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LCD MONITOR TV

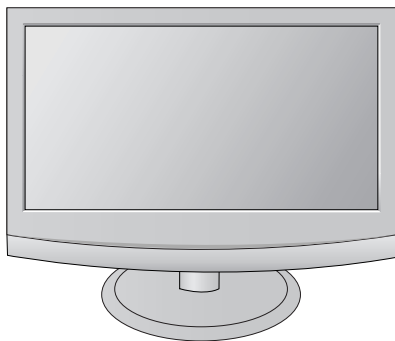
SERVICE MANUAL

CHASSIS : LD93A

MODEL : M2762D M2762D-P(W)ZL

CAUTION

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



P/NO : MFL62477305(0908-REV00)

Printed in Korea

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by Δ 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 Shock, Fire, or other Hazards.

Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and its components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1W), keep the resistor 10mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.

If the exposed metallic part has a return path to the chassis, the measured resistance should be between $1M\Omega$ and $5.2M\Omega$.

When the exposed metal has no return path to the chassis the reading must be infinite.

An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.

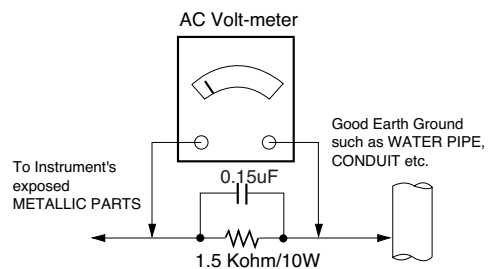
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.

Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which corresponds to 0.5mA.

In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



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

*Base on Adjustment standard

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 reconnecting 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.

- 1) This spec sheet is applied all of the LCD TV with LD93A chassis.
- 2) Not included spec and each product spec in this spec sheet apply correspondingly to the following each country standard and requirement of Buyer

2. Specification

Each part is tested as below without special appointment

- 1) Temperature : 25±5°C(77±9°F) , CST: 40±5°C
- 2) Relative Humidity : 65±10%
- 3) Power Voltage : Standard input voltage (100~240V@50/60Hz)
*Standard Voltage of each product is marked by models
- 4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
- 5) The receiver must be operated for about 20 minutes prior to the adjustment.

3. Test method

- 1) Performance :
LGE TV test method followed
- 2) Demanded other specification
 - Safety : CE,IEC specification
 - EMC : CE,IEC specification

Model	Market	Appliance
Mx62D	EU (PAL Market)	Safety : IEC/ EN60065 EMI :EN55013 EMS : EN55020

4. Electrical Specification

4.1 Module Specification

- M2762D- P(W)ZL : LGD / LM270WF1- TLD1 (P/ N : EAJ60703601)

No	Item	Specification	Unit	Remark
1	Type	TFT Color LCD Module		
2	Diagonal Size	27 inches(686.0mm) diagonal		
3	Active Display area	597.89(H) 236.31(V)	mm	
4	Outline Dimension	630(H) x 368.2(V) x 21.6(D)	mm	Typ. (Without Inverter)
5	Aspect Ratio	16: 9		
6	Pixel Number	1920 x RGB x 1080	pixel	
7	Pixel Pitch	0.3114(H) x 0.3114 (V)	mm	
8	Color arrangement	RGB vertical Stripe		
9	Color Depth	16.7M color		
10	Electrical Interface	LVDS 2Port		
11	Surface Treatment	Hard coating(3H) & Anti- glare(Haze 25)		
12	Operating Mode	Normally White		
13	Backlight Unit	4 CCFL (4 lamps)		
14	Response Time	Rising Time : 1 + Falling Time : 4	ms	Typ.
15	Color Gamut	72%		

5. General specification

5.1 TV

No	Item	Specification	Remarks
1	Market	EU(PAL Market-26Countries)	DTV & Analog- UK, France, Germany, Spain, Sweden, Finland, Italy, Netherland, Belgium, Czech, Luxemburg, Greece, Denmark, Austria, Hungary, Switzerland, Croatia, Turkey Analog Only -Poland, Portugal, Norway, Bulgaria, Serbia, Slovenia, Russia, Romania
2	Broadcasting system	1) PAL-BG 2) PAL-DK 3) PAL-I/I' 4) SECAM L/L' 5) DVB-T	
3	Receiving system	Analog : Upper Heterodyne Digital : COFDM	
4	Scart Jack (2EA)	PAL, SECAM	Scart 1 Jack is Full scart and support RF-OUT(ATV) Scart 2 jack is Half scart and support MNT/DTV-OUT.
5	Component Input (1EA)	Y/Cb/CrY/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	DVI Input	DVI-D	Digital
9	HDMI Input (2EA)	HDMI1-DTV HDMI2-DTV	1ea(Rear), 1ea(Side) HDMI version 1.3 Support HDCP / Not support PC
10	Audio Input (3EA)	RGB/DVI Audio, Component, CVBS	L/R Input
11	SPDIF out (1EA)	SPDIF out	
12	Earphone out (1EA)	Antenna, AV1, AV2, AV3, Component, RGB, DVI, HDMI1, HDMI2	
13	USB (1EA)	Picture, Music	Software Update +Picture +Music
14	RS-232C (1EA)		Commercial Mode

5.2 RGB

No	Item		Specification				Remark	
1	Supported Sync.Type		Separate Sync.,Digital					
2	Operating Frequency		Analog	Horizontal	30~83kHz			
				Vertical	56~75 Hz			
			Digital	Horizontal	30~83kHz			
				Vertical	56~75 Hz			
3	Resolution		Analog	Max.	1360 x 768 @60Hz			M1962D
				Recommend	1360 x 768 @60Hz			
			Digital	Max.	1360 x 768 @60Hz			
				Recommend	1360 x 768 @60Hz			
			Analog	Max.	1600 x 900 @60Hz			M2062D
				Recommend	1600 x 900 @60Hz			
			Digital	Max.	1600 x 900 @60Hz			
				Recommend	1600 x 900 @60Hz			
			Analog	Max.	1920 x 1080 @60Hz			M2262D/M2362D/M2762D
				Recommend	1920 x 1080 @60Hz			
			Digital	Max.	1920 x1080 @60Hz			
				Recommend	1920 x1080 @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 Mode	M1962D	On/On	Active	Blue	40	Max.
				On/On	Active	Blue	35	Typ.
			M2062D	On/On	Active	Blue	60	Max.
				On/On	Active	Blue	50	Typ.
			M2262D	On/On	Active	Blue	60	Max.
				On/On	Active	Blue	53	Typ.
		M2362D	On/On	Active	Blue	65	Max.	
			On/On	Active	Blue	55	Typ.	
		M2762D	On/On	Active	Blue	70	Max.	
			On/On	Active	Blue	63	Typ.	
		Sleep mode		Off/On	Off	Amber	1W	RGB / DVI
				On/Off				
	Off mode		-	Off	Off	0.5W		
7	MTBF		50,000 HRS with 90%Confidence level				Lamp Life 19"LGD :50,000 Hours(min) 19"AUO :50,000 Hours(min) 20"LGD :50,000 Hours(min) 20"CMO :40,000 Hours(min) 22"LGD :50,000 Hours(min) 22"AUO :40,000 Hours(min) 23"LGD :50,000 Hours(min) 27"LGD :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

6.1 M2362D – LGD Module

No.	Item	Specification				Remark	
			Min	typ	Max		
1.	Viewing Angle[CR>10]	Right/Left	70/70	85/85	-		
		Up/Down	60/70	75/85	-		
2.	Luminance	Luminance (cd/m ²)	250	300	-		
		Variation(%)	75	-	-		
3.	Contrast Ratio	CR	700	1000	-	Full white/ Full black	
4.	Color Coordinates [CIE 1931]	White	Wx	Typ -0.03	0.313	Typ +0.03	DVI or RGB - Standard, 6500K - Full White (100IRE) - Backlight 100
			Wy		0.329		
		RED	Rx		0.644		
			Ry		0.336		
		Green	Gx		0.301		
			Gy		0.611		
		Blue	Bx		0.146		
By	0.070						
5.	Response Time	Rise Time	TrR	1.3	2.6	Condition : DVI or RGB	
		Decay Time	TrD	3.7	7.4	Standard, Backlight100	

6.2 M2762D –LGD Module

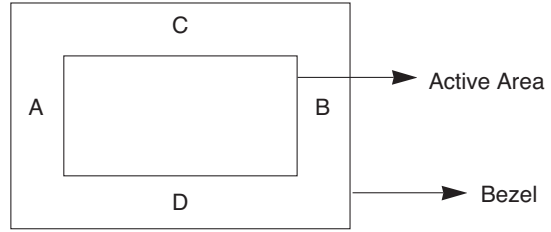
No.	Item	Specification				Remark	
			Min	typ	Max		
1.	Viewing Angle[CR>10]	Right/Left	70/70	85/85	-		
		Up/Down	60/70	75/85	-		
2.	Luminance	Luminance (cd/m ²)	250	300	-		
		Variation(%)	75	-	-		
3.	Contrast Ratio	CR	700	1000	-	Full White/ Full black	
4.	Color Coordinates [CIE 1931]	White	Wx	Typ -0.03	0.313	Typ +0.03	DVI or RGB - Standard, 6500K - Full White (100IRE) - Backlight 100
			Wy		0.329		
		RED	Rx		0.637		
			Ry		0.337		
		Green	Gx		0.298		
			Gy		0.613		
		Blue	Bx		0.147		
By	0.057						
5.	Response Time	Rise Time	TrR	1	4	Condition : DVI or RGB	
		Decay Time	TrD	4	8	Standard, Backlight100	
		Gray to Gray	T _{GrD_AVR}	2	6		

6.3 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.

6.4 Active area

- Active area of LCD PANEL is in bezel of cabinet.
- Interval between active area and bezel
 $IA-BI \leq 1.0 \text{ mm}$, $IC-DI \leq 1.0 \text{ mm}$
 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. Chroma (PSM : PC Mode-Standard, AV Mode-Vivid)

No	Item		Min	Typ	Max	Remark	
1.	Cool	White Balance,X axis	0.268	0.283	0.298	DQA :±0.015	Measurement Condition PSM :Outgoing condition Input signal :White pattern(85IRE) Pattern number :78 (MSPG series)
		White Balance,Y axis	0.283	0.298	0.313	DQA :±0.015	
2.	Medium	White Balance,X axis	0.280	0.295	0.310	DQA :±0.015	
		White Balance,Y axis	0.290	0.305	0.320	DQA :±0.015	
3.	Warm	White Balance,X axis	0.298	0.313	0.328	DQA :±0.015	
		White Balance,Y axis	0.314	0.329	0.344	DQA :±0.015	
4.	6500k	White Balance,X axis	0.298	0.313	0.328	DQA :±0.015	
		White Balance,Y axis	0.314	0.329	0.344	DQA :±0.015	
5.	9300k	White Balance,X axis	0.268	0.283	0.298	DQA :±0.015	
		White Balance,Y axis	0.283	0.298	0.313	DQA :±0.015	

8. SET Optical Feature

8.1 General feature

- PC Mode

No	Item	Luminance(cd/m ²)			C/R		Remark
		Min	Typ	Max	Min	Typ	
1	M1962D	150	180		500	700	RGB &DVI
2	M2062D	200	230		500	700	DFC 50000:1(Typ)
3	M2262D	200	230		500	700	-Mode :Outgoing condition
4	M2362D	200	230		500	700	Input signal :100IRE White pattern
5	M2762D	200	230		500	700	(Pattern #4 :MSPG series)

- AV Mode

No	Item	Luminance(cd/m ²)		C/R(min)		Remark
		Typ	Max	RF,AV,COMPONENT,HDMI		
1	M1962D	120	150	500		RF, AV, COMPONENT, HDMI
2	M2062D	170	200	500		Test Condition
3	M2262D	170	200	500		Mode :Outgoing condition
4	M2362D	170	200	500		Input signal : 100IRE White pattern
5	M2762D	170	200	500		(Pattern #4 : MSPG series)

8.2 Special feature(DFC)

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

No	Item	Min	Typ	Max	Remark
1	M1962D/ M2062D/ M2262D/ M2362D/ M2762D	40000: 1	50000: 1	-	PC Mode(D- sub, DVI), Mode : Outgoing condition Input signal : 100 IRE Full white pattern

9. Component Video Input (Y, P_B , P_R)

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

10. RGB/DVI INPUT (PC)

No.	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock(MHz)	Remark
1.	720*400	31.468	70.08	28.321	
2.	640*480	31.469	59.94	25.175	
3.	640*480	37.5	75	31.5	
4.	800*600	37.879	60.317	40.0	
5.	800*600	46.875	75.0	49.5	
6.	1024*768	48.363	60.0	65.0	
7.	1024*768	60.123	75.029	78.75	
8.	1152*864	67.500	75.000	108.0	
9.	1280*1024	63.981	60.02	108.0	
10.	1280*1024	79.976	75.035	135.0	
11.	1680*1050	64.674	59.883	119.0	
12.	1680*1050	65.290	59.954	146.25	
13.	1600*1200	75.0	60.0	162.0	
14.	1920*1080	66.587	59.934	138.5	

10.1 RGB EDID Data (Product ID : 22381)

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	6D	57	01	01	01	01
0x01	01	13	01	03	68	3C	22	78	EA	14	E5	A3	56	4C	9D	25
0x02	0E	50	54	A5	6B	80	81	80	81	8F	71	40	B3	00	81	4F
0x03	71	4F	01	01	01	01	1A	36	80	A0	70	38	1F	40	30	20
0x04	35	00	56	50	21	00	00	1A	00	00	00	FD	00	38	4B	1E
0x05	53	11	00	0A	20	20	20	20	20	20	00	00	00	FC	00	4D
0x06	32	37	36	32	44	0A	20	20	20	20	20	20	00	00	00	FC
0x07	00	0A	20	20	20	20	20	20	20	20	20	20	20	20	00	D1

10.2 DIV EDID Data (Product ID : 22382)

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	6E	57	01	01	01	01
0x01	01	13	01	03	80	3C	22	78	EA	14	E5	A3	56	4C	9D	25
0x02	0E	50	54	A5	6F	80	81	80	81	8F	71	40	B3	00	81	4F
0x03	71	4F	01	01	01	01	1A	36	80	A0	70	38	1F	40	30	20
0x04	35	00	56	50	21	00	00	1A	21	39	90	30	62	1A	27	40
0x05	68	B0	36	00	56	50	21	00	00	1C	00	00	00	FD	00	38
0x06	4B	1E	53	11	00	0A	20	20	20	20	20	20	00	00	00	FC
0x07	00	4D	32	37	36	32	44	0A	20	20	20	20	20	20	00	0C

11. HDMI INPUT(DTV)

No.	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock(MHz)	Remark
1	720* 480	31.469 / 31.5	59.94 / 60	27.00/ 27.03	SDTV 480P
2	720* 576	31.25	50	27.864	SDTV 576P
3	1280* 720	37.500	50	74.25	HDTV 720P
4	1280* 720	44.96 / 45	59.94 / 60	74.17/ 74.25	HDTV 720P
5	1920* 1080	33.72 / 33.75	59.94 / 60	74.17/ 74.25	HDTV 1080I
6	1920* 1080	28.125	50.00	74.25	HDTV 1080I
7	1920* 1080	27	24	74.25	HDTV 1080P
8	1920* 1080	33.75	30.00	74.25	HDTV 1080P
9	1920* 1080	56.250	50	148.5	HDTV 1080P
10	1920* 1080	67.43 / 67.5	59.94 / 60	148.35/ 148.50	HDTV 1080P

ADJUSTMENT INSTRUCTION

1. Application

This document is applied to LD93A chassis 19/20/22/23/27" LCD Monitor TV which is manufactured in TV (or Monitor) Factory or is produced on the basis of this data.

