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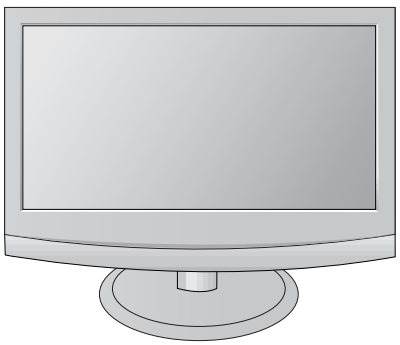
LCD MONITOR TV
SERVICE MANUAL

CHASSIS : LD84G

MODEL : M227WD M227WD-PZJ

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



CONTENTS

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 ⚠ 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 softmaterial. (Cleaning with a dirty or rough cloth may damage the panel.)

⚠ CAUTION

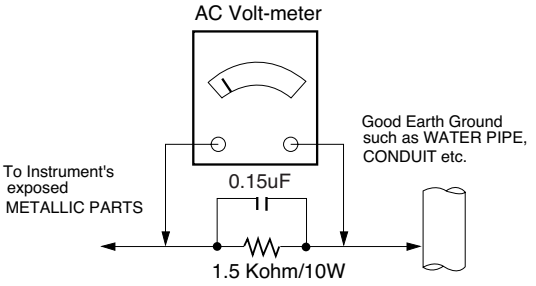
Please use only a plastic screwdriver to protect yourself from shock hazard during service operation.

⚠ 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 Grond 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) is opropyl alcohol (90%-99% strength)
   CAUTION: This is a flammable mixture.
   Unless specified otherwise in this service manual, lubrication of contacts in 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 500ºF to 600ºF.
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. (500ºF to 600ºF)
   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 (500ºF to 600ºF)
   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 22" LCD Monitor TV used LD84G chassis.

2. Specification

Each part is tested as below without special appointment

2.1 Temperature : 25±5°C(77±9°F), CST : 40±5°C
2.2 Relative Humidity : 65±10%
2.3 Power Voltage : Standard input voltage
(100~240V@ 50/60Hz)
• 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
EMC : CE, IEC

4. Module Specification

4.1 M227WD-PZJ : AUO, M215HW01-V0(P/N : EAJ55729601)

No	Item	Specification	Unit	Remark
1	Type	TFT Color LCD Module		
2	Diagonal Size	21.53 inches (546.86mm) diagonal		
3	Active Display area	476.64 (H) x 268.11 (V)	mm	
4	Outline Dimension	495.6(H) x292.2(V) x 16.35(D)	mm	Typ.
5	Aspect Ratio	16:9		
6	Pixel Number	1920 x RGB x 1080	pixel	
7	Pixel Pitch	0.24825(H) x 0.24825(V)	mm	
8	Color arrangement	RGB vertical Stripe		
9	Color Depth	16.7M color (6bit with Hi-FRC)		
10	Electrical Interface	LVDS		
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 : 3.8 + Falling Time : 1.2	ms	Typ.
15	Color Gamut	Normal 72% Panel(CIE1931)		

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, Netherlands, Belgium, Luxemburg, Greece, Denmark, Czech, Austria, Hungary, Switzerland, Croatia, Turkey Analog Only - Poland, Portugal, Norway, Bulgaria, Serbia,Slovenia, Russia, Rumania
2	Broadcasting system	1) PAL-BG 2) PAL-DK 3) PAL-I/I' 4) SECAM L/L' 5) DVB-T (ID TV)	
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/Cr Y/Pb/Pr	
6	CVBS Input (1EA)	PAL, SECAM, NTSC	4 System(Rear):PAL50, SECAM,NTSC,PAL60
7	S-Video Input (1EA)	PAL, SECAM, NTSC	4 System(Rear):PAL50, SECAM,NTSC,PAL60
8	RGB Input	RGB-PC	Analog(D-SUB 15 Pin)
9	DVI Input	DVI-D	Digital
10	HDMI Input (2EA)	HDMI1-DTV HDMI2-DTV	HDMI version 1.3 Support HDCP (Not Support PC)
11	Audio Input (3EA)	RGB/DVI Audio Component CVBS/S-Video	L/R Input
12	SDPIF out (1EA)	SPDIF out	
13	Earphone (1EA)	Antenna, AV1, AV2, AV3, Component, RGB, DVI, HDMI1, HDMI2	
14	USB (1EA)	ISP Download (Version 2.0)	For service only
15	RS-232C (1EA)	For TV Linkloader	

5.2 RGB / DVI

No	Item		Specification				Remarks
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.	1920x1080 @ 60Hz		
				Recommend	1920x1080 @ 60Hz		
			Digital	Max.	1920x1080 @ 60Hz		
				Recommend	1920x1080 @ 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	On/On	Active	Blue	70W	Max.
			On/On	Active	Blue	55W	Typ.
		Sleep mode	Off/On	Off	Amber	1W	RGB
			On/Off				
	Power S/W Off	Off mode	-	Off	Off	1W	
7	MTBF		50,000 HRS with 90% Confidence level				Lamp Life: 40,000 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 21.5” LCD Module (for more details, refer to the module spec.)

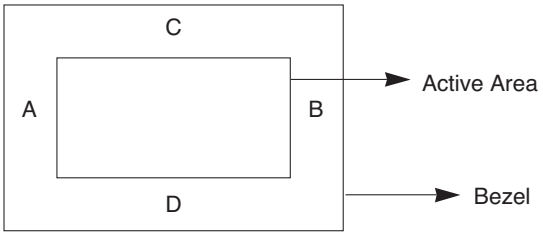
No.	Item	Specification		Min.	Typ.	Max.	Remark
1.	Viewing Angle<CR>10>	Right/Left		75/75	85/85		CR >10
		Up/Down		70/70	80/80		
2.	Luminance	Luminance (cd/m2)		240	300		DVI or RGB -Standard, 6500K -Full White(100IRE)
		Variation(%)		75	80		MIN / MAX
3.	Contrast Ratio	CR		600	1000		Full white/Full black
4.	Color Coordinates[CIE1931]	White	W_X	Typ	0.313	Typ	DVI or RGB
			W_Y	-0.03	0.329	+0.03	-Standard, 6500K
		RED	Xr		0.648		- Full White(100IRE)
			Yr		0.339		
		Green	Xg		0.282		
			Yg		0.603		
		Blue	Xb		0.143		
			Yb		0.070		

* 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 (Measurement Condition: Full white/ Standard/6500K) -> Measure the black luminance after 30 seconds.

No	Item	module	Luminance (cd/m²)			C/R(min)		Remark
			Min	Typ	Max	Min	Typ	
1	22 inch	AUO	240	300	-	600:1	1000:1	RGB & DVI DFC 20000:1

7.2 AV Mode (Measurement Condition: Full white(100IRE)/ Vivid) Measure the black luminance after 30 seconds.

No	Item	module	Luminance (cd/m²)			C/R(min)	Remark
			Min	Typ	Max	RGB(Full White 100IRE)	
1	22 inch	AUO	170	220	-	500:1	RF, AV, COMPONENT,HDMI

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

No.	Specification			Remark
	Resolution	H-freq(kHz)	V-freq(Hz)	
1.	720x480	15.73	60.00	SDTV, DVD 480i
2.	720x480	15.63	59.94	SDTV, DVD 480i
3.	720x480	31.47	59.94	480p
4.	720x480	31.50	60.00	480p
5.	720x576	15.625	50.00	SDTV, DVD 625 Line
6.	720x576	31.25	50.00	HDTV 576p
7.	1280x720	37.5	60.00	HDTV 720p
8.	1280x720	44.96	59.94	HDTV 720p
9.	1280x720	45.00	60.00	HDTV 720p
10.	1920x1080	28.125	50.00	HDTV 1080i
11.	1920x1080	33.75	60.00	HDTV 1080i
12.	1920x1080	33.72	59.94	HDTV 1080i
13.	1920x1080	26.97//27	23.97/24	HDTV 1080p
14.	1920x1080	33.716/33.75	29.976/30.00	HDTV 1080p
15.	1920x1080	56.250	50	HDTV 1080p
16.	1920x1080	67.43/67.5	59.94/60	HDTV 1080p

9. RGB Input (PC)

No.	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock(MHz)	Remark
1	720x400	31.468	70.08	28.321	
2	640x480	31.469	59.94	25.175	Input 848x480 60Hz, 852x480 60Hz => 640x480 60Hz Display
3	640x480	37.5	75	31.5	
4	800x600	37.879	60.317	40.0	
5	800x600	46.875	75.0	49.5	
6	1024x768	48.363	60.0	65.0	
7	1024x768	60.123	75.029	78.75	
8	1152x864	67.500	75.000	108.0	
9	1280x1024	63.981	60.02	108.0	
10	1280x1024	79.976	75.035	135.0	
11	1680x1050	64.674	59.883	119.0	
12	1680x1050	65.290	59.954	146.25	
13	1600X1200	75.0	60.0	162.0	
14	1920X1080	66.587	59.934	138.5	

10. RGB EDID Data

10.1 M227WD-PZJ

	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	D3	56	01	01	01	01
0x01	01	12	01	03	08	30	1B	78	EA	3D	85	A6	56	4A	9A	24
0x02	12	50	54	A5	6B	80	81	8F	71	40	B3	00	81	4F	01	01
0x03	01	01	01	01	01	01	1A	36	80	A0	70	38	1F	40	30	20
0x04	35	00	DC	0C	11	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	32	37	57	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	80

11. DVI Input (PC)

No.	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock(MHz)	Remark
1	720x400	31.468	70.08	28.321	
2	640x480	31.469	59.94	25.175	Input 848x480 60Hz, 852x480 60Hz => 640x480 60Hz Display
3	640x480	37.5	75	31.5	
4	800x600	37.879	60.317	40.0	
5	800x600	46.875	75.0	49.5	
6	1024x768	48.363	60.0	65.0	
7	1024x768	60.123	75.029	78.75	
8	1152x864	67.500	75.000	108.0	
9	1280x1024	63.981	60.02	108.0	
10	1280x1024	79.976	75.035	135.0	
11	1680x1050	64.674	59.883	119.0	
12	1680x1050	65.290	59.954	146.25	
13	1600X1200	75.0	60.0	162.0	
14	1920X1080	66.587	59.934	138.5	

12. DVI EDID Data

12.1 M227WD-PZJ

	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	D4	56	01	01	01	01
0x01	01	12	01	03	80	30	1B	78	EA	3D	85	A6	56	4A	9A	24
0x02	12	50	54	A5	6B	80	81	80	81	8F	71	40	B3	00	81	4F
0x03	D1	C0	01	01	01	01	1A	36	80	A0	70	38	1F	40	30	20
0x04	35	00	DC	0C	11	00	00	1A	21	39	90	30	62	1A	27	40
0x05	68	B0	36	00	DC	0C	11	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	32	37	57	44	0A	20	20	20	20	20	20	00	9F

13. HDMI input (DTV) (Not Support PC)

No.	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock(MHz)	Proposed
1	720x480	31.469 / 31.5	59.94 / 60	27.00/27.03	SDTV 480P
2	720x576	31.25	50	54	SDTV 576P
3	1280x720	37.500	50	74.25	HDTV 720P
4	1280x720	44.96 / 45	59.94 / 60	74.17/74.25	HDTV 720P
5	1920x1080	33.72 / 33.75	59.94 / 60	74.17/74.25	HDTV 1080I
6	1920x1080	28.125	50.00	74.25	HDTV 1080I
7	1920x1080	26.97 / 27	23.97 / 24	74.17/74.25	HDTV 1080P
8	1920x1080	33.716 / 33.75	29.976 / 30.00	74.25	HDTV 1080P
9	1920x1080	56.250	50	148.5	HDTV 1080P
10	1920x1080	67.43 / 67.5	59.94 / 60	148.35/148.50	HDTV 1080P

14. HDMI EDID Data

14.1 M227WD-PZJ (HDMI 1)

128 B | 256 B | Summary

	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	D5	58	01	01	01	01
0x01	01	12	01	03	80	30	1B	78	0A	3D	85	A6	56	4A	9A	24
0x02	12	50	54	A5	6F	00	81	80	81	8F	71	40	B3	00	81	4F
0x03	D1	C0	01	01	01	01	1A	36	80	A0	70	38	1F	40	30	20
0x04	35	00	DC	0C	11	00	00	1A	21	39	90	30	62	1A	27	40
0x05	68	B0	36	00	DC	0C	11	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	32	37	57	44	0A	20	20	20	20	20	20	01	F9

128 B | 256 B | Summary

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	02	03	1F	F1	4E	84	05	03	02	20	22	10	11	13	12	14
0x01	1F	07	16	23	09	07	07	67	03	0C	00	10	00	B8	2C	01
0x02	1D	00	72	51	D0	1E	20	38	88	15	00	DC	0C	11	00	00
0x03	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	DC	0C	11
0x04	00	00	9E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	DC
0x05	0C	11	00	00	18	8C	0A	D0	8A	20	E0	2D	10	10	3E	96
0x06	00	DC	0C	11	00	00	18	02	3A	80	18	71	38	2D	40	58
0x07	2C	45	00	DC	0C	11	00	00	1E	00	00	00	00	00	00	F1

