



LCT TV
Service Manual

MODEL: LCT-20CVST

CONTENTS

SPECIFICATION	4
ADJUSTMENT SPECIFICATION	8
PCB ASSEMBLY FUNCTIONAL DESCRIPTION	11
BLOCK DIAGRAM	16
IMPORTANT IC LIST	17
TROUBLE SHOOTING	18
EXPLODED VIEW	22
PART LIST	30
CIRCUIT DIAGRAM	32

SPECIFICATION

LCD Panel

- LG-Philips LCD Panel : LC201V02-A3
- Active Screen Size : 20.1 inches (**584.40m/m**) diagonal
- Outline Dimension : 432(H) x 331.5(V) x 25.0(D)mm(Typ)
- Pixel Pitch : **0.6375mm x 0.6375 x RGB**
- Pixel Format : 640 horiz. By 480 Vert. Pixels RGB strip arrangement
- Color Depth : 8bit, 16.7M Colors
- Luminance, White : 450 cd/□
- Response Time : 25msec (Rise 13ms + Decay 12ms)
- Viewing Angle : R/L 176 Degree, U/D 176 Degree
- Backlight Assembly : 6 CCFL
- Contrast Ratio : 350 : 1

In/Out Jack

- Power Input : AC100 ~ 240V 50 ~ 60Hz
- Antenna Input : 75 Ohm Unbalanced Coaxial Cable
- PC Input : 15 Pin D-sub Jack(Female Type) – RGB Analog Input, Included Main Board
- PC Audio Input : Phone Jack(Stereo) – From PC, Included Main Board
- Video & Audio In/Out – Included Sub Board
 - Video Input 1(Composite RCA 3Pin, Included Audio 2Pin)
 - Video Input 2(Composite RCA 3Pin, Included Audio 2Pin)
 - DVD Input (Y Cb Cr, RCA 3Pin)
 - S-Video Input
 - EURO Scart Jack
 - Headphone Output (Phone Jack, Stereo)
 - A/V Output (Scart Jack)

User Interface

- 7 Panel Key
- Power , Menu , Select , Vol Up , Vol Down , CH Up , CH Down
- 3 Color LED
- Red : Stand by Condition
- Green : Power On Condition
- Yellow : SLEEP TIME On Condition
- Remocon Receiver
- Remocon (42Key)
- On Screen Display
- Control using OSD
- OSD Language : English, Arab
- Plug & Play : DDC - 1/2B
- Factory Mode
- Mode for controlling the adjustment item & Panel Option in mass production

Electrical specification

In /Out	Items	Sub Items	Specification
INPUT	Video 1, 2	Level	1±0.1p_p (75Ω)
	PC	Analog RGB	0.7±0.1Vp_p (75Ω)
		H Frequency	31KHz
		V Frequency	56~85Hz
	DVD	Level	Y: 1Vp_p
			Cb: 0.7Vp_p
			Cr: 0.7Vp_p
	Sound	Level	1.4±0.2Vp_p (0.5Vrms)
OUTPUT	A/V OUT	Level	2±0.1Vp_p
	Sound	Speaker	RMS 5W*2
POWER	LIPS	Input Voltage	AC 90~265 Vac
		Input Frequency	47~63Hz
		Output 1 Voltage	DC 14.5~15.5V
		Out Current	Min 30mA~Max 2A
		Output 2 Voltage	DC 10.8~15V
		Out Current	Min 0A~Max2A
	Power Consumption		60W

Available PC input mode & Video timing standard

Mode	Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)	Pixel Clock Frequency (MHz)	Sync Polarity (H/V)
VGA	720 x 400	31.469	70.087	28.322	-/+
	640 x 480	31.469	59.940	25.175	-/-
	640 x 480	37.861	72.809	31.500	-/-
	640 x 480	37.500	75.000	31.500	-/-
	640 x 480	43.269	85.008	36.000	-/-

OSD Specification

- PICTURE
- CONTRAST
- BRIGHTNESS
- COLOR TEMPERAT (PC input mode only)
- STANDARD , 6500K , USER, RESET , 9300K
- SHARPNESS (Not Available PC MODE)
- COLOR (Not Available PC MODE)
- SOUND
- TREBLE
- BASS
- BALANCE
- S.MODE
- GEOMETRY (PC input mode only)
- H-POSITION
- V-POSITION
- AUTO POSITION
- FUNCTION
- TRACKING (PC input mode only)
- AUTO TRACKING
- CLOCK
- PHASE
- INFORMATION
- TUNING (TV input mode only)
- SORT
- AUTO TUNING
- MANUAL TUNING
- FINE TUNING
- CH SKIP
- LANGUAGE

Factory Mode OSD Specification

- How to use Factory Mode
- Press Power & Select Key in Panel Control key, and go to Factory mode.
- Factory ADJ
- CLOCK DELAY
- AUTO COLOR GAIN
- OPTION
- MX88L281 1
- MST9883 1 (PC input mode only)
- MST9883 2 (PC input mode only)
- SUB C VCO
- SUB C CHG CURRENT
- INIT VCO CURRENT
- VPC3230 (excluding PC MODE)
- CONTRAST
- BRIGHTNESS
- PEAKING
- CIP CONTRAST
- CIP BRIGHT

** In mass production, adjust only Factory ADJ item, do not adjust other Modes. (In the time of variation of A/S & initial condition of screen quality , built in other Modes for controlling)

ADJUSTMENT SPECIFICATION

Adjustment instruction of CLOCK DELAY

1. Adjustment item: Adjust the dispersion happening in the time of matching ASSY-MAIN and LCD PANEL. (As the contact status of the CONNCETOR for connecting LCD PANEL, dispersion happens)
2. Adjustment Process: After assembling the SET, do the adjustment.
3. Preliminary adjustment:
 - 1) Connect the outlet VIDEO PATTERN GENERATOR (ANALOG RGB & SEPARATE H, V OUT) to INPUT (15PIN D-sub with VGA CABLE)
 - 2) TEST PATTERN: 1DOT MOIRE PATTERN.
 - 3) Select Output FORMAT into 640 x 480 @60HZ.
 - 4) Turn on the SET, and them select in PC MODE.
4. Adjustment Instruction:
 - 1) Press SEL & Power Key in Front panel at the same time , go to Factory mode
 - 2) Select CLOCK DELAY (including in FACTORY ADJ MENU) with CH UP/DOWN KEY in Factory mode
 - 3) Changing the level of CLOCK DELAY with VOL UP/DOWN KEY, adjust to the noiseless level in screen (variable range : 0 ~ 15, DEFAULT : 15)

Adjustment Instruction of AUTO COLOR GAIN

1. Adjustment Item: Function of automatically setting ADC LEVEL of AD9884 with ANALOG RGB (D-sub) signal. (WHITE BALANCE & CONTRAST adjustment)
2. Adjustment Process: After assembling the SET, do the adjustment.
3. Preliminary Adjustment
 - ⇒ Connect Outlet of VIDEO PATTERN GENERATOR to the input terminal of D-SUB.
 - ⇒ TEST PATTERN : Select COLOR BAR PATTERN
 - ⇒ Turn on the SET, and then select in PC MODE.
4. Adjustment Instruction
 - ⇒ Press SEL & Power Key in Front Panel at the same time, and go to Factory mode.
 - ⇒ In Factory mode, select Auto Color Gain in Factory ADJ.
 - ⇒ Press VOL UP KEY, and then displaying the phrase " Processing ", AUTO Adjustment start
 - ⇒ When adjustment is completed, the phrase " Processing " disappears
 - ⇒ Caution: In the course of Processing, do not remove the signal.

Setting Instruction for OPTION

1. OPTION : - X2 - BYPASS
 - Using 6 BIT PANEL
 - Back-Light Control of Inverter
(Bright Max: LOW, Min : HIGH)
2. OPTION : - X2 - INVERT
 - Using 6 BIT PANEL
 - Back-Light Control of Inverter voltage polarity
(Bright Max : HIGH, Min : LOW)
3. OPTION : - X3 - BYPASS
 - Using 8 BIT PANEL
 - Back-Light Control of Inverter voltage polarity
(Bright Max : LOW, Min : HIGH)
4. OPTION : - X3 - INVERT
 - Using 8 BIT PANEL
 - Back-Light Control of Inverter voltage polarity
(Bright Max : HIGH, Min : LOW)

*** Select no 4 in the case that no 4 is not selected.

Adjustment Instruction of VPC3230

1. Adjustment item: Function of adjusting DEFAULT VALUE of VPC3230 DEVICE.
2. Adjustment process: After assembling the SET, do the adjustment .
3. Preliminary adjustment
 - Connect Outlet of VIDEO PATTERN GENERATOR to the input terminal of CVBS.
 - TEST PATTERN : Select COLOR BAR PATTERN
 - Turn on the SET, and then select in VIDEO MODE.
4. Adjustment Instruction
 - Press SEL & Power Key in Front Panel at the same time, and go to Factory mode.
 - Select VPC3230 in Factory mode.
 - Adjust to the following levels with VOLUME UP/DOWN, CH UP/DOWN
 - a. CONTRAST 52
 - b. BRIGHT 9
 - c. PEAKING 0
 - d. CIP CONTRAST 12
 - e. CIP BRIGHT 7

*** No need to adjust when the SET is stable.

PCB ASSEMBLY FUNCTIONAL DESCRIPTION

A/D Board

Display conversion A/D Board assembly (champion Junior) connector location:

Reference	Description	Pin	Connector Type 4
JA360	Analog RGB input		15 Pin D-sub jack
JAS1	Euro scart input		Scart jack (2202-21T)
JA203	PC-audio input		Ear-phone jack (EJ310CD-5-A 3.5ϕ)
JA301A	S-Video input		S-Video jack
JA202	Video input		RCA 1P jack
JA201	Sound input		RCA 4P jack
JA204	Video 2/ DVD input		RCA 4P Jack
JA206	Head phone output		Ear-phone jack (EJ310CD-5-A 3.5ϕ)
CN21M	Tuner connector	8	Moles 53014-08
CN70M	Inverter connector	12	Molex53015-12
CN01M	OSD Control connector	8	Molex53015-08
CN002	RS232 Control connector (option)	4	Molex 53015-04
CN25M	Speaker Connector	4	Molex 53015-04
CN72M	Interface connector	40	PH03-40DS-G

➤ CN21M (tuner connector)

Pin No	Symbol	Description
1	VCC	+5V
2	GND	GND
3	SDA	I2C serial data
4	SCL	I2C serial clock
5	GND	GND
6	CVBS	CVBS out
7	GND	GND
8	SIF	Sound IF out

➤ **CN70M (inverter connector)**

Pin No.	Symbol	Description
1	VCC	+24V
2	VCC	
3	VCC	
4	NC	
5	PWSEL	Select of luminance control signal method
6	BRTP	PWM signal
7	BRTI	Luminance control by voltage method
8	BRTC	Backlight ON/OFF signal
9	NC	
10	GND	GND
11	GND	
12	GND	

➤ **CN25M (speaker connector)**

Pin No.	Symbol	Description
1	R+	Speaker out right
2	R-	GND
3	L-	GND
4	L+	Speaker out left

➤ **CN72M (interface connector)**

Pin No.	Symbol	Description
1	VLCD	+12Vcc
2	VLCD	+12Vcc
3	RA0	Red Data (LSB)
4	RA1	Red Data
5	RA2	Red Data
6	RA3	Red Data
7	RA4	Red Data
8	RA5	Red Data
9	GND	Ground
10	GND	Ground
11	RA6	Red Data

Pin No.	Symbol	Description
12	RA7	Red Data (MSB)
13	GA0	Green Data (LSB)
14	GA1	Green Data
15	GA2	Green Data
16	GA3	Green Data
17	GND	Ground
18	GND	Ground
19	GA4	Green Data
20	GA5	Green Data
21	GA6	Green Data
22	GA7	Green Data (MSB)
23	BA0	Blue Data (LSB)
24	BA1	Blue Data
25	GND	Ground
26	GND	Ground
27	BA2	Blue Data
28	BA3	Blue Data
29	BA4	Blue Data
30	BA5	Blue Data
31	BA6	Blue Data
32	BA7	Blue Data (MSB)
33	GND	Ground
34	GND	Ground
35	LVSYNC	Vertical sync
36	LCKA	Dot Clock
37	GND	Ground
38	GND	Ground
39	LHSYNC	Horizontal Sync
40	LDTC	Data Enable

OSD Control Board

OSD Key Pad Control Board Assembly.

The Control Board assembly is the OSD user control /interface.

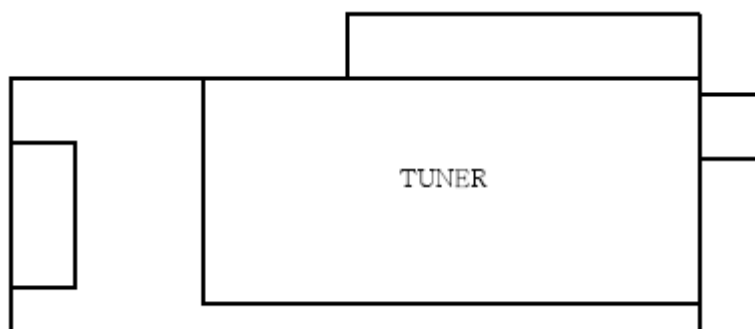


Control PCB connector and switch identification.