2. Designation

- 2.1 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.
- 2.2. Power Adjustment: Free Voltage
- 2.3. Magnetic Field Condition: Nil.
- 2.4. Input signal Unit: Product Specification Standard
- 2.5. Reserve after operation: Above 5 Minutes (Heat Run)
Temperature : at 25°C ± 5°C
Relative humidity : 65 ±10%
Input voltage : 220V, 60Hz
- 2.6. Adjustment equipment: Color Analyzer (CA-210 or CA-110), Pattern Generator (MSPG-925L or Equivalent), DDC Adjustment Jig equipment, SVC remote controller
- 2.7. Don't push The "IN STOP KEY" after completing the function inspection.

3. Tool Option

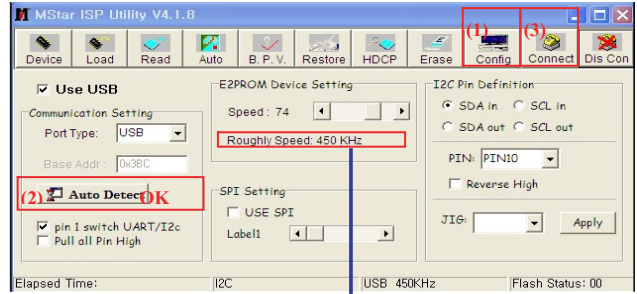
Model	Module	Tool option
M1962D-P(W)ZL	LGD	4301
M1962D-P(W)ZL	AUO	37069
M2062D-P(W)ZL	LGD	4557
M2062D-P(W)ZL	CMO	20941
M2262D-P(W)ZL	LGD/AUO	4813 / 37581
M2362D-P(W)ZL	LGD	5069
M2762D-P(W)ZL	LGD/CMO	5325 / 21709

4. Main PCB check process

- APC - After Manual-Insult, executing APC

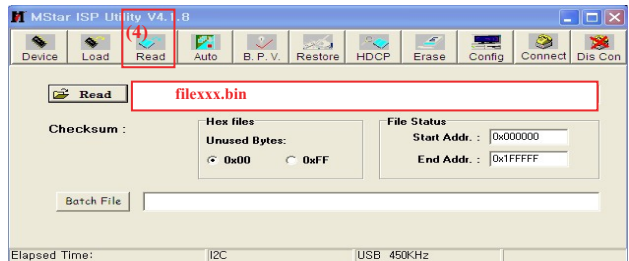
4.1 Download

1. Execute ISP program "Mstar ISP Utility" and then click "Config" tab.
2. Set as below, and then click "Auto Detect" and check "OK" message.
If display "Error", Check connect computer, jig, and set.
3. Click "Connect" tab.
If display "Can't ", Check connect computer, jig, and set.

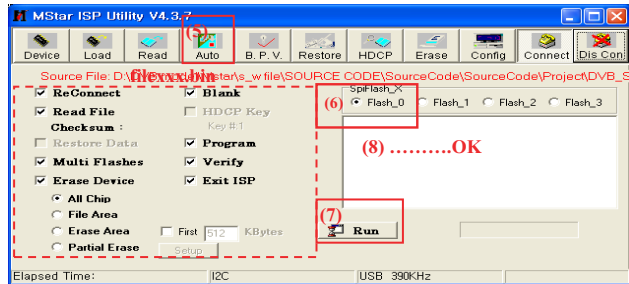


Please Check the Speed :
To use speed between
from 200KHz to 400KHz

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

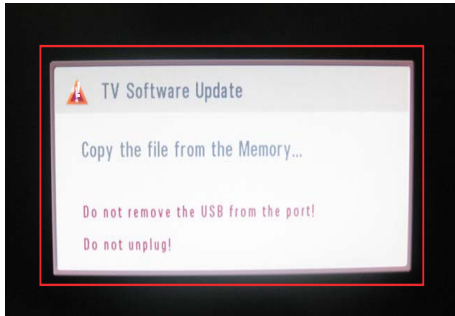


5. Click "Auto" tab and set as below
6. Click "Run".
7. After downloading, check "OK" message.

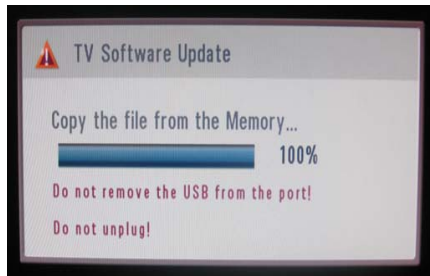
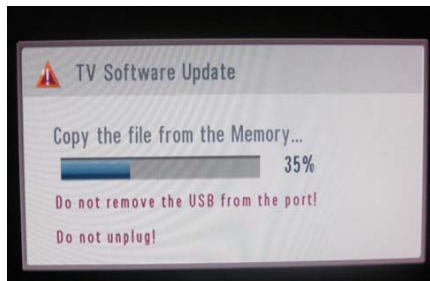


4.2 DOWNLOAD USB

1. Put the USB Stick to the USB socket
2. Automatically detecting update file in USB Stick
- If your downloaded program version in USB Stick is Low, it didn't work.
But your downloaded version is High, USB data is automatically detecting
3. Show the message "Copying files from memory"



4. Updating is starting.



5. Updating Completed, The TV will restart automatically.
6. If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)

* If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

- * After downloading, have to adjust TOOL OPTION again.
1. Push "ADJ" key in service remote controller
 2. Select "1.Tool Option" and Push "OK" button
 3. Punch in the number. (Each model has their number.)
 4. Completed selecting Tool option

4.3 ADC Process

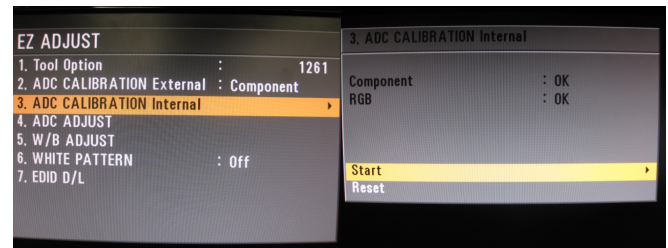
EZ ADJUST		Tool Option : 1229	
1. Tool Option	: 1229	Model Name	: M2794DP-PZ
2. ADC CALIBRATION External	: DTV	Inch	: 27
3. ADC CALIBRATION Internal		Tool	: Mx94DP
4. ADC ADJUST		DSUB Port	: RGB 0 (NEW)
5. W/B ADJUST		Media Player	: EMF-PM
6. WHITE PATTERN	: OFF	HDMI Type	: 3-HDMI
7. EDID D.L		OK to Download	DOWNLOAD:

4.3.1 ADC Calibration Internal

: ADC is executed automatically using internal pattern.

- If ADC is executed by ADC Calibration Internal, RGB and Component is executed at the same time.
 - Remove the all input jack from set.
 - Press the ADJ KEY on R/C and enter EZ ADJUST.
 - Press "Power only" key of service remocon.(Baud rate : 115200 bps).
 - Select "3. ADC CALIBRATION Internal" by using ▲ / ▼ (CH +/-) and press ENTER(■).
 - Select "Start" and press navigation key().
 - ADC Calibration Internal is executed automatically.
 - Press EXIT key on R/C

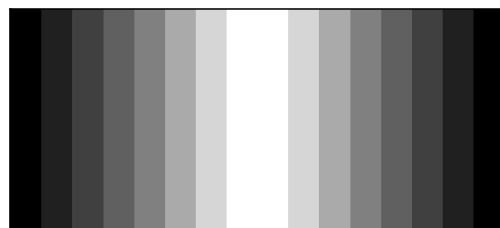
4.3.2 ADC Calibration External



(If ADC calibration had done in internal process, It doesn't need to use this process.)

1) Auto RGB Gain/Offset Adjustment

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



- Press the ADJ KEY and then select "2.ADC CALIBRATION External" by using ▲ / ▼ (CH +/-) and press ENTER(■).

1-1) Confirmation

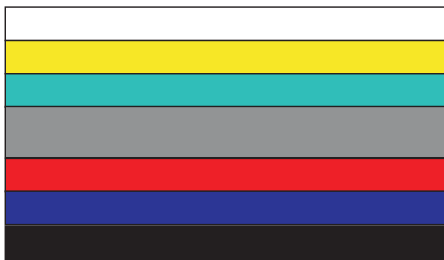
- We confirm whether "0xAA (RGB)" address of EEPROM "0xA2" is "0xAA" or not.
- If "0xAA (RGB)" address of EEPROM "0xA2" isn't "0xAA", we adjust once more
- We can confirm the ADC values from "0xA4~0xA9 (RGB)" addresses in a page "0xA2"

*Manual ADC process using Service Remocon. After enter Service Mode by pushing "ADJ" key, execute "4.ADC Adjust" by pushing "▶" key at "ADC CALIBRATION: RGB".

EZ ADJUST		4. ADC ADJUST	
1. Tool Option : 1261		MODE : RGB	✓
2. ADC CALIBRATION External : Component		R-GAIN : 115	
3. ADC CALIBRATION Internal		G-GAIN : 114	
4. ADC ADJUST ▶		B-GAIN : 114	
5. W/B ADJUST		R-OFFSET : 137	
6. WHITE PATTERN : OFF		G-OFFSET : 131	
7. EDID D.L		B-OFFSET : 137	

2) Component Gain/Offset Adjustment

- Convert to Component in Input-source
- Signal equipment displays
Impress Resolution 1080i
MODEL: 223 in Pattern Generator(1080i Mode)
PATTERN: 65 in Pattern Generator(MSPG-925 SERISE)*



Adjustment pattern (COMPONENT)

- Press the ADJ KEY and then select "2.ADC CALIBRATION External" by using ▲ / ▼ (CH +/-) and press ENTER(■).

2-1) Confirmation

- We confirm whether "0xB3 (480i)/0xBC (1080i)" address of EEPROM "0xA2" is "0xAA" or not.
- If "0xB3 (480i)/0xBC(1080i)" address of EEPROM "0xA2" isn't "0xAA", we adjust once more
- We can confirm the ADC values from "0xAD~0XB2 (480i)/0XB6~BB (1080i)" addresses in a page "0xA2"

*Manual ADC process using Service Remocon. After enter Service Mode by pushing "ADJ" key, execute "ADC Adjust" by pushing "▶"key at "ADC CALIBRATION :COMPONENT".
Impress Resolution 1080i

EZ ADJUST		Tool Option : 1229	
1. Tool Option : 1229		Model Name : M2794DP-PZ	
2. ADC CALIBRATION External : DTV		Inch : 27	
3. ADC CALIBRATION Internal		Tool : Mx94DP	
4. ADC ADJUST		DSUB Port : RGB 0 (NEW)	
5. W/B ADJUST		Media Player : EMF-PM	
6. WHITE PATTERN : OFF		HDMI Type : 3-HDMI	
7. EDID D.L		OK to Download	DOWNLOAD:

4.4 Function Check

- 1) Check display and sound
- Check Input and Signal items. (cf. work instructions)
 1. TV
 2. AV (SCART1/SCART2/CVBS)
 3. COMPONENT (1080i)
 4. RGB (PC : 1360 x 768 @ 60Hz -M1962D)
(PC : 1600 x 900 @ 60Hz -M2062D) (PC : 1920 x 1080 @ 60Hz -M2262D&M2362D/M2762D)
 5. DVI (PC : 1360 x 768 @ 60Hz -M1962D)
(PC : 1600 x 900 @ 60Hz -M2062D) (PC : 1920 x 1080 @ 60Hz -M2262D&M2362D/M2762D)
 6. HDMI
 7. PC Audio In

* Display and Sound check is executed by Remote controller.

5. Total Assembly line process

5.1 Adjustment Preparation

- W/B Equipment condition
CA210: CH 9, Test signal: Inner pattern (85IRE)
- Above 5 minutes H/run in the inner pattern. ("power on" key of adjust remote control)
- 15 Pin D-Sub Jack is connected to the AUTO W/B EQUIPMENT.

Color Temperature	Cool	9,300k	°K	X=0.285 (±0.003) Y=0.293 (±0.003)	M1962D M2062D	<Test Signal> Inner pattern (216gray,85IRE)
	Medium	8,000k	°K	X=0.295 (±0.003) Y=0.305 (±0.003)	M2262D M2362D	
	Warm	6,500k	°K	X=0.313 (±0.003) Y=0.329 (±0.003)	M2762D	
Luminance (cd/m²)	Cool	Min : 120		Typ : 170	M1962D	<Test Signal> Inner pattern (216gray,85IRE)
	Medium	Min : 120		Typ : 170		
	Warm	Min : 120		Typ : 170		
	Cool	Min : 170		Typ : 220	M2062D M2262D M2362D M2762D	
	Medium	Min : 170		Typ : 220		
Warm	Min : 170		Typ : 220			

- Adjust Process will start by execute I2C Command (Inner pattern (0xF3, 0xFF).

