test method followed.
- 3.2 Demanded other specification
 - Safety : CE, IEC specification, UL6500
 - EMC : CE, IEC, FCC Part 15Class A/ B

Safety : IEC/EN60065
EMI : EN55013
EMS : EN55020

4. Module Specification

1) LGD LM185WH1_TLF7 (P/N : EAJ60989201)

No	Item	Specification	Unit	Remark
1	Type	TFT Color LCD Module		
2	Diagonal Size	18.51 inches (470.1mm) diagonal		
3	Active Display area	413.4(H) x 234.0(V)	mm	
4	Outline Dimension	430.4(H) x 254.6(V) x 13.0(D)	mm	Typ. (Without Inverter)
5	Aspect Ratio	16:9		
6	Pixel Number	1366 x RGB x 768	pixel	
7	Pixel Pitch	0.30(H) x 0.30(V)	mm	
8	Color arrangement	RGB vertical Stripe		
9	Color Depth	16.7M color with Advanced FRC		
10	Electrical Interface	LVDS 1port		
11	Surface Treatment	Hard coating(3H) & Anti-glare		
12	Operating Mode	Transmissive mode & Normally White		
13	Backlight Unit	2 CCFL (2 lamps)		
14	Response Time	Rising Time : 1.1 + Falling Time : 3.9	ms	Typ.
15	Color Gamut	Normal 72% Panel(CIE1931)		

2) LGD, LM185WH1-TLF8 (P/N : EAJ61009301)

No	Item	Specification	Unit	Remark
1	Type	TFT Color LCD Module		
2	Diagonal Size	18.51 inches (470.1mm) diagonal		
3	Active Display area	413.4(H) x 234.0(V)	mm	
4	Outline Dimension	430.4(H) x 254.6(V) x 13.0(D)	mm	Typ.
5	Aspect Ratio	16:9		
6	Pixel Number	1366 x RGB x 768	pixel	
7	Pixel Pitch	0.10(H) x 0.30(V)	mm	
8	Color arrangement	RGB vertical Stripe		
9	Color Depth	16.7M color with Advanced FRC		
10	Electrical Interface	LVDS 1port		
11	Surface Treatment	Hard coating(3H) & Anti-glare		
12	Operating Mode	Transmissive mode & Normally White		
13	Backlight Unit	2 CCFL (2 lamps)		
14	Response Time	Rising Time : 1.1 + Falling Time : 3.9	ms	Typ.
15	Color Gamut	Normal 72% Panel(CIE1931)		

5. General Specification

5.1 TV

No	Item	Specification		Remarks
1	Market	Central and South America		
2	Broadcasting system	NTSC PAL-M PAL-N		
3	Receiving system	BAND	NTSC	
		VHF	2 ~ 13	
		UHF	14 ~ 69	
		CATV	1 ~ 125	
4	Receiving system	Upper Heterodyne		
5	Component Input (1EA)	Y/Cb/Cr Y/Pb/Pr		
6	CVBS Input (1EA)	PAL, SECAM, NTSC		4 System(Rear) :PAL50, SECAM, NTSC, PAL60
7	RGB Input	RGB-PC		Analog(D-SUB 15Pin)
8	HDMI Input (1EA)	HDMI1-DTV/PC		HDMI version 1.3 , Support HDCP
9	Audio Input (3EA)	RGB-PC/ DVI Audio Component CVBS		L/R Input
10	Earphone out (1EA)	Antenna, AV, Component, RGB-PC, HDMI1		

5.2 RGB - PC

No	Item			Specification				Remarks
1	Supported Sync. Type			Separate Sync.(RGB), Digital(DVI)				
2	Operating Frequency			Analog	Horizontal	30 ~ 61kHz		
					Vertical	56 ~ 61 Hz		
				Digital	Horizontal	30 ~ 61kHz		
					Vertical	56 ~ 61 Hz		
3	Resolution			Analog	Max.	1366x768 @ 60Hz		
					Recommend	1360x768 @ 60Hz		
				Digital	Max.	1366x768 @ 60Hz		
					Recommend	1360x768 @ 60Hz		
4	Input Voltage			Voltage :100 – 240 Vac, 50 or 60Hz				
5	Inrush Current			Cold Start : 50 A Hot : 120 A				
6	Operating Condition			Sync (H/V)	Video	LED	Wattage	
	Power S/W On	On mode	Typ.	On/On	Active	Blue	25W	
			Max	On/On	Active	Blue	30W	
		Sleep mode	Off/On	Off	Amber	1W	RGB	
	On/Off							
Power S/W Off	Off mode	-	Off	Off	0.5W	Just operate power key and remote controller power button		
7	MTBF			50,000 HRS with 90% Confidence leve				Lamp Life: 50,000 Hours(min)
8	Using Altitude			5,000 m (for Reliability) 3,000m(for FOS)				
9	Operating Environment			Temp : 10°C ~ 35°C Humidity : 20 % ~ 80 %				
10	Storage Environment			Temp : -10°C~60°C non condensing Humidity : 5 % ~ 90 % non condensing				

6. Chroma & Brightness

18.5" LCD Module (for more details, refer to the module spec.)

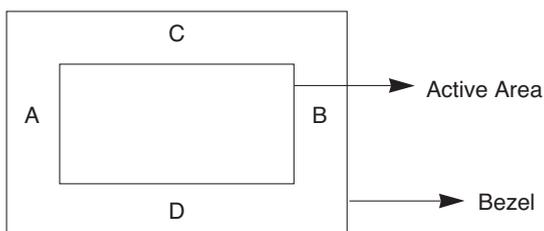
No.	Item	Specification	Min.	Typ.	Max.	Remark
1	Viewing Angle[CR>10]	Right/Left Up/Down	70/70 60/70	85/85 75/85	-	CR >10
2	Luminance	Luminance (cd/m2) Variation(%)	180 75	250	-	Min/ Max
3	Contrst Ratio	CR	600	1000		Full white/Full black
4	Color Coordinats [CIE1931]	White RED Green Blue	W_X W_Y -0.03 X_g Y_g X_b Y_b	Typ. 0.313 0.329 0.644 0.335 0.304 0.613 0.146 0.071	Typ. +0.03	RGB Vivid, 6500K Full white(100IRE)

*** Optical Test Condition**

- Surrounding Brightness Level : dark
- Surrounding Temperature : 25±5°C
- warm-up Time : 30 Min
- Contrast, Brightness : Outgoing condition
- *Incase of Vivid Mode, high level saturation may be occurred. Check gray linearity at standard mode.

*** Active area**

1. Active area of LCD PANEL is in bezel of cabinet.
2. Interval between active area and bezel
IA-BI<1.0 mm , IC-DI<1.0 mm
A: Interval between left of active area and bezel
B: Interval between right of active area and bezel
C: Interval between top of active area and bezel
D: Interval between bottom of active area and bezel



7. SET Optical Feature

7.1 PC Mode (-Mode : Outgoing condition, Input signal : 100IRE White pattern(Pattern #4 : MSPG series))

No	Item	module	Luminance (cd/m ²)			C/R(min)		Remark
			Min	Typ	Max	Min	Typ	
1	19" inch	-	180	250	-	700:1	71000:1	RGB DFC 30000:1

7.2 Special feature(DFC)

-DFC Working Condition : Full Black Pattern(All Black, No pattern(MSPG Pattern#2)) signal in D-sub

No	Item	module	Min	Typ	Max	Remark
1	19" inch		24000:1	30000:1		PC Mode(D-sub, DVI) For Checking Black Luminance, wait for over 1 minute.