Reference	Description	Connector type
Sw1	POWER	IT-1102AH-T
Sw2	SELECT	IT-1102AH-T
Sw3	VOL+	IT-1102AH-T
Sw4	VOL-	IT-1102AH-T
Sw5	CH+	IT-1102AH-T
Sw6	CH-	IT-1102AH-T
Sw7	Menu	IT-1102AH-T
LED	LED	SAM3270
RM03	Remocon reciver	Rom-N338TM2
CNC01	OSD Connector	MOLEX 53015-0810

Tuner board

Tuner control board assembly



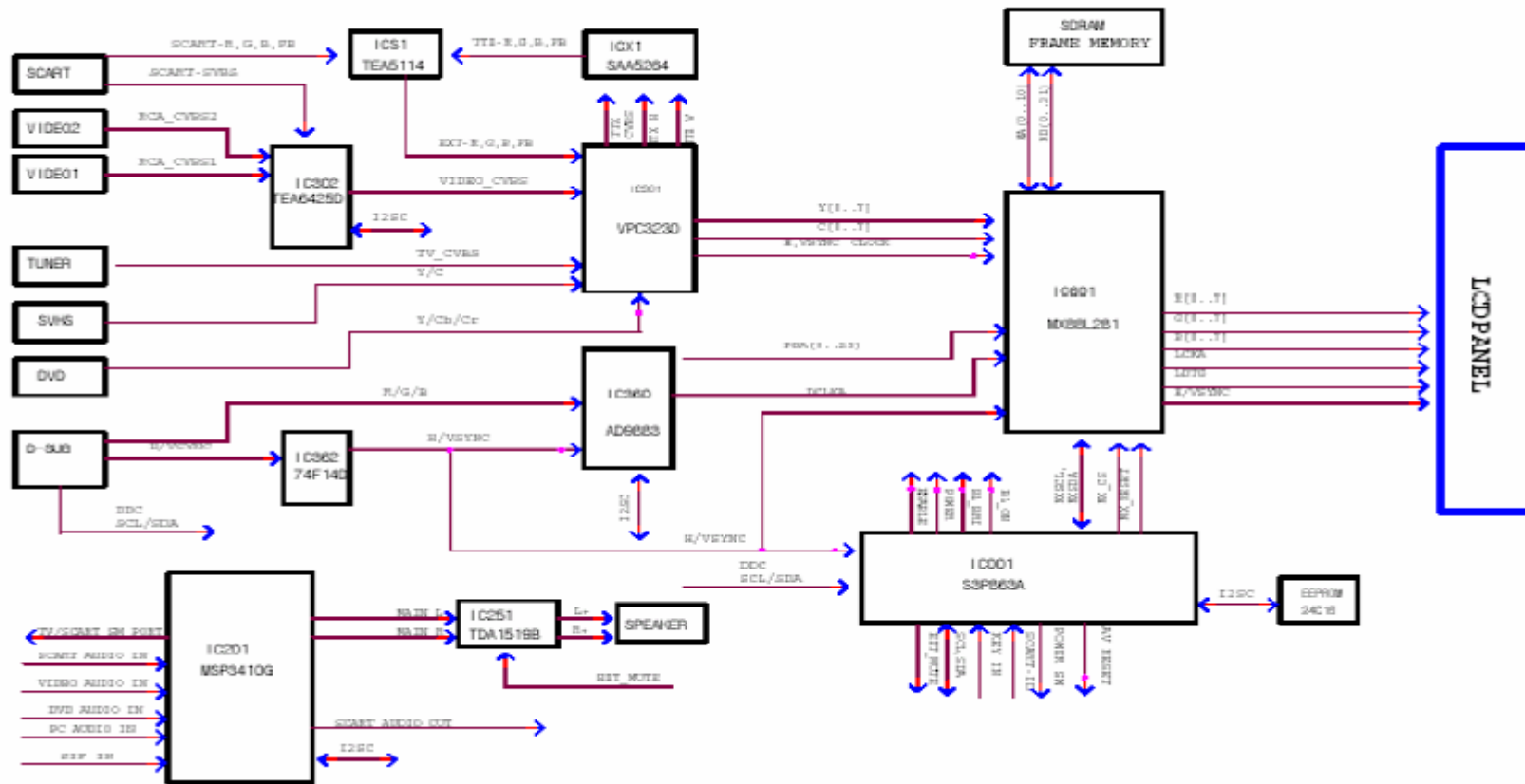
Tuner specification

Model			TCPQ9091PD27D(T) (SAM SUNG)
Receiving			PAL – B /GD /K, I SECAM L /L’
Channel	VHF	LOW	48.25MHz ~ 168.25MHz
		HI	175.25MHz ~ 463.25MHz
	UHF		471.25MHz ~ 855.25MHz

TUNER PCB connector and switch identification

Pin No	Symbol	Description
1	VCC	+5V
2	GND	GND
3	SDA	I2C serial Data
4	SCL	I2C serial clock
5	GND	GND
6	CVBS	CVBS out
7	GND	GND
8	SIF	Sound if out

BLOCK DIAGRAM



IMPORTANT IC LIST

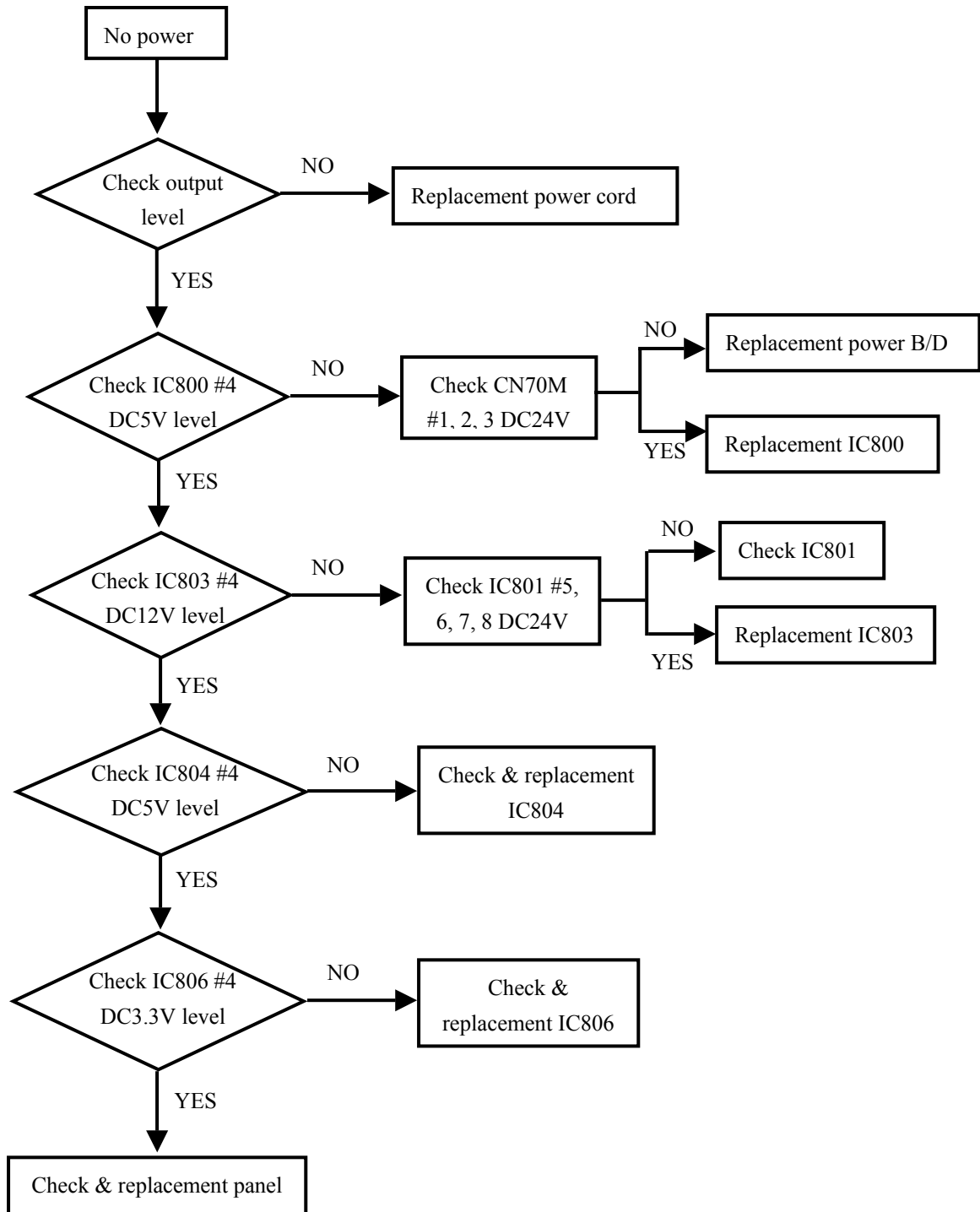
No	Part type	Specification	Package	Qty	Ref No
1	IC image scaller	MX88L284AEC	QFP-282	1	IC601
2	IC Video	VPC3230D-C5	PQFP-80	1	IC301
3	IC Audio	MSP3410G-B8	PQFP-80	1	IC201
4	IC Video S/W	TEA6425D	SOIC	1	IC302
5	IC ADC	MST9883C-110	LQFP-80	1	IC360
6	IC Memory	HY57V16160DTC-7	SOP-50	2	IC701, IC702
7	IC Micom	S3P863AXZZ /OTP DIP	DIP	1	IC0001
8	IC TTX	SAA5264PS /M3 /0104 DIP	DIP	1	ICX1
9	IC Audio AMP	TDA1519B	SOT110	1	IC251
10	IC RGB S/W	TEA5114A DIP	DIP	1	ICS1
11	IC EEPROM	24C16 ROM DIP	DIP	1	IC002
12	IC Logic	N74F14D	SOIC	1	IC362
13	IC EEPROM	24C02 DIP	DIP	1	ICX2
14	IC Reset	KIA7042AF	SOT-89	1	IC003

TROUBLE SHOOTING

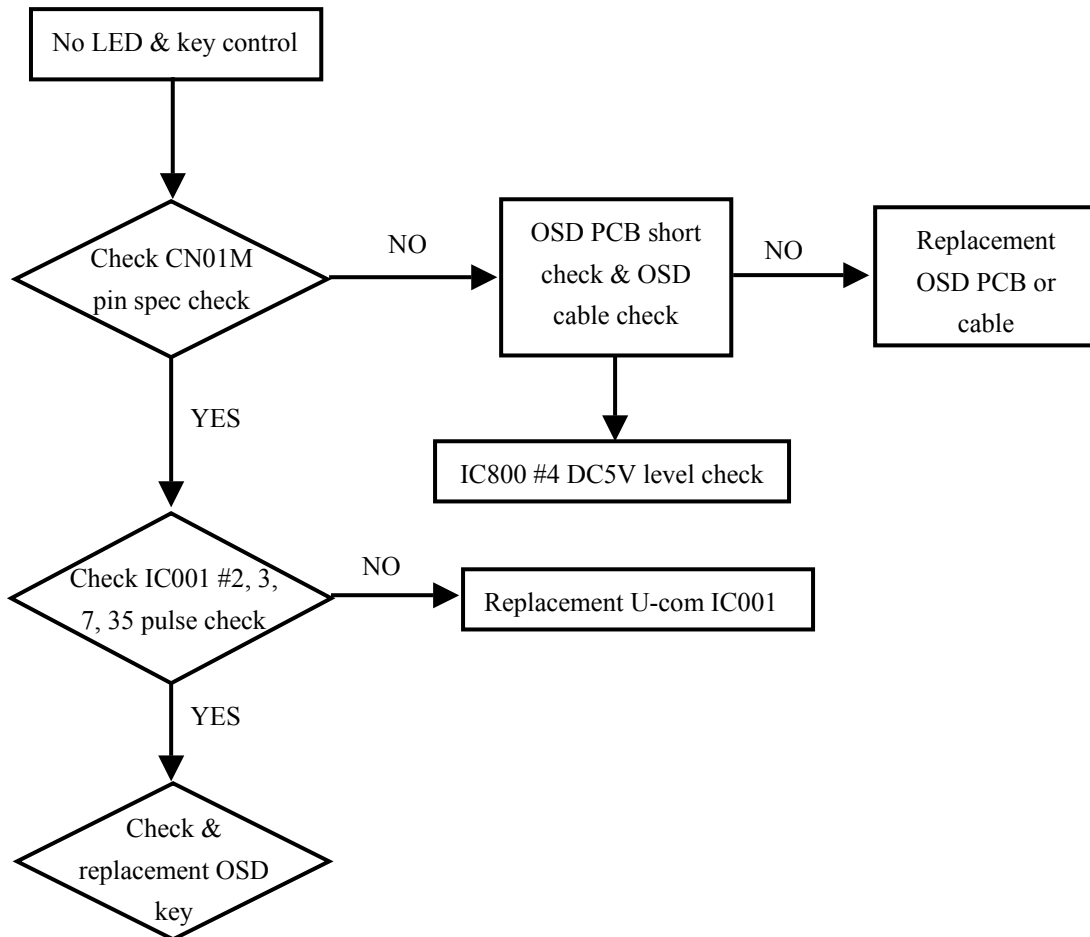
What you see	Suggestion actions	Reference
Screen is blank and power indicator is off	➤ Ensure that the power cord is firmly connected and the LCD monitor is on	Connecting a PC.
“CHECK CABLE OR SIGAL” message	➤ Ensure that the signal cable is firmly connected to the PC or video sources. ➤ Ensure that the PC or video sources are tuned on.	Connecting a PC, TV, VCR.
“INVALID MODE” message	➤ Check the maximum resolution and the frequency of the video adaptor. ➤ Compare these values with the data in the display modes timing chart.	PC stable adjustment.
The image is too light or too dark	➤ Adjust the brightness and contrast.	
Horizontal bars appear to flicker, jitter or shimmer on the image	➤ Adjust the clock function. Auto tracking will clear it automatically.	
Vertical bars appear to flicker, jitter or shimmer on the image	➤ Adjust the phase function and then adjust the clock function. ➤ Auto tracking will clear it automatically.	
Image is not stable and may appear to vibrate	➤ Auto tracking will clear it automatically.	PC stable adjustment.
	➤ Check that the display resolution and frequency from your PC or video board is an available mode for your monitor.	
	➤ On your computer check control panel, display, setting.	
	➤ Horizontal frequency ➤ Vertical frequency ➤ Maximum refresh rate	31khz 56~85hz 640*480 @ 60hz

What you see	Suggestion actions	Reference
Image is not centered on the screen	➤ Auto position will set the best position automatically	Auto position, h position v-position.
No sound	➤ Adjust the horizontal and vertical position. ➤ Ensure that the audio cable is firmly connected to both the audio-in jack on your monitor and the audio-out jack on your sound card. ➤ Check the volume level.	Connecting a PC, TV, VCR.
Sound level is too low	➤ Check the volume level ➤ If the volume is still too low after turning the control to its maximum, check the volume control on the computer sound card or software program.	Refer to your computer, sound card or software documentation.
Sound is too high pitched or too low pitched	➤ Adjust the treble and bass to appropriate level.	
TV signal is not received	➤ Ensure that the antenna cable is firmly connected to the VHF /UHF jack. ➤ Check “channel memory” and make sure you choose the correct channel system. ➤ Select “Auto tuning” to configure the channel system automatically.	Channel memory.