* 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 Module)

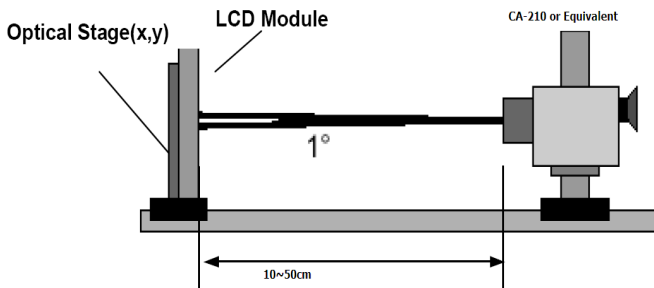
5.2 W/B condition

- Surrounding Temperature : 20 % ~ 80 %
- Surrounding Temperature : 25±5 °C
- warm-up Time : Under 5 Min

- * Manual W/B process using adjusts Remote control.
 - After enter Service Mode by pushing "ADJ" key,
 - Enter White Pattern off of service mode, and change off -> on.
 - Enter "W/B ADJUST" by pushing "▶" key at "5. W/B ADJUST".

EZ ADJUST	MODE : DTV
ADC CALIBRATION : DTV	TEMPERATURE : Cool
ADC ADJUST	R-GAIN : 192
SUB B/C ADJUST	G-GAIN : 192
W/B ADJUST ▶	B-GAIN : 192
WHITE PATTERN : Off	R-OFFSET : 128
2HOUR OFF : Off	G-OFFSET : 128
	B-OFFSET : 128
	COPY ALL

- * 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.



5.3 DPM operation confirmation

Check if Power LED Color and Power Consumption operate as standard.

- Set Input to RGB and connect D-sub cable to set
- Measurement Condition: (100~240V@ 50/60Hz)
- Confirm DPM operation at the state of screen without Signal

5.4 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.

5.5 DDC EDID Write (DVI 128Byte)

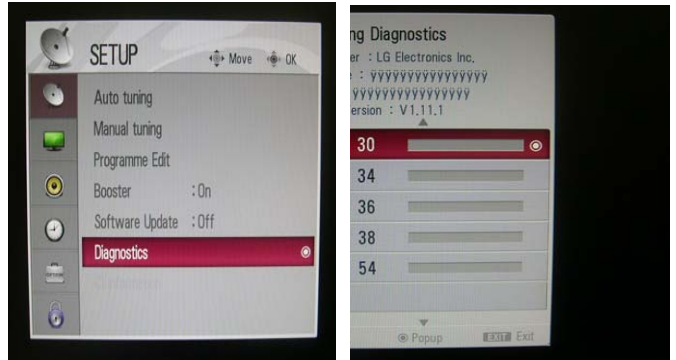
- Connect DVI-D Signal Cable to DVI Jack.
- Write EDID DATA to EEPROM (24C02) by using DDC2B protocol.
- Check whether written EDID data is correct or not.

5.6 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.

5.7 Serial number (RS-232C)

- press "Power on" key of service remocon.(Baud rate : 115200 bps)
- Connect RS232 Signal Cable to RS-232 Jack.
- Write Serial number by use RS-232.
- Must check the serial number at the Diagnostics of SET UP menu. (Refer to below).



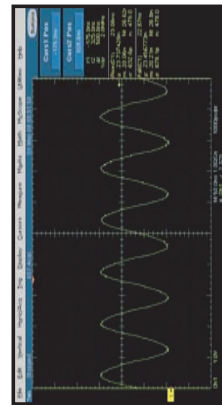
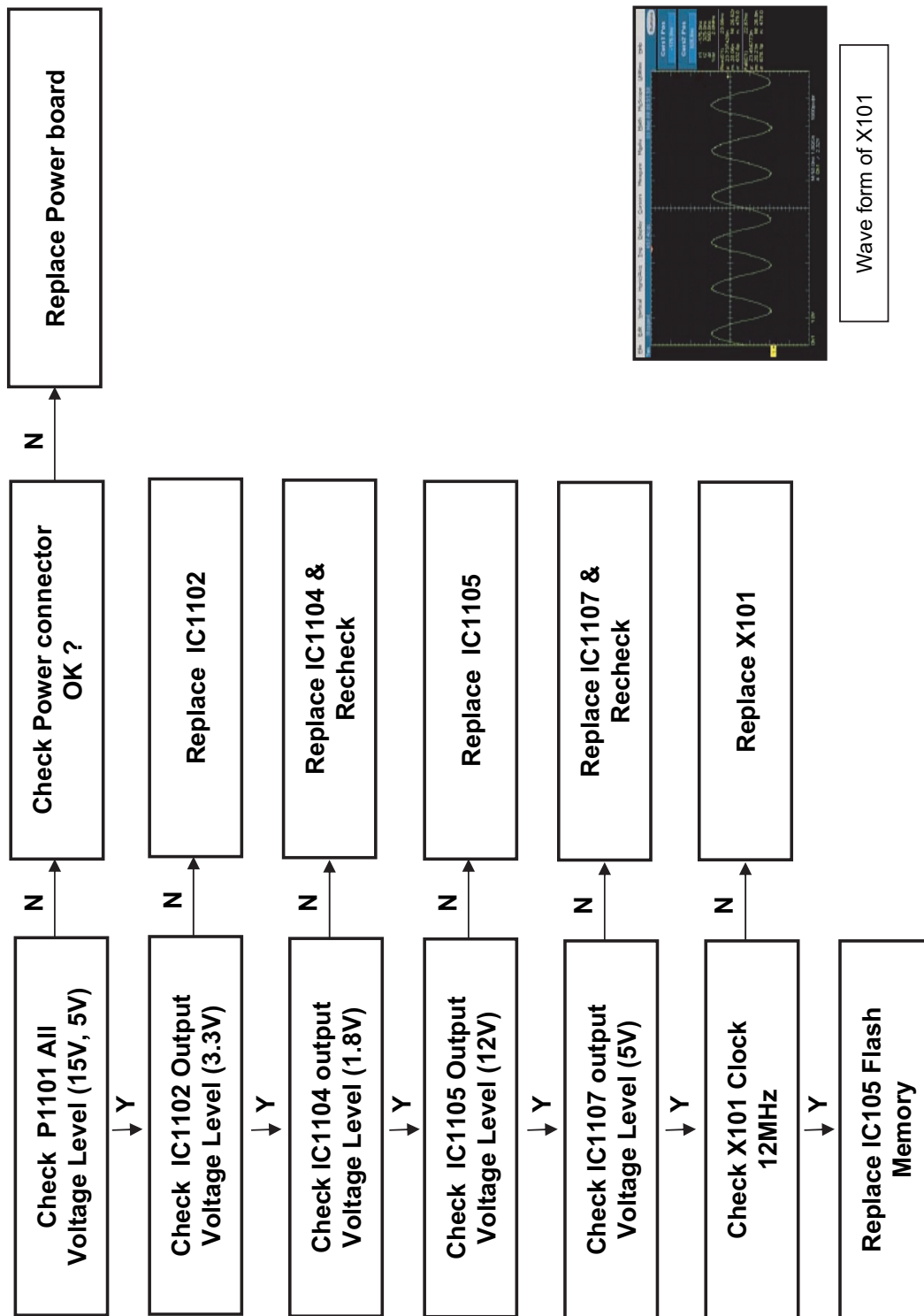
5.8 EDID DATA

- EDID download
- 1) Press "Power only" key of service remocon.(Baud rate : 115200 bps).
- 2) Press the ADJ KEY on R/C and enter EZ ADJUST
- 3) Select "7.EDID D/L" by using ▲/▼(CH +/-) and press ENTER(■).
- 4) Select "Start" and press navigation key(▶).
- 5) EDID download is executed automatically.
- 6) Press EXIT key on R/C.

EZ ADJUST	7. EDID D/L
1. Tool Option : 1261	RGB : OK
2. ADC CALIBRATION External : Component	HDMI 1 : OK
3. ADC CALIBRATION Internal	HDMI 2 : OK
4. ADC ADJUST	DVI : OK
5. W/B ADJUST	Start
6. WHITE PATTERN : OFF	Reset
7. EDID D.L	