8. Component Video Input (Y, PB, PR)

No.	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock(MHz)	
1.	720*480	15.73	59.94	13.500	SDTV, DVD 480I(525I)
2.	720*480	15.75	60.00	13.514	SDTV, DVD 480I(525I)
3.	720*576	15.625	50.00	13.500	SDTV, DVD 576I(625I) 50Hz
4.	720*480	31.47	59.94	27.000	SDTV 480P
5.	720*480	31.50	60.00	27.027	SDTV 480P
6.	720*576	31.25	50.00	27.000	SDTV 576P 50Hz
7.	1280*720	44.96	59.94	74.176	HDTV 720P
8.	1280*720	45.00	60.00	74.250	HDTV 720P
9.	1280*720	37.50	50.00	74.25	HDTV 720P 50Hz
10.	1920*1080	33.72	59.94	74.176	HDTV 1080I
11.	1920*1080	33.75	60.00	74.250	HDTV 1080I
12.	1920*1080	28.125	50.00	74.250	HDTV 1080I 50Hz,
13.	1920*1080	56.25	50	148.5	HDTV 1080P
14.	1920*1080	67.432	59.94	148.350	HDTV 1080P
15.	1920*1080	67.5	60.00	148.5	HDTV 1080P

9. RGB Input (PC)

No.	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock(MHz)	Remark
1	640*480	31.469	59.94	25.175	
2	800*600	37.879	60.317	40.0	
3	1024*768	48.363	60.0	65.0	
4	1280*720	47.77	59.85	74.5	
5	1360*768	47.71	60.02	85.5	

10. HDMI Input (DTV)

No.	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock(MHz)	Proposed
1	720*480	15.75	60.00	13.514	SDTV, DVD 480I(525I)
2	720*480	15.73	59.94	13.500	SDTV, DVD 480I(525I)
3	720*576	15.625	50.00	13.500	SDTV, DVD 576I(625I) 50Hz
4	720*480	31.47	59.94	27.000	SDTV 480P
5	720*480	31.50	60.00	27.027	SDTV 480P
6	720*576	31.25	50.00	27.000	SDTV 576P 50Hz
7	1280*720	44.96	59.94	74.176	HDTV 720P
8	1280*720	45.00	60.00	74.250	HDTV 720P
9	1280*720	37.50	50.00	74.25	HDTV 720P 50Hz
10	1920*1080	33.72	59.94	74.176	HDTV 1080I
11	1920*1080	33.75	60.00	74.250	HDTV 1080I
12	1920*1080	28.125	50.00	74.250	HDTV 1080I 50Hz
13	1920*1080	67.432	59.94	148.350	HDTV 1080P
14	1920*1080	67.5	60	148.5	HDTV 1080P
15	1920*1080	56.250	50	148.5	HDTV 1080P 50Hz

11. Mechanical specification

No.	Item		Content				Unit	Remark
1.	Product Dimension		Width(W)	Length(D)	Height(H)		mm	
		Before Packing	454.7	193.2	362.8		mm	
		After Packing	517	403	135		mm	
2.	Product Weight	Only SET	3.5				Kg	
		With BOX	4.8				Kg	
3.	Container Loading Quantity	Individual or Palletizing	20ft		40ft			
			Indi.	Wooden	Indi.	Wooden		
			1037	810	2159	1800		
4.	Stand Assy	Type	Detachable (Base detachable)					
		Size(W x D x H)	271.2x 193.2x 108.4					
		Tilt Degree	-5~15 degree					
		Tilt force	0.8~3.5kgf					
		Swivel Degree Swivel Force	none					
5.	Appearance	General	Refer to Standard of LG(55)G1-1020					*Appearance Gap spec Front: 0.5 mm ↓ Back & Bottom : 1.0 m ↓

ADJUSTMENT INSTRUCTION

1. Application

This document is applied to LP92C chassis 19" LCD Monitor TV which is manufactured in Monitor Factory or is produced on the basis of this data.

2. Designation

- 1) The adjustment is according to the order which is designated and which must be followed, according to the plan which can be changed only on agreeing.
- 2) Power Adjustment: Free Voltage
- 3) Magnetic Field Condition: Nil.
- 4) Input signal Unit: Product Specification Standard
- 5) Reserve after operation: Above 5 Minutes (Heat Run)
Temperature : at 25°C±5°C
Relative humidity : 65 ±10%
Input voltage : 220V, 60Hz
- 6) Adjustment equipment: Color Analyzer (CA-210 or CA-110), Pattern Generator (MSPG-925L or Equivalent), DDC Adjustment Jig equipment, SVC remote controller
- 7) Don't push The "IN STOP KEY" after completing the function inspection.

3. Adjustment items

PCB assembly adjustment items

- 1) Download the MSTAR main software (IC603, Mstar ISP Utility)
- 2) Auto Color Balance(ADC) - RGB
- 3) Auto Color Balance(ADC) – Component
- 4) Input Tool-Option/Area option.
- 5) Check SW Version.

SET assembly adjustment items

- 1) DDC Data input.
- 2) HDCP data input
- 3) Adjustment of White Balance.
- 4) Preset CH information
- 5) Factoring Option Data input.

4. PCB assembly adjustment method

4.1 Input Tool-Option, Area Option

Option adjustment following BOM (Tool Option 1, Area Option)

* Required Equipments

- Remote controller for adjustment

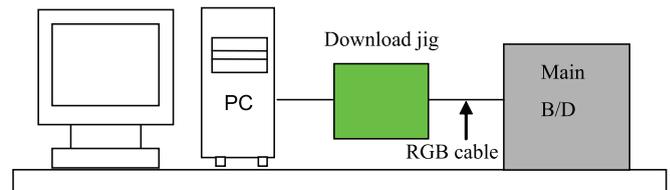
* Profile : Must be changed the option value because being different with some setting value depend on module maker, inch and market.

Adjustment method

The input methods are same as other chassis.(Use IN-START Key on the Adjust Remocon.)

LW91A	LPL	L22FHD
Main		V1.00
HDCP		0
UTT		XX
Tool Option 1		37000
Tool Option 2		112
Area Option		20

- 1) Push the IN-START key in the Adjust R/C.
 - 2) Input the Option Number that was specified in the BOM, into the Shipping area.
 - 3) Select "Tool Option/ Area Option" by using ▼/▲(CH+/-) key , and press the number key(0~9) consecutively
 - ex) If the value of Tool Option1 is 7, input the data using number key "7"
- (If not changed the option, the input menu can differ from the model spec.)
- * Refer to Job Expression of each main chassis ass'y (EBTxxxxxxx) for Option value



- * Before PCB check, you have to change the Tool option, Areaoption and have to AC off/on (Plug out and in)
(If missing this process, set can operate abnormally)
- * Never push the IN-STOP KEY after completing the function inspection.

4.2 S/W program download (Using MSTAR Download program)

Profile : This is for downloading the s/w to the flash memory of IC603

Equipment

- 1) PC
- 2) ISP_tool program
- 3) Download jig

Connection structure

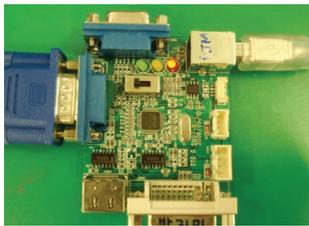
Connection condition

- 1) IC name and circuit number : Flash Memory and IC603
- 2) Use voltage : 3.3V (5 pin)
- 3) SCL : 15 pin
- 4) SDA : 12 pin
- 5) Tact time : about 2min

4.2.1 Preliminary steps



(1) Download method 1 (PCB Assy)



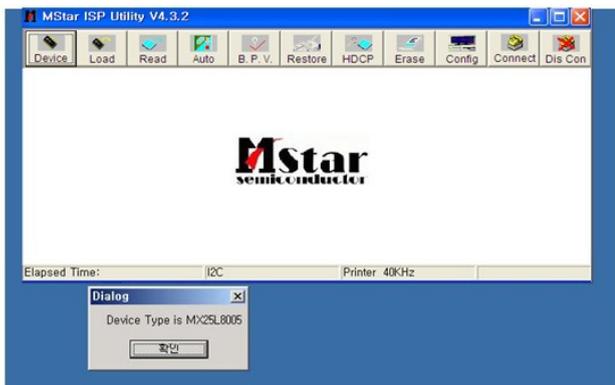
(2) Connect the download jig to D-sub jack

4.2.2 Download Steps

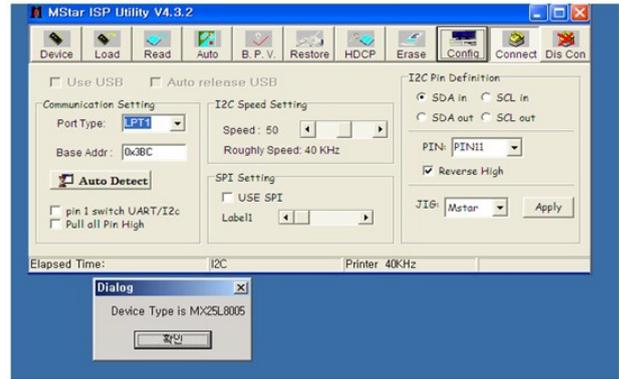
(1) Execute 'ISP Tool' program in PC, then a main window will be opened



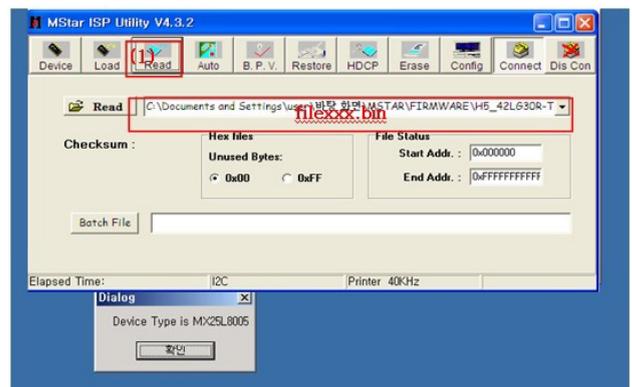
(2) Click the connect button and confirm "Dialog Box".



