

IBBK

LT1500S

service manual



Catalog

Chapter One About Maintenance	1
1.1 Safety precautions	1
1.1.1 Power supply	1
1.1.2 Precautions for antistatic	1
1.1.3 Precautions for display screen	1
1.1.4 About placement position	2
1.2 Maintenance method	2
1.2.1 Visualized method	2
1.2.2 Electric resistance method	2
1.2.3 Voltage method	2
1.2.4 Current method	2
1.2.5 Cutting method	2
1.2.6 Element substitution method	3
1.2.7 Comparison method	3
1.3 Required device for maintenance	3
 Chapter Two Operation Instructions	4
2.1 PANEL BUTTON FUNCTIONS	4
2.1.1 FRONT PANEL	4
2.1.2 LEFT PANEL	4
2.1.3 RIGHT PANEL	4
2.1.4 REAR PANEL	5
2.2 REMOTE CONTROLLER	5
2.2.1 REMOTE BUTTONS	5
2.3 TV MENU SETUP	6
2.3.1 PICTURE	6
2.3.2 SOUND	6
2.3.3 TV SETTING	7
2.3.4 SYSTEM SETTING	7
2.3.5 NICAM/BILINGUAL RECEIVING	8

2.4 AV, S-VIDEO, SCART AND YPbPr SETUP	8
2.4.1 VIDEO SETTING MENU	8
2.5 SPECIFICATIONS	8
2.6 DISPLAY MODE	9
2.7 ACCESSORIES	9
 Chapter Three Principle and Servicing	11
Section One Principle of the Player	11
3.1.1 Brief introduction to the player	11
3.1.2 Block diagram of the player	11
3.1.3 Introduction to IC used by the player	13
Section Two Unit Circuit Principle	13
3.2.1 System control circuit	14
1. System reset circuit	14
2. System clock circuit	15
3. System control circuit	15
4. IIC main line control circuit	16
5. Working state indication circuit	17
6. Remote control circuit	17
3.2.2 Audio circuit	18
1. NICAM processing circuit	18
2. Input sound source selection circuit	19
3. Audio amplifying circuit	20
4. Audio control circuit	20
3.2.3 Video circuit	21
1. Video input and A/D conversion circuit	21
2. LCD image processing circuit	22
3.2.4 Input circuit	22
1. SCART terminal introduction	22
2. Tuner circuit	23
3.2.5 Power circuit	24
1. Input protection circuit	24
2. Standby control circuit	25
3. Power control circuit	26
4. D+5V voltage stabilizing circuit	26

5. +5VEXT power voltage stabilizing circuit	27
6. Display screen power supply circuit	27
7. Inverter components control circuit	28
8. Inverter components principle	28
Section Three Servicing Cases	31
3.3.1 Servicing cases	31
3.3.2 Troubleshooting flow chart	38
Section Four Waveform diagram	50
Section Five Function Introduction to IC	59
3.5. 1 function introduction to STV8216	59
3.5. 2 function introduction to MST518	62
3.5. 3 function introduction to Mp1430	68
3.5. 4 function introduction to W79E632.....	69
3.5. 5 function introduction to TVP5146	71
3.5. 6 function introduction to NCP1377	75
3.5. 7 function introduction to TDA7266P	76
3.5. 8 function introduction to La7952	78
3.5. 9 function introduction to Mp1008	78
3.5.10 function introduction to CD4052	80
Chapter Four Disassembly and Assembly Process	82
4.1 Disassembly process for the player	82
4.2 Assembly process for the player	84
Chapter Cinque PCB board & Circuit diagram	88
Section One PCB board	88
Section Two Circuit diagram	98
Chapter six BOM List	108

Chapter One About Maintenance

1.1 Safety precautions

1.1.1 Power supply

When maintenance personnel are repairing DVD TV, he should pay special attention to the power with 220V 800V AC and 330V DC which will cause hurt and damage to persons!

1.1.2 Precautions for antistatic

Movement and friction will both bring static electricity which causes serious damages to integrated IC. Though static charge is little, when a limited quantity of electric charge is added to large scale integrated IC, as the capacitance is very small in the meantime, now the integrated IC is very much easy to be struck through by static electricity or the performance will decrease. Thus static electricity prevention is of extraordinary importance. The following are several measures to prevent static electricity:

1. Use a piece of electric conduction metal with the length of about 2 metres to insert into the earth, and Fetch the lead wire from the top of the surplus metal and connect to the required static electricity device. The length and depth of the metal embedded under the earth should be determined according to the wettability of the local soil. For humid places, it may be shorter, and longer and deeper for dry places. If possible, it can be distributed and layed in terms of “#” shape.

2. On operating table-board, the antistatic table cushion should be covered and grounded.

3. All devices and equipments should be placed on the antistatic table cushion and grounded.

4. Maintenance personnel should wear antistatic wrist ring which should be grounded.

5. Places around the operating position should also be covered with electric conduction cushion or Painted with antistatic paint.

1.1.3 Precautions for display screen

1. Display screen is breakable article, so please protect carefully when carrying and prevent fingers or hard objects striking the screen to damage structure of the screen.

2. When cleaning screen, do not use organic chemicals. You should use cloth and use small amount of special cleaning liquid in places difficult to clean.

1.1.4 About placement position

1. Never place TV in positions with high temperature and humidity.
2. Avoid placing near high magnetic fields, such as loudspeaker or magnet.
3. Positions for placement should be stable and secure.

1.2 Maintenance method

1.2.1 Visualized method

Directly view whether abnormalities of collision, lack of element, joint welding, shedding welding, rosin joint, copper foil turning up, lead wire disconnection and elements burning up among pins of Elements appear. Check power supply of the machine and then use hands to touch the casing of part of elements and check whether they are hot to judge the trouble spot. You should pay more attention when using this method to check in high voltage parts.

1.2.2 Electric resistance method

Set the multimeter in resistance position and test whether the numerical value of resistance of each point in the circuit has difference from the normal value to judge the trouble spot. But in the circuit the tested numerical value of resistance is not accurate, and the tested numerical value of integrated IC's pins can only be used for reference, so the elements should be broken down for test.

1.2.3 Voltage method

Voltage method is relatively convenient, quick and accurate. Set the multimeter in voltage position and test power supply voltage of the player and voltage of a certain point to judge the trouble spot according to the tested voltage variation.

1.2.4 Current method

Set the multimeter in current position and test current of the player of a certain point to judge the trouble spot. But when testing in current method, the multimeter should be series connected in the circuit, which makes this method too trivial and troublesome, so it is less frequently used in reality.

1.2.5 Cutting method

Cutting method should be combined with electric resistance method and voltage method to use. This method is mainly used in phenomena of short circuit and current leakage of the circuit. When cutting the input terminal voltage of a certain level, if voltage of the player rises again, it means that the trouble lies in this level.

1.2.6 Element substitution method

When some elements cannot be judged good or bad, substitution method may be adopted directly.

1.2.7 Comparison method

A same good PC board is usually used to test the correct voltage and waveform. Compared these data with those tested through fault PC board, the cause of troubles may be found.

Through the above maintenance method, theoretical knowledge and maintenance experience, all difficulties and troubles will be readily solved.

1.3 Required device for maintenance

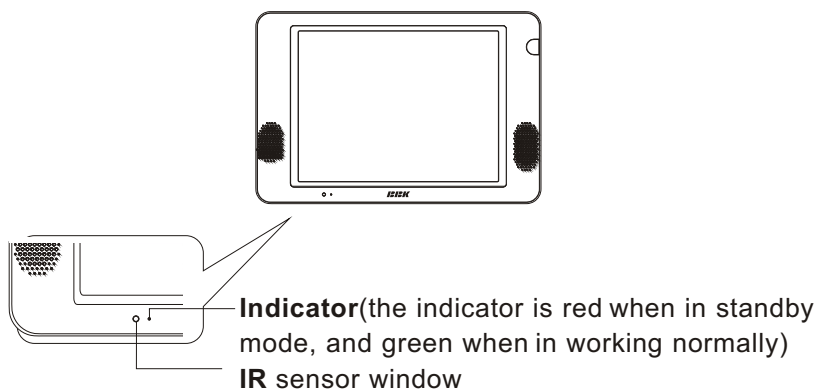
- ◆ Audio Generator
- ◆ Digital oscillograph ($\geq 100\text{MHz}$)
- ◆ DVD player
- ◆ SMD rework station
- ◆ Multimeter
- ◆ Soldering iron
- ◆ Pointed-month pincers
- ◆ Cutting nippers
- ◆ Forceps
- ◆ Electric screw driver
- ◆ Terminals connecting cord
- ◆ Headphone
- ◆ Microphone

Chapter Two

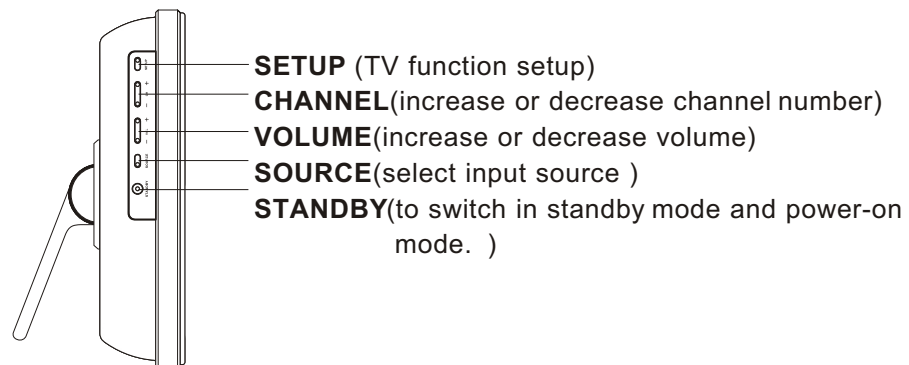
Functions and Operation Instructions

2.1 PANEL BUTTON FUNCTIONS

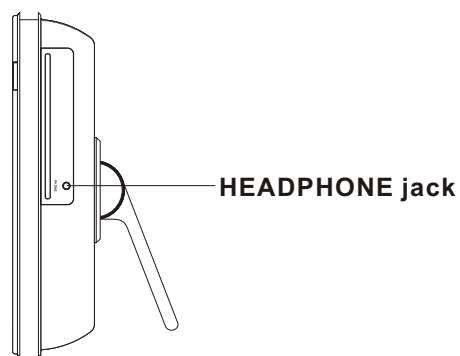
2.1.1 FRONT PANEL



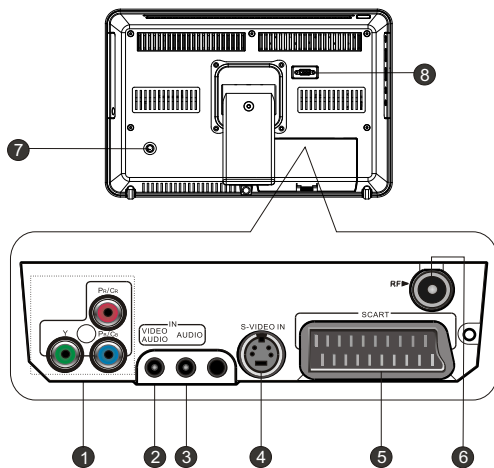
2.1.2 LEFT PANEL



2.1.3 RIGHT PANEL



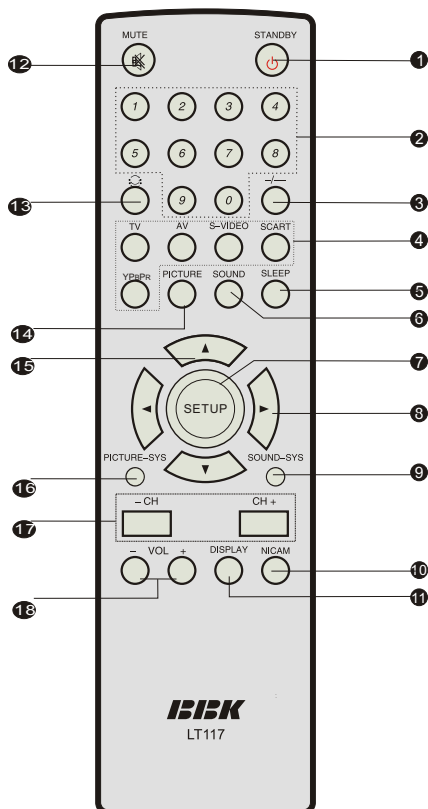
2.1.4 REAR PANEL



- ① YPbPr or YCbCr input terminal
- ② Composite video/audio and S-VIDEO audio input
- ③ YPbPr audio input
- ④ S-VHS VIDEO input
- ⑤ SCART connecting socket
- ⑥ RF input terminal
- ⑦ 12V DC input terminal
- ⑧ UPGRADE

2.2 REMOTE CONTROLLER

2.2.1 REMOTE BUTTONS



- ⑩ **NICAM**
Switch in NICAM, A2 and mono channel (it is effective in TV signal input with NICAM or A2 function).
- ⑪ **DISPLAY**
To display setup information of channel or source.

- ① **STANDBY**
To switch between standby mode and power-on mode.
- ② **Number buttons**
To select program number.
- ③ **TWO-DIGIT NUMBER BUTTON**
To switch one or two-digit program number.
- ④ **Source selection**
Signal source select rapidly: TV, AV, S-VIDEO, SCART, YPbPr.
- ⑤ **SLEEP**
Setting sleep timer.
- ⑥ **SOUND**
To adjust the sound effect. There are 4 modes for you selection in this function: User, Music, Film and News.
- ⑦ **SETUP**
Brings up the main on-screen menu (press again to remove menu).
- ⑧ **Left/Right cursor (menu adjustment)**
To move leftward/ rightward or adjust the selected item in the menu, or adjust sound volume.
- ⑨ **SOUND-SYS**
To select sound system.

12 MUTE

To switch on sound or turn off sound.

13 RETURN

To exchange channel between the previous program and the current program.

14 PICTURE

To select picture mode: user, soft, standard, dynamic.

15 UP/DOWN cursor

To select upward/downward in the menu or change the channel.

16 PICTURE-SYS

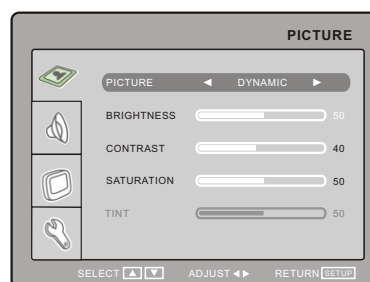
To select video system.

17 CHANNEL

To increase or decrease program number.

18 VOLUME

To increase or decrease volume.



Item	Description
PICTURE	Can be change between : "USER", "STANDARD", " DYNAMIC " and "SOFT ".
BRIGHTNESS	To adjust brightness .
CONTRAST	To adjust contrast.
SATURATION	To adjust color saturation.
TINT	To adjust picture tint, only valid in N 3.58/N 4.43/PAL60 and display mode with V-scanning frequency equal 59.94 (please refer to P18).

2.3 TV MENU SETUP

This product can store up to 100-channel programs (0~99). You can select your favorite channel through [CH+/-] or number buttons, and you can scan and store all of the channels through manual or automatic mode.

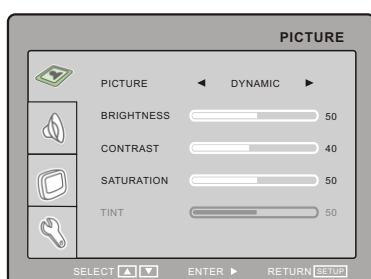
In TV mode, press [SETUP] button into the main menu and the main menu will show as follows:

Through pressing [▲/▼] button on the remote control, you can select main menu sections(main menu

sections consist of " PICTURE ", " SOUND ", " TV SETTING ", " SYSTEM SETTING ").

Press [▶] button to enter this menu section.

Press [▲/▼] button on the remote control to select the item, and then press [◀/▶] button to adjust parameter value. Press [SETUP] button to return to main menu sections.

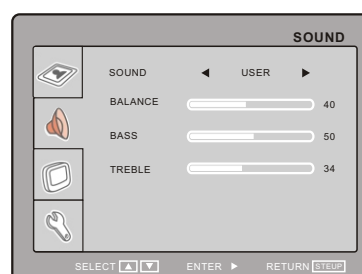


2.3.1 PICTURE

Select " " and menu will show as follows:
Press [▲/▼] button to select items and [◀/▶] button to adjust.

2.3.2 SOUND

Select " " and menu will show as follows:

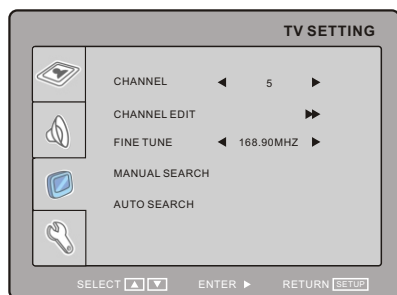


Press [▲/▼] button to select item and press [◀/▶] button to adjust . The following is sound item description.

Item	Description
SOUND	Can be change between "USER", "NEWS", "FILM" and "MUSIC".
BALANCE	To adjust balance of left and right channels.
BASS	To adjust bass.
TREBLE	To adjust treble.

2.3.3 TV SETTING

Select "  " and tuning menu will show as follows:



Press [▲/▼] button to select item and press [◀/▶] button to adjust or activate.

Item	Description
CHANNEL	To change the channel number.
CHANNEL EDIT	To enter a submenu to set channel skip and channel swap. Please refer the next page.
FINE TUNE	To adjust the channel frequency accurately to make the sound and picture effect better.
MANUAL SEARCH	To scan programs by manual.
AUTO SEARCH	To scan programs and store all of them automatically.

NOTE

During the searching, you can press [SETUP] button to stop.

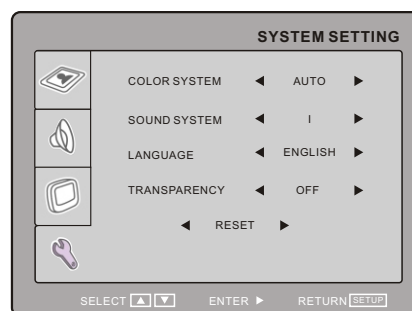


Item	Description
CHANNEL	To select current channel here.
SKIP	To select "Yes " or "No ", you can select "Yes " to make current channel inaccessible while using [CH+/-] button to browse channels.

SWAP	Select or enter the channel number directly to swap with current channel.
OK	Highlight this option and press the [▶] button to confirm the swap function.

2.3.4 SYSTEM SETTING

You can setup some system configuration here. Press [▲/▼] to select "  " item and press [▶] button to enter the following section:



Press [▲/▼] button to select item and press [◀/▶] button to adjust or activate.

Item	Description
COLOR SYSTEM	Can be changed between: "Auto", "PAL" and "SECAM".
SOUND SYSTEM	Can be changed between: "BG", "DK", "I" and "L" .
LANGUAGE	Select OSD language.
TRANSPARENCY	To change transparency of OSD.
RESET	To reset all value to default.

NOTES

Which "COLOR SYSTEM" mode and "SOUND SYSTEM" mode to use is related to your local TV broadcasting system.

SECAM system is only used by some European countries and districts, such as France.

If the local system is SECAM L, the color system must be selected as "SECAM" and sound system must be selected as "L".

2.3.5 NICAM/BILINGUAL RECEIVING

If you can receive Nicam/bilingual signal, you can operate as follows to enjoy that.

You can select Nicam stereo, mono channel or bilingual through NICAM button on the remote control. If stereo signal is too weak, this unit will switch into mono channel automatically.

When selecting mono channel, "MONO" will show on screen; when selecting bilingual, "DUAL1" will show on screen; when selecting bilingual II, "DUAL 2" will show on screen and when selecting stereo, "STEREO" will show on screen.

NOTE

Nicam/bilingual function is only effective in TV mode while program coming with Nicam/bilingual.

2.4 AV, S-VIDEO, SCART AND YPBPR SETUP

2.4.1 VIDEO SETTING MENU

When in AV/S-VIDEO/SCART input mode, there are 6 color system modes for selection: "Auto", "PAL", "N 3.58", "N 4.43", "PAL60" and "SECAM". Select the right system for your video program. If you do not know which mode your video playback devices and video media is using, you should select the auto mode or you should check and confirm this with your supplier.

The menu setup of AV/S-VIDEO/SCART modes is much the same as that of TV mode,

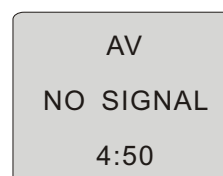
Except the " "section is invalid and a little difference in color and sound modes. In order to make this manual pithy and concise, it is not repeated here. You can find it in preceding pages.

The menu setup of YPBPR: press [SETUP] button to enter main section. Press [▲/▼] button to select sections and then press[►] button to enter. If all is done, please press [SETUP] button twice to exit and your setup data will be saved automatically. The " " section YPBPR used is the same as that of TV mode. Please refer to P12 for it.

NOTE

If no signal input in TV, AV, S-VIDEO, SCART, YPBPR, the screen will show like the following figure.

This unit will go into standby mode automatically with no signal input for more than 5 minutes.



If the input channel is SCART, this unit will automatically recognise RGB or CVBS signal of SCART; when normal RGB signal appears, this unit will automatically switch into RGB display mode. For this unit is combined by multiple functions, when inserting into SCART socket, it will not automatically switch into SCART mode. You have to select SCART channel through pressing [SCART] button, that is a little different with that of others TV set.

2.5 SPECIFICATIONS

Panel	Type Class Size Display Size Pixel Pitch Response time (ms) Brightness (Cd/m ²) Contrast ratio Viewing Angle (H) Viewing Angle (V) Panel Life (Hours)	TFT color II (ISO 13406-2) 15" 304.1 (H) x 228 (V) 0.297 (H) x 0.297 (V) 16 250 450:1 120 100 50 000
Frequency	Vertical Horizontal Display Color	50 Hz – 75 Hz 30kHz– 75 kHz 16 700 000
Display Mode	Optimum Mode	1024x768; 75 Hz

Inputs	Video	
	Composite (RF and AV)	2
	UPGRADE	1
	S-VIDEO	1
	SCART	1
	YPbPr	1
	Audio	
	Stereo	1
Outputs	Audio	
	Headphone	1
Color Systems	TV tuner	PAL, SECAM
	Video inputs	PAL, SECAM, NTSC 3.58, NTSC 4.43, PAL60
Sound Systems	TV tuner	DK, I, BG, L
Power adaptor	Input	~ 100 V – 240 V; 50/60 Hz; 1.5 A
	Output	12 V; 4.5 A; 54 W
Environmental Consideration	Operating Temperature	+5°C...+35 °C
	Operating Humidity	10% – 80%
	Storage Temperature	–20°C...+45 °C
	Storage Humidity	5% – 95%
Dimensions	438.7 mm x 163.1 mm x 295.7 mm	
Net Weight	5.5 kg	

These items are depended on the TFT panel, Design and specification are subject to change without notice.

2.6 DISPLAY MODE

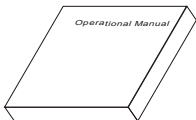
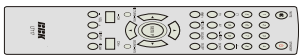
SUPPORTED VIDEO INPUT MODE			
Format	Hor scanning frequency	Ver scanning frequency	Vert scan type
720X480	31.47	59.94	480P
720X480	15.734	59.94	480i
720X576	31.25	50	576P
720X576	15.625	50	576i

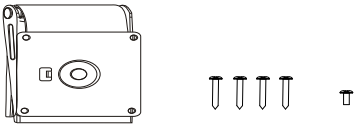
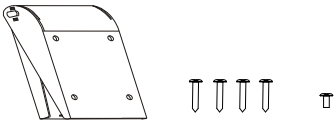
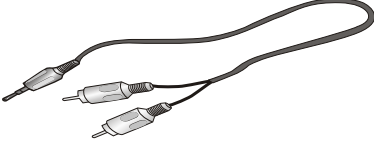
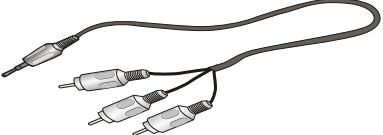
NOTE

Specifications and design are subject to change without notice.

2.7 ACCESSORIES

Please check the following accessories.

	
User manual	Remote control

 Wall Mount Holder Kit AK556(optional)	 Batteries(AAA×2)
 Wall Mount Holder Kit AK558(optional)	 Power adaptor
 Kickstand Kit	 Audio cord
 AV cord	

Chapter Three Principle and Servicing

Section One Principle of the Player

3.1.1 Brief introduction to the player

LT1500S is a 15" LCD TV set and the electronic scheme adopts SVA150XG04TB 15" TFT+inverter components (INV203)+MST518VA+TVP5147+STV8216+TDA7266P+tuner JS-6B2/121+ CPU (W79E632A40PNA40PN), which supports the demodulation of PAL BG/DK/I and SECAM BG/DK/L/L' RF signals; supports PAL/NTSC/SECAM/PAL60 multi-system video signals; support the demodulation of FM, NICAM, A2 Stereo signals of BG/DK/I/LL/L' accompanying sound system and the accompanying sound restore; support multiple input modes of external input, SCART, S-VIDEO, composite video and components video. This model is mainly composed of power amplifier board, boost components, main video board, button board, remote control receiving board and TUNEL board.

Our company adopts TFT (Thin Film Transistor) screen, that is each LCD pixel spot is driven by the thin film transistor integrated behind the pixel spot to display information in high speed, high brightness and high contrast. TFT-LCD is one of the best LCD colourful display device at present and its effect is close to CRT display. Each pixel spot of TFT-LCD is controlled by the TFT integrated on itself, which is active pixel spot. Therefore, the speed may be enhanced greatly and also the contrast and brightness, meanwhile resolution can be up to high level. The main merits of TFT-LCD is that screen response speed is fast; contrast and brightness are high; observing angle of screen is large; colour is rich and resolution is high.

3.1.2 Block diagram of the player

Block diagram of the player is shown in the figure 3.1.2.1:

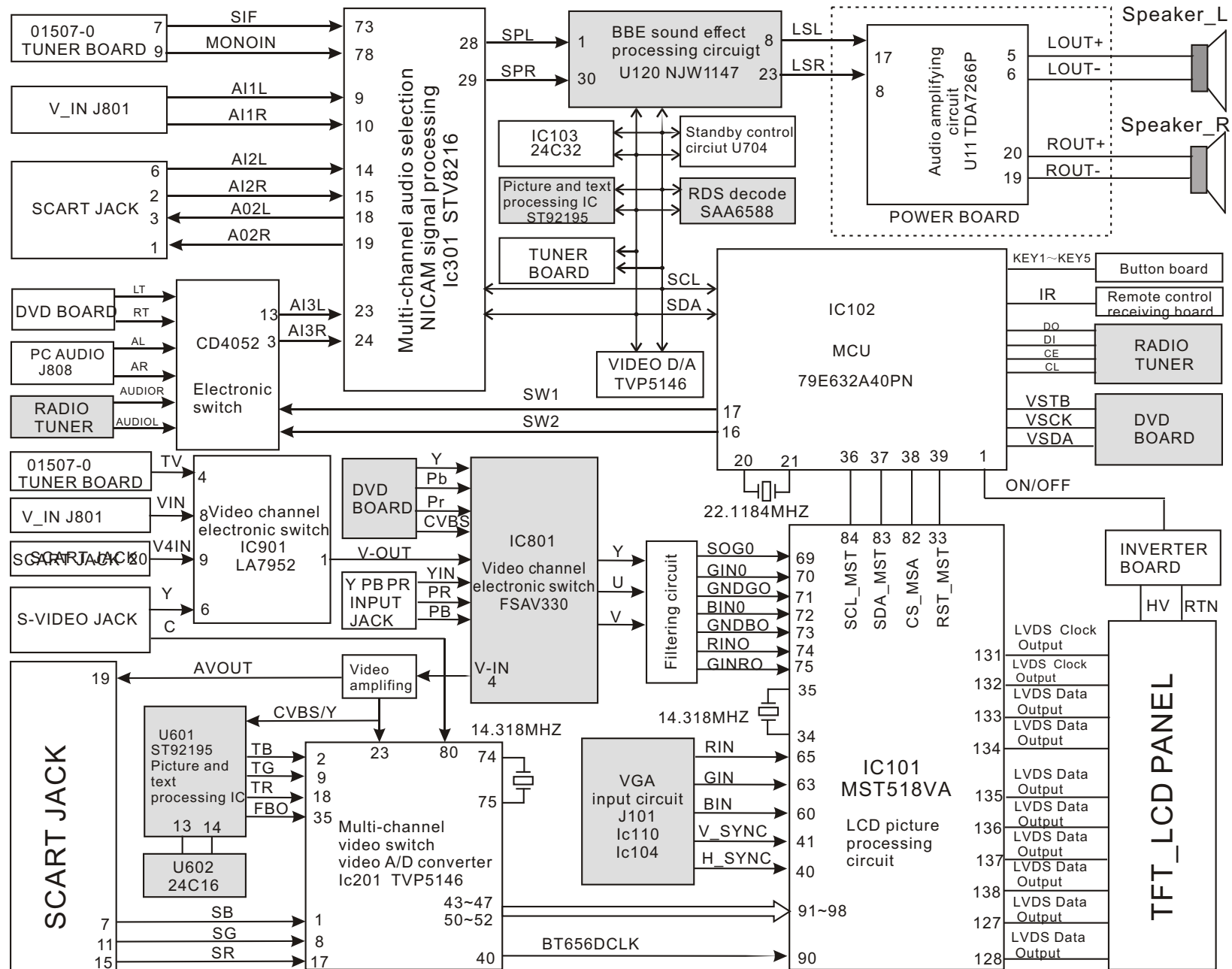


figure 3.1.3.1 Block diagram of the player

As for main board design, it has functions of radio set, picture and text display, BBE sound effect processing, component video input and VGA input/DVD. According to LT1500S' design demands, this player does not have the function with gray frame and the VGA terminal is only used as the jack for software upgrading of the product.

3.1.3 Introduction to IC used by the player

Introduction to IC of the player is shown as in the following table:

SN	Material code	Material name	Specs & model	Qty	Location	Function description
1	882030	IC	STV8216 TQFP	1	IC301	Video A/D converter
2	882485	IC	AZ1117H-3.3 SOT-223	4	IC106, IC111, IC202, IC303	Voltage stabilizing IC
3	883247	IC	AZ1084S-ADJ TO-263-3L	1	IC702	3.3V voltage stabilizing IC
4	790126	SMD FET	FDS9435A SOP	1	Q709	MOS tube (power switch control)
5	882112	IC	LA7952 SIP	1	IC901	Video electronic switch (video output selection)
6	882121	IC	AK18 SOT-223	2	IC203, IC105	Voltage stabilizing IC
7	882376	IC	TVP5146M1 PQFP	1	IC201	Multi-channel sound source selection NICAM processing
8	882515	IC	HEF4052BT SOP	1	U111	Audio input selection electronic switch
9	882638	IC	MST518VA PQFP	1	IC101	LCD image processor
10	880504	IC	24C32N SOP	1	IC103	Save user information (32K memorizer)
11	1020028	Tuner	JS-6B2/121	1	T1	Receiver high frequency signal and invert to audio/video signal
12	882637	IC	W79E632A40PN PLCC	1	U15	MCU (programmable)
13	900442	Software program EPROM	ROMLT1500S-0A(512B)	1	U704	Standby control IC
14	883149	IC	TDA7266P SSO24	1	U1	Audio amplifying circuit
15	882945	IC	MP1430DN SOP	2	IC1/IC3	5V voltage stabilizing IC
16	8824629	IC	AZ431AZ-A TO-92	1	U3	3-end precision voltage stabilizer
17	883304	IC	NCP1337 SOP\$	1	U1	Power box power IC
18	10800118	Photoelectric coupler	HS817\$	1	U2	Photoelectric coupler

Section Two Unit Circuit Principle

3.2.1 System control circuit

System control circuit is mainly composed of rest circuit, clock circuit and central micro processor (W79E632A40PN). W79E632A40PN is responsible for the coordination and control of the player's system and also it is a programmable MCU processor; each I/O port function may be adjusted through software and external device's upgrading is supportable.

1. System reset circuit

(1) System reset circuit is shown in the figure 3.2.1.1:

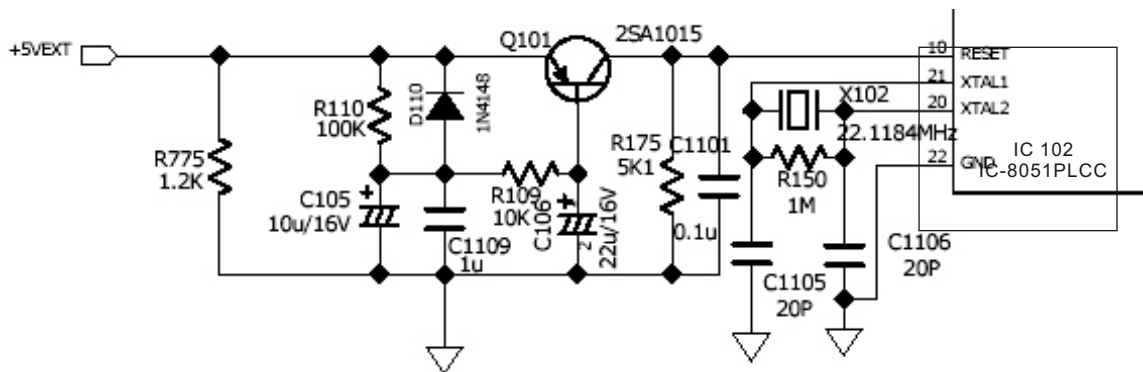


Figure 3.2.1.1 System reset circuit diagram

(2) Working principle: this circuit is a typical and high level effective reset circuit. After power on, "+5VEXT" skips from 0V to 5V to supply power for system control circuit and also charge C105 through R110 at the same time. Since voltage on two ends of C105 cannot change suddenly, now 5V power supplies a high level reset signal to pin 10 of Ic102 through C-E electrode of Q101 to reset W79E632A40PN. After capacitor C106 is fully charged, voltage on two ends is close to 5V, and now Q101 cuts off and voltage of pin 10 of W79E632A40PN restores to low level to finish reset action. Reset time of this circuit is about 100MS, shown in figure 2, and this time depends on the value of R110 and C105. Function of D110 in figure 3.2.1.1 is discharge C106 quickly after power off to ensure the reliable reset when power on for the second time. Default of this circuit is that after power on this player cannot enter standby state or system down.

2. System clock circuit

(1) System clock circuit is shown in the figure 3.2.1.2:

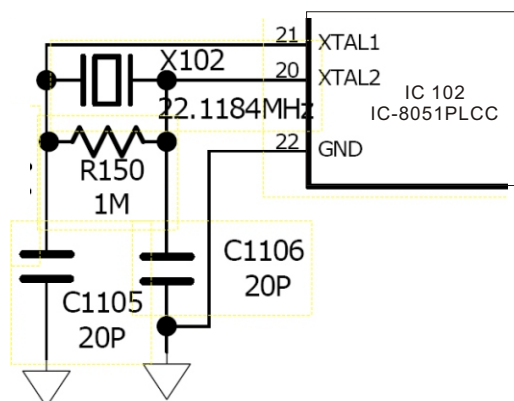


Figure 3.2.1.2 System clock circuit diagram

(2) Working principle: this clock circuit is mainly composed of X102 and C1105 C1106. X102 is a 22.1184MHZ crystal oscillator and C1105 C1106 are two externally connected resonance capacitors to generate a 22.1184MHZ clock signal, which is supplied to W79E632A to generate clock signals required by system through internal doubling circuit to act as the working clock.