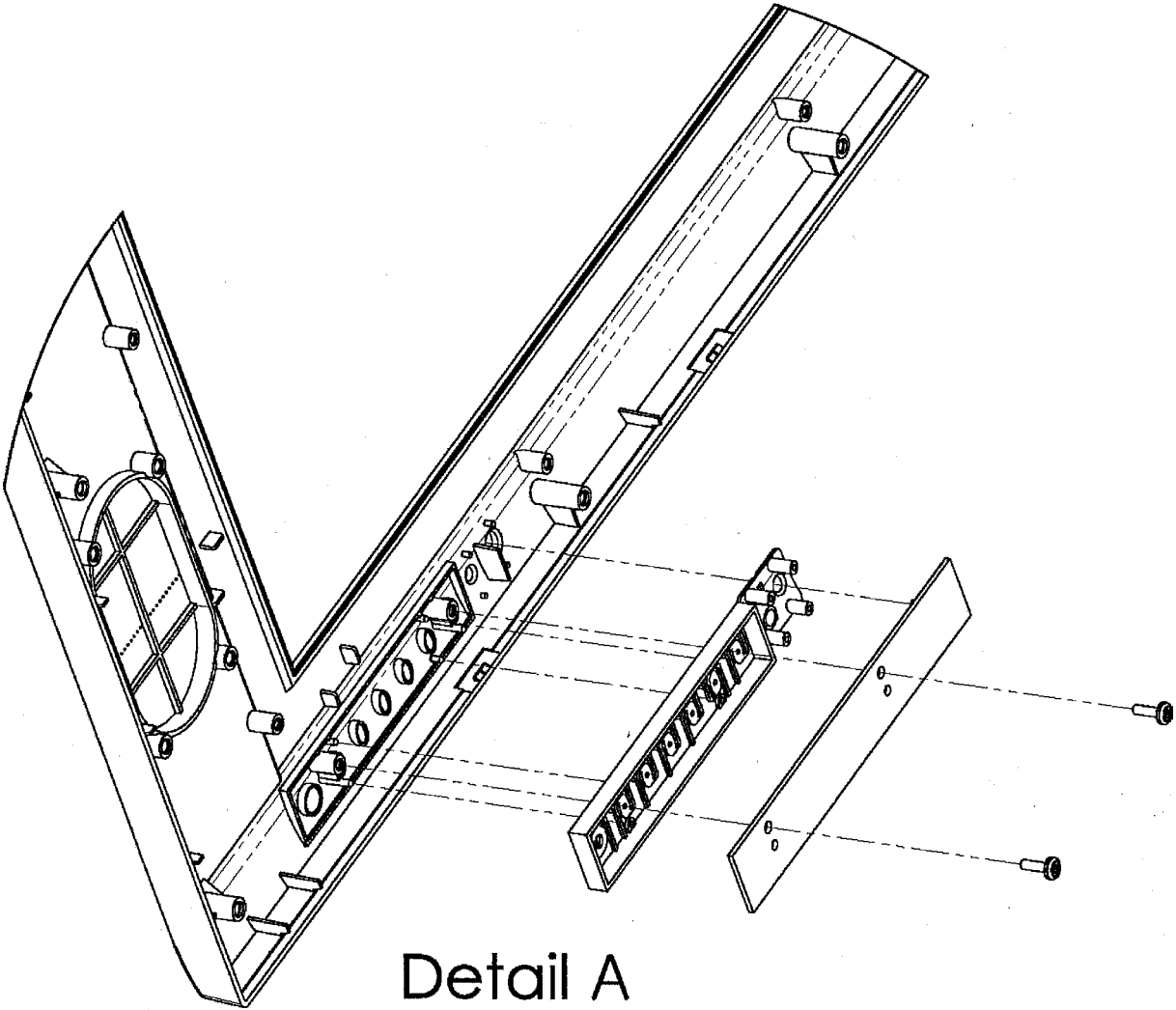
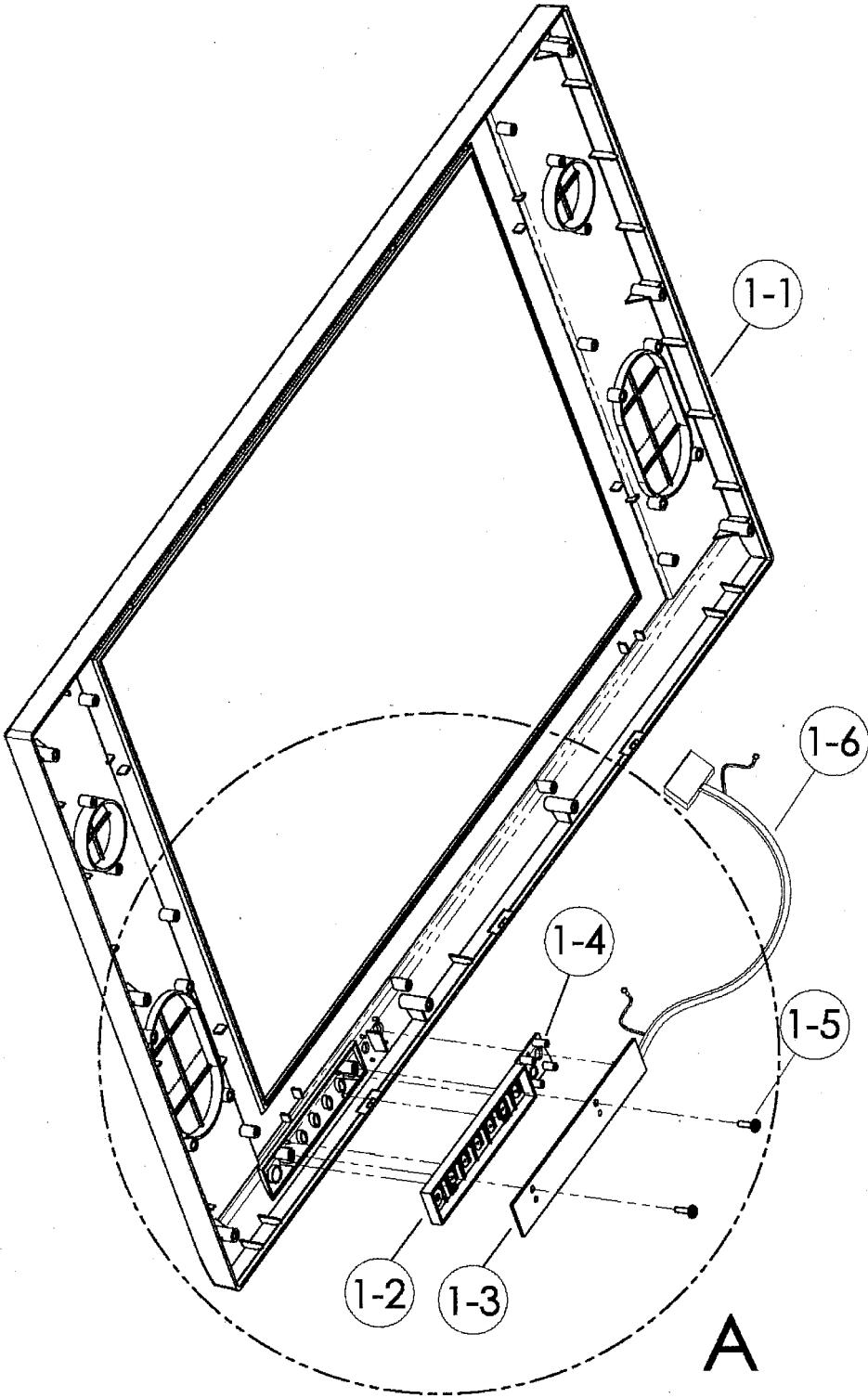
No power