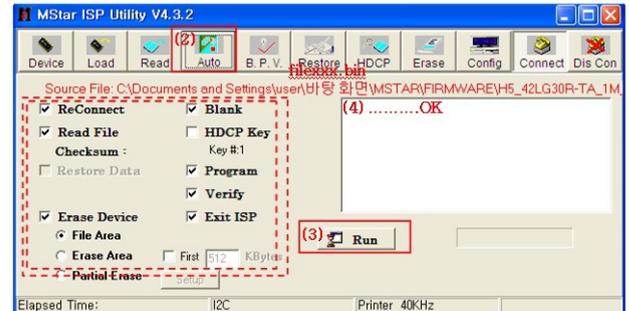
(3) Click the Config button and Change speed E2PROM Device setting : over the 350Khz



(4) Read and write bin file
Click "(1)Read" tab, and then load download file(XXXX.bin) by clicking "Read".



(5) Click "Auto(2)" tab and set as below
(6) click "Run(3)".
(7) After downloading, check "OK(4)" message.



4.3. ADC Process

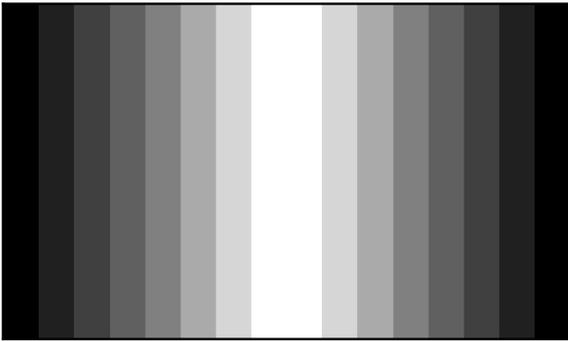
4.3.1 ADC calibration

- * MSPG-925
- Component: series Model : 216 (720P@60Hz)
- RGB: Model : 60(1024X768@60Hz)

4.3.2 PC input ADC

4.3.2.1 Auto RGB Gain/Offset Adjustment

- Convert to PC in Input-source
- Signal equipment displays
Output Voltage: 700 m Vp-p
Impress Resolution XGA (1024 x 768 @ 60Hz)
Model : 60 in Pattern Generator
Pattern : 29 in Pattern Generator (MSPG-925 SERIES)



Adjustment pattern (PC)

- Adjust by commanding AUTO_COLOR_ADJUST.

4.3.2.2 Confirmation

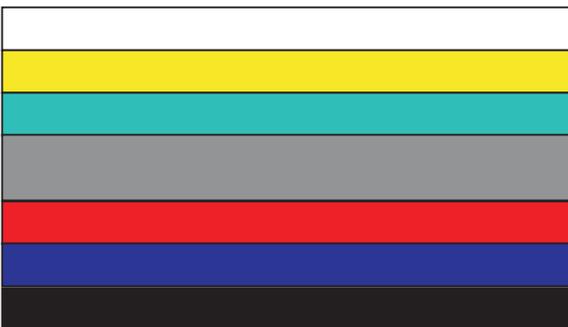
- We confirm to address "0xF3 (offset), 0xF4 (gain)" in page "0x0E" of EEPROM the value is "0xAA" or not.
- If the value is not "xAA", we adjust once more.
- We can write the ADC values from "0x06~0x0B" addresses in a page "0x0E".

*Manual ADC process using Service Remocon. After enter Service Mode by pushing "ADJ" key, execute "Auto-RGBB" by pushing "▶" key at "Auto-RGB".

4.3.3 COMPONENT input ADC

4.3.3.1 Component Gain/Offset Adjustment

- Convert to Component in Input-source
- Signal equipment displays
Impress Resolution 720p
MODEL : 216 in Pattern Generator(720P/60Hz 100% Color Bar Mode)
PATTERN : 65 in Pattern Generator(MSPG-925 SERISE)



Adjustment pattern (COMPONENT)

- Adjust by commanding AUTO_COLOR_ADJUST.

4.3.3.2 Confirmation

- We confirm to address "0xF3 (offset), 0xF4 (gain)" in page "0x0E" of EEPROM the value is "0xAA" or not.
- If the value is not "xAA", we adjust once more.
- We can write the ADC values from "0x06~0x0B" addresses in a page "0x0E".

*Manual ADC process using Service Remocon. After enter Service Mode by pushing "ADJ" key, execute "Auto-RGB" by pushing "▶" key at "Auto-RGB".

5. EDID (The Extended Display Identification Data) / DDC(Display Data Channel) download

- * Caution 1: Use the proper cables below for EDID Writing
- * Caution 2: Write EDID data to EEPROM by using DDC2B Protocol.

5.1 Profile : To be possible for plug and play

5.2 Equipment

- 1) Adjusting PC with S/W for writing EDID Data.(S/W : EDID TESTER Ver.2.5)
- 2) A Jig for EDID Download
- 3) Cable : D-sub 15Pin cable, HDMI cable.

For Analog EDID	For HDMI EDID
	

5.3 DDC EDID Write (RGB 128Byte)

- Connect D-sub Signal Cable to D-Sub Jack.
- Write EDID DATA to EEPROM (24C02) by using DDC2B protocol.
- Check whether written EDID data is correct or not.

5.4 DDC EDID Write (HDMI 256Byte)

- Connect HDMI Signal Cable to HDMI Jack.
- Write EDID DATA to EEPROM(24C02) by using DDC2B protocol.
- Check whether written EDID data is correct or not

5.5 EDID data

1) M197WAP

No.	Item	content	16bit Data
1	Manufacturer ID	GSM	1E6D
2	ProductID	19410(Analog) 19412(HDMI)	4BD2 4BD4
3	Year	2009	13
4	Version	Analog : 1 Digital : 1	1
5	Revision	Analog : Digital :	3
6	Model Name	M197WP	

5.5.1. RGB EDID Data

1) M197WAP

Addr	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
0000	00	FF	FF	FF	FF	FF	FF	00	1E	6D	D2	4B	01	01	01	01
0010	01	13	01	03	68	29	17	78	E8	66	F5	A4	55	4D	9C	24
0020	11	50	54	A1	08	00	81	C0	61	40	45	40	31	40	01	01
0030	01	01	01	01	01	01	66	21	50	B0	51	00	1B	30	40	70
0040	36	00	9A	E6	10	00	00	1E	00	00	00	FD	00	38	3D	1E
0050	3D	09	00	0A	20	20	20	20	20	20	00	00	00	FC	00	4D
0060	31	39	37	57	41	50	0A	20	20	20	20	20	00	00	00	FF
0070	00	0A	20	20	20	20	20	20	20	20	20	20	20	20	00	3F...