3. System control circuit

(1) System control circuit block diagram is shown in the figure 3.2.1.3:

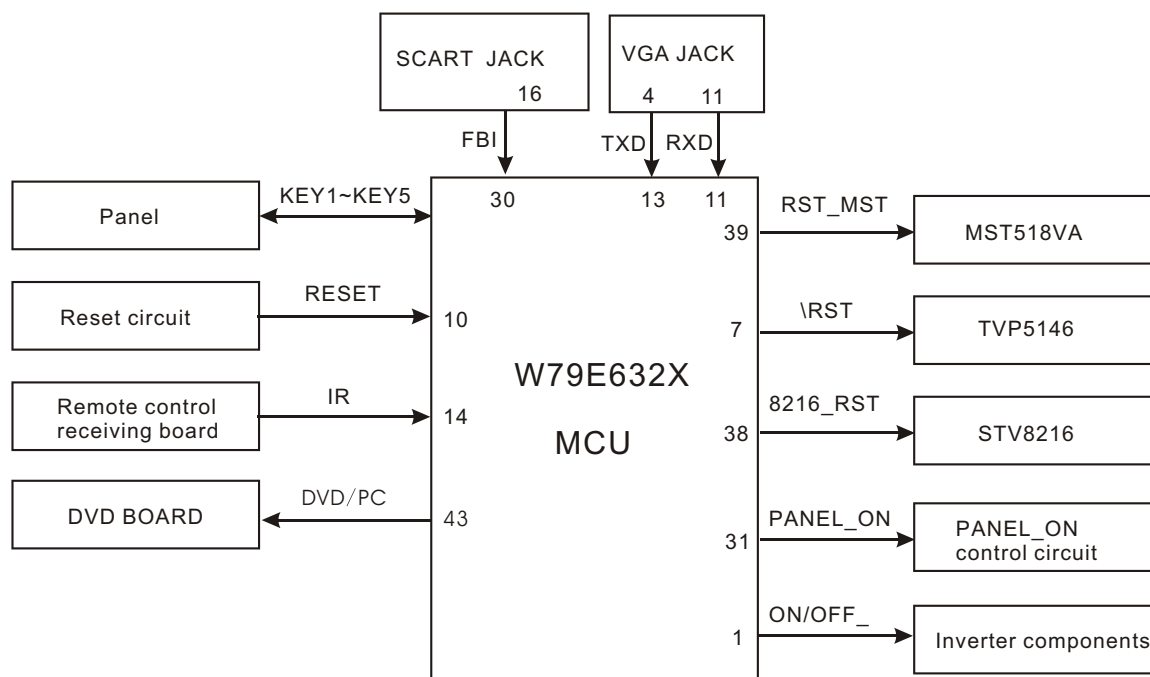


Figure 3.2.1.3 System control circuit block diagram

(2) Working principle

Power on: the 12V power inputted by power adapter is inputted to IC3/Q502 through polarity protection circuit. 12V power outputs 5V power through being adjusted by IC3 to supply power for DVD main board, power management chip (U704) on TV main board and standby indication circuit on panel. Now, other circuit has no power supply and machine enters standby state.

The process for entering power on from standby: after pressing POWER button on panel or WAKE code on remote controller, pin 5 of IC-12C508A outputs a high level signal, Q706 cuts off, STB changes from low level to high level, Q506/Q502 on power amplifier board is connected, 12V power is supplied to boost board through video board and adjusted at +5V power through Ic1 to supply power for main video board (as for the machine with version SI2.60, power amplifier board number is @31507-4, power is supplied for main board through IC1 voltage stabilizing; as for machine with version SI2.40, power amplifier board number is @31507-3, power is supplied for main board through lead wire after IC1 voltage stabilizing. Because @31507-3 UL socket J2 is 6P socket and 21507-7 socket CN802 is 6P socket, when using a lead wire must be added between power board and main video board to connect anode of power amplifier board CE5 and L503 on main video board, and cut off the copper foil between CE5 anode and C1 anode at the same time. IC1 is not used on the power amplifier board of the machine with version SI2.30 and this IC's location number is IC501 when used on video board. After power on, system begins to reset, normal picture outputs and the player enters normal working state.

The process for entering standby state from working state: when machine begins to enter standby state, pin 5 of U704 outputs high level, pin STB outputs low level to make Q502, Q505 on power amplifier board cut off, +12V power does not output to main video board and machine enters standby state.

4. IIC main line control circuit

(1) IIC main line control circuit is shown in the figure 3.2.1.4:

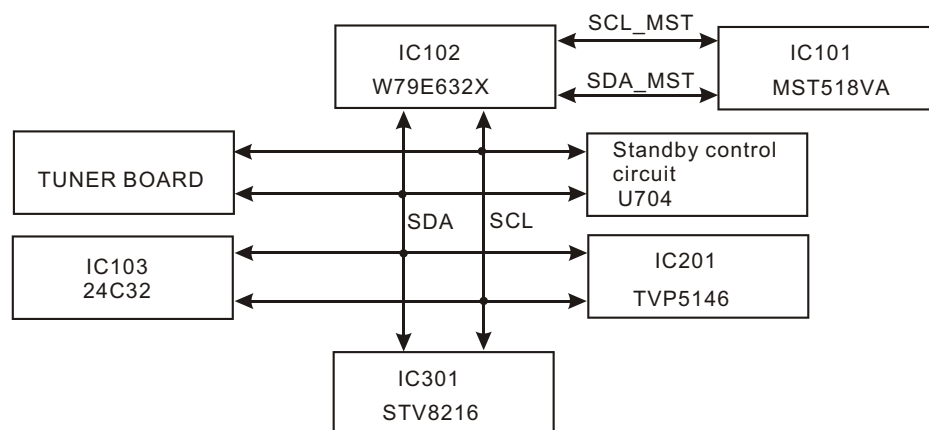


Figure 3.2.1.4 IC main line control circuit block diagram

(2) Working principle: IIC main line is a kind of simple bidirectional two-wire system and synchronized serial main line developed by PHILIPS Company. Only two lines (serial clock line and serial data line) are needed to convey information among the elements on main line. This main line is high performance line with functions of the ruling and high/low speed equipment synchronization require by multi-main engines system, IC103 is a 32K memorizer to store user information mainly. Since IIC main line has the problem of level matching, some level switch circuits are selected, such as Q720 and Q721 according to different IC.

5. Working state indication circuit

(1) Working state indication circuit is shown in the figure 3.2.5.1:

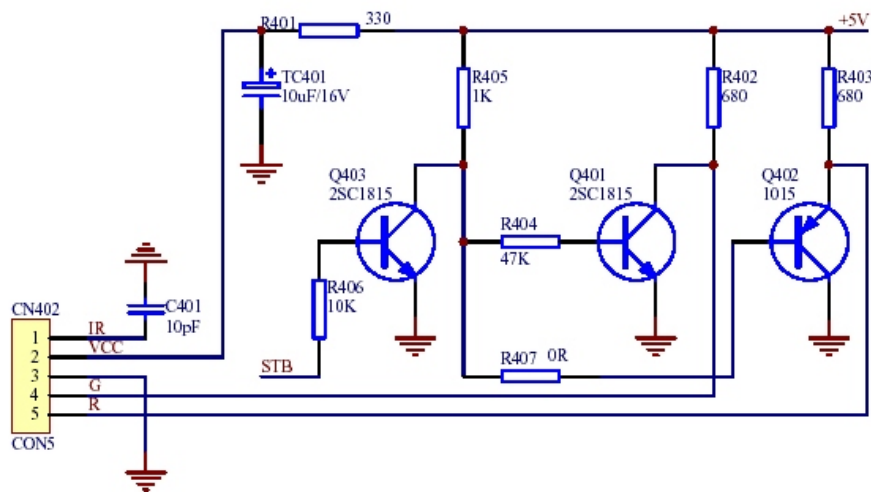


Figure 3.2.5.1 Working state indication circuit diagram

(2) Working principle: this circuit is mainly used to indicate working state of the player and also decide machine fault. After machine power on and enters standby state, U704 outputs high level, Q706 is saturated on, STB is low level to control two circuits at the same time: one circuit is standby indicator light control circuit and the other is standby power control circuit. When STB pin is low level, Q403 and Q402 on panel cut off, +5V power is supplied for the red indicator light on subsidiary board through R403. If red indicator light is on, it means that machine enters standby working state. After machine power on, STB is high level, Q403/Q402 is connected, Q401 cuts off, 5V power is supplied for green light on subsidiary board through R402. If green light is on, it means that machine enters working state and standby indication realizes.

6. Remote control circuit

The remote control signals received by remote control receiver on subsidiary board are connected to CPU of main video board and standby control IC through panel. When machine is in standby state, since subsidiary remote control board and panel use CPU 5V power supply, there is power supply in standby

State. When remote control receiver receives wake code sent out by remote controller, the code is transmitted to the remote control input pin of standby control IC and pin 5 of standby control IC outputs low level to carry out power-on action. When machine is working normally, remote control order is inputted to pin 14 of MCU through IR pin and then decoded by W79E632A40PN inside to carry out control action and realize remote control function.

3.2.2 Audio circuit

Audio processing circuit is responsible for the switch, amplifying of audio and restoring analog audio and mainly composed of sound source input selection, NICAM processing circuit, audio amplifying circuit and mute control circuit, shown in the figure 3.2.2.1:

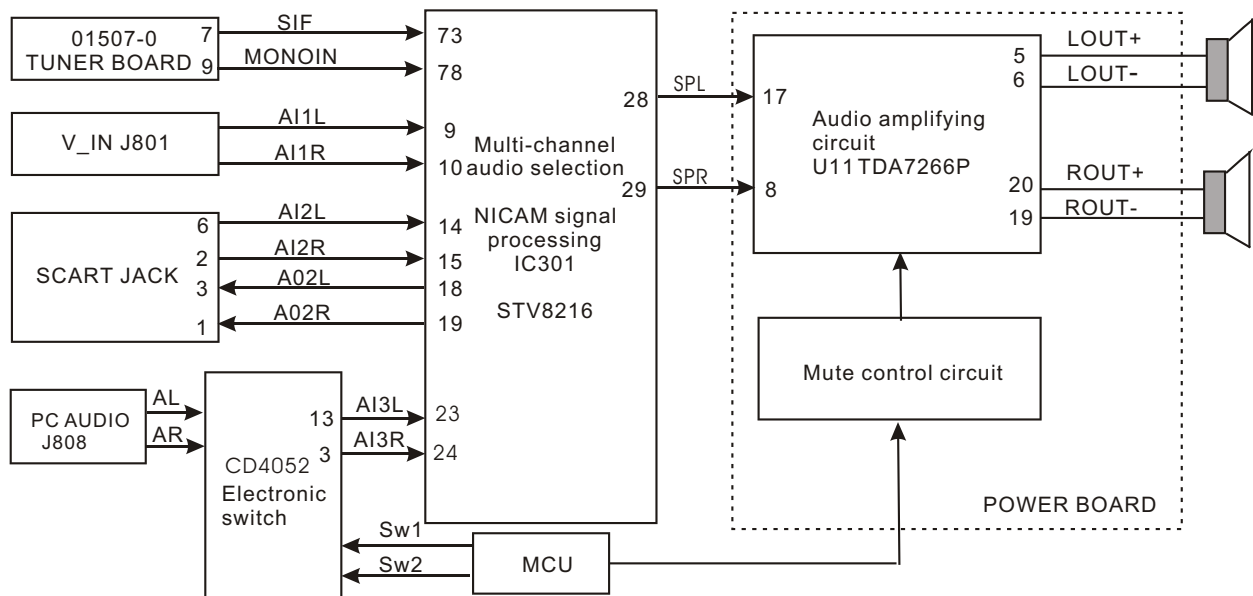


Figure 3.2.2.1 Audio processing circuit block diagram

1. NICAM processing circuit

(1) What is NICAM: The core technology of NICAM is NICAM728 technology developed by BBC and its meaning is "Near Instantaneous Companded Audio Multiplex", which is NICAM. Besides transmitting TV image and stimulating mono channel signals, NICAM visual broadcast system also transmits two-channel digital coding audio signals. NICAM is famous for its clear tweeter and deep bass, with the transaudiant quality close to directly listening to CD disk. As for aspects of SNR, dynamic range and channel separation, NICAM is far better than the current FM accompanying sound. Acting as accompanying sound of TV, NICAM applies 3 kinds of working means at present: 1) Double language means: NICAM transmits two-channel digital sound relevant or irrelevant to the current programme and then transmits 3-channel audio signals together with the original FM accompanying sound, which is used

N multi-language area; 2) Stereo means: two NICAM digital channels transmit left and right stereo channel audio signals separately, and the original FM accompanying sound channel only transmits the mixed audio signals of the two channels to make it compatible with TV set without NICAM function; 3) Mono channel means: two channels of NICAM transmit one channel audio signals and one channel data signals separately, with the original TV accompanying sound added, it equals to providing 3-channel signals, in which two-channel are audio signals and one channel is data signal.

(2) NICAM processing circuit: after tuner receives NICAM signal outputs from pin 11 of tuner (SIF) to Pin 73 of STV8216 through the filtering circuit composed by elements of C301 and C302, after being demodulated by STV8216 internal circuit, two audio signals are reverted to audio signals to output from pin 28, 29 of STV8216 and send to audio amplifying circuit. STV8216 internal block diagram is shown in the figure 3.2.2.2:

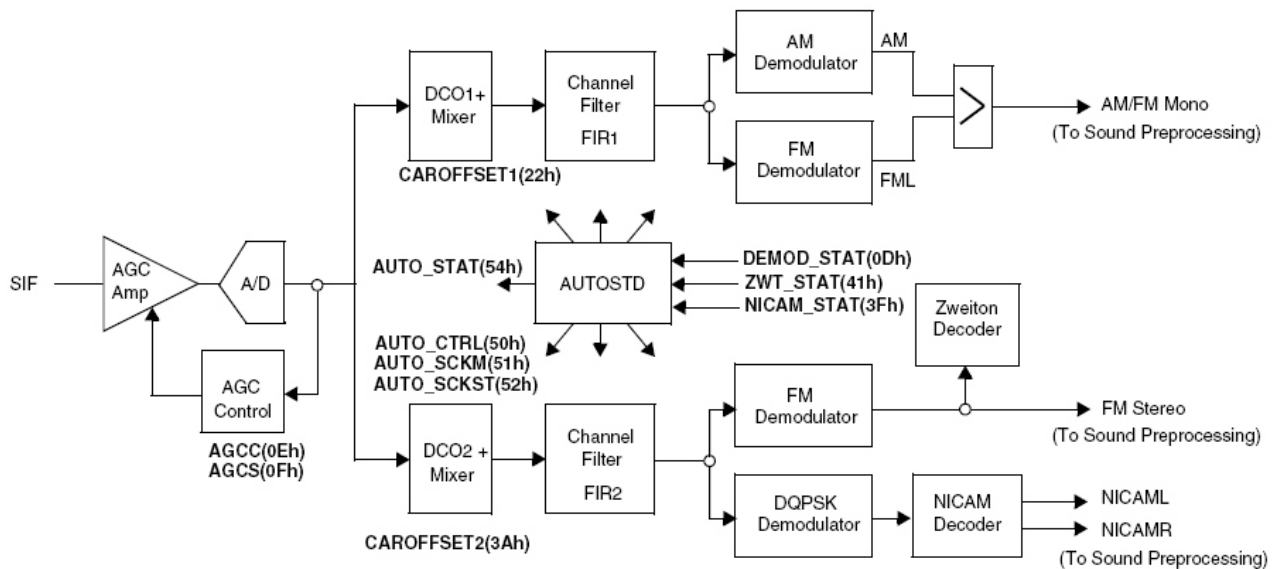


Figure 3.2.2.2 STV8216 internal block diagram

2. Input sound source selection circuit

Besides NICAM processing function, STV8216 also includes multi-channel sound source selection function. After machine enters power-on state from standby, system sends out a low level effective reset signal to pin 43 of STV8216 to reset STV8216. IIC main line means is adopted between STV8216 and W79E632A40PN for communication. When system working state is set in SCART input, STV8216 switches to SCART_IN signal for processing under control of W79E632A40PN, now the output of pin 28, 29 of STV8216 is audio signals inputted by SCART_IN and audio signals output from pin 18, 19 at the Same time to act as external input signals; working principle of other groups of sound source input is the same basically, so we will not give introduction.

This player has many external input sources and the original port cannot meet the demands, so a CD4052 is added at the front of STV8216 to switch DVDR and PC AUDIO input port.

3. Audio amplifying circuit

(1) Audio amplifying circuit is shown in the figure 3.2.2.3:

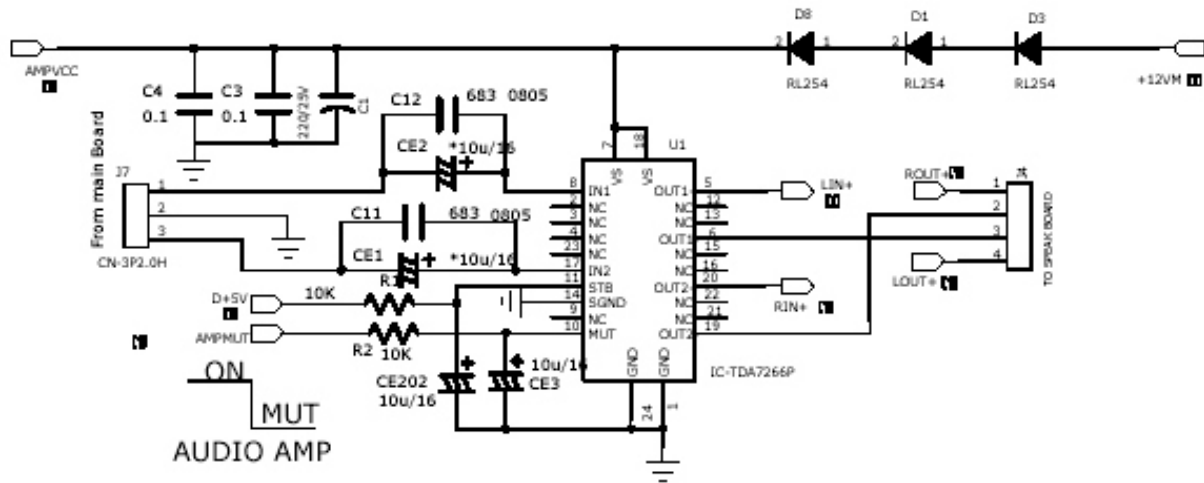


Figure 3.2.2.3 Audio amplifying circuit

(2) Working principle: TDA7266P is a 3W double bridge audio amplifier. Audio signals input through pin 8, 17 of TDA7266P, after being amplified by internal double bridge audio amplifier, output from pin 5, 6, 19, 20 of TDA7266P to drive loudspeaker to make sounds. This IC adopts +10V power supply, D1/D8/D3 is voltage drop diode, pin 11 is standby control pin and not used in this player, pin 10 is mute pin.

4. Audio control circuit

(1) Audio control circuit is shown in the figure 3.2.2.4:

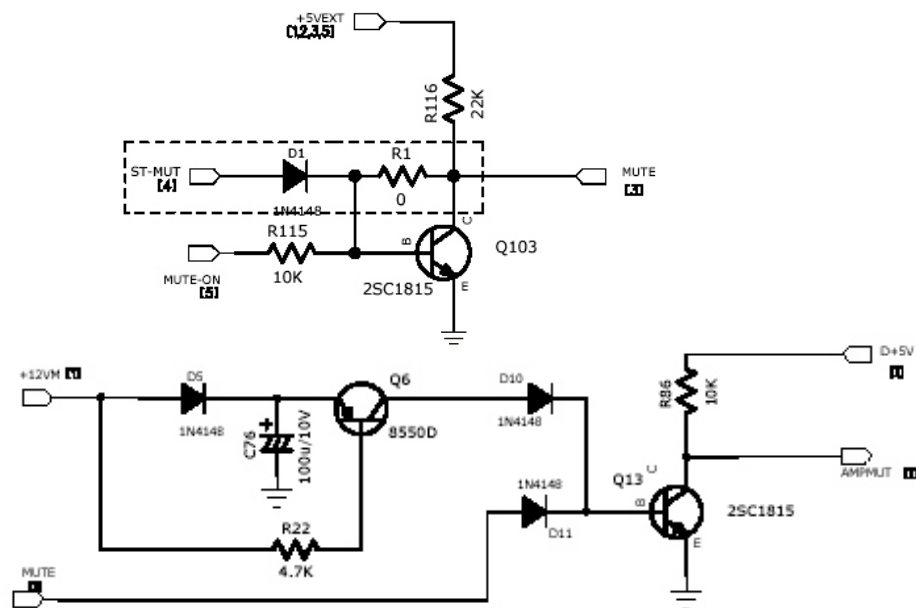


Figure 3.2.2.4 Audio control circuit diagram

(2) Working principle

Power-on mute: after machine power on, pin 2 of standby control IC outputs a high signal to make Q13 saturated on through D1, D11, pin 10 of TDA7266P is low level, TDA7266P enters mute state to realize power-on mute.

Power-on mute: after machine power on, pin MUT_ON of MCU outputs a high level to make Q103 saturated through R115, pin MUTE is low level signal, Q13 cuts off, pin AMPMUT is high level, TDA7266P enters working state to realize power-on mute.

Power-off mute: after machine enters standby mode from working state or switches off power, for CE36 has been fully charged when power on, after power off CE36 discharges through Q16/D10 to make Q13 on, now pin 10 of TDA7266P maintains low level to realize power-off mute function.

3.2.3 Video circuit

Video circuit includes video input selection, video A/D conversion circuit, LCD image processing circuit and video output circuit. Video circuit block diagram is shown in the figure 3.2.3.1:

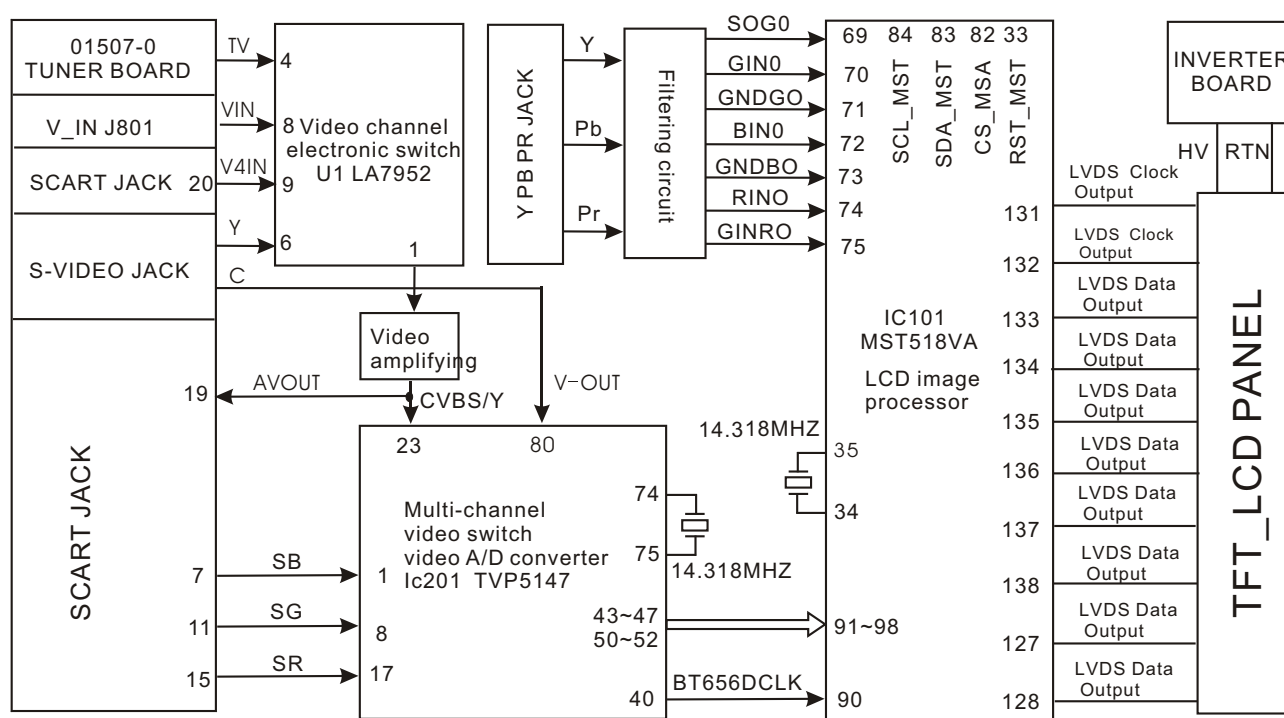


Figure 3.2.3.1 Video block diagram of the player

1. Video input and A/D conversion circuit

This circuit is mainly composed of TVP5146 and peripheral elements. TVP5146 supports NTSC, PAL and SECAM system video signals. The supportable video signal format has RGB, YPbPr, CVBS or S-video video, with built-in A/D converter added to realize multi-format conversion. External input video

Signal of LT1500S has S-VIDEO, SCART-RGB, SCART-CVBS, Y/Pb/Pr and TUNER-CVBS. External input video signal of LT1506SI has DVD(Y/cb/Cr), composite video input and TUNER-CVBS function.

When machine is set in S-VIDEO input, S_C_IN directly inputs to pin 80 of TVP5146. S_Y_IN signal inputs to pin 2 of video 1-in-4 electronic switch La7952 and then outputs from pin 1 through being selected by electronic switch, after being amplified by the video amplifying circuit composed by Q901 and Q904, output to SCART output pin and pin 23 of TVP5146. Pin 80 of TVP5146 inputs C signal and Y signal of pin 23, through TVP5146 inside processing, converter to digital video signal and then output to LCD picture processing chip MST518VA from pin 43~47, 50~52 of TVP5146.

2. LCD image processing circuit

LCD image processing circuit is composed of MST518VA and peripheral elements, responsible for switching the inputted digital video signal or analog video signal to signals required by LCD drive. MST518 is a high performance and high integrated image processing chip designed for LCD and can support SXGA format (1280×1024). It integrates one group of high performance A/D converter, high quality format change system, OSD generator, output clock generator and multi-format output display jack (support TTL, LVDS, RSDS). This player adopts digital signal input, which inputs from pin 91~98 of MST518VA, and TVP5146 supplies a 27MHZ clock signal to MST518VA. W79E632A40PN performs data exchange and control to MST518VA through main line means. MST518VA has multi-format output display jack and LVDS output means is adopted in this player and the output means may be adjusted through software according to screen's drive means. MST518VA outputs 6-channel data and 2-channel clock signal to drive display screen whose working voltage is 3.3V.

3.2.4 Input circuit

TV set has many external input means and this player has SCART, S-VIDEO, CVBS and Y/PB/PR input means, and also composite video and stereo audio output function.

1. SCART terminal introduction

SCART terminal is an European standard input port. In this jack circuit, many bidirectional diode are used, who act as protection function in the circuit to prevent external device from damaging machine because of its instability or large static electricity to strengthen machine's stability. SCART pin function is shown on the figure:

Pin	Name	Signal direction	Function description	Pin	Name	Signal direction	Function description
1	A(B)OUT	I	Audio right channel input	12	NC		Network communication data line 2
2	A(B)IN	O	Audio right channel output	13	RETURN		Pr signal ground
3	A(A)OUT	I	Audio left channel input	14	RETURN		Blanking signal ground

4	A-COM		Audio signal ground	15	RED I/O	I/O	Pr signal I/O port
5	RETURN		Pb signal ground	16	BLK I/O	I/O	Blanking signal I/O port ★
6	A(A)IN	O	Audio left channel output	17	RETURN		Blanking signal ground
7	BLUE I/O	I/O	Pb signal I/O port	18	TRTURN		Composite video signal ground
8	FUNCSW	I	Function selection jack	19	V-OUT	I	Composite video signal input
9	RETURN		Y1 signal ground	20	V-IN	O	Composite video signal output
10	CONT	I/O	Network communication data line 2	21	GND		Common
11	GREEN I/O	I/O	Y1 signal I/O port				

2. Tuner circuit

(1) Tuner circuit is shown in the figure 3.2.4.1:

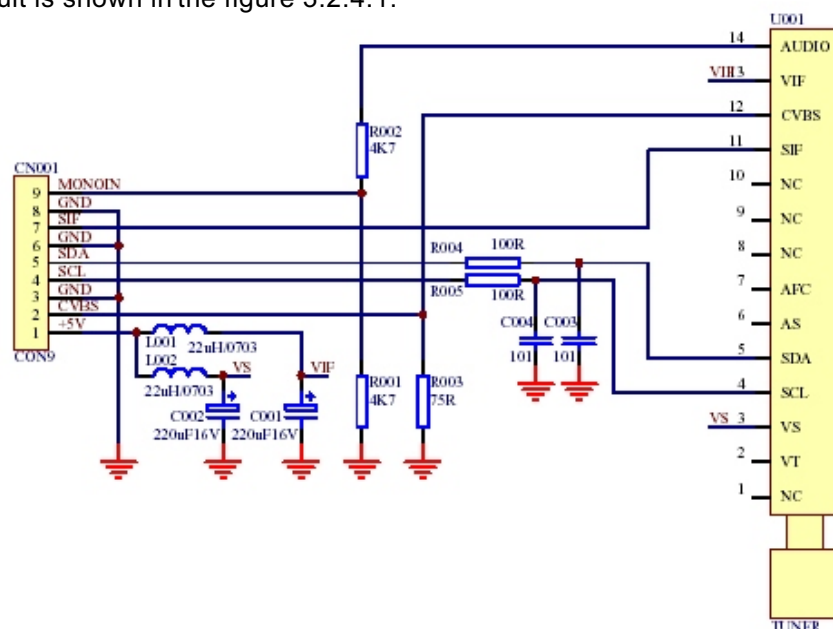


Figure 3.2.4.1 Tuner circuit diagram

(2) Working principle: this tuner includes intermediate frequency amplifying circuit and IIC main line means is adopted to control functions (such as select channel and search channel) by W79E632. After high frequency signals are demodulated, filter through the inside filter of tuner to separate video audio signals, who output from pin 12, 14 of tuner to send to video and audio processing circuit. After tuner receives NICAM signal, NICAM signal outputs from pin 11 of tuner to STV8216 for demodulating.

(3) Tuner pins function is shown in the following table:

Pin	Name	Function	Pin	Name	Function
1	NC	NC	8	NC	NC
2	VT	NC	9	NC	NC
3	VS	(+5V power supply pin)	10	NC	NC
4	SCL	SCL is connected with MCU	11	SIF	NICAM jack

5	SDA	SDA is connected with MCU	12	TUNER_CVBS	Video output
6	AS	GND	13	VIF	5V power is connected externally
7	AFC	NC	14	AUDIO	Audio output

3.2.5 Power circuit

Power circuit supplies stable and pure power for each unit circuit to ensure normal working of the player. Power circuit block diagram is shown in the figure 3.2.5.1:

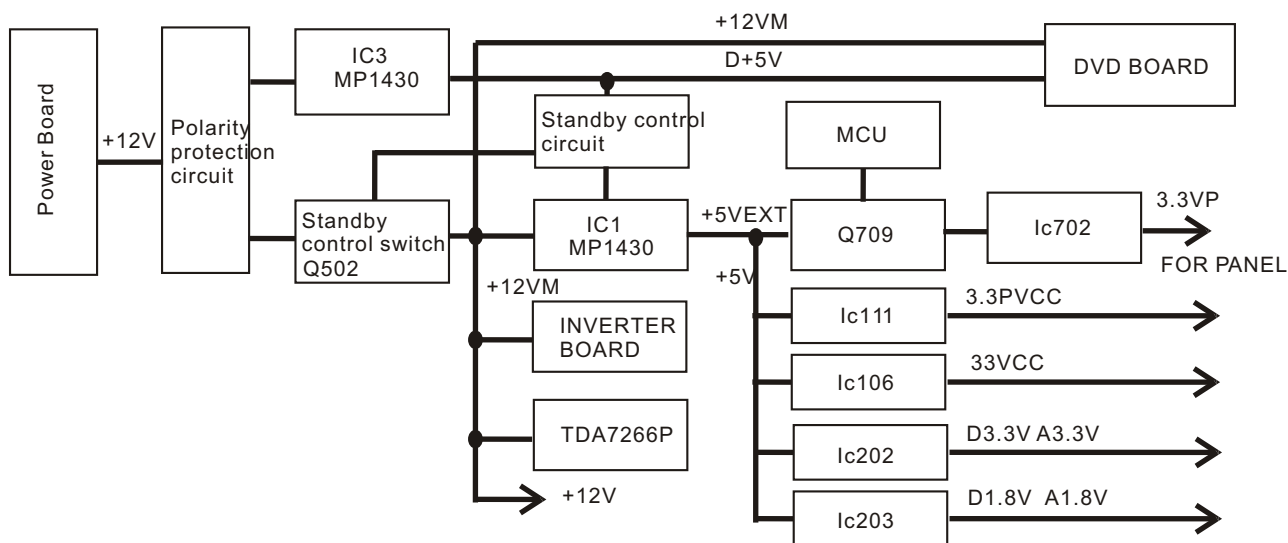


Figure 3.2.5.1 Power circuit block diagram

1. Input protection circuit

(1) Input protection circuit is shown in the figure 3.2.5.2:

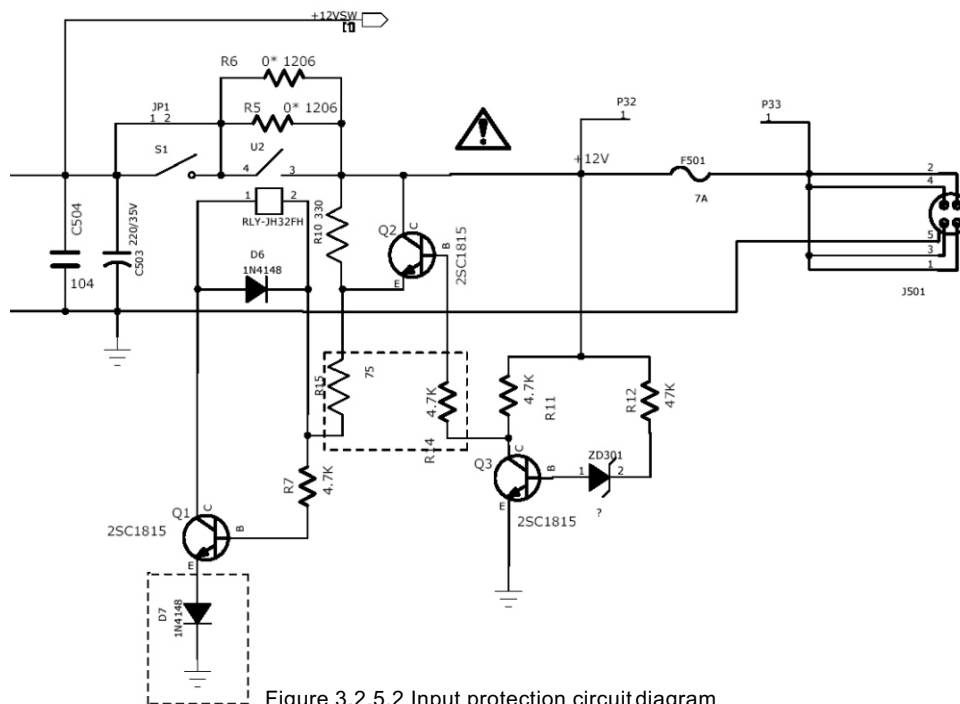


Figure 3.2.5.2 Input protection circuit diagram

(2) Working principle

Over-current protection: when external input voltage is too high or current is too large, fuse will be cut off to perform protection function.

Polarity protection: when external input polarity is connected reversely, Q1 cuts off, U2 has no current through, relay cuts off, load has no power supply to realize protection function. When polarity is correct, Q1 is connected, there is current, relay closes and load supplies power normally.