14.2 M197WD-PZJ (HDMI 2)

128 B | 256 B | Summary

	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	D5	58	01	01	01	01
0x01	01	12	01	03	B0	30	1B	78	0A	3D	85	A6	56	4A	9A	24
0x02	12	50	54	A5	6F	00	81	80	81	8F	71	40	B3	00	81	4F
0x03	D1	C0	01	01	01	01	1A	36	80	A0	70	38	1F	40	30	20
0x04	35	00	DC	0C	11	00	00	1A	21	39	90	30	62	1A	27	40
0x05	68	B0	36	00	DC	0C	11	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	32	37	57	44	0A	20	20	20	20	20	20	01	F9

128 B | 256 B | Summary

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	02	03	1F	F1	4E	84	05	03	02	20	22	10	11	13	12	14
0x01	1F	07	16	23	09	07	07	67	03	0C	00	20	00	B8	2C	01
0x02	1D	00	72	51	D0	1E	20	38	B8	15	00	DC	DC	11	00	00
0x03	1E	01	1D	B0	18	71	1C	16	20	58	2C	25	00	DC	0C	11
0x04	00	00	9E	BC	0A	D0	8A	20	E0	2D	10	10	3E	96	00	DC
0x05	0C	11	00	00	18	8C	0A	D0	8A	20	E0	2D	10	10	3E	96
0x06	00	DC	0C	11	00	00	18	02	3A	80	18	71	38	2D	40	58
0x07	2C	45	00	DC	0C	11	00	00	1E	00	00	00	00	00	00	E1

15. Mechanical specification

15.1 M227WD-PZJ

No.	Item		Content			Unit	Remark
1.	Product Dimension		Width(W)	Length(D)	Height(H)	mm	
		Before Packing	519.8	193.2	400.5	mm	
		After Packing	592	446	135	mm	
2.	Product Weight	Only SET	4.7			Kg	
		With BOX	6.3			Kg	
3.	Container Loading Quantity	Individual or Palletizing	20ft		40ft		
			Indi.	Wooden	Indi. / Wooden		
			816	600	1700 / 1380		
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 LD84G chassis 22” LCD Monitor TV which is manufactured in Monitor Factory or is produced on the basis of this data.

2. Designation

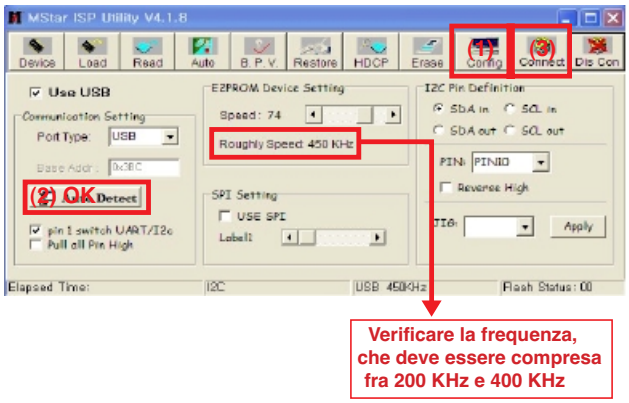
2.1 The adjustment is according to the order which is designated and which must be followed, according to the plan which can be changed only on agreeing.
2.2. Power Adjustment: Free Voltage
2.3. Magnetic Field Condition: Nil.
2.4. Input signal Unit: Product Specification Standard
2.5. Reserve after operation: 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. Main PCB check process

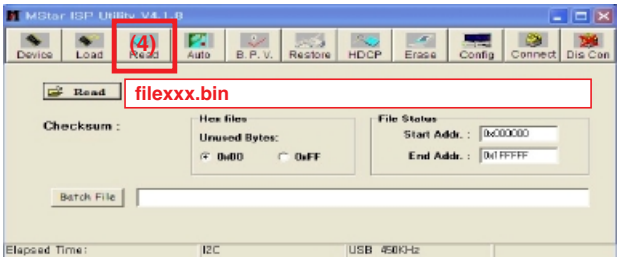
• APC - After Manual-Insult, executing APC

• Download

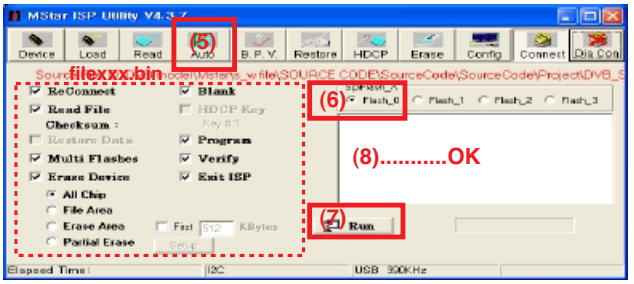
1. Execute ISP program "Mstar ISP Utility" and then click "Config" tab.
2. Set as below, and then click "Auto Detect" and check "OK" message.
   If display "Error", Check connect computer, jig, and set.
3. Click "Connect" tab.
   If display "Can’t ", Check connect computer, jig, and set.



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

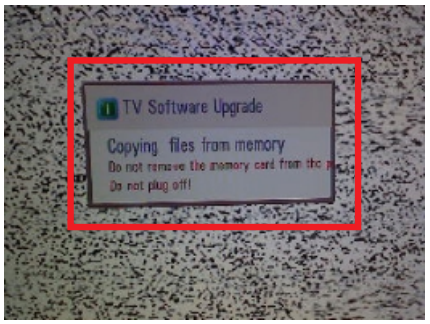


5. Click "Auto" tab and set as below
6. Click "Run".
7. After downloading, check "OK" message.

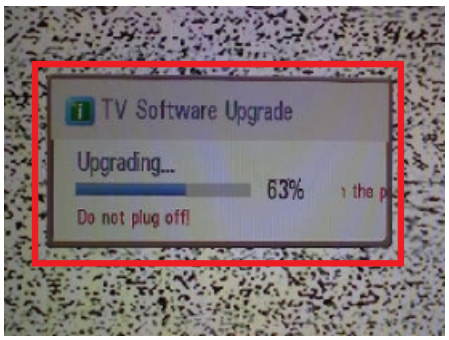


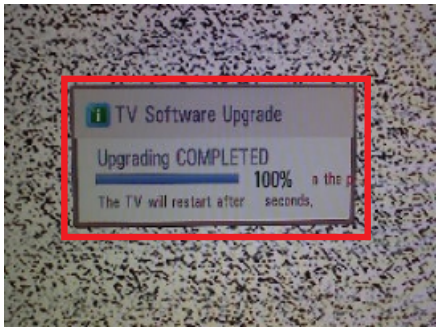
• USB DOWNLOAD

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 staring.





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 "IN-START" key in service remote controller
2. Select "Tool Option 1" and Push "OK" button
3. Punch in the number. (Each model has their number.)
4. Completed selecting Tool option

3.1 ADC Process

3.1.1 PC input ADC

3.1.1.1 Auto RGB Gain/Offset Adjustment

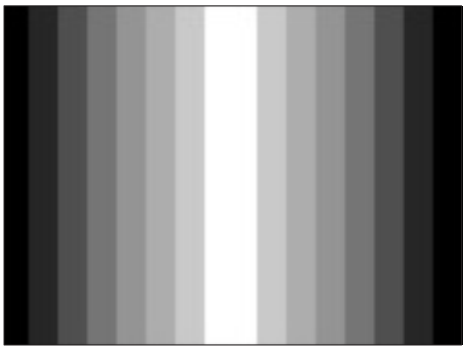
- Convert to PC in Input-source
- Signal equipment displays

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)

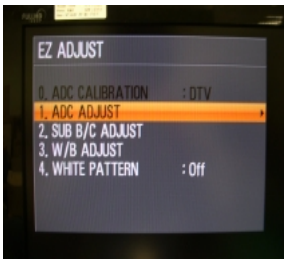
- Adjust by commanding AUTO_COLOR_ADJUST.

3.1.1.2 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 "ADC Adjust" by pushing "▶" key at "ADC CALIBRATION: RGB-PC".



3.1.2 COMPONENT input ADC

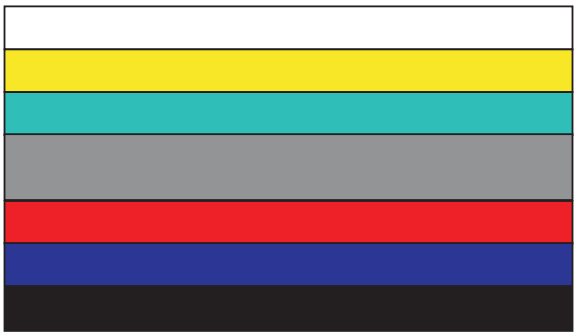
3.1.2.1 Component Gain/Offset Adjustment

- 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 SERIES)



Adjustment pattern (COMPONENT)

- Adjust by commanding AUTO_COLOR_ADJUST.

3.1.2.2 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

3.2 Function Check

3.2.1 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 : 1920x1080 @ 60Hz)
5. DVI (PC : 1920x1080 @ 60Hz)
6. HDMI
6. PC Audio In

* Display and Sound check is executed by Remote controller.

4. Total Assembly line process

4.1 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.
- Adjust Process will start by execute I2C Command (Inner pattern (0xF3, 0xFF).

Color Temperature	Cool	9,300k	°K	X=0.285 (±0.003) Y=0.293 (±0.003)	<Test Signal> Inner pattern (216gray,85IRE)
	Medium	8,000k	°K	X=0.295(±0.003) Y=0.305(±0.003)	
	Warm	6,500k	°K	X=0.313 (±0.003) Y=0.329 (±0.003)	
Luminance (cd/m²)	Cool	Min : 130		Typ : 220	
	Medium	Min : 130		Typ : 220	
	Warm	Min : 130		Typ : 220	

- Adjust Process will finish by execute I2C Command (Inner pattern (Inner pattern (0xF3,0x00)).

** 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)

* W/B condition

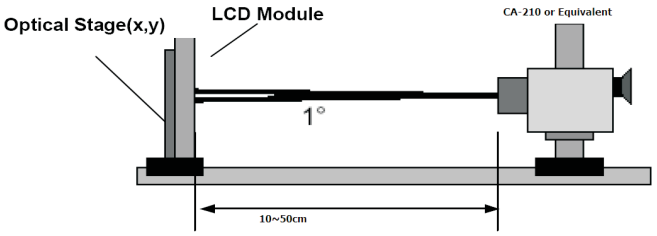
- Surrounding Temperature : 20 % ~ 80 %
- Surrounding Temperature : 25±5 °C
- warm-up Time : Under 5 Min.

*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 "3. W/B ADJUST".

Module	Luminance		Remark
	Min	Typ	
AUO	240	300	1920*1080@60hz

* 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.



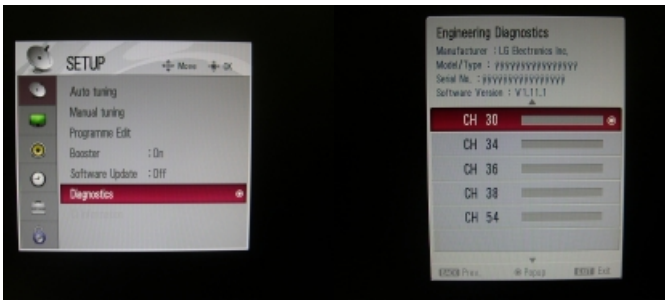
4.2 DPM operation confirmation (Only Apply for MNT Model)
• Check if Power LED Color and Power Consumption operate as standard.
  - Set Input to RGB and connect D-sub cable to set
  - Measurement Condition: (100~240V@ 50/60Hz)
  - Confirm DPM operation at the state of screen without Signal

4.3 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.

4.4. DDC EDID Write (DVI 128Byte)
  - Connect DVI-D Signal Cable to DVI Jack.
  - Write EDID DATA to EEPROM (240C02) by using DDC2B protocol.
  - Check whether written EDID data is correct or not.

4.5. 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

4.6. 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).