5.5.2. HDMI EDID Data

1) M197WAP

Addr	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
0000	00	FF	FF	FF	FF	FF	FF	00	1E	6D	D4	4B	01	01	01	01
0010	01	13	01	03	80	29	17	78	E8	66	F5	A4	55	4D	9C	24
0020	11	50	54	A1	08	00	81	C0	61	40	45	40	31	40	01	01
0030	01	01	01	01	01	01	66	21	50	B0	51	00	1B	30	40	70
0040	36	00	9A	E6	10	00	00	1E	00	00	00	FD	00	38	3D	1E
0050	3D	09	00	0A	20	20	20	20	20	20	00	00	00	FC	00	4D
0060	31	39	37	57	41	50	0A	20	20	20	20	20	20	00	00	FF
0070	00	0A	20	20	20	20	20	20	20	20	20	20	20	20	01	24*
0080	02	03	19	F1	4A	90	04	03	01	14	12	05	1F	10	13	23
0090	09	07	07	65	03	0C	00	10	00	02	3A	80	18	71	38	2D
00A0	40	58	2C	45	00	9A	E6	10	00	00	1E	01	1D	80	18	71
00B0	1C	16	20	58	2C	25	00	9A	E6	10	00	00	9E	01	1D	00
00C0	72	51	D0	1E	20	6E	28	55	00	9A	E6	10	00	00	1E	8C
00D0	0A	D0	8A	20	E0	2D	10	10	3E	96	00	9A	E6	10	00	00
00E0	18	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	F2****

- All data are HEXA

- Adjustable Data :

** : week

*** : year ex) when year 2008 : input "12"

**** : CHECK SUM (deferent along week, year)

6.HDCP(High-Bandwidth Digital Contents Protection)

- * confirmation
 - * Before HDCP Download, you have to Set the Configuration that CMD delay.
 - > Configuration -> Option-> I2C delay(Write Byte : 0.5 ms, Read Byte : 0.5ms, Read CMD Byte : 0.5ms)
 - * Change the DDC -> After Write Data delay Time 20ms
 - * Check the Communication Clock -> 45KHz.
- 1) Connect D-sub Signal Cable to D-Sub Jack.
 - 2) Input HDCP key with HDCP-key- in-program.
 - 3) HDCP Key value is stored on Main M-STAR IC(LGE7871) which is 0x80~0xA0 addresses of 0x00~0x01 page(EEPROM MAP PAGE0~PAGE1 / START :A080).
 - 4) AC off/on and on HDCP button of MSPG925 and confirm whether picture is displayed or not of using MSPG925.
 - 5) HDCP Key value is different among the sets

7.Adjustment of White Balance

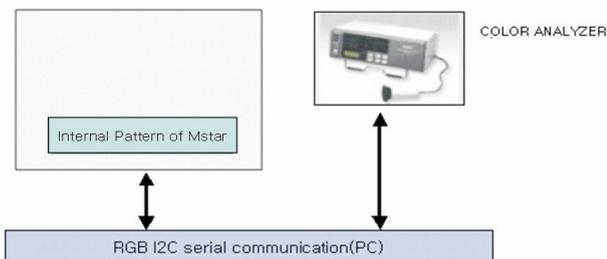
7.1 Purpose and Principle for adjustment of the color temperature

- Purpose : Adjust the color temperature to reduce the deviation of the module color temperature.
- Principle :To adjust the white balance without the saturation,Fix the one of R/G/B gain to C0 and decrease the others.
- Adjustment mode : Cool , Medium , Warm

** Required Equipment

- Remote controller for adjustment
- Color Analyzer : CA-210
- CH : 09 (LCD MNT, Normal) E M197WAP / M227WAP/ M237WAP
- Auto W/B adjustment instrument(only for Auto adjustment)
- PC (for communication through RGB)
- Pattern Generator (MSPG-925FS series.)

7.2 Connecting diagram of equipment for measuring (For Automatic Adjustment)



- (1) Enter the adjustment mode of DDC
 - Set command delay time : 50ms
 - Enter the DDC adjustment mode at the same time heat-run mode when pushing the power on by power only key

- Maintain the DDC adjustment mode with same condition of Heat-run
 - > Maintain after AC off/on in status of Heat-run pattern display)

- (2) Release the DDC adjustment mode
 - Release the adjust mode after AC off/on or std-by off/on in status of finishing the Hear-run mode)
 - Release the Adjust mode when receiving the aging off command(F3 00 00) from adjustment equipment)
 - Need to transmit the aging off command to TV set after finishing the adjustment.)
 - Check DDC adjust mode release by exit key and release DDC adjust mode)
- (3) Enter the adjust mode of white balance
 - Enter the white balance adjustment mode with aging command(F3, 00, FF)

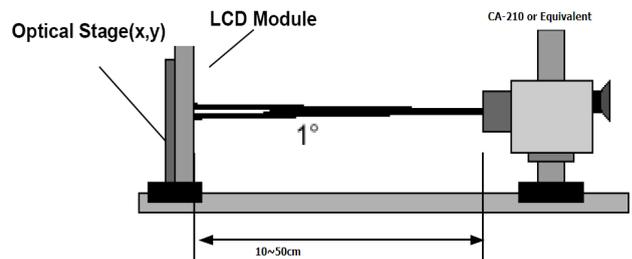
* Target Value CA-210(LCD MNT, Normal: CH 09
(Standard color coordinate and temperature when using the CA210 equipment)

* Luminance min value is 130cd/m² in the cool/ medium/ warm

Mode	Color coordinate		Temp
	X	Y	
Cool	0.285±0.003	0.293±0.003	11,000K
Medium	0.295±0.003	0.305±0.003	8,000K
Warm	0.313±0.003	0.329±0.003	6,500K

mode(Typ: 170)

- * Test Signal: Inner pattern (216gray,85IRE)
- * After done all adjustments, Press "In-start" button and compare Tool option and Area option value with its BOM, if it is correctly same then unplug the AC cable. If it is not same, then correct it same with BOM and unplug AC cable. For correct it to the model's module from factory JIG model.
- * Don't push The "IN STOP KEY" after completing the function inspection.
- *When doing Adjustment, Please make circumstance as below.



7.3. Adjustment of White Balance for Manual Adjustment

- Color analyzer(CA110, CA210) should be used in the calibrated ch by CS-1000(LCD : CH9)
- Operate the zero-calibration of the CA-100+ or CA-210, then stick sensor to the module when adjusting.
- For manual adjustment, it is also possible by the following sequence.

- 1) Push the ADJ key two times (Entering White Balance mode)
- 2) Stick sensor to center of the screen and select each items (Red/Green/Blue Gain and Offset) using ▲/▼ (CH + / -) key on R/C.
- 3) Adjust R/G/B Gain using ◀/▶ (VOL + / -) key on R/C.
(Fix the one of R/G/B and change the others).
- 4) Adjust all modes(Cool, Medium, Warm): Fix the one of R/G/B gain and change the others.
- 5) When adjustment is completed, Exit adjustment mode using EXIT key on R/C.

[CASE]

First adjust the coordinate much away from the target value(x, y).

1. $x, y > \text{target}$
 - a) Decrease the R, G.
2. $x, y < \text{target}$
 - a) First decrease the B gain,
 - b) Decrease the one of the others.
 - In case of decreasing the x, decreasing the R: fix G
 - In case of decreasing the y, decreasing the G: fix R
3. $x > \text{target}, y < \text{target}$
 - a) First decrease B, so make y a little more than the target.
 - b) Adjust x value by decreasing the R
4. $x < \text{target}, y > \text{target}$
 - a) First decrease B, so make x a little more than the target.
 - b) Adjust x value by decreasing the G

** Caution **

Color Temperature: COOL, Medium, Warm

One of R Gain/G Gain/ B Gain should be kept on 0xC0, and adjust other two lower than C0.

(when R/G/B Gain are all C0, it is the FULL Dynamic Range of of Module)

* W/B condition

- Surrounding Temperature : 20 % ~ 80 %
- Surrounding Temperature : 25±5 °C

8. Function Check

8.1 Check display and sound

- Check Input and Signal items (cf. work instructions)
 - 1) TV
 - 2) AV (SCART1/ SCART2/ CVBS/ S-Video)
 - 3) COMPONENT (1080i)
 - 4) RGB (PC: 1920 x 1080 @ 60Hz)
 - 5) DVI (PC: 1920 x 1080 @ 60Hz)
 - 6) HDMI
 - 7) PC Audio In

