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LCD TV

SERVICE MANUAL

CHASSIS : ML-051A

MODEL : 26LX2R-ZE

CAUTION

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



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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 $\triangle$ in the Schematic Diagram and Replacement Parts List.

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.

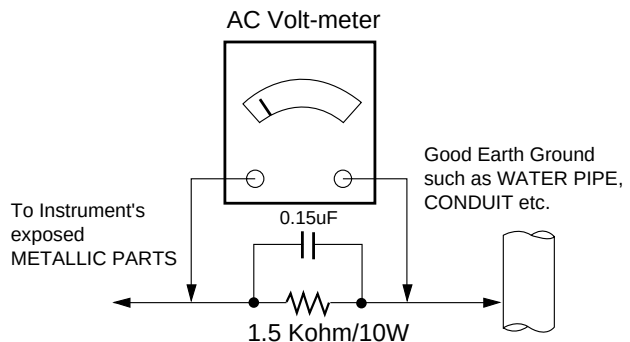
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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



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 circuitboard printed foil.
6. Use the following soldering technique.
 - a. Allow the soldering iron tip to reach a normal temperature (500 °F to 600 °F)
 - b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
 - c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
CAUTION: Work quickly to avoid overheating the circuit board printed foil.
 - d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Remove/Replacement

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

Removal

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

Replacement

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

"Small-Signal" Discrete Transistor

Removal/Replacement

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

Power Output, Transistor Device

Removal/Replacement

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

Diode Removal/Replacement

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

Fuse and Conventional Resistor

Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.

CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair

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

At IC Connections

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

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

At Other Connections

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

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

SPECIFICATION

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

1. Application range

This specification is applied to ML-051A chassis.

2. Requirement for Test

Testing for standard of each part must be followed in below condition.

- (1) Temperature: 25°C ± 2°C
- (2) Humidity: 65% ± 10%
- (3) Power: Standard input voltage (AC 100-240V, 50/60Hz)
- (4) Measurement must be performed after heat-run more than 30min.
- (5) Adjusting standard for this chassis is followed a special standard.

3.General Specification(TV)

No	Item	Specification	Remark
1.	Video input applicable system	PAL-D/K, B/G, I, NTSC-M, SECAM NTSC 4.43	
2.	Receivable Broadcasting System	1) PAL/SECAM BG 2) PAL/SECAM DK 3) PAL I/I 4) SECAM L/L' 5) NTSC M	(ZE/TE) EU/Non-EU (PAL Market)
		6) PAL-N/M 7) NTSC M	6),7) South America Market 7) Except South America NTSC Market (ME)
3.	RF Input Channel	VHF : E2 ~ E12 UHF : E21 ~ E69 CATV : S1 ~ S20 HYPER : S21~ S41	PAL
		L/L' : B, C, D	FRANCE
		VHF : 2~13 UHF : 14~69 CATV : 1~125	NTSC
		VHF Low : 1 ~ M10 VHF High : 4~S22 UHF : S23~62	JAPAN
4.	Input Voltage	AC 100 ~ 240 V/50Hz, 60Hz	
5.	Market	Worldwide	
6.	Picture Size	600.53 mm (diagona)	26.005 inch
7.	Tuning System	FVS 100 program FS	PAL, 200 PR.(Option) NTSC
8.	Operating Environment	1) Temp : 0 ~ 40 deg 2) Humidity : 10~90 %	
9.	Storage Environment	3) Temp : -20 ~ 50 deg 4) Humidity : 10~90 %	
10.	Display	LCD Module	LPL(LC260W02)

4. General Specification

No	Item	Specification			Unit	Remark
1	Panel	26" TFT WXGA LCD				
2	Frequency range	H : 31 ~ 61Khz V : 56 ~ 75Hz				PC Input
3	Control Function	1) Contrast/Brightness 2) H-Position / V-Position 3) Tracking : Clock / Phase 4) Auto Configure 5) Reset				
4	Component Jack	1 : Y 3 : Pb 5 : Pr 7 : Line1 Ready 9 : LINE2 11: LINE3 13: Line3 Ready				ZE(SIDE) TE/ME(REAR, SIDE) 480i, 480p, 720p, 1080i
	D4 Jack (525i,525p,750p,1125i)	2 : Y GND 4 : Pb GND 6 : Pr GND 8 : LINE1 10:Line2 Ready 12:SWITCH GND 14: SWITCH				JAPAN Only
5		H/V-Sync	Video	Power consumption		LED
	Power ON	ON/ON	Active	≤ max 115W	W	Green
	Stand by	OFF/ON	OFF	≤ 3.0W	W	Red
	DPMS Mode	ON/OFF	OFF	≤ typ. 30W	W	Green
	Power off	-	-	-	W	*
6	LCD Module	Type Size	LPL	626.0x 373.0 x 44.1	mm	(H) x (V) x (D)
		Pixel Pitch	LPL	147.5x 421.5 x RGB	μm	
		Pixel Format	1366 horiz. By 768 vert. Pixels RGB strip arrangement			
		Coating	Hard coating(3H), Anti-glare treatment of the front polarizer,			
		Back Light	LPL	18EEFL		

5.Optical Feature(LCD Module)

No.	Item	Specification				Remark
			Min	Typ	Max	
1	Viewing Angle (CR>10)	R/L, U/D		178, 178	178, 178	
2	Luminance	Luminance(cd/ m^2)		500		Typical
		Variation			1.3	MAX/MIN
3	Contrast Ratio		450/900	600/1200	500	ALL white/All back
4	CIE Color Coordinates (CIE 1931)	WHITE	W _X	Typ.	0.275	Typ. +0.03
			W _Y	Typ.	0.279	
		RED	R _X	Typ.	0.640	
			R _Y	Typ.	0.340	
		GREEN	G _X	Typ.	0.282	
			G _Y	Typ.	0.607	
		BLUE	B _X	Typ.	0.145	
			B _Y	Typ.	0.066	

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

No	Specification				Proposed
	Resolution	H-freq(kHz)	V-freq(Hz)		
1.	640x480	15.73	60	SDTV, DVD 480i	ZE, TE, ME
2.	640x480	15.63	59.94	SDTV, DVD 480i	ZE, TE, ME
3.	704x480	31.47	59.94	EDTV 480p	TE, ME
4.	720x576	15.625	50.00	SDTV, DVD 625 Line	ZE, TE, ME
5.	720x576	31.25	50.00	HDTV 576p	TE, ME
6.	1280x720	45.00	60.00	HDTV 720p	TE, ME
7.	1280x720	44.96	59.94	HDTV 720p	TE, ME
8.	1920x1080	31.25	50.00	HDTV 1080i 50Hz (AU Ver.)	TE, ME
9.	1920x1080	33.75	60.00	HDTV 1080i 60Hz (ATSC)	TE, ME
10.	1920x1080	33.72	59.94	HDTV 1080i 59.94Hz	TE, ME

7. PC INPUT Mode Table

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed
	Analog RGB, Digital RGB				
1	720x400	31.468	70.8	28.321	
2	640x480	31.469	59.94	25.17	VESA
		37.684	75.00	31.5	VESA
3	800x600	37.879	60.31	40.00	VESA
		46.875	75	49.5	VESA
4	832x624	49.725	74.55	57.283	
5	1024x768	48.363	60.00	65.00	VESA(XGA)
		56.47	70.00	75.00	VESA(XGA)
		60.123	75.029	78.75	VESA(XGA)
6	1280x768	47.776	59.870	79.50	VESA(WXGA)
7	1360x768	47.720	59.799	84.75	VESA(WXGA)
8	1366x768	47.720	59.799	84.75	Supported
9	1920x1080	33.75	60.00	86.375	HDCP DVI Digital 1080i
10	1280x720	45.00	60.00	74.375	HDCP DVI Digital 720p

8. HDMI INPUT Mode Table

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed
	Analog RGB, Digital RGB				
1	720x400	31.468	70.8	28.321	
2	640x480	31.469 37.684	59.94 75.00	25.17 31.5	VESA VESA
3	800x600	37.879 46.875	60.31 75	40.00 49.5	VESA VESA
4	832x624	49.725	74.55	57.283	
5	1024x768	48.363 56.47 60.123	60.00 70.00 75.029	65.00 75.00 78.75	VESA(XGA) VESA(XGA) VESA(XGA)
6	1280x768	47.776	59.870	79.50	VESA(WXGA)
7	1360x768	47.720	59.799	84.75	VESA(WXGA)
8	1366x768	47.720	59.799	84.75	Supported
9	1920x1080	33.75	60.00	86.375	HDCP DVI Digital 1080i
10	1280x720	45.00	60.00	74.375	HDCP DVI Digital 720p

9. Mechanical specification

<Table 1> Scart Arrangement 1.(Full Scart)

Pin	Signal	Signal Level	Impedance
1	Audio Output B (right)	0.5 Vrms	< 1 K Ω
2	Audio Input B (right)	0.5 Vrms	> 10 K Ω
3	Audio Output A (left)	0.5 Vrms	< 1 K Ω
4	Ground (audio)	-	-
5	Ground (blue)	-	-
6	Audio input A (left)	0.5 Vrms	> 10 K Ω
7	Blue input	0.7 V	75 Ω
8	Function Select (AV control)	High (9.5 - 12V) - AV Mode Mid (5 - 8V) - Wide Screen Low (0 - 2V) - TV Mode	> 10 K Ω
9	Ground (Green)	-	-
10	Comms Data 2		
11	Green input	0.7 V	75 Ω
12	Comms Data 1		
13	Ground (Red)	-	-
14	Ground (Blanking)	-	-
15	Red input	0.7 V	75 Ω
16	RGB Switching Control	High (1 - 3V) - RGB Low (0 - 0.4V) - Composite	75 Ω
17	Ground (Video input & Output)	-	-
18	Ground (RGB Switching Control)	-	-
19	Video output (Composite)	1V including sync	75 Ω
20	Video input (Composite)	1V including sync	75 Ω
21	Common ground (Shield)	-	-

<Table 2> Scart Arrangement 2.(Half Scart)

Pin	Signal	Signal Level	Impedance
1	Audio Output B (right)	0.5 Vrms	< 1 K Ω
2	Audio Input B (right)	0.5 Vrms	> 10 K Ω
3	Audio Output A (left)	0.5 Vrms	< 1 K Ω
4	Ground (audio)	-	-
5	Ground (blue)	-	-
6	Audio input A (left)	0.5 Vrms	> 10 K Ω
7	-	-	-
8	Function Select (AV control)	High (9.5 - 12V) - AV Mode Mid (5 - 8V) - Wide Screen Low (0 - 2V) - TV Mode	> 10 K Ω
9	Ground (Green)	-	-
10	Comms Data 2		
11	-	-	-
12	Comms Data 1		
13	Ground (Red)	-	-
14	Ground (Blanking)	-	-
15	Red input		
16	-	-	-
17	Ground (Video input & Output)	-	-
18	-	-	-
19	Video output (Composite)	1V including sync	75 Ω
20	Video input (Composite)	1V including sync	75 Ω
21	Common ground (Shield)	-	-

ADJUSTMENT INSTRUCTION

1. Application Range

This spec. sheet is applied to all of the ML-051A chassis (TORNADO) manufactured at LG TV Plant

2. Specification.

- 2.1 Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help to protect test instruments.
- 2.2 Adjustment must be done in the correct sequence.
- 2.3 The adjustment must be performed at 25±5°C temperature and 65±10% relative humidity if there is no specified designation.
- 2.4 The input voltage of the receiver must be kept between 100~220V, 50/60Hz.
- 2.5 Before adjustment, execute Heat-Run for 30 minutes at RF no signal.