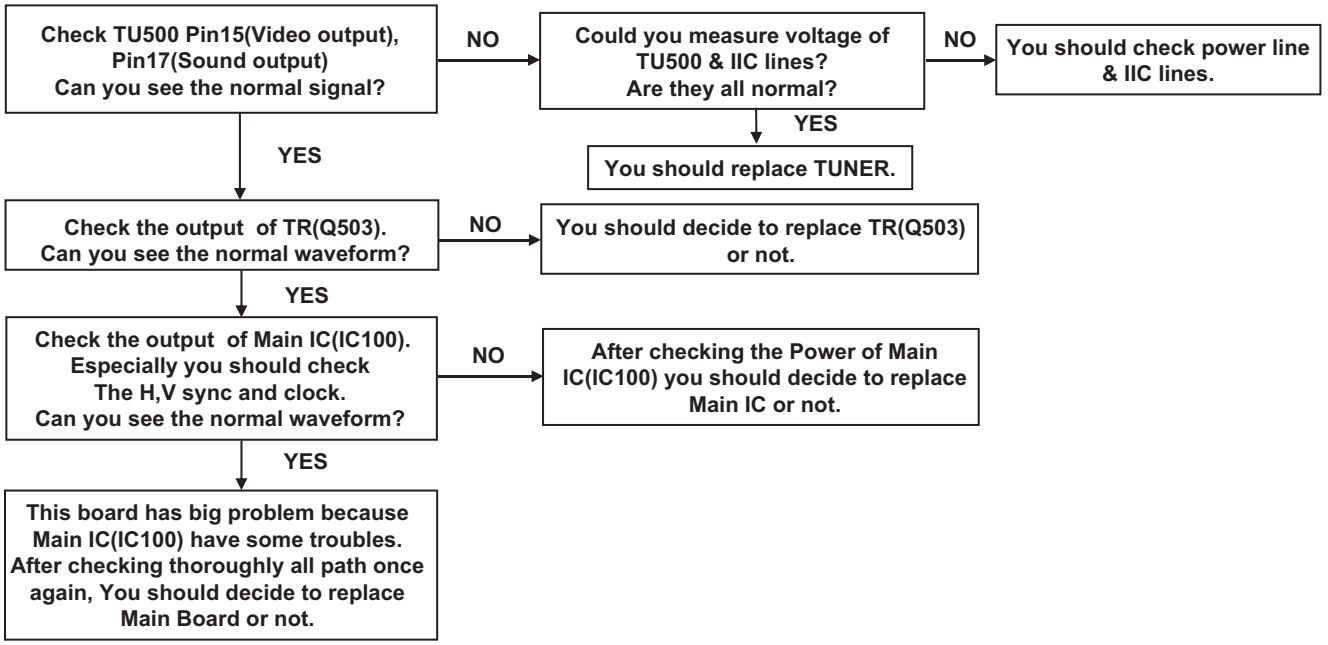
4.7. HDCP (High-Bandwidth Digital Contents Protection) SETTING (Scaler : Mstar)
  - Connect D-sub Signal Cable to D-Sub Jack
  - Input HDCP key with HDCP-key- in-program
  - HDCP Key value is stored on EEPROM (AT24C512) which is 0x80 addresses of 0xA0 page
  - AC off/ on and on HDCP button of MSPG925 and confirm whether picture is displayed or not of using MSPG925
  - HDCP Key value is different among the sets.

4.8. Outgoing condition Configuration
  - After all function test., press IN-STOP Key by SVC Remote controller. And make Outgoing Condition.
  - When pressing IN-STOP key by SVC remocon, Blue and Amber LED are blinked alternatively. And then Automatically turn off.
    (Must not AC power OFF during blinking)

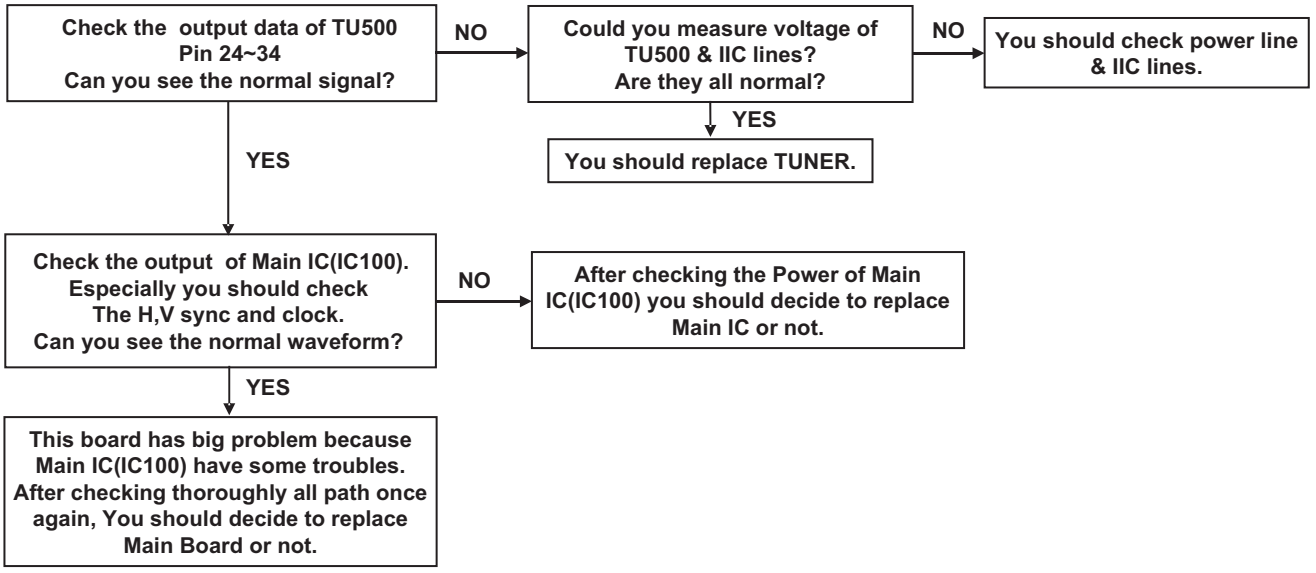
4.9. Internal pressure
  - Confirm whether is normal or not when between power board's ac block and GND is impacted on 1.5kV(dc) or 2.2kV(dc) for one second