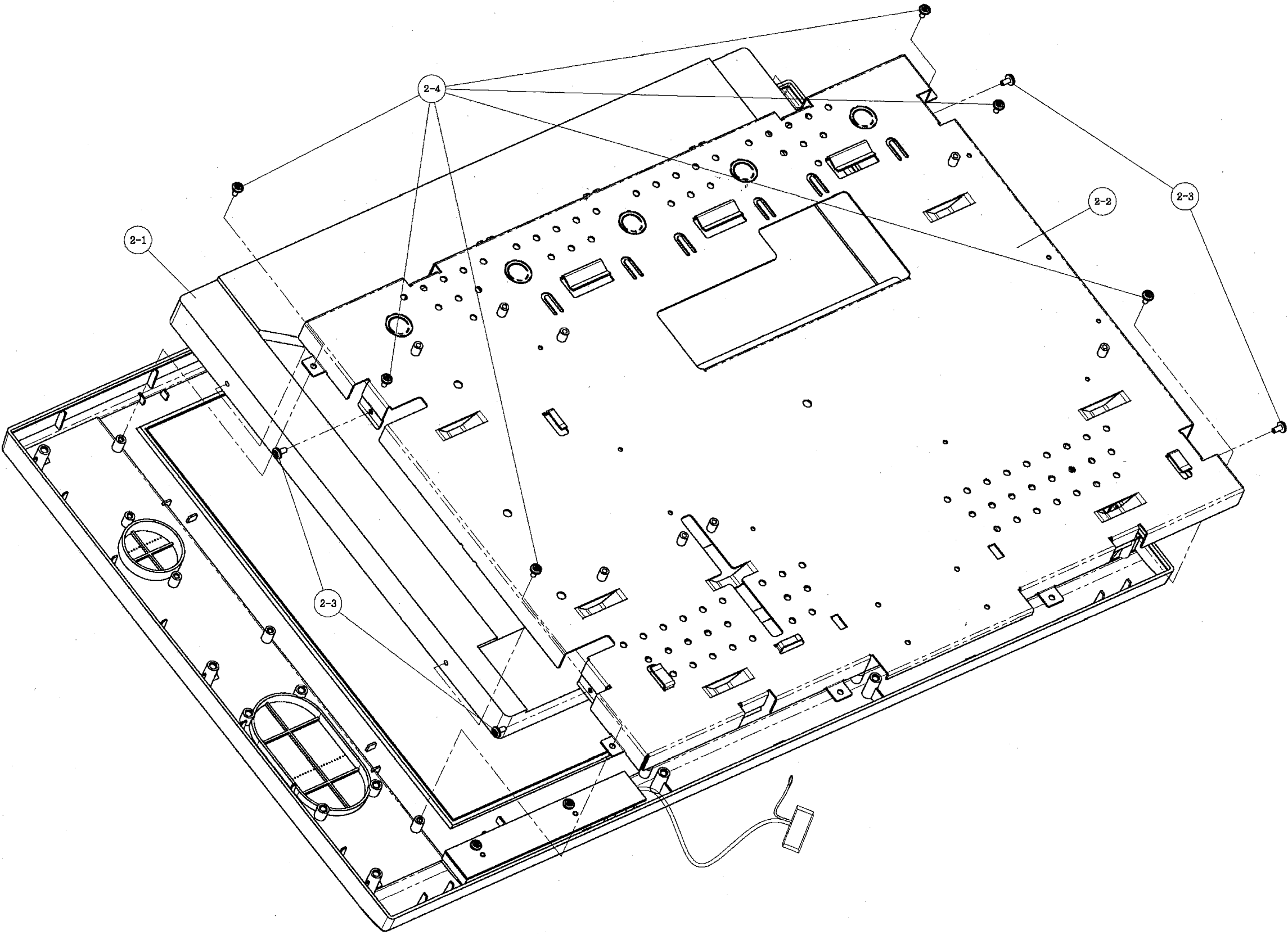


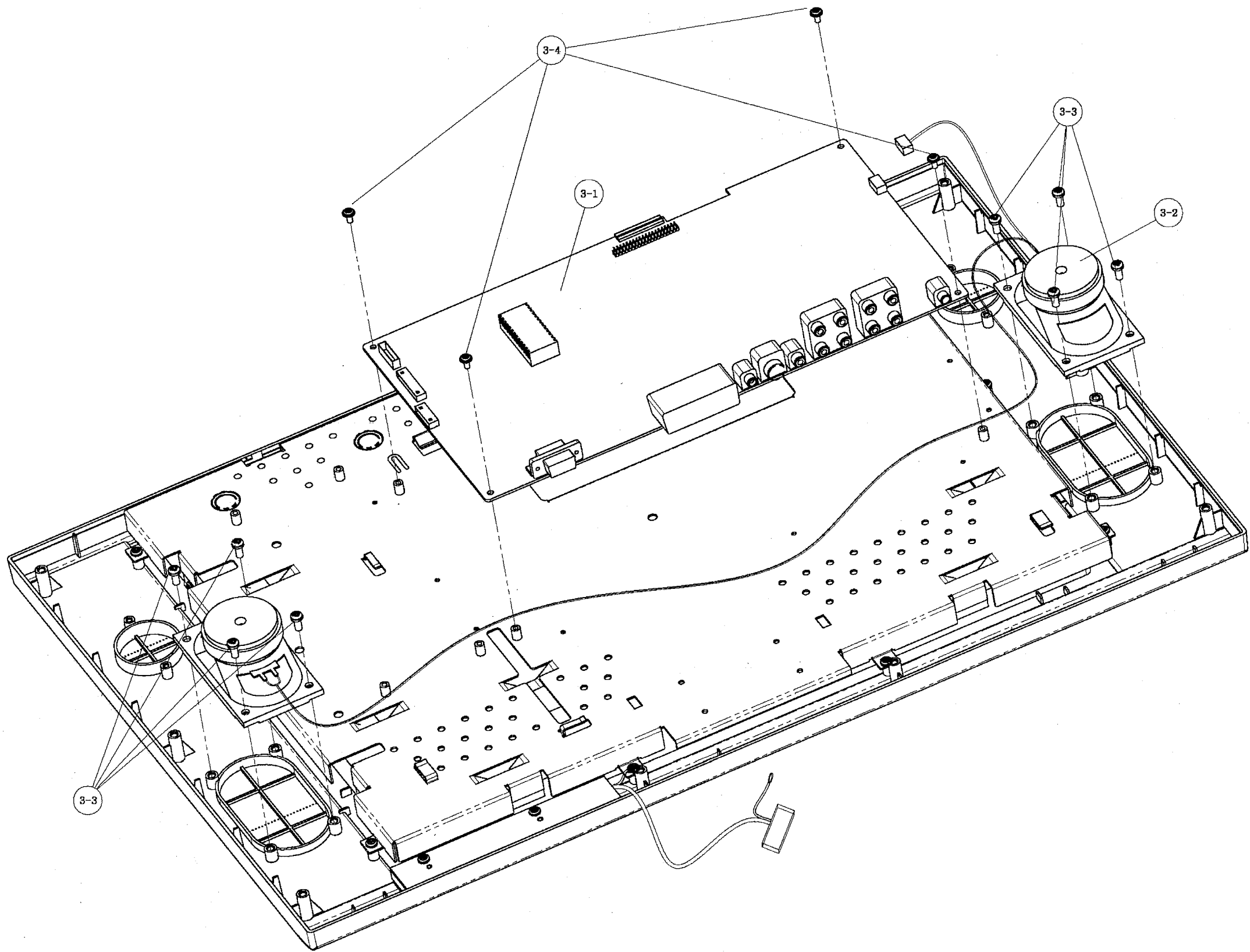
No LED & key control

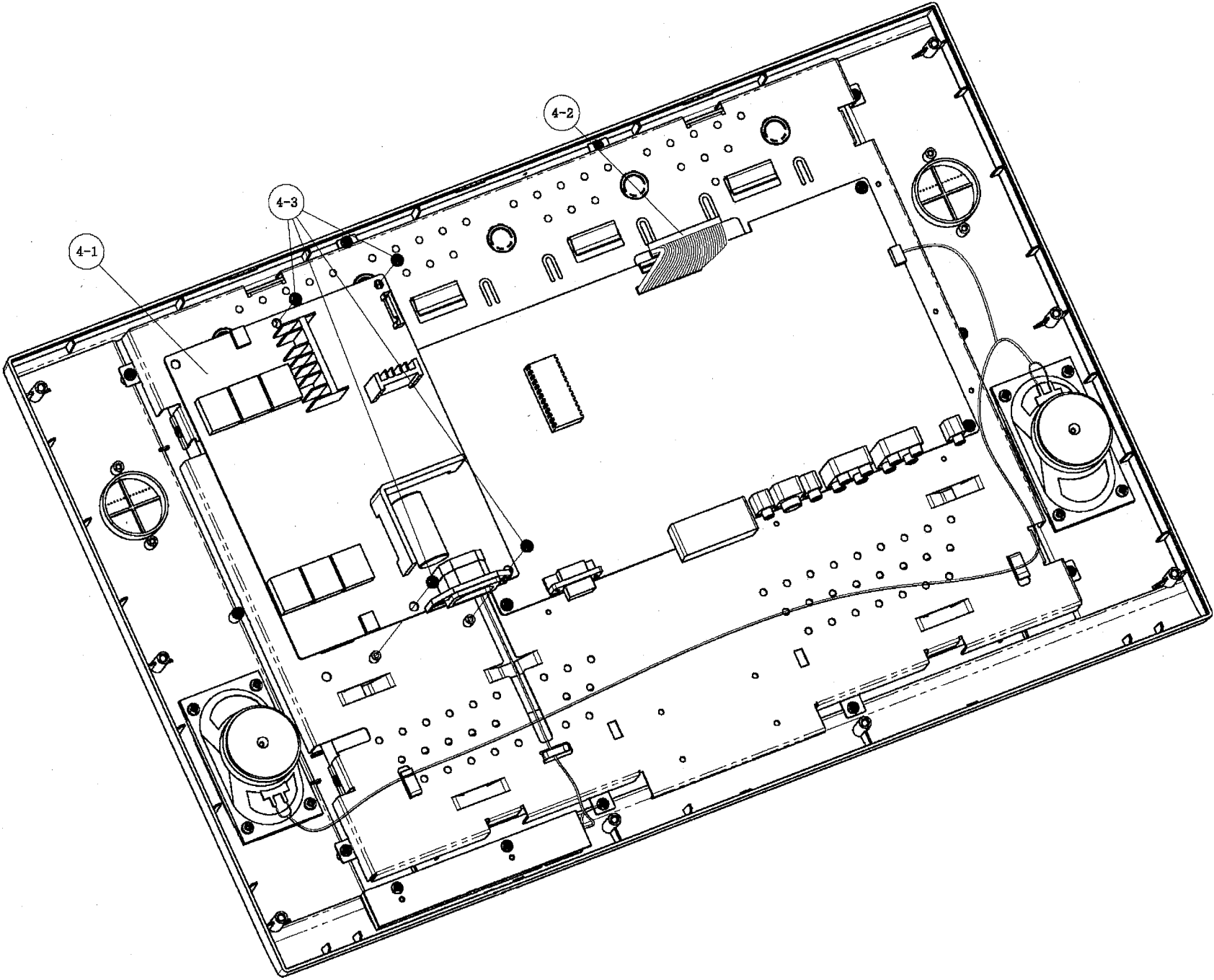


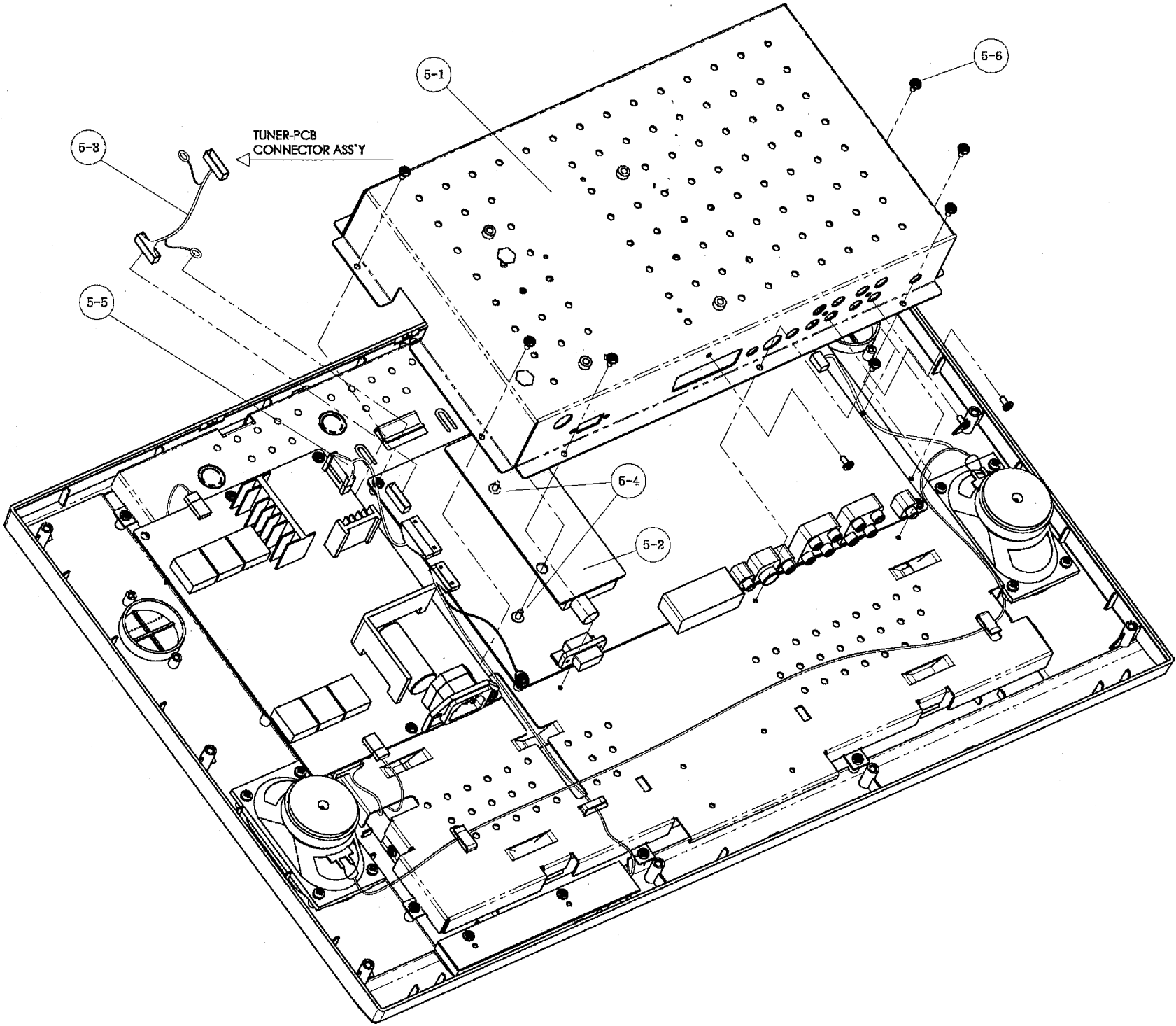
EXPLODED VIEW

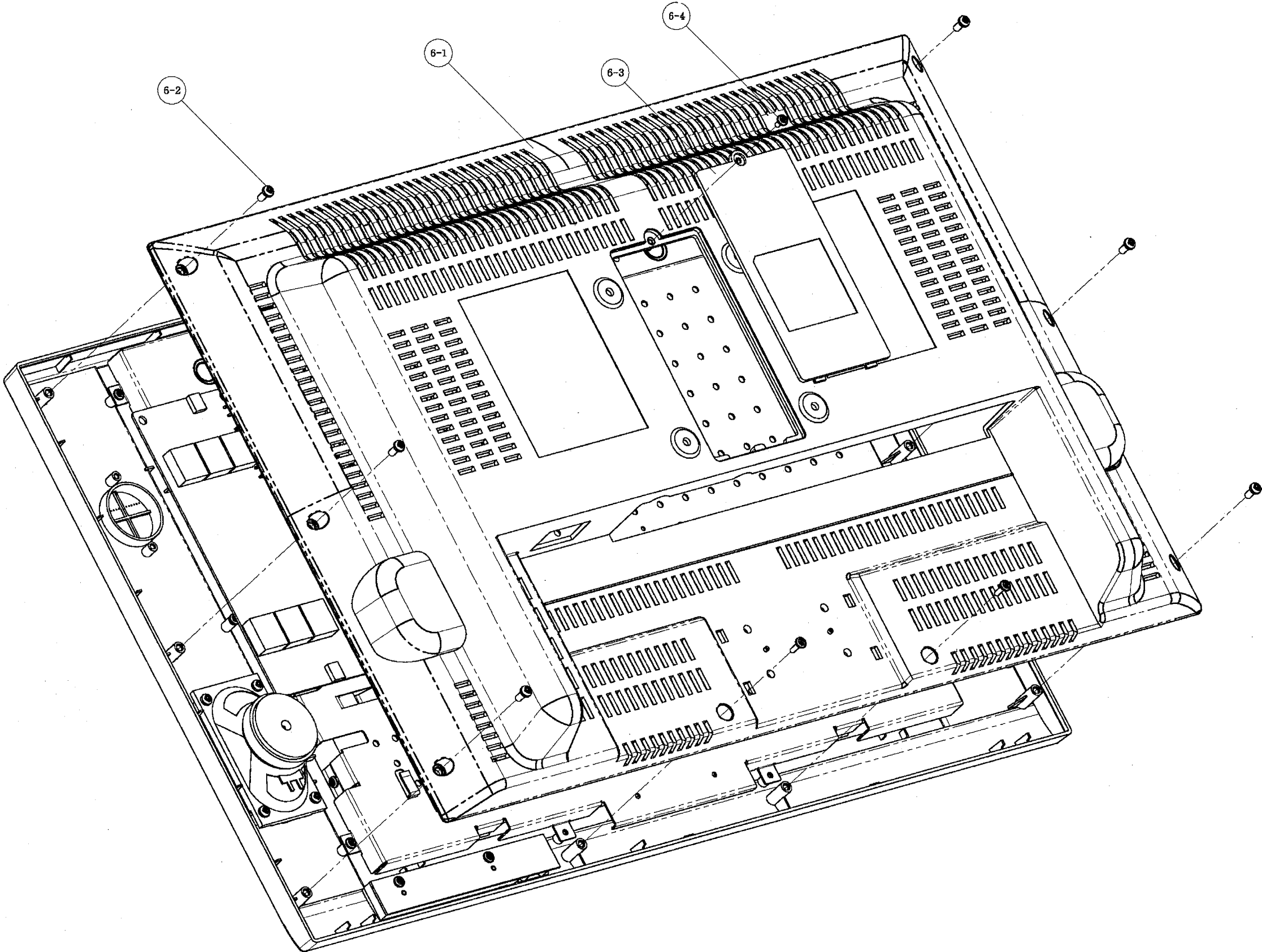


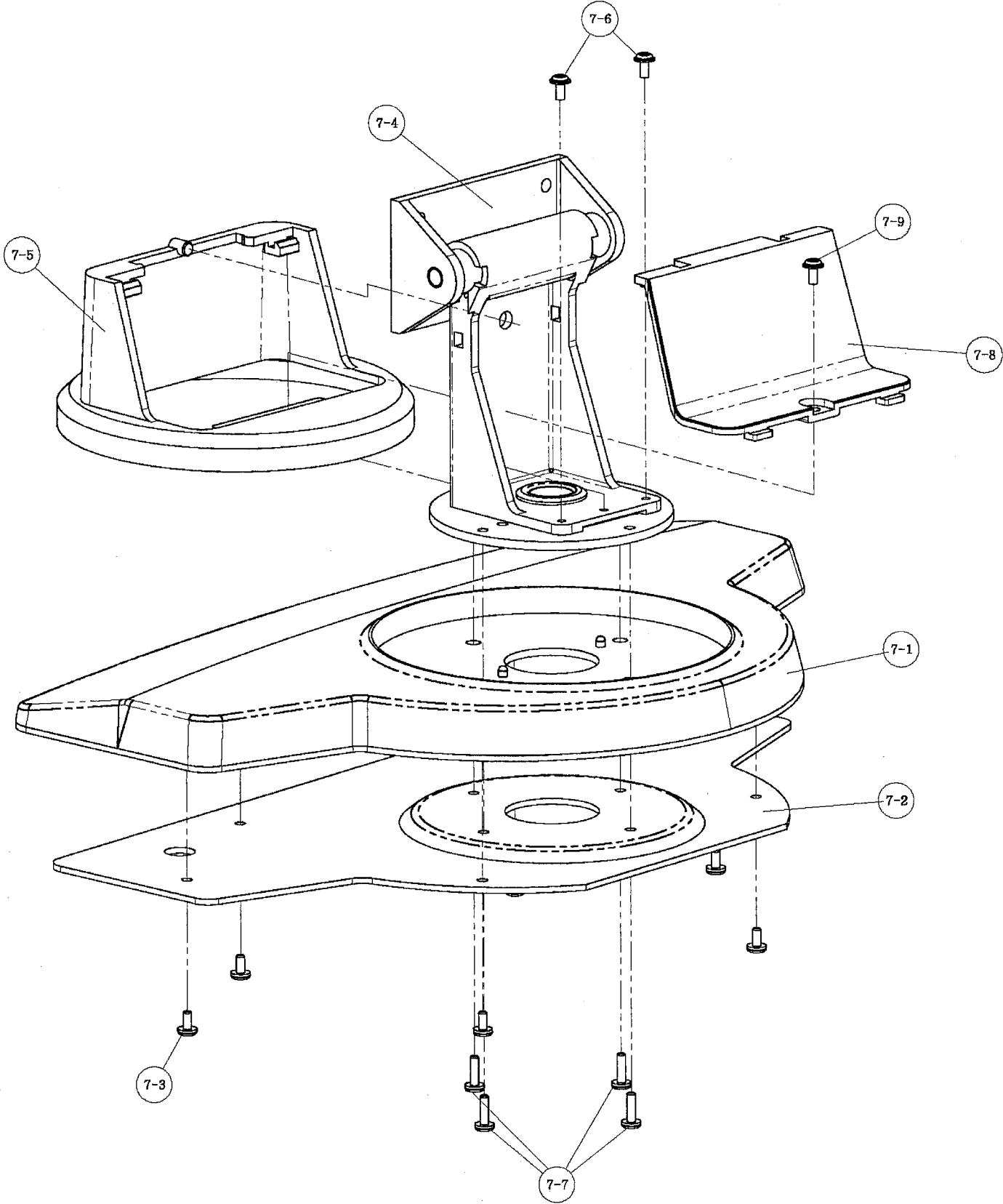


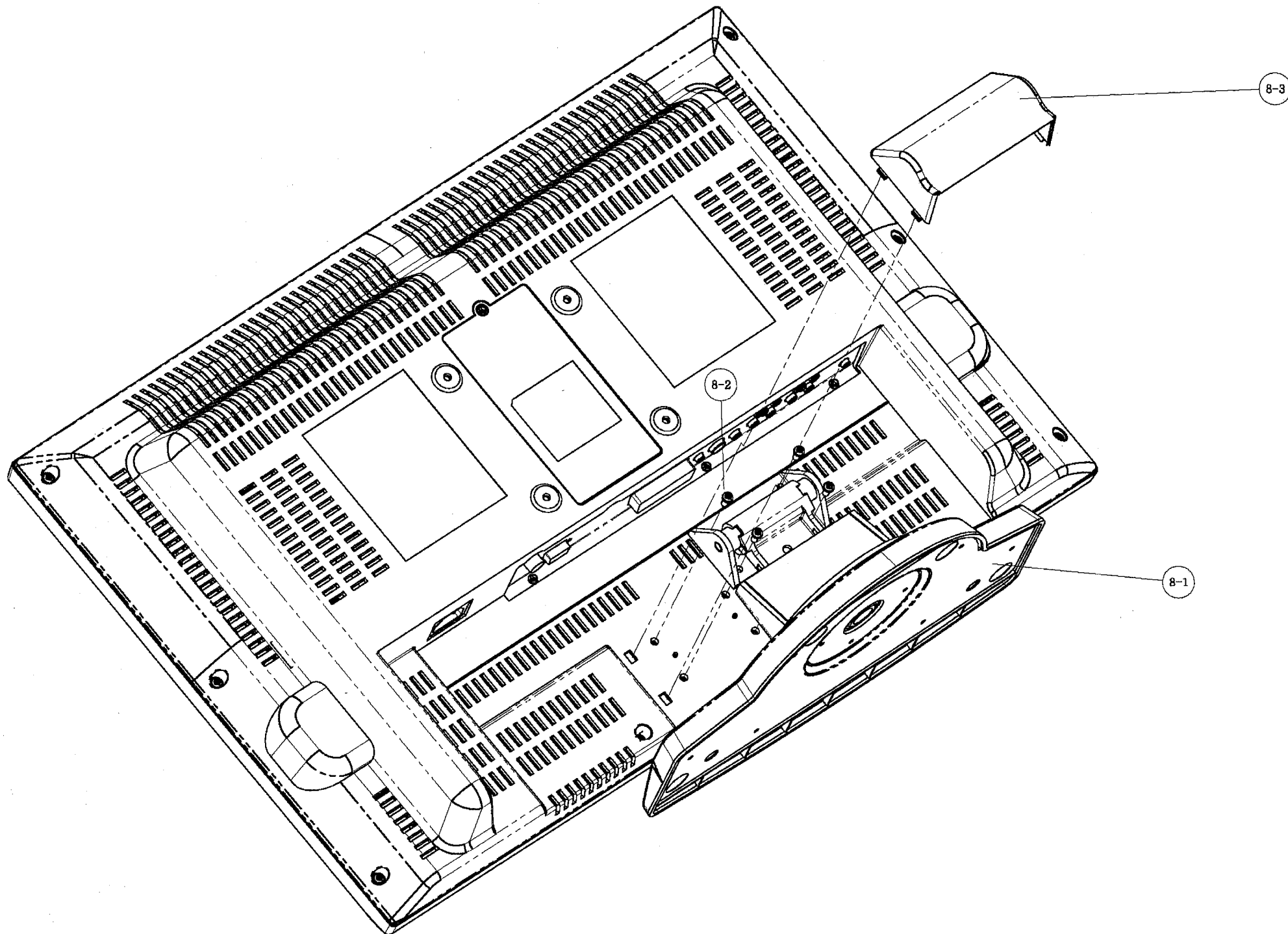












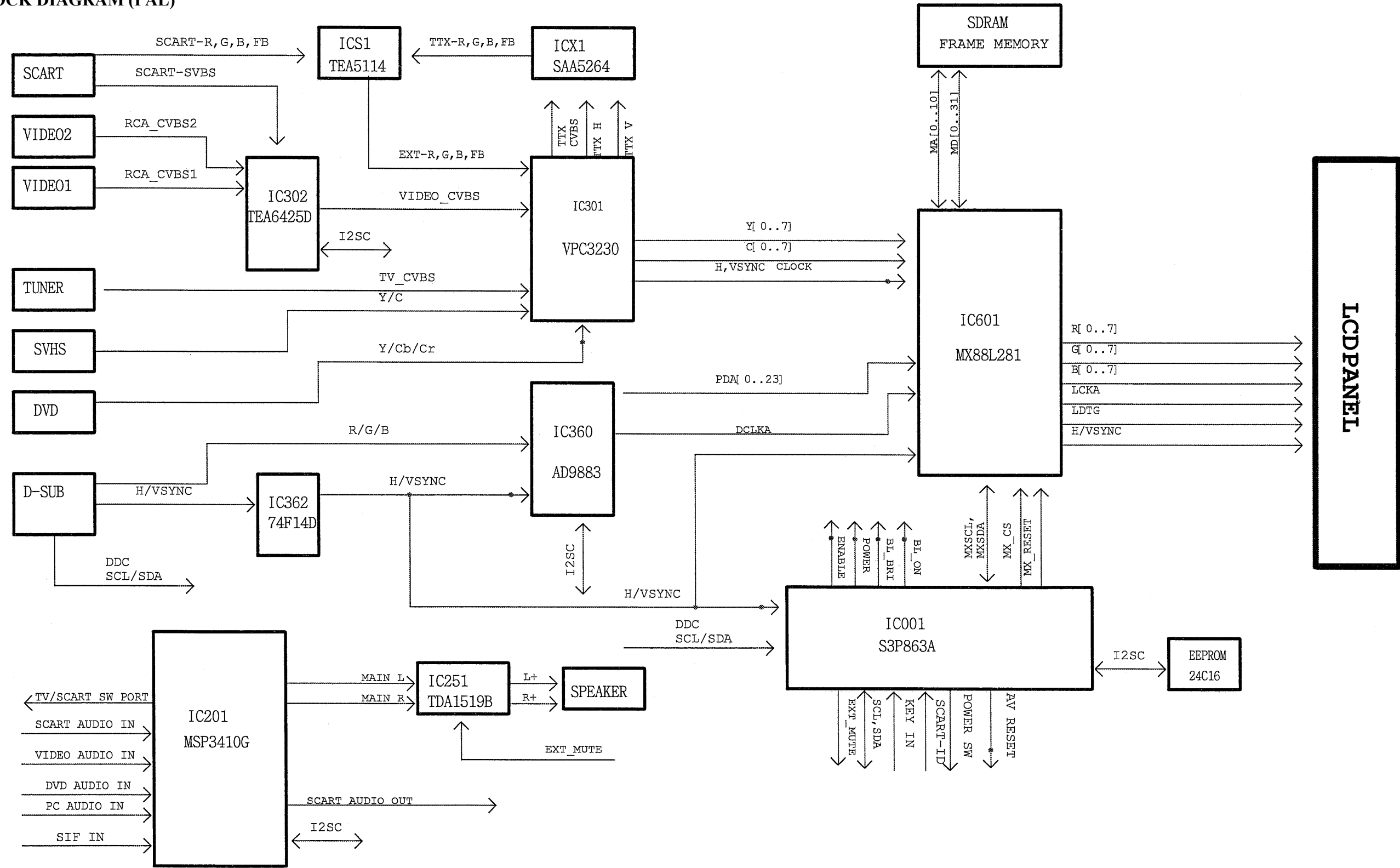
PART LIST

No	Part name	Qty
1-1	Front cover	1
1-2	Key knob	1
1-3	OSD PCB	1
1-4	Window	1
1-5	BTS-(TT) 3*8	2
1-6	OSD PCB cable	1
2-1	LCD-Panel	1
2-2	Main chassis	1
2-3	BHS M3x5	4
2-4	TTB (TT) 3x8	6