3. EDID

* Caution

- Use the proper signal cable for EDID Download
Analog EDID: Pin3 exists
Digital EDID: Pin3 exists

Caution: - Never connect HDMI & DVI-D & DVI-A Cable at the same time.

- Use the proper cables below for EDID Writing

No	Item	Content	Hexadecimal
1	Manufacturer ID	GSM	1E6D
2	Version	Digital 1	01
3	Revision	Digital 3	03

3.1 Data

3.1.1 ANALOG(128Bytes)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a	b				
10	c	01	03	80	46	27	78	EA	D9	B0	A3	57	49	9C	25	
20	11	49	4B	A5	6E	80	31	40	01	01	01	01	45	40	01	01
30	61	40	01	01	01	01	1B	21	50	A0	51	00	1E	30	48	88
40	35	00	BC	88	21	00	00	1C	4E	1F	00	80	51	00	1E	30
50	40	80	37	00	BC	88	21	00	00	18	00	00	00	FD	00	38
60	4B	1F	3D	09	00	0A	20	20	20	20	20	20	00	00	00	FC
70																e

3.2.2 DIGITAL(128Bytes)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a	b				
10	c	01	03	80	46	27	78	EA	D9	B0	A3	57	49	9C	25	
20	11	49	4B	A5	6E	80	31	40	01	01	01	01	45	40	01	01
30	61	40	01	01	01	01	1B	21	50	A0	51	00	1E	30	48	88
40	35	00	BC	88	21	00	00	1C	4E	1F	00	80	51	00	1E	30
50	40	80	37	00	BC	88	21	00	00	18	00	00	00	FC	00	33
60																FD
70	00	38	4B	1F	3D	09	00	0A	20	20	20	20	20	20	00	e

3.2.3 EDID FOR HDMI(256Bytes)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a	b				
10	c	01	03	80	46	27	78	EA	D9	B0	A3	57	49	9C	25	
20	11	49	4B	A5	6E	80	31	40	01	01	01	01	45	40	01	01
30	61	40	01	01	01	01	1B	21	50	A0	51	00	1E	30	48	88
40	35	00	BC	88	21	00	00	1C	4E	1F	00	80	51	00	1E	30
50	40	80	37	00	BC	88	21	00	00	18	00	00	00	FC	00	33
60										0A	20	20	20	00	00	FD
70	00	38	4B	1F	3D	09	00	0A	20	20	20	20	20	20	01	e

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	02	03	21	1C	46	85	04	02	01	03	00	23	09	07	07	23
10	09	07	07	23	09	07	07	83	01	00	00	65	03	0C	00	10
20	00	01	1D	00	80	51	D0	1C	20	40	80	35	00	BC	88	21
30	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	13
40	8E	21	00	00	18	2A	12	00	10	41	43	17	20	28	60	35
50	00	00	00	32	00	00	1C	00	00	00	00	00	00	00	00	00
60	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	1E

3.2.4 Detail EDID Options are below(a, b, c, d, e)

a. Product ID

Model name	Product ID	Product ID		
		Dec	Hex	EDID Table
26LX2R	22039(A)	22039(A)	5617	1756
	22040(A)	22040(D)	5618	1856
32LX2R	30041(A)	30041(A)	7559	5975
	30042(D)	30042(D)	755A	5A75
32LP1R	30039(A)	30039(A)	7557	5775
	30040(D)	30040(D)	7558	5875
37LP1R	30043(A)	30043(A)	755B	5B75
	30044(D)	30044(D)	755C	5C75
42LP1R	40013(A)	40013(A)	9C4D	4D9C
	40014(D)	40014(D)	9C4E	4E9C

b. Serial No : Controlled on production line

c. Month, Year : Controlled on production line

d. Model Name(Hex) :

Model Name	Model Name(HEX)
26LX2R-ZE	32364C5832522D5A45
32LX2R-ZE	33324C5832522D5A45
32LP1R-ZE	33324C5031522D5A45
37LP1R-ZE	33374C5031522D5A45
42LP1R-ZE	34324C5031522D5A45

e. Checksum: ChangeCable by total EDID data

4. ADC Calibration

4.1 Adjustment of RF/AV/SAV

* Test Equipment

- Remote controller for adjustment
- MSPG-925F Pattern Generator->Model: 202 / Pattern: 32

4.1.1 Method of Auto RF/AV/S-VIDEO Color Balance.

- 1) Input the Video Signal: 75% Color Bar signal into AV3 (ZE), AV1(TE), VIDEO1(ME)
- 2) Set the PSM to Standard mode in the Picture menu.
- 3) Press ADJ key on R/C for adjustment.
- 4) Press the ►(Vol. +) key to operate the set, then it becomes automatically.
- 5) Auto-RGB OK means the adjustment is completed.

4.2 Adjustment of Component.

* Required Equipments

- Remote controller for adjustment
- MSPG-925F Pattern Generator->Model: 215 / Pattern: 33

4.2.1 Method of Auto Component Color Balance

- 1) Input the Component 720p 100% Color Bar(MSPG-925F model:215, pattern:33) signal into Component. (ZE : component , TE/ME : component 1 or 2)
- 2) Set the PSM to Standard mode in the Picture menu.
- 3) Press the ADJ key on R/C for adjustment.
- 4) Press the ►(Vol. +) key to operate the set , then it becomes automatically.
- 5) Auto-RGB OK means the adjustment is completed.

4.3 Adjustment of RGB

* Required Equipments

- Remote controller for adjustment
- MSPG-925F Pattern Generator

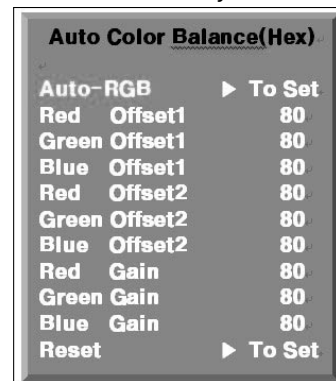
4.3.1 Method of Auto RGB Color Balance

- 1) Input the PC 1024x768@60Hz 1/2 Black & White Pattern(MSPG-925F model:37, pattern:18) into RGB. (using D-sub to DVI-I cable)
- 2) Set the PSM to Standard mode in Picture menu.
- 3) Press the ADJ key on R/C for adjustment.
- 4) Press the ►(Vol. +) key operate To set , then it becomes automatically.
- 5) Auto-RGB OK means adjustment is completed.

5. white Balance

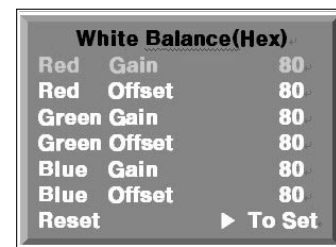
5.1 Manual white Balance (AV)

- 1) Execute CA-110 Zero Calibration.
- 2) Execute the SET Heat Run for 30minutes
- 3) Push the ADJ Button then you can see the OSD



Auto Color Balance(Hex)		
Auto- RGB	► To Set	
Red Offset1		80
Green Offset1		80
Blue Offset1		80
Red Offset2		80
Green Offset2		80
Blue Offset2		80
Red Gain		80
Green Gain		80
Blue Gain		80
Reset	► To Set	

- 4) Push the ADJ Button again for White Balance mode



White Balance(Hex)		
Red Gain		80
Red Offset		80
Green Gain		80
Green Offset		80
Blue Gain		80
Blue Offset		80
Reset	► To Set	

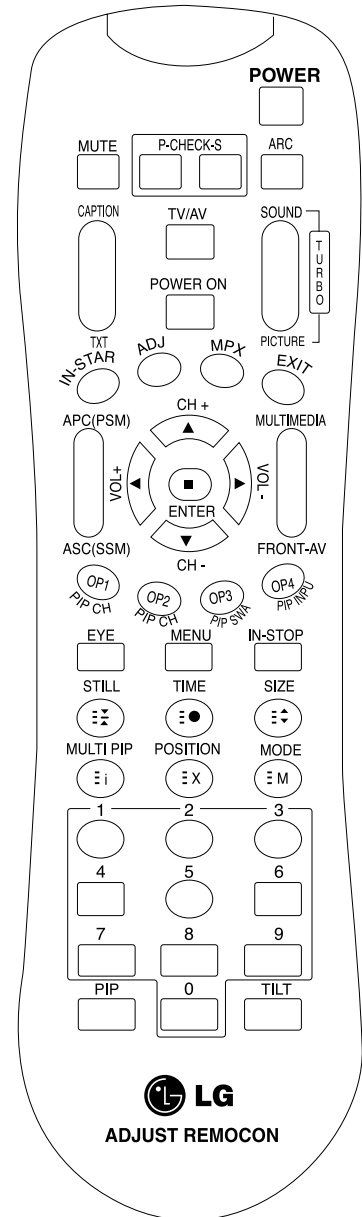
- 5) Adjust High light with R/B Gain/Offset(G Gain fix, G Offset fix)