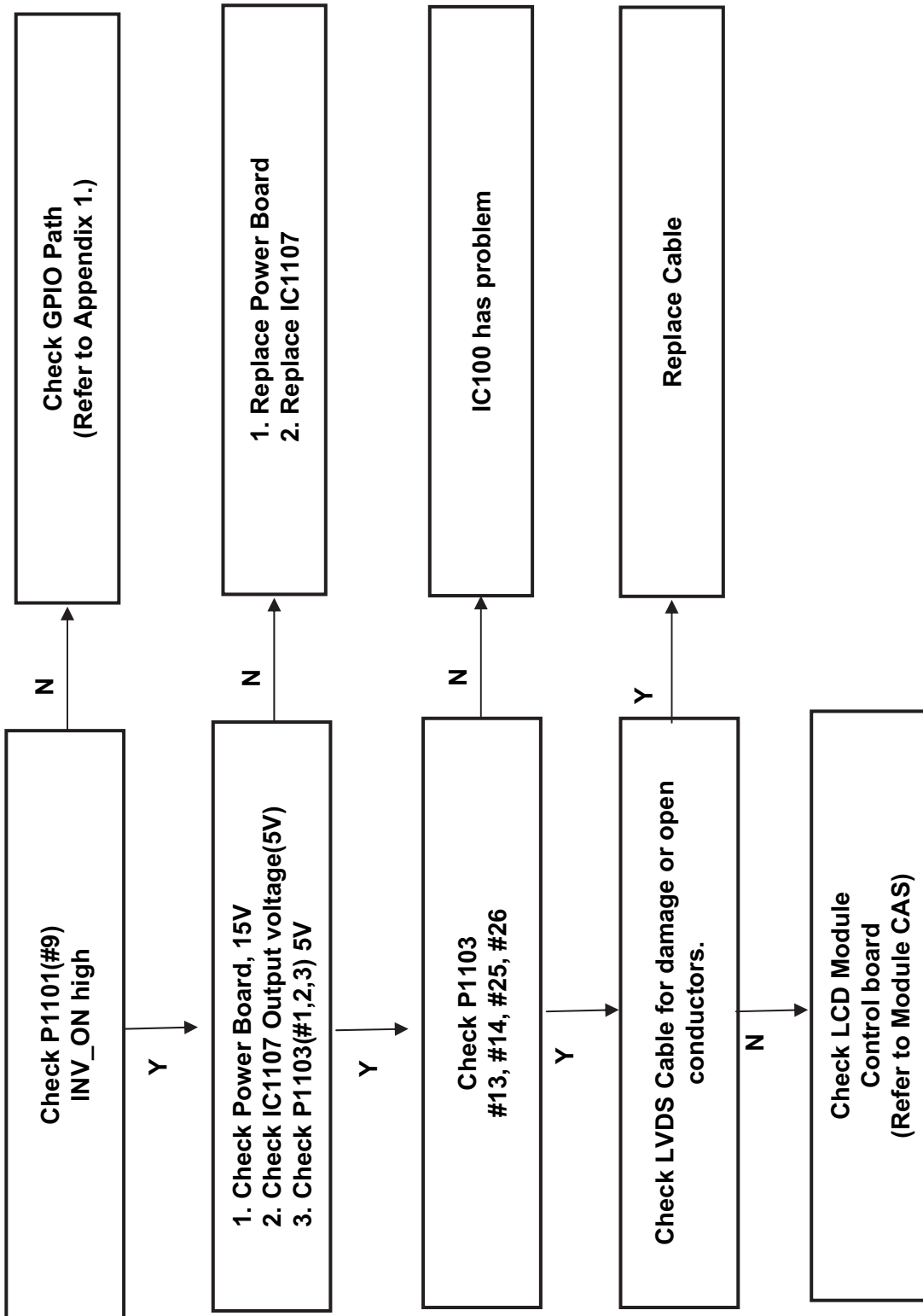
TROUBLESHOOTING

1. Power- Up Boot Fail Trouble Shooting

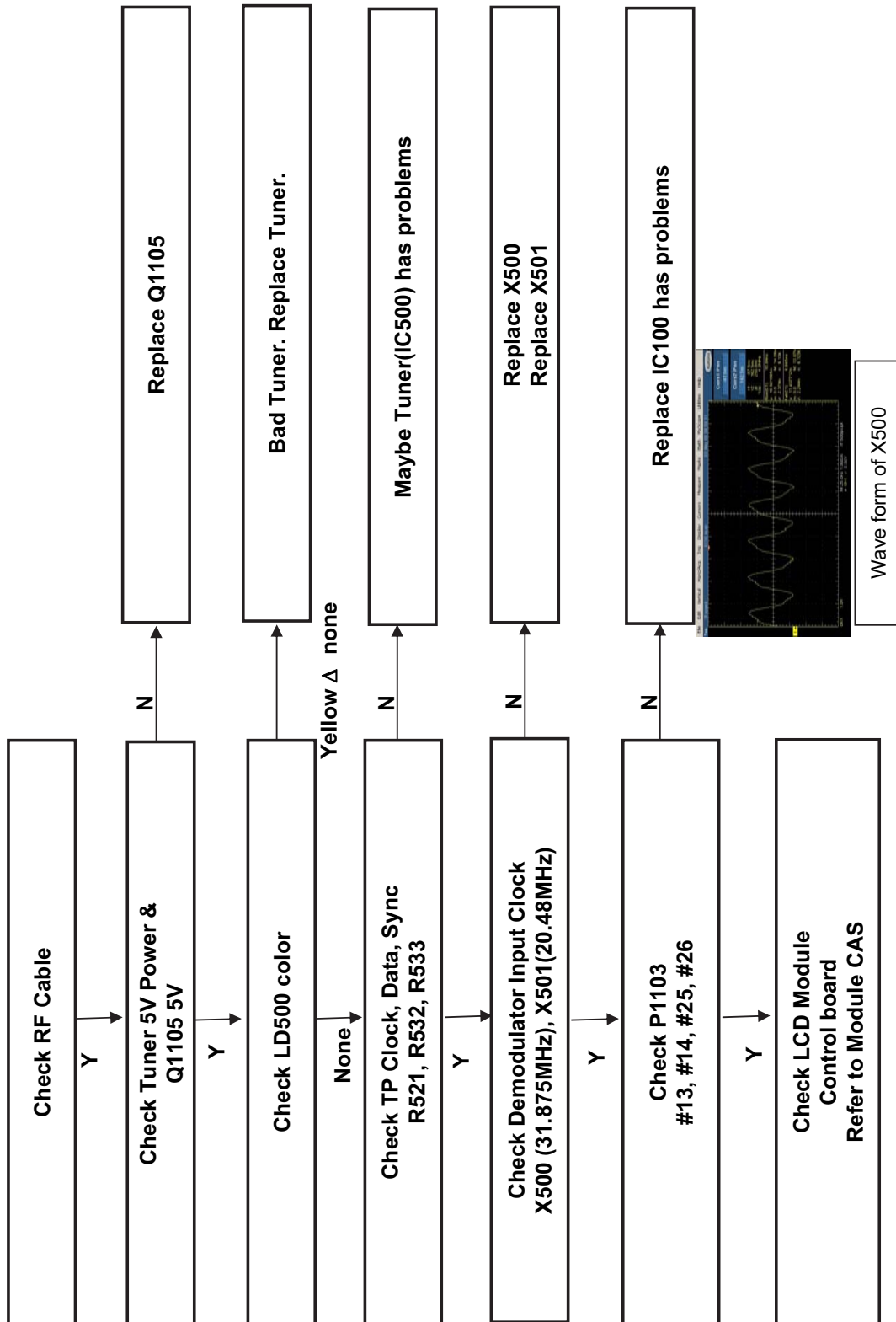


Wave form of X101

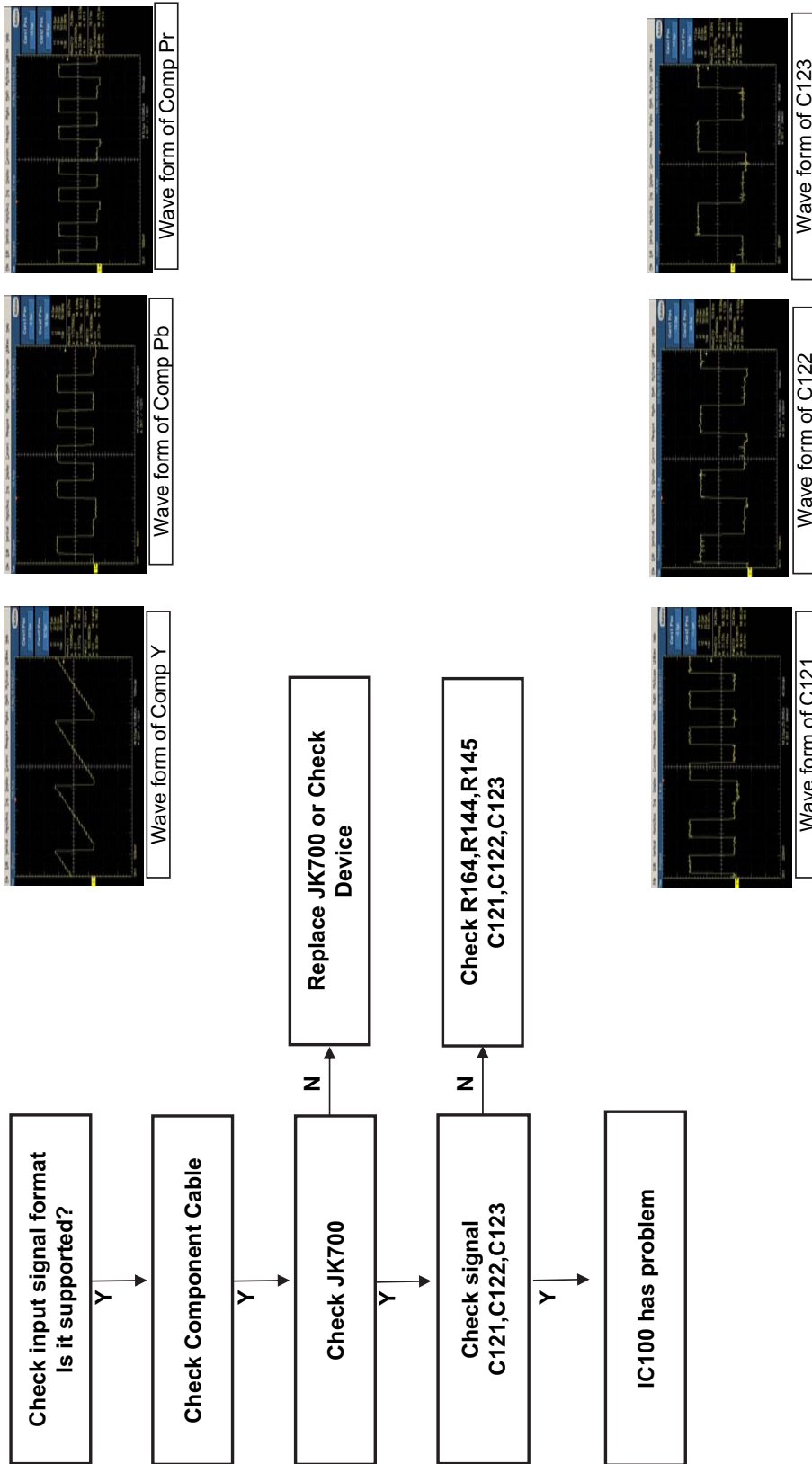
2. No OSD Trouble Shooting



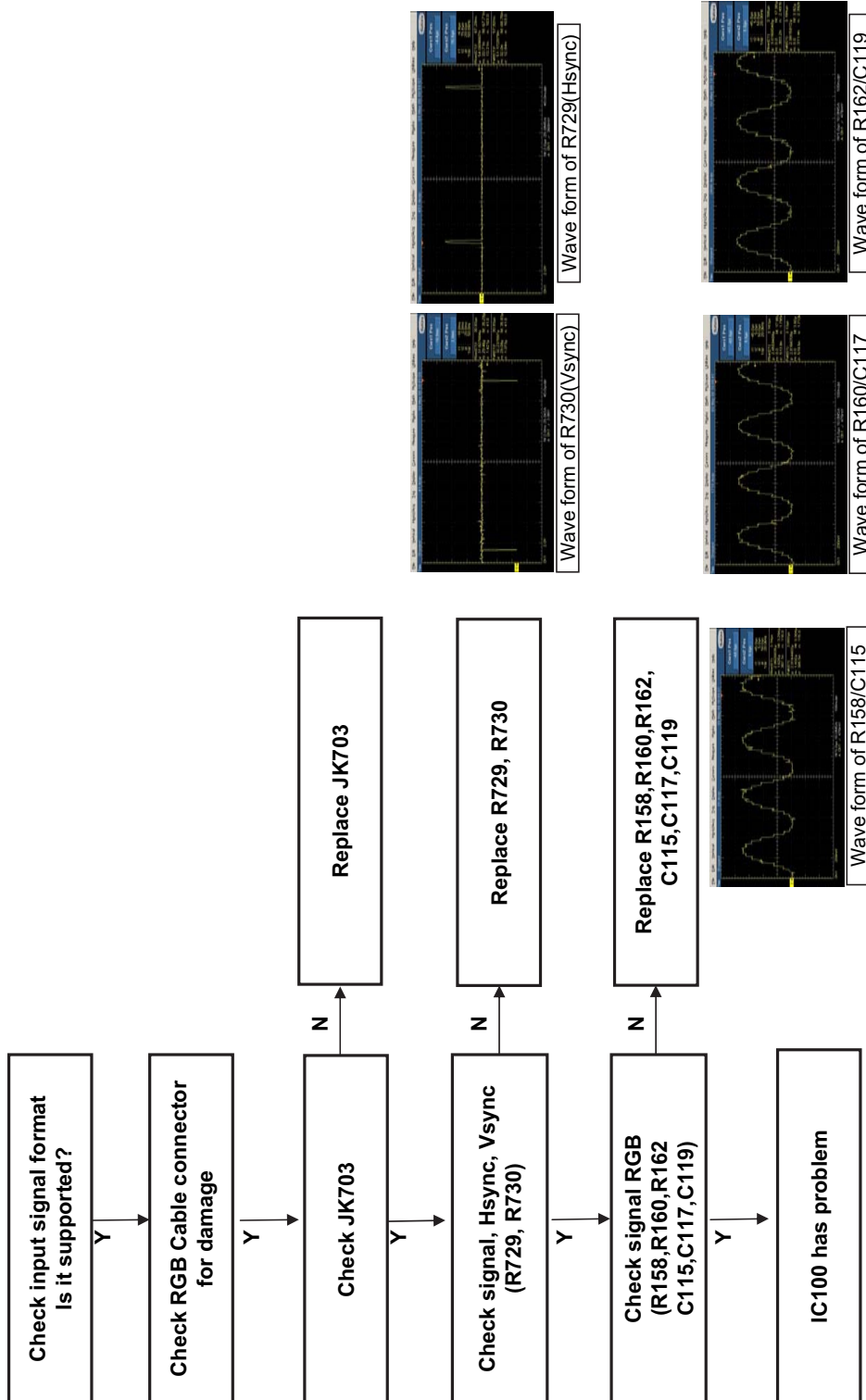
3. Digital TV Video Trouble Shooting



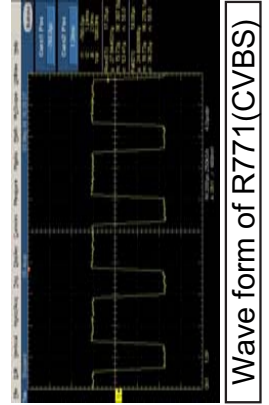
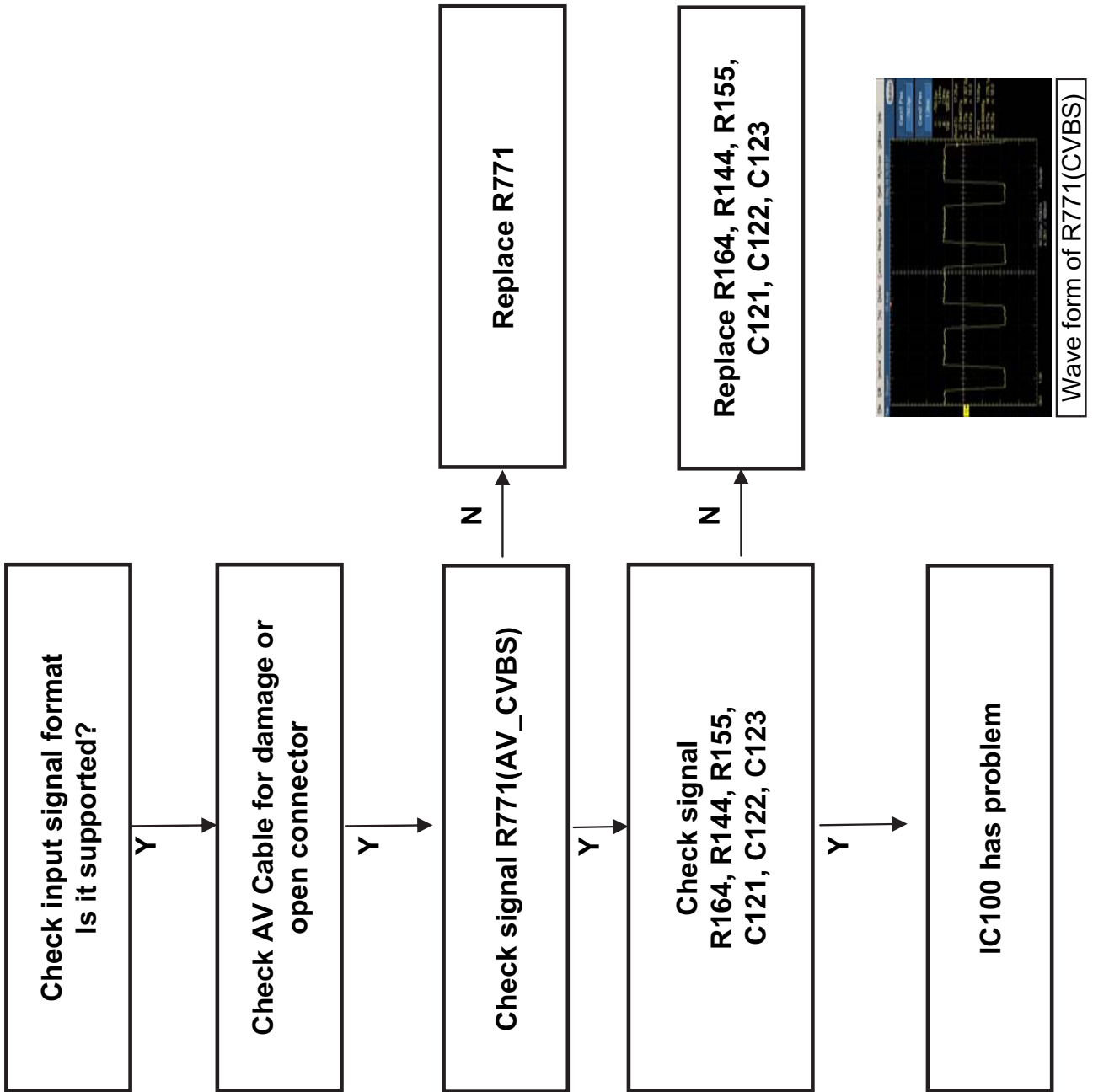
4. Component Video Trouble Shooting