2. Standby control circuit

(1) Standby control circuit is shown in the figure 3.2.5.3:

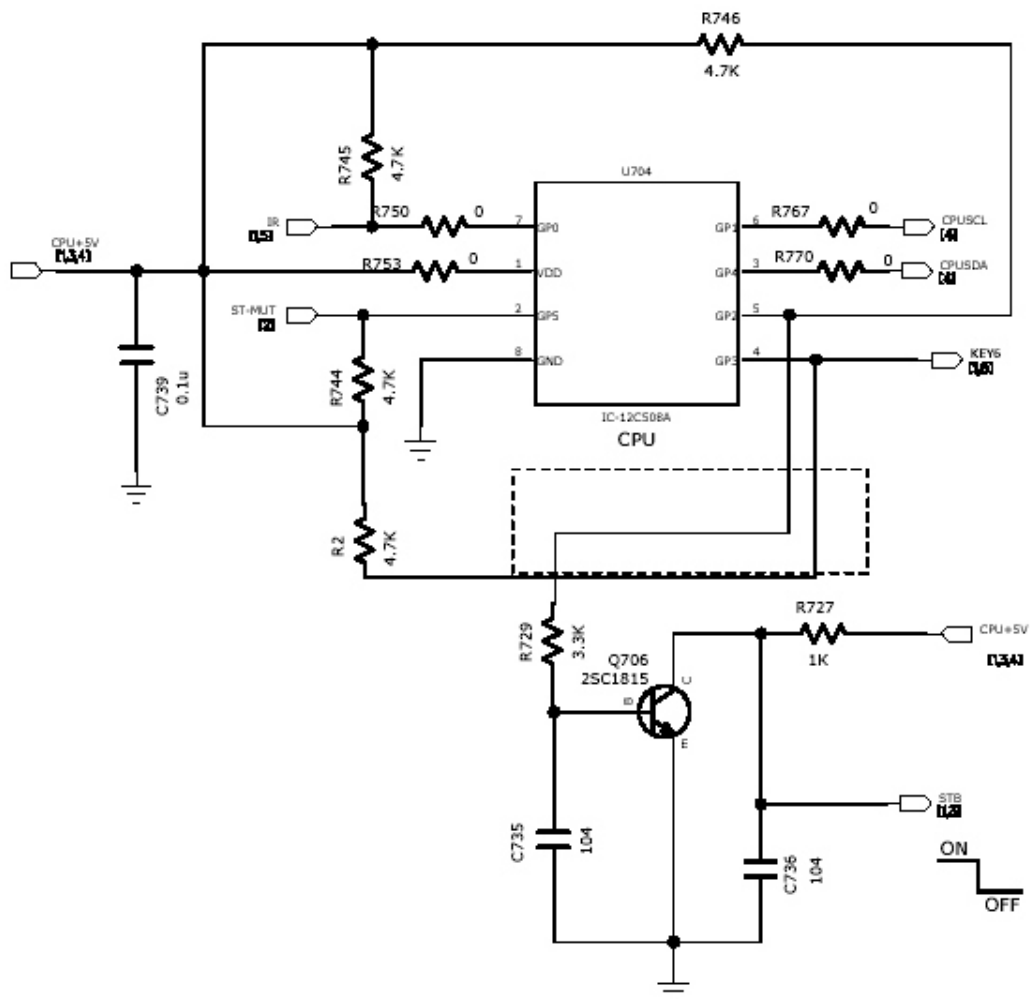


Figure 3.2.5.3 Standby control circuit diagram

(2) Working principle: U704 in the diagram is a small monolithic integrated circuit IC with built-in company's program code (pay attention whether software is in accordance when changing). When machine is in standby state, this IC has power board to supply CPU5V power directly. After pressing POWER button on panel, KEY6 port has high level to change into low level, now inside of U704 is

3. Power control circuit

4. D+5V voltage stabilizing circuit

[illegible]

- 26 -

5. +5VEXT power voltage stabilizing circuit

12V power controlled by Q502 is supplied for DVD board, INVERTER BOARD, TDA7266P and Ic1, in which Ic1 is a voltage-drop style voltage stabilizing IC and its working principle is the same with that of D+5V voltage stabilizing circuit, who mainly supplies +5VEXT for each circuit of video main board. The schematic diagram is shown in the figure 3.2.5.5:

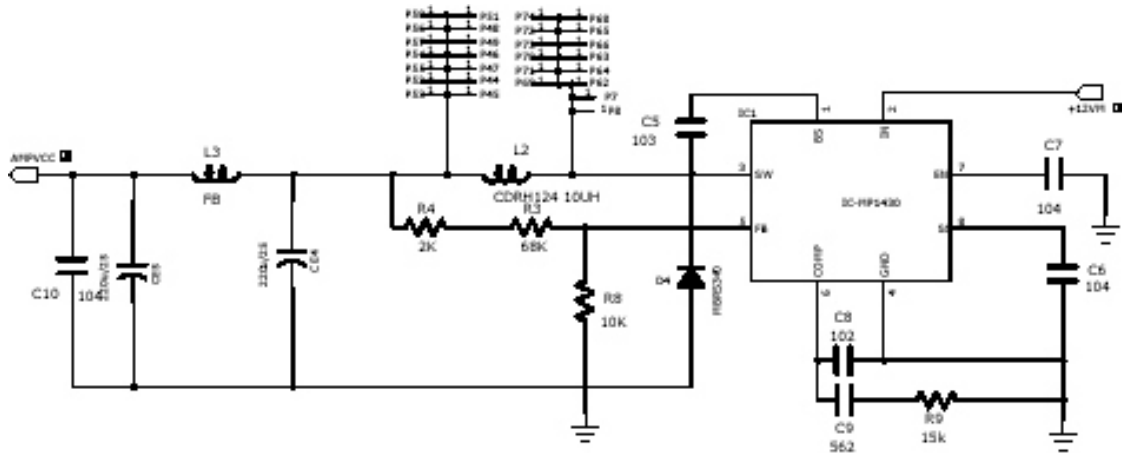


Figure 3.2.5.5 +5VEXT power voltage stabilizing circuit diagram

6. Display screen power supply circuit

(1) Display screen power supply circuit is shown in the figure 3.2.5.6:

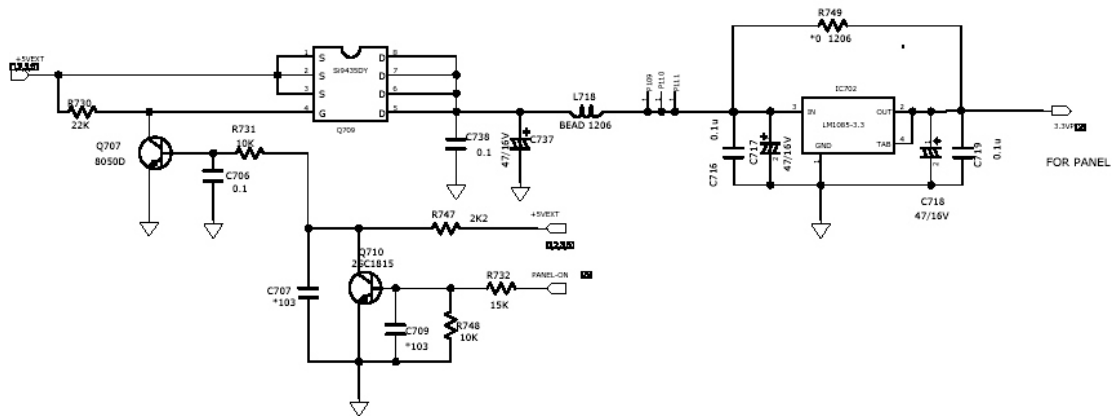


Figure 3.2.5.6 Display screen power supply circuit diagram

(2) Working principle: Q709 is also a MOS tube that mainly controls PANEL power and voltage of this power is decided by the specification of screen. At present, our company uses +3.3V/5V and +12V. +3.3V is used in this player and the control process is that after machine power on pin PANEL_ON of W79E632A40PN outputs low level to make Q710 cut off, which makes Q707 saturated on, Q709 is also on and display screen power supply is normal. After machine enters standby state, pin PANEL_ON of W79E632A40PN outputs high level to make Q710 on, Q707 cuts off, control end of Q709 is high level and 3.3VP has no voltage output.

7. Inverter components control circuit

(1) Inverter components control circuit is shown in the figure 3.2.5.7:

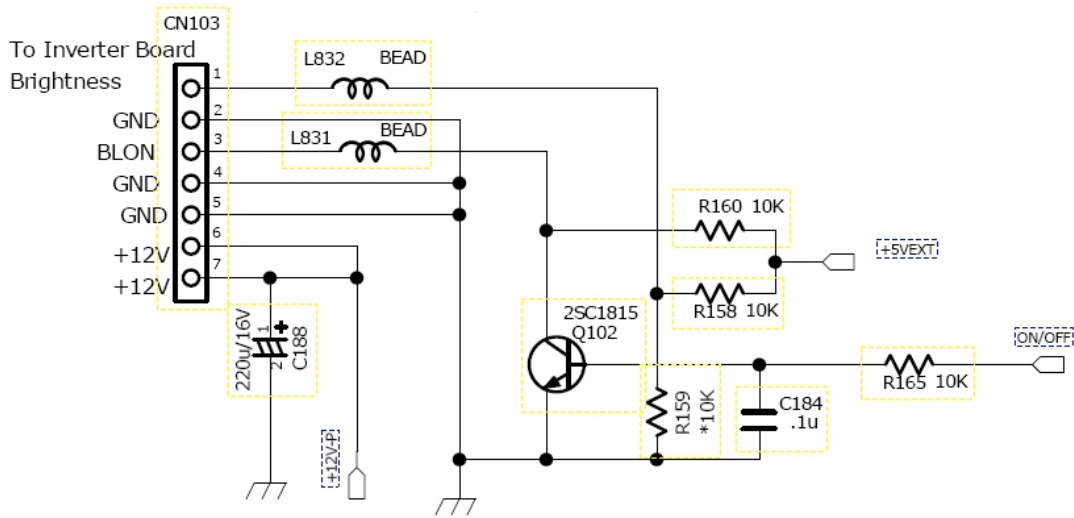


Figure 3.2.5.7 Inverter components control circuit diagram

(2) Working principle: after machine power on, +12V power is normal, machine is in standby state, pin ON/OFF of MCU outputs high level, Q102 is saturated on, pin 3 of Cn103 is low level and boost board stops working. When machine enters power-on state from standby, pin ON/OFF of MCU outputs low level, Q102 cuts off, pin 3 of Cn103 is high level and boost board enters working state.

8. Inverter components principle

(1) Brief introduction to CCFL back light source

This player adopts CCFL back light source. When CCFL back light source cools (during a period without running), to activate CCFL back light source, 1600V high voltage electricity is needed, which is 3 times of that when in running (average voltage is 500-800V). CCFL back light source is positive resistance at the beginning and then changes to negative resistance above 1mA. These features mean that it has high output impedance (current source) who can resist negative load resistance effect and can limit current when activating CCFL back light source. To provide CCFL back light source with high voltage power, full bridge circuit, transformer boost circuit, resonance circuit and feedback control circuit are needed.

(2) Boost circuit block diagram is shown in the figure 3.2.5.8:

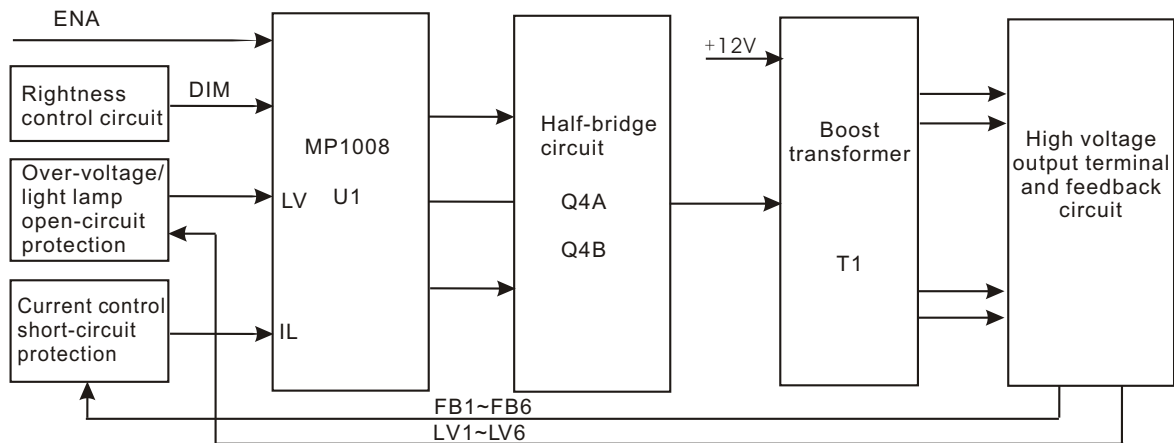


Figure 3.2.5.8 Boost circuit block diagram

(3) Working principle

1) Half-bridge circuit: half-bridge drive circuit is driven by mps1008 directly. Full-bridge circuit is composed of 2 Nmos tubes (Q4A Q4B). MOS tube has features of small connected resistance and small consumption. Q4B Q4A is connected circularly under drive of MPS1008 and the alternating current opposite to the flow direction generates in transformer preliminary winding and boosts through boost transformer (ratio of boost transformer is 27:1860 who can boost 12V input voltage to 800V or more).

2) Resonance circuit: resonance circuit is composed of boost transformer secondary leakage inductance and capacitor (C19 3000V/10Pf). Leakage inductance of secondary transformer is 200mH and it comprises parallel resonance loop together with output capacitor to rectify preliminary output square wave into sine wave; since Q value gain of parallel resonance loop is more than its load resistance and CCFL impedance is too large (about 100M ohm) when lightening, parallel resonance loop may get large gain when lightening, therefore large output voltage may be achieved, about 2KV to lighten CCFL. After light is on, CCFL resistance drops, about 100K ohm, so Q value of resonance circuit drops, output voltage drops to maintain normal working of light lamp.

3) Feedback circuit: inverter is constant output, through sampling light lamp current, current sampling is finishes by serial connection of 1K resistor (R38, R37) and light lamp to invert the sampled AC power into voltage and input to feedback pin L1 of mp1048, AC voltage inputted by LI converses into RMS voltage value through IC internal circuit sampling and then input to invert input end of internal amplifier to control TH/TL of PWM signal.

4) Protection circuit: voltage feedback loop control of over-voltage protection/open-circuit protection is finished by sampling output voltage. High voltage capacitor of 3KV/10PF and capacitor of 103/25V comprise bleeder circuit to invert output voltage to voltage sampling and then send to voltage feedback

Pin LV of IC through D2~D4 rectification. When sampled voltage is more than 1.2V, IC enters protection state and pulse drive closes.

5) Other control circuit: pin 8 of Mp1008 is the enabled control end of this IC. When this pin is high level, IC enters working state; when this pin is low level, this IC stops working. This pin in this player is controlled by CPU.

Section Three Servicing Cases

3.3.1 Servicing cases

[Example 1] Symptom: screen is black when power on (back light of screen is not on)

Description: from standby to power on, screen is black all the time and panel indicator light can display normally.

Analysis and troubleshooting: according to servicing experience, if screen is black when power on, firstly put the head of oscillograph near boost board high voltage and find that oscillograph has no induction waveform, so we may confirm that boost board does not output high voltage. Shown in the figure 3.3.1.1, use multimeter to check +12V power supply voltage of Cn4 and it is normal; test pin 4 voltage and it is 5V all the time. Use multimeter to check ON/OFF end, in normal conditions, standby is high level, power-on is low level and it is normal after test, so we doubt that triode Q102 has trouble; use diode level of multimeter to test Q102 and we judge that triode Q102 has been stricken through. Change Q102 and trouble is removed.

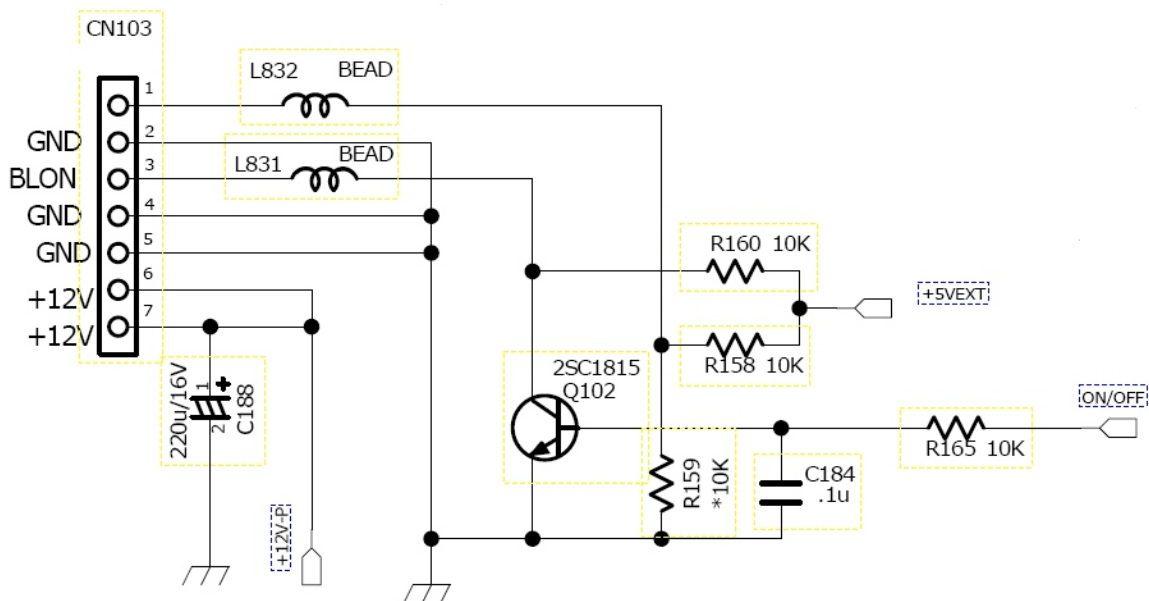


Figure 3.3.1.1 Boost control circuit diagram

[Example 2] Symptom: power not on

Description: after inserting power plug, indicator is not on. Press POWER button and machine Cannot power on.

Analysis and troubleshooting: when this kind of trouble happens, firstly confirm whether power/power amplifier board J501 has +12V voltage. Check J8 flat cable holder and find that there is +12V voltage to video main board, which means 12V power circuit is OK. Then check power control circuit and whether Ic3 pin 3 has 5V voltage. Check IC3 pin 2 has +12V voltage, so we doubt that IC3 has trouble. Change IC3, after inserting IC3 pin, there is +5V voltage output. Power on ,test functions of the player and they are normal, so trouble is removed.

[Example 3] Symptom: speaker has no sound

Description: in any working mode, there is no sound output

Analysis and troubleshooting: select signal source in “DVD” state, switch on DVD player and play the demonstration disk. Use oscillograph to test left/right speaker and find that there is no signal Waveform output, so trouble should lie in the previous circuit. Shown in the figure 3.3.1.2, test pin 8, 17 of U1 (TDA7226) and there is waveform input; while output pin 9, 20 have no waveform output. Then test the power supply loop, voltage from which that +12V voltage has dropped to chip is 10V and this voltage is normal. Observe whether pins around have rosin welding, false welding or joint welding. Weld again and trouble still exists. After analysis, we think the chio internal processing circuit may have trouble. After changing U1, trouble is removed.

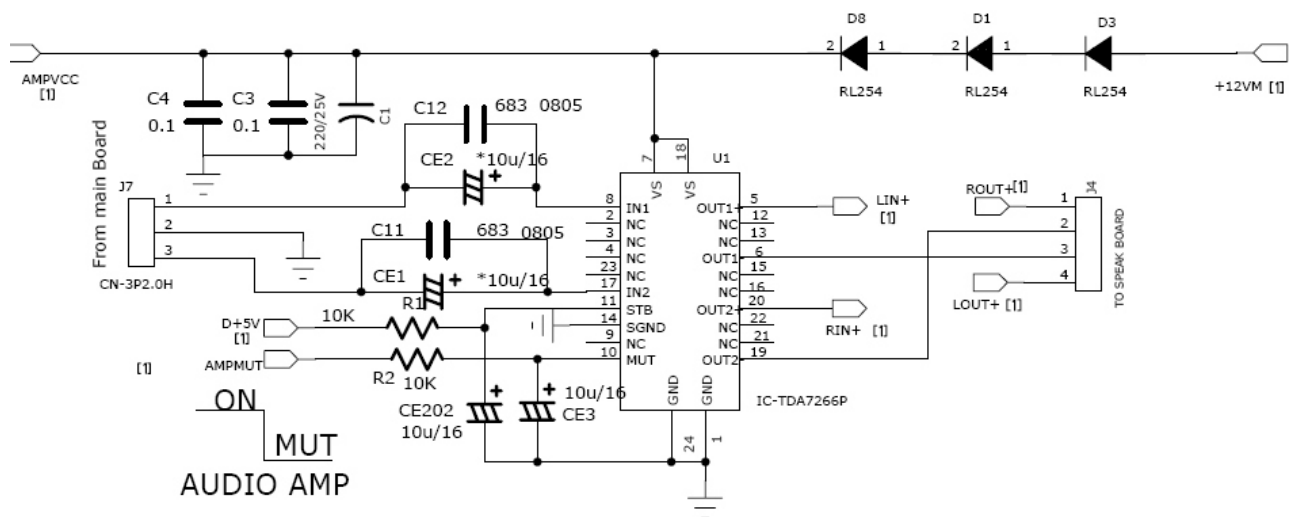


Figure 3.3.1.2 Audio amplifying circuit

[Example 4] Symptom: standby indicator light is not on

Description: after power on, red standby indicator light is not on; after pressing POWER button, the player may enter power-on state.

Analysis and troubleshooting: after power on, standby light is not on no matter when in standby or power-on state, but after pressing POWER, system can power on. According to trouble symptom, trouble should lie in indicator light control circuit. Shown in figure 3.3.1.3, test collector electrode of Q403 in standby state and it is low level; test transmitter electrode of Q402 and it is low level; so we doubt that triode Q402 has trouble; after changing Q402, trouble is removed.

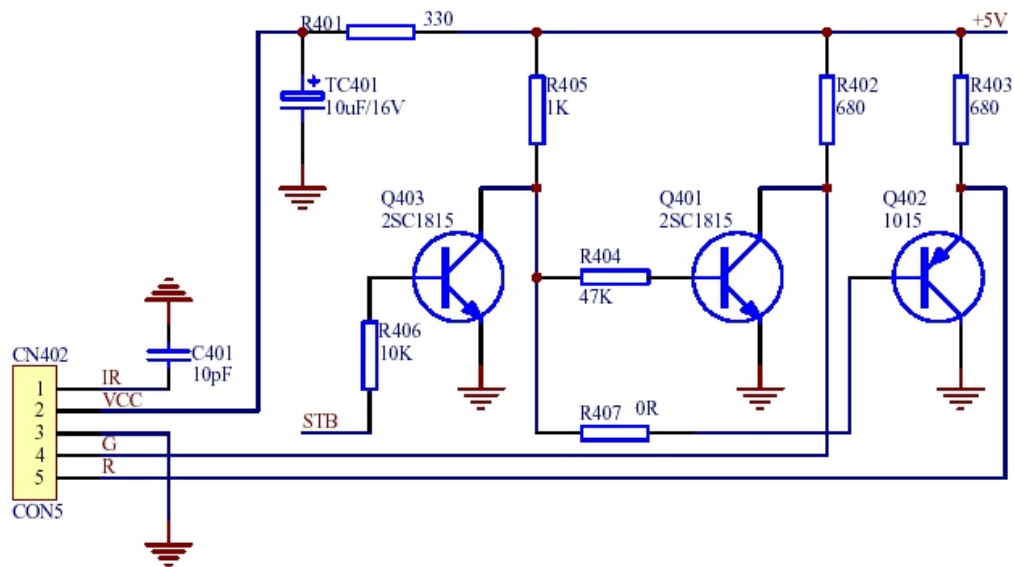


Figure 3.3.1.3 Indicator light control circuit

[Example 5] Symptom: TV has no sound

Description: after inserting antenna, TV can search channel, but speaker has no sound output and external input has sound output.

Analysis and troubleshooting: according to trouble symptom, we judge that trouble lies in TV audio signal processing circuit. Check audio signal output pin received from tuner and this tuner may output analog TV image and analog mono channel signal and digital coding signal (NICAM). When meeting this kind of trouble, please do not be anxious to repair. Firstly make sure whether there is sound output in SCART, AV input mode. After confirming, there is sound output in other mode now, which means that U1 and speaker have no trouble. Use oscillograph to test pin 14 of tuner and check whether there is waveform output. After test, we find that this pin has waveform output and this signal enters chip ic301 (STV8216) through capacitor C303. Test pin 8, 17 of U1 and there is no audio signal input. Check carefully and find that pin 28, 29 of ic301 may probably have rosin joint. Use iron adding tin to pull; after power again, trouble is removed.

[Example 6] Symptom: there is noise when power on

Description: press POWER button on remote controller or control board to power on and off and you may hear POP noise during this process.

Analysis and troubleshooting: according to servicing experience, when meeting this kind of trouble, check mute circuit firstly. Shown in the figure 3.3.1.4, when machine power on, AMP-MUTE signal changed from low level to high level and add to base electrode of triode Q13 through diode D11 to make triode Q13 saturated on, now MUTE end is low level to realize power-on quieting effect. When power off, voltage on two ends of C76 cannot change suddenly, high level is kept to make triode Q6 on; voltage is added to base electrode of triode Q13 through diode D10 to make it saturated on. Now, MUTE end is low level and power-off quieting effect is realized at the same time. Now noise exists when in power on and off, so the common loop has trouble. After testing, triode Q13 is stricken through. Change the corresponding model and trouble is removed.

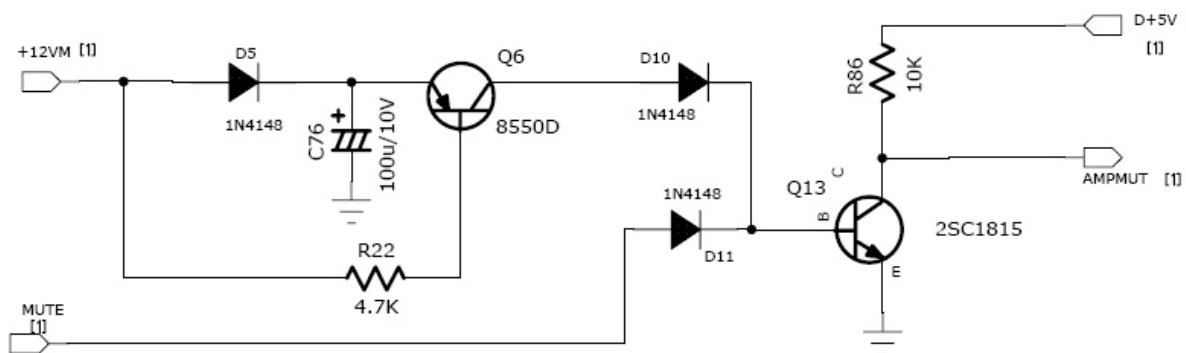


Figure 3.3.1.4 Mute circuit

[Example 7] Symptom: remote control has no function

Description: when pressing buttons on remote control, TV screen has no response.

Analysis and troubleshooting: test voltage of CN901_2 pin and it is +4.96, which is normal. When power is not connected, check elements between pin 1 of CN901 and chip IC102 and they are all normal. After power on, test voltage of pin 1 of Cn7 and it is +4.98V, which is also normal. Press remote control buttons and find that voltage of pin 1 of CN7 has no change. In normal cases, when pressing Remote control buttons, voltage skips from +4.98V to 3V and more, which means that remote control information has been received, so trouble is in receiver. Change it and trouble is removed.

[Example 8] Symptom: AV input has no picture

Description: select signal source in “AV” state, switch on DVD player to play demonstration disk and screen has no picture.

Analysis and troubleshooting: use oscillograph to test waveform on two ends of L809 close to J801 and it is normal. Video signal inputted by AV is sent to pin 8 of LA7952 through L809 and then output from pin 1 to external video amplifier circuit after being selected by LA7952. Now we test that two ends of C907 have waveform and pin 1 of LA7952 has no waveform output. Test pin 7 power supply voltage of IC901 and it is normal, so we doubt IC901 has trouble. Change IC901 and trouble is removed.

[Example 9] Symptom: picture has distortion

Description: picture colour is not fresh and serious picture clock phenomenon exists.

Analysis and troubleshooting: from trouble symptom, we judge that trouble should lie in picture processing circuit. Firstly make sure whether external input picture has trouble. 8-bit data outputted by tvp5147 has no trouble. Test power supply and clock signal of MST518VA and they are normal, signals outputted by video LVDS jack are also normal, so we doubt that display screen components have trouble. Change components and picture is normal.

[Example 10] Symptom: machine not power on

Description: after power on, standby indicator light displays normally but machine has no response.

Analysis and troubleshooting: according to trouble symptom, we judge that trouble lies in trouble control circuit. Firstly test D+5v on power amplifier board and there is no abnormality. After pressing POWER button, panel standby indicator light cannot turn out, so we decide that trouble lies in standby control circuit. Test STB signal and find that voltage in this point has no change when pressing POWER button, shown in the figure 3.3.1.5. Test Q706 base electrode level and it has no change when power on, so we judge that U704 has trouble. After changing it, trouble is removed. (This IC cannot be used until software is recorded. When servicing, pay attention to software version)

[illegible]

Figure 3.3.1.5 Standby control circuit diagram

[Example 11] Symptom: machine not power on

Description: after power on, standby is normal. After pressing POWER button, working indicator light indicates normally, but machine cannot power on and there is no picture output.

Analysis and troubleshooting: according to trouble symptom, we judge that standby control circuit is normal. Use multimeter to test +5VEXT voltage and it is normal, so doubt trouble lies in system control

- 35 -

Circuit. Test MCU power supply and it is 5V, which is normal. Then use oscillograph to test clock signal of X105 and it is normal; test reset signal and it is normal, so we doubt that IC102 has trouble. Change IC and trouble is removed. (This IC cannot be used until software is recorded. When servicing, pay attention to software version)

[Example 12] Symptom: AV input has no picture

Description: select signal source in "AV" state, switch on DVD player to play demonstration disk and screen has no picture.

Analysis and troubleshooting: use oscillograph to test waveform on two ends of L809 close to J801 and it is normal. Video signal inputted by AV is sent to pin 8 of LA7952 through L809 and then output from pin 1 after being selected by LA7952 to external video amplifier circuit. Test two ends of C907 have waveform and pin 1 of LA7952 has no waveform output. Test IC901 pin 7 power supply voltage and it is normal, so we doubt that IC901 has trouble. After changing IC901, trouble is removed.

[Example 13] Symptom: screen is black

Description: sound output is normal and TV screen is black.

Analysis and troubleshooting: according to trouble symptom, we judge that there is no high voltage output and this causes that screen light lamp is not on. Firstly test boost components power supply loop And it is normal and boost components control circuit is normal; test boost board high voltage output port and there is no high voltage output, so we doubt that boost board protection circuit has trouble. Test voltage of pin 1/2 of U1 and it is normal; observe and find that surface of Q4 is somewhat black. Use multimeter to test and find that Q4 has been stricken through. After changing Q4, high voltage output is normal. Power on , test and trouble us removed.

[Example 14] Symptom: white screen

Description: after power on, display back light is on and machine display screen is white.

Analysis and troubleshooting: according to trouble symptom, we judge that trouble is in video processing circuit. Firstly test power supply voltage of IC101 and it is normal. Test clock signal of IC101 and it is normal. Test external input signal and it is normal, so we doubt display screen has trouble. Before changing display screen, please confirm again. During the course of test, we find that power supply 3.3V of screen is abnormal. Check display screen power supply circuit IC702 and it is normal. Test PANEL_ON control signal and it is low level, which is normal. Test control end of Q709 and it is low level, so we doubt Q709 has trouble. After changing it, trouble is removed.

[Example 15] Symptom: cannot watch TV program

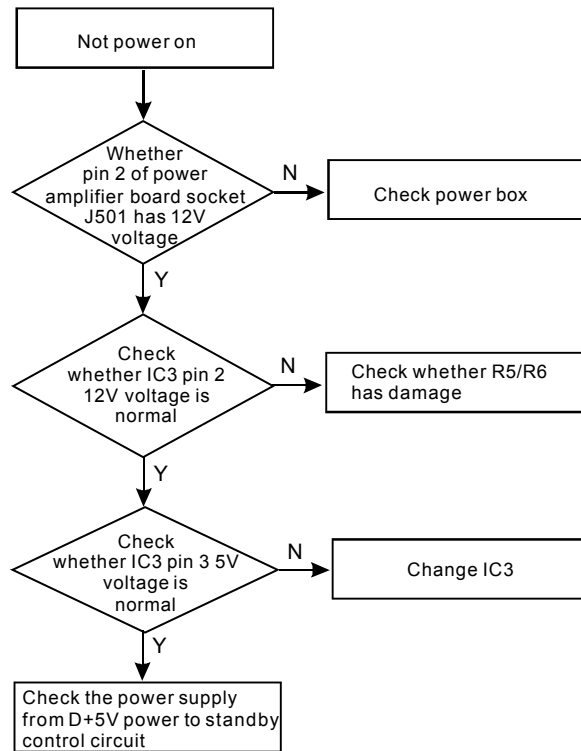
Description: cannot receive TV signal

Analysis and troubleshooting: this trouble mainly lies in TV signal processing circuit. Firstly set machine in TV state, adjust auto searching in setup menu and find that there is no TV signal. Test IIC main line control signal of tuner and it is normal. Tuner power supply is normal and we doubt tuner has trouble. After changing tuner, trouble is removed.

3.3.2 Troubleshooting flow chart

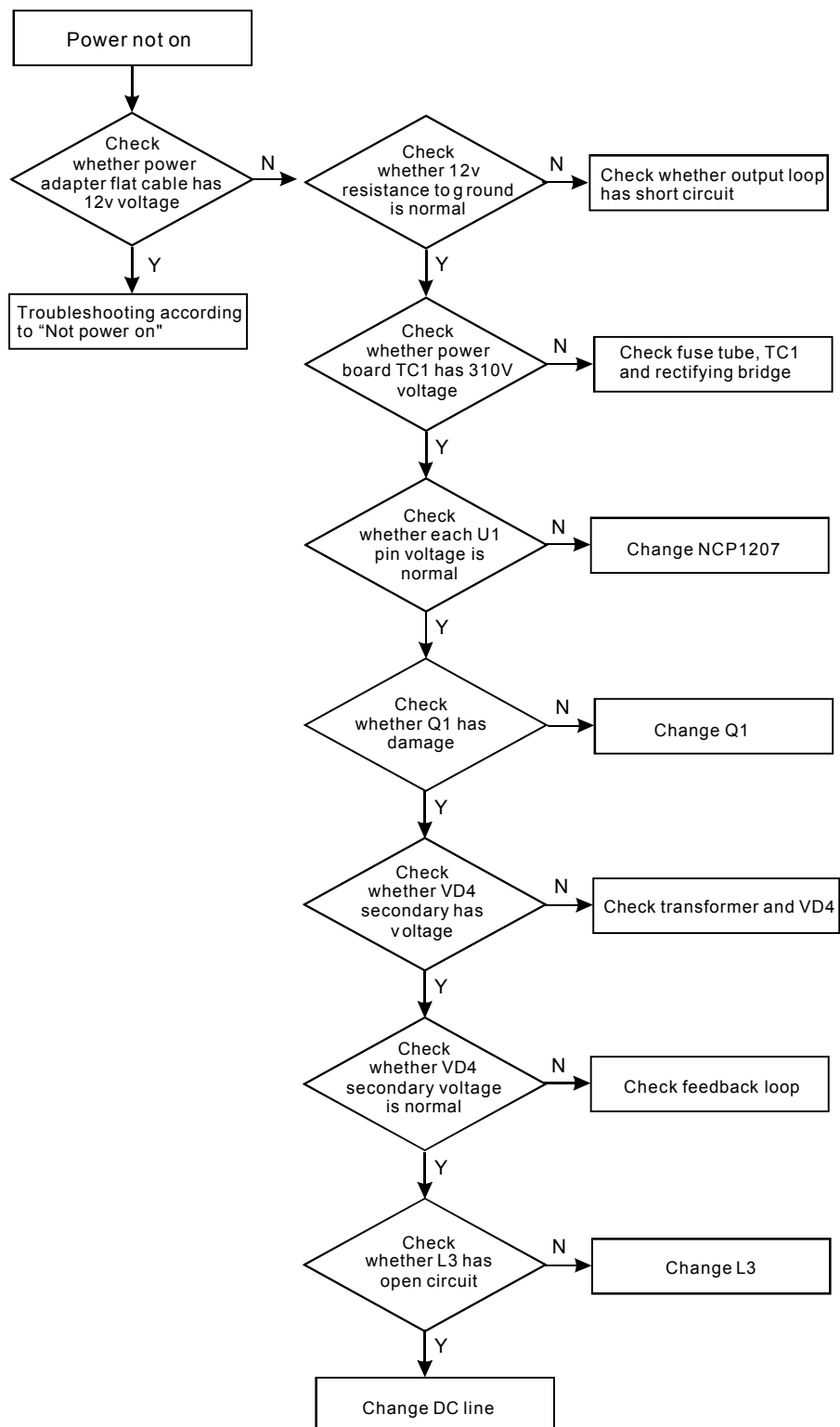
[Flow chart 1] Symptom: standby indicator light is not on

Description: switch on power, standby indicator light is not on, machine has no response and buttons have no function.