3-1	Main PCB	1
3-2	Speaker ass'y	1
3-3	PTS (TT) 4x8	8
3-4	BMS 4x6	4
4-1	Power-lips	1
4-2	Signal-cable	1
4-3	BMS 4x6	4
5-1	EMI-cover	1
5-2	Tuner-PCB	1
5-3	Tuner cable	4
5-4	Lips cable	1
5-5	BMS M3x6	2
5-6	BTS (TT) 3x6	10
6-1	Rear cover	1
6-2	PTS (TT) 4x10	8
6-3	Tuner cover	4
6-4	WPTS (TT) 4x8	1
7-1	Base cover	1
7-2	Metal base	1
7-3	BTS (TT) 3x8	6
7-4	Hinge body	1
7-5	Base cover-F	1

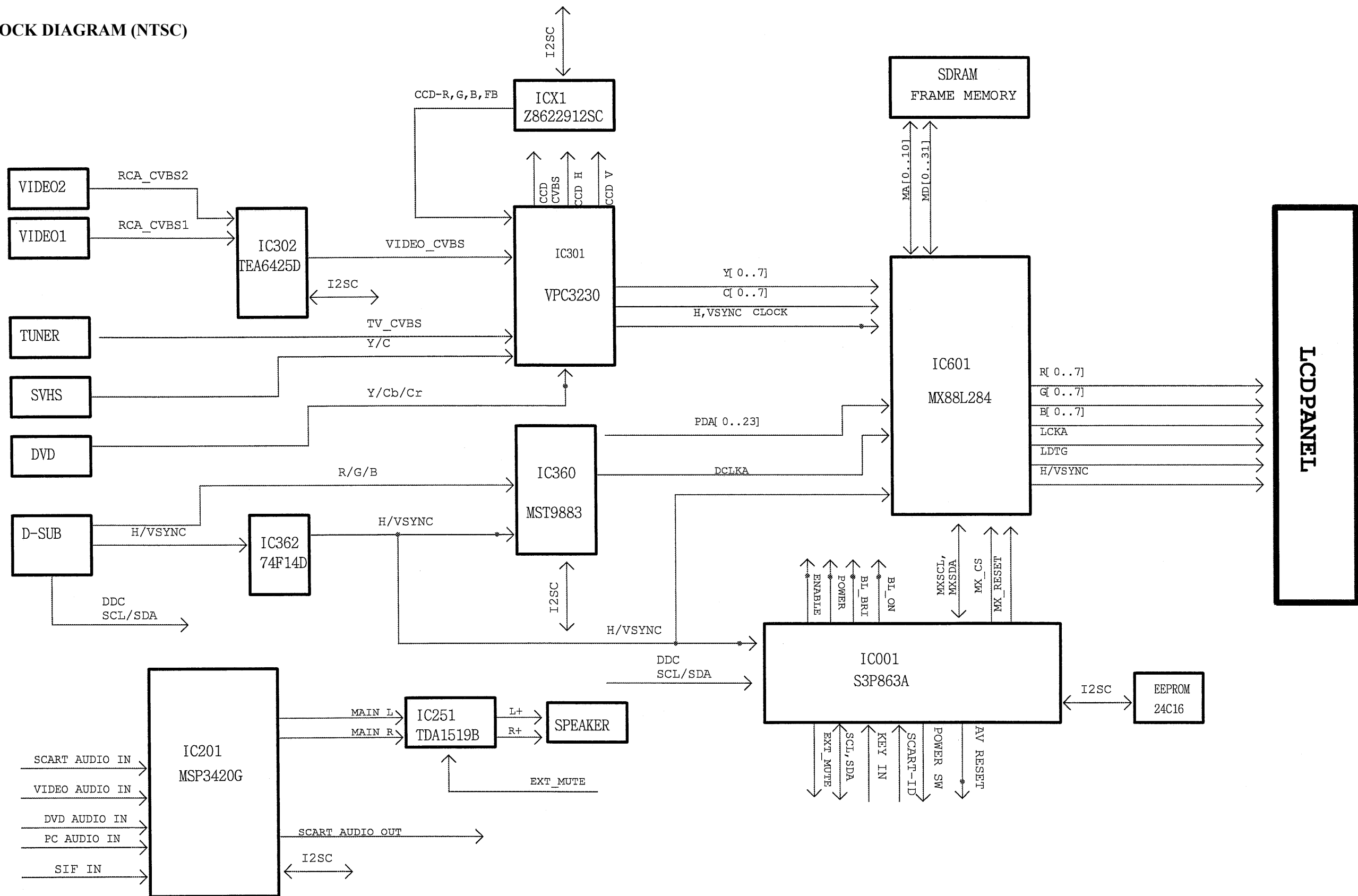
No	Part name	Qty
7-6	BHM M3x6	2
7-7	BHM M4x10-SEMS	4
7-8	Base cover-R	1
7-9	BHM M3x6	1
8-1	Stand ass'y	1
8-2	PMS M4x12-SEMS	4
8-3	Hinge cover	1