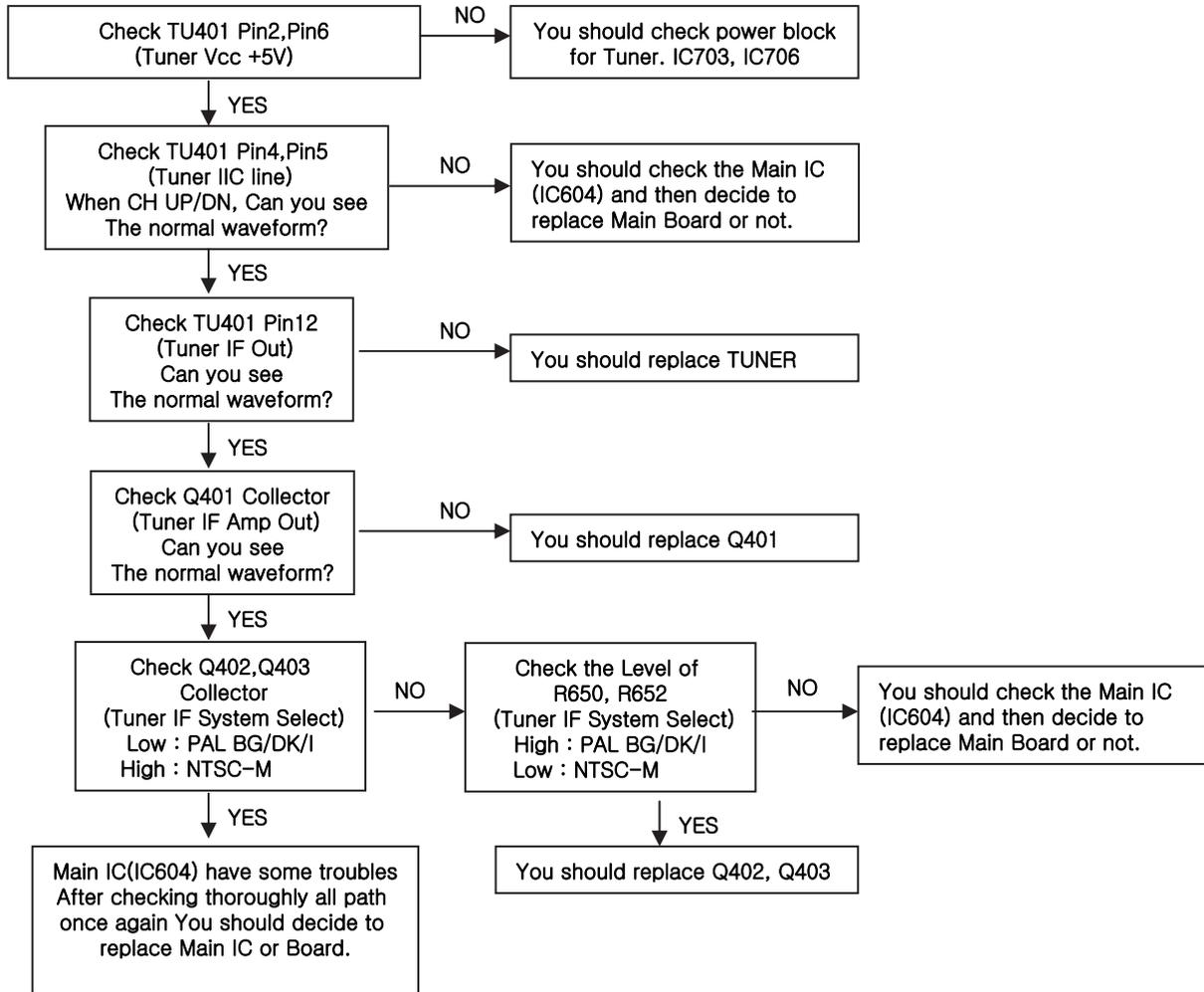
* Display and Sound check is executed by Remote controller

9. Preset CH write condition

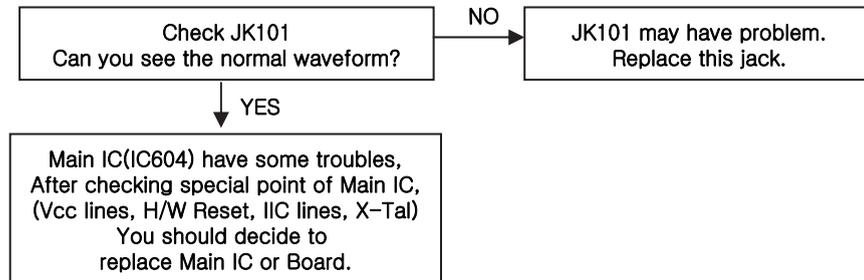
- 1) AC on time on only one after assembled automatically
- 2) CH recover on SVC OSD manually