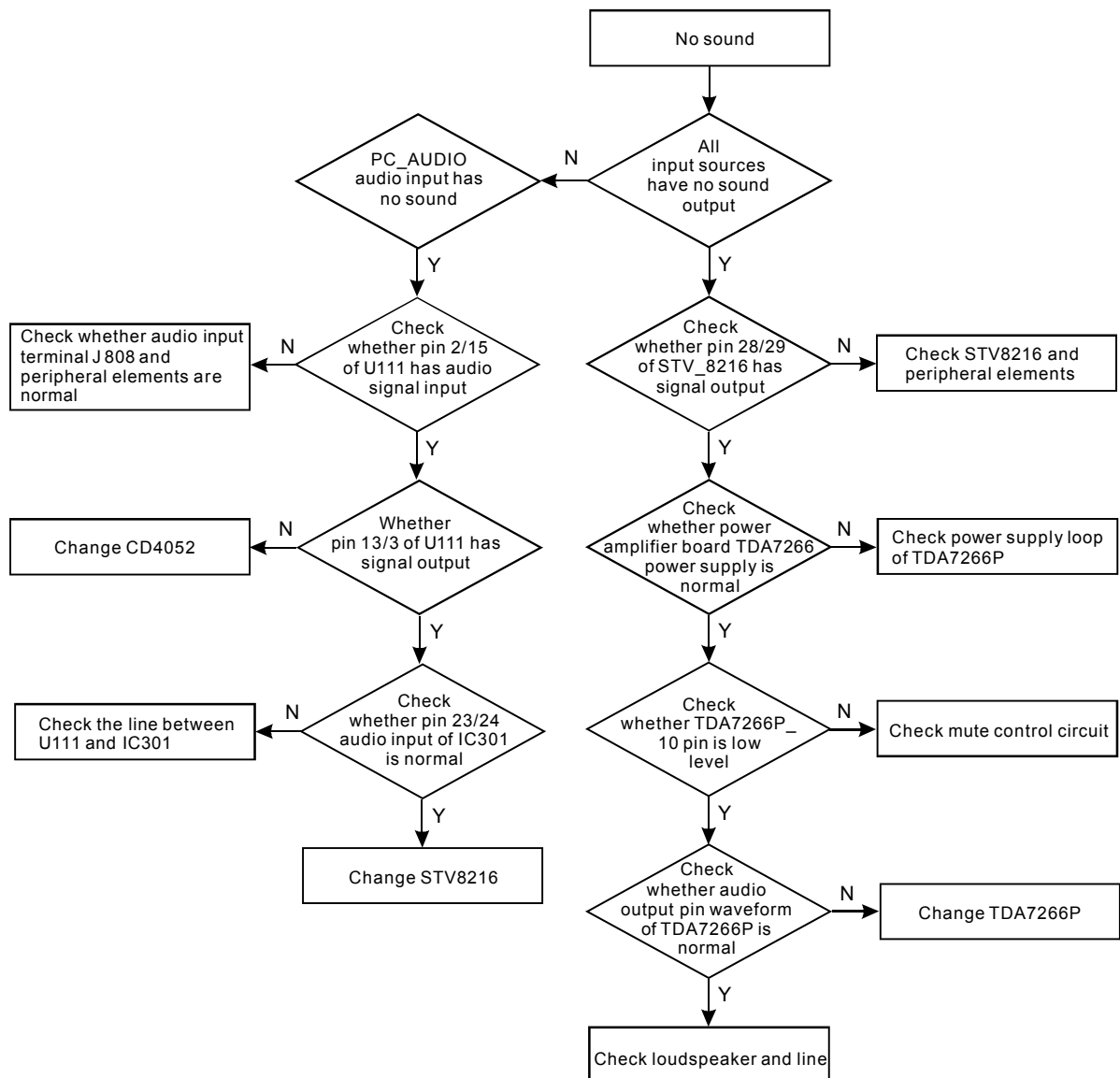
[Flow chart 2] Symptom: power not on

Description: power adapter's power is not on



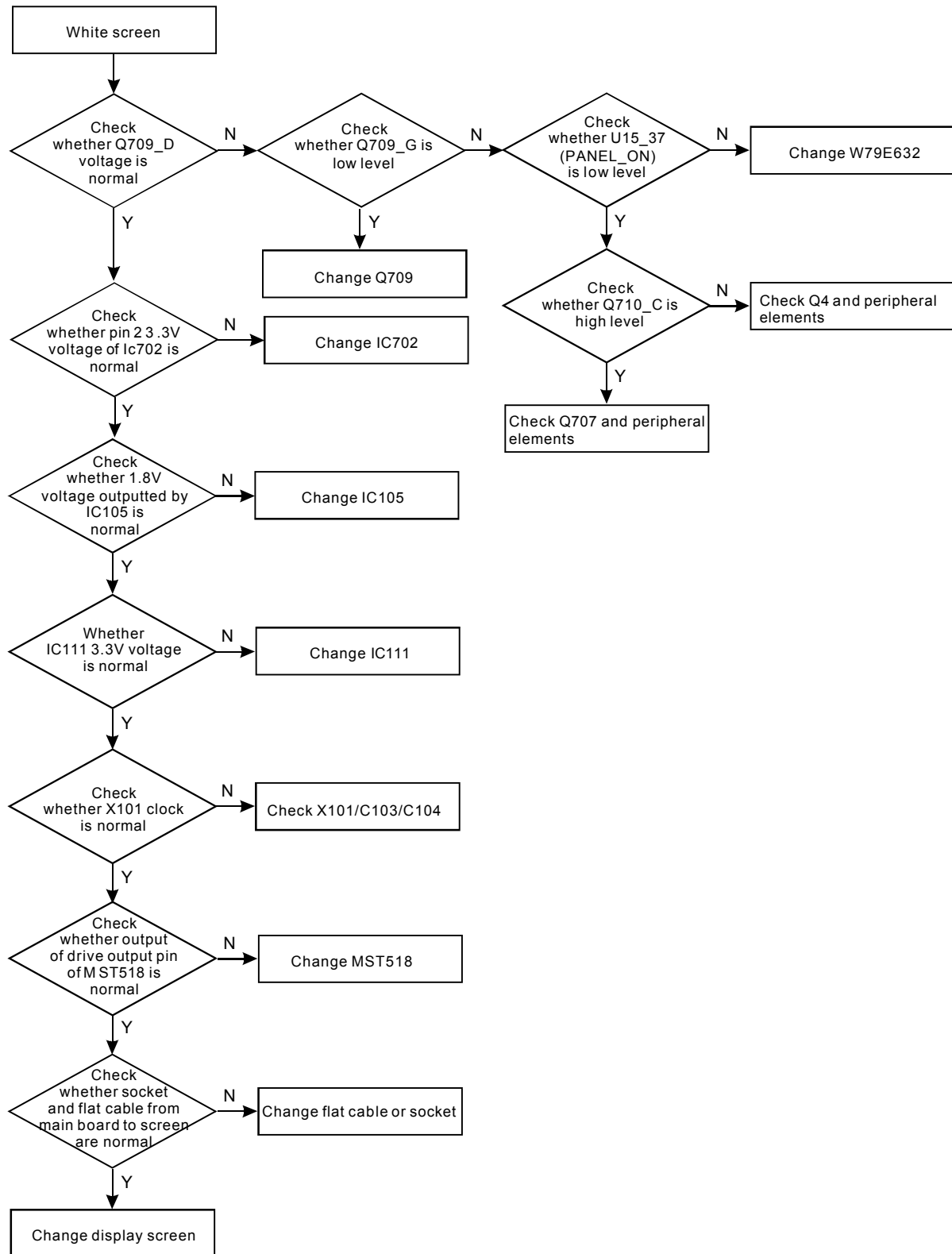
[Flow chart 3] Symptom: no sound

Description: there is picture, but no audio output



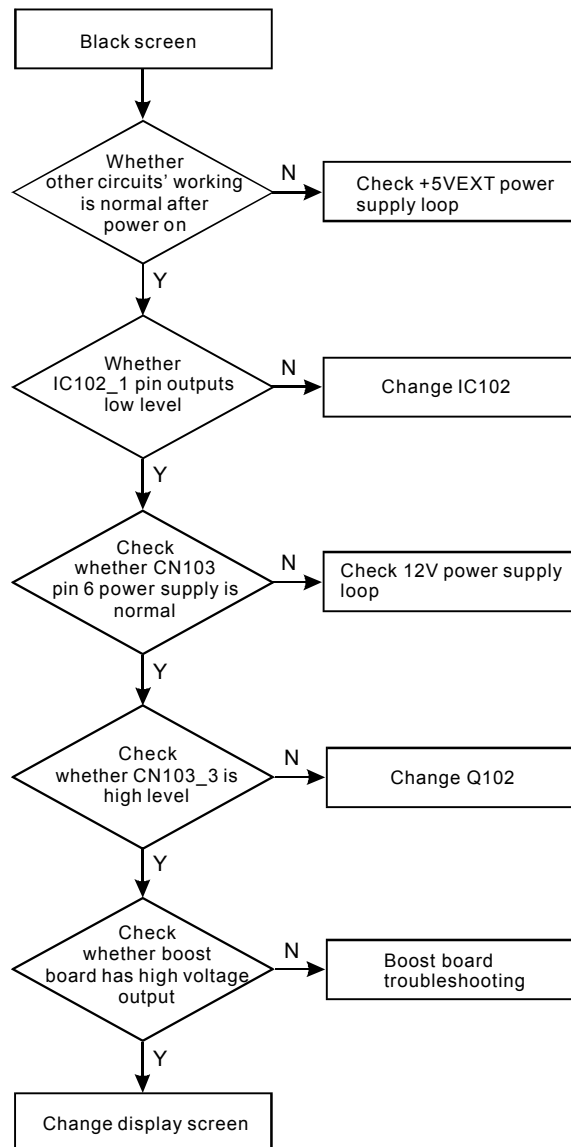
[Flow chart 4] Symptom: white screen

Description: screen is white and indicator light is on



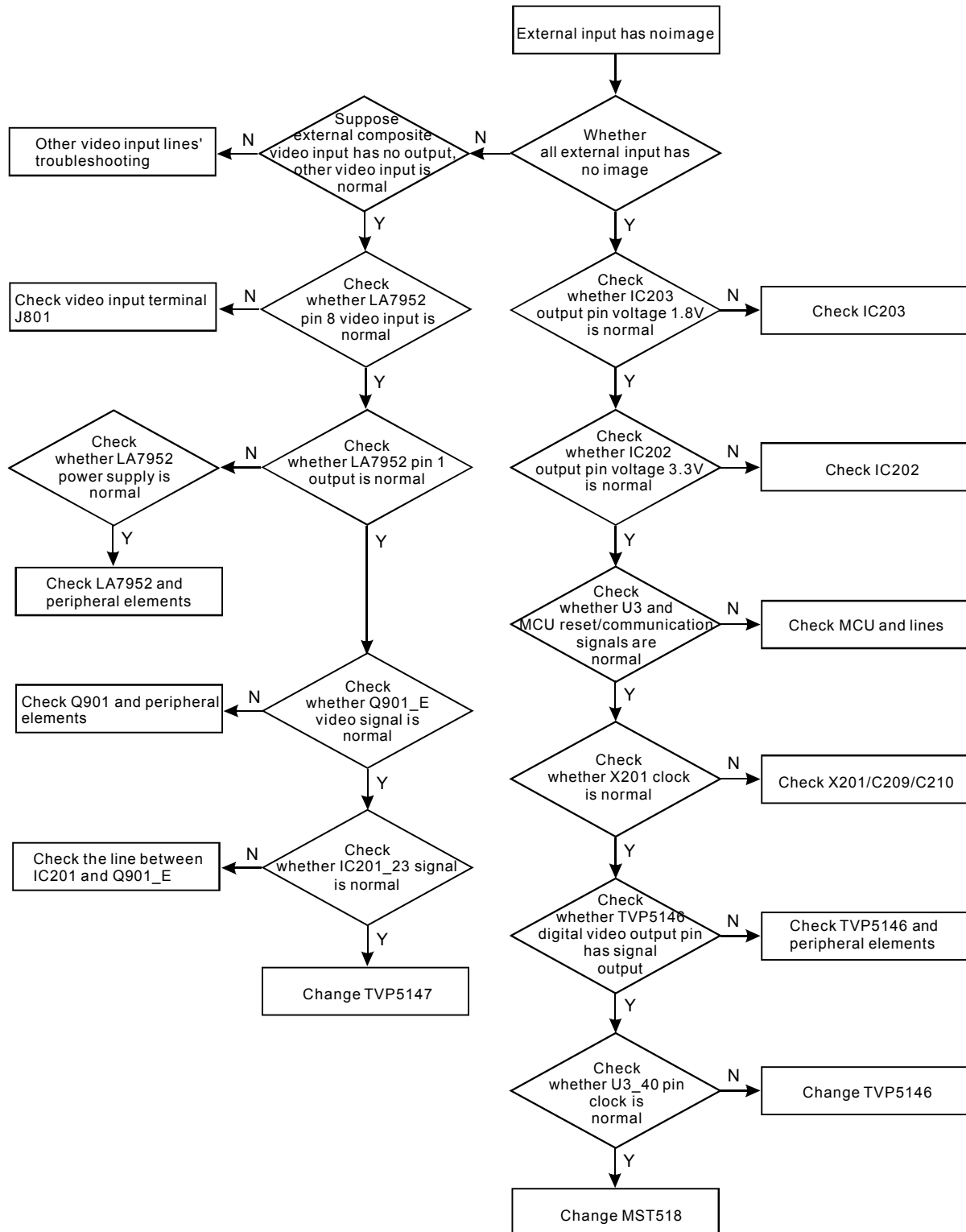
[Flow chart 5] Symptom: black screen

Description: display screen is black and indicator light is normal



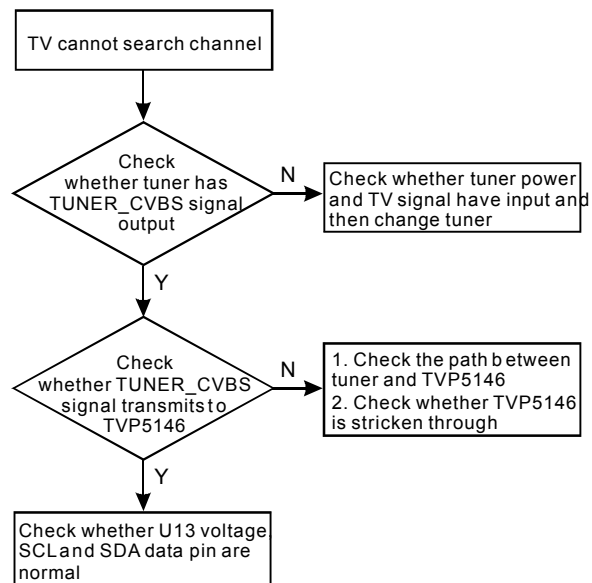
[Flow chart 6] Symptom: external input has no image

Description: external input has no image, but has sound



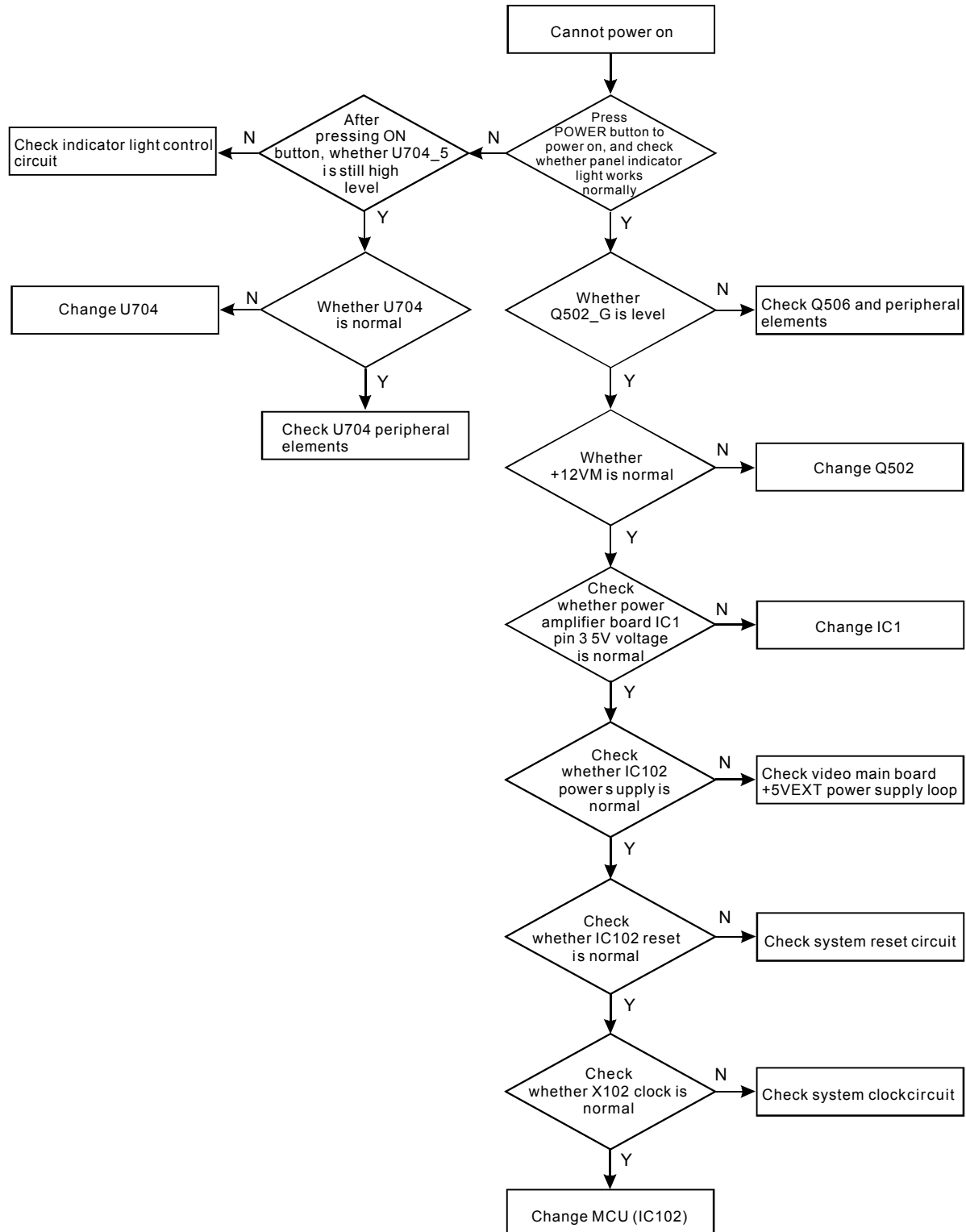
[Flow chart 7] Symptom: TV cannot search channel

Description: cannot search any channel



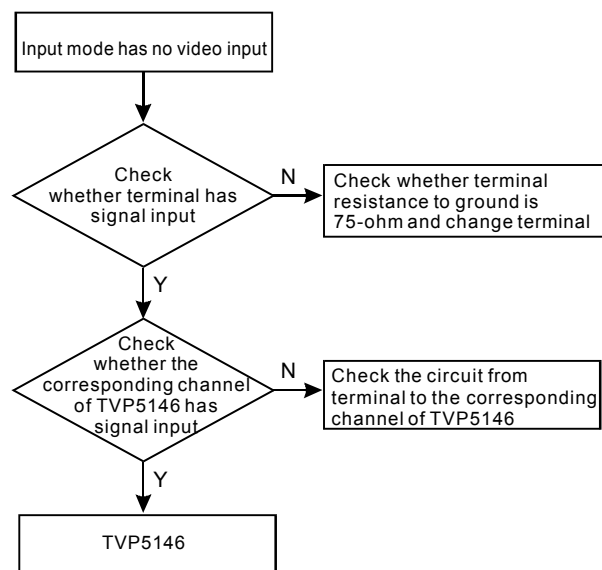
[Flow chart 8] Symptom: cannot power on

Description: connect with power, standby indicator light is on, press POWER button and machine cannot power on



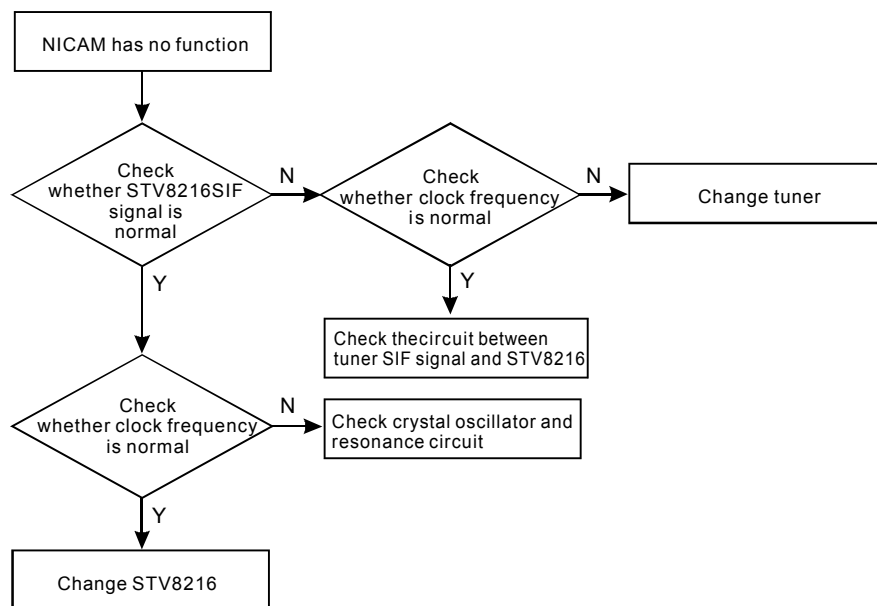
[Flow chart 9] Symptom: input mode has no video input

Description: input mode has no video input, but has audio input



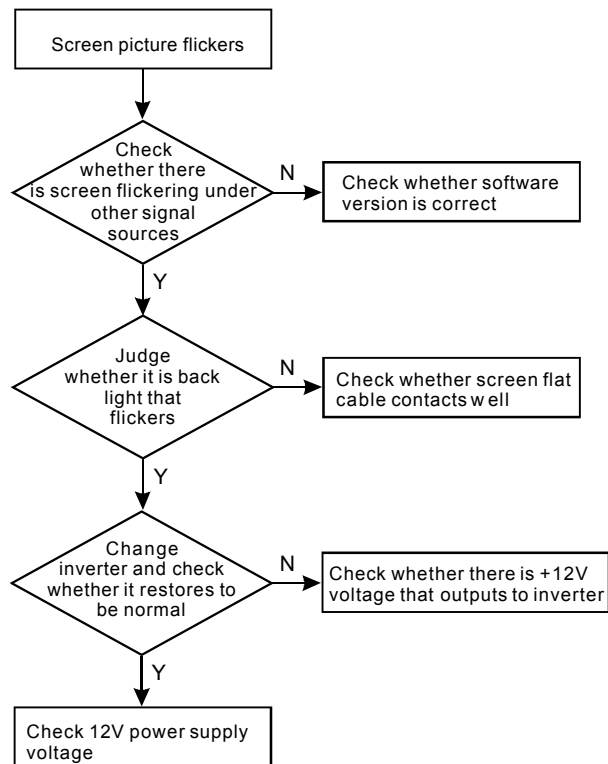
[Flow chart 10] Symptom: NICAM has no function

Description: NICAM function cannot be realized



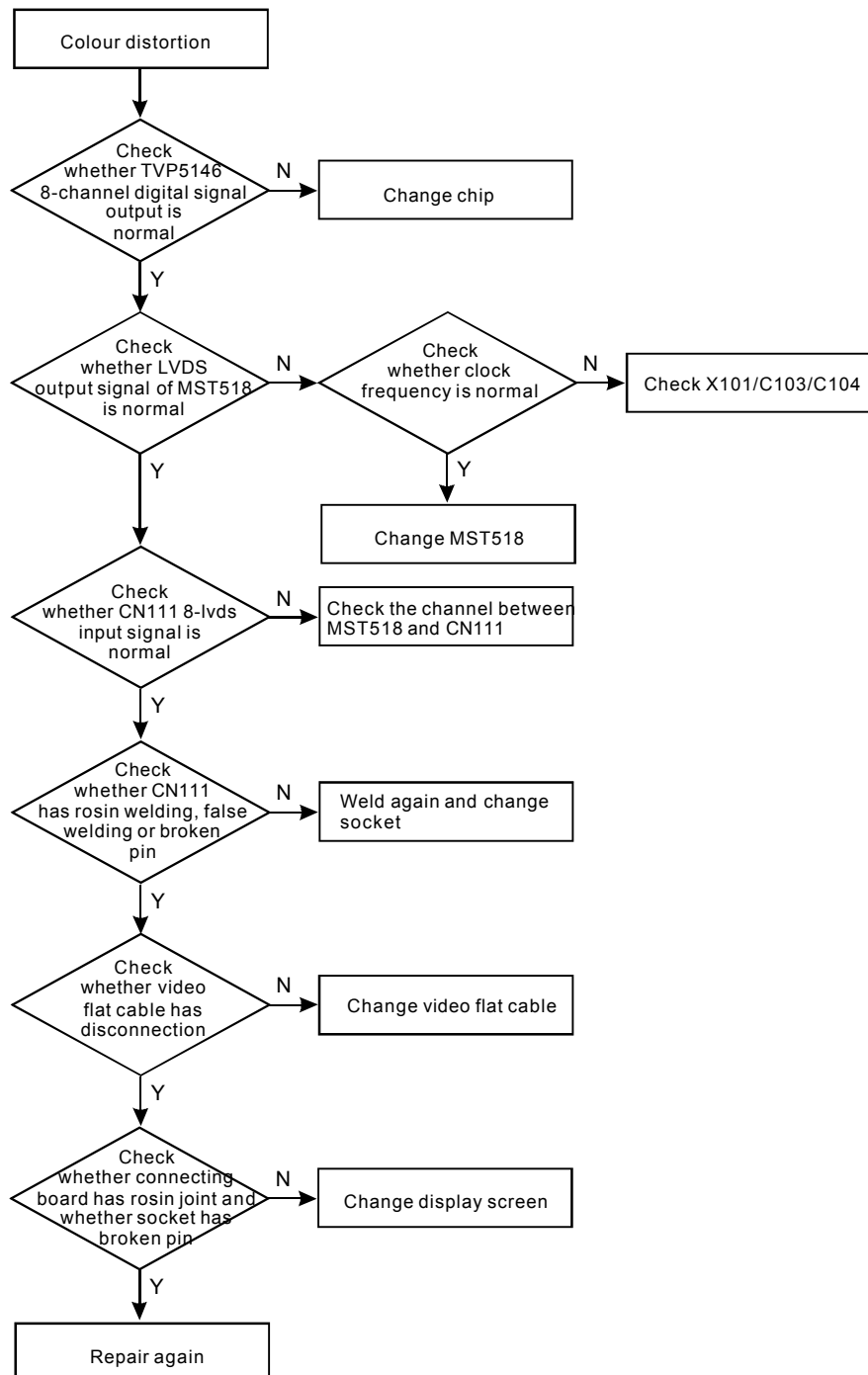
[Flow chart 11] Symptom: screen picture flickers

Description: screen picture flickers and sound is normal



[Flow chart 12] Symptom: colour distortion

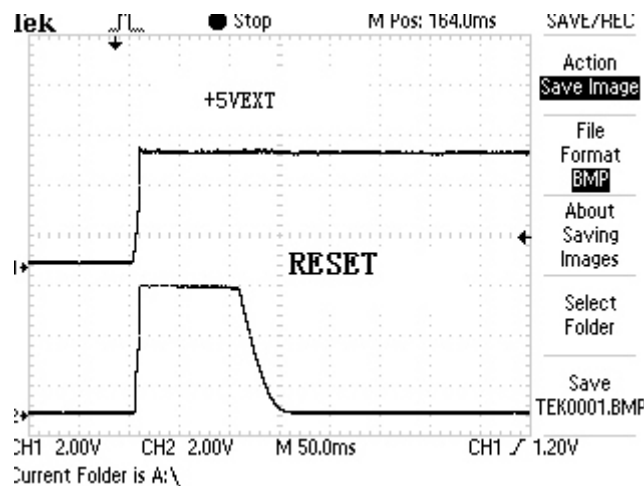
Description: picture colour has distortion



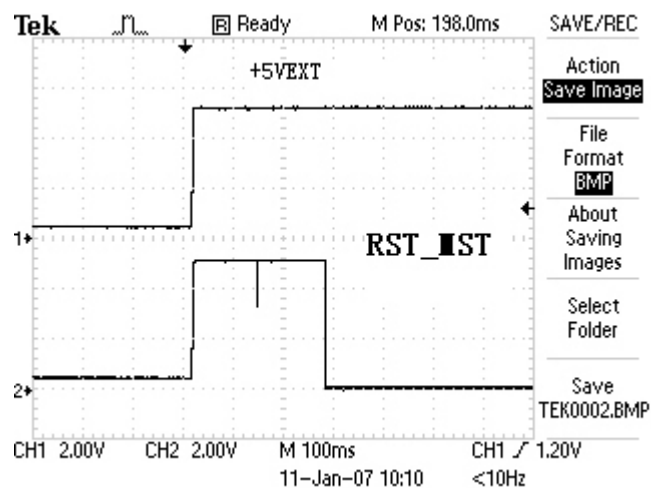
Section Four Waveform diagram

This section collects signal waveform diagram of audio, video and each unit circuit with the purpose to help servicing personnel to judge where trouble lies in accurately and quickly to improve servicing skills. For the difference of oscillograph's type, model and tuner, a certain difference may exist, so the servicing personnel are expected to pay more attention to check in daily operation.

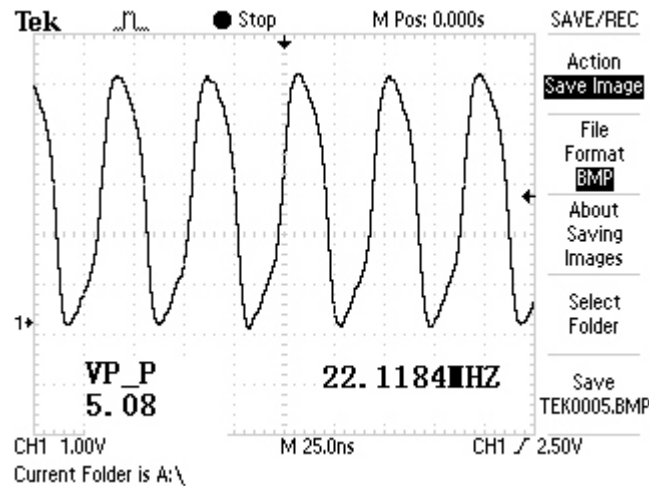
1. System reset signal waveform diagram: waveform comparison diagram for +5EXT and system reset pin during the course of power on.



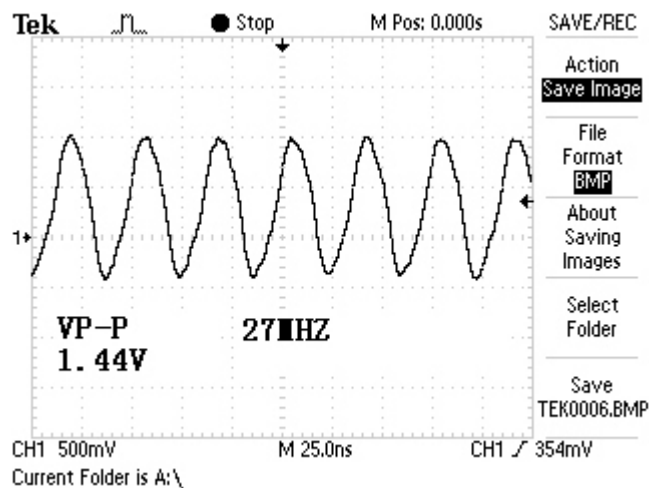
2. MST518 reset waveform diagram: waveform comparison diagram for :5VEXT and MST518 during the course of power on.