TROUBLESHOOTING

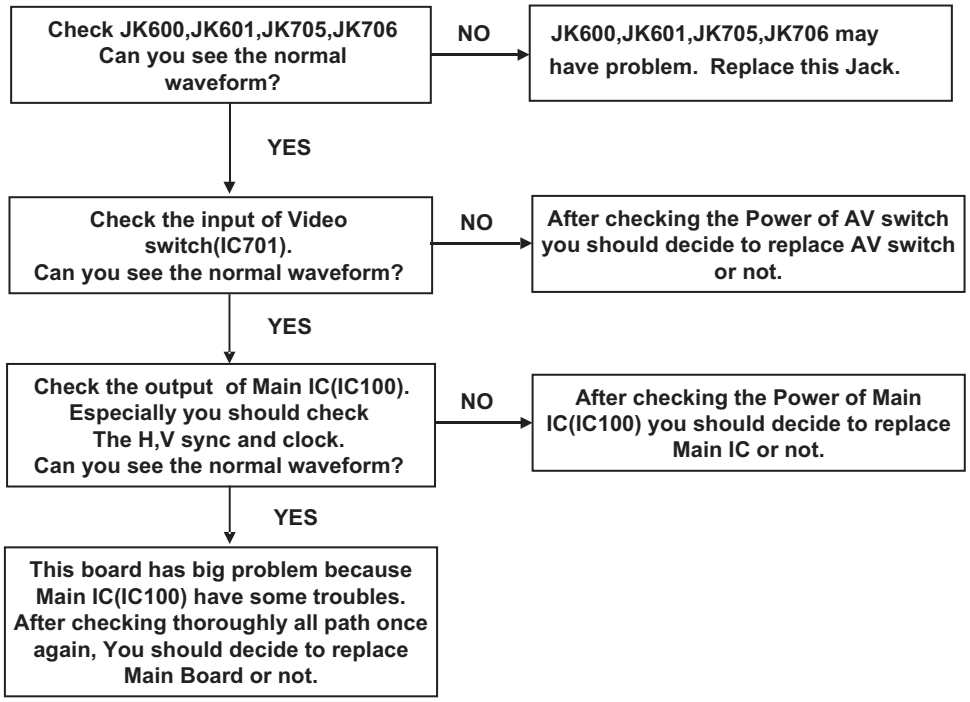
TV/CATV doesn't display



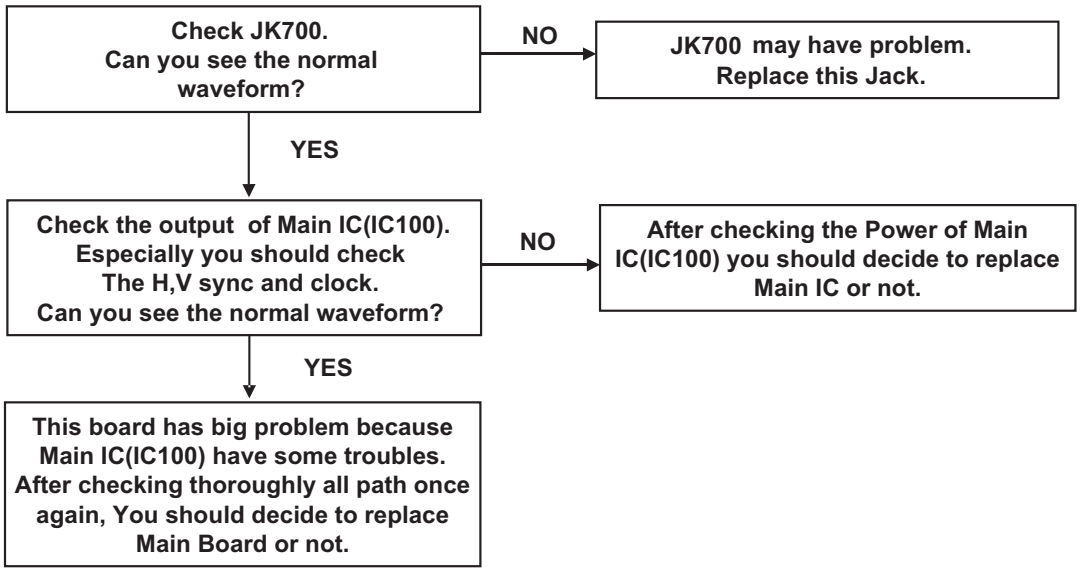
DTV doesn't display



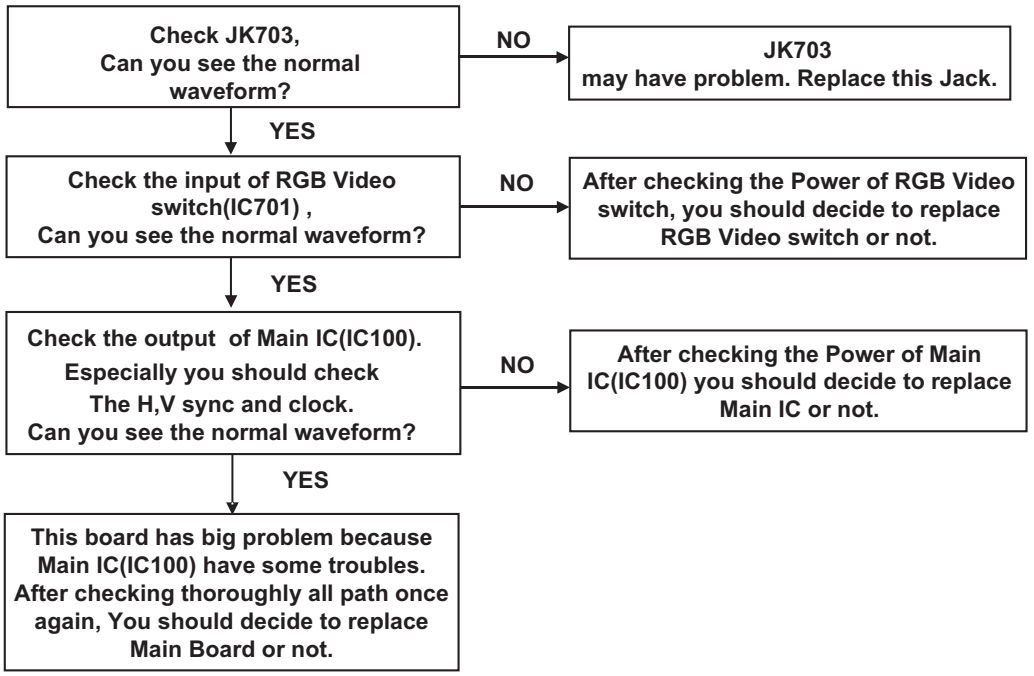
AV1/AV2/AV3 doesn t display



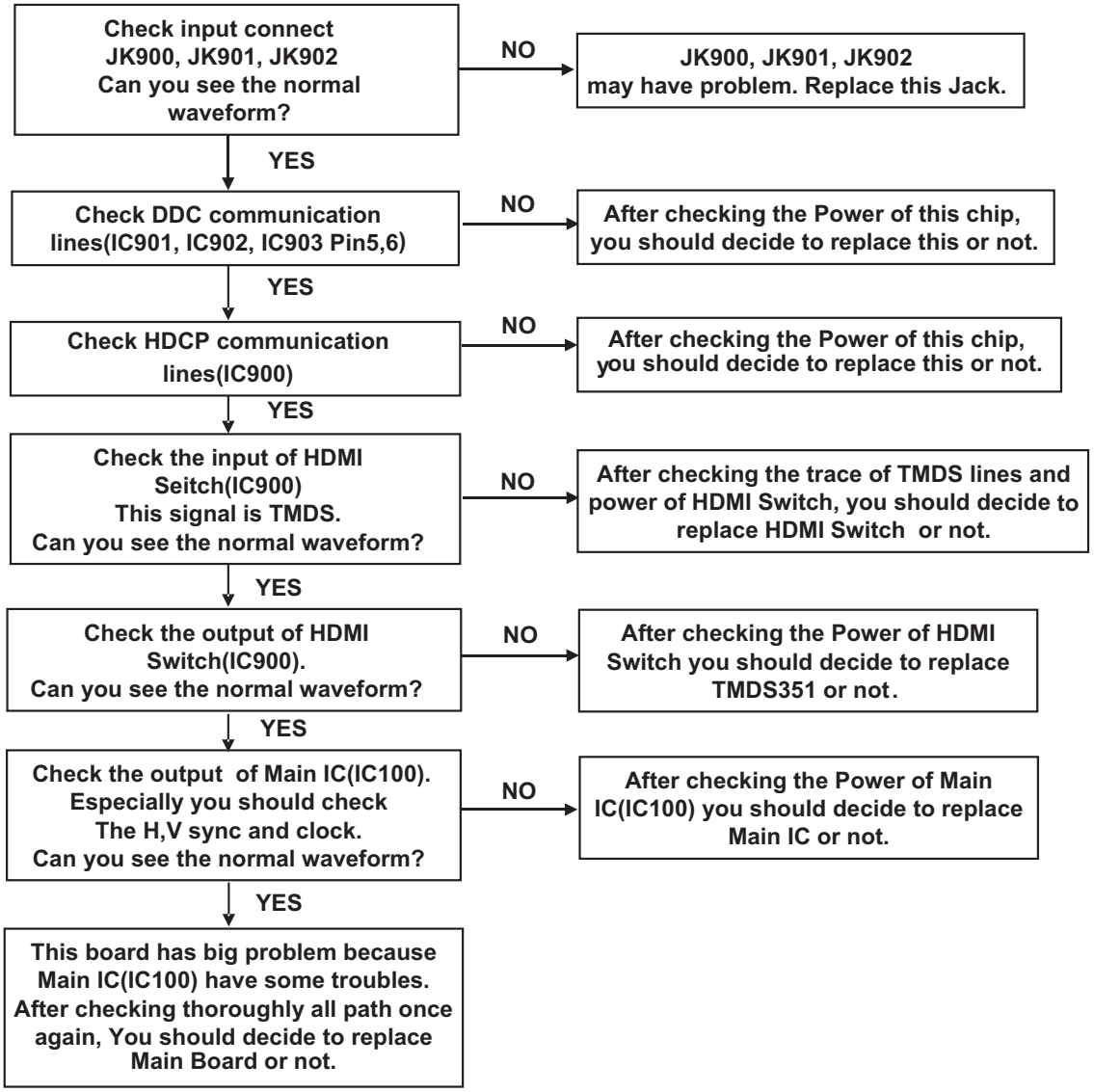
Component doesn't display



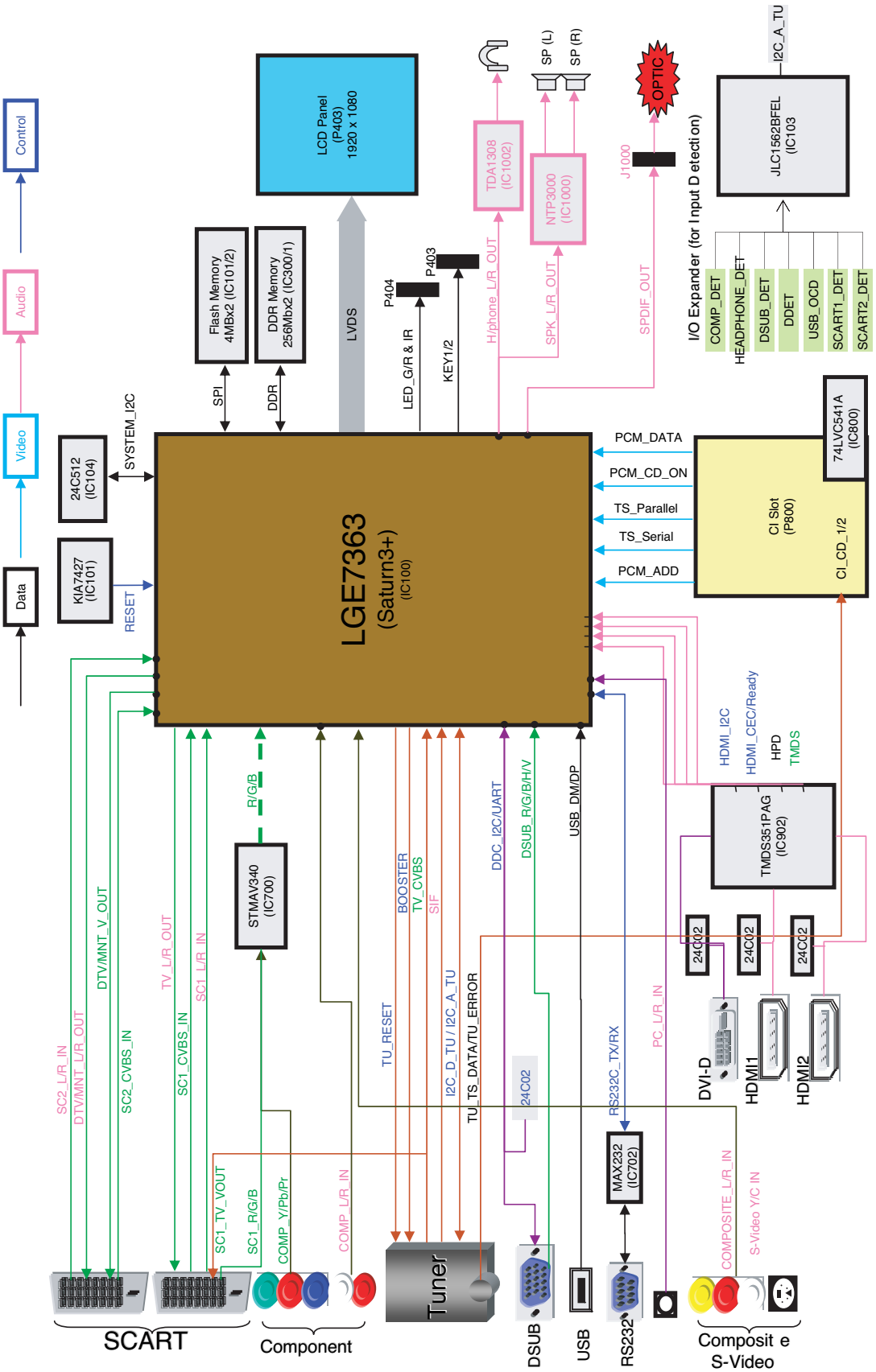