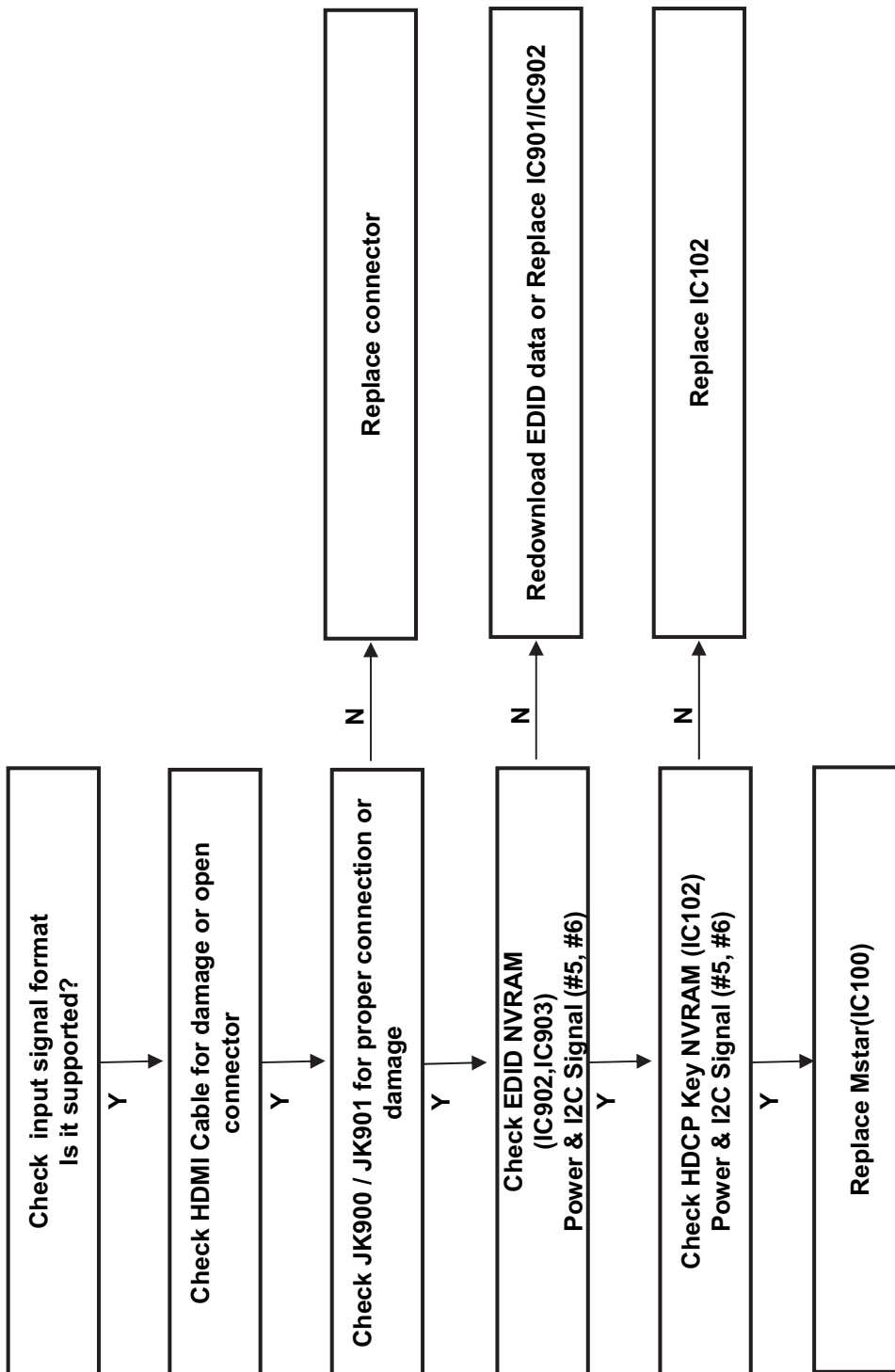
5. RGB Video Trouble Shooting



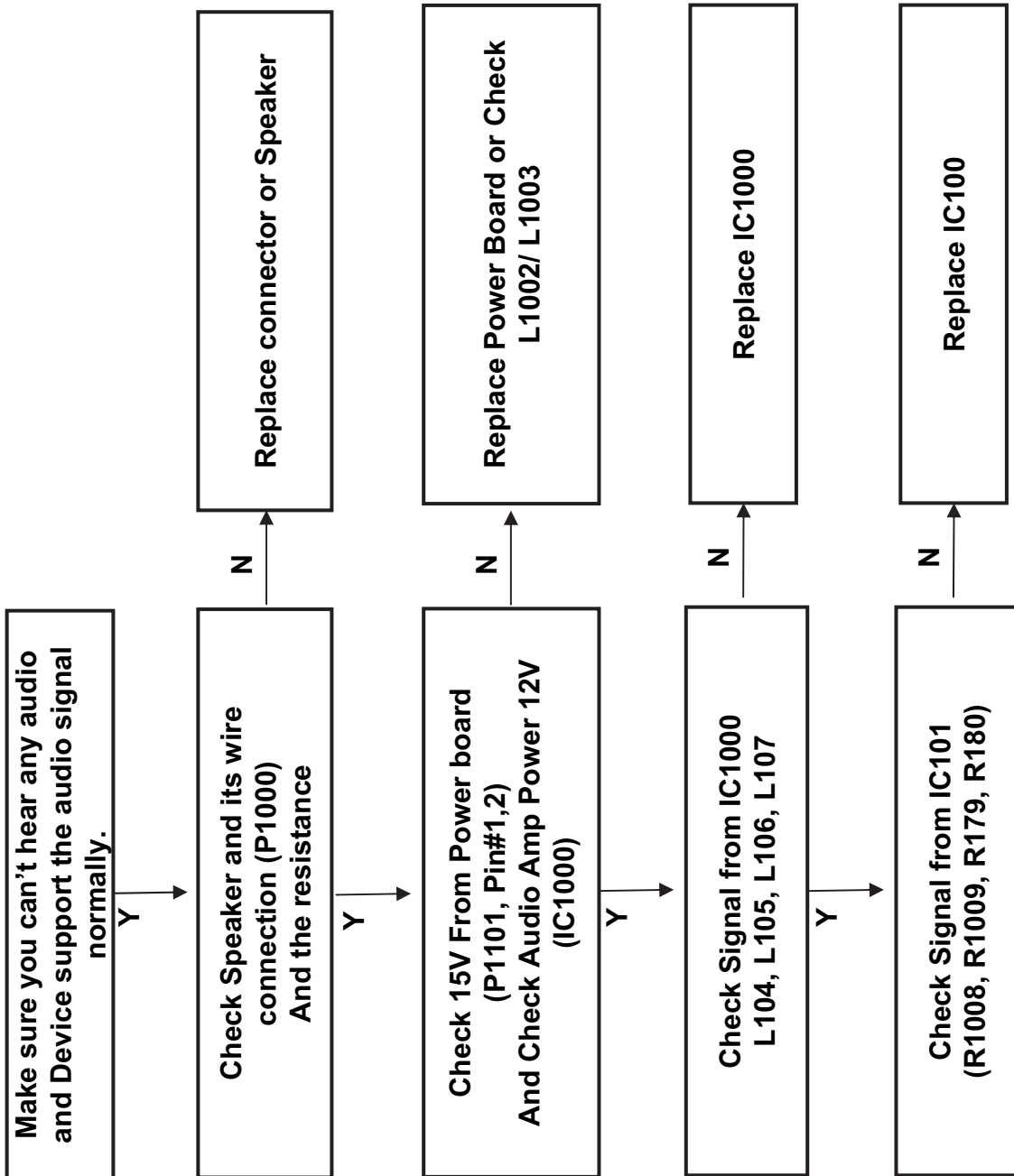
6. AV Video Trouble Shooting



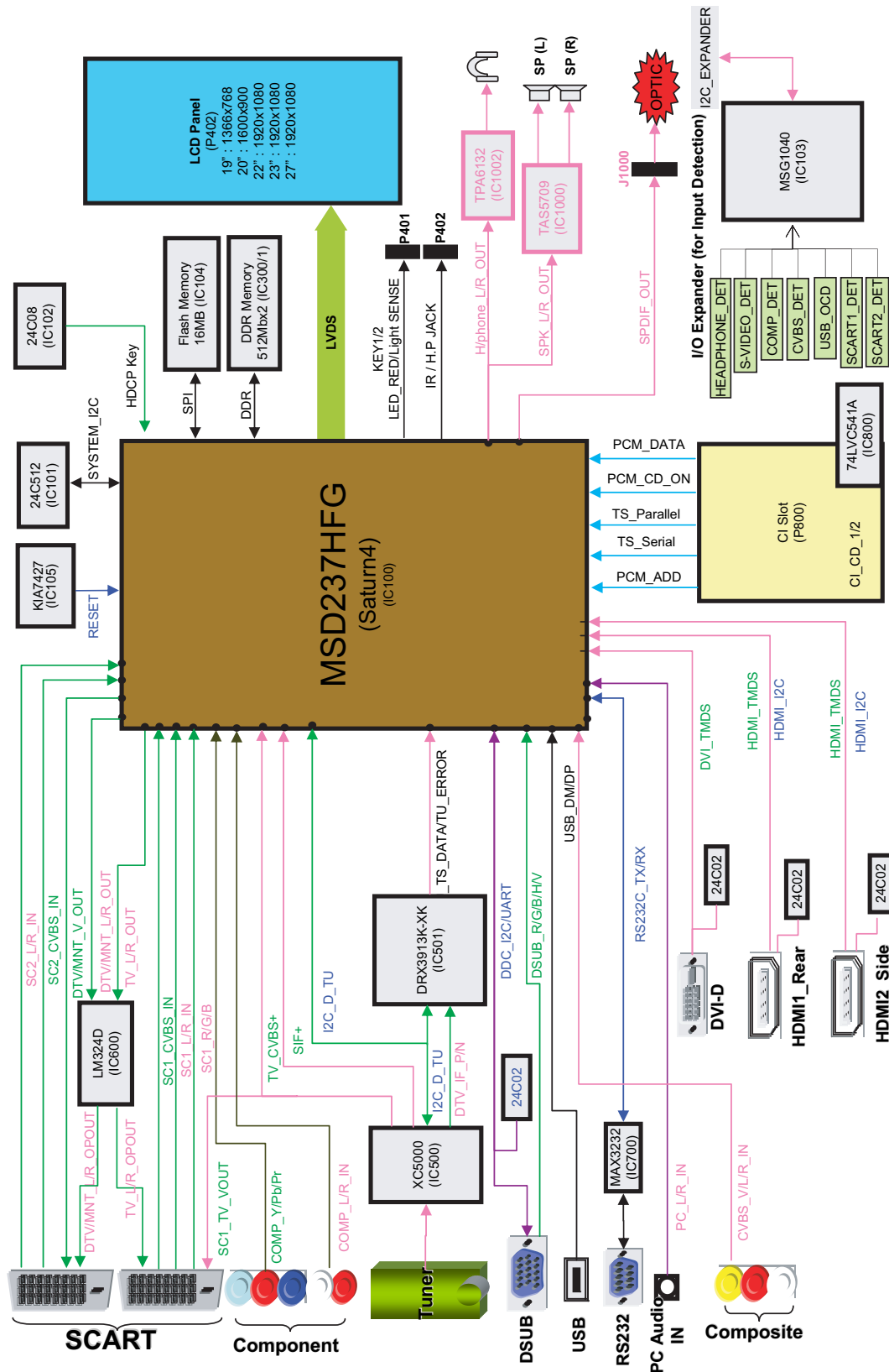
7.HDMI Video Trouble Shooting



8. All Source Audio Trouble Shooting




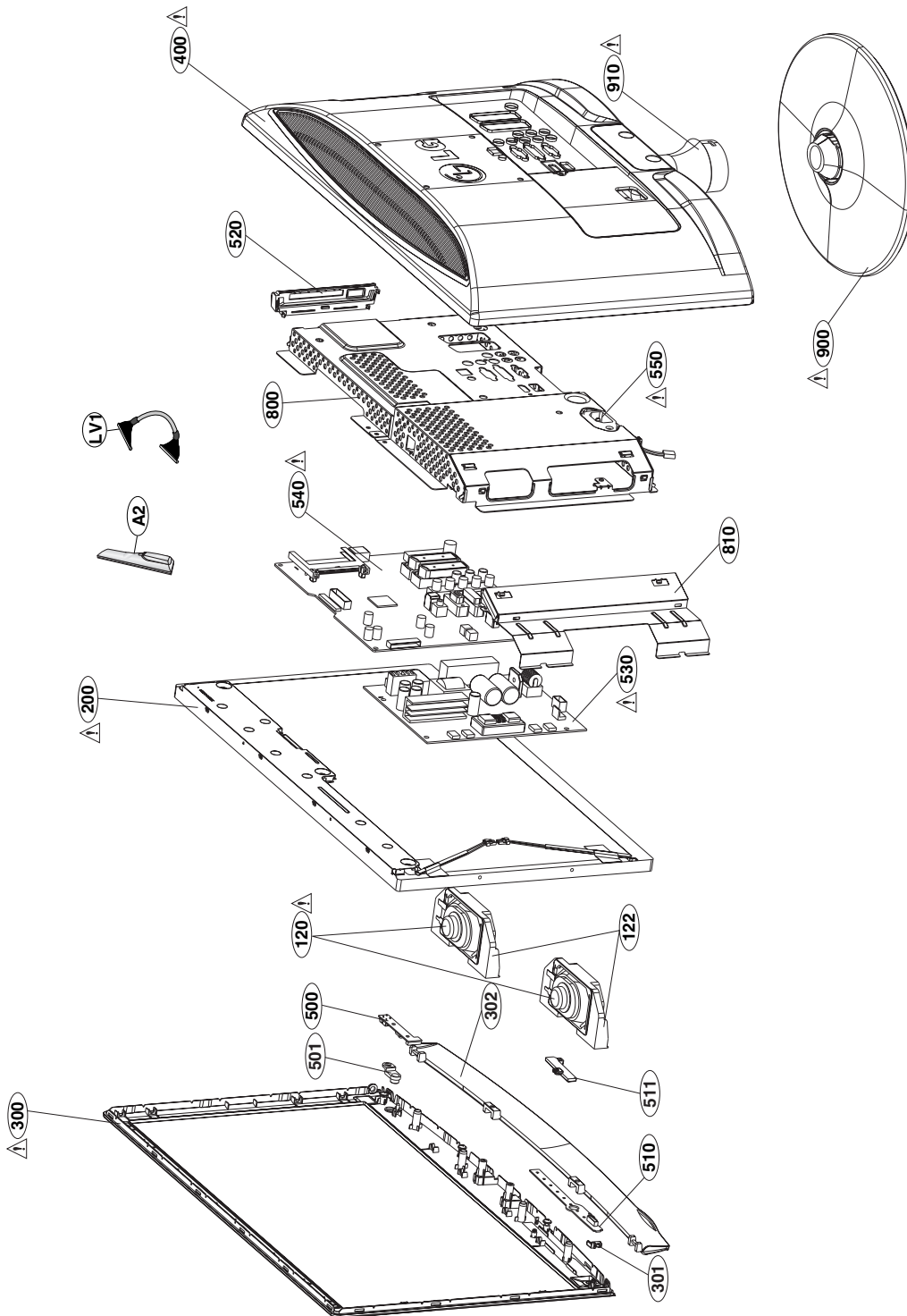
BLOCK DIAGRAM

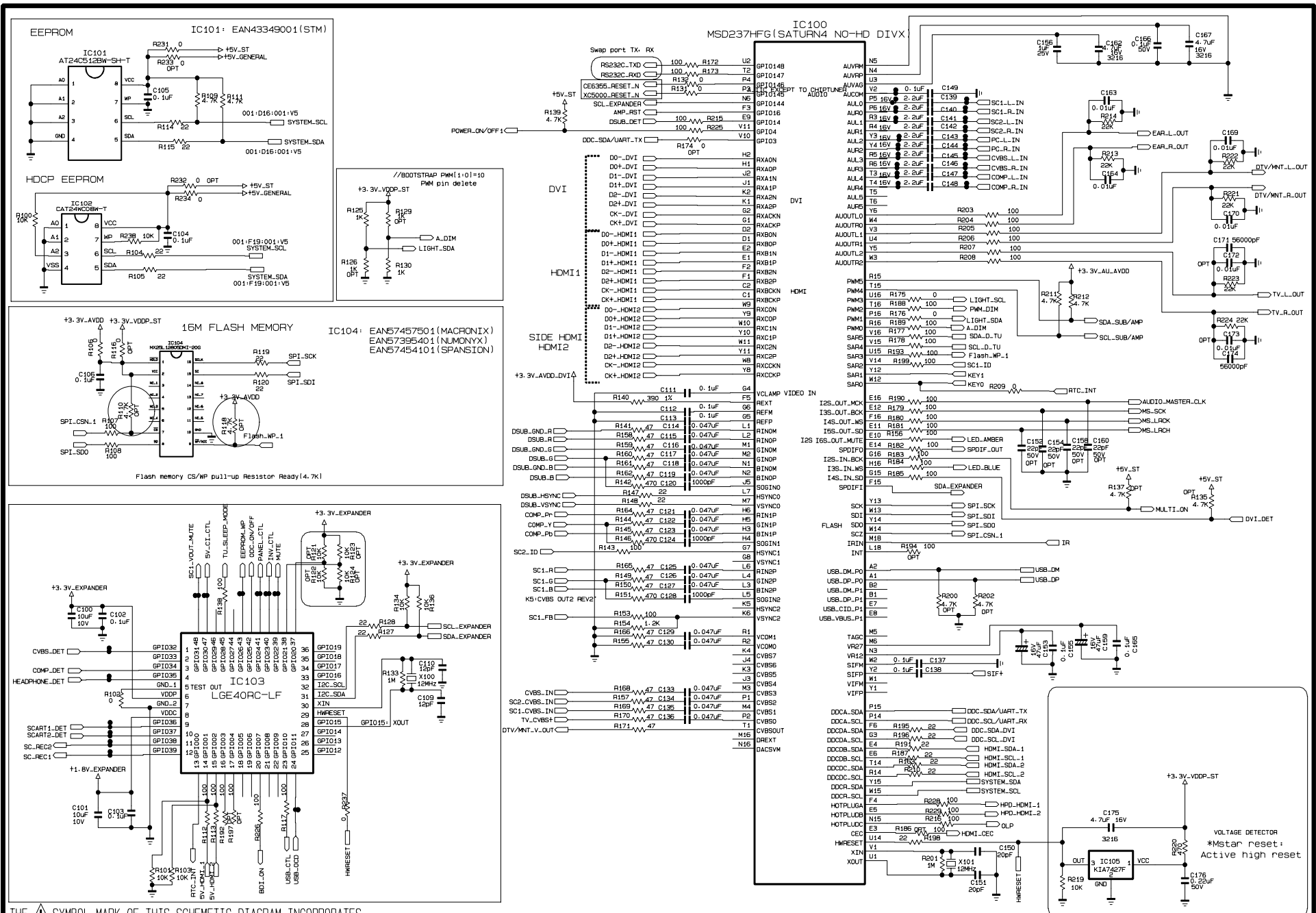


EXPLODED VIEW

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by  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.