6. Shipping Conditions

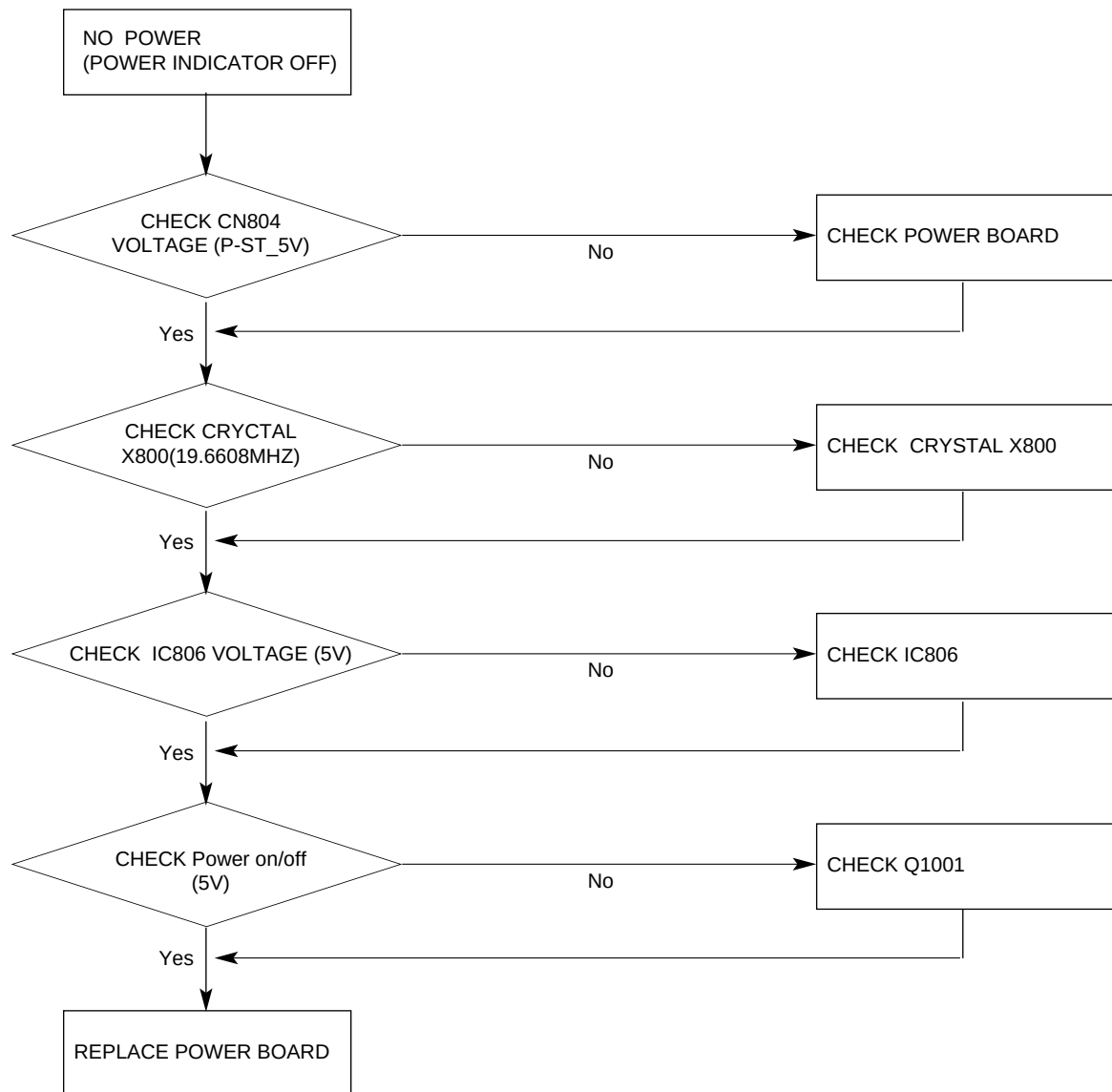
No	Item			Condition	Remark
1	Power			Off	
2	Volume Level			30	
3	Main Picture Input			TV	
4	Main Last Channel			Pr 01	
5	Mute			Off	
6	ARC			16 : 9	
7	Station	Auto Program			
		Manual Program			
		Program Edit			
		Favorite Program		None	
8	Picture	PSM		Dynamic	
		Dynamic	Contrast	100	
			Brightness	45	
			Colour	50	
			Sharpness	50	
9	Sound	SSM		Flat	
		AVL		Off	
		Balance		0	
10	Special	Input		TV	
		Child Lock		Off	
		Auto sleep		Off	
		Language		English(Area Management)	
11	PC	H-Position		Variable by each mode	
		V-Position			
		Clock			
		Phase			
		Auto Configure			