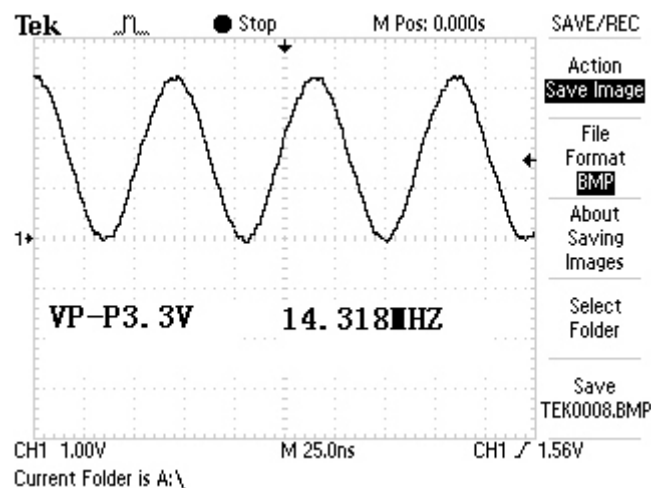
3. System clock waveform diagram: waveform diagram when :X102 is working (frequency 22.1184MHZ)



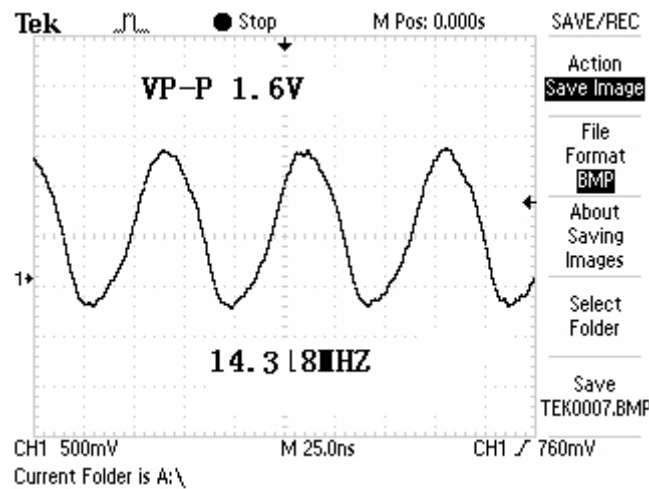
4. NICAM processing circuit clock signal waveform diagram: waveform diagram when :X301 is working (frequency 27MHZ)



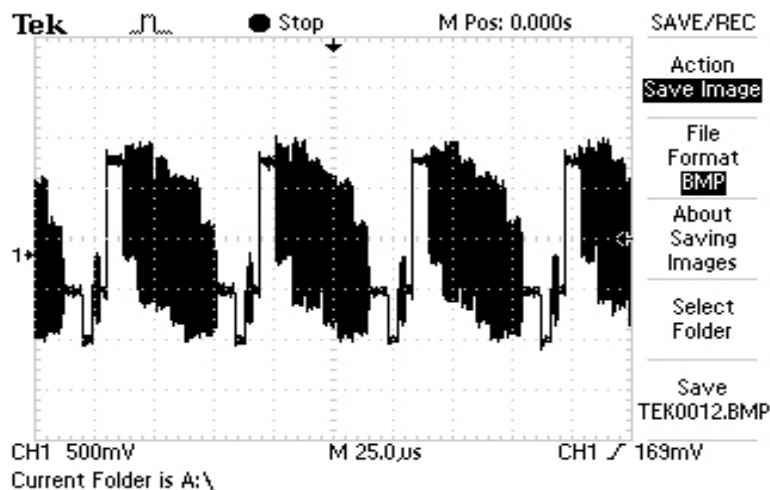
5. TVP5147 clock signal waveform diagram: waveform diagram when X201 is working frequency 14.318MHZ)



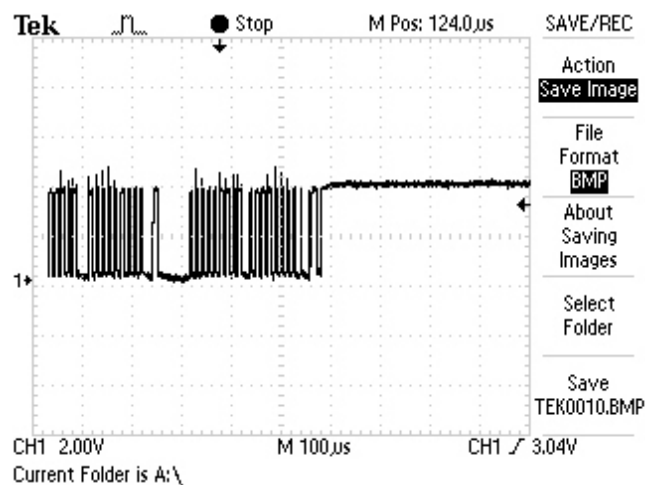
6. MST518 clock signal waveform diagram: waveform diagram when X101 is working (frequency 14.318MHZ)



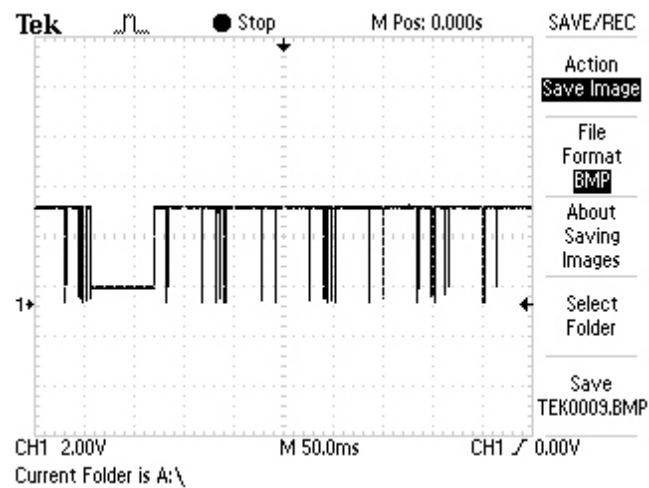
7. TVP5146_23: video signal waveform diagram for TVP5146_13 pin when machine is receiving standard signal source in TV mode.



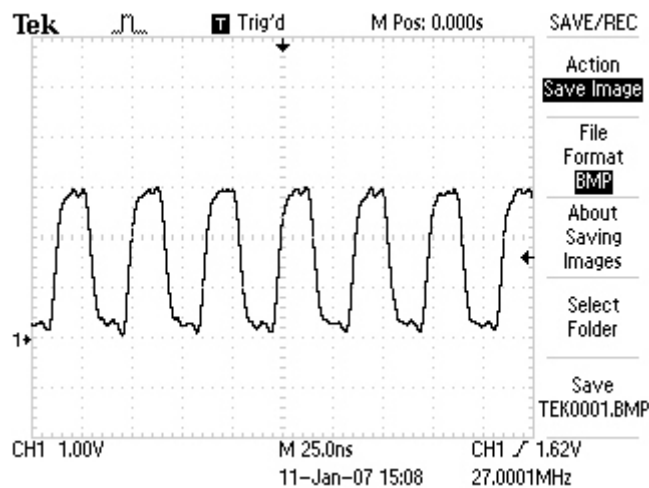
8. IC102_8: waveform diagram of SCL in IIC bus



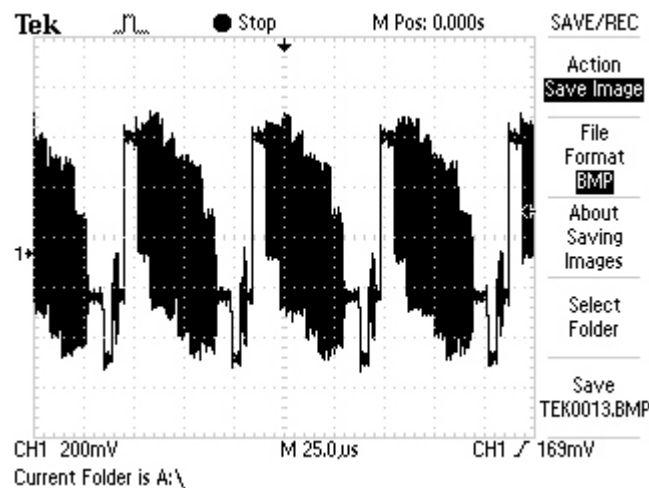
9. IC102_7: waveform diagram of SDA in IIC bus



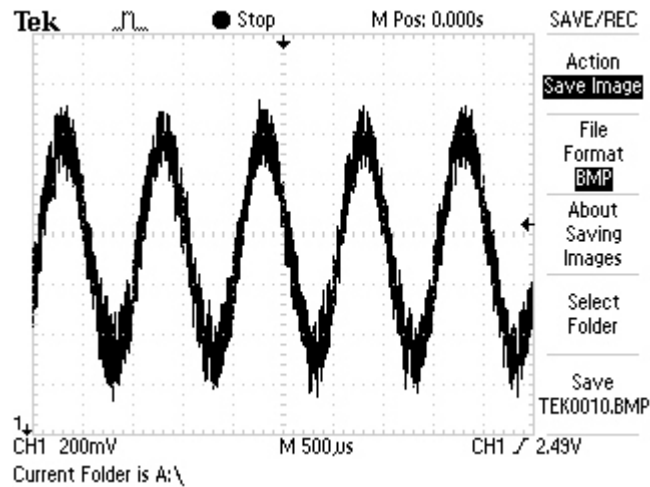
10. TVP5147_40: waveform diagram when TVP5147_40 pin outputs clock signal to MST518 (frequency 27MHZ)



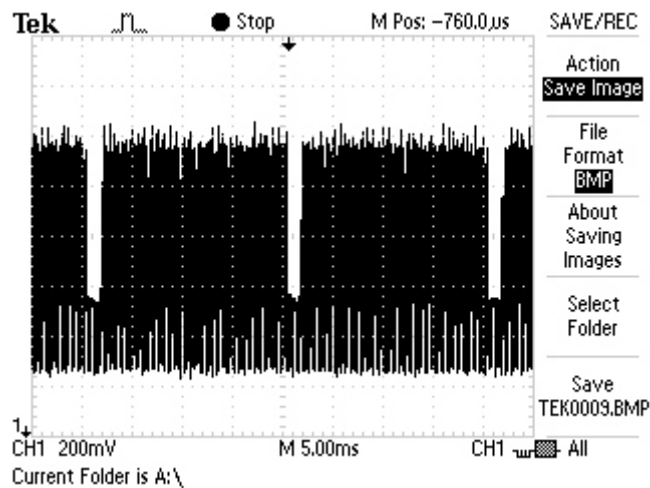
11. TV video signal waveform diagram: waveform diagram for video signals outputted by U901_1 pin when machine is receiving standard signal source in TV mode. :



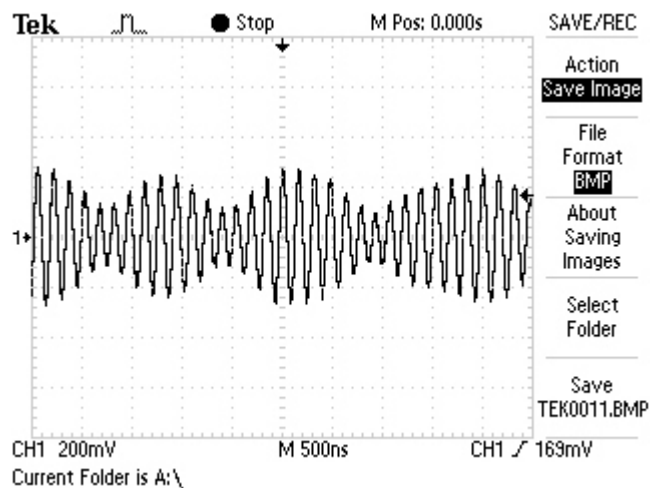
12. U001_14: waveform diagram for audio output pin of tuner when machine is receiving standard signal source in TV mode.



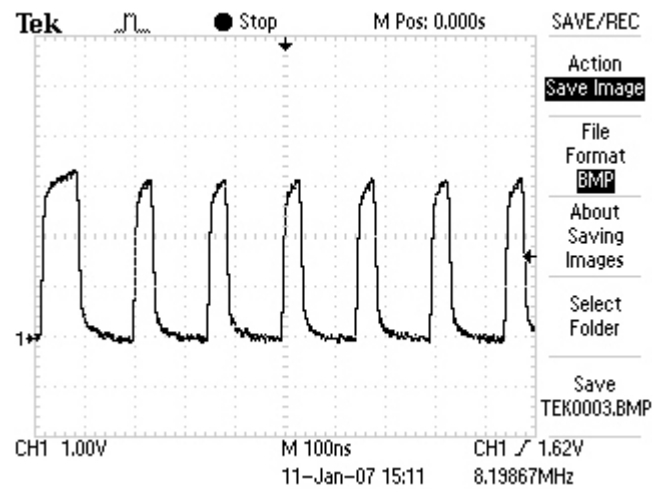
13. U001_12: waveform diagram for video signals outputted by pin 12 of tuner when machine is receiving TV signal in TV mode.



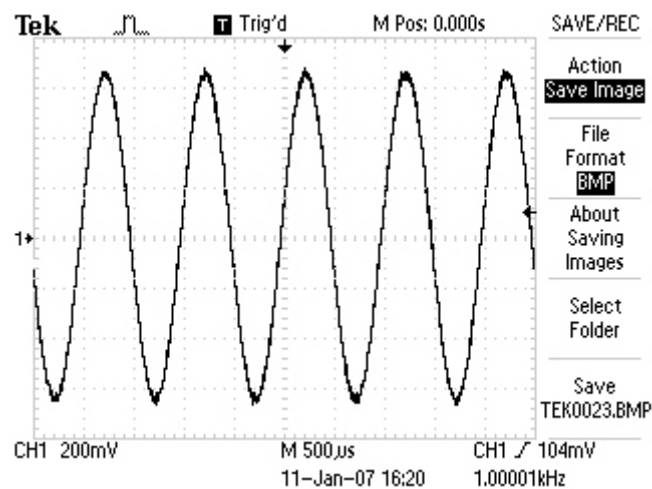
14. U001_11: output waveform diagram of NICAM output pin



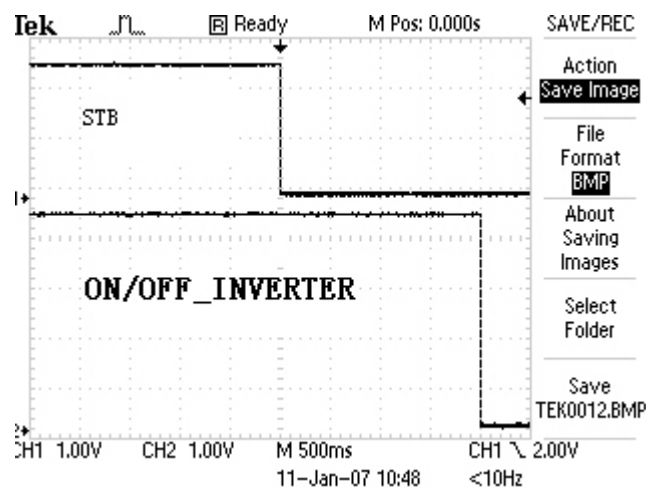
15. Digital video waveform diagram: waveform diagram for digital video signals outputted by TVP5146 (test point RP201)



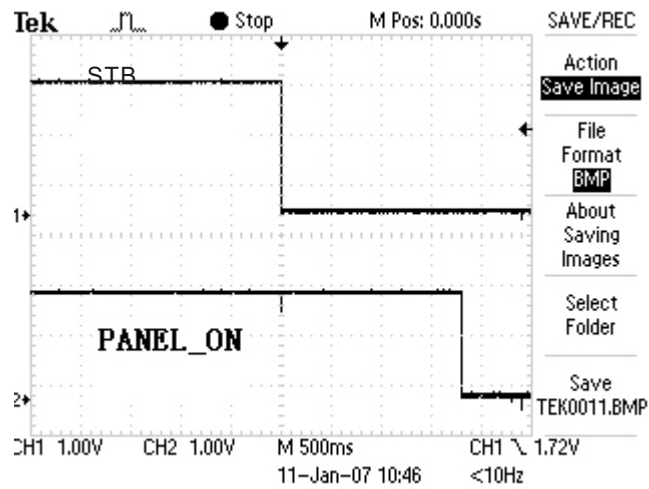
16. ROUT: audio output waveform (test point J4)



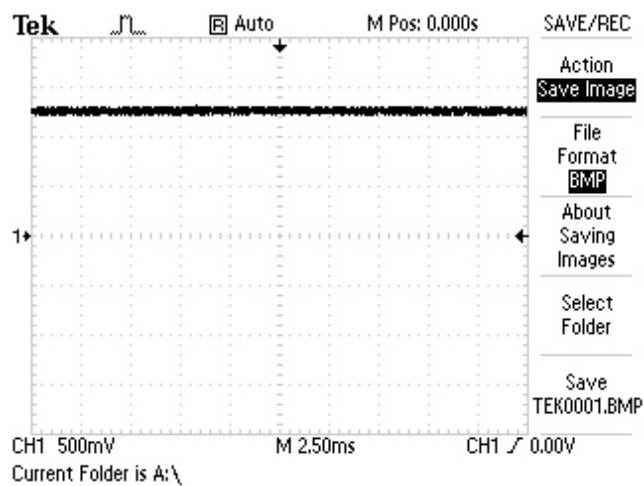
17. INVERTER: waveform comparison diagram for STB and ON/OFF_INVERTER signal when machine enters from standby to power-on



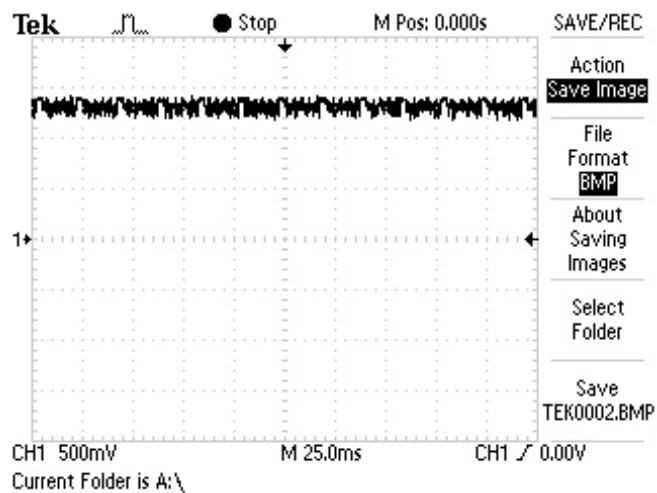
18. PANEL_ON: waveform comparison diagram for STB and PANEL_ON signal when machine enters from standby to power-on.



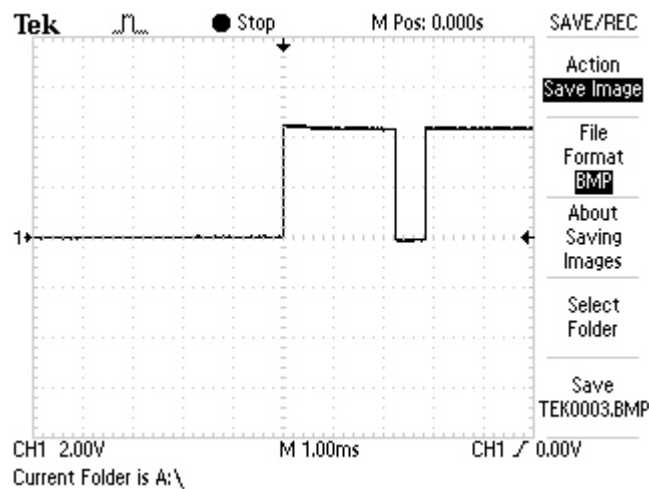
19. LVDS output clock signal waveform diagram (test point: pin 13 of MST518VA)



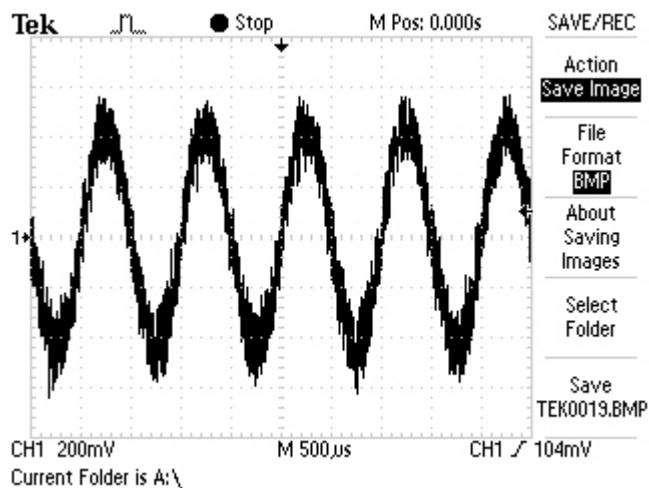
20. LVDS output data signal waveform diagram (test point: pin 138 of MST518VA)



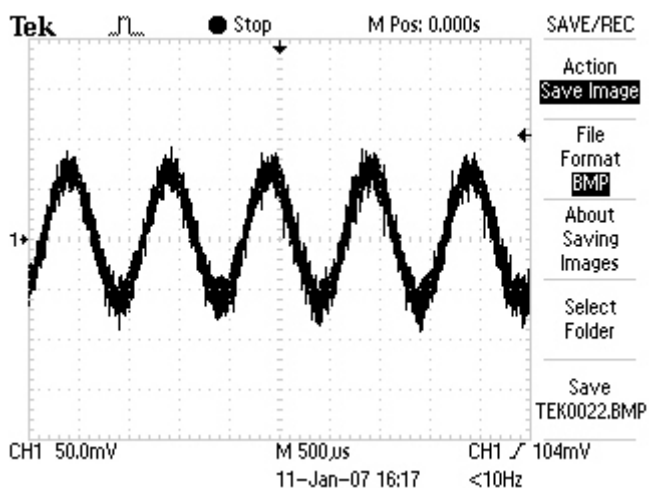
21. Waveform diagram when IR pin of remote controller is receiving remote control signals (button board CN401_2 or video main board Q106_E)



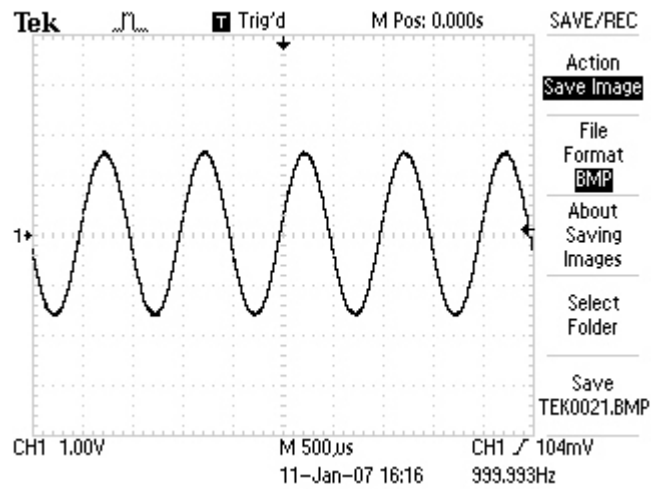
22. 8216_78: waveform diagram for audio signals from tuner when machine is receiving standard signal source in TV mode. (Test point: STV8216_78)



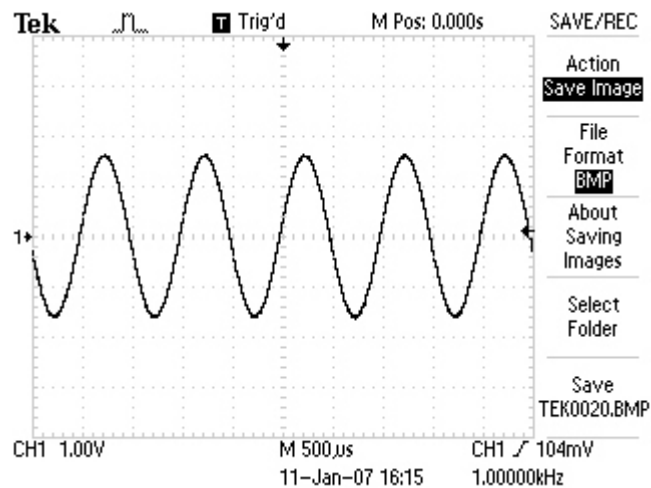
23. 8216_28: waveform diagram after the audio signals from tuner are processed by STV8216 and then output from pin 28/29 when machine is receiving standard signal source in TV mode.



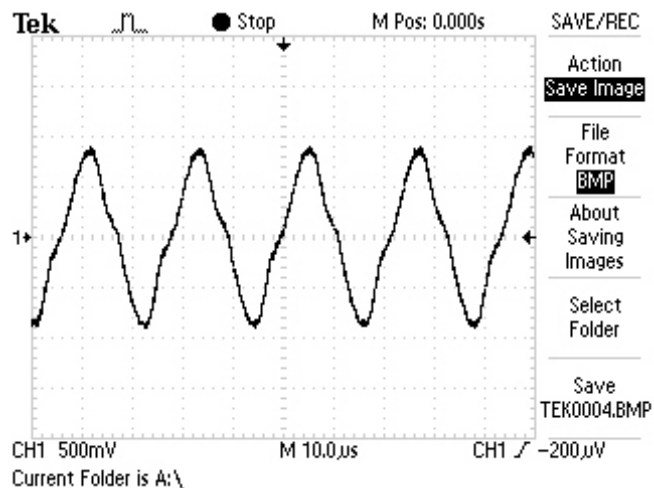
24. 8216_18: waveform diagram after audio signals from tuner are processed by STV8216 and output from pin 18/19 when machine is receiving standard signal source in TV mode.



25. 8216_1: waveform diagram after audio signals from tuner are processed by STV8216 and output from pin 1/2 when machine is receiving standard signal source in TV mode.



26. Induction waveform diagram for boost board output end (do not contact high voltage end when testing; put detect head aside to test)



Section Five Function Introduction to IC

3.5.1 function introduction to STV8216

1. Description

TV Sound Demodulator: provides all the necessary circuitry for the demodulation of audio transmissions of European and Asian terrestrial TV broadcasts. The various transmission standards are automatically detected and demodulated without user intervention.

Audio Processor: based on DSP technology, independently controls loudspeaker, subwoofer and headphone signals. It offers basic and advanced features, such as a ST WideSurround, Equalizer, Automatic Loudness and Smart Volume Control for television viewer comfort. The STV8226/36 versions can perform additionally the SRS 3D Surround for stereo and mono signals.

Audio Matrix: 3 stereo and 1 mono external analog audio inputs to loudspeakers and headphone, with 2 stereo external analog audio outputs (SCART compatible).

2. Feature

- # NICAM, AM, FM Mono and FM 2 Carrier Stereo Demodulators for all sound carriers between 4.5 and 7 MHz
- # Spatial Sound Effects (ST Wide Surround and Pseudo-Stereo)
- # Mono input provided for optimum AM Demodulation performances
- # Subwoofer output with Volume Control and Programmable Bandwidth
- # Demodulation controlled by Automatic Standard Recognition System
- # Loudspeaker and Headphone outputs with Volume/Balance Controls and Beeper
- # Sound IF AGC with wide range
- # Overmodulation and Carrier Offset recovery
- # Smart Volume Control
- # 5-band Equalizer & Bass/Treble Control
- # SRS® 3D Surround
- # 3-to-2 Analog Stereo Audio I/Os (SCART compatible) with Audio Matrix
- # Low-noise Audio Mutes and Switches
- # I²S Output to interface with Dolby® ProLogic® Decoder
- # Automatic Loudness Control
- # I²C Bus-controlled

Single and standard 27 MHz Crystal Oscillator

Embedded 3.3 V Regulators

Power supplies: 3.3 V Digital, 5 V or 8 V Analog

I = Input

O = Output

OD = Open Drain

B = Bidirectional

A = Analog

AP = Analog Power Supply

DP = Digital Power Supply

3. Pin Definitions

PIN	Name	Type	Function
1	AO1L	A	Left SCART1 Audio Output
2	AO1R	A	Right SCART1 Audio Output
3	NC		Not Used
4	NC		Not Used
5	NC		Not Used
6	NC		Not Used
7	VDDC	AP	3.3 V Power Supply for Audio DAC/ADC
8	GNDC	AP	0 V Power Supply for DAC/ADC
9	AI1L	A	Left SCART1 Audio Input
10	AI1R	A	Right SCART1 Audio Input
11	VMC1	A	Switched VREF Decoupling Pin for Audio Converters (VMCP)
13	VMC2	A	VREF Decoupling Pin for Audio Converters (VMC)
14	AI2L	A	Left SCART2 Audio Input
15	AI2R	A	Right SCART2 Audio Input
16	VDDA	AP	3.3 V Power Supply for Audio Buffers, Matrix & Bias
17	GNDAH	AP	0 V Power Supply for Audio Buffers & SCART
18	AO2L	A	Left SCART2 Audio Output
19	AO2R	A	Right SCART2 Audio Output
20	VDDH	AP	8 V / 5 V Power Supply for SCART & Audio Buffers
21	NC		Not Used
22	VREFA	A	Voltage Reference for Audio Buffers

23	AI3L	A	Left SCART3 Audio Input
24	AI3R	A	Right SCART3 Audio Input
25	N/C		Not Used
26	BGAP	A	Bandgap Voltage Source Decoupling
27	N/C		Not Used
28	LSL	A	Left Loudspeaker Output
29	LSR	A	Right Loudspeaker Output
30	SW	A	Subwoofer Output
31	HPL	A	Left Headphone Output
32	HPR	A	Right Headphone Output
33	GNDSA	AP	Substrate Analog/Digital Shield
34	N/C		Not Used
35	HPD	B	Headphone Detection Input (Active Low)
36	ADR	I	Hardware I ² C Chip Address Control
37	N/C		Not Used
38	N/C		Not Used
39	SCL	OD	I ² C Serial Clock
40	SDA	OD	I ² C Serial Data
41	N/C		Not Used
42	REG	A	5 V Power Regulator Control
43	RESET	I	Hardware Reset (Active Low)
44	SYSCK	B	System Clock Output
45	MCK	B	I ² S Master Clock Output
46	VDD1	DP	3.3V Power Supply for Digital Core & IO Cells
47	GND1	DP	0V Power Supply for Digital Core & IO Cells
48	N/C		Not Used
49	GNDSP	AP	Substrate Analog/Digital Shield for Clock-PLL
50	N/C		Not Used
51	N/C		Not Used
52	XTI	I	Crystal Oscillator Input
53	XTO	O	Crystal Oscillator Output
54	VDDP	AP	3.3 V Power Supply for Analog PLL Clock
55	GNDP	AP	0 V Power Supply for Analog PLL Clock

56	GND2	DP	0 V Power Supply for Digital Core, DSPs & IO Cells
57	VDD2	DP	3.3 V Power Supply for Digital Core, DSPs & IO Cells
58	CKTST	I	Must be Connected to 0 V
59	N/C		Not Used
60	N/C		Not Used
61	SDO	B	I ² S Bus Data Output
62	ST/SDI	B	Stereo Detection Output / I ² S Bus Data Input
63	WS	B	I ² S Bus Word Select Output
64	SCK	B	I ² S Bus Clock Output
65	BUS1	B	I ² C Bus Expander Output 1
66	N/C		Not Used
67	N/C		Not Used
68	BUS0	B	I ² C Bus Expander Output 2
69	IRQ	B	I ² C Status Read Request
70	N/C		Not Used
71	N/C		Not Used
72	N/C		Not Used
73	SIF	A	Sound IF Input
74	VTOP	A	ADC VTOP Decoupling Pin
75	VREFIF	A	AGC Voltage Reference Decoupling Pin
76	VDDIF	AP	3.3 V Power Supply for IF AGC & ADC
77	GNDIF	AP	0 V Power Supply for IF AGC & ADC
78	MONOIN	A	Mono Input
79	NC		Not Used
80	NC		Not Used

3.5.2 function introduction to MST518

1. Description

The MST518V is a high performance, and fully integrated graphics processing IC solution for LCD monitors with resolutions up to SXGA. It is configured with an integrated triple-ADC/PLL, a high quality scaling engine, an on-screen display controller, a built-in output clock generator, and a multi-purpose output display interface.

To further reduce system costs, the MST518V also integrates intelligent power management control

capability for green-mode requirements and spread-spectrum support for EMI management.

2. Feature

- # High-quality zoom and shrink scaling engine (Compatible with VGA thru SXGA)
- # Integrated 8-bit triple-ADC/PLL
- # On-screen display controller (OSD)
- # Supports dual-RGB inputs
- # Supports sRGB
- # Supports composite sync and SOG separator
- # Programmable 10-bit gamma correction
- # Integrated brightness & contrast control adjustment
- # Supports peaking function for video sharpness enhancement
- # Supports coring function for low level noise reduction
- # Supports multi-purpose output display interface driver
- # Supports copy protection
- # Supports PWM backlight intensity control
- # Green PC and low EMI features
- # Low standby power mode (< 16mA)
- # Supports 8-bit video decoder input (ITU 656)

3. Pin Definitions

PIN	Pin Name	Pin Type	Function
33	HWRESET	Schmitt Trigger Input w/ 5V-tolerant	Hardware reset; active high
82	CS	Input w/ 5V-tolerant	3 Wire Serial Bus Chip Select; active high
83	SDA	I/O w/ 5V-tolerant	3 Wire Serial Bus Data; 4mA driving strength
84	SCL	Input w/ 5V-tolerant	3 Wire Serial Bus Clock
Analog Interface			
38	HSYNC0	Schmitt Trigger Input w/ 5V-tolerant	Analog HSYNC Input from Channel 0
39	VSYNC0	Schmitt Trigger Input w/ 5V-tolerant	Analog VSYNC Input from Channel 0
40	HSYNC1	Schmitt Trigger Input w/ 5V-tolerant	Analog HSYNC Input from Channel 1
41	VSYNC1	Schmitt Trigger Input w/ 5V-tolerant	Analog VSYNC Input from Channel 1

55	REXT		External resistor 390 ohm to AVDD
60	BIN1	Analog Input	Analog Blue Input from Channel 1
61	BIN1M	Analog Input	Reference Ground for Analog Blue Input from Channel 1
62	SOGIN1	Analog Input	Sync-On-Green Input from Channel 1
63	GIN1	Analog Input	Analog Green Input from Channel 1
64	GIN1M	Analog Input	Reference Ground for Analog Green Input from Channel 1
65	RIN1	Analog Input	Analog Red Input from Channel 1
66	RIN1M	Analog Input	Reference Ground for Analog Red Input from Channel 1
69	BIN0M	Analog Input	Reference Ground for Analog Blue Input from Channel 0
70	BIN0	Analog Input	Analog Blue Input from Channel 0
71	GIN0M	Analog Input	Reference Ground for Analog Green Input from Channel 0
72	GIN0	Analog Input	Analog Green Input from Channel 0
73	SOGIN0	Analog Input	Sync-On-Green Input from Channel 0
74	RIN0M	Analog Input	Reference Ground for Analog Red Input from Channel 0
75	RIN0	Analog Input	Analog Red Input from Channel 0
78	RMID		Mid-Scale Voltage Bypass
79	REFP		Internal ADC Top De-coupling Pin
80	REFM		Internal ADC Bottom De-coupling Pin
Video Interface			
90	VCLK	Input w/ 5V-tolerant	Video Decoder Clock
98-91	VD[7:0]	Input w/ 5V-tolerant	Video Decoder Data[7:0]
LCD Interface			
143	LHSYNC	Output w/ Pull-down Resistor	LCD HSYNC; 4~12mA driving strength programmable
144	LVSYNC	Output w/ Pull-down Resistor	LCD VSYNC; 4~12mA driving strength programmable
145	OCLK	Output w/ Pull-down Resistor	LCD Output Clock; 4~12mA driving strength programmable
146	LDE	Output w/ Pull-down Resistor	LCD Display Enable; 4~12mA driving strength programmable
138-131	RA[7:0]	Output w/ Pull-down Resistor	Port A Red Channel Bit[7:0]; 4~12mA driving strength programmable
128, 127, 120-115	GA[7:0]	Output w/ Pull-down Resistor	Port A Green Channel Bit[7:0]; 4~12mA driving strength programmable
110-103	BA[7:0]	Output w/ Pull-down Resistor	Port A Blue Channel Bit[7:0]; 4~12mA driving strength programmable
26-23, 18-15	RB[7:0]	I/O w/ Pull-down Resistor	Port B Red Channel Bit[7:0]; 4~12mA driving strength programmable
14-11, 8-5	GB[7:0]	I/O w/ Pull-down Resistor	Port B Green Channel Bit[7:0]; 4~12mA driving strength programmable
4, 3, 154,	BB[7:0]	I/O w/ Pull-down Resistor	Port B Blue Channel Bit[7:0]; 4~12mA driving strength programmable

153, 150-147			
126, 155-160	GPO[6:0]	Output w/ Pull-down Resistor	TCON GPO[6:0]; 4~12mA driving strength programmable
124	OINV	Output w/ Pull-down Resistor	TCON "Odd" Channel Inversion; 4~12mA driving strength programmable
123	EINV	Output w/ Pull-down Resistor	TCON "Even" Channel Inversion; 4~12mA driving strength programmable
122	OSP	Output w/ Pull-down Resistor	TCON "Odd" Channel Start Pulse; 4~12mA driving strength programmable
121	ESP	Output w/ Pull-down Resistor	TCON "Even" Channel Start Pulse; 4~12mA driving strength programmable
LVDS Interface			
138	LVA0M	Output	A-Link Negative LVDS Differential Data Output
137	LVA0P	Output	A-Link Positive LVDS Differential Data Output
136	LVA1M	Output	A-Link Negative LVDS Differential Data Output
135	LVA1P	Output	A-Link Positive LVDS Differential Data Output
134	LVA2M	Output	A-Link Negative LVDS Differential Data Output
133	LVA2P	Output	A-Link Positive LVDS Differential Data Output
128	LVA3M	Output	A-Link Negative LVDS Differential Data Output
127	LVA3P	Output	A-Link Positive LVDS Differential Data Output
132	LVACKM	Output	A-Link Negative LVDS Differential Clock Output
131	LVACKP	Output	A-Link Positive LVDS Differential Clock Output
154	LVB0M	Output	B-Link Negative LVDS Differential Data Output
153	LVB0P	Output	B-Link Positive LVDS Differential Data Output
150	LVB1M	Output	B-Link Negative LVDS Differential Data Output
149	LVB1P	Output	B-Link Positive LVDS Differential Data Output
148	LVB2M	Output	B-Link Negative LVDS Differential Data Output
147	LVB2P	Output	B-Link Positive LVDS Differential Data Output
144	LVB3M	Output	B-Link Negative LVDS Differential Data Output
143	LVB3P	Output	B-Link Positive LVDS Differential Data Output
146	LVBCKM	Output	B-Link Negative LVDS Differential Clock Output
145	LVBCKP	Output	B-Link Positive LVDS Differential Clock Output
RSDS Interface			
143	CLKAP	Output	A-Link Positive RSDS Differential Clock Output from

			"Odd" Channel
144	CLKAN	Output	A-Link Negative RSDS Differential Clock Output from "Odd" Channel
145	CLKBP	Output	B-Link Positive RSDS Differential Clock Output from "Even" Channel
146	CLKBN	Output	B-Link Negative RSDS Differential Clock Output from "Even" Channel
109, 107, 105, 103	BA[3:0]P	Output	A-Link Positive RSDS Differential Data Output from "Odd" Channel
110, 108, 106, 104	BA[3:0]N	Output	A-Link Negative RSDS Differential Data Output from "Odd" Channel
127, 119, 117, 115	GA[3:0]P	Output	A-Link Positive RSDS Differential Data Output from "Odd" Channel
128, 120, 118, 116	GA[3:0]N	Output	A-Link Negative RSDS Differential Data Output from "Odd" Channel
137, 135, 133, 131	RA[3:0]P	Output	A-Link Positive RSDS Differential Data Output from "Odd" Channel
138, 136, 134, 132	RA[3:0]N	Output	A-Link Negative RSDS Differential Data Output from "Odd" Channel
3, 153, 149, 147	BB[3:0]P	Output	B-Link Positive RSDS Differential Data Output from "Even" Channel
4 154, 150, 148	BB[3:0]N	Output	B-Link Negative RSDS Differential Data Output from "Even" Channel
13, 11, 7, 5	GB[3:0]P	Output	B-Link Positive RSDS Differential Data Output from "Even" Channel
14, 12, 8, 6	GB[3:0]N	Output	B-Link Negative RSDS Differential Data Output from "Even" Channel
25, 23, 17, 15	RB[3:0]P	Output	B-Link Positive RSDS Differential Data Output from "Even" Channel
26, 24, 18, 16	RB[3:0]N	Output	B-Link Negative RSDS Differential Data Output from "Even" Channel
126, 155-160	GPO[6:0]	Output w/ Pull-down Resistor	TCON GPO[6:0]; 4~12mA driving strength programmable
122	OSP	Output w/ Pull-down Resistor	TCON "Odd" Channel Start Pulse; 4~12mA driving strength programmable
121	ESP	Output w/ Pull-down Resistor	TCON "Even" Channel Start Pulse; 4~12mA driving strength programmable
GPIO Interface			
87	GOUT1/PWM1	Output	GOUT1/PWM1; 4mA driving strength

86	GOUT1/PWM0	Output	GOUT0/PWM0; 4mA driving strength
Misc. Interface			
2	BYPASS		For External Bypass Capacitor
29	DDC_DAT	I/O w/ 5V-tolerant	DDC Data for Analog Interface; 4mA driving strength
30	DDC_CLK	Input w/ 5V-Tolerant	DDC Clock for Analog Interface
31	DDCROM_CLK	Input w/ 5V-Tolerant	DDC ROM Clock
32	DDCROM_DAT	I/O w/ 5V-tolerant	DDC ROM Data; 4mA driving strength
34	XIN	Crystal Oscillator Input	Xin
35	XOUT	Crystal Oscillator Output	Xout
Power Pins			
48, 54, 58, 77	AVDD	3.3V Power	ADC Power
56	AVDD_PLL	3.3V Power	PLL Power
36	AVDD_MPLL	3.3V Power	MPLL Power
10, 22, 88, 99, 111, 129, 139, 151	VDDP	3.3V Power	Digital Output Power
19, 102, 114, 142	VDDC	2.5V Power	Digital Core Power
1, 9, 20, 21, 37, 42, 45, 51, 57, 59, 76, 81, 89, 100, 101, 112, 113, 125, 130, 140, 141, 152	GND	Ground	Digital Core Ground
27, 28, 43, 44, 46, 47, 49, 50, 52, 53, 67, 68, 90	NC		No Connect. Leave These Pins Floating.