TROUBLESHOOTING

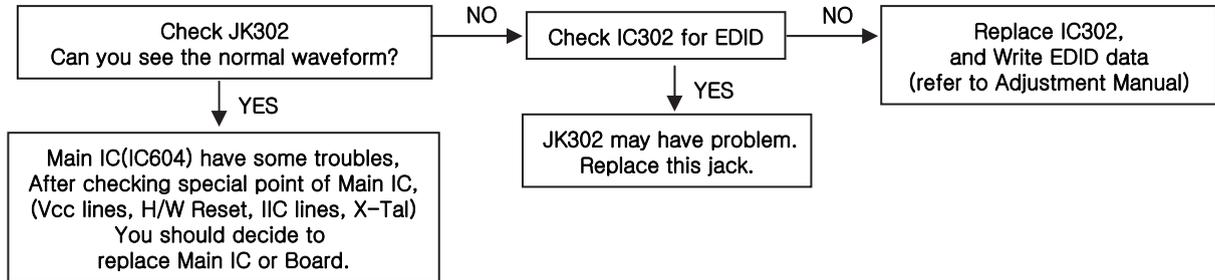
1. TV/CATV doesn't display



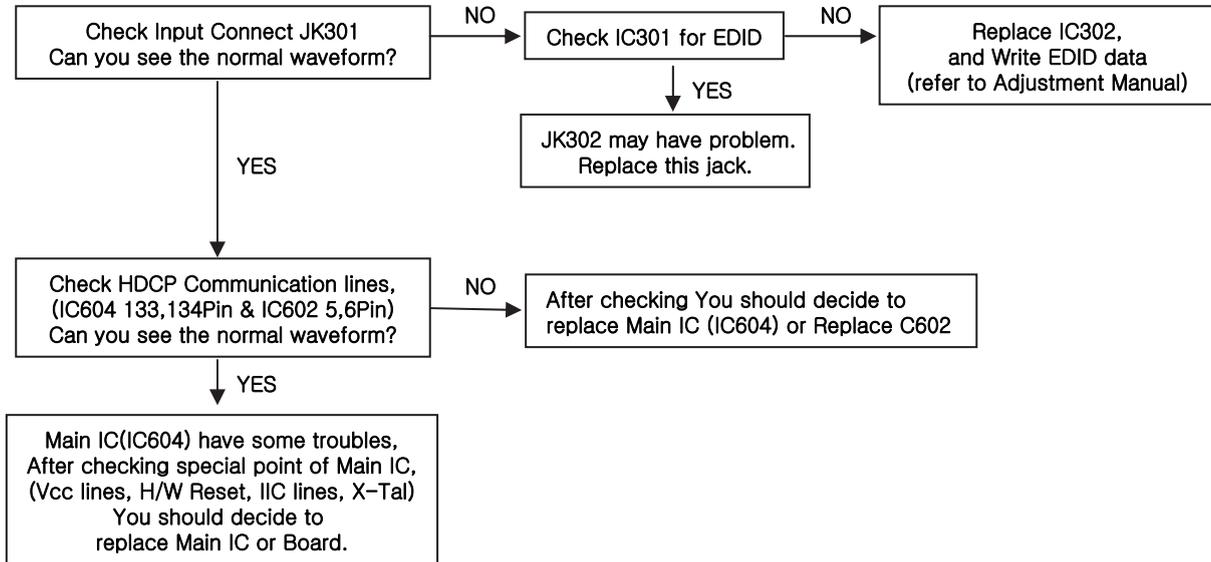
2. AV, Component doesn't display



3. RGB-PC doesn't display



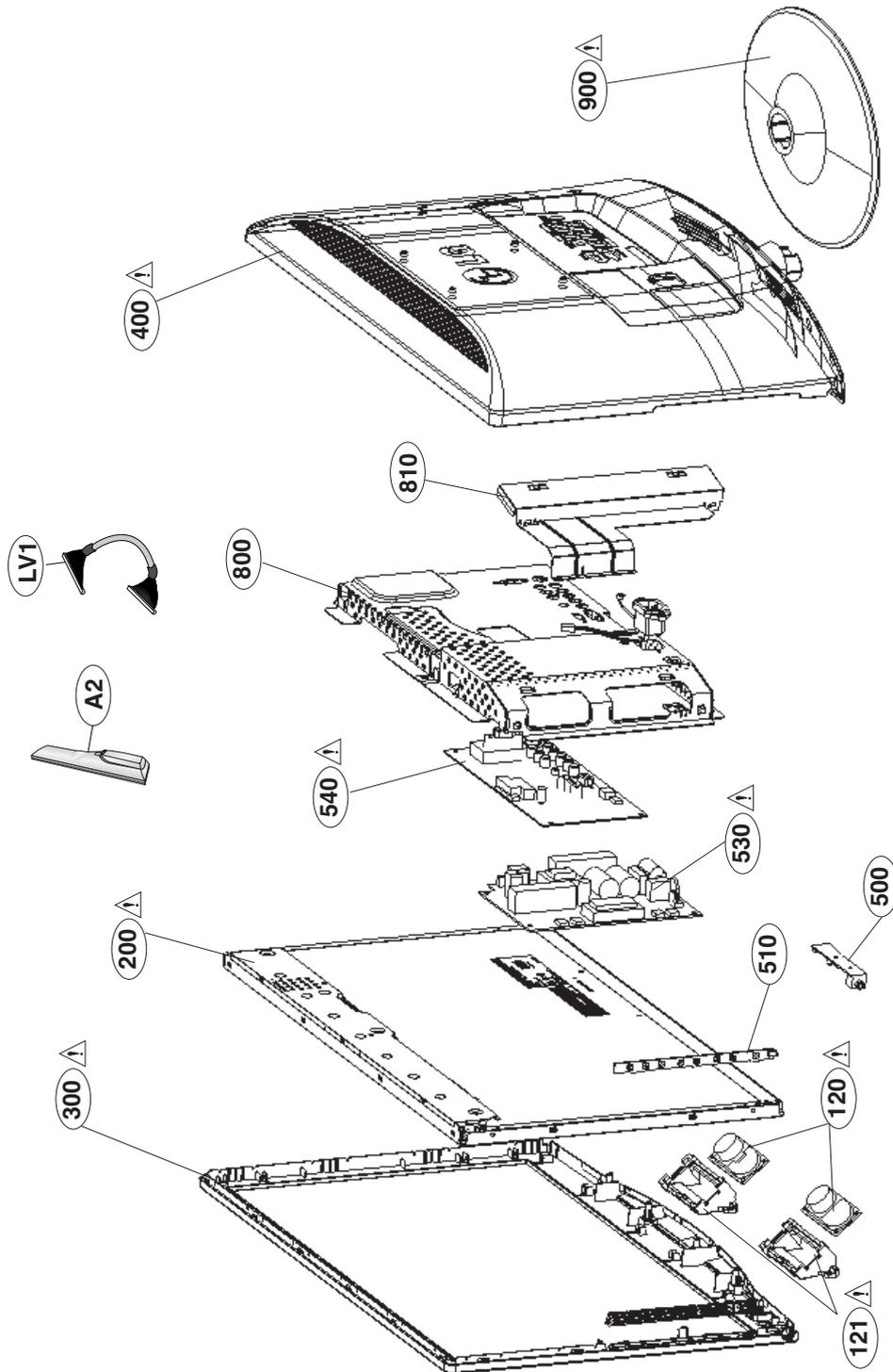
4. HDMI doesn't display



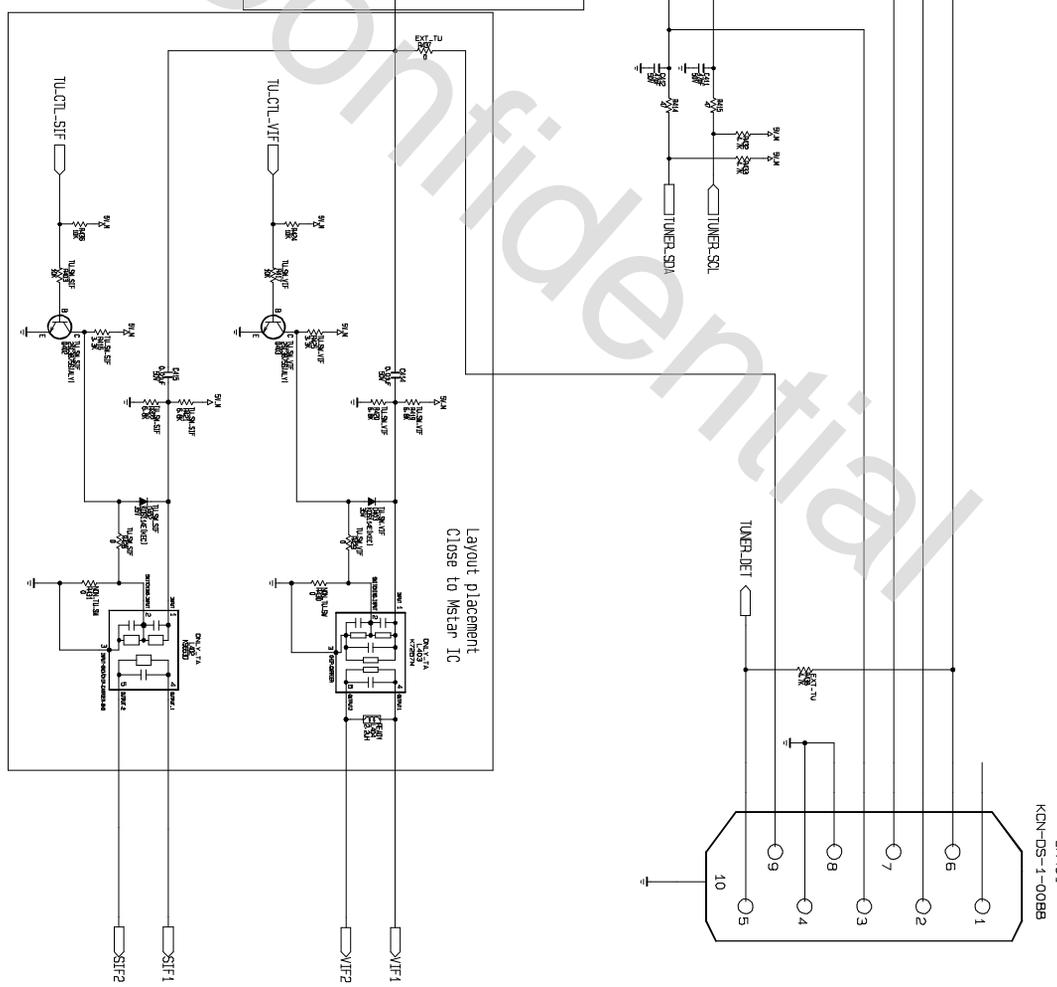
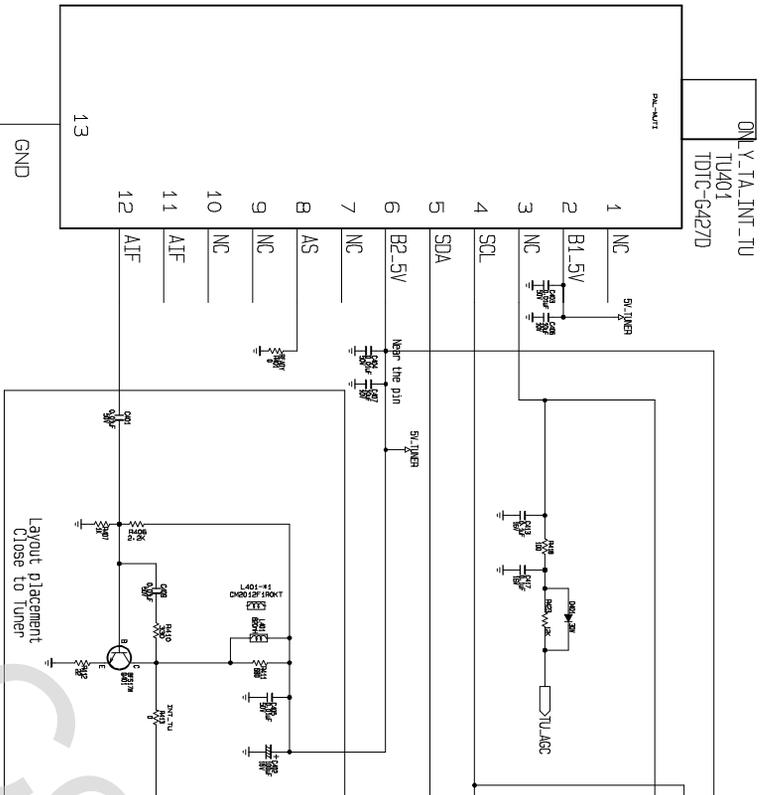
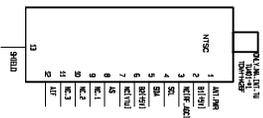
EXPLODED VIEW

IMPORTANT SAFETY NOTICE

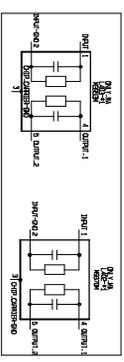
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by \triangle in the Schematic Diagram and EXPLODED VIEW. It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards. Do not modify the original design without permission of manufacturer.