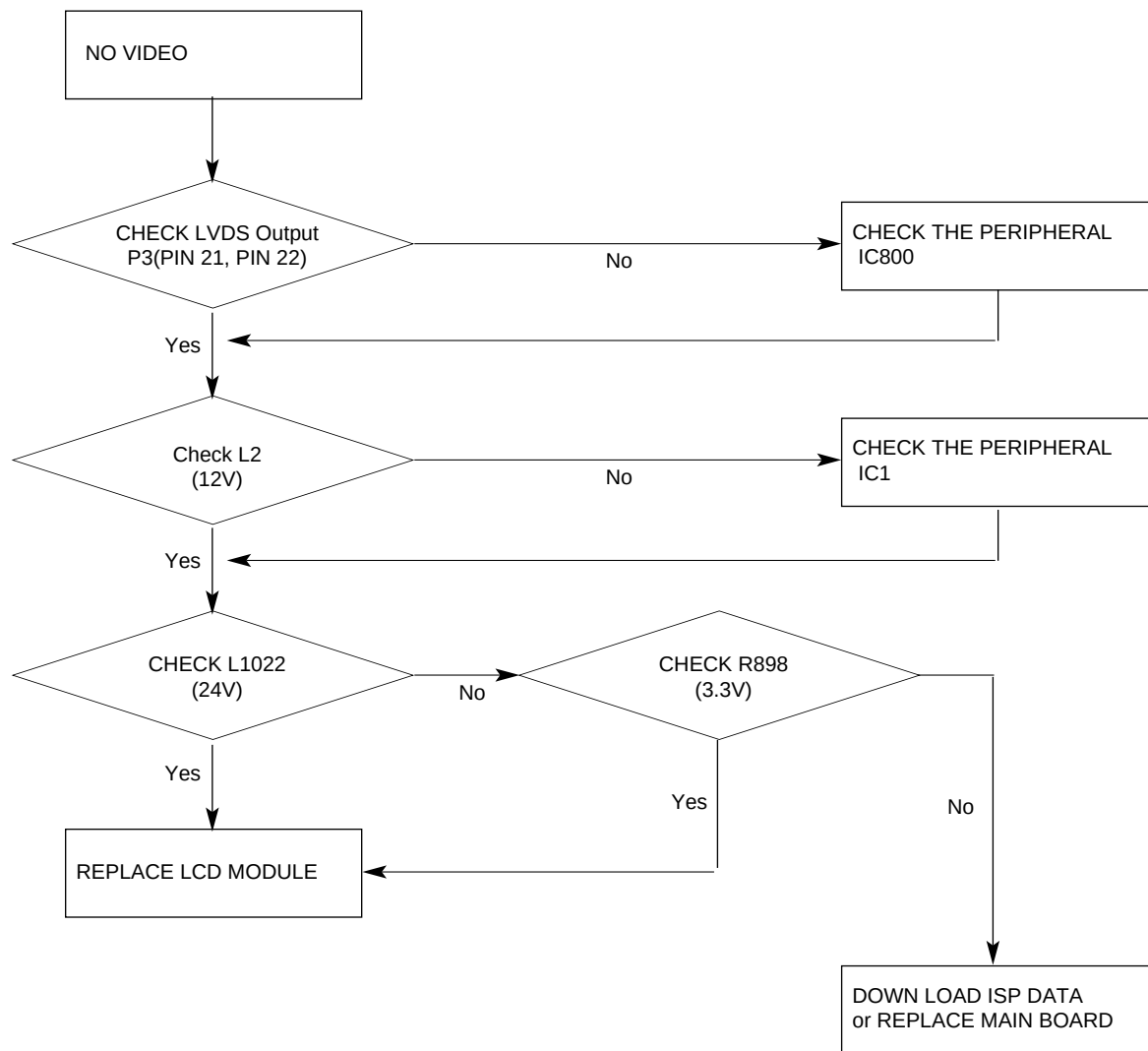
SVC REMOCON

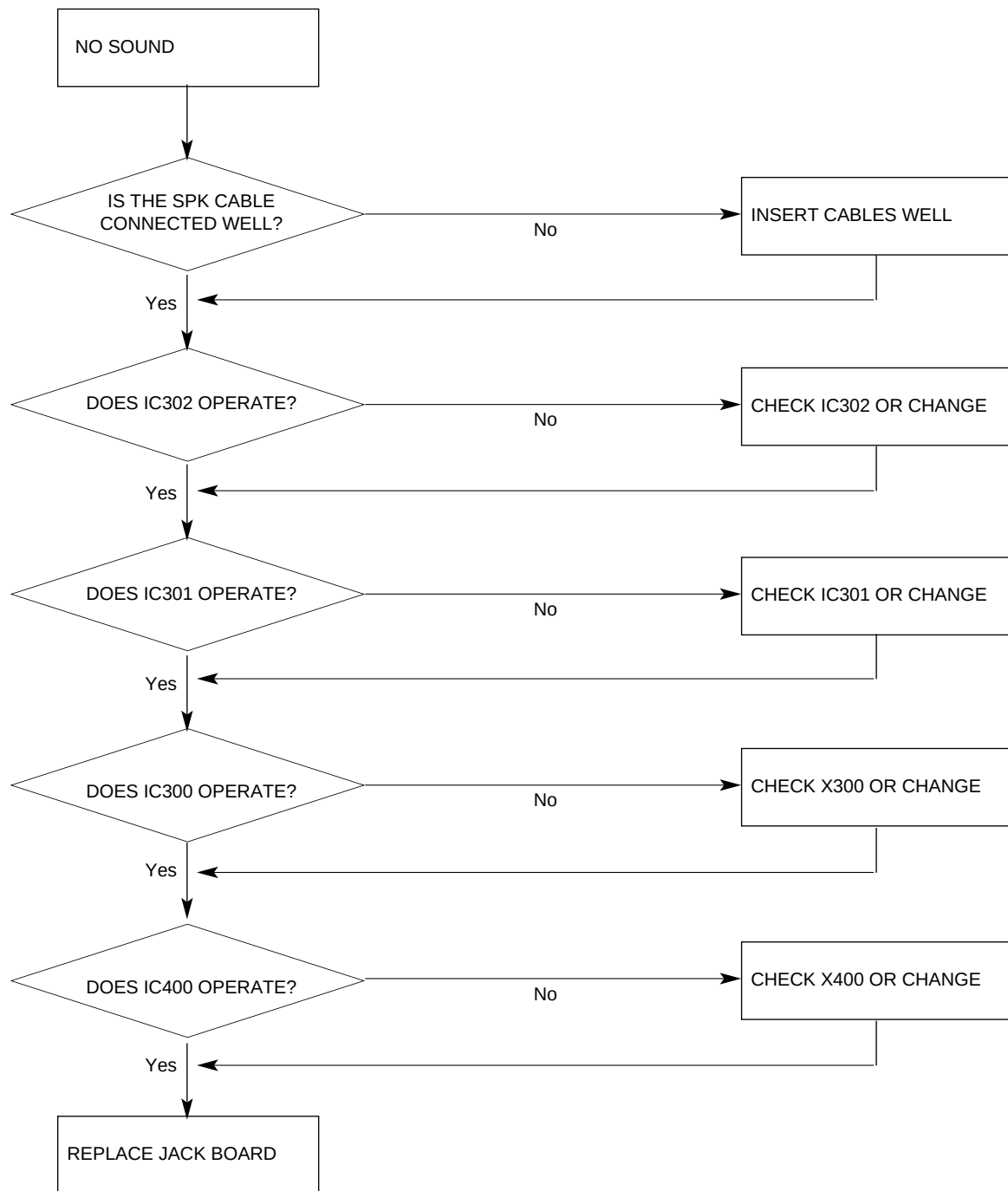
NO	KEY	FUNTION	REMARK
1	POWER	To turn the TV on or off	
2	POWER ON	To turn the TV on automatically if the power is supplied to the TV. (Use the POWER key to deactivate): It should be deactivated when delivered.	
3	MUTE	To activate the mute function.	
4	P-CHECK	To check TV screen image easily.	Shortcut keys
5	S-CHECK	To check TV screen sound easily	Shortcut keys
6	ARC	To select size of the main screen (Normal, Spectacle, Wide or Zoom)	Shortcut keys
7	CAPTION	Switch to closed caption broadcasting	
8	TXT	To toggle on/off the teletext mode	
9	TV/AV	To select an external input for the TV screen	
10	TURBO SOUND	To start turbo sound	
11	TURBO PICTURE	To start turbo picture	
12	IN-START	To enter adjustment mode when manufacturing the TV sets.	Use the AV key to enter the screen W/B adjustment mode.
		To adjust the screen voltage (automatic): In-start → mute → Adjust → AV(Enter into W/B adjustment mode)	
		W/B adjustment (automatic): After adjusting the screen →W/B adjustment →Exit two times (Adjustment completed)	
13	ADJ	To enter into the adjustment mode. To adjust horizontal line and sub-brightness.	
14	MPX	To select the multiple sound mode (Mono, Stereo or Foreign language)	
15	EXIT	To release the adjustment mode	
16	APC(PSM)	To easily adjust the screen according to surrounding brightness	
17	ASC(SSM)	To easily adjust sound according to the program type	
18	MULTIMEDIA	To check component input	Shortcut keys
19	FRONT-AV	To check the front AV	Shortcut keys
20	CH ±	To move channel up/down or to select a function displayed on the screen.	
21	VOL ±	To adjust the volume or accurately control a specific function.	
22	ENTER	To set a specific function or complete setting.	
23	PIP CH-(OP1)	To move the channel down in the PIP screen. To use as a red key in the teletext mode	
24	PIP CH+(OP2)	To move the channel in the PIP screen To use as a green key in the teletext mode	
25	PIP SWAP(OP3)	To switch between the main and sub screens To use as a yellow key in the teletext mode	
26	PIP INPUT(OP4)	To select the input status in the PIP screen To use as a blue key in the teletext mode	
27	EYE	To set a function that will automatically adjust screen status to match the surrounding brightness so natural color can be displayed.	
28	MENU	To select the functions such as video, voice, function or channel.	
29	IN-STOP	To set the delivery condition status after manufacturing the TV set.	
30	STILL	To halt the main screen in the normal mode, or the sub screen at the PIP screen. Used as a hold key in the teletext mode (Page updating is stopped.)	
31	TIME	Displays the teletext time in the normal mode Enables to select the sub code in the teletext mode	
32	SIZE	Used as the size key in the PIP screen in the normal mode Used as the size key in the teletext mode	
33	MULTI PIP	Used as the index key in the teletext mode (Top index will be displayed if it is the top text.)	
34	POSITION	To select the position of the PIP screen in the normal mode Used as the update key in the teletext mode (Text will be displayed if the current page is updated.)	
35	MODE	Used as Mode in the teletext mode	
36	PIP	To select the simultaneous screen	
37	TILT	To adjust screen tilt	Shortcut keys
38	0~9	To manually select the channel.	