3.5.3 function introduction to MP1430

1. Description

The MP1430 is a step-down regulator with an internal Power MOSFET. It achieves 3A continuous output current over a wide input supply range with excellent load and line regulation.

Current mode operation provides fast transient response and eases loop stabilization.

Fault condition protection includes cycle-by-cycle current limiting and thermal shutdown. Adjustable soft-start reduces the stress on the input source at turn-on. In shutdown mode the regulator draws 20 μ A of supply current.

The MP1430 requires a minimum number of readily available external components to complete a 3A step down DC to DC converter solution.

2. Feature

- # 3A Output Current
- # Programmable Soft-Start
- # 110m Ω Internal Power MOSFET Switch
- # Stable with Low ESR Output Ceramic Capacitors
- # Up to 95% Efficiency
- # 20 μ A Shutdown Mode
- # Fixed 385KHz Frequency
- # Thermal Shutdown
- # Cycle-by-Cycle Over Current Protection
- # Wide 6V to 28V Operating Input Range
- # Output Adjustable from 1.22V
- # Under Voltage Lockout
- # Available in 8-Pin SOIC Package

3. Pin Definitions

Pin	Pin Name	Function
1	BS	High-Side Gate Drive Boost Input. BS supplies the drive for the high-side N-Channel MOSFET switch. Connect a 10nF or greater capacitor from SW to BS to power the high side switch.
2	IN	Power Input. IN supplies the power to the IC, as well as the step-down converter switches. Drive IN with a 6V to 28V power source. Bypass IN to GND with a suitably large capacitor to eliminate noise on the input to the IC. See Input Capacitor section.
3	SW	Power Switching Output. SW is the switching node that supplies power to the output. Connect the output LC filter from SW to the output load. Note that a capacitor is required from SW to BS to power the high-side switch.
4	GND	Ground. (Note: Connect the exposed pad on backside to Pin 4).

5	FB	Feedback Input. FB senses the output voltage to regulate that voltage. Drive FB with a resistive voltage divider from the output voltage. The feedback threshold is 1.222V. See Setting the Output Voltage section.
6	COMP	Compensation Node. COMP is used to compensate the regulation control loop. Connect a series RC network from COMP to GND to compensate the regulation control loop. In some cases, an additional capacitor from COMP to GND is required. See Compensation section.
7	EN	Enable Input. EN is a digital input that turns the regulator on or off. Drive EN high to turn on the regulator, drive EN low to turn it off. An Under Voltage Lockout (UVLO) function can be implemented by the addition of a resistor divider from VIN to GND. For complete low current shutdown its needs to be less than 0.7V. For automatic startup, leave EN unconnected.
8	SS	Soft-Start Control Input. SS controls the soft-start period. Connect a capacitor from SS to GND to set the soft-start period. A 0.1 μ F capacitor sets the soft-start period to 10ms. To disable the soft-start feature, leave SS unconnected.

3.5.4 function introduction to W79E632

1. Description

The W79E632 is a fast 8051 compatible microcontroller with a redesigned processor core without wasted clock and memory cycles. As a result, it executes every 8051 instruction faster than the original 8051 for the same crystal speed. Typically, the instruction executing time of W79E632 is 1.5 to 3 times faster than that of traditional 8051, depending on the type of instruction. In general, the overall performance is about 2.5 times better than the original for the same crystal speed. Giving the same throughput with lower clock speed, power consumption has been improved. Consequently, the W79E632 is a fully static CMOS design; it can also be operated at a lower crystal clock. The W79E632 contains In-System Programmable (ISP) 128 KB bank-addressed Flash EPROM; 4KB auxiliary Flash EPROM for loader program; on-chip 1 KB MOVX SRAM; power saving modes.

2. Feature

- # 8-bit CMOS microcontroller
- # High speed architecture of 4 clocks/machine cycle runs up to 40 MHz
- # Pin compatible with standard 80C52
- # Instruction-set compatible with MCS-51
- # Four 8-bit I/O Ports
- # One extra 4-bit I/O port, chip select
- # Three 16-bit Timers
- # 7 interrupt sources with two levels of priority
- # On-chip oscillator and clock circuitry
- # One enhanced full duplex serial port

Dual 64KB In-System Programmable Flash EPROM banks (APFlash0 and APFlash1)

4KB Auxiliary Flash EPROM for loader program (LDFlash)

256 bytes scratch-pad RAM

1 KB on-chip SRAM for MOVX instruction

Programmable Watchdog Timer

6 channels of 8 bit PWM

Software Reset

Software programmable access cycle to external RAM/peripherals

Code protection

3. Pin Definitions

PIN	PIN NAME	Function
1	NC	
2	KEY1	panel key1
3	KEY2	panel key2
4	KEY3	panel key3
5	KEY4	panel key4
6	FBI	CVBS/RGB switch
7	/RST	TVP5146 out Reset
8	NC	
9	NC	
10	RST	RESET: A high on this pin for two machine cycles while the oscillator is running resets the device.
11	RXD	upgrade port
12	KEY2	panel key2
13	TXD	upgrade port
14	IR	remote input
15	NC	
16	ON/OFF_INVERTER	Higher voltage switch
17	POWER	power control
18	NC	
19	NC	
20	XTAL2	CRYSTAL2: This is the crystal oscillator output. It is the inversion of XTAL1.
21	XTAL1	CRYSTAL1: This is the crystal oscillator input. This pin may be driven by an external clock.
22	GND	GROUND: Ground potential

23	NC	
24	SS	Screen proportion switch
25	SW1	Video Output Switch1
26	SW2	Video Output Switch2
27	SCL	IIC clock
28	SDA	IIC data
29	SEL_I/P	Progressive/Interlaced Scanning Switch
30	AMP_MUTE	Audio Amplifier Mute
31	AMP_STB	Audio Amplifier Standby
32	PSEN	PROGRAM STORE ENABLE: PSEN enables the external ROM data onto the Port 0 address/data bus during fetch and MOVC operations. When internal ROM access is performed, no PSEN strobe signal outputs from this pin.
33	ALE	ADDRESS LATCH ENABLE: ALE is used to enable the address latch that separates the address from the data on Port 0.
35	EA	EXTERNAL ACCESS ENABLE: This pin forces the processor to execute out of external ROM. It should be kept high to access internal ROM. The ROM address and data will not be present on the bus if EA pin is high and the program counter is within 128 KB area. Otherwise they will be present on the bus.
34	NC	
36	NC	
37	PANEL_ON	Screen power switch
38	8216_RST	STV8216 Reset output
39	WP	Protect 24C32
40	RST_MST	MST518 Reset
41	CS_MST	MST518 Chip Enable
42	SDA_MST	IIC Clock to CPU
43	SCL_MST	IIC Data to CPU
44	VDD	POWER SUPPLY: Supply voltage for operation.

3.5.5 function introduction to TVP5146

1. Description

TVP5146 is a high quality, single-chip digital video decoder that digitizes and decodes all popular base-band analog video formats into digital component video. TVP5146 supports the A/D conversion of component RGB and YPbPr signals, as well as the A/D conversion and decoding of NTSC, PAL and SECAM

composite and S-Video into component YCbCr. This chip includes four 10-bit 30-MSPS A/D converters. Prior to each A/D converter, each analog channel contains an analog circuit, which clamps the input to a reference voltage and applies a programmable gain and offset. A total of 10 video input terminals can be configured to any combination of RGB, YPbPr, CVBS, S-Video video inputs.

Component, Composite or S-Video signals are sampled at 2x the square-pixel or ITU-R BT.601 clock frequency (27 MHz), line-locked for correct pixel alignment, and are then decimated to the 1x pixel rate. CVBS decoding utilizes 2-dimensional complementary 5-line adaptive comb filtering for both the luma and chroma data paths, to reduce both cross-luma and cross-chroma artifacts. A chroma trap filter is also available. On CVBS and Y/C inputs, the user can control video characteristics such as contrast, brightness, saturation and hue via an I2C host port interface. Furthermore, luma peaking with programmable gain is included, as well as a patented chroma transient improvement (CTI) circuit.

2. Feature

- # Four 30-MSPS, 10-bit A/D Channels with programmable clamp and gain control
- # Supports NTSC (J, M, 4.43), PAL (B, D, G, H, I, M, N, Nc, 60) and SECAM (B, D, G, K, K1, L) CVBS, S-video
- # Supports analog component YPbPr /RGB video formats with embedded sync
- # 10 analog video input terminals for multi-source connection
- # User-programmable video output formats
- # HSYNC/VSYNC outputs with programmable position, polarity and width and FID (Field ID) output
- # Component video processing
- # Vertical Blank Interval Data Processor
- # I²C host port interface #
- # Reduced power consumption: 1.8V digital core, 3.3V and 1.8V analog core with power-save and power-down modes
- # Embedded RAM to allow user-downloadable configuration micro code (feature upgrade)
- # 80-pin TQFP PowerPAD™ package

3. Pin Definitions

Name	No.	I/O	Description
Analog Video			
VI_1_A	80	I	VI_1_x: Analog video input for CVBS/Pb/B/C
VI_1_B	1		VI_2_x: Analog video input for CVBS/Y/G
VI_1_C	2		VI_3_x: Analog video input for CVBS/Pr/R/C
VI_2_A	7		VI_4_A: Analog video input for CVBS/Y
VI_2_B	8		Up to ten composite, 4 S-video and two composite or three component video

VI_2_C	9		inputs (or a combination thereof) can be supported. The inputs must be AC coupled. The recommended coupling capacitor is 0.1 μF. The possible input configurations are listed in the input select register 00h.
VI_3_A	16		
VI_3_B	17		
VI_3_C	18		
VI_4_A	23		
Clock Signals			
XTAL1	74	I	External clock reference input.
XTAL2	75	O	External clock reference output.
DATACLK	40	O	Line-locked data output clock.
Digital Video			
Y[9:0]	43-47,50-54	O	Digital video output of Y/YCbCr, Y[9] is MSB and Y[0] is LSB.
C[9:0]/GPIO[9:0]	57-60,63-66,69,70	I/O	Digital video output of CbCr, C[9] is MSB and C[0] is LSB. Unused outputs can be left unconnected. Also these terminals can be programmable general purpose I/O. Fast-Switch Overlay between Digital RGB and component RGB/YPbPr Digital BLUE input from Closed Caption decoder (Overlay device) Digital GREEN input from Closed Caption decoder (Overlay device) Digital RED input from Closed Caption decoder (Overlay device)
FSO	57	I	Fast-Switch Overlay between Digital RGB and component RGB/YPbPr
D_BLUE	58	I	Digital BLUE input from Closed Caption decoder (Overlay device)
D_GREEN	59	I	Digital GREEN input from Closed Caption decoder (Overlay device)
D_RED	60	I	Digital RED input from Closed Caption decoder (Overlay device)
Miscellaneous Signals			
RESETB	34	I	Reset input, active low.
PWDN	33	I	Power down input. 1: Power down 0: Normal mode
GLCO/I2CA	37	I/O	Genlock Control Output (GLCO). Two Genlock data formats are available: TI formats and Real Time Control (RTC) format. During reset, this terminal is an input, used to program the I2C address LSB.
FSS/GPIO	35	I/O	Fast-switch (Blanking) input. Switching signal between synchronous component video (YPbPr/RGB) and composite video input. Programmable general purpose I/O
TMS	27	I	This terminal should be connected to a ground.
INTREQ	30	O	Interrupt request.

Host Interface			
SDA	29	I/O	I2C Data bus.
SCL	28	I	I2C Clock input.
Power Supplies			
NSUB	26	I	Substrate ground. Connect to analog ground.
CH1_A33GND CH2_A33GND CH3_A33GND CH4_A33GND	3 6 19 22	I	Analog 3.3V return.
CH1_A33VDD CH2_A33VDD CH3_A33VDD CH4_A33VDD	4 5 20 21	I	Analog power. Connect to 3.3V.
CH1_A18GND CH2_A18GND CH3_A18GND CH4_A18GND	79 10 15 24	I	Analog 1.8V return.
CH1_A18VDD CH2_A18VDD CH3_A18VDD CH4_A18VDD	78 11 14 25	I	Analog power. Connect to 1.8V.
A18GND_REF	13	I	Analog 1.8V return.
A18VDD_REF	12	I	Analog power for reference 1.8V.
PLL_A18GND	77	I	Analog power return.
PLL_A18VDD	76	I	Analog power. Connect to 1.8V.
DGND	32,42,56,68	I	Digital return.
DVDD	31,41,55,67	I	Digital power. Connect to 1.8V.
IOGND	39,49,62	I	Digital power return.
IOVDD	38,48,61	I	Digital power. Connect to 3.3V or less for reduced noise.
Sync Signals			
HS/CS/GPIO	72	I/O	Horizontal sync output or digital composite sync output Programmable general purpose I/O
VS/VBLK/GPIO	73	I/O	Vertical sync output. (for modes with dedicated VSYNC) or VBLK output Programmable general purpose I/O
FID/GPIO	71	I/O	Odd/even field indicator output Programmable general purpose I/O

AVID/GPIO	36	I/O	Active Video indicator output Programmable general purpose I/O
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3.5.6 function introduction to NCP1377

1. Description

The NCP1377 combines a true current mode modulator and a demagnetization detector which ensures full borderline/critical Conduction Mode in any load/line conditions together with minimum drain voltage switching (Quasi- Resonant operation). Due to its inherent skip cycle capability, the controller enters burst mode as soon as the power demand falls below a predetermined level. As this happens at low peak current, no audible noise can be heard. For NCP1377, an internal 8.0 μ s timer prevents the free- run frequency to exceed the 150 kHz CISPR- 22 EMI starting limit while the skip adjustment capability lets the user select the frequency at which the burst foldback takes place. For NCP1377B, the internal timer duration is reduced to 3.0 μ s to allow operation at higher frequencies.

The transformer core reset detection is done through an auxiliary winding which, brought via a dedicated pin, also enables fast Over Voltage Protection (OVP). Once an OVP has been detected, the IC permanently latches- off. The 1377 features a sampling time of 4.5 μ s whereas it is 1.5 μ s for the B version.

The NCP1377 also features an efficient protective circuitries which, in presence of an overcurrent condition, disables the output pulses and enters a safe burst mode, trying to restart. Once the default has gone, the device auto- recovers. Finally an internal 1.0 ms soft- start eliminates the traditional startup stress.

2. Feature

- # Free- Running Borderline/Critical Mode Quasi- Resonant Operation
- # Latched Over Voltage Protection
- # Auto- Recovery Short- Circuit Protection Via UVLO Crossover
- # External Latch Triggering, e.g. Via Overtemperature Signal
- # Current- Mode with Adjustable Skip- Cycle Capability
- # Internal 1.0 ms Soft- Start
- # Internal Temperature Shutdown
- # Internal Leading Edge Blanking
- # 500 mA Peak Current Source/Sink Capability
- # Under Voltage Lockout Level of 12.5 V (On) and 7.5 V (Min)
- # Direct Optocoupler Connection
- # SPICE Models Available for TRANsient Analysis
- # Internal Minimum TOFF

3. Pin Definitions

Pin	Symbol	Function	Description
1	Demag	Core reset detection and OVP	The auxiliary FLYBACK signal ensures discontinuous operation and offers a fixed over voltage detection level of 7.2 V.
2	FB	Sets the peak current setpoint	By connecting an optocoupler to this pin, the peak current setpoint is adjusted accordingly to the output power demand. By bringing this pin below the internal skip level, you shut off the device.
3	CS	Current sense input and skip cycle level selection	This pin senses the primary current and routes it to the internal comparator via an L.E.B. By inserting a resistor in series with the pin, you control the level at which the skip operation takes place.
4	Gnd	The IC ground	-
5	Drv	Driving pulses	The driver's output to an external MOSFET.
6	VCC	Supplies the IC	This pin is connected to an external bulk capacitor of typically 10 µF.
7	NC	-	This unconnected pin ensures adequate creepage distance.
8	HV	High- voltage pin	Connected to the high- voltage rail, this pin injects a constant current into the VCC bulk capacitor and ensures a clean lossless startup sequence.

3.5.7 function introduction to TDA7266P

1. Description

The TDA7266P is a dual bridge amplifier specially designed for LCD TV/Monitor, PC Motherboard, TV and Portable Audio applications.

2. Feature

TECHNOLOGY BI20II

WIDE SUPPLY VOLTAGE RANGE (3.5 - 12V)

OUTPUT POWER:

- 3+3W @THD = 10%, RL = 8Ω, VCC = 7.5V
- 4+4W Music Power @THD = 10%, RL = 8Ω, VCC = 8.5V

SINGLE SUPPLY

MINIMUM EXTERNAL COMPONENTS:

- NO SVR CAPACITOR
- NO BOOTSTRAP
- NO BOUCHEROT CELLS
- INTERNALLY FIXED GAIN

STAND-BY & MUTE FUNCTIONS

SHORT CIRCUIT PROTECTION

THERMAL OVERLOAD PROTECTION

3. Pin Definitions

PIN	Pin Name	Pin Type	Function
1	PW_GND	GND	GND
2	NC		NC
3	NC		NC
4	NC		NC
5	OUT1+	Output	LOUT+ OUTPUT
6	OUT1-	Output	LOUT- OUTPUT
7	+VS	10V POWER	Power
8	IN1	AUDIO INPUT	AUDIO_L_INPUT
9	NC		NC
10	MUTE	MUTE	
11	STBY	AMP_STBY	
12	NC		NC
13	NC		NC
14	SGND	GND	GND
15	NC		NC
16	NC		NC
17	IN2	AUDIO INPUT	AUDIO_R_INPUT
18	+VS	10V POWER	Power
19	OUT2+	Output	ROUT+ OUTPUT
20	OUT2-	Output	ROUT- OUTPUT
21	NC		NC
22	NC		NC
23	NC		NC
24	PW_GND	GND	GND

3.5.8 function introduction to LA7952

1. Feature

- # On-chip driver with 4 inputs, 1 output, 75W termination.
- # On-chip 6dB amplifier.
- # Excellent crosstalk characteristic.
- # Wide band.
- # Input with DC restoration circuit.

2. Pin Definitions

Pin	Pin Name	Pin Type	Function
1	VIDEO OUT	OUTPUT	VIDEO OUTPUT
2	A		SWITCH
3	B		SWITCH
4	VIN1	INPUT	VIDEO INPUT
5	GND	GND	GND
6	VIN2	INPUT	VIDEO INPUT
7	VCC	POWER	12V
8	VIN3	INPUT	VIDEO INPUT
9	VIN4	INPUT	VIDEO INPUT

3.5.9 function introduction to Mp1008

1. Description

The MP1008 is a fixed operating frequency inverter controller that controls two external N-Channel power MOSFETs in a half-bridge configuration. The inverter is designed to power one or more cold cathode fluorescent lamps (CCFL) to backlight liquid crystal displays. Its half-bridge architecture converts unregulated DC input voltages to nearly pure sine waves. Burst mode dimming is controlled with either an external analog or digital signal. Built-in fault management features include an open lamp regulator, short circuit protection and a dualmode fault timer. The MP1008 is available in 16-pin SOIC and DIP packages.

2. General Feature lists

- # Controls Two External, Low Cost, N-Channel MOSFETs
- # Fixed Operating Frequency
- # Input Voltage Range of 10V to 30V
- # Lamp Current and Voltage Regulation

Full-Wave Sense Amp for Lamp Current Feedbacks

Burst Mode Dimming Control

Integrated Burst Mode Oscillator and Modulator

Soft-On and Soft-Off Burst Envelope

Open Lamp Protection

Fault Timer

Thermal Shutdown with Hysteresis

Available in SOIC 16 and DIP16 Packages

3. Pin Definitions

Pin #	Name	Description
1	LV	Open Lamp Voltage Feedback Input. Connect a capacitive voltage divider from the first end of the lamp to ground. Connect this pin to the tap on the divider and shunt a bias resistor to ground. If the voltage at LV exceeds +1.2V, the controller will treat this as an open lamp condition. A pulse of current will pull down on the COMP pin to regulate the lamp voltage and the Fault Timer will be started.
2	LI	Lamp Current Feedback. The error amplifier will regulate the RMS LI voltage to 1.33VRMS.
3	COMP	Feedback Compensation Node. Connect a compensation capacitor from this pin to ground.
4	FT	Fault Timing. Connect a timing capacitor from this pin to AG to set the fault timeout period.
5	SWSET	Switching Frequency Set. Connect a resistor from this pin to AG. This resistor sets the operating frequency of the MP1008.
6	BRSET	Burst Repetition Rate Setting. If the burst repetition rate is to be synchronized to an external clock, connect a capacitor from BRS to AG. If the burst is to be controlled by an external logic signal, connect BRS to VCC and apply the logic signal to the DBRT pin.
7	DBRT	Burst-Mode (Digital) Brightness Control Input. The voltage range of 0V to 1.2V at DBRT linearly sets the burst-mode duty cycle from minimum 10% to 100%. If burst dimming is not used, connect DBRT to VCC.
8	EN	Enable Input. Pull EN high to turn on the IC; low to turn it off.
9	VIN	Input Power Rail. Decouple this pin to power ground with >1 μ F ceramic capacitor. It is desirable to add a 1000 resistor between VIN pin and the input bus.
10	BT	Output Bootstrap. BT provides gate bias for the high-side MOSFET. Connect a capacitor from BT to OUT.
11	UG	High-Side MOSFET Gate Output. Connect UG to the gate of the high-side, external power MOSFET.
12	OUT	Bridge Output. Connect OUT to the source of the high-side MOSFET and the drain of the low-side MOSFET.
13	VCC	Voltage Rail Output. VCC allows bypassing the bias supply for the control circuitry. Bypass VCC with a ceramic capacitor.
14	LG	Low-Side MOSFET Gate Output. Connect LG to the gate of the low-side MOSFET.
15	PG	Power Ground. Connect PG to the source of the low-side MOSFET.

16	AGND	Analog Ground.
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3.5.10 function introduction to CD4052

1. Description

The CD4052B (N5) analog multiplexers is digitally-controlled analog switches having low ON impedance and very low OFF leakage current. Control of analog signals up to 20VP-P can be achieved by digital signal amplitudes of 4.5V to 20V (if $V_{DD}-V_{SS} = 3V$, a $V_{DD}-V_{EE}$ of up to 13V can be controlled; for $V_{DD}-V_{EE}$ level differences above 13V, a $V_{DD}-V_{SS}$ of at least 4.5V is required). For example, if $V_{DD} = +4.5V$, $V_{SS} = 0V$, and $V_{EE} = -13.5V$, analog signals from -13.5V to +4.5V can be controlled by digital inputs of 0V to 5V. These multiplexer circuits dissipate extremely low quiescent power over the full $V_{DD}-V_{SS}$ and $V_{DD}-V_{EE}$ supply-voltage ranges, independent of the logic state of the control signals. When a logic “1” is present at the inhibit input terminal, all channels are off.

The CD4052B is a differential 4-Channel multiplexer having two binary control inputs, A and B, and an inhibit input. The two binary input signals select 1 of 4 pairs of channels to be turned on and connect the analog inputs to the outputs.

2. FEATURES

◆ Wide Range of Digital and Analog Signal Levels

Digital : 3V to 20V

Analog: $\leq 20VP-P$

◆ Low ON Resistance, 125W (Typ) Over 15VP-P Signal Input Range for $V_{DD}-V_{EE} = 18V$

◆ High OFF Resistance, Channel Leakage of $\pm 100pA$ (Typ) at $V_{DD}-V_{EE} = 18V$

◆ Logic-Level Conversion for Digital Addressing Signals of 3V to 20V ($V_{DD}-V_{SS} = 3V$ to 20V) to Switch Analog Signals to 20VP-P ($V_{DD}-V_{EE} = 20V$)

◆ Matched Switch Characteristics, $r_{ON} = 5W$ (Typ) for $V_{DD}-V_{EE} = 15V$

◆ Very Low Quiescent Power Dissipation Under All Digital-Control Input and Supply Conditions, 0.2mW (Typ) at $V_{DD}-V_{SS} = V_{DD}-V_{EE} = 10V$

◆ Binary Address Decoding on Chip

◆ 5V, 10V and 15V Parametric Ratings

◆ 10% Tested for Quiescent Current at 20V

◆ Maximum Input Current of 1mA at 18V Over Full Package Temperature Range, 100nA at 18V and 25 °C

◆ Break-Before-Make Switching Eliminates Channel Overlap

3. Pin Definitions

Pin	Name	Function	I/O
1、 2、 4、 5	Y0-Y3	Y signal input	I
11、 12、 14、 15	X0-X3	X signal input	I
3、 13	Y	Y signal output	O
6	INH	Two groups have no output when two ends are high level	I
7	VEE	-12V power (grounding)	
8	VSS	ground	
16	VDD	+5V power	
9、 10	B、 A	Strobe signal	I
13	X	X signal output	O

Chapter Four

Disassembly and Assembly Process

In order to know structure of TV set LT1500S easily, directly and quickly, pictures are adopted here to present each link of assembly and disassembly process of the player to avoid operating blindly to damage elements. Structure design of this TV set is reasonable, so please avoid striking with hard objects in actual operation to ensure each parts is not damaged.

4.1 Disassembly process for the player



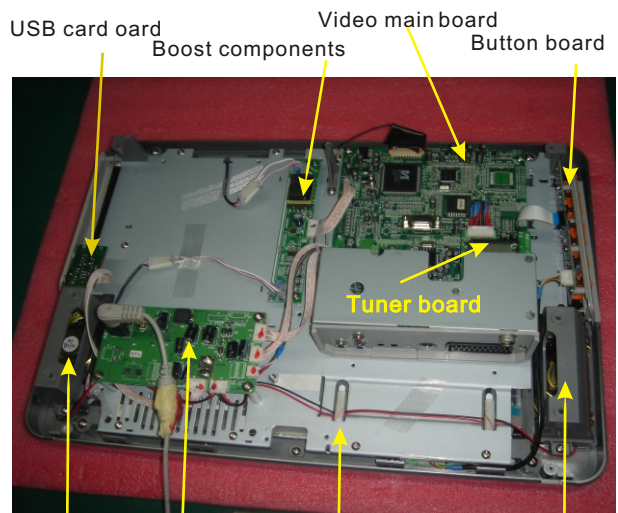
1. Place the machine on table board flatly and add a soft sponge spacer to protect machine's display screen.



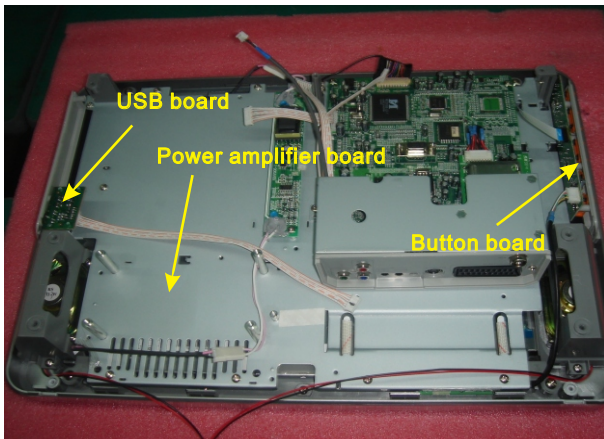
2. Use electric screwdriver to take down 11 screws marked in the picture.



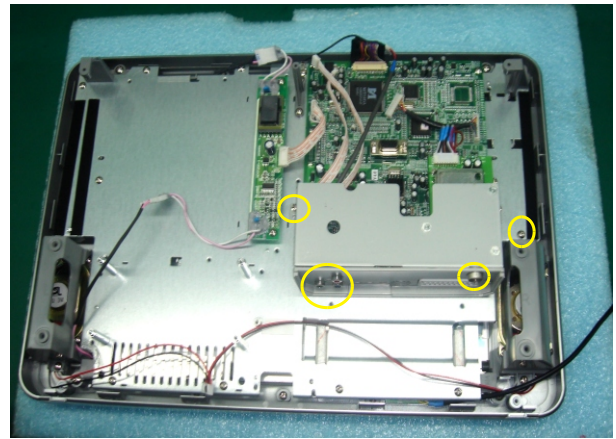
3. Take down rear casing components and do not damage clasp.



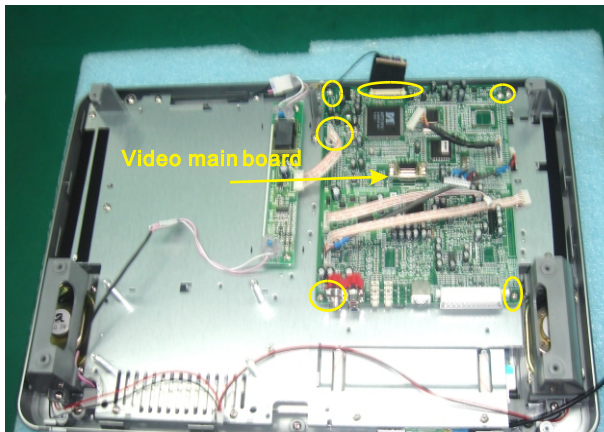
4. Components distribution diagram inside machine.



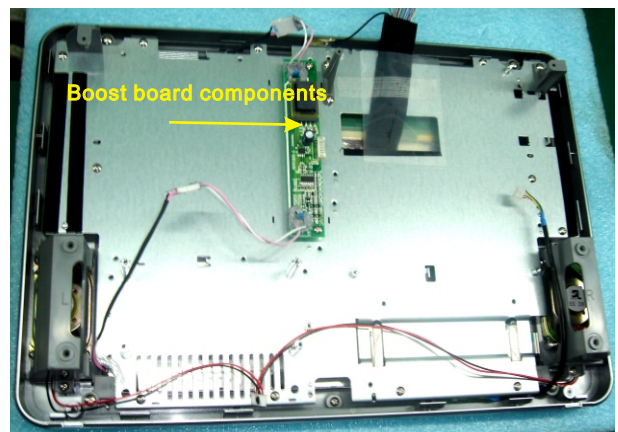
5. Take out screws of power amplifier board, USB board and button board, unplug the corresponding flat cable and remove each semi-finished product's components.



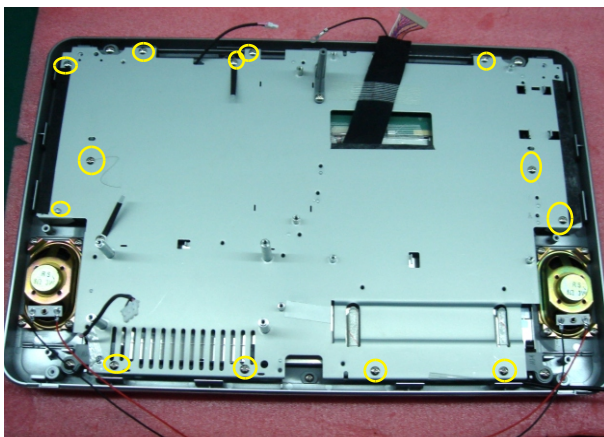
6. Take out screws marked in the picture and then take out output board components.