RGB-PC doesn't display



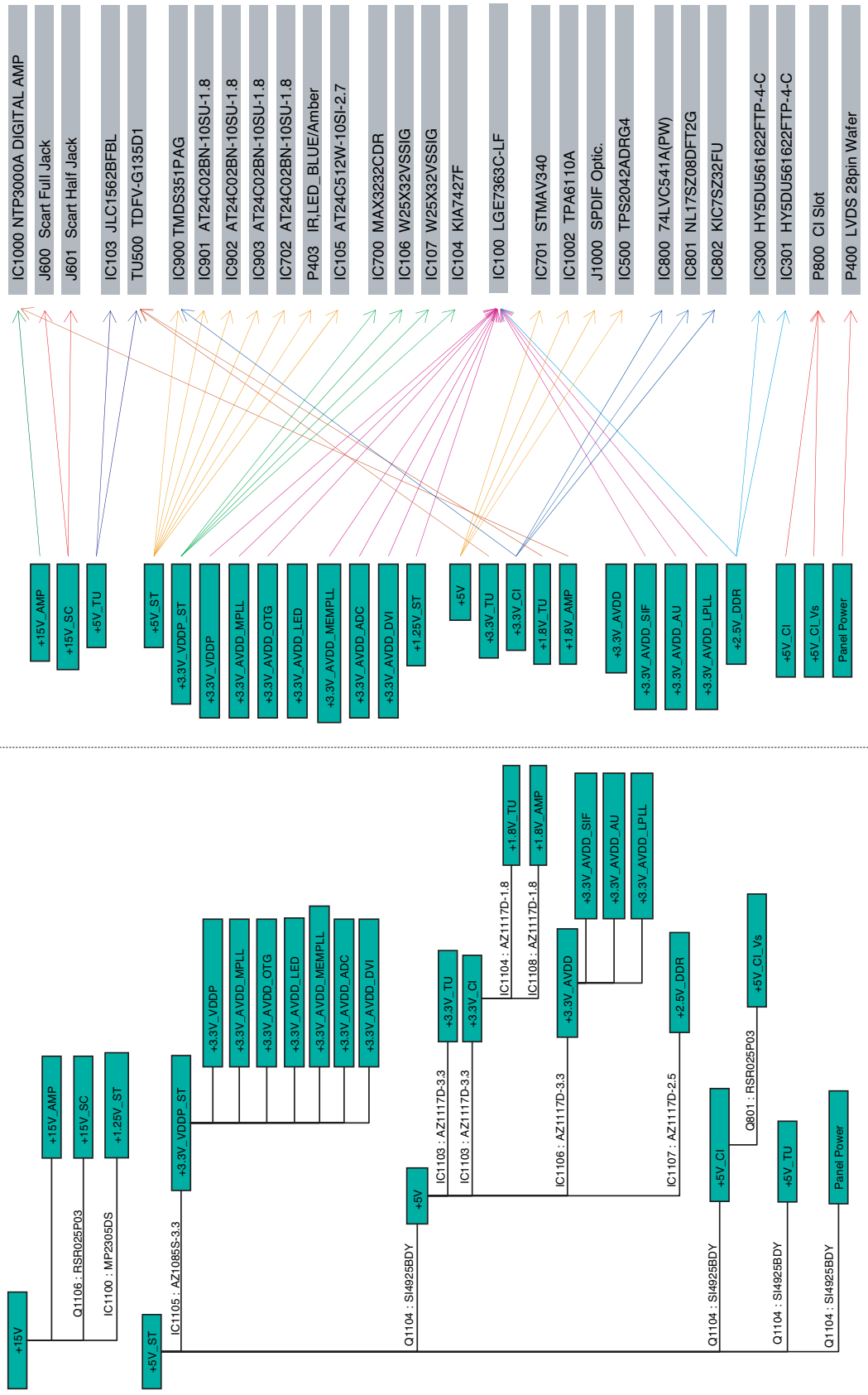
HDMI / DVI doesn t display



BLOCK DIAGRAM



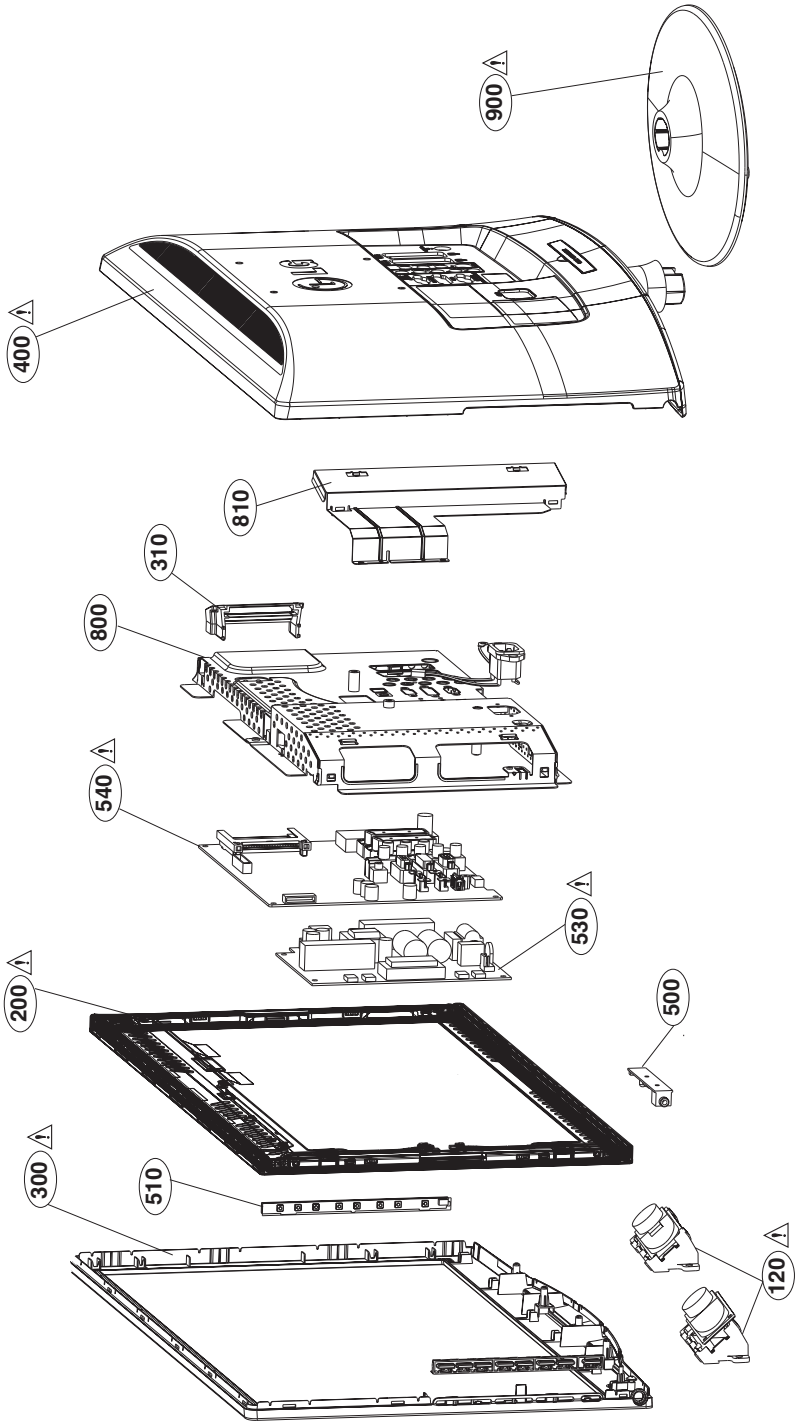
Power Connection



EXPLODED VIEW

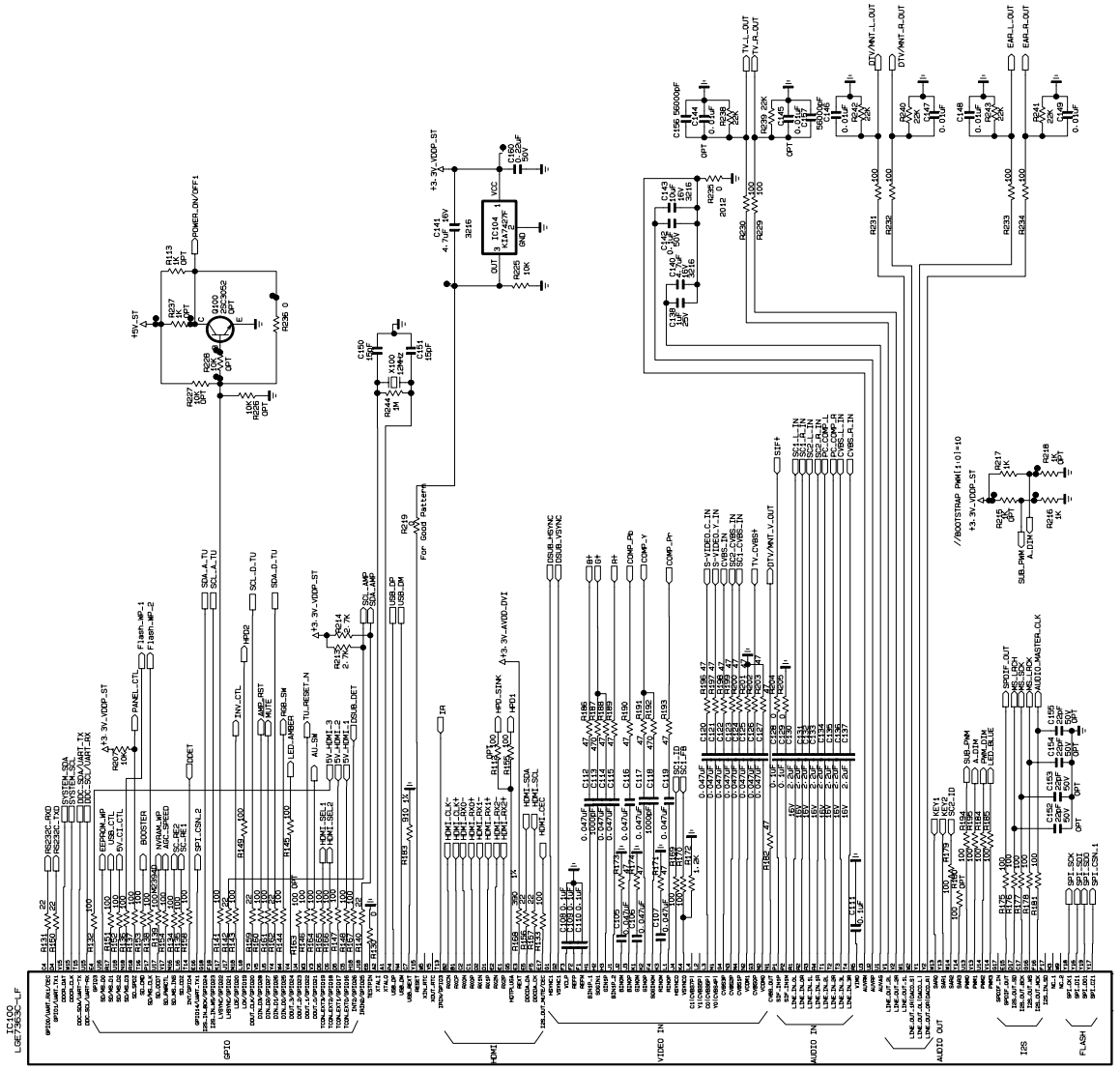
IMPORTANT SAFETY NOTICE

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.