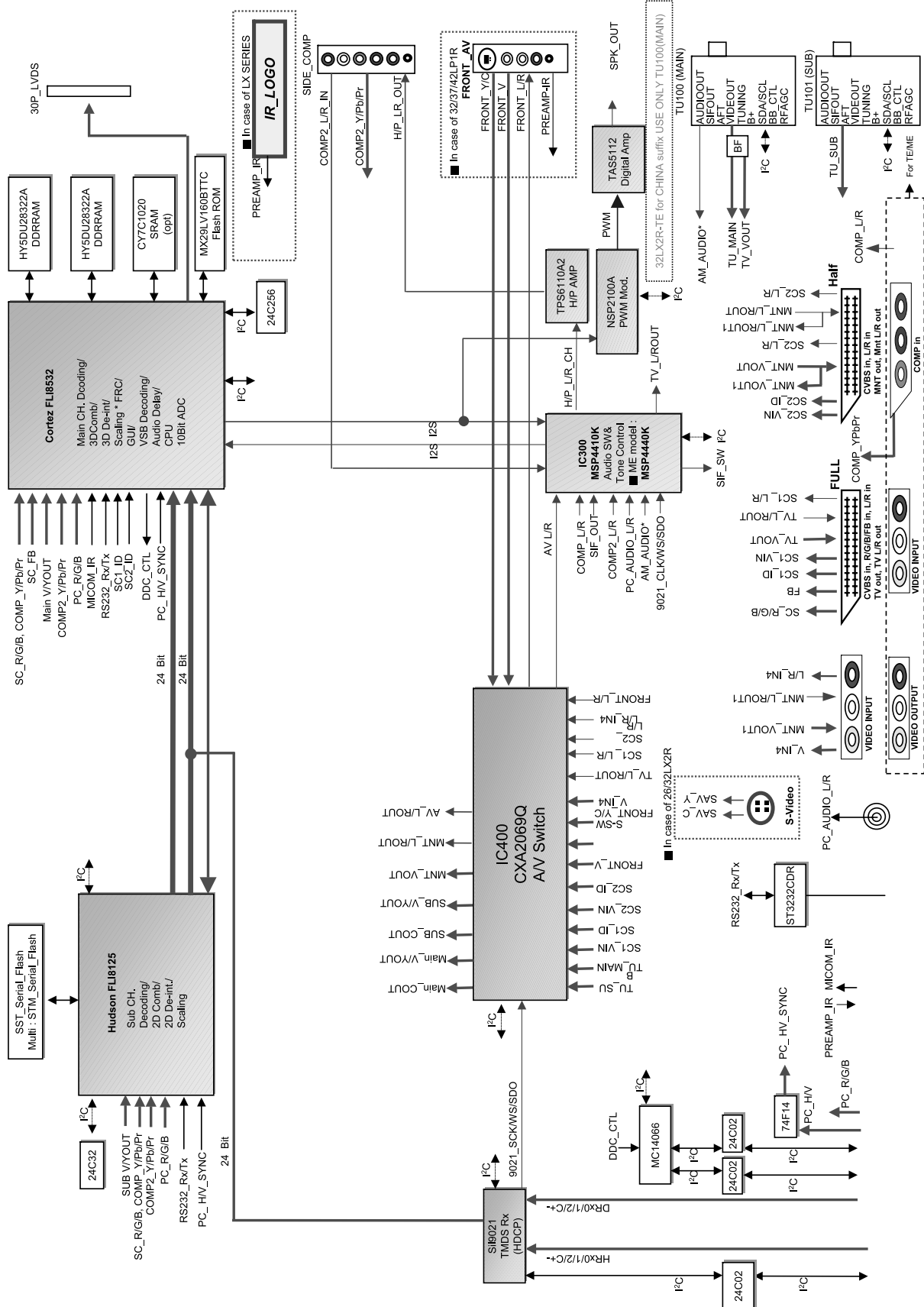
TROUBLESHOOTING



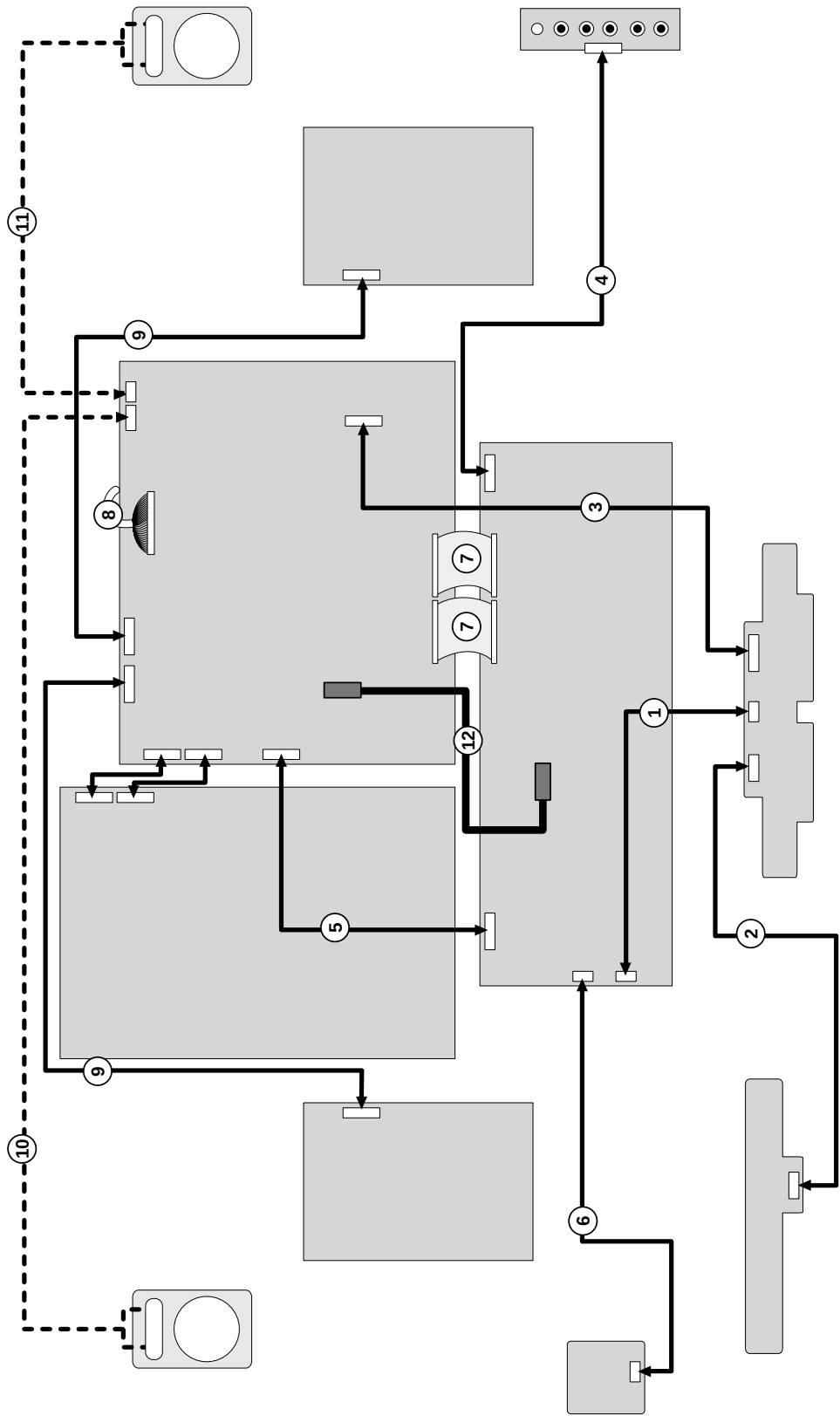




BLOCK DIAGRAM

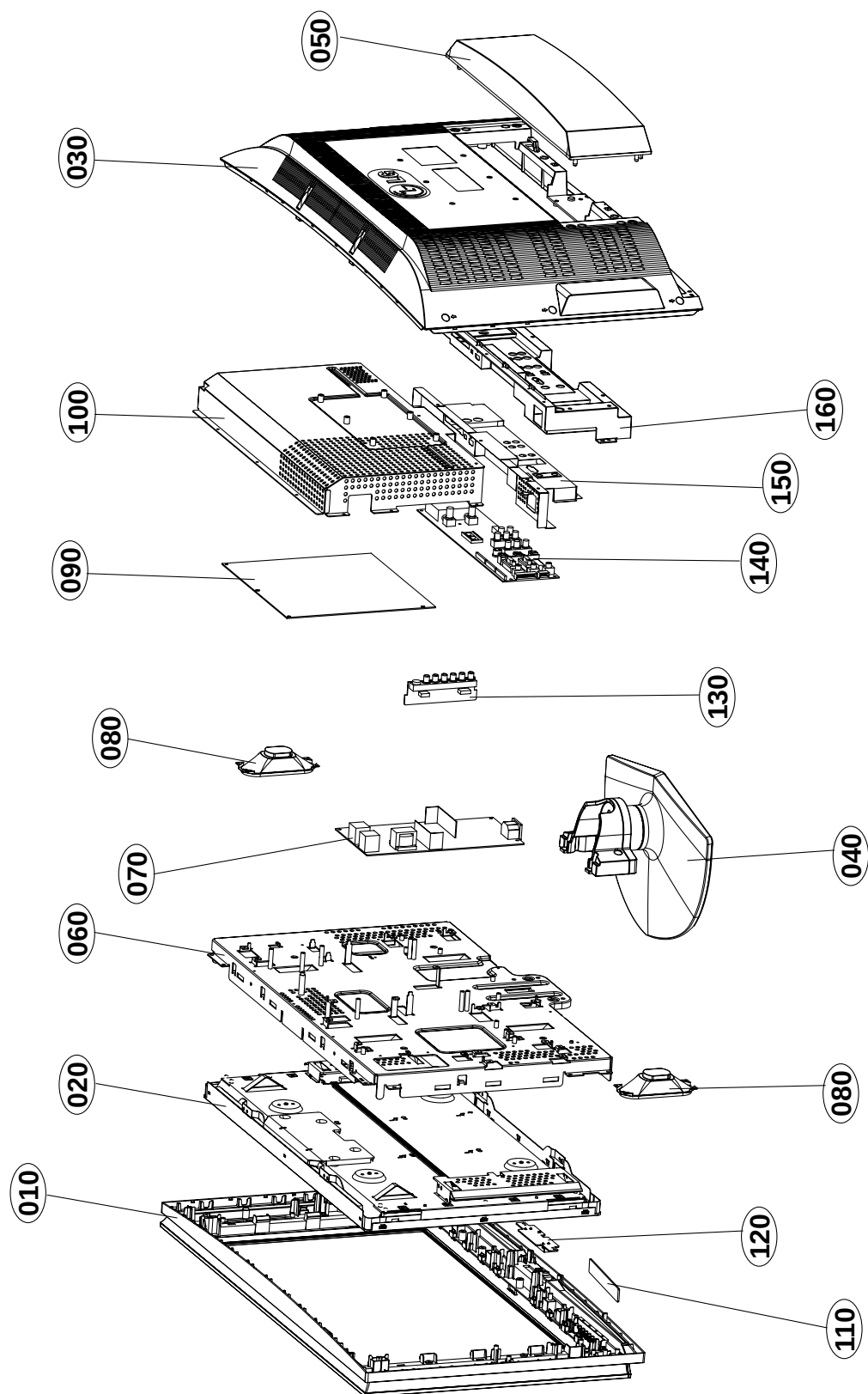


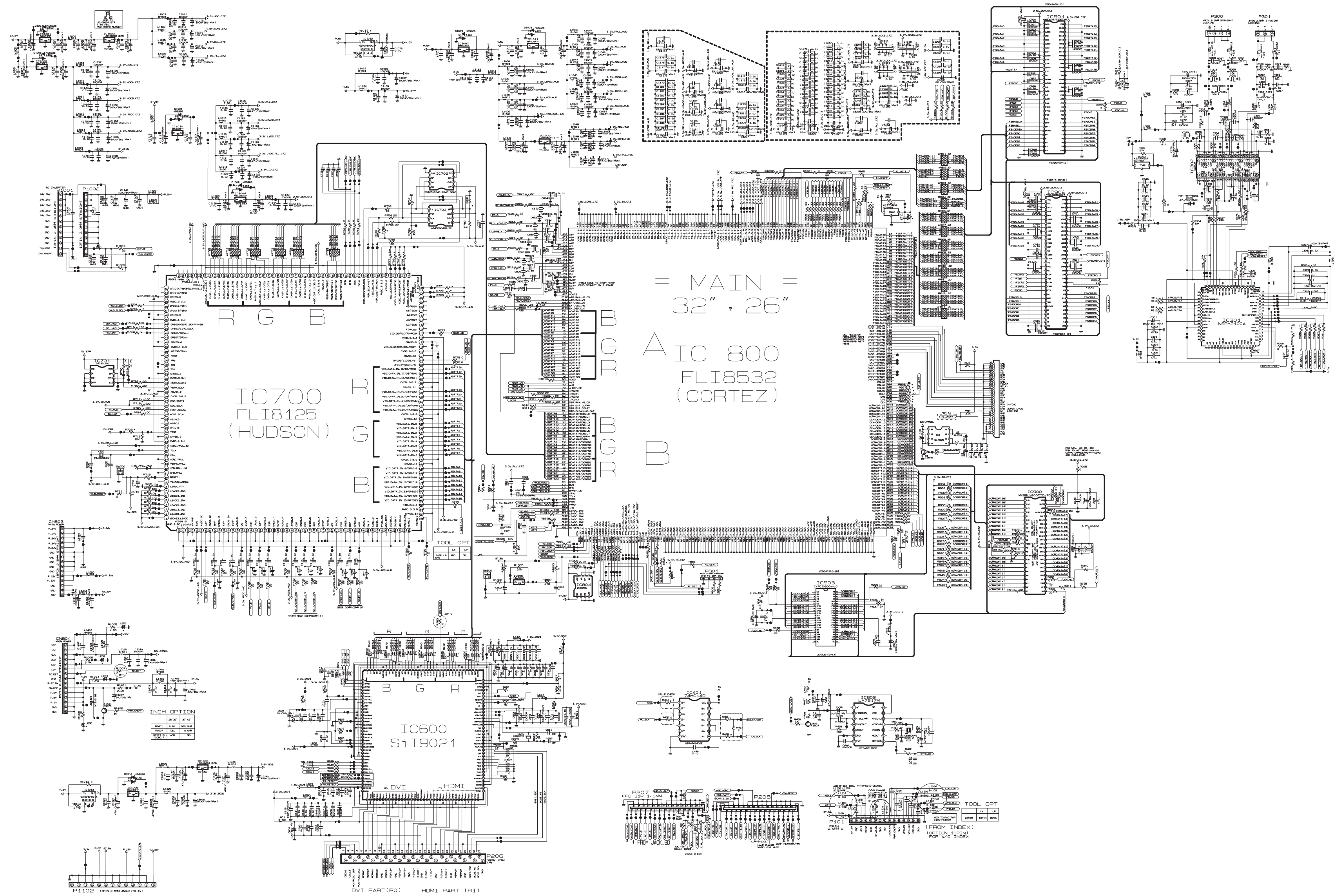
WIRING DIAGRAM



NO.	PART NO.	NO.	PART NO.	NO.	PART NO.
1	6631T20033D	5	6631T25023G	9	6631T20032H
2	6631T20037N	6	6631T25024Z	10	6631T25026C
3	6631T20037X	7	6631V10004A	11	6631T25026A
4	6631T20034V	8	6631T11020Z	12	6631T11023D