TUNER



TU401_VIF	HIGH	LOW
TU401_SIF	HIGH	LOW



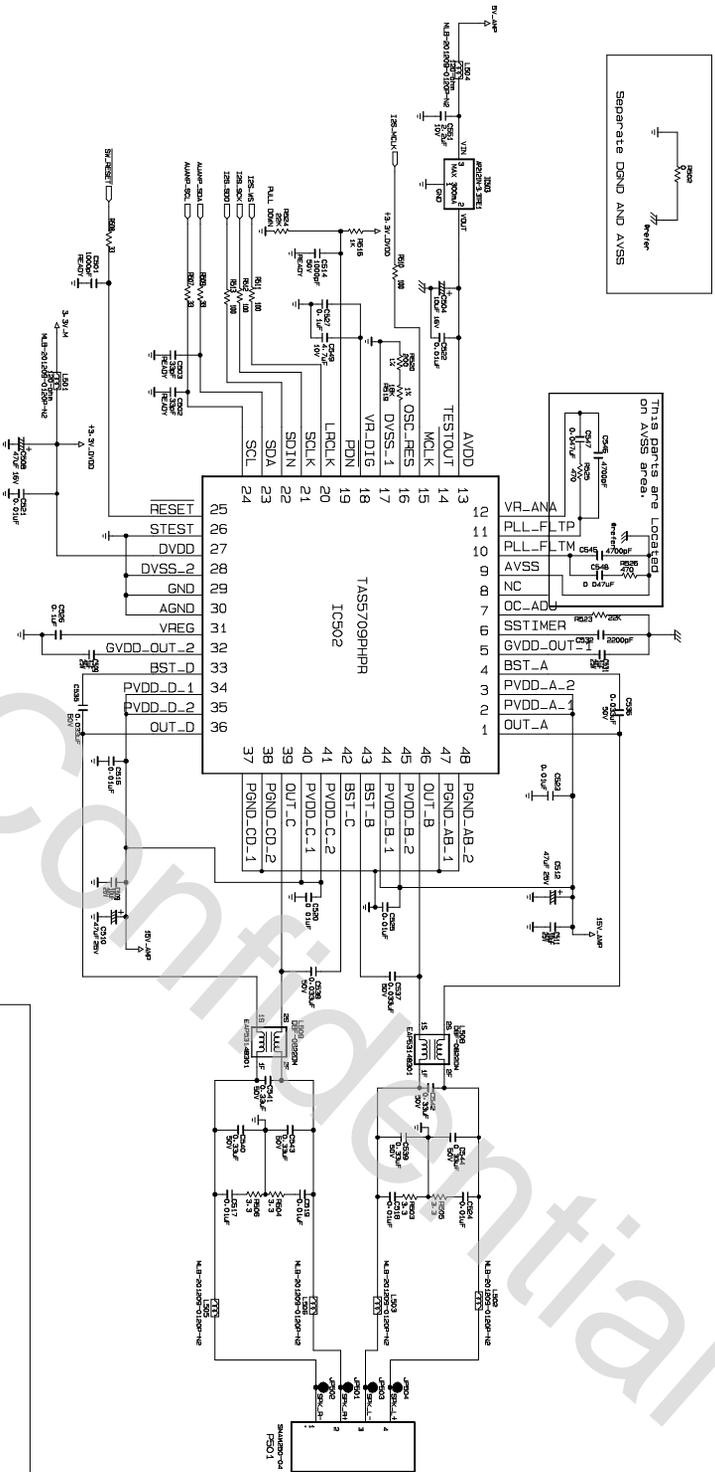
	R428	R429	R430	R431	L403	L402
NTSC	X	X	0	0	M3953	M9370
PAL/MULTI	0	0	X	X	K7257	K9553

THE Δ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION, FLUORESCENT TUBE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURER SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE Δ SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics
LG ELECTRONICS

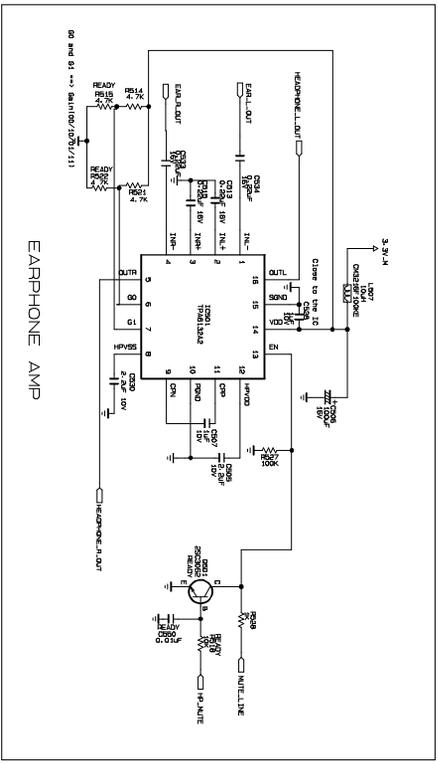
MODEL: EAX61528101
BLOCK: TUNER
DATE: 2009/11/06
SHEET: 4/7

AUDIO



SEPARATE GND AND AVSS

THIS PARTS ARE LOCATED ON AVSS AREA.



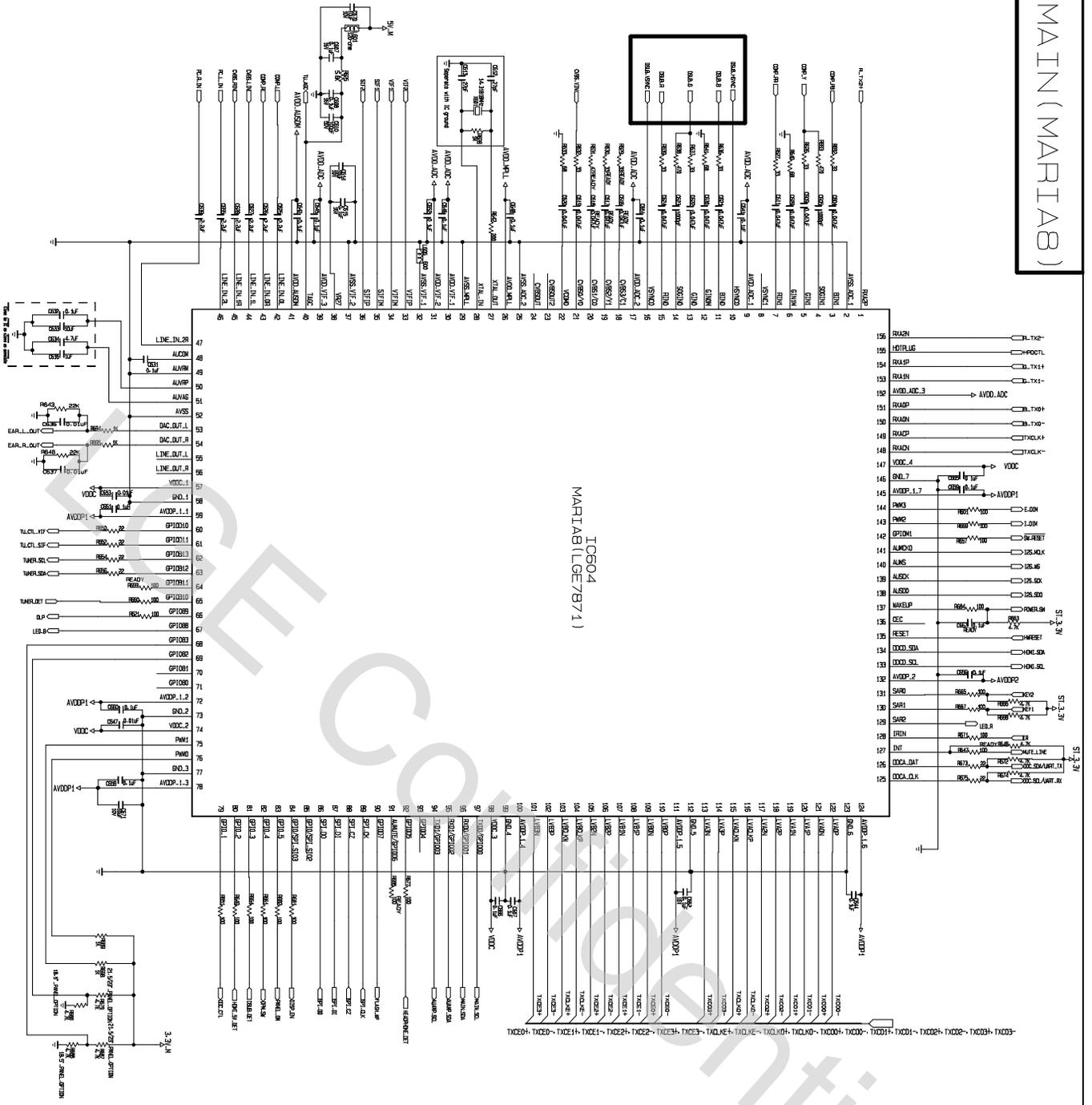
THE Δ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION, FLAME AND ELECTRICAL SHOCK HAZARDS. WHEN SERVING IF IT IS ESSENTIAL, THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE Δ SYMBOL MARK OF THE SCHEMATIC.