7. Unplug video board flat cable, take out screws that fix video board and then the video board.



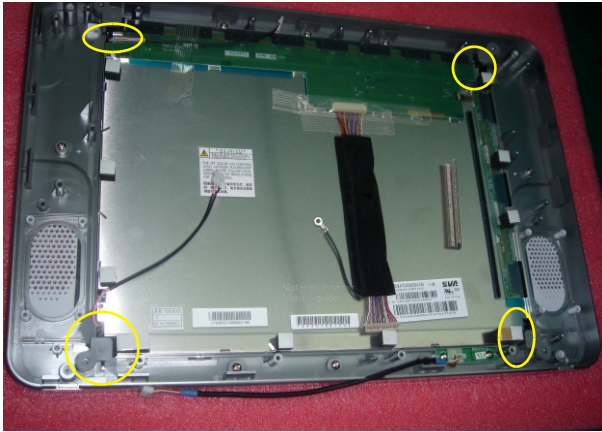
8. Take out screws and flat cable that fix boostboard components and then the boost board components.



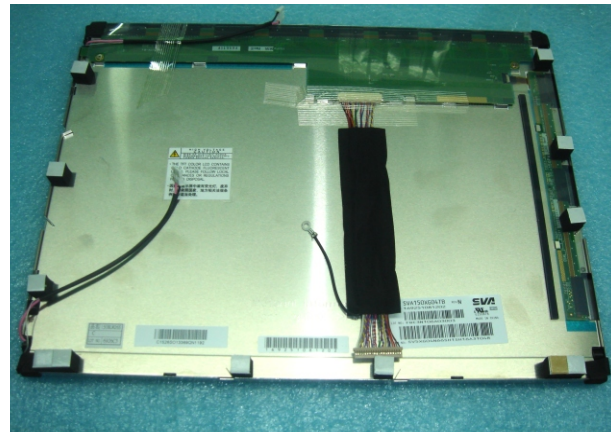
9. Remove screws on main installation board marked in the picture.



10. Take out main installation board and remove pictures behind the main installation board inside the machine.



11. Remove the fixing screws in 4 corners of display screen components.



12. Take out display screen components and now the disassembly process finishes.

4.2 Assembly process for the player



1. Place the well-processed front casing on table flatly (if it is servicing, processing is not needed).



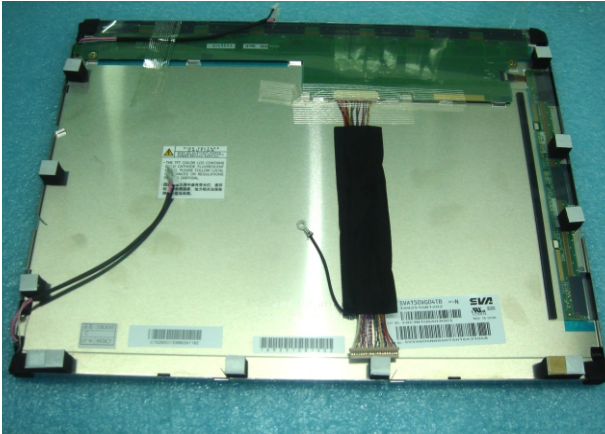
2. After combining front casing and middle casing, use 6 screws to fix middle casing and front casing according to the position shown in the picture.



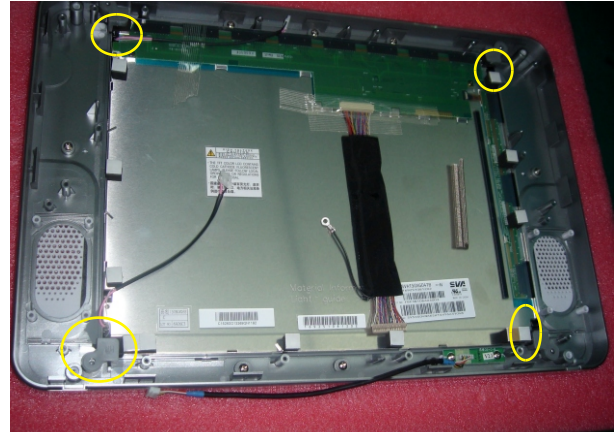
3. Place display screen on table flatly and stick soft sponge spacers on 4 corners.



4. Stick 12 purchase soft sponge spacers in the position of display screen shown in the picture.



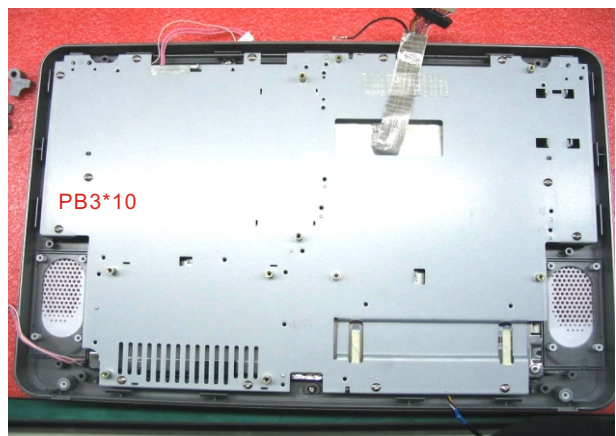
5. Insert one end of 20P flat cable into display screen, shown in the picture.



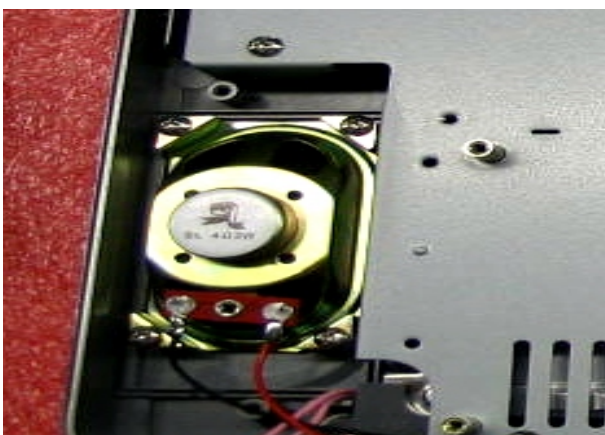
6. Install displayscreen onto middle casing to proper position. Install 4 pressing plates around display screen in the corresponding positions, shown in the picture, and then use 4 screws to fix the 4 pressing plates onto middle casing.



7. Assemble main installation board onto middle casing and lead display screen flat cable from the hole.



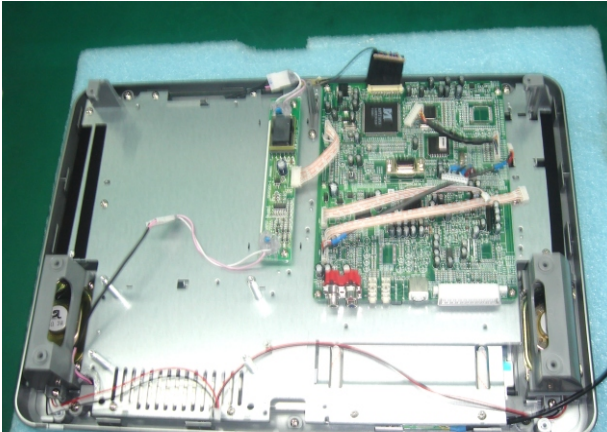
8. Use 12 pcs TB3*10 screws and 1 PB3*10 screw to fix the lower part of main installation board onto middle casing.



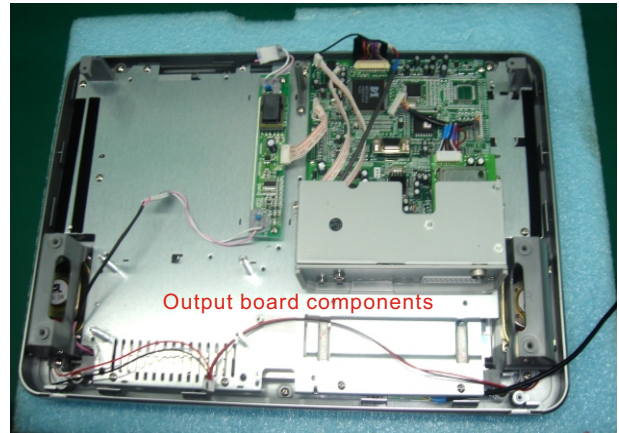
9. Pre-install the well-welded loudspeaker components onto middle casing and use screws to fix.



10. Install inverter components into the appointed position on main installation board and use 2 Pm3×6 white nickel screws to fix inverter components.



11. Install video board onto main installation board, use 4 screws to fix decode board onto main installation board and lock grounding wire. Insert the flat cable from display screen into CN111 socket of decode board and insert the flat cable from inverter components into CN103 of decode board.



12. Insert the flat cable on output board components and then install them onto main installation board. Use 2 BT3×3 white nickel screws to fix.



13. Install buttonboard and USB board and then use screws to fix.



14. Install power amplifier board, use screws to fix and then insert all flat cables.



15. Arrange flat cable and check technique inside machine.



16. Close upper cover components and install them to proper position.



17. Use screws to fix rearcover and install support bracket.



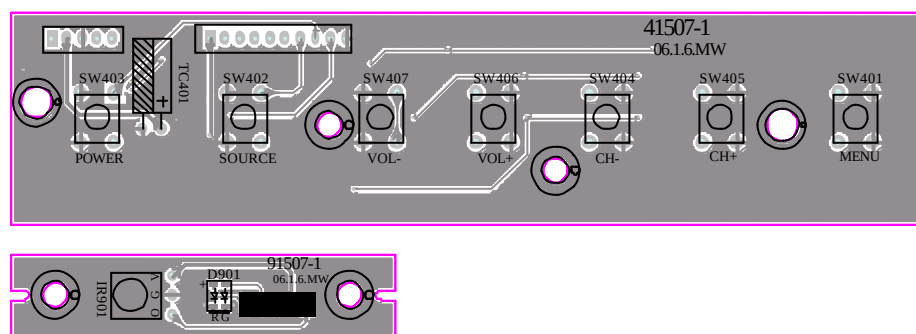
18. Use screws to fix support bracket and machine assembly finishes.