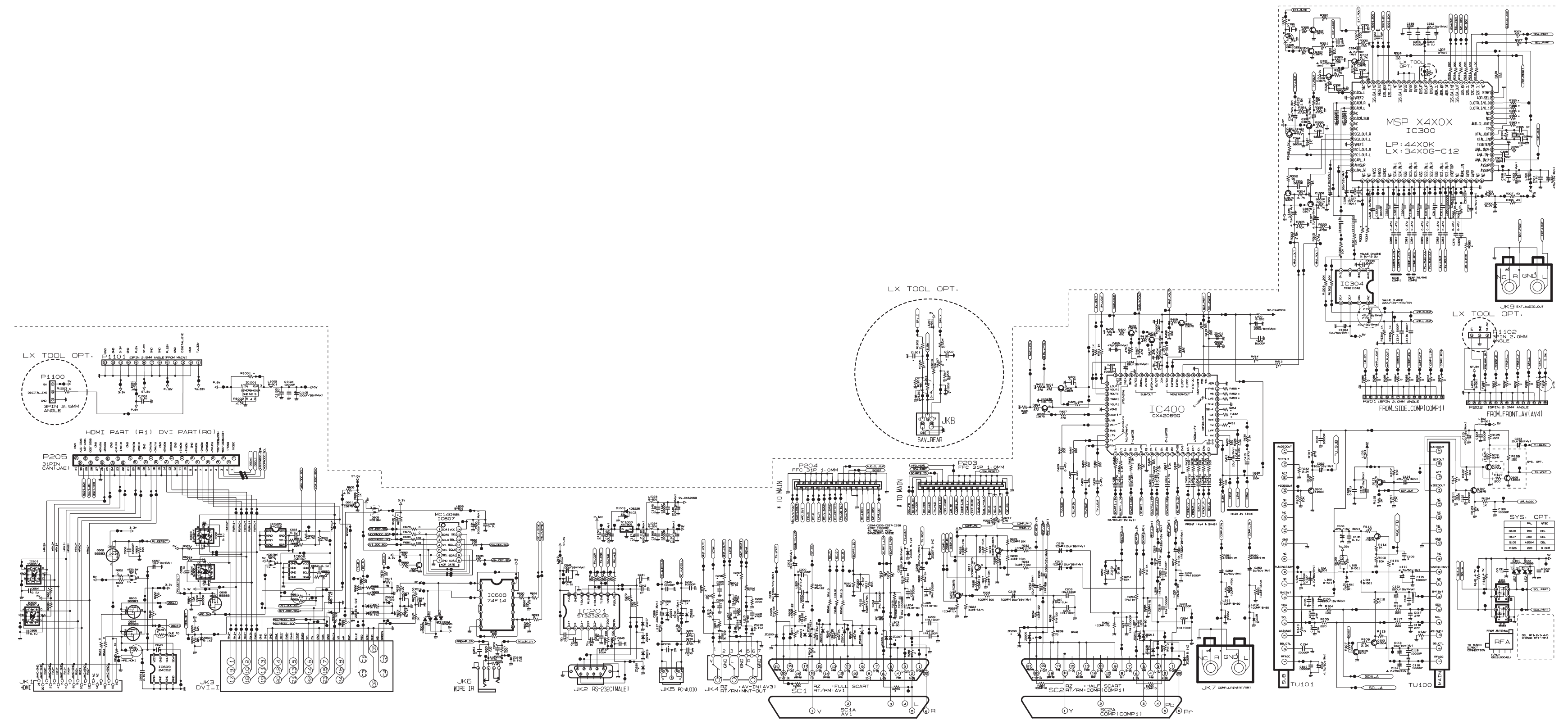
EXPLODED VIEW





= INITIAL (32") =
JACK_BD
MP DATA (8-1DR)

APPLIED MODEL
32LX2R, 32LP1R, 37LP1R, 42LP1R

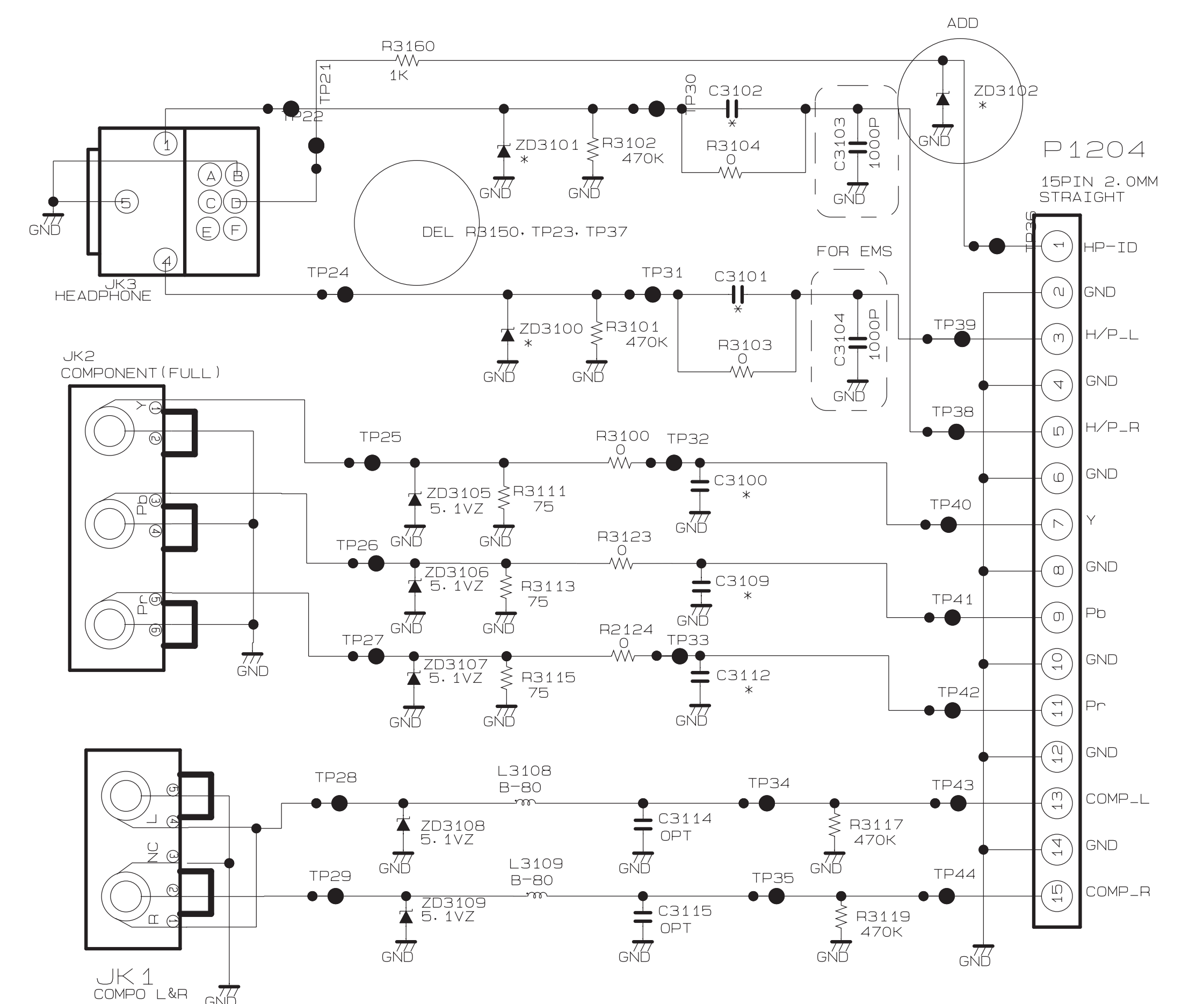
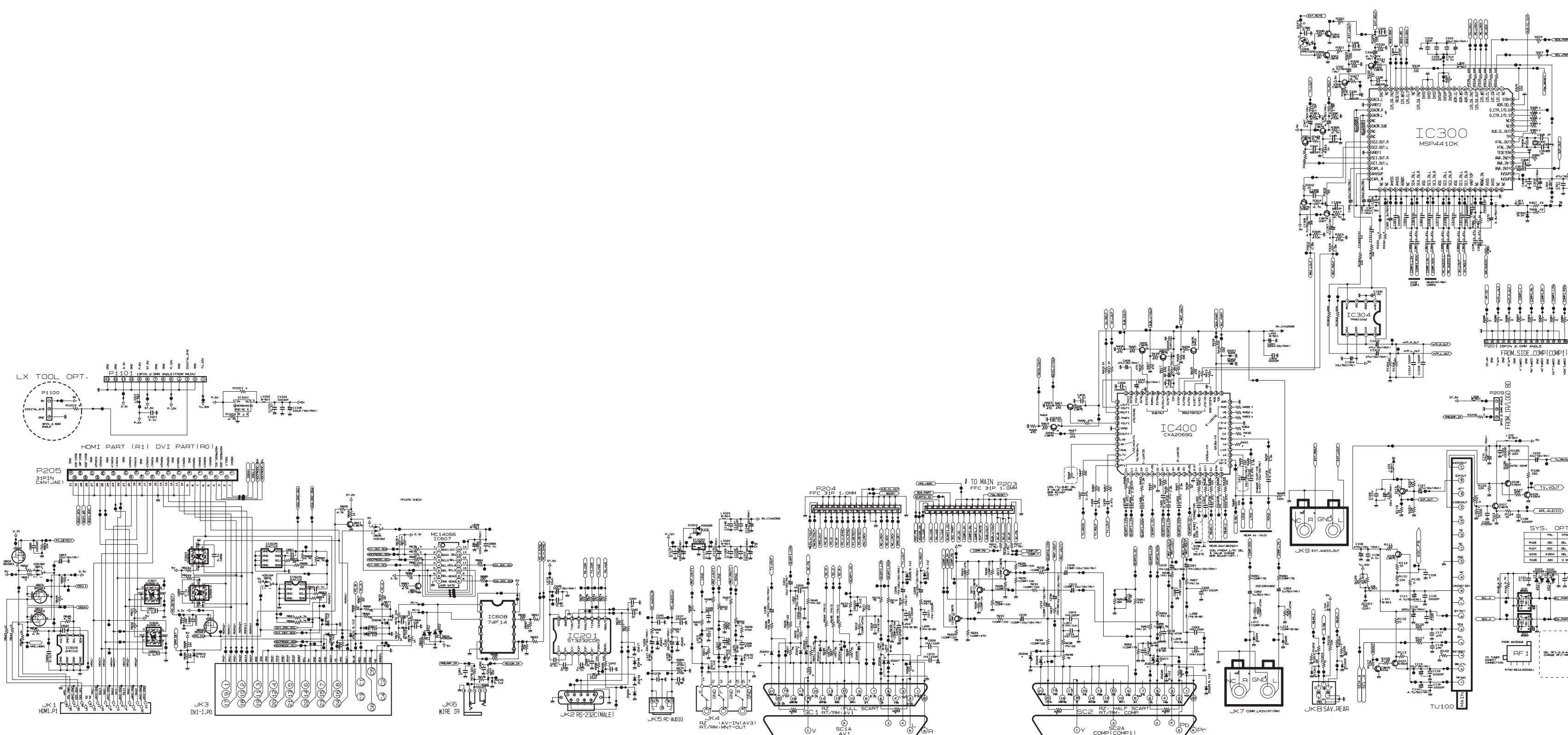