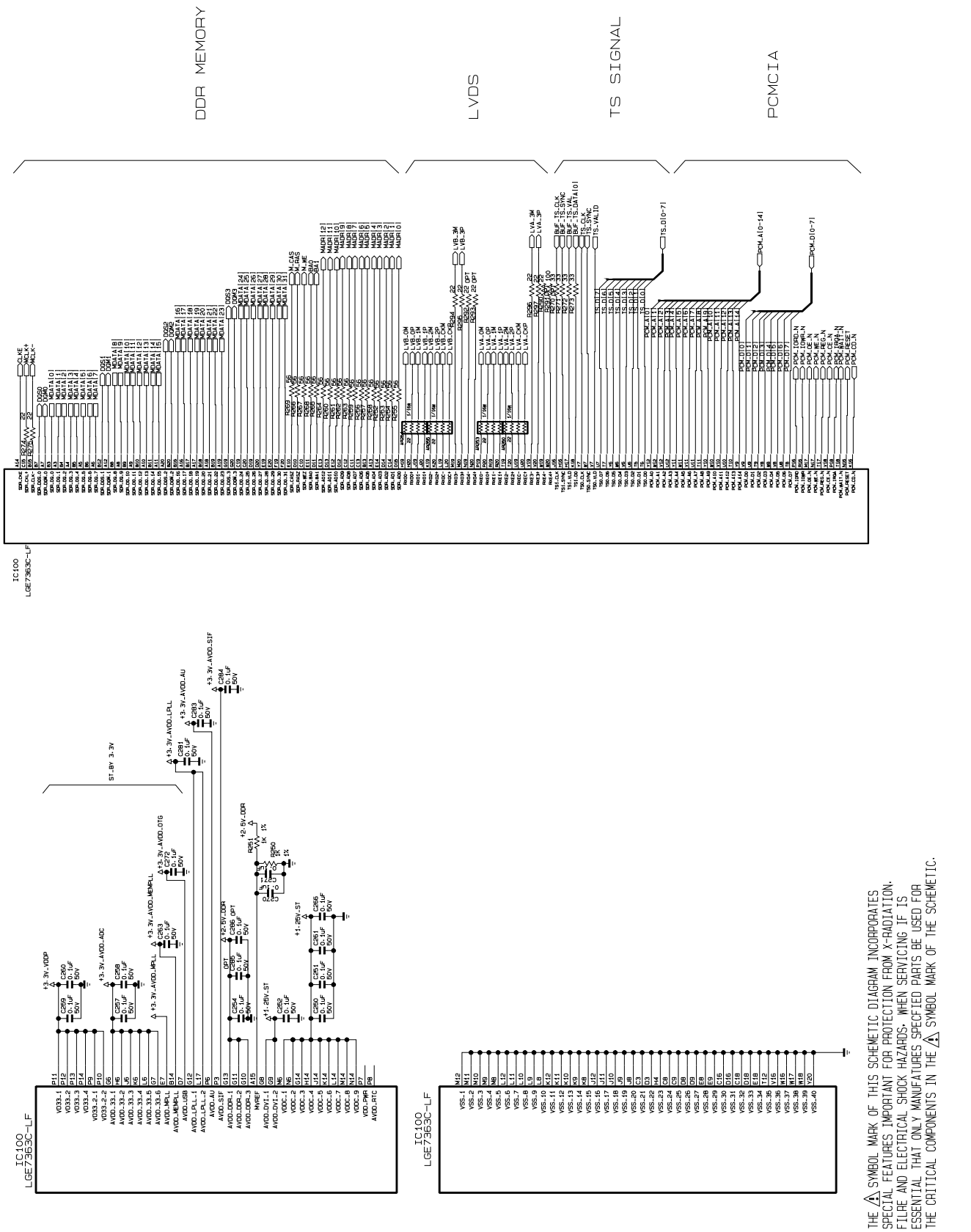


SCHEMATIC DIAGRAM

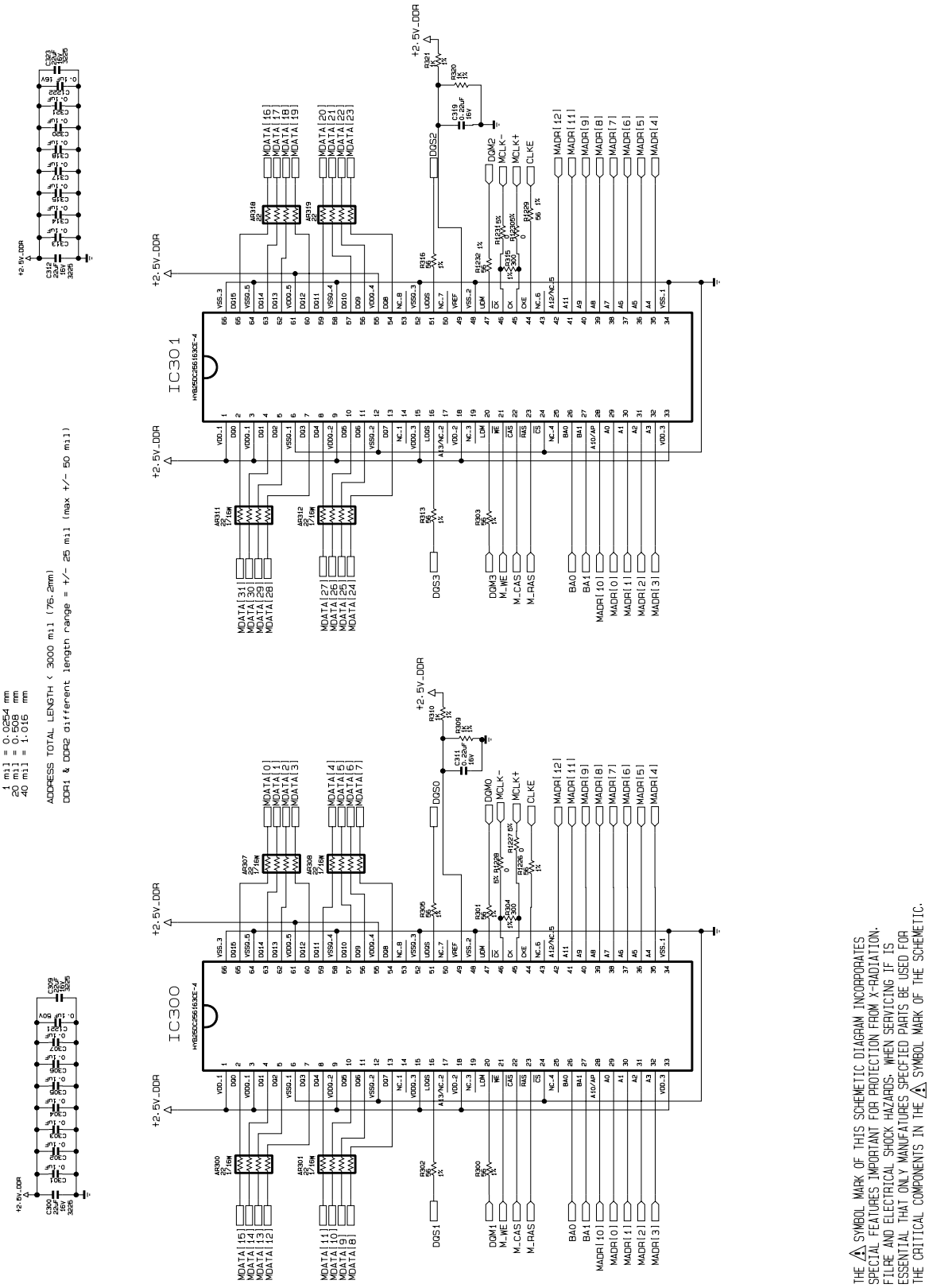
MAIN-1



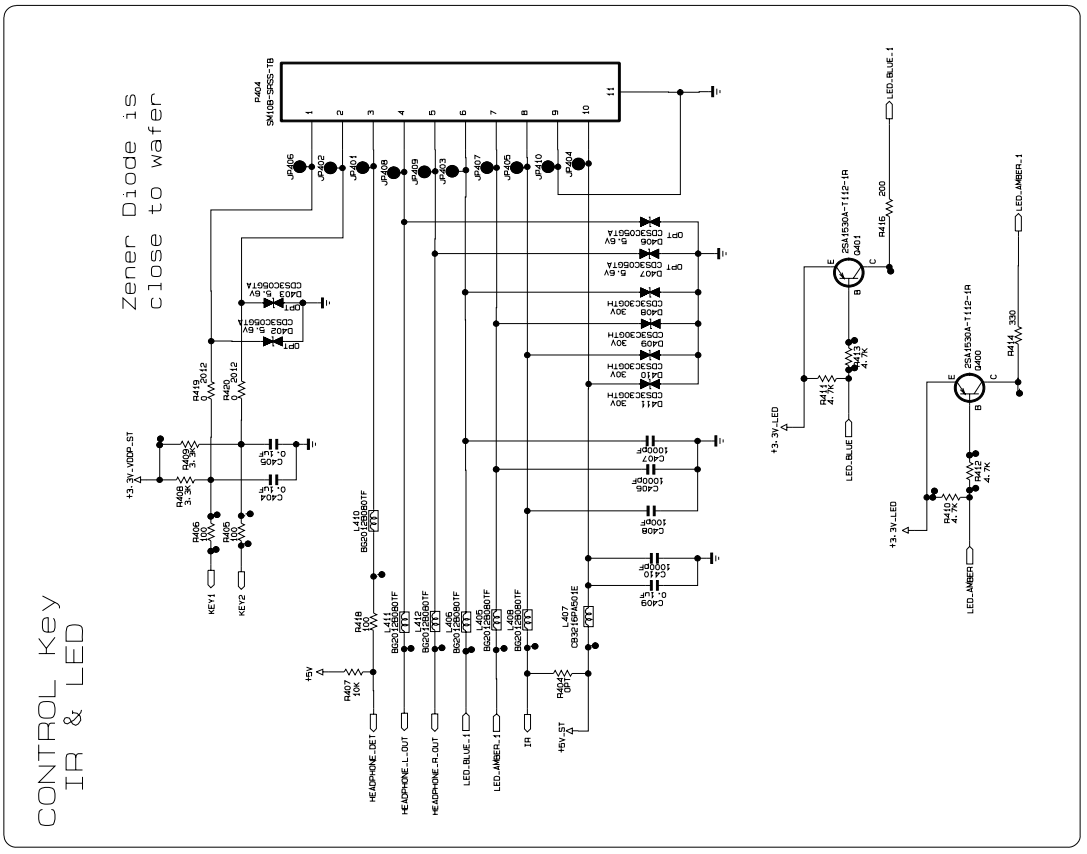
MAIN-2

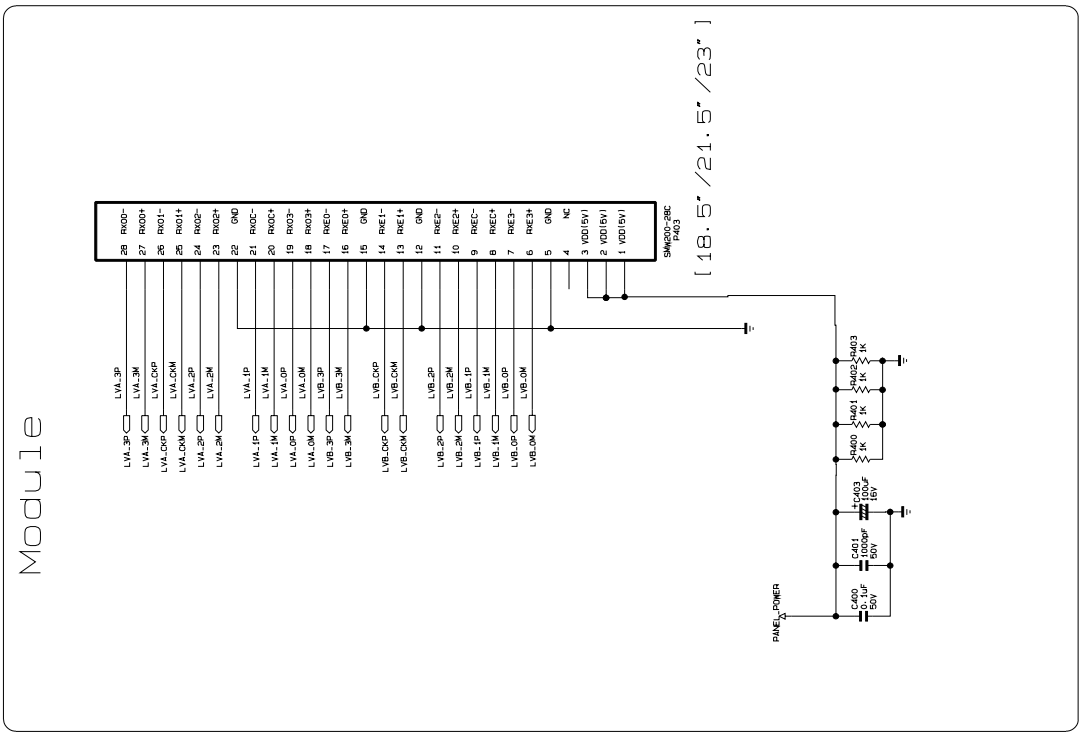


DDR



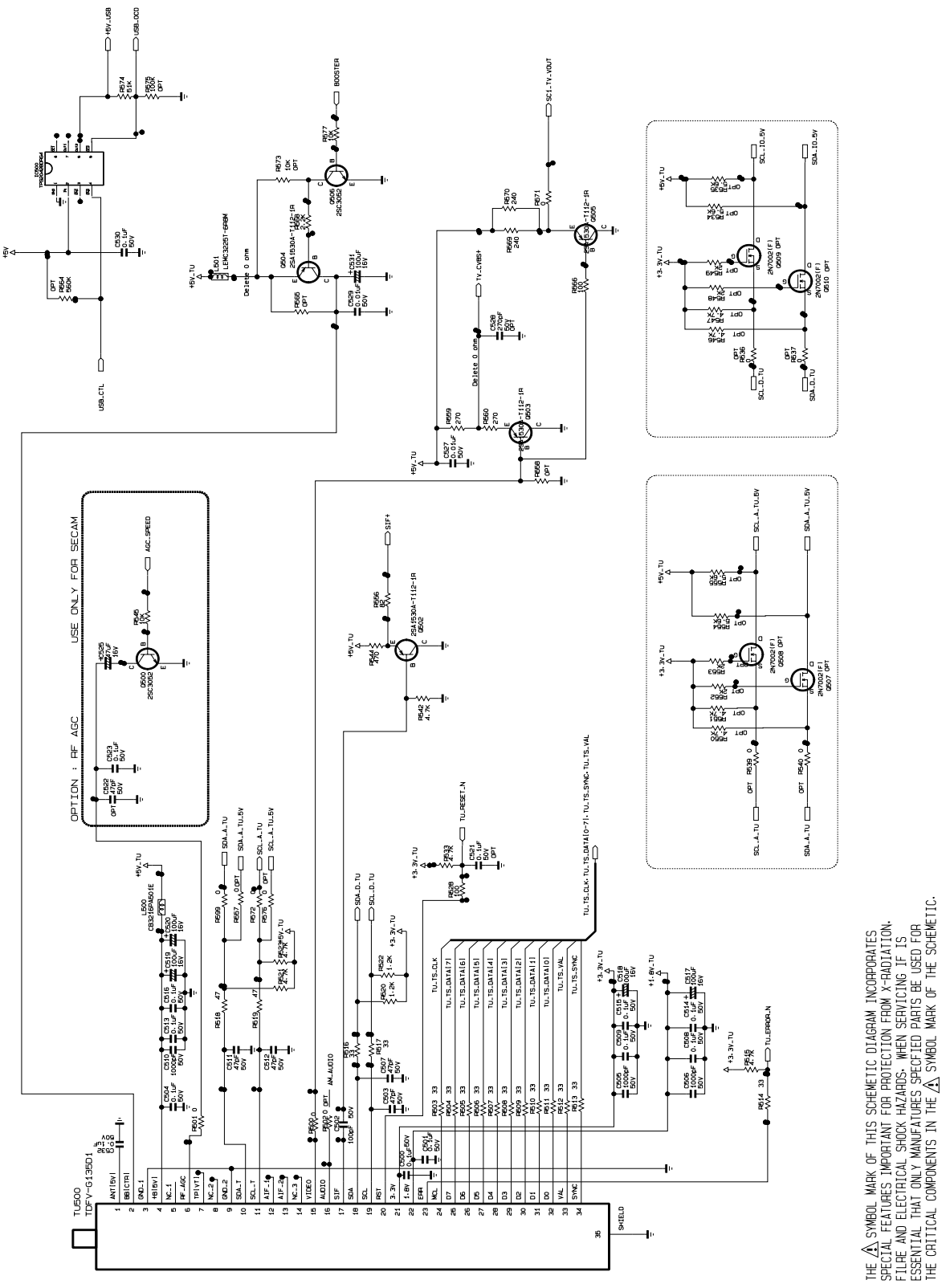
MODULE & Ct1





THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

TUNER



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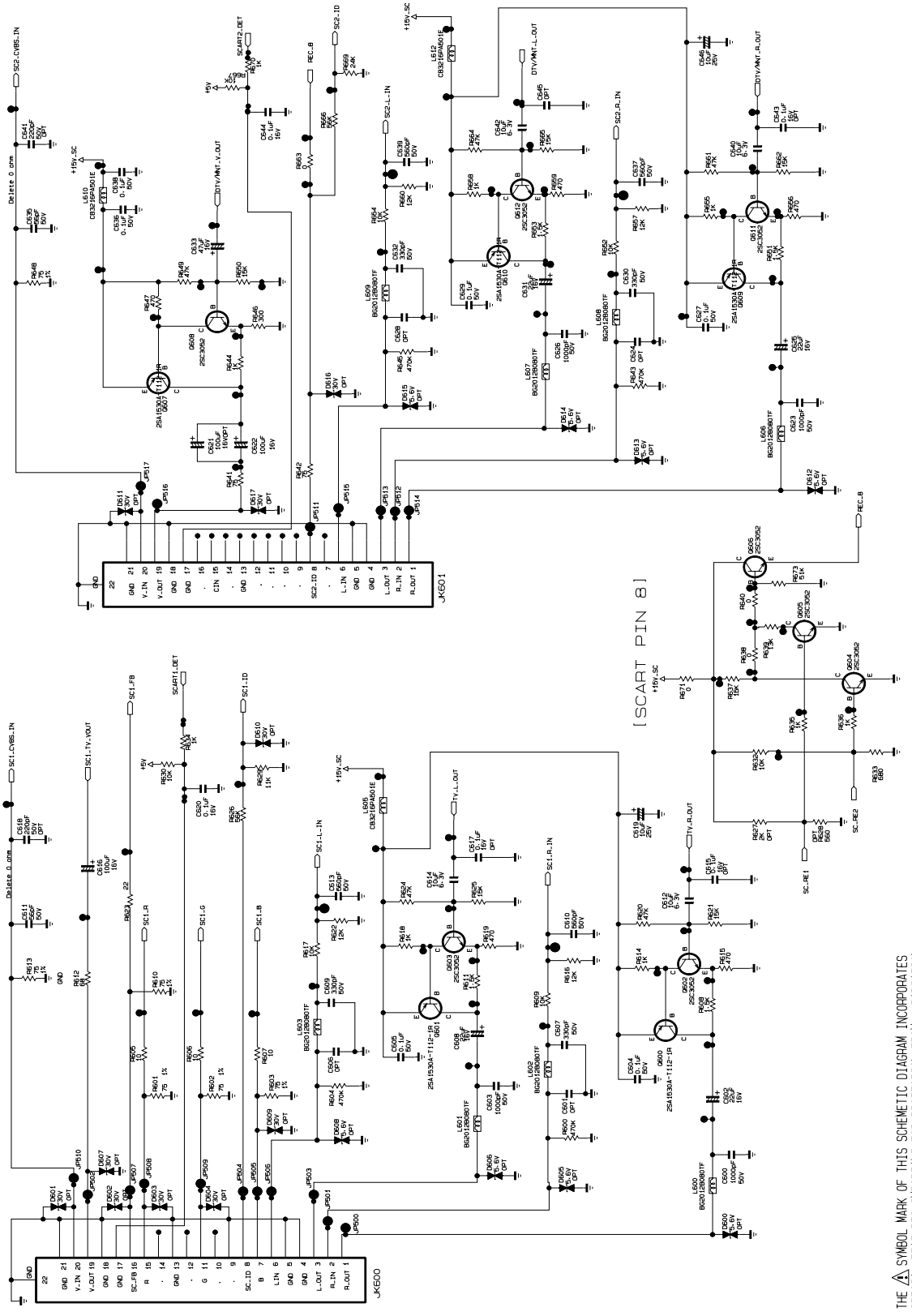
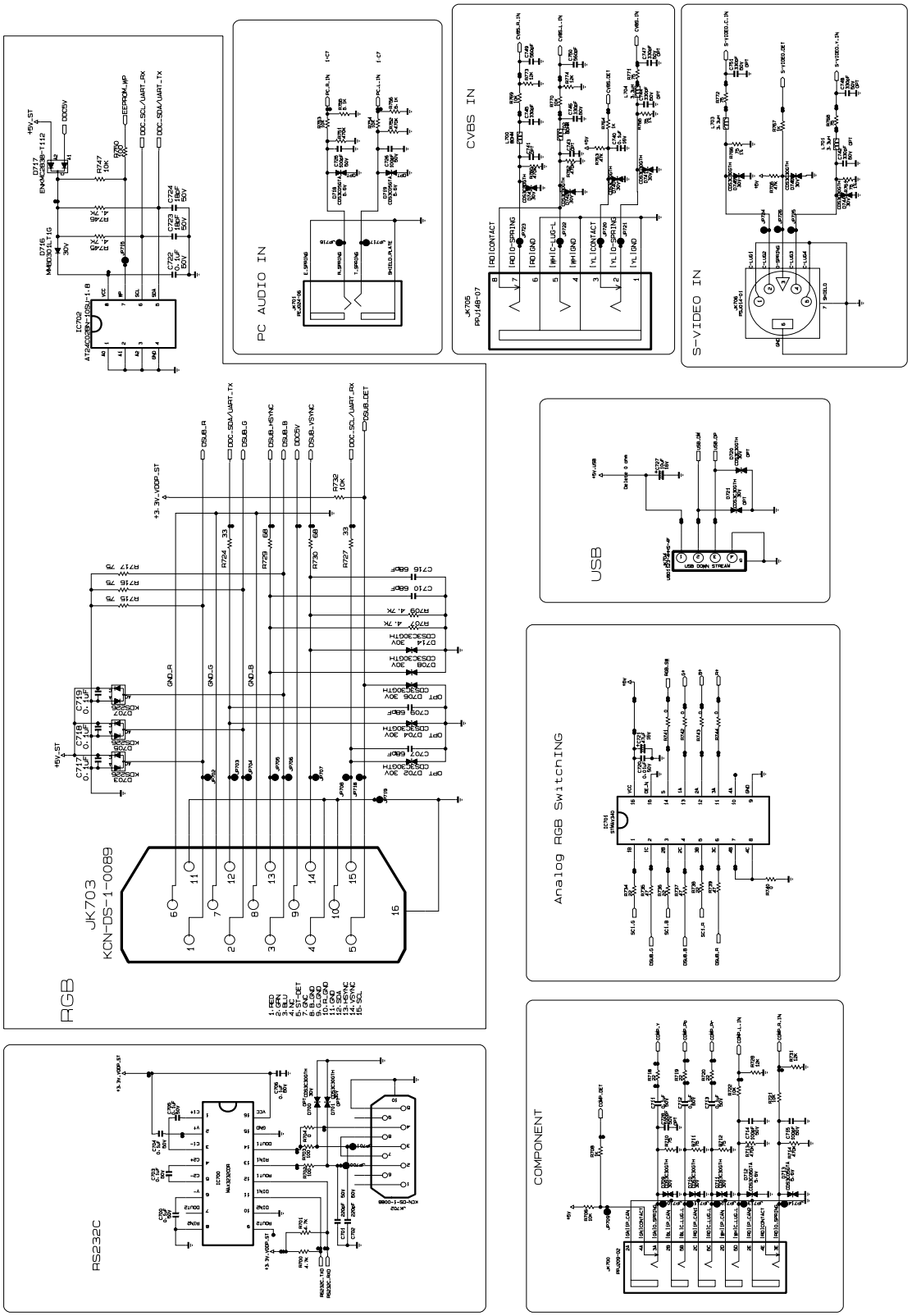