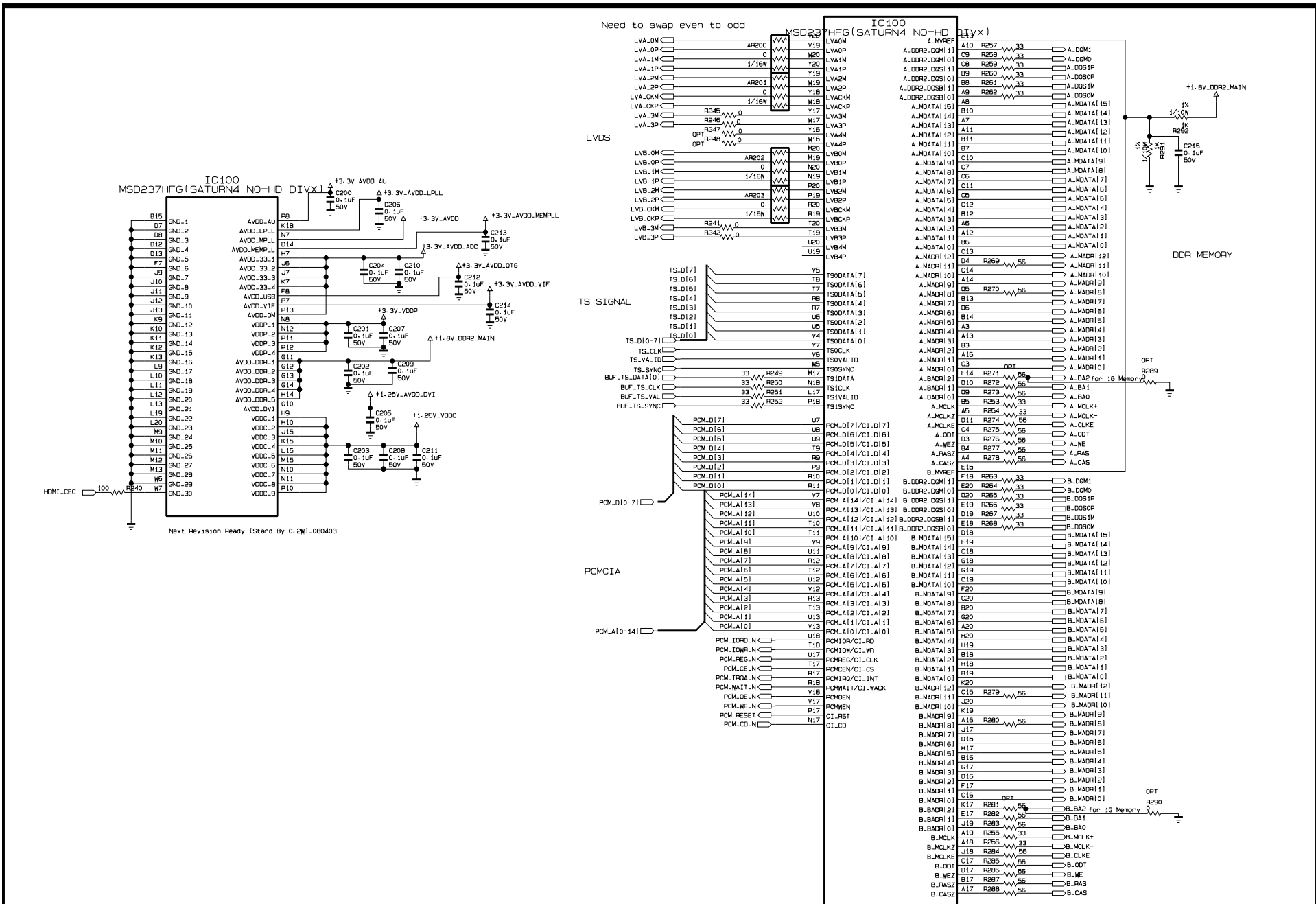
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL Mx x62D
BLOCK MAIN_1

DATE 2009.04.17
SHEET 1 / 11

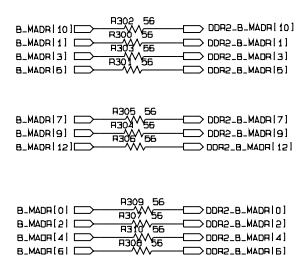
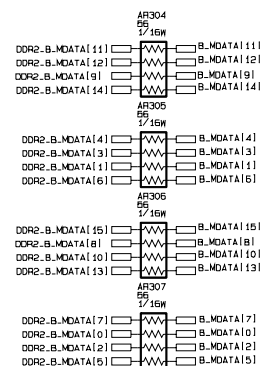
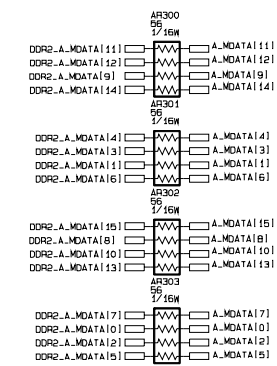
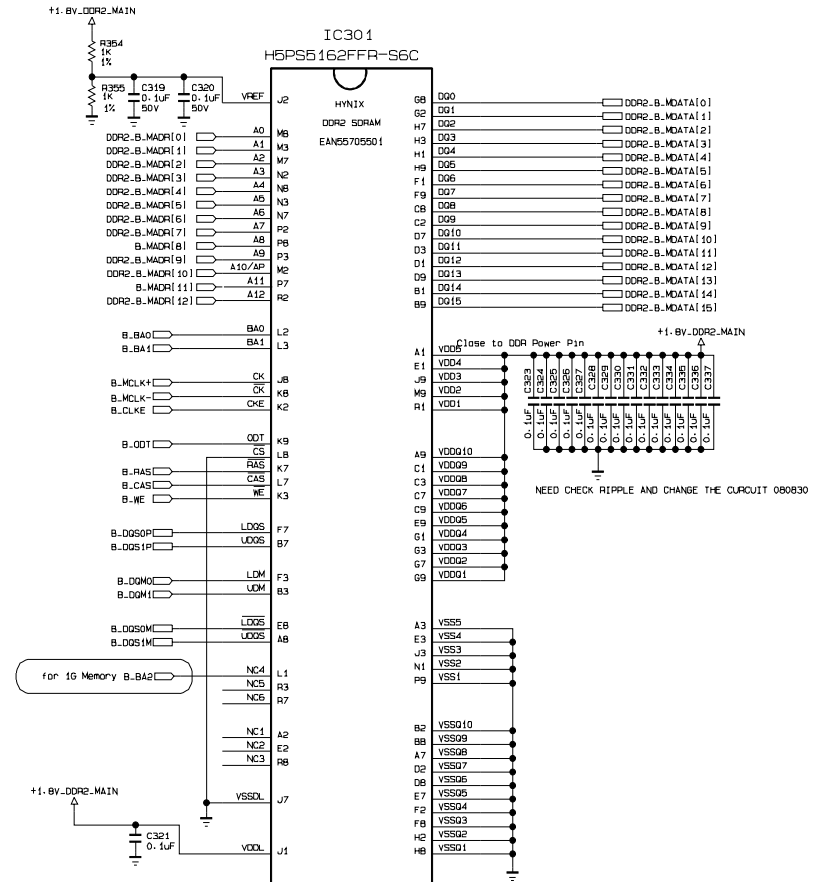
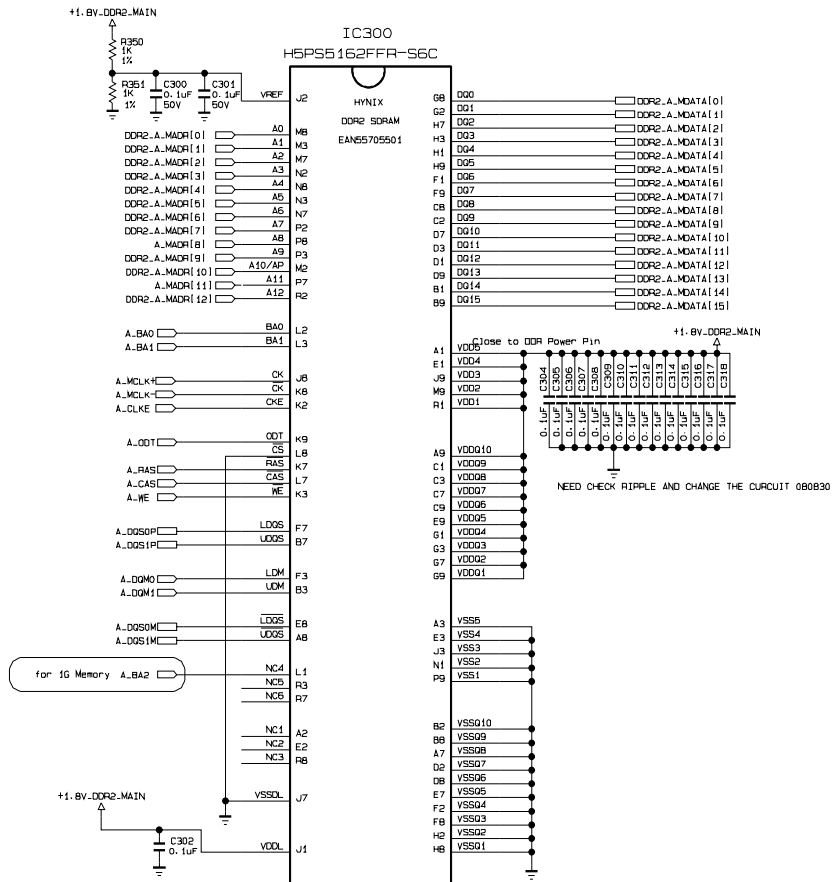


THE Δ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE Δ SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	Mxx62D	DATE	2009.04.17
BLOCK	MAIN_2	SHEET	2 / 11