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MODEL	EAX6152810.1	DATE	2009/11/06
BLOCK	AUDIO	SHEET	5 / 7

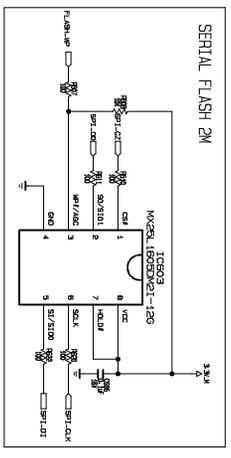
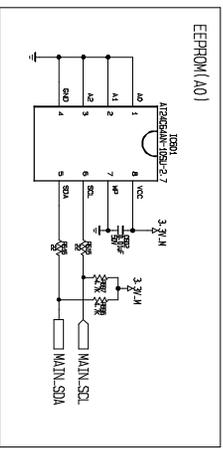
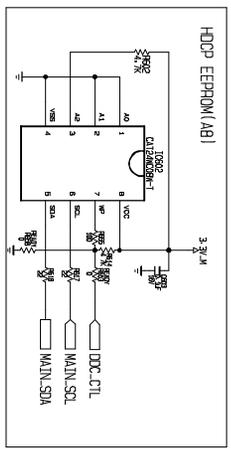
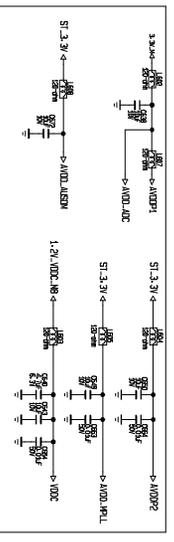
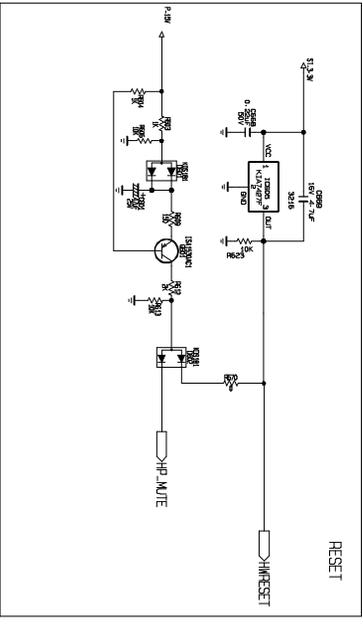
MAIN (MARIAB)



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SECRET
LGElectronics

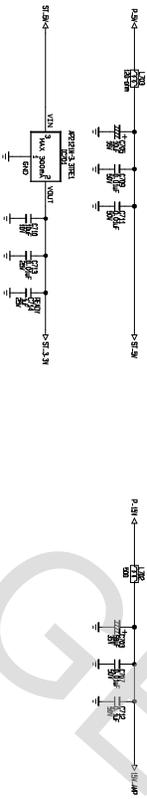
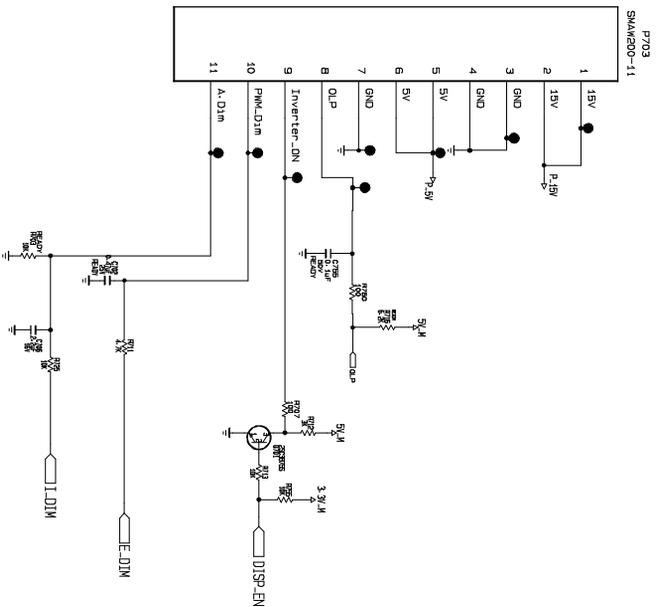
LG ELECTRONICS



MODEL	EAX6152P3401	DATE	2009/11/06
BLOCK	MARIAB	SHEET	6/7

Power

LGE confidential

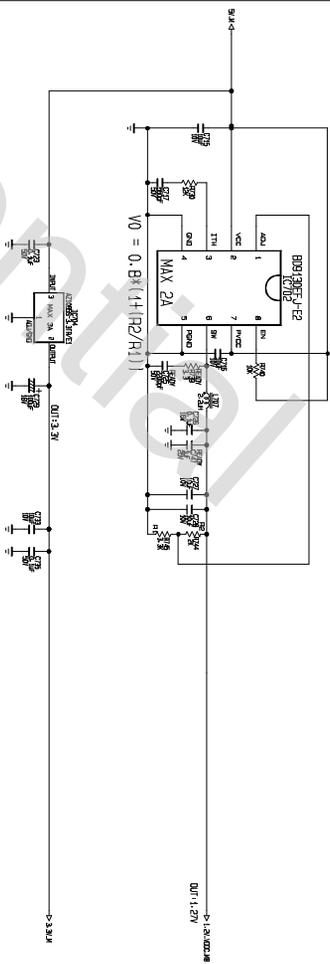


THE Δ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION, FILTRATION, SHOCK HAZARDS, WHEN SERVICING. IF IT IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE Δ SYMBOL MARK OF THE SCHEMATIC.

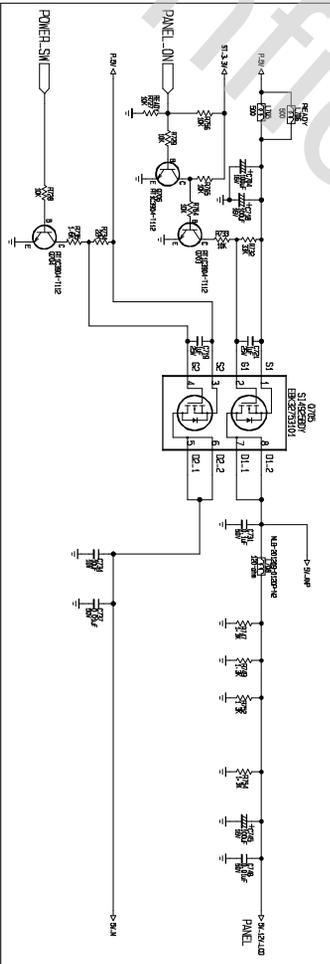
SECRET
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STAND-BY VOLTAGE 5V_M -> 1.2V_VDDC_M3, 3.3V_M

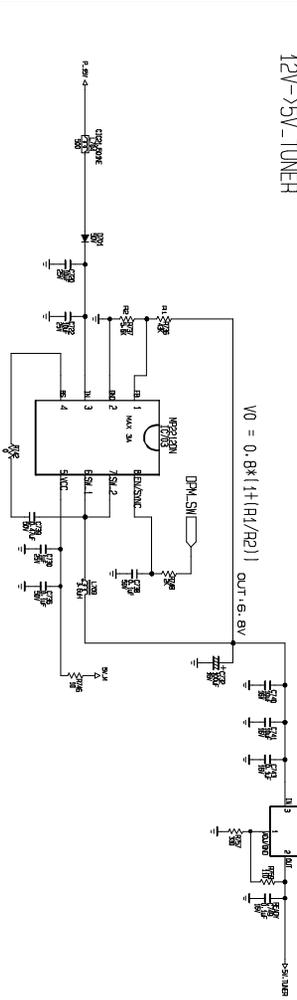


MULTI VOLTAGE **Switch P5V -> 5V_LCD



**Switch 5V:P5V -> 5V_M

TUNER VOLTAGE **DC-DC CONVERTER 12V->5V_TUNER



MODEL	EAX6152P3101	DATE	2009/11/06
BLOCK	POWER	SHEET	7 / 7



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