INTERFACE



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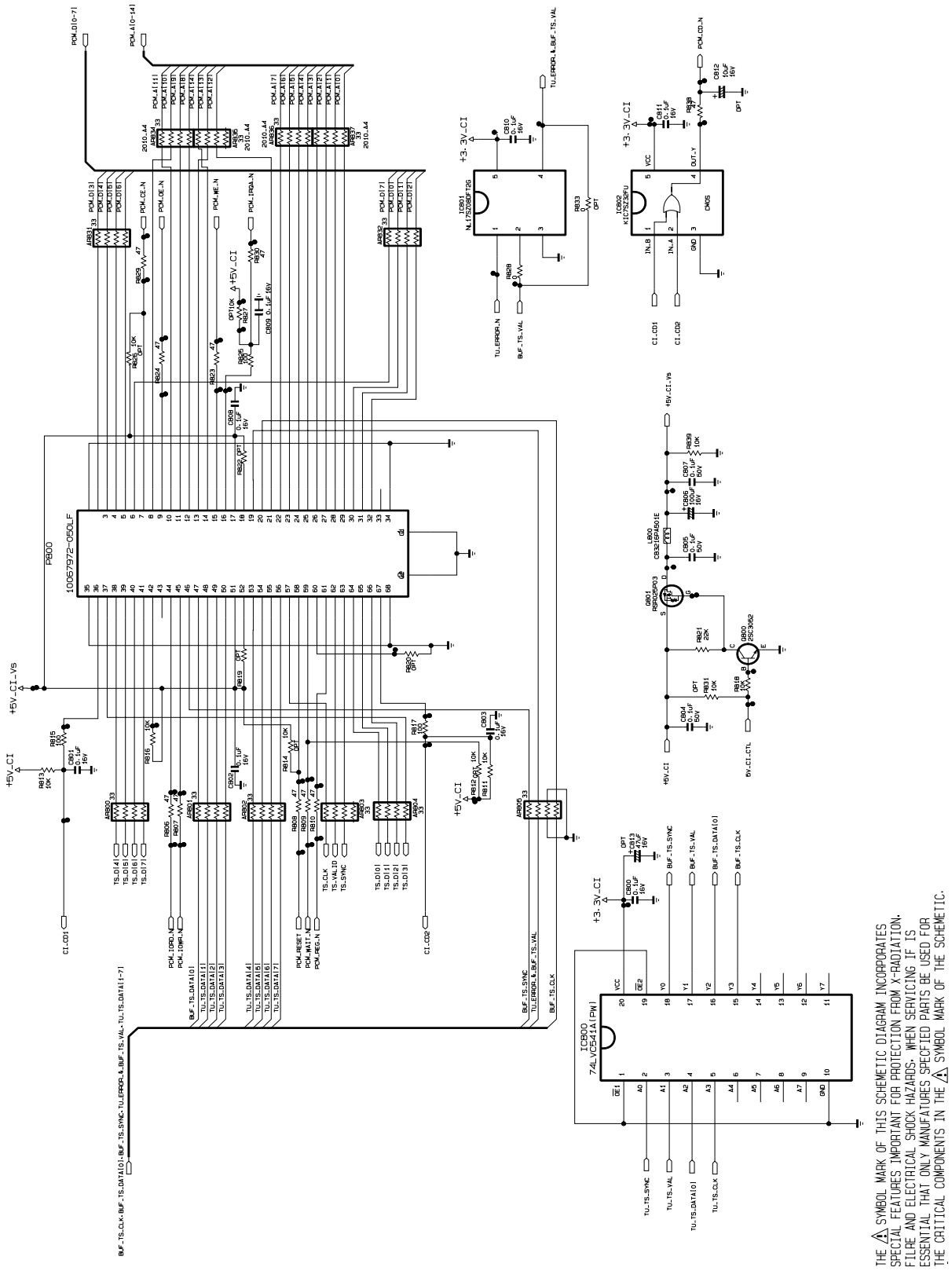
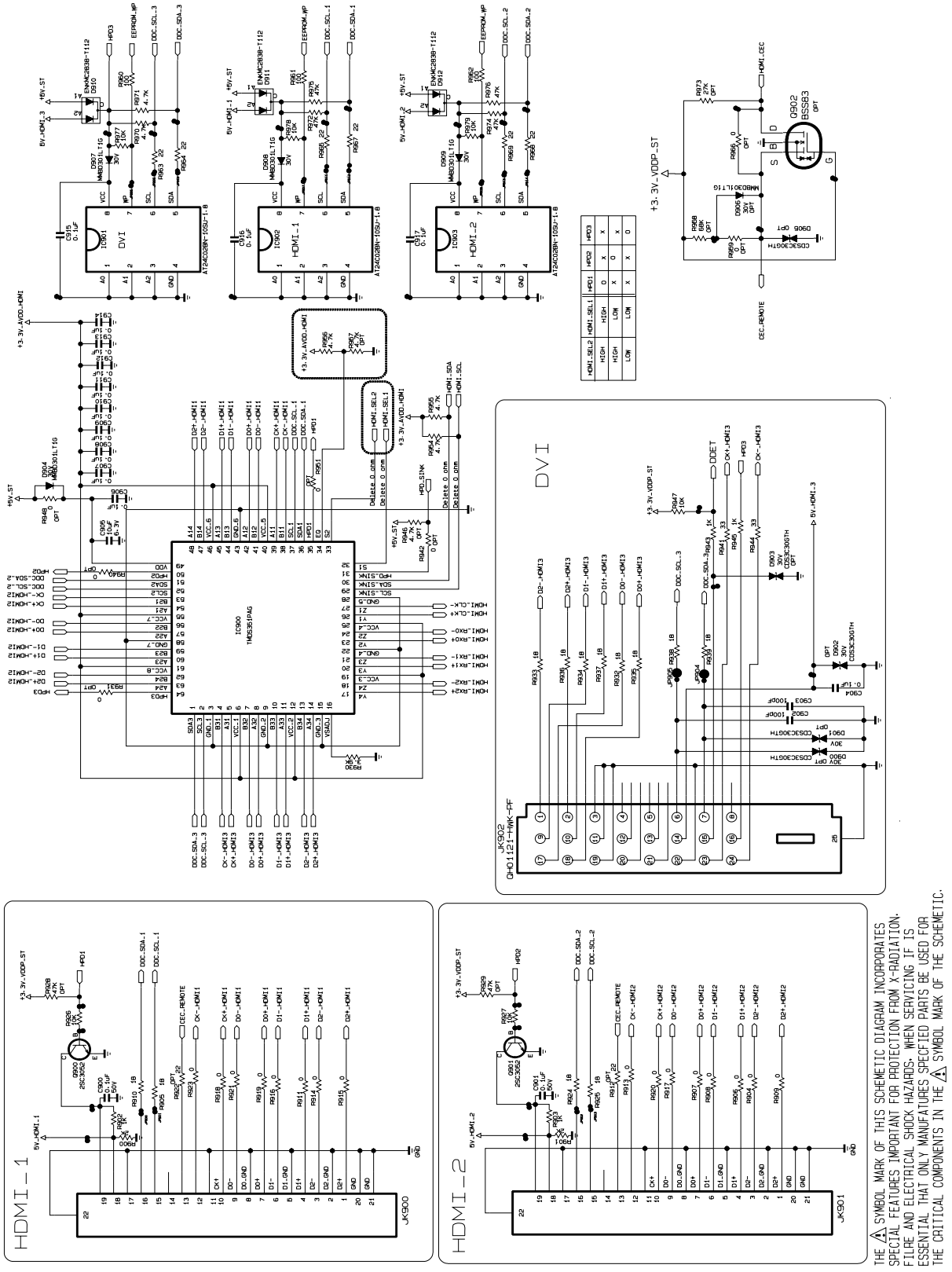
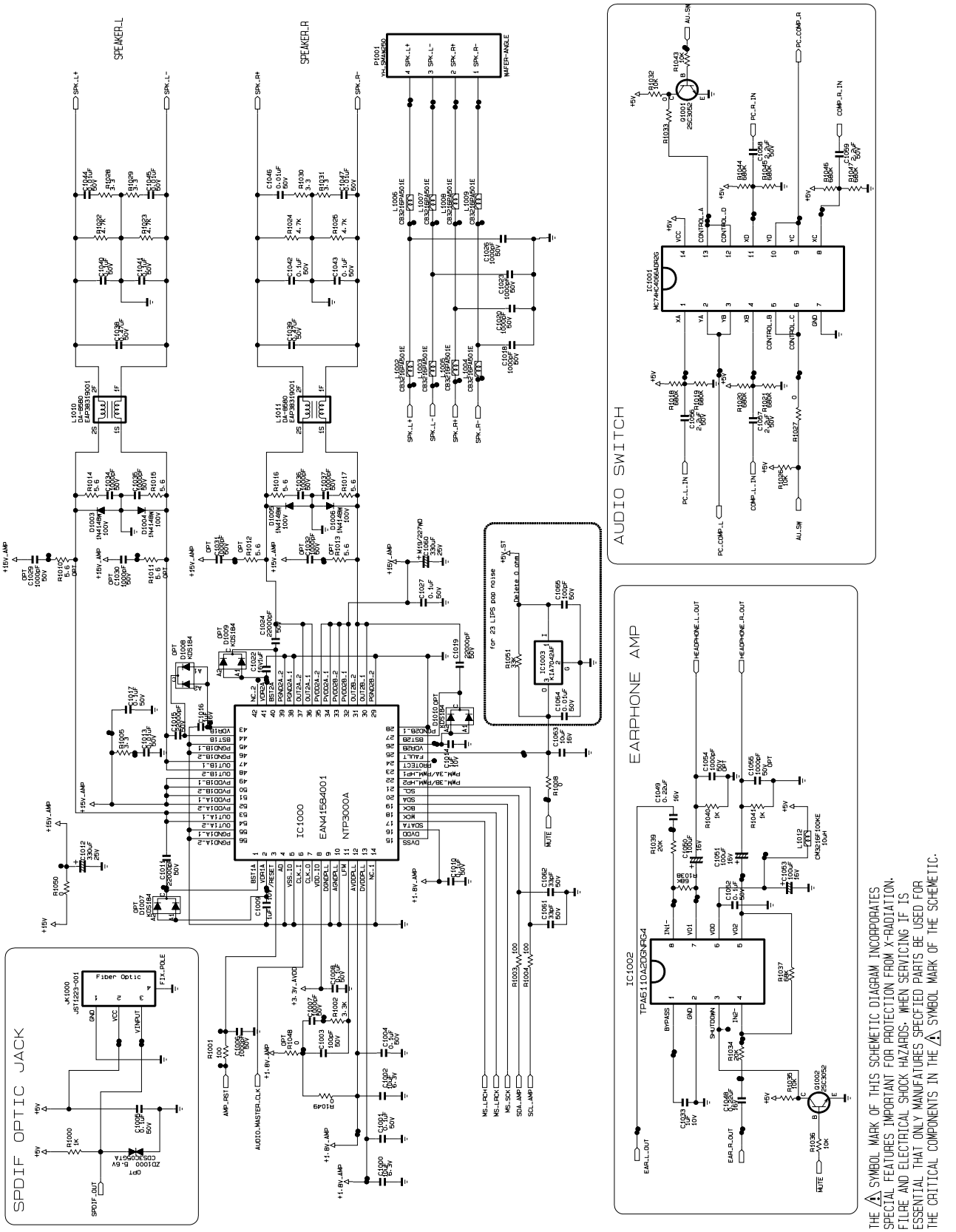
PCMCIA