CIRCUIT DIAGRAM

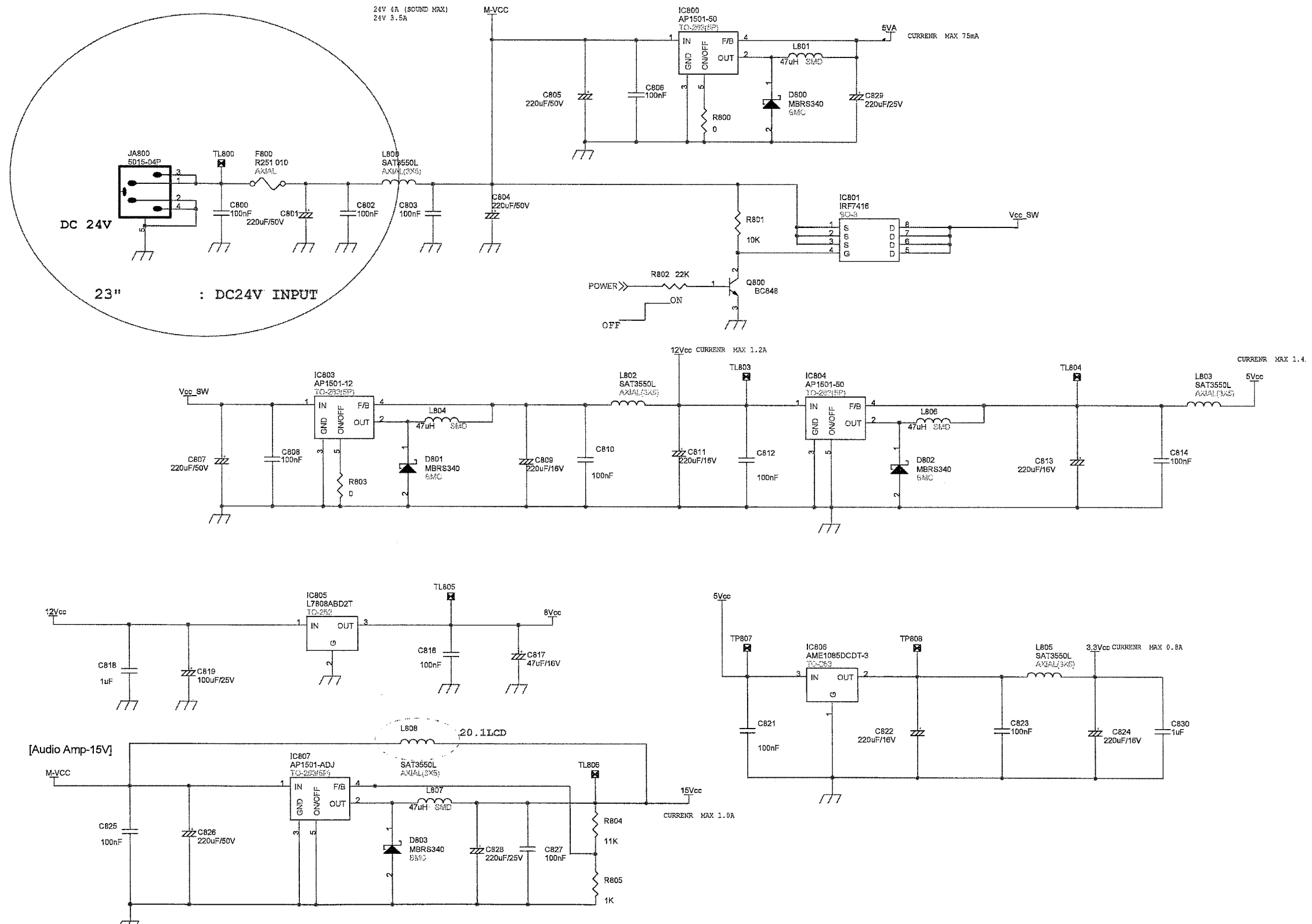
BLOCK DIAGRAM (PAL)



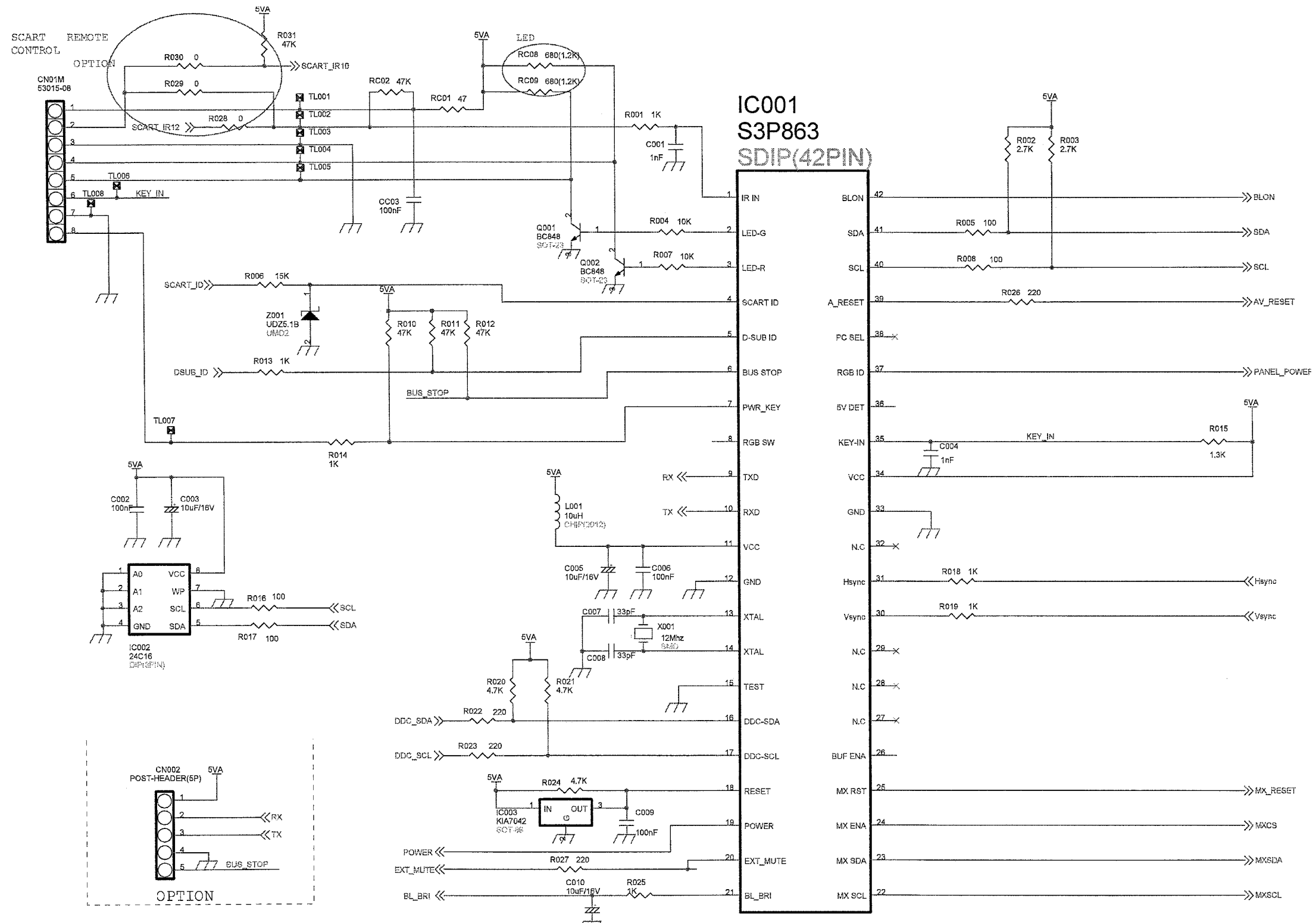
BLOCK DIAGRAM (NTSC)