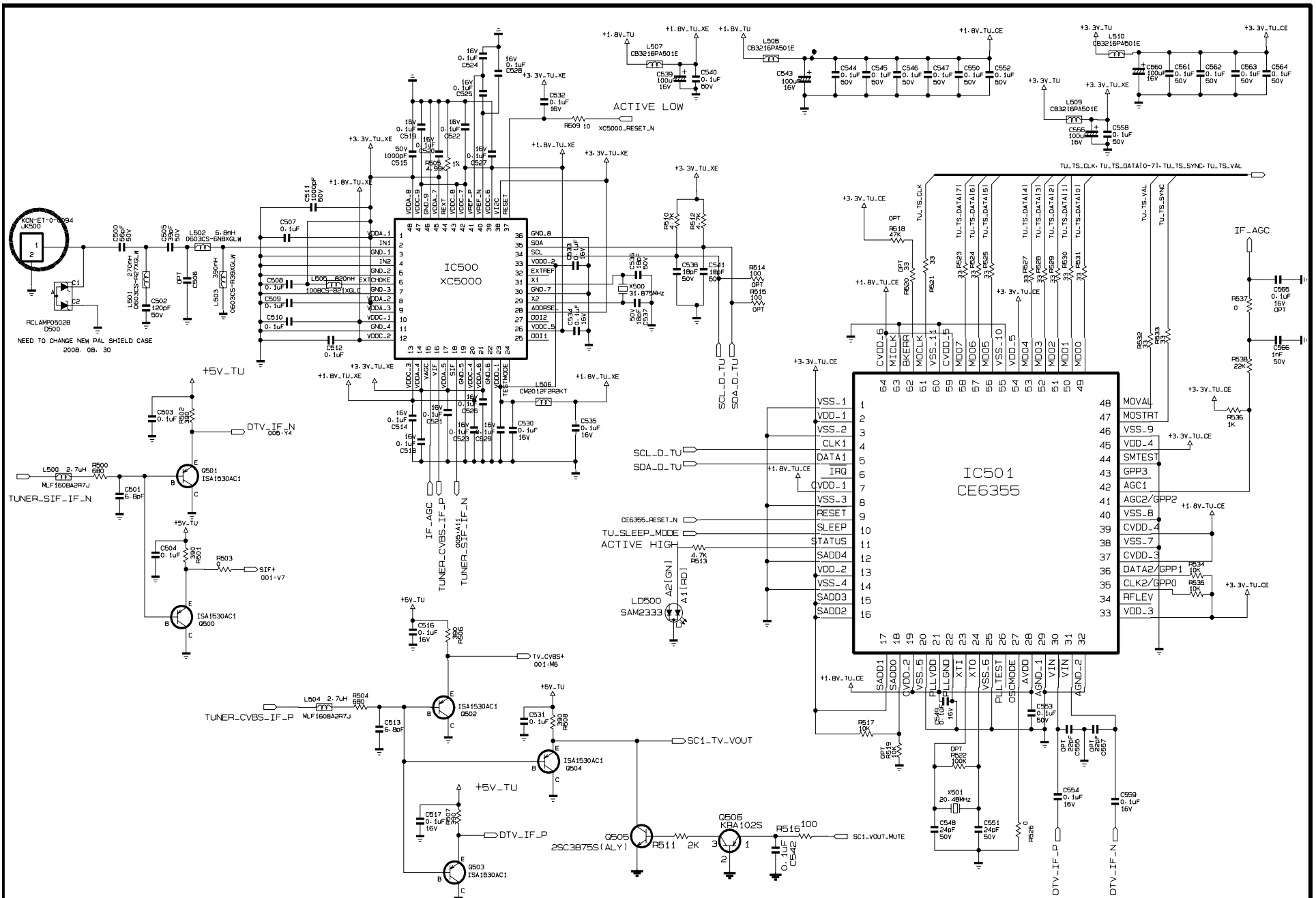


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION, FILRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	Mx x 62D	DATE	2009.04.17
BLOCK	DDR2	SHEET	3 / 11



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

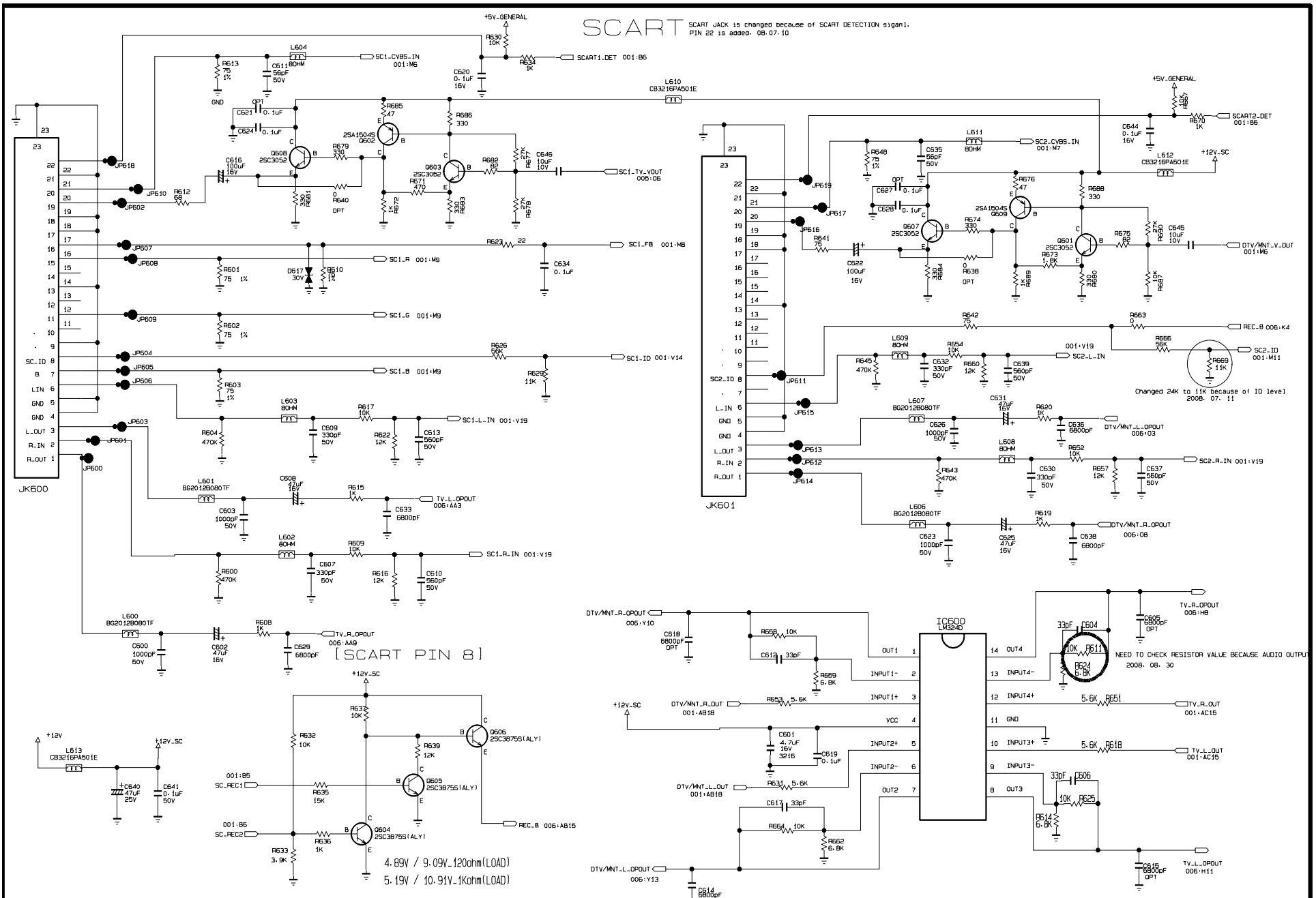
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BLOCK	Tuner	SHEET	5 / 11

SCART

SCART JACK 15 changed because of SCART DETECTION signal.
PIN 22 is added. 08.07.10



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

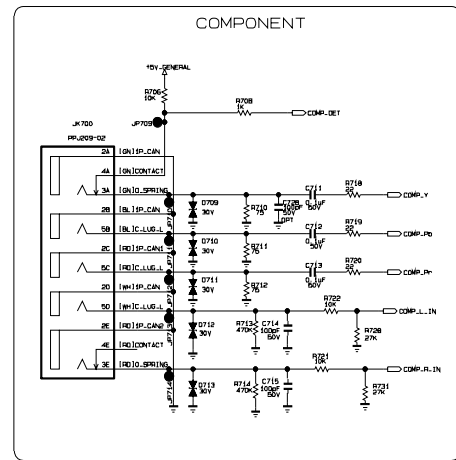
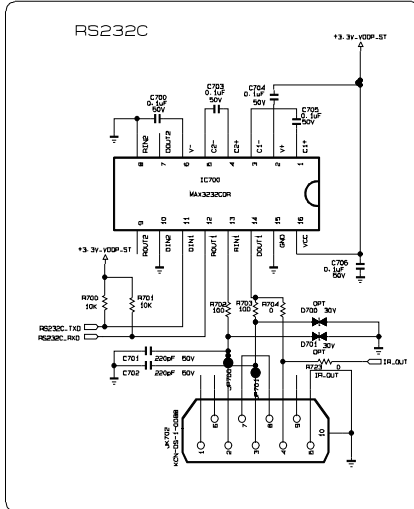
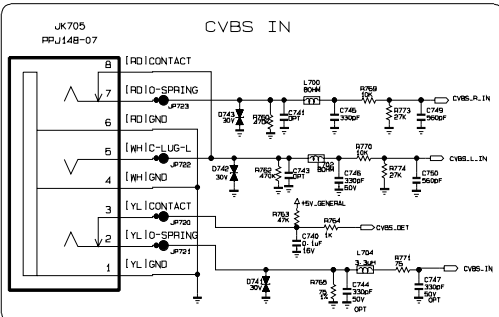
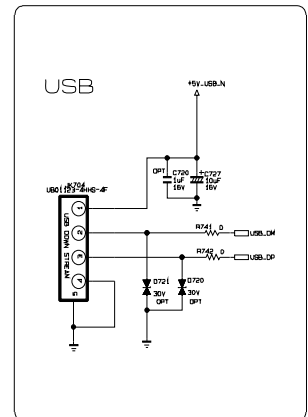
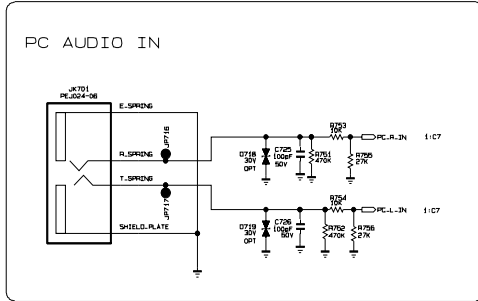
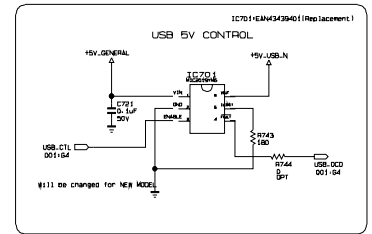
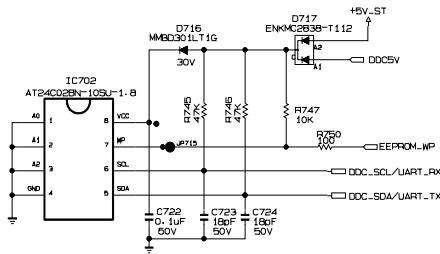
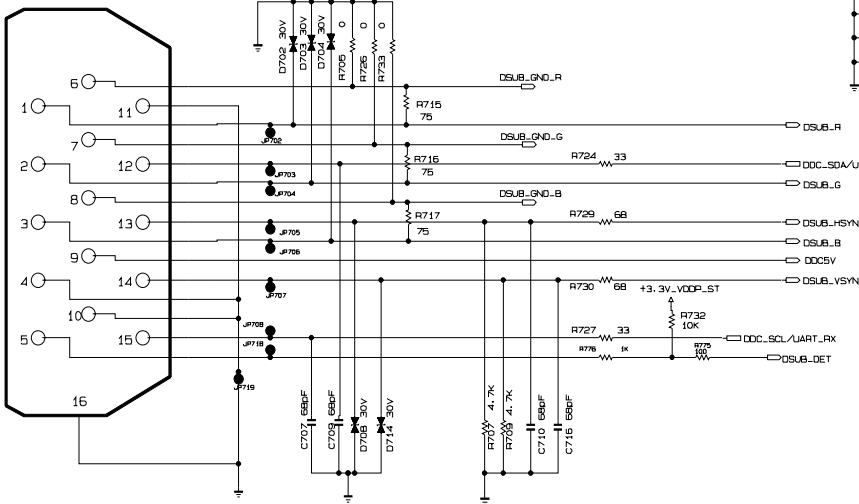
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BLOCK	SCART	SHEET	6 / 11

RGB

JK703
KCN-DS-1-0089

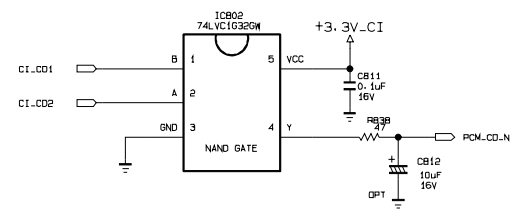
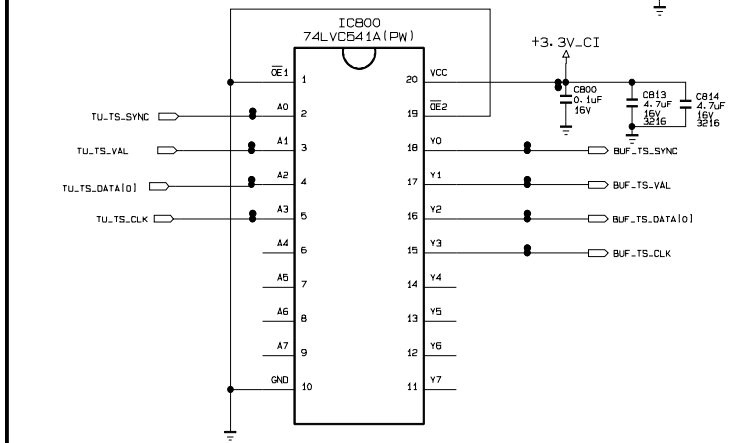
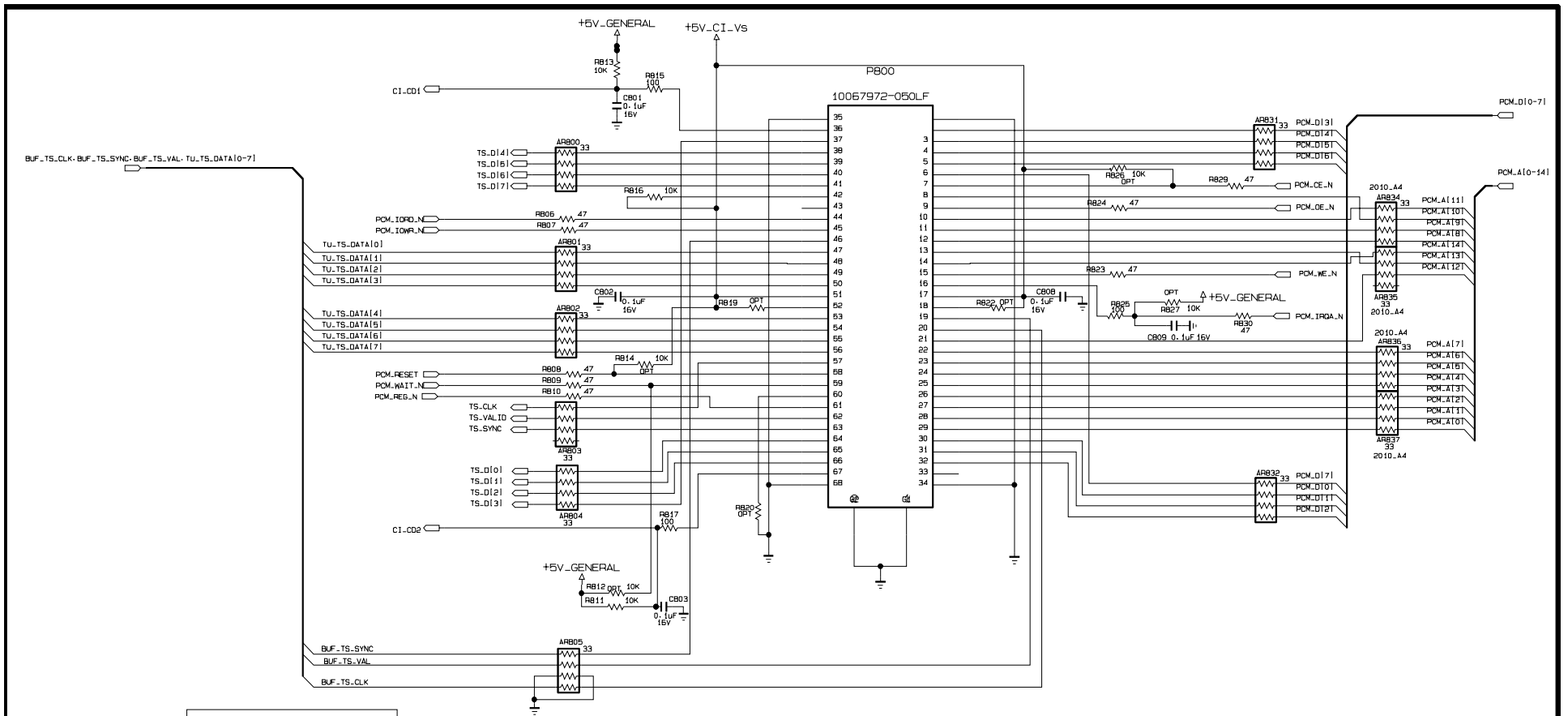