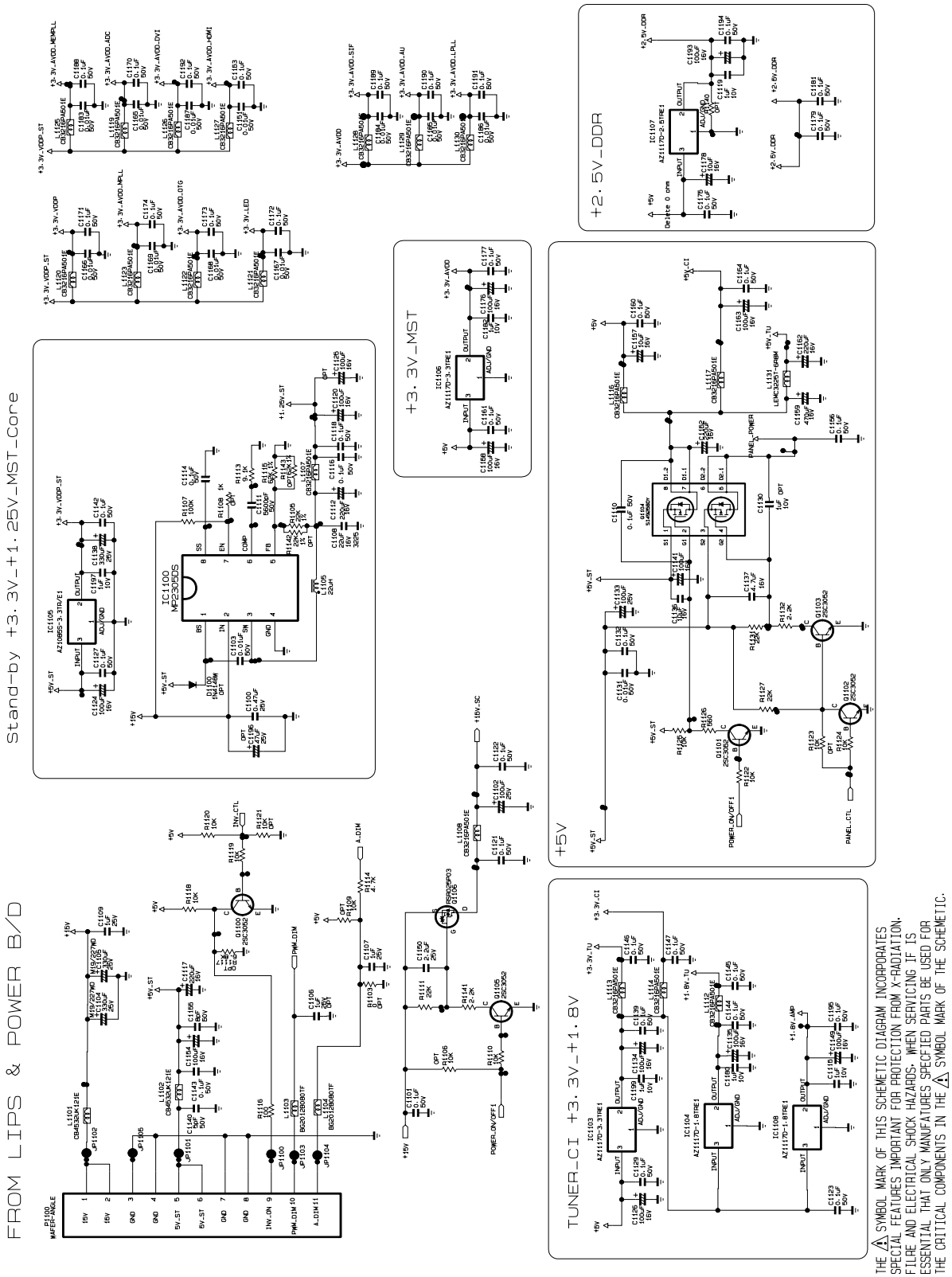
HDMI / DVI



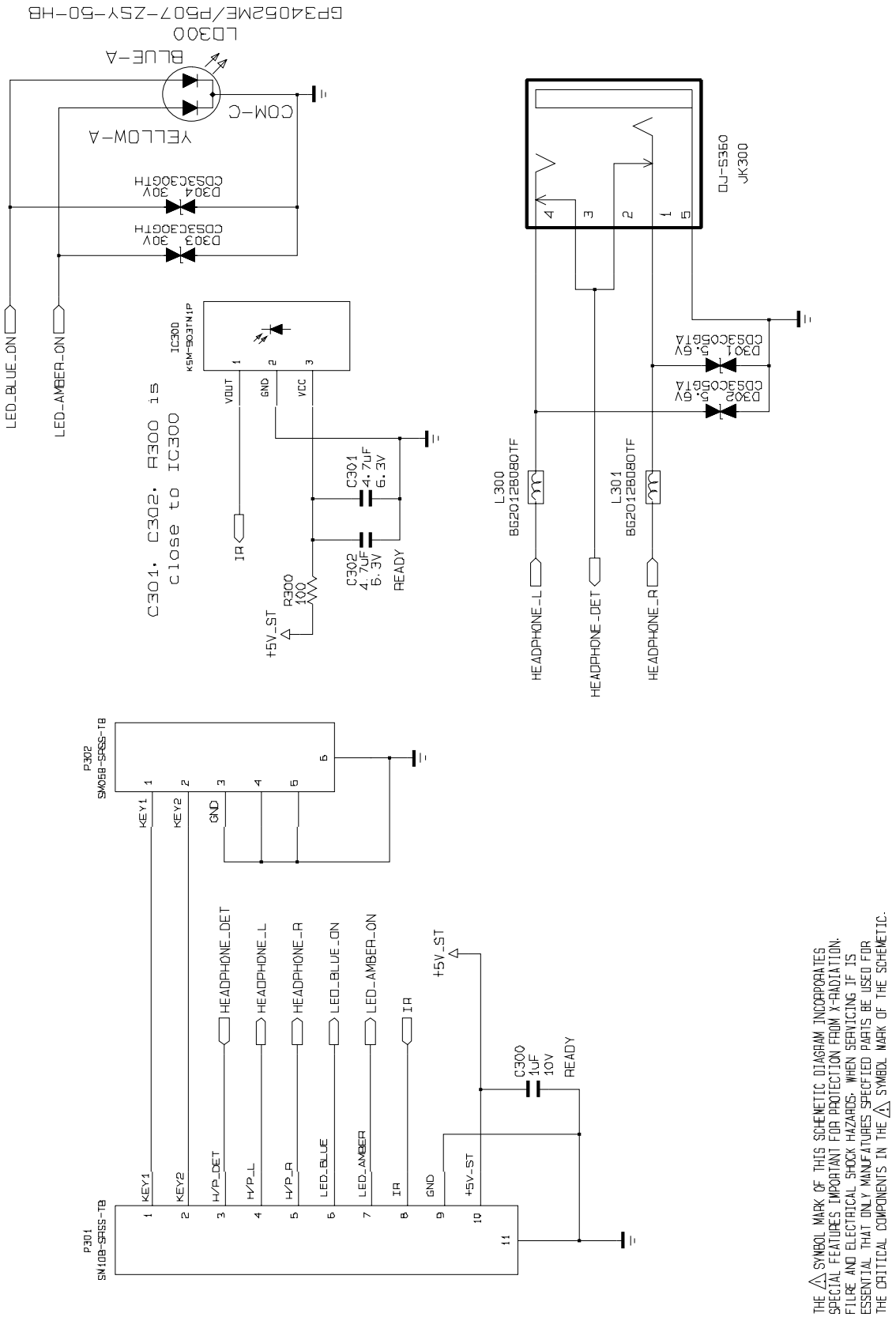
AMP



POWER



LED_IR_HP



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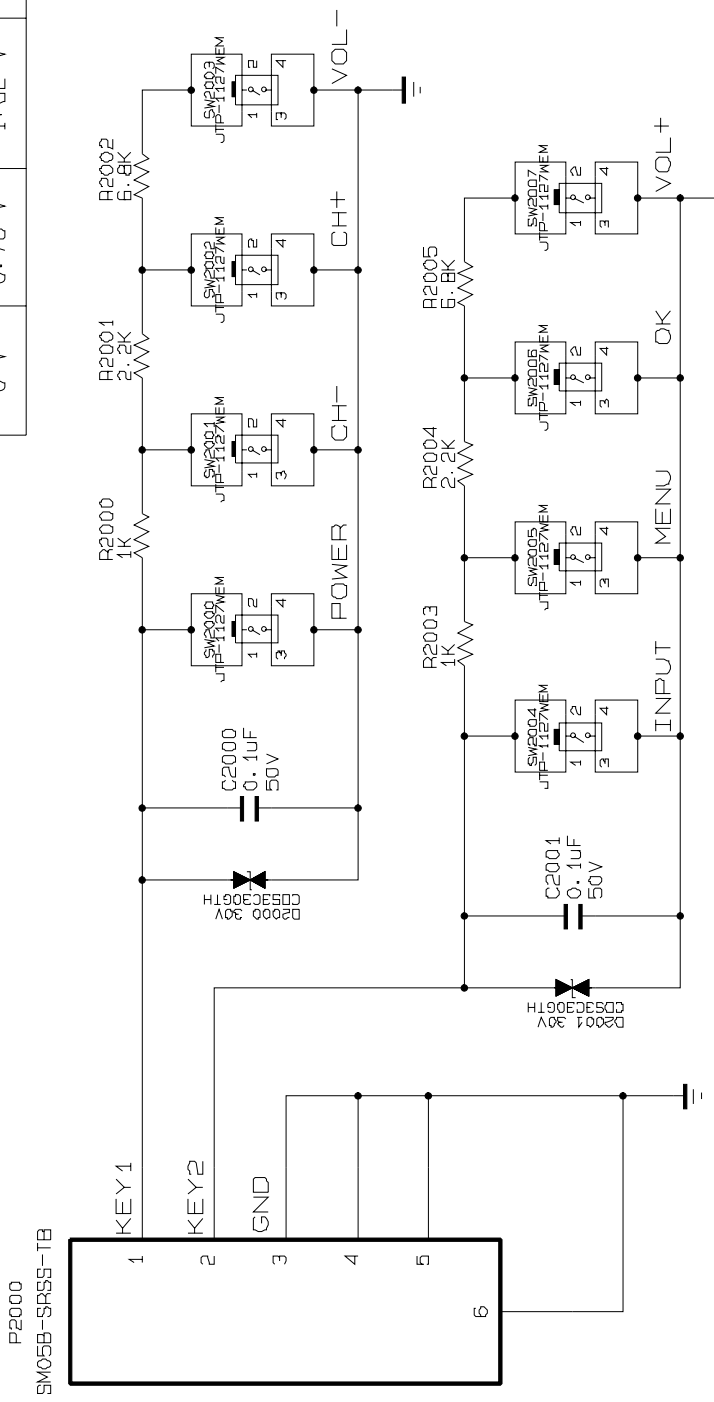
CONTROL KEY

POWER	CH−	CH+	VOL−
0 V	0.76 V	1.62 V	2.48 V
INPUT	MENU	OK	VOL+
0 V	0.76 V	1.62 V	2.48 V



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