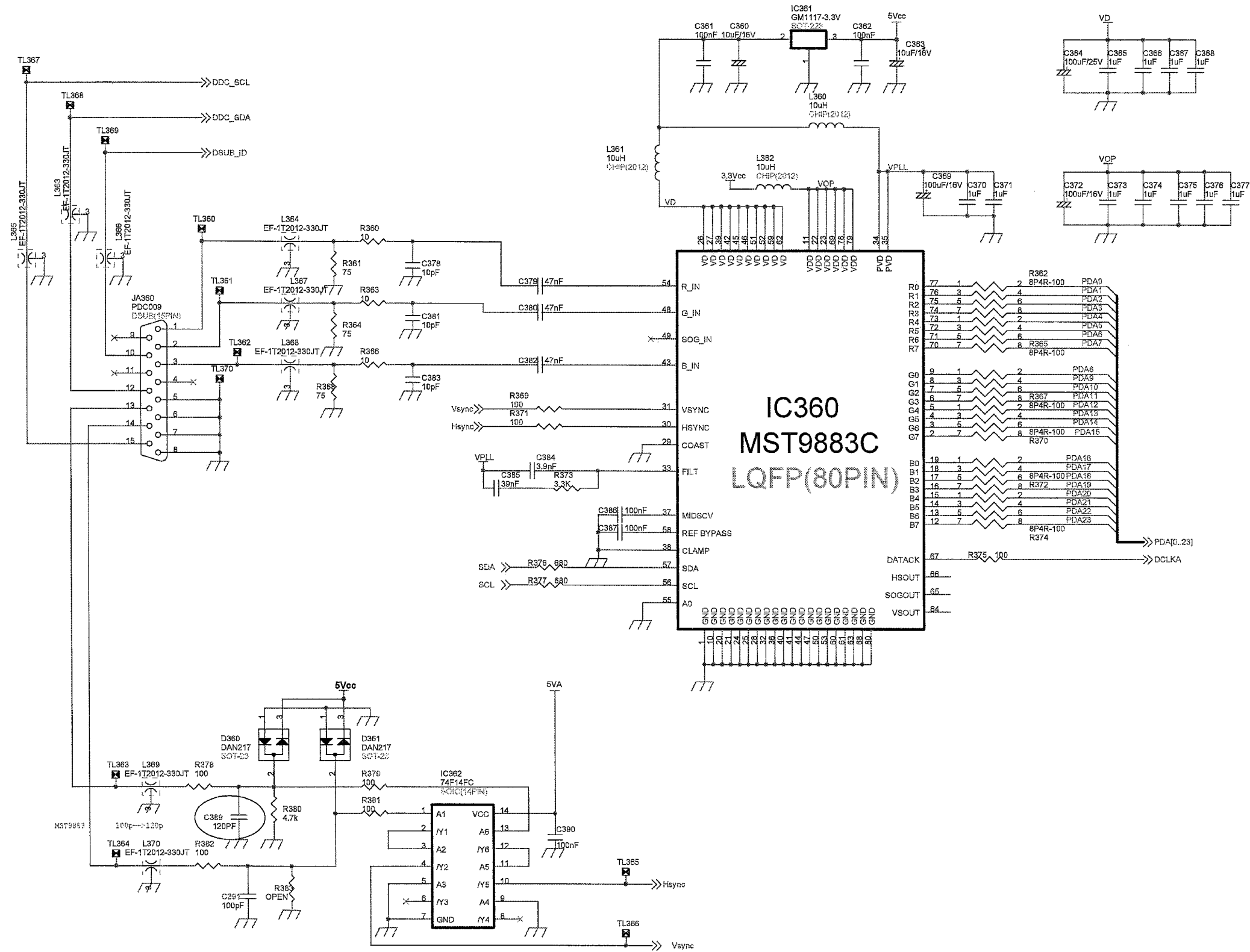
POWER



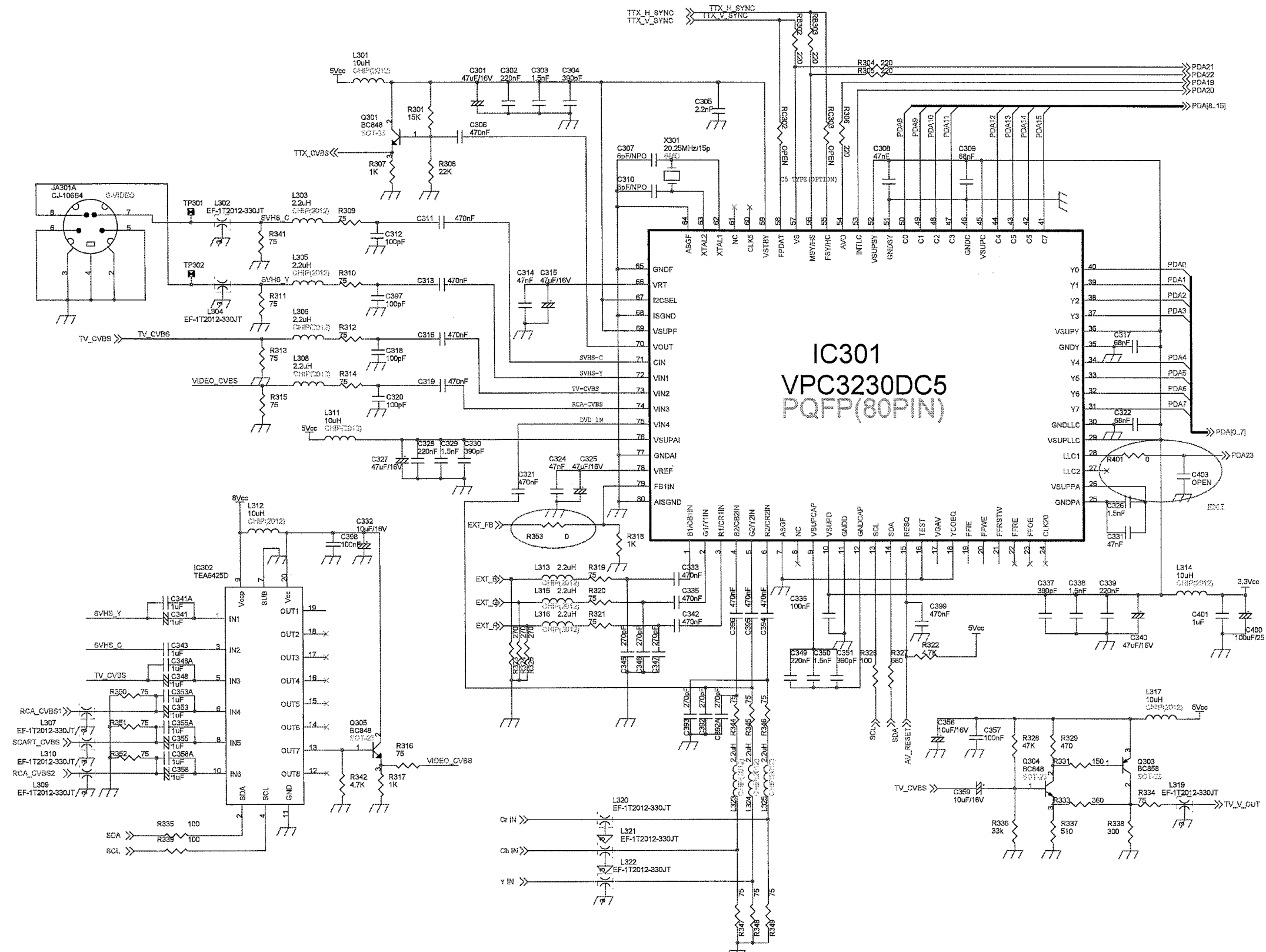
U-COM

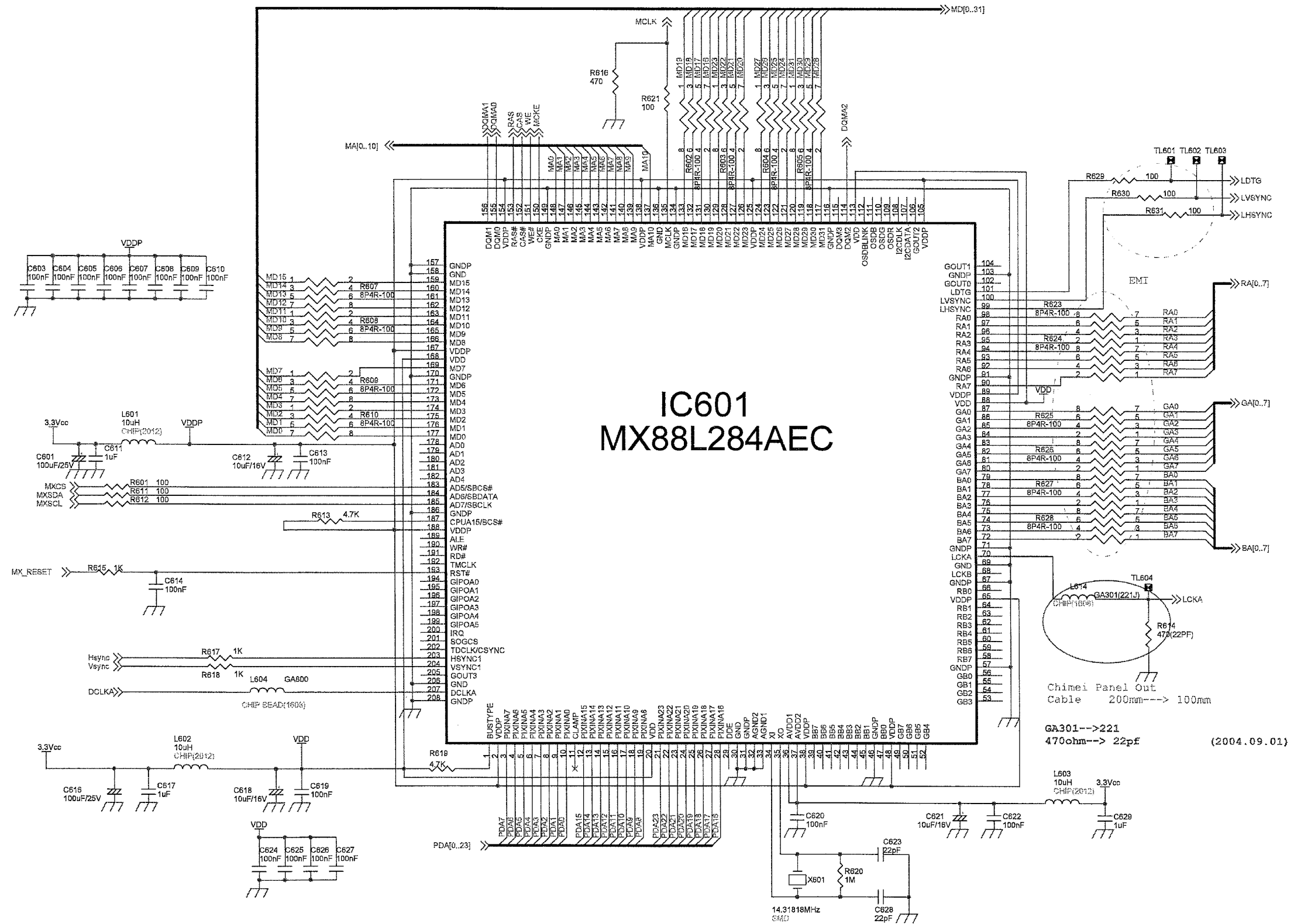


AD9883

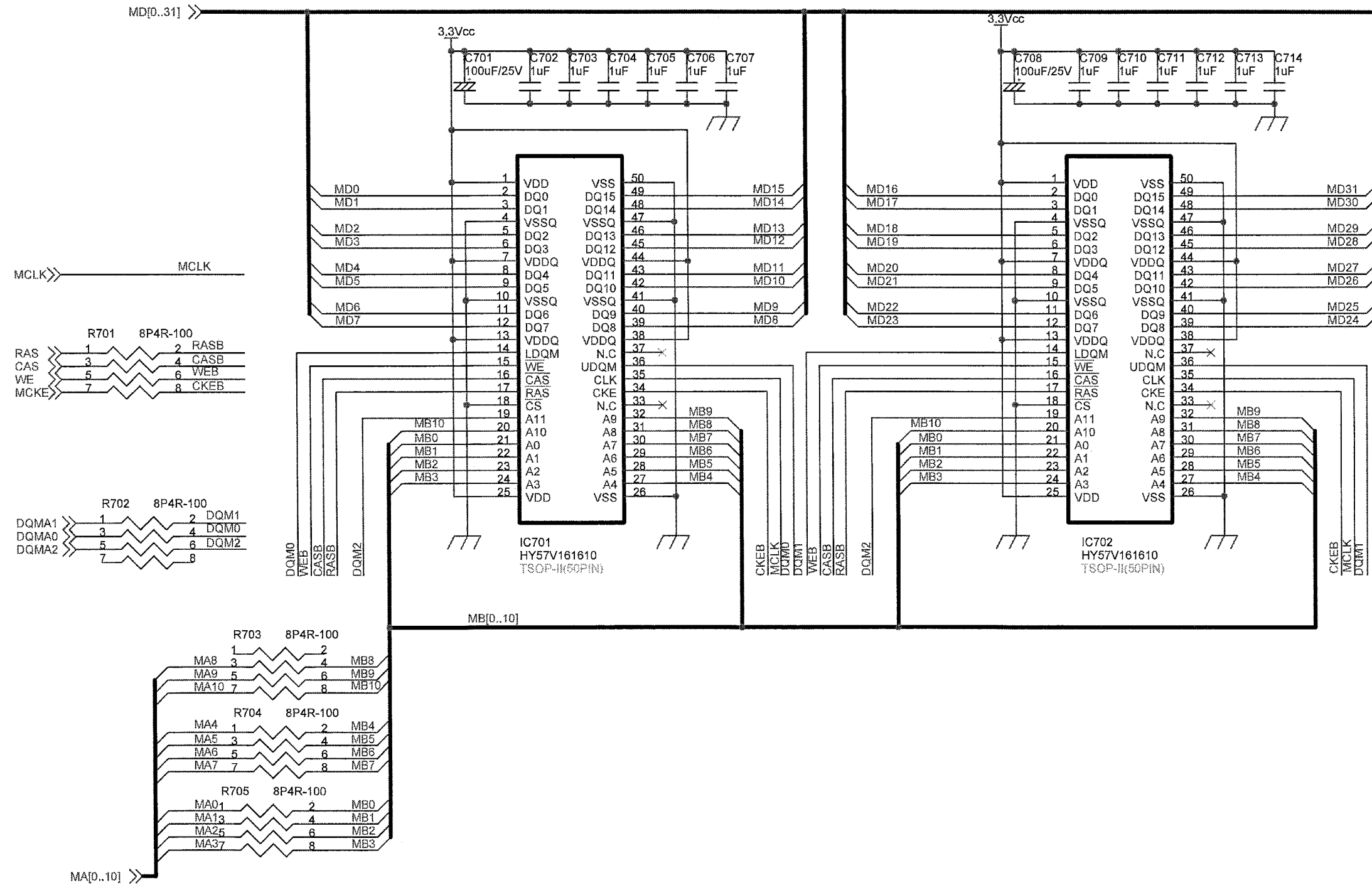


VPC3230

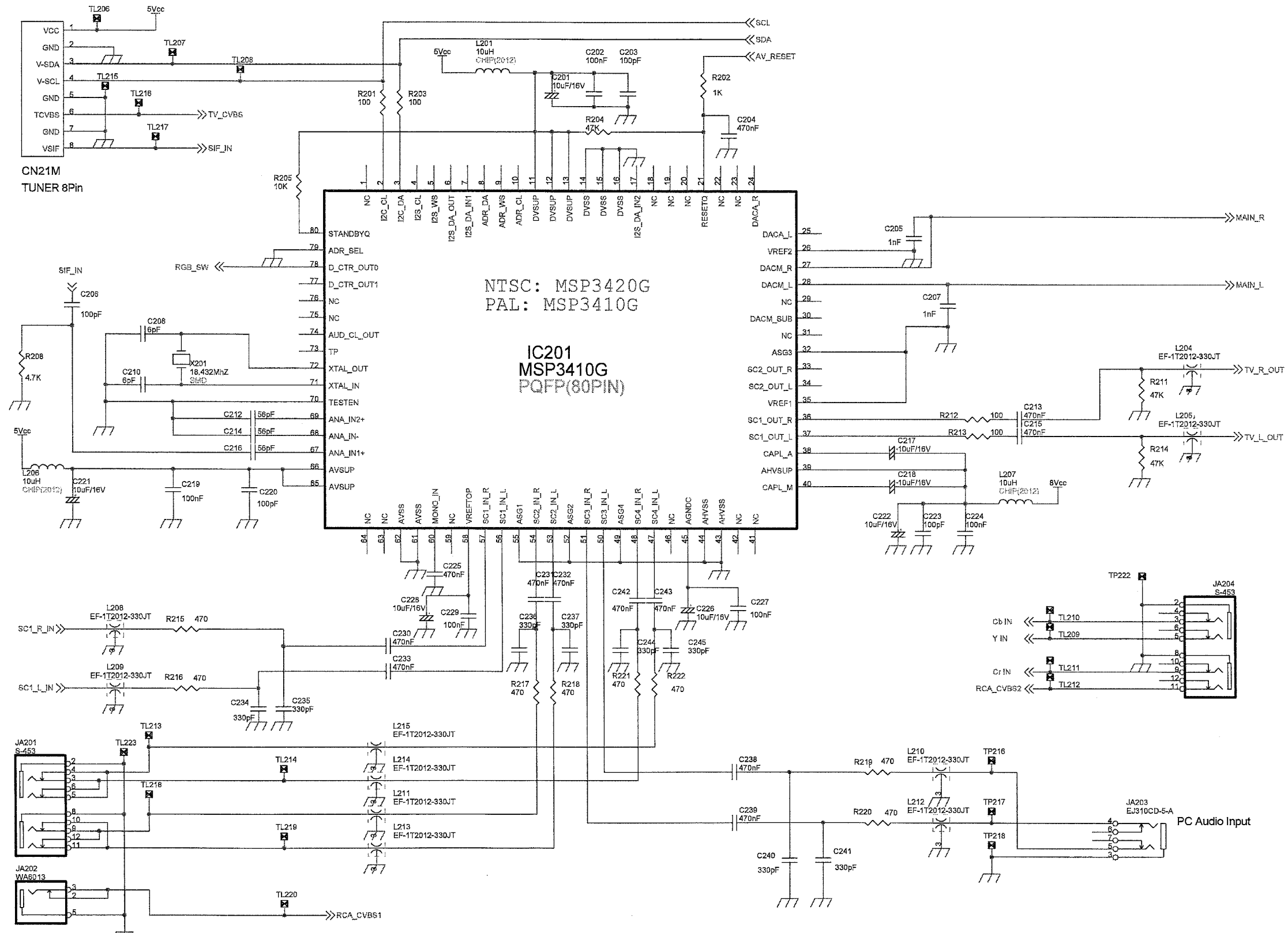


SCALER