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BLOCK	Interface	SHEET	7 / 11

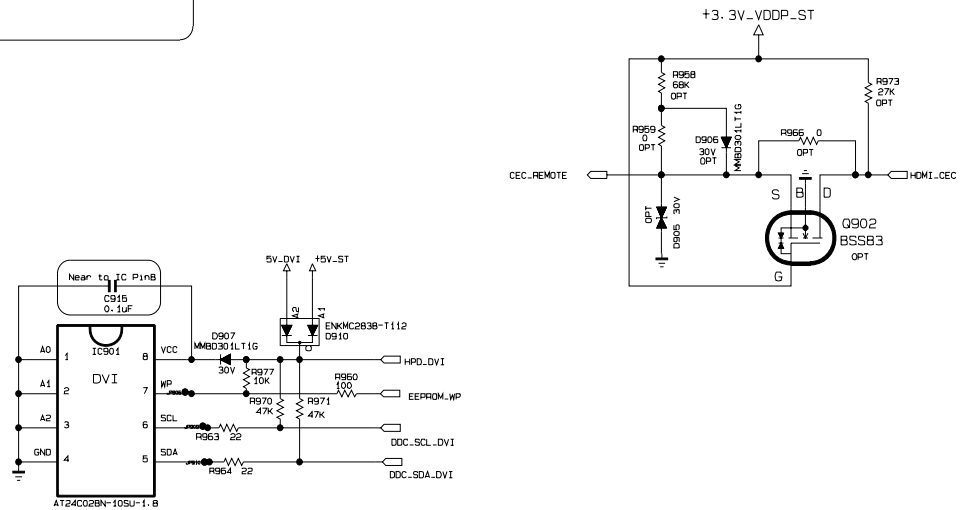
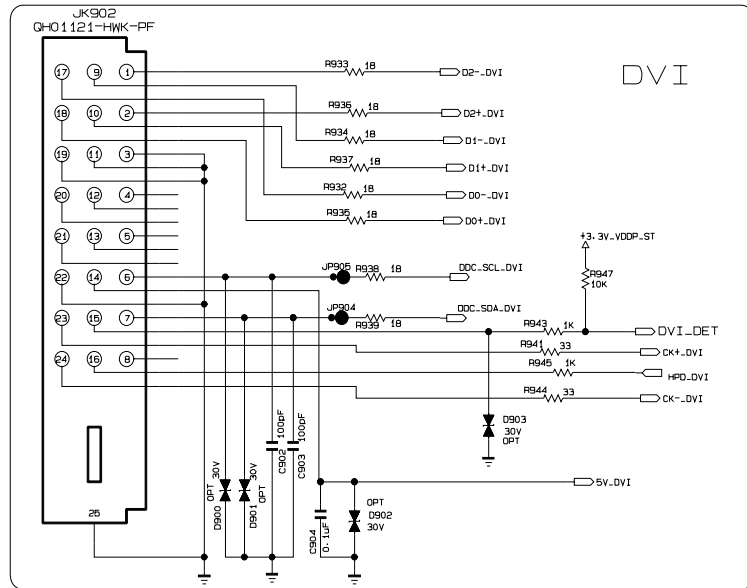
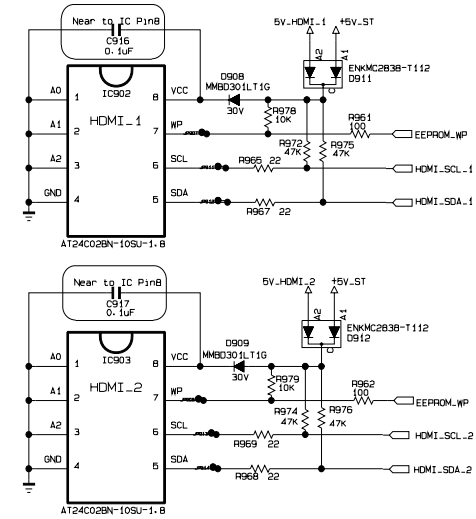
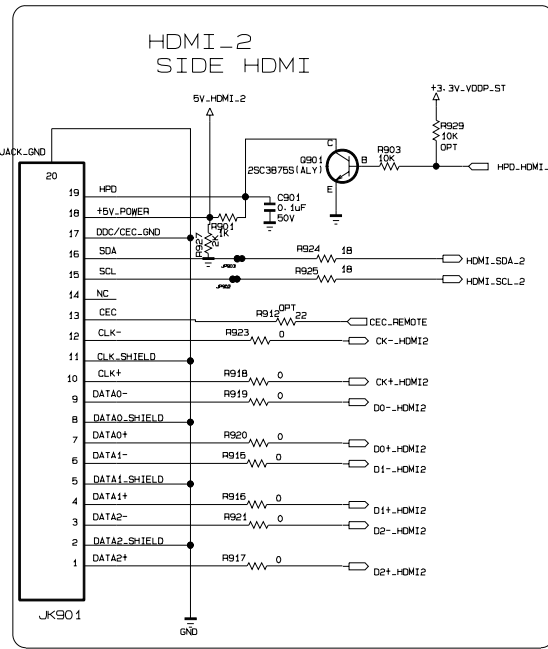
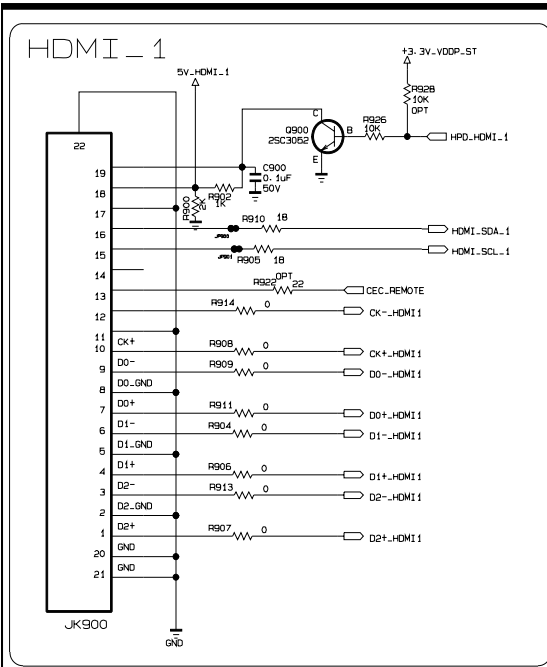


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BLOCK	PCMCI A	SHEET	8 / 11



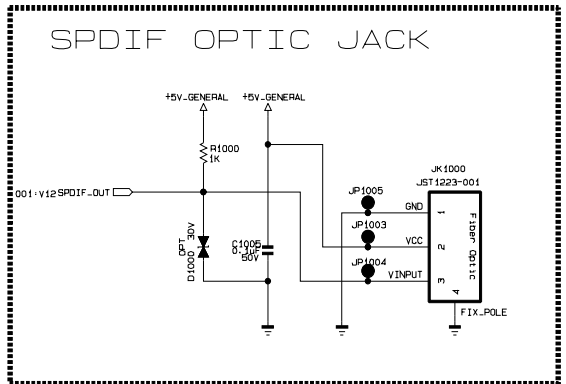
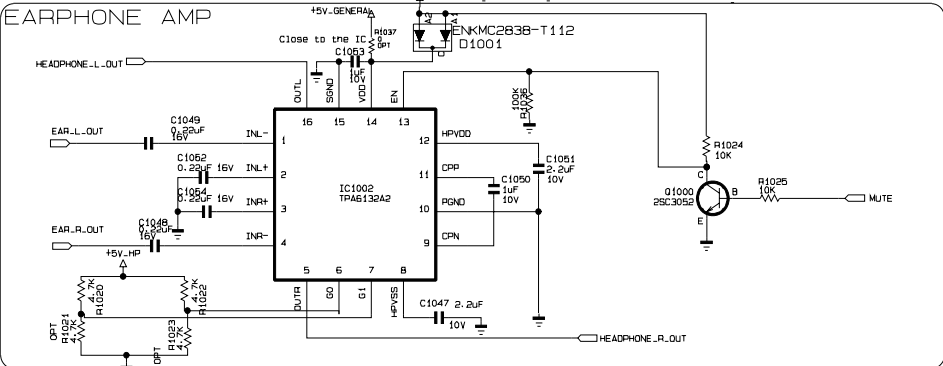
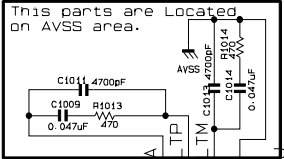
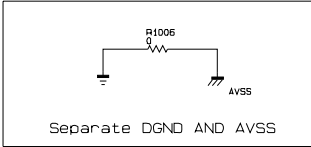
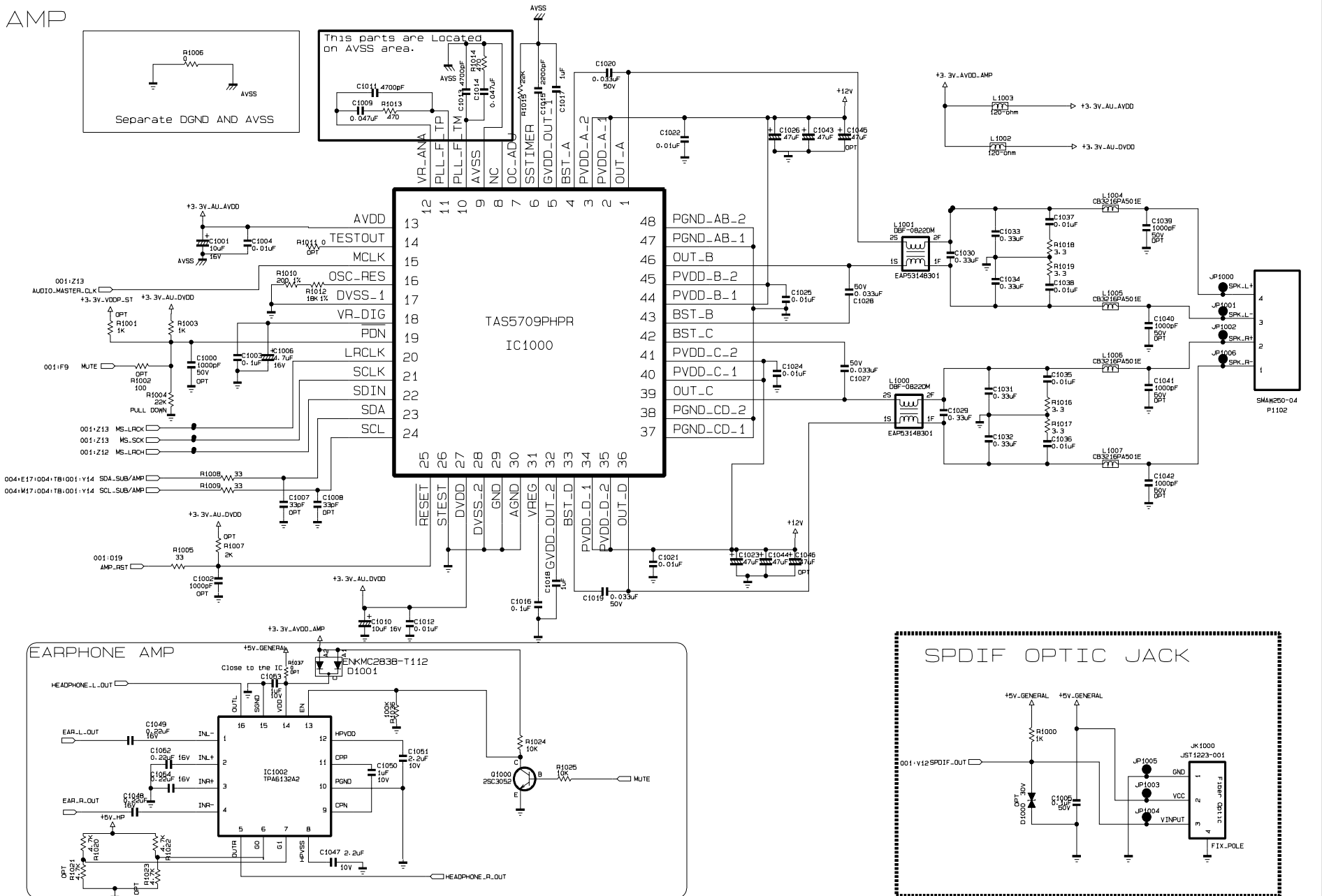
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BLOCK	HDMI	SHEET	9 / 11

AMP



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MODEL	Mx x62D	DATE	2009.04.17
BLOCK	AMP	SHEET	10 / 11



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