= JACK_BD =
26" ONLY
LP & MP PCB DATA

SIDE_COMP

TORNADO
INITIAL-32
LX TOOL ALSO
USE THIS CIRCUIT

LP TOOL FINAL



TCRNADO (ML-051A)
32LP1B-ZF

p4
p3
p2
p1

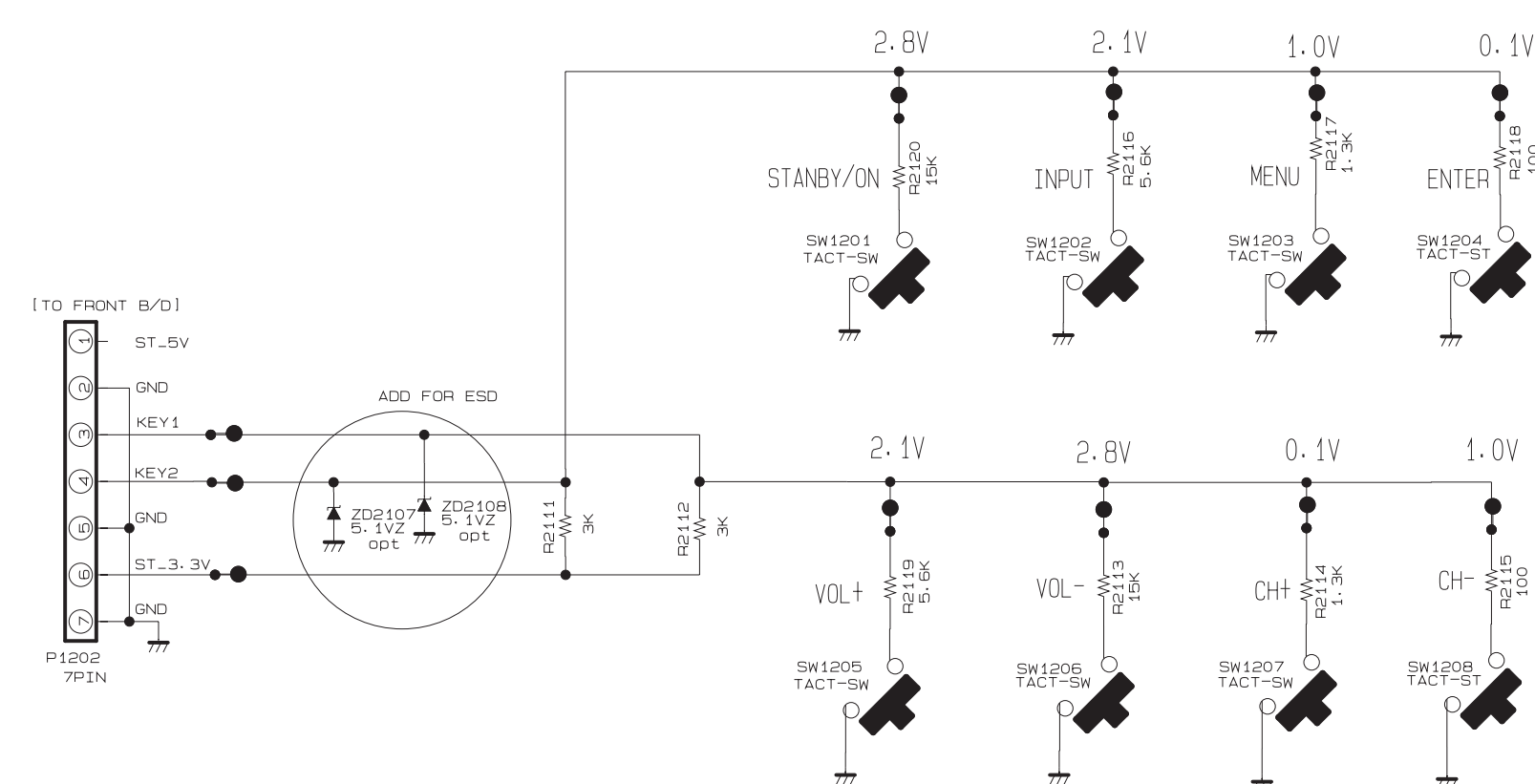
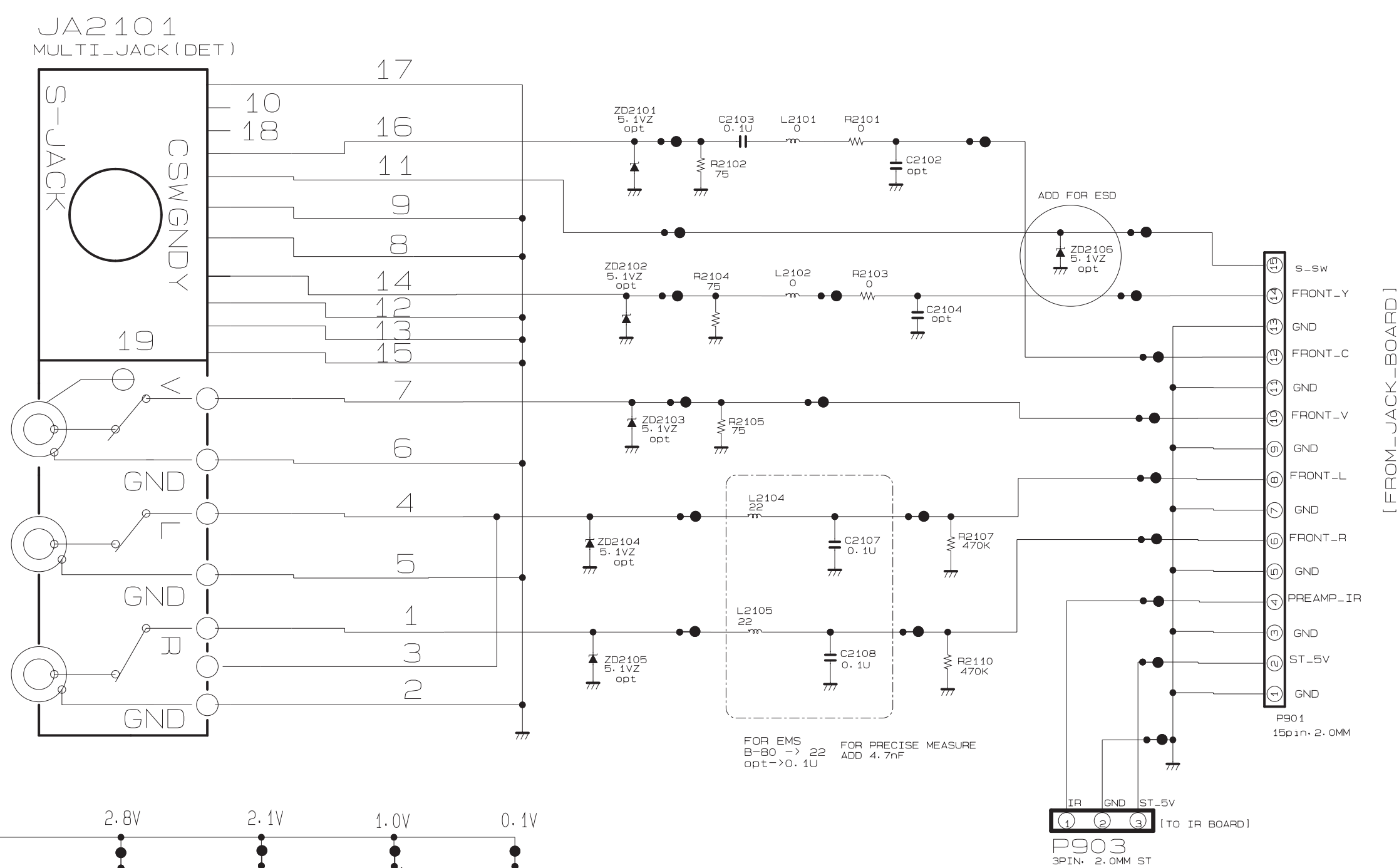