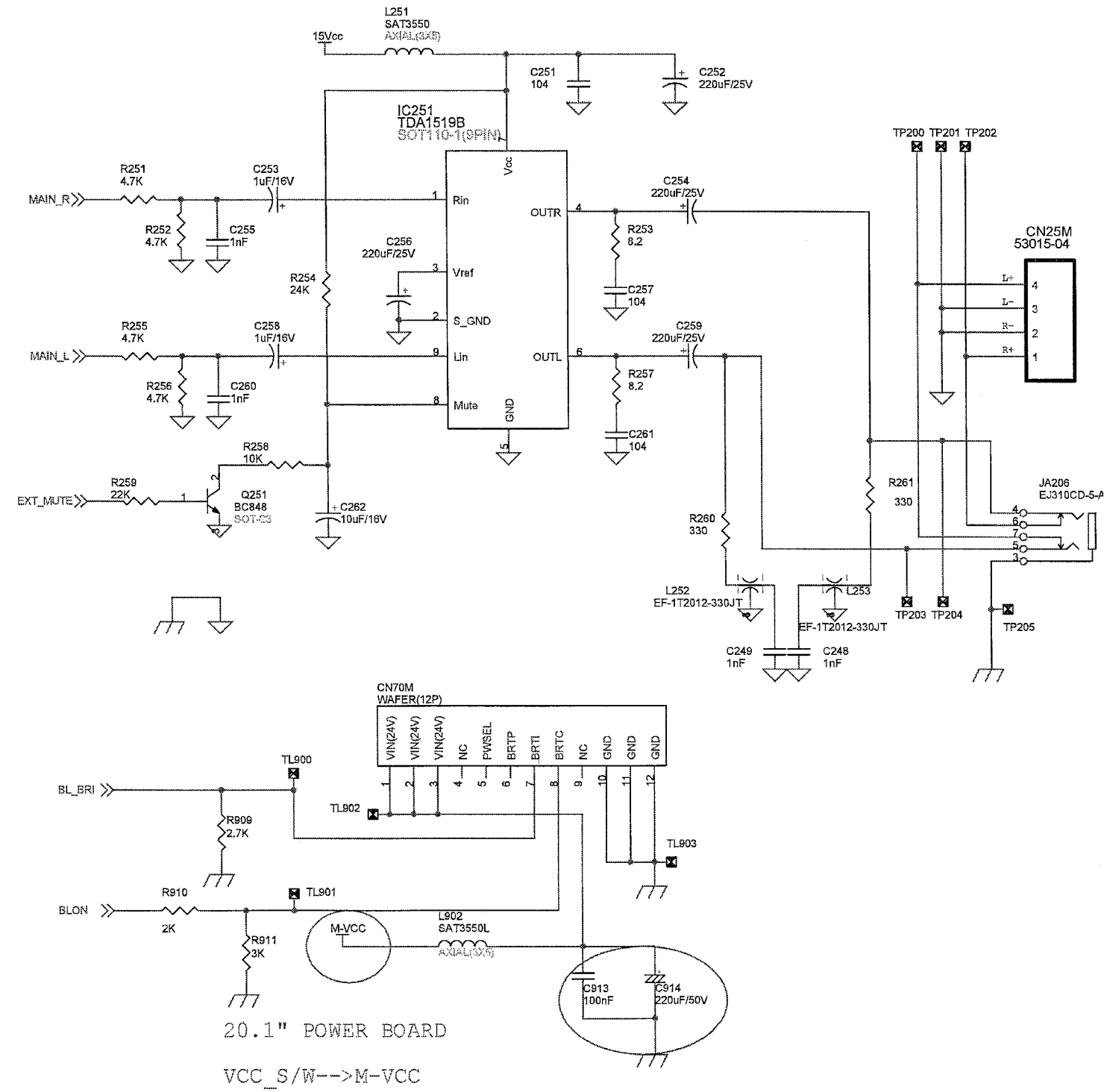
MEMORY



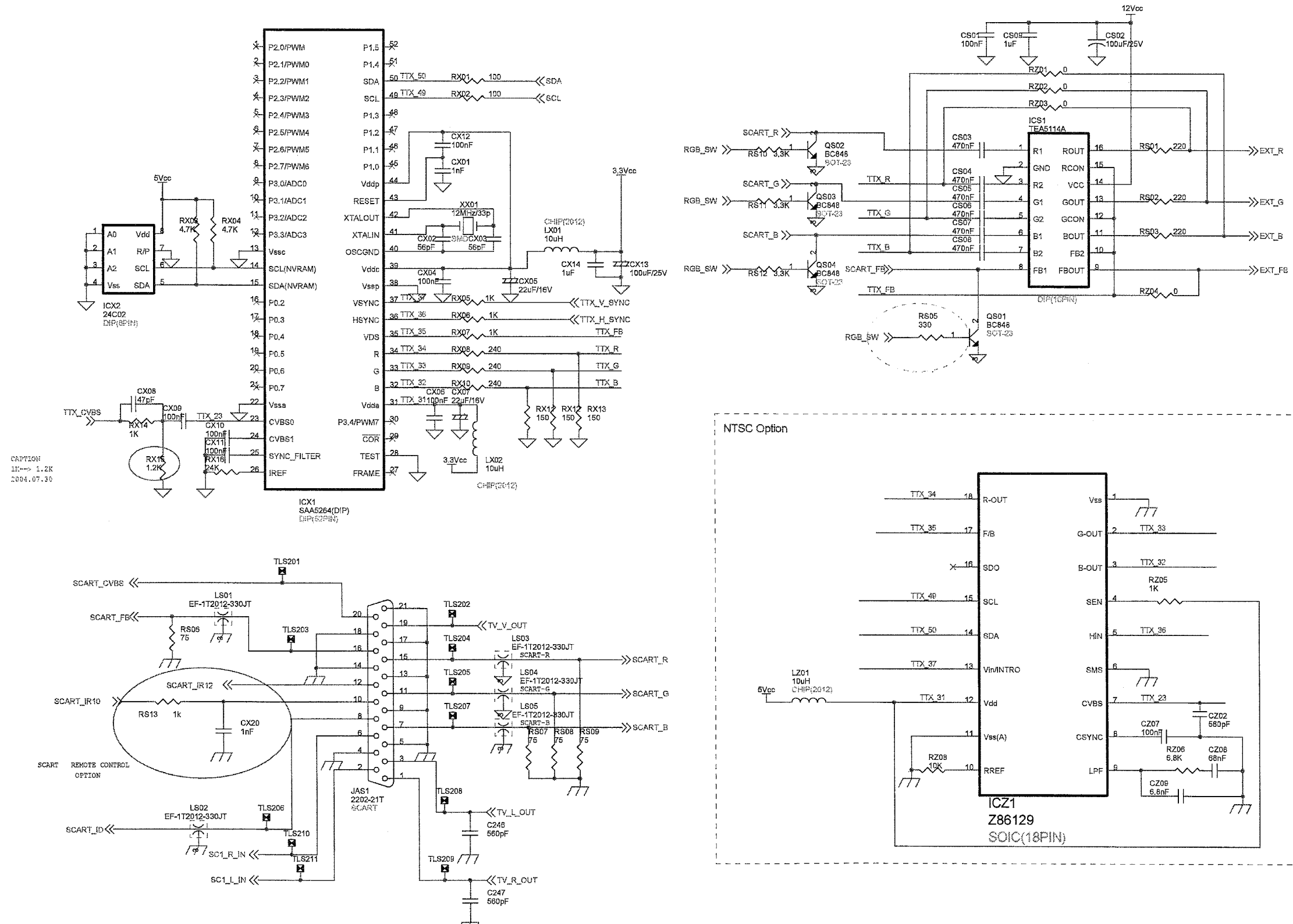
SOUND IC



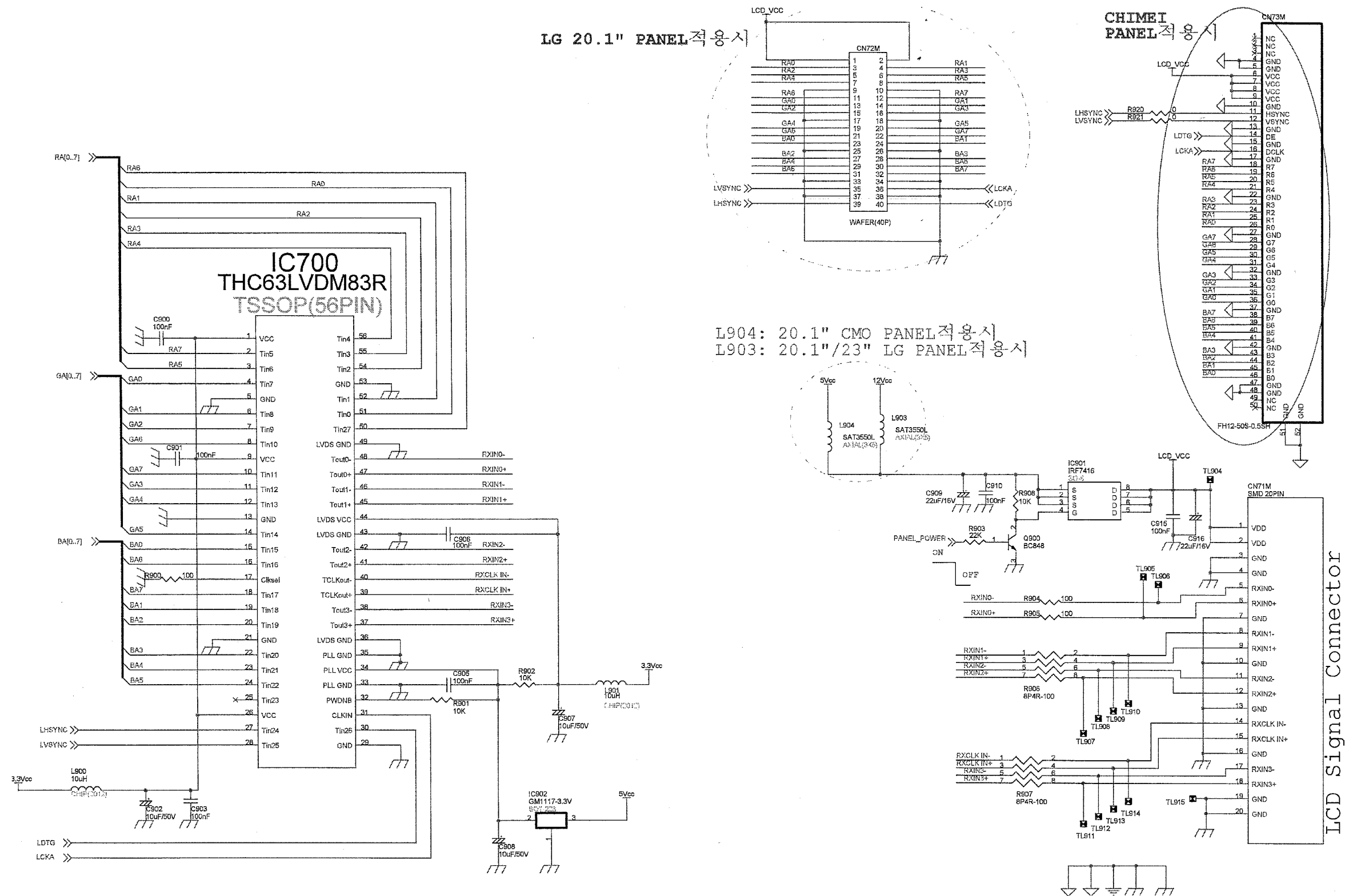
SOUND AMP



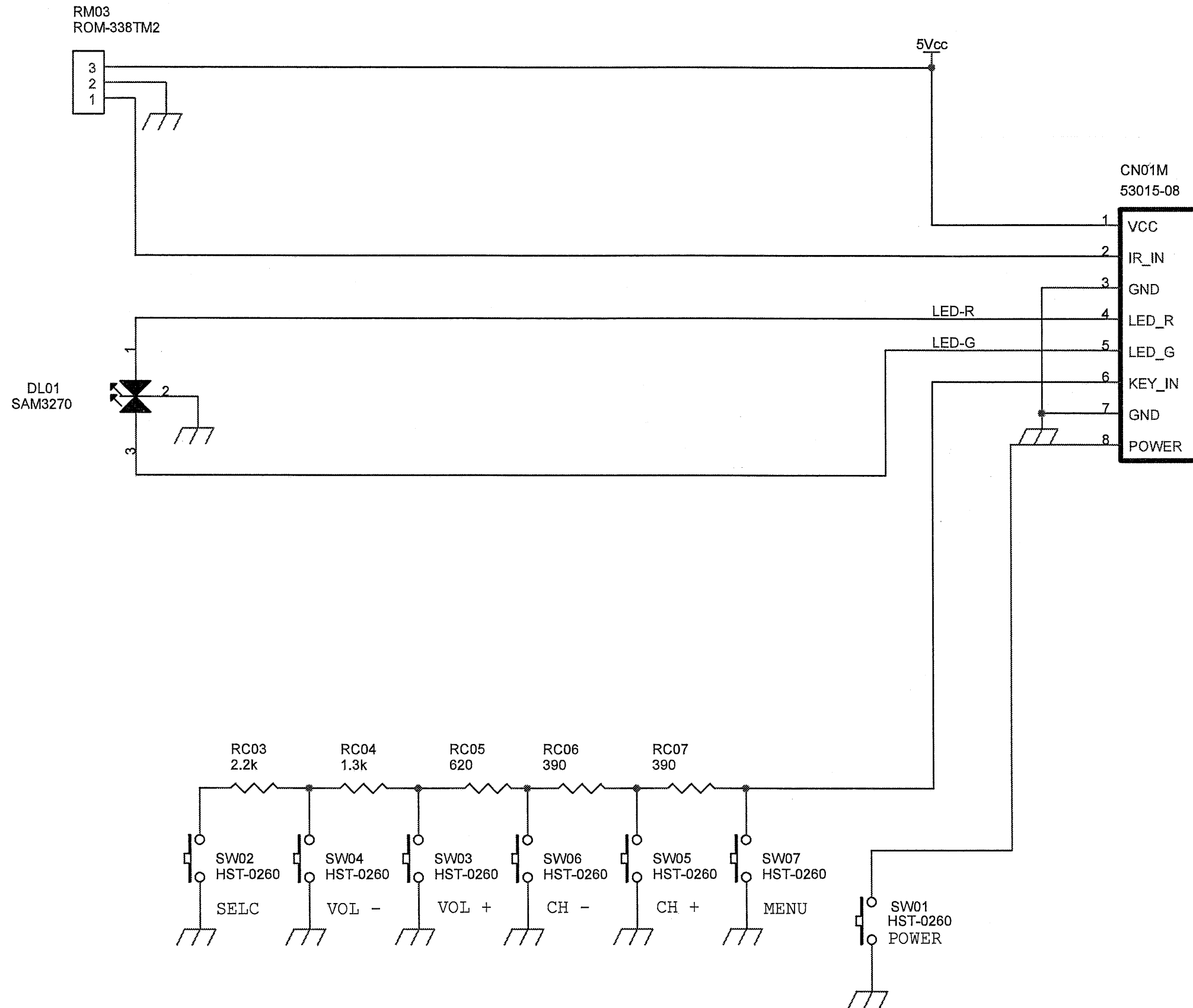
TTX /CAPTION



LVDS



KEY CONTROL



TUNER

NTSC: TCLN9081DA27D
PAL:
TCPQ9091PD27D (T)