GOLD BAR 7



TORNADO
INITIAL_32INCH

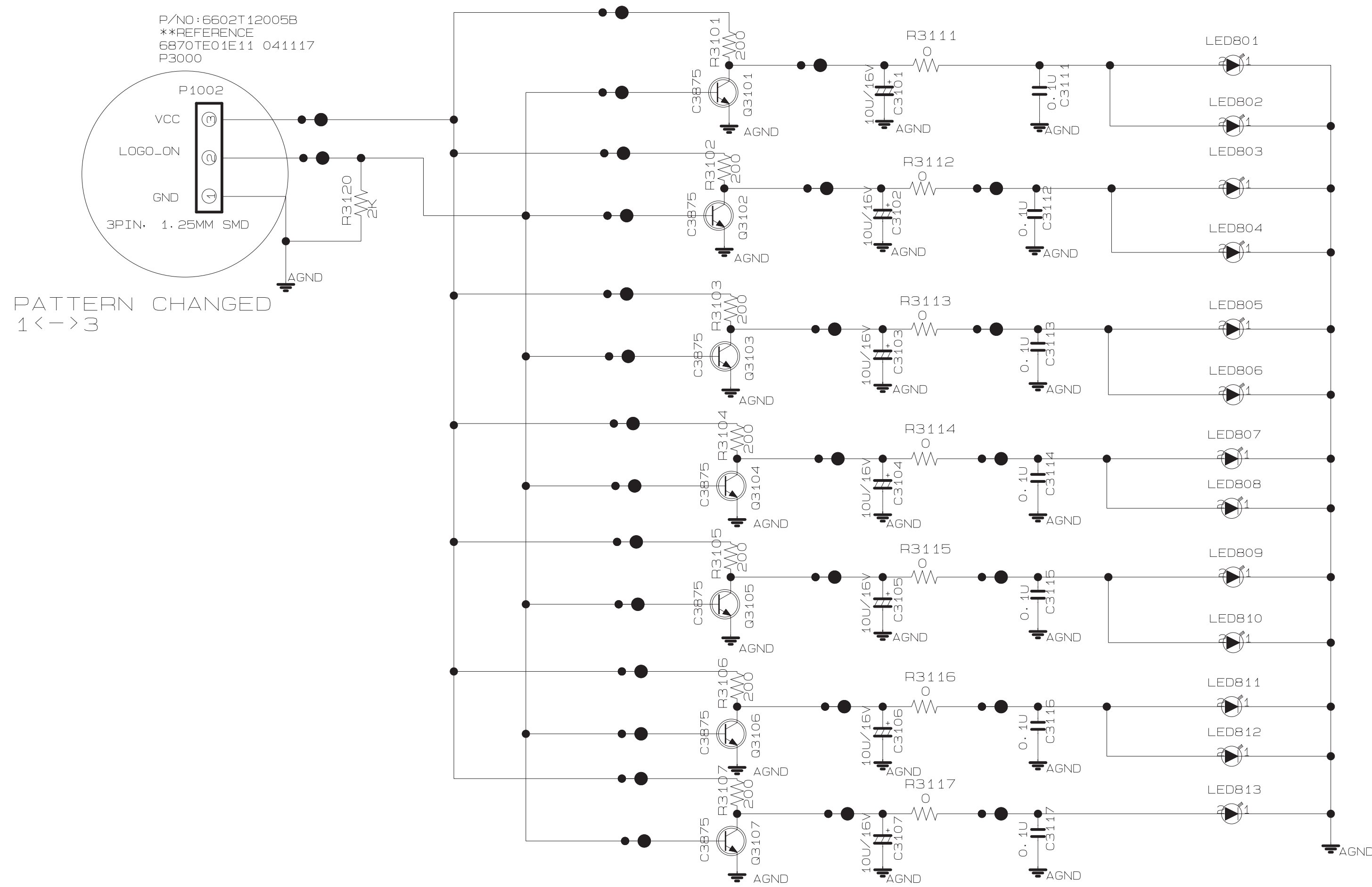
LP TOOL FINAL



FOR TORNADO

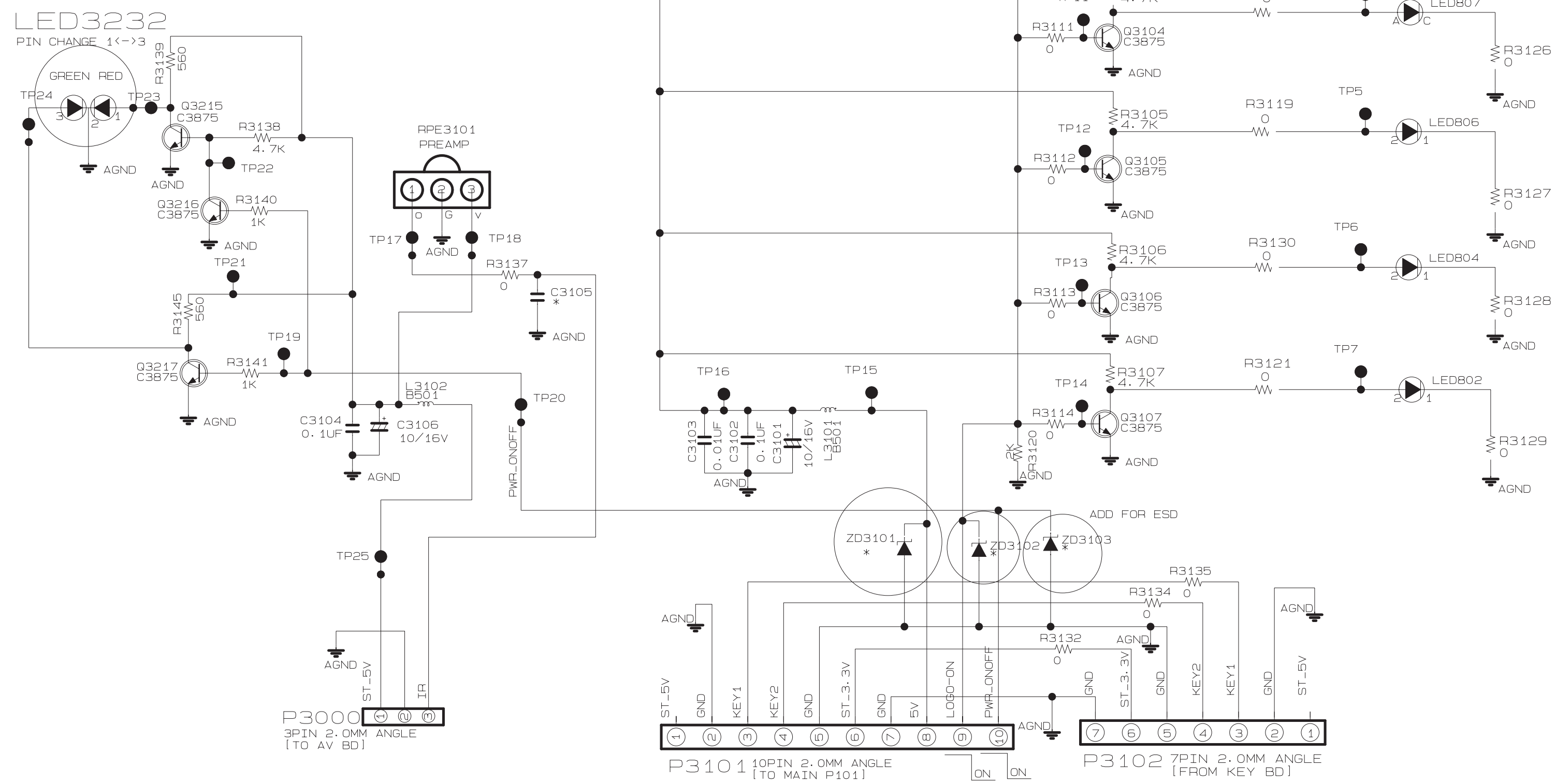
FOR TORNADO
32INCH

LP TOOL FINAL

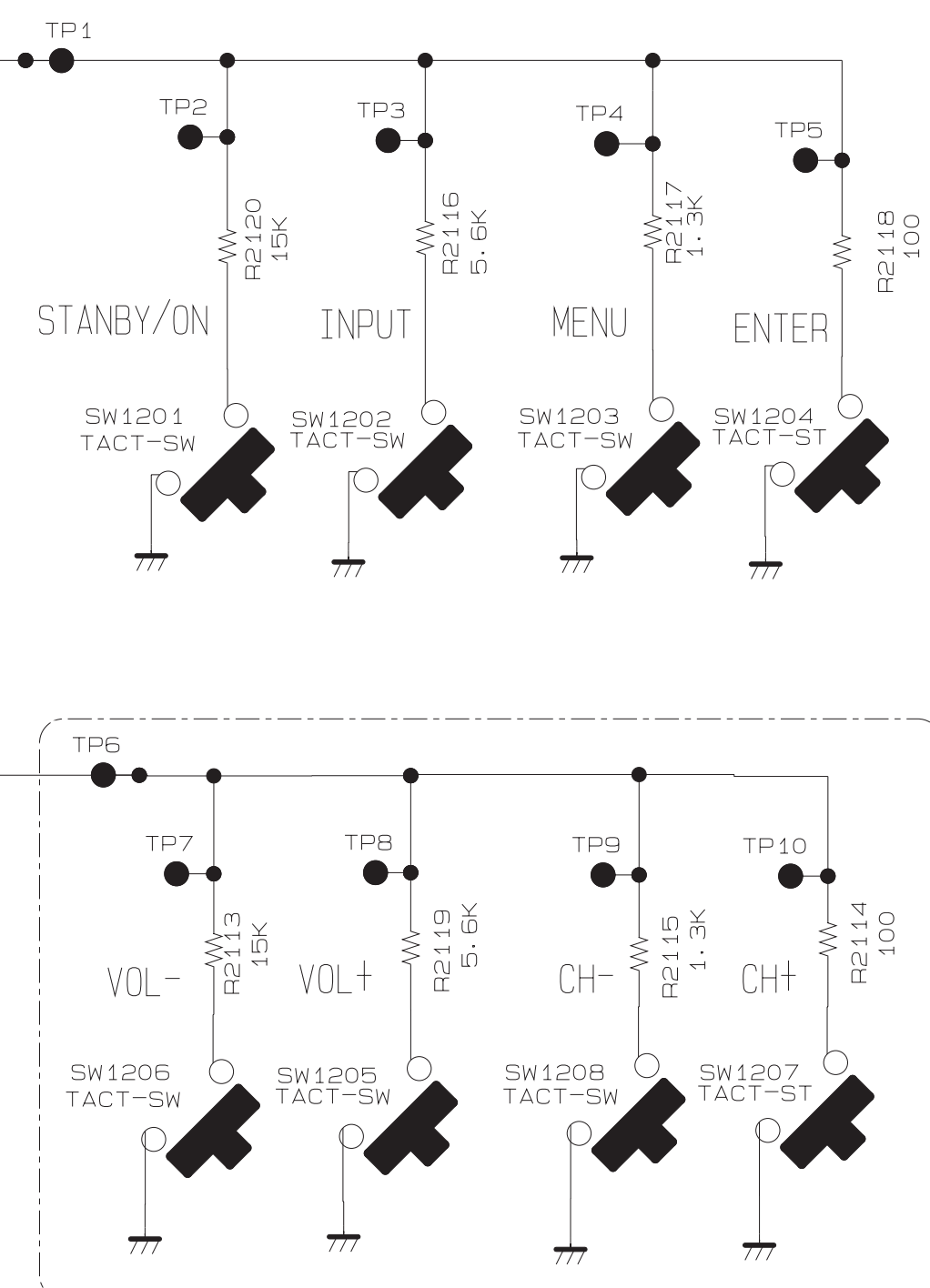
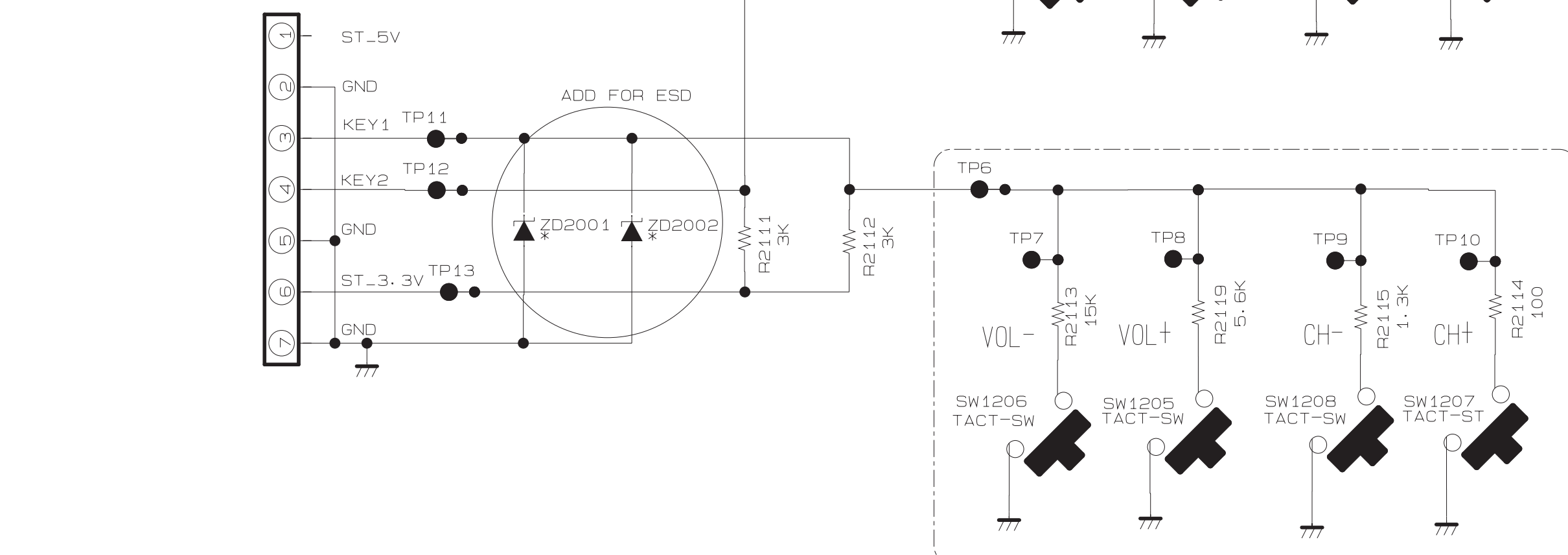


32, 26 LX TOOL

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32, 26 LX TOOL





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Jul., 2005
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