Chapter Cinque

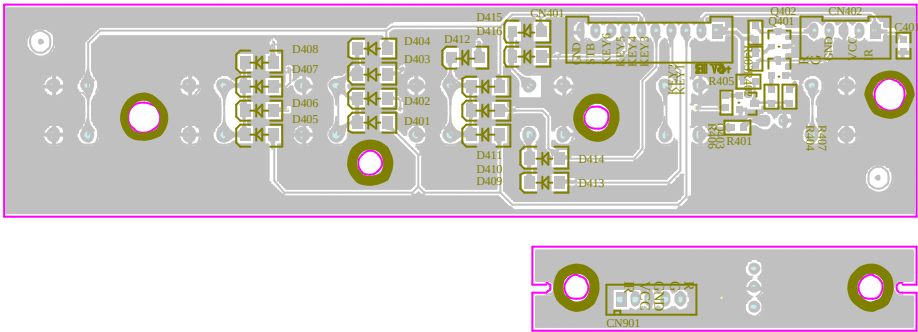
PCB board & Circuit diagram

Section One PCB board

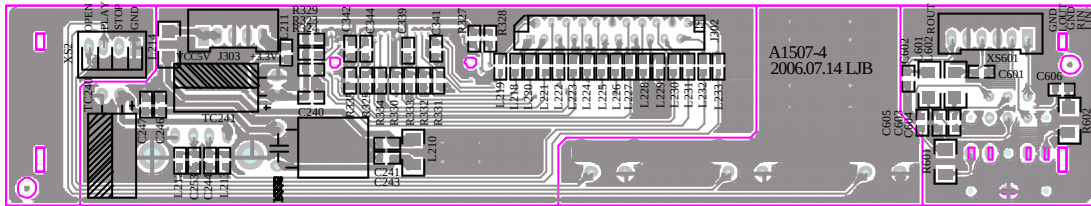
5.1.1 Surface layer of KEY SCAN Board



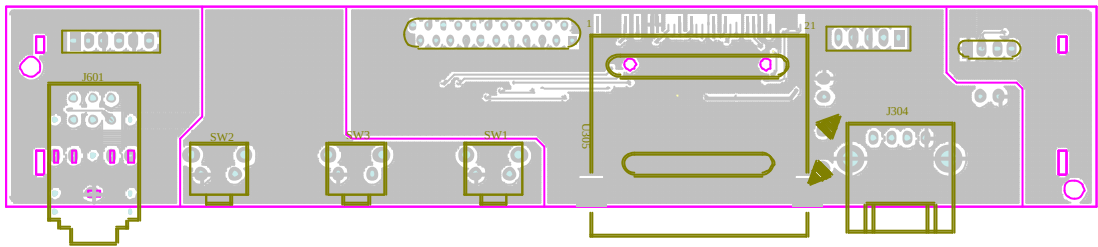
5.1.2 Bottom layer of KEY SCAN Board



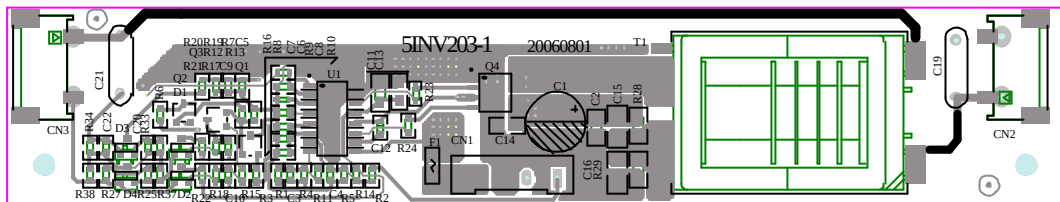
5.1.3 Surface layer of USB&CARD Board



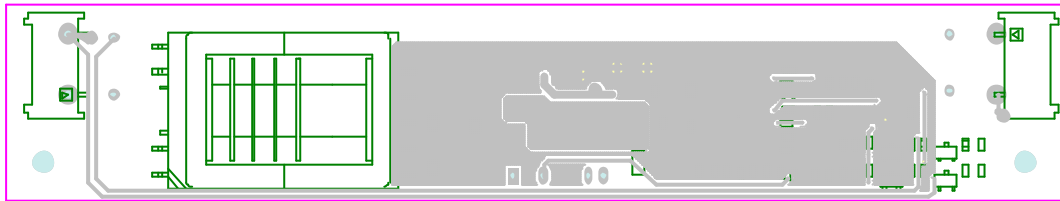
5.1.4 Bottom layer of USB&CARD Board



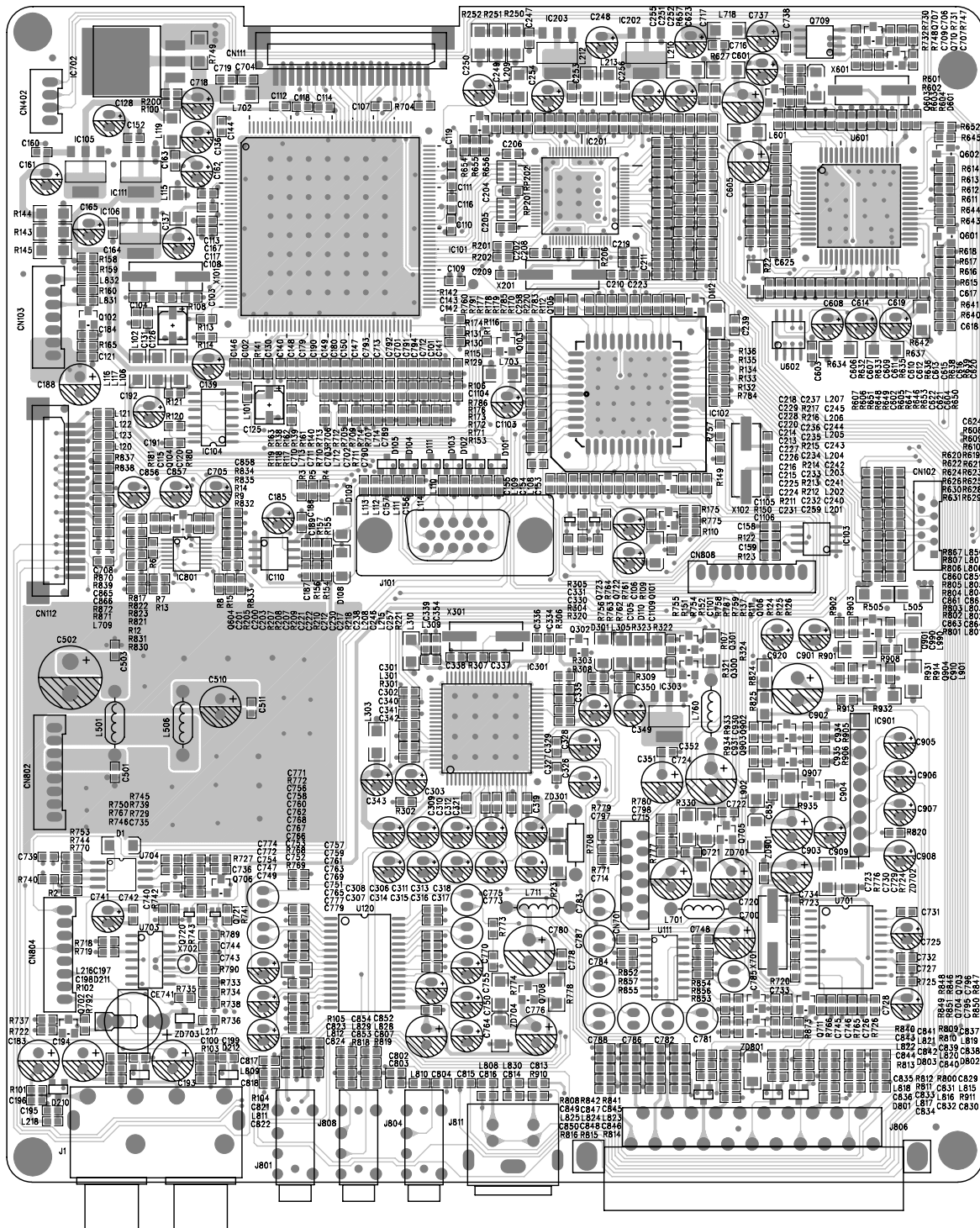
5.1.5 Surface layer of Boost Board



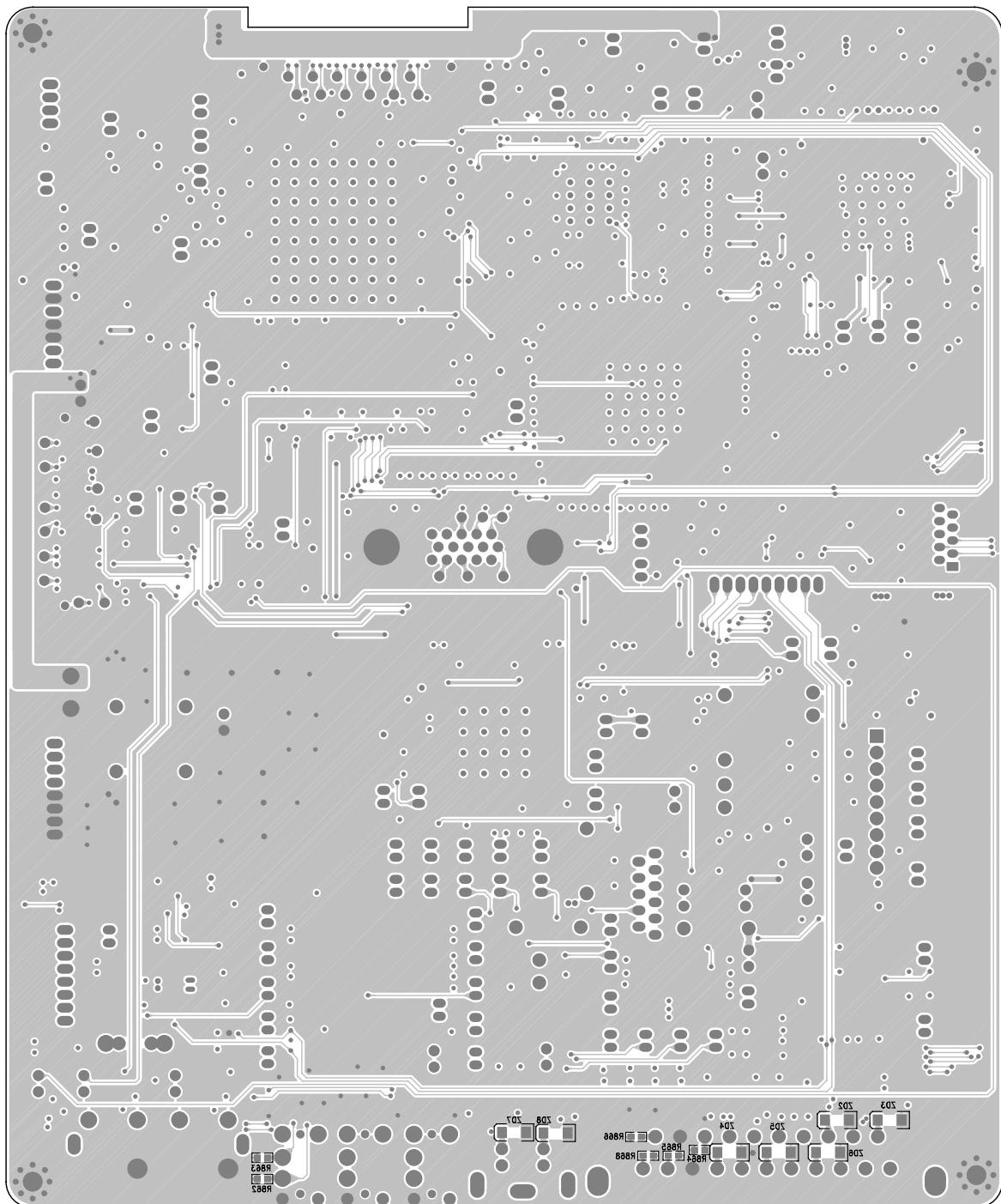
5.1.6 Bottom layer of Boost Board



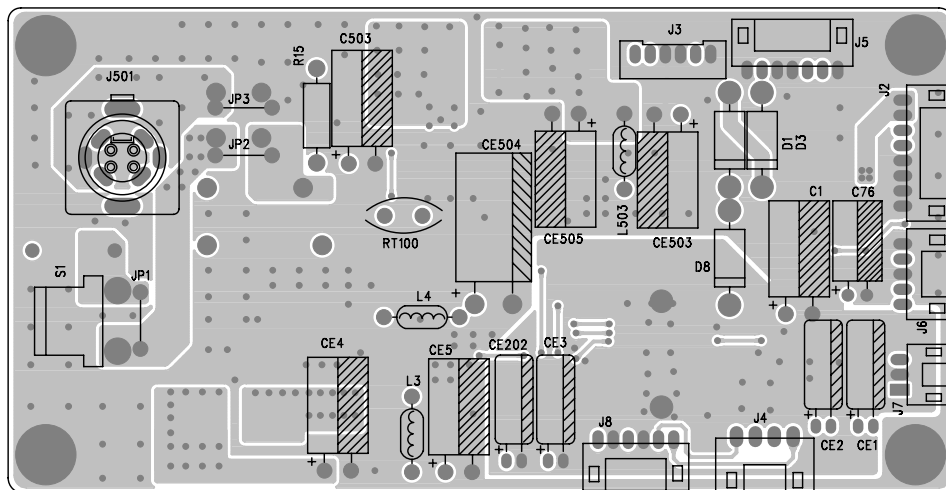
5.1.7 Surface layer of Video Board



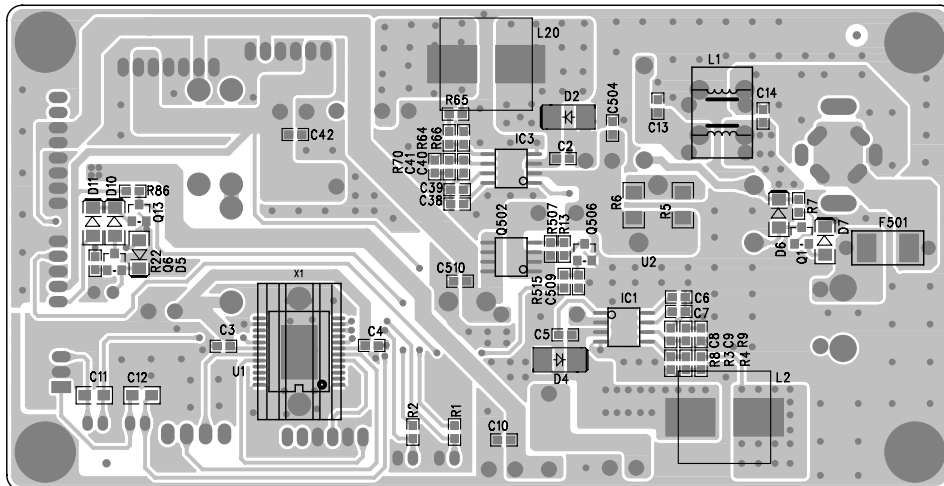
5.1.8 Bottom layer of Video Board



5.1.9 Surface layer of Audio Board

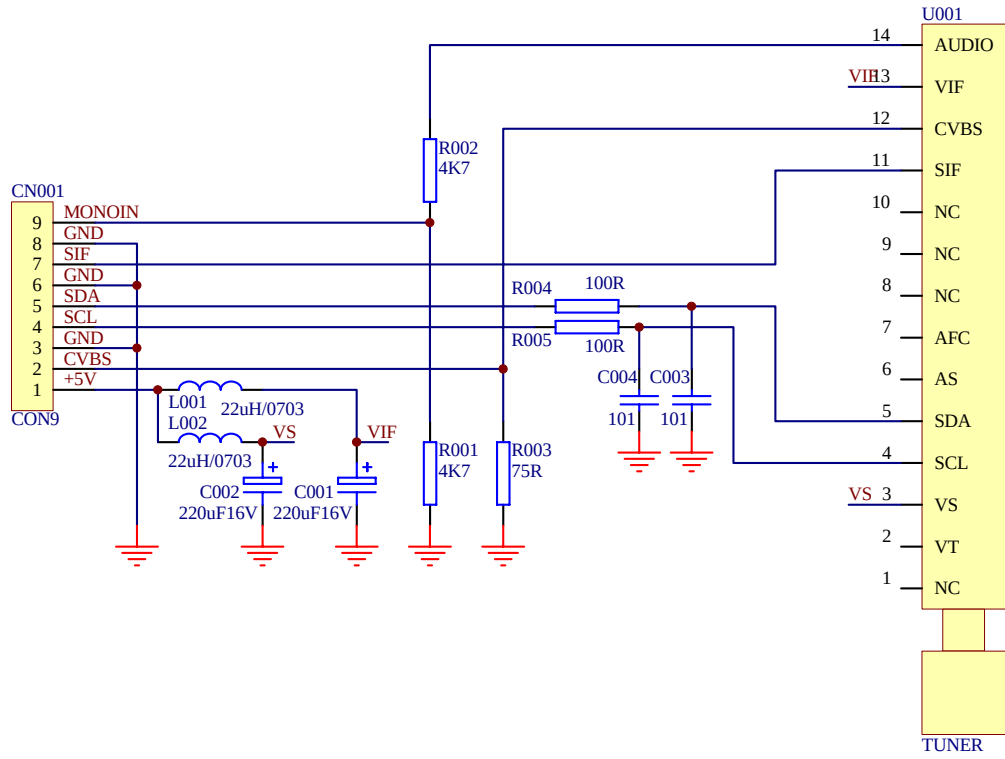


5.1.10 Bottom layer of Audio Board

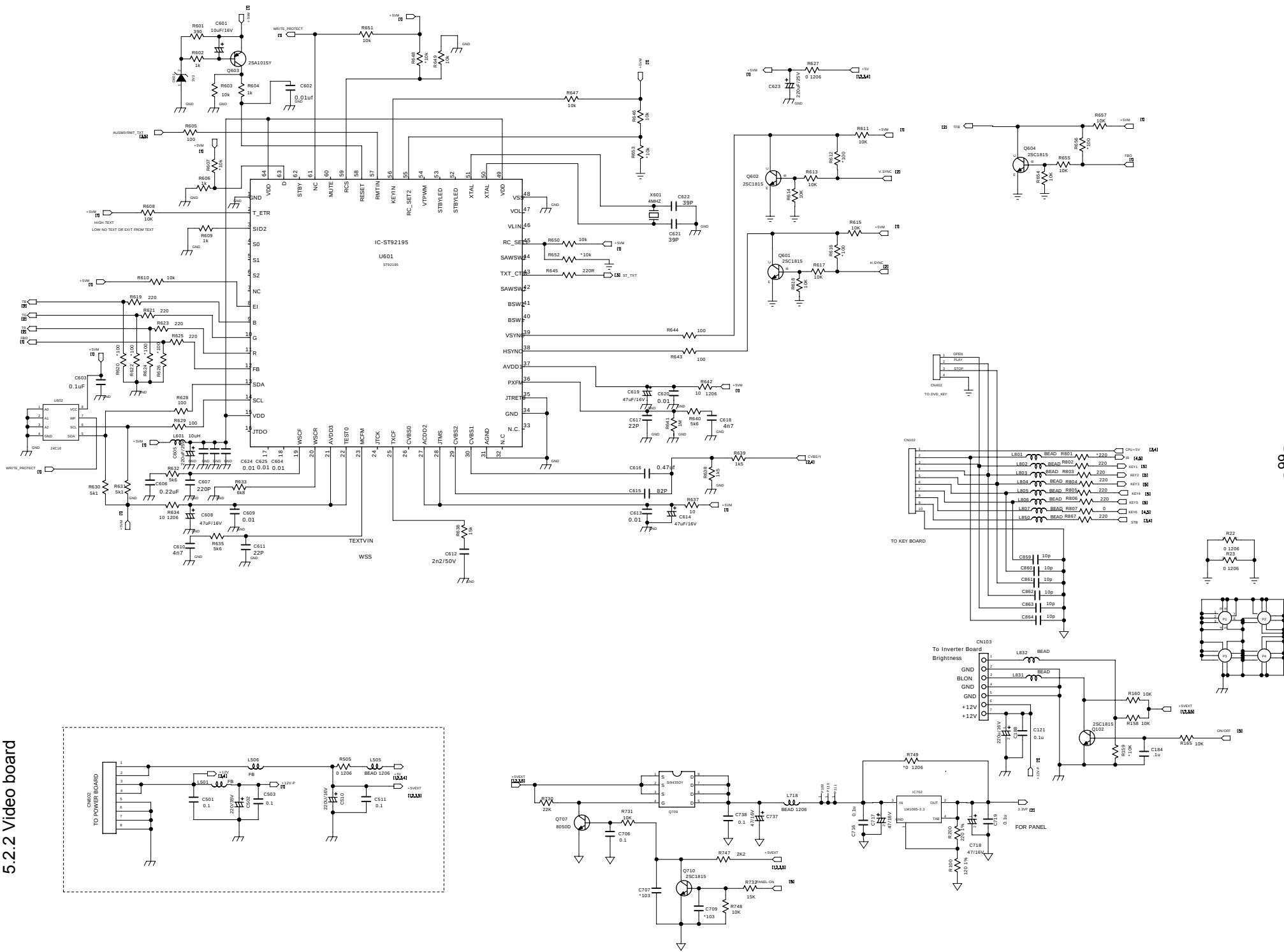


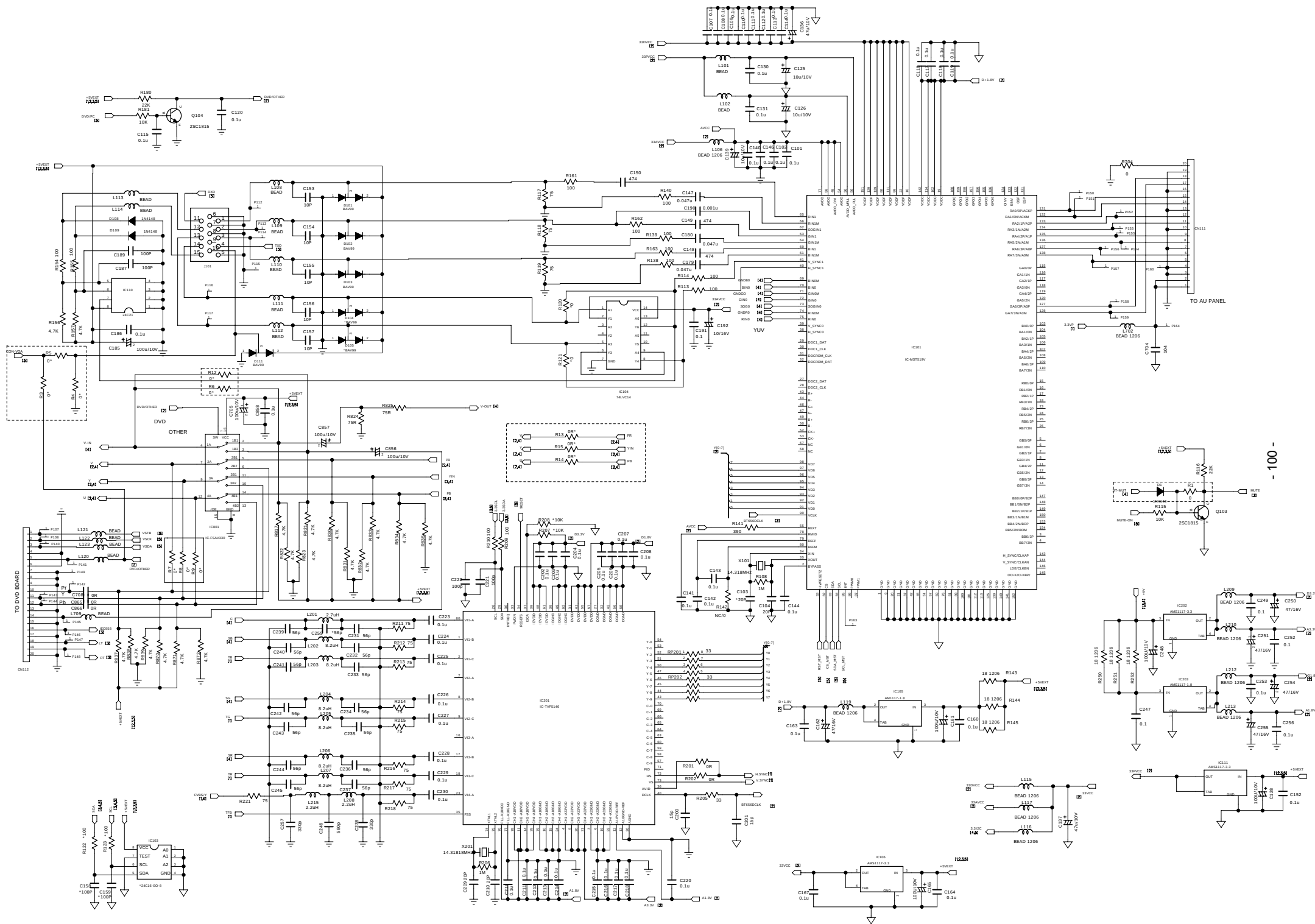
Section Two Circuit diagram

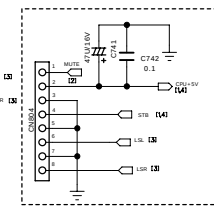
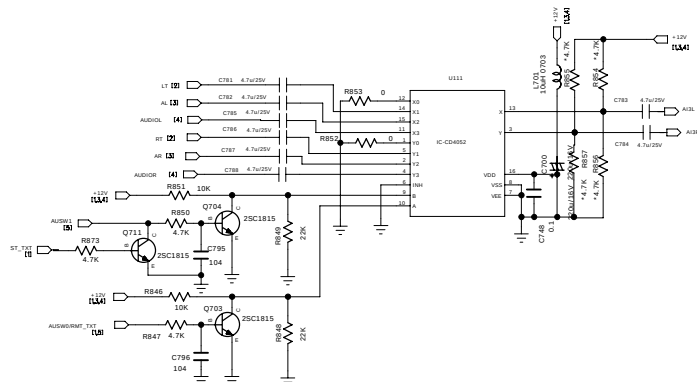
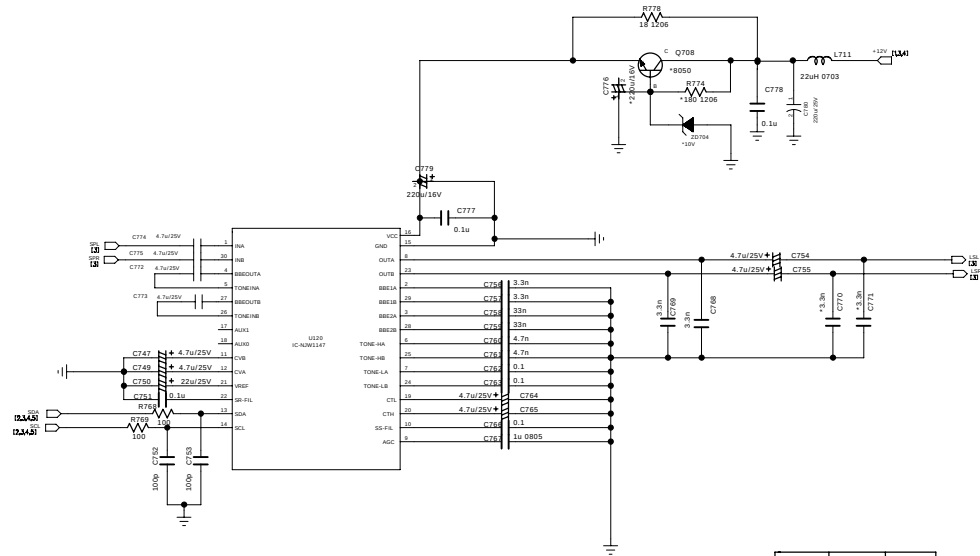
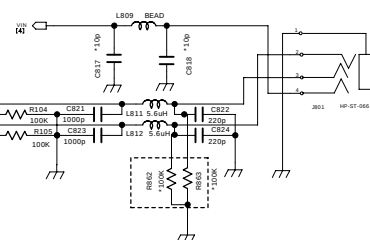
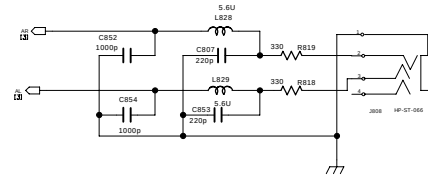
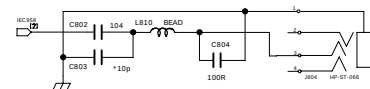
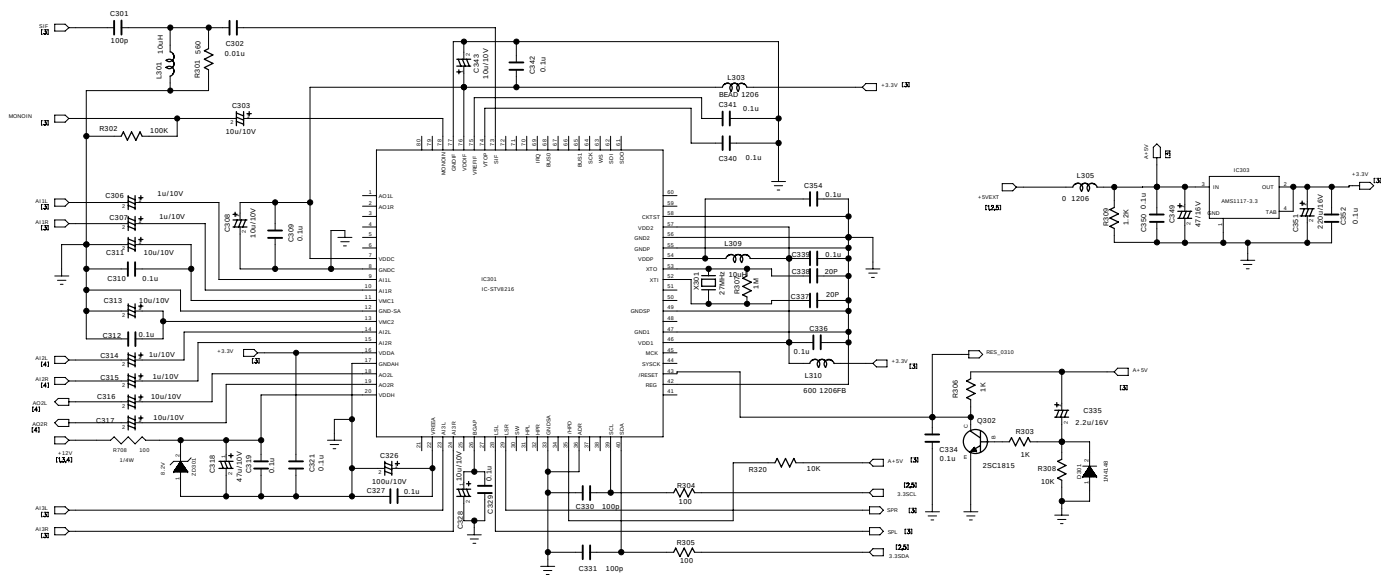
5.2.1 Tuner circuit

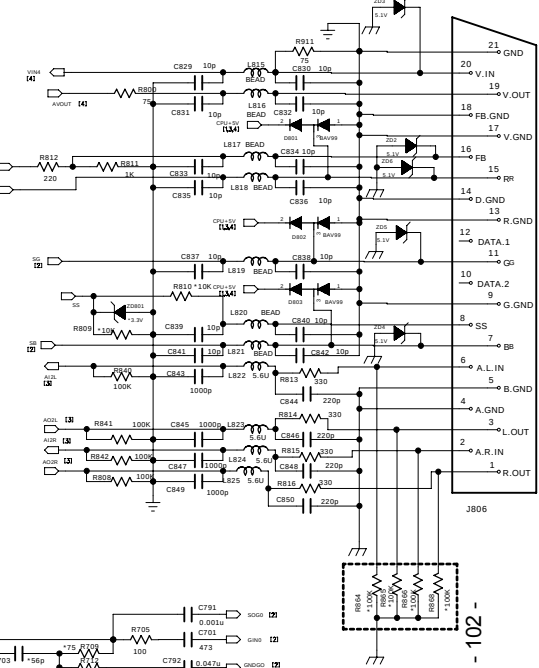
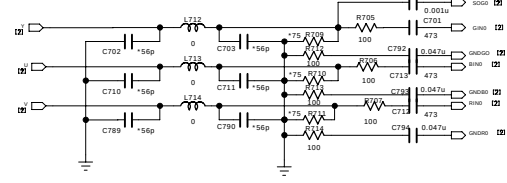
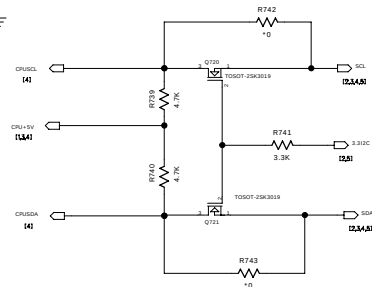
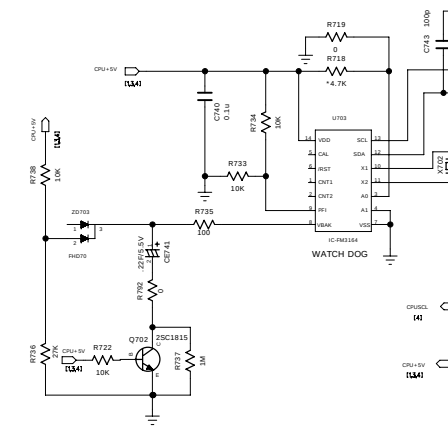
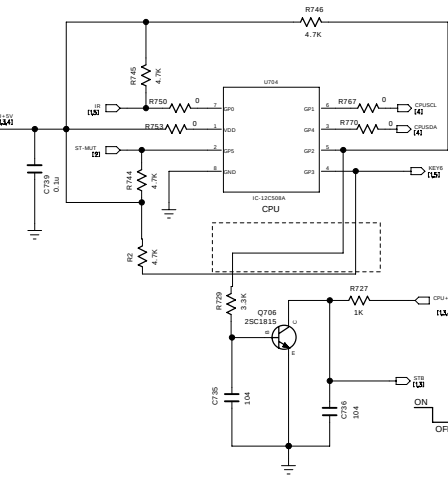
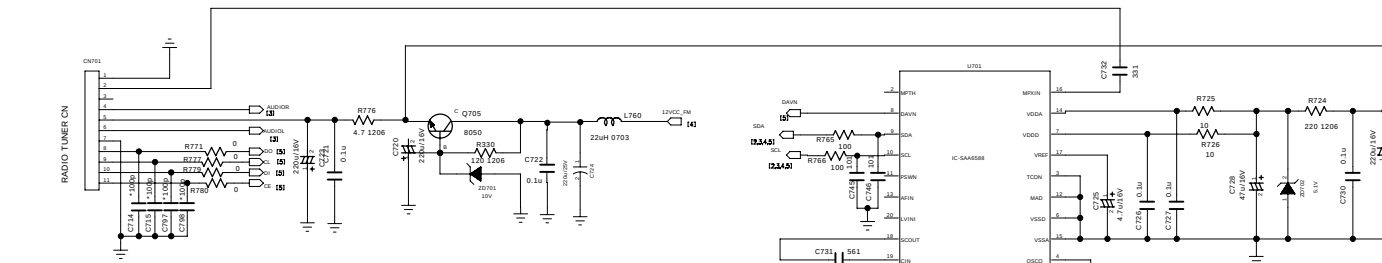
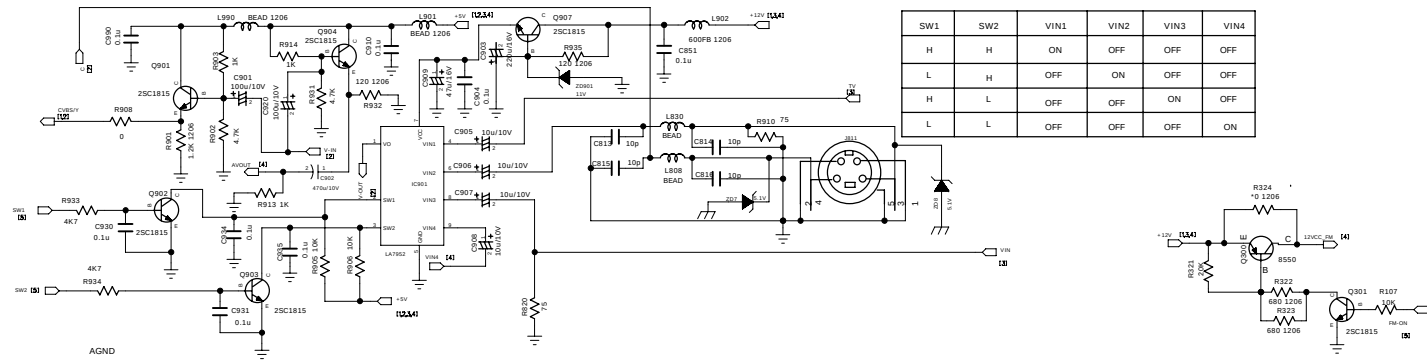


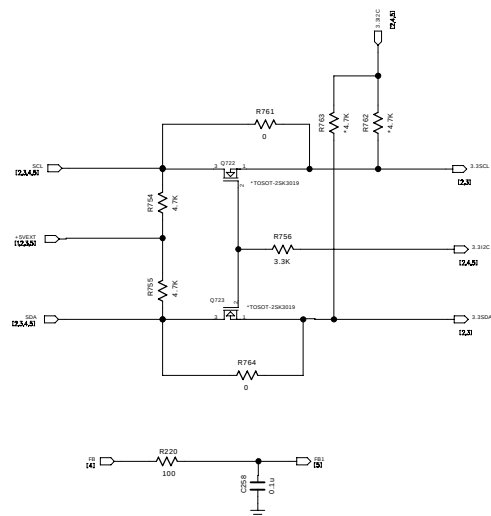
5.2.2 Video board



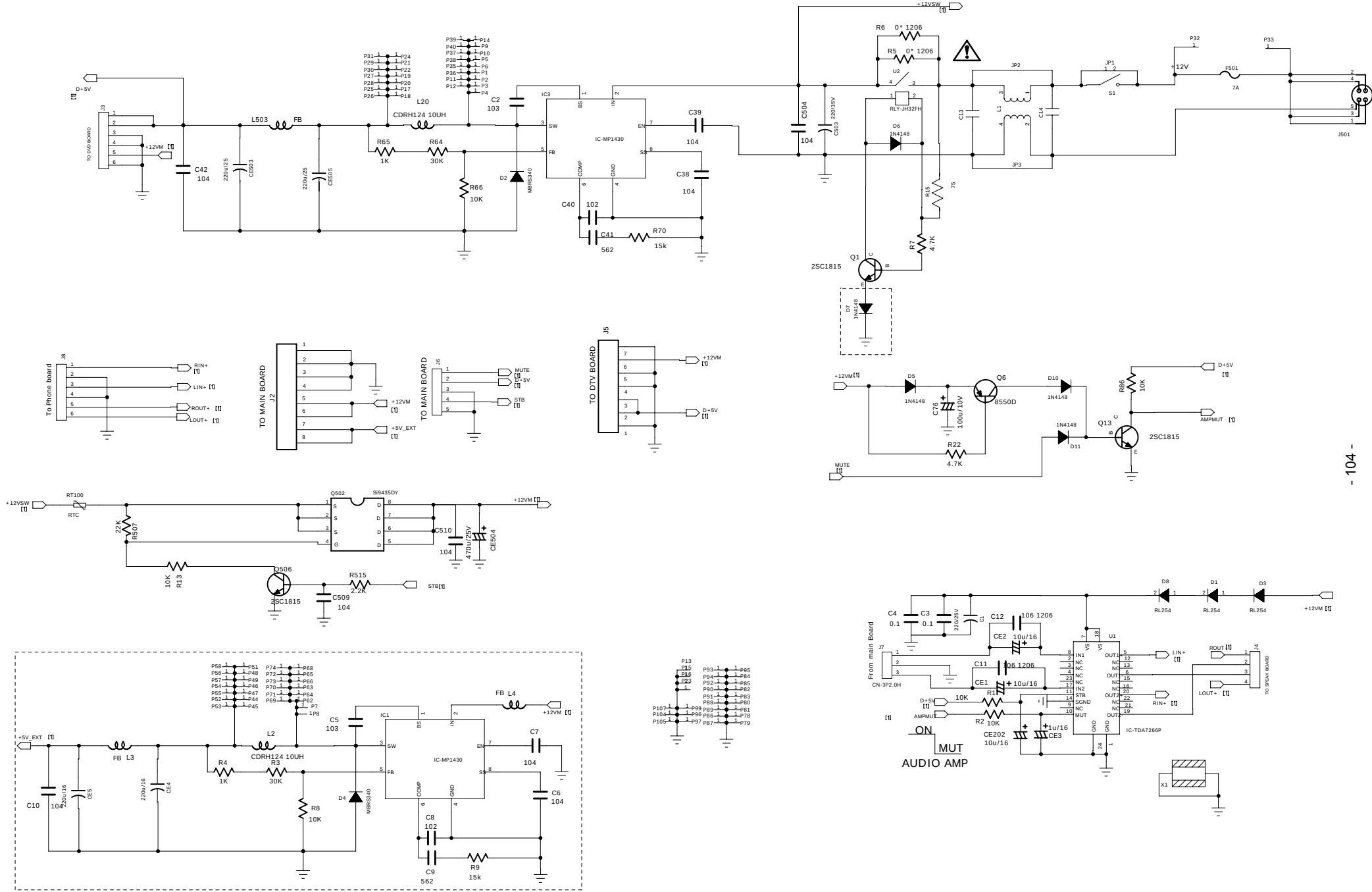




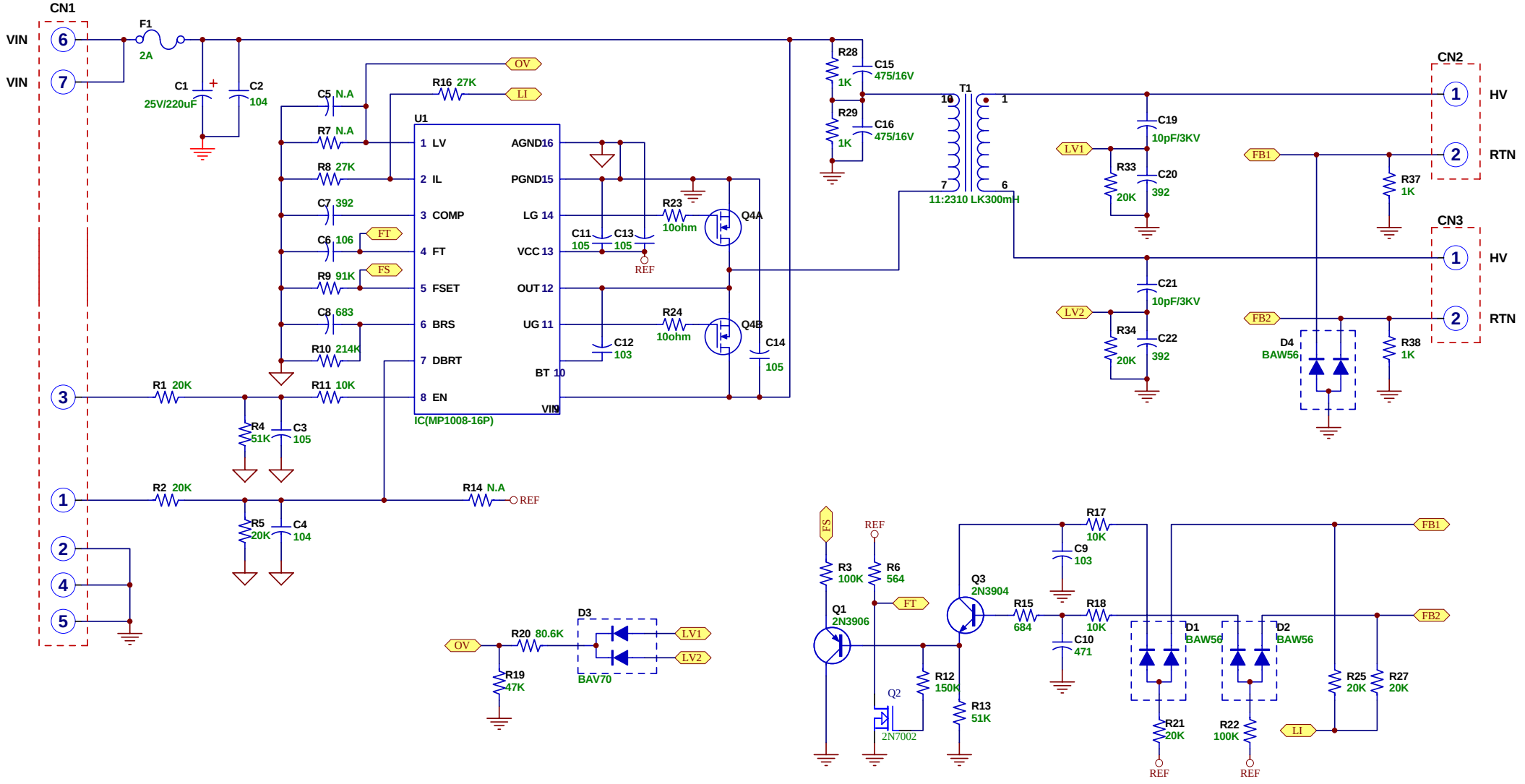




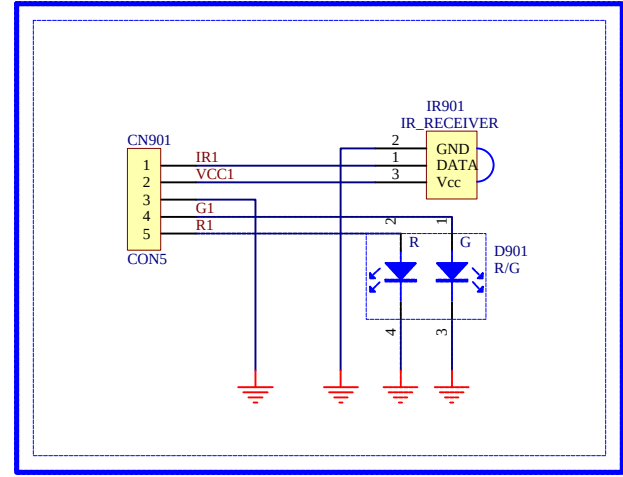
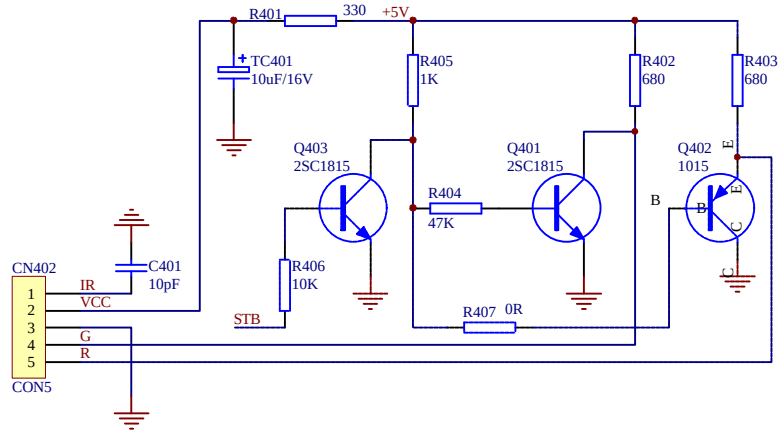
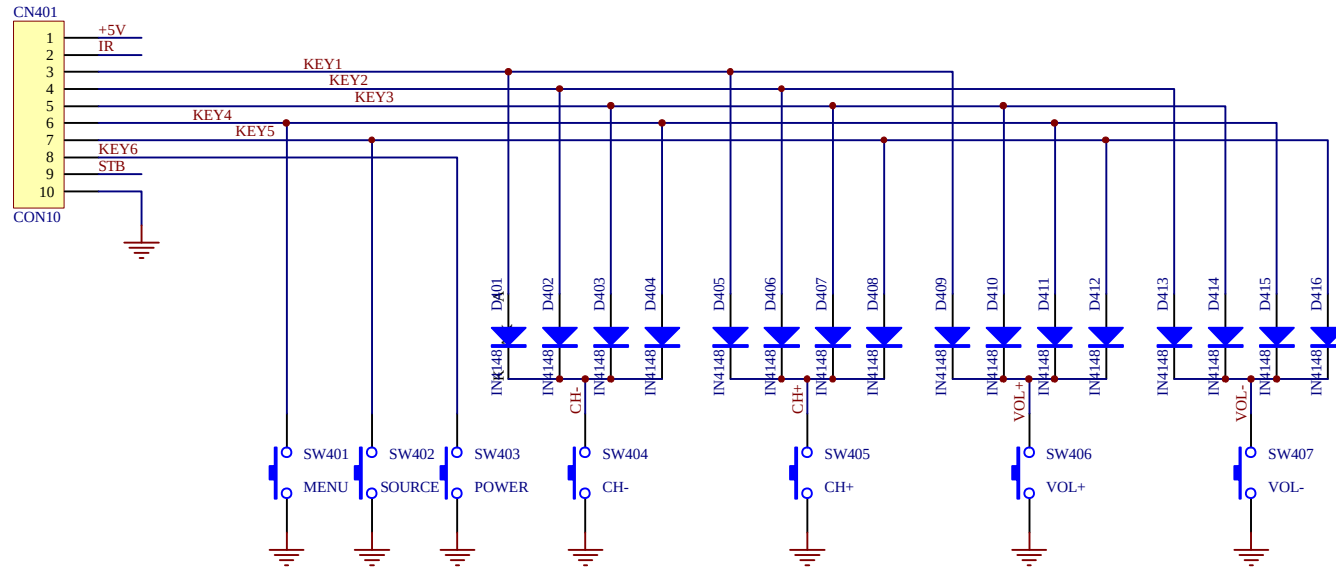
5.2.3 POWER&Audio board



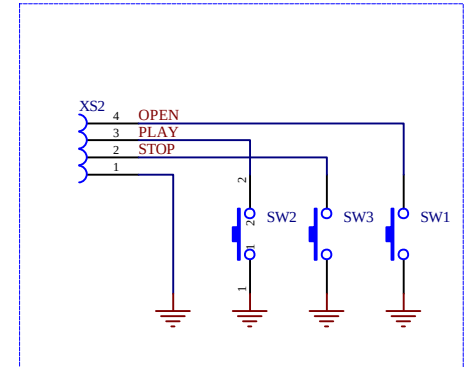
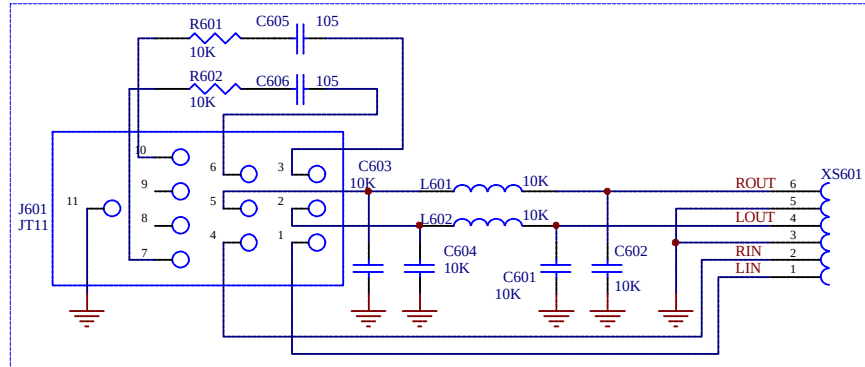
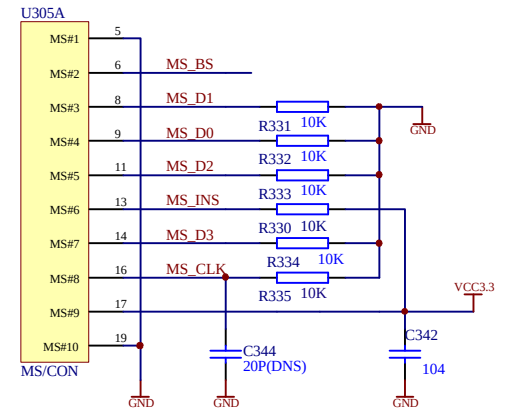
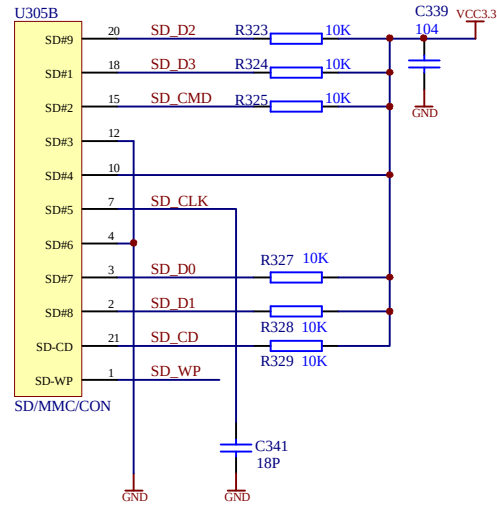
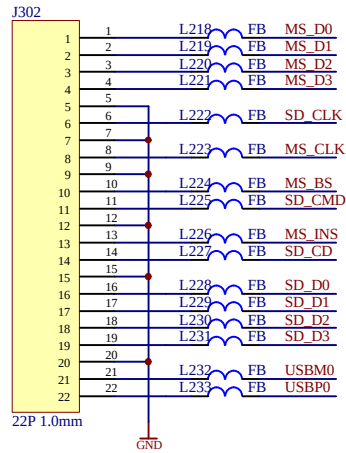
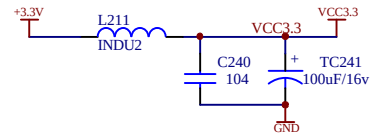
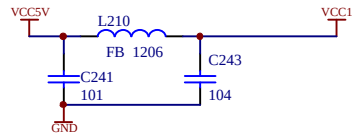
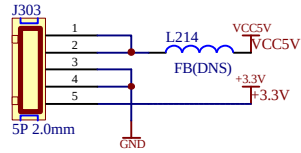
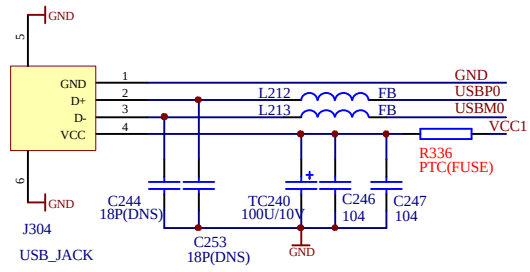
5.2.4 Boost board



5.2.5 KEY SCAN board



5.2.6 USB&CARD board



Chapter six BOM List

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
LCD TV LT1500S (RU) SILVER			
AMPLIFIER BOARD: 5449214			
0090189	SMD RESISTOR	1/16W 30K±5% 0603	R64
0090001	SMD RESISTOR	1/16W 00±5% 0603	R13
2100059	LEAD	F 1.0 SHAPED 7.5mm	JP1,S1
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R65
0090026	SMD RESISTOR	1/16W 22K±5% 0603	R507
0090017	SMD RESISTOR	1/16W 2.2K±5% 0603	R515
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R22
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R1,R2,R66,R86
0090024	SMD RESISTOR	1/16W 15K±5% 0603	R70
0310072	SMD CAPACITOR	50V 103±10% 7R 0603	C2
0310207	SMD CAPACITOR	50V 104 ±20% 7R 0603	C3,C4,C38,C39,C42,C504,C509,C510
0310199	SMD CAPACITOR	50V 562±10% 7R 0603	C41
0310598	SMD CAPACITOR	50V 102±20% 7R 0603	C40
0310150	SMD CAPACITOR	50V 683±10% 7R 0805	C11,C12
0700001	SMD DIODE	LS4148	D5,D10,D11
0680028	SMD SCHOTTKY DIODE	MBRS340	D2
0570019	DIODE	0000254	D1,D3,D8
2310003	FUZE	125V 7A	F501
0780129	SMD TRIODE	8550D	Q6
0780197	SMD TRIODE	C1815	Q13,Q506
0260583	CD	CD11T 16V220U±20%6×12 2.5	CE202
0260774	CD	CD11K 16V100U±20%6.3×11 2.5	C76
0260595	CD	CD110 105°C 50V1U±20%5×11 2	CE3
0260581	CD	CD11T 25V100U±20%6×12 2.5	CE504
0260593	CD	CD112 105°C25V220U±20% 8×12 3.5	CE503,CE505,C1,C503
0390404	SMD CORES INDUCTOR	10uH±20% 4.5A CDRH124	L20
1050017	HEAT SENSITIVITY RESISTOR	NTC 10(5A)±20% 10D 5	RT100
0390052	MAGNETIC BEADS INDUCTOR	FB	L503

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0790021	FIELD EFFECT TRANSISTOR	IR7416 SOP	Q502 ①
0790097	FIELD EFFECT TRANSISTOR	AO4419 SO8	Q502 ①
0882945	IC	1430DN SOP	IC3
1910163	TERMINAL SOCKET	S TERMINAL D34 STRAIGHT INSERT	J501
1940135	SOCKET	6P 2.0mm STRAIGHT FLEX	J2,J8
1940160	SOCKET	5P 2.0mm STRAIGHT FLEX	J6
1940012	SOCKET	4P 2.5mm STRAIGHT CURVING	J4
0090555	SMD RESISTOR	1/400±5% 1206	R5,R6
1633504	PCB	@31507-1 UL	
0883149	IC	7266P SSO24	U1
3580236	HEAT RADIATION PIECE	18×11×6.9 1509	U1
1940216	SOCKET	3P 2.0mm FLEX INSERT	J7
LCD TV LT1500S (RU) SILVER			
KEY-PRESS BOARD: 5446785			
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R401
0090013	SMD RESISTOR	1/16W 680O±5% 0603	R403,R402
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R404
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R406
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R405
0090001	SMD RESISTOR	1/16W 0O±5% 0603	R407
0310188	SMD CAPACITOR	50V 10P±5% NPO 0603	C401
0700001	SMD DIODE	LS4148	D407,D408,D404,D403,D402,D401,D406,D405, D410,D409,D411,D412,D415,D416,D414,D413
0780197	SMD TRIODE	C1815	Q403,Q401
0260102	CD	CD110 25V10U±20%5×11 2	TC401
1340145	LIGHT TOUCH RESTORE SWITCH	VERTICAL TSAC-2	SW401~SW407
1940046	SOCKET	10P 2.0mm	CN401
1940024	SOCKET	5P 2.0mm	CN402
0780198	SMD TRIODE	2S1015	Q402
1632349	PCB	41507-0	
LCD TV LT1500S (RU) SILVER			
RECEIVING BOARD OF REMOTE CONTROL: 5446787			
0620172	BICOLOR SMD DIODE	LTST-C155KGJRK7	D901

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
2360002	IR SENSOR	HS0038B	IR901
1632980	PCB	91507-1	
2150255	FLAT CABLE	5P 230 2.0 2 5P SHIELD REVERSE WITH NEEDLE	BUTTON :CN402, REMOTE CONTROL :CN901
LCD TV LT1500S (RU) SILVER			
REMOTE CONTROL 5471835			
0090147	SMD RESISTOR	1/10W 10 $\pm$ 5% 0805	R801
0310048	SMD CAPACITOR	50V 151 $\pm$ 5% NPO 0603	C802,C803
0630009	EMISSION PIPE	TSAL4400	LED801
0700001	SMD DIODE	LS4148	D801~D803
0780130	SMD TRIODE	STC3265	Q801 ②
0780150	SMD TRIODE	UTC 8050S (D9-D)	Q801 ②
0780085	SMD TRIODE	8050D	Q801 ②
0880220	IC	P2222 SOP	U801
0970003	CERAMIC RESONATOR	455E	X801
1631960	PCB	81703SRU-0	
3031118	SURFACE CASING OF REMOTE CONTROL	019-01 GREY	
3040813	REMOTE CONTROL BOTTOM CASING	019-01 GREY	
3050701	BATTERY CASE DOOR OF REMOTE CONTROL	019-01 GREY	
3850063	ANODE SPRING	019-01 3#	
3850064	CATHODE SPRING	019-01 3#	
3850065	ANODECATHODE SPRING	019-01 3#	
4631112	CONDUCT GLUE O REMOTE CONTROL	1500S(RU)	
5070558	PLASTIC BAG	210 $\times$ 70 $\times$ 0.05 PE	PACK REMOTE CONTROLLER
5156868	SURFACE STICKER O REMOTE CONTROL	1500S(RU)SILVER	
LCD TV LT1500S (RU) SILVER			
TUNER BOARD: 5446788			
0090001	SMD RESISTOR	1/16W 00 $\pm$ 5% 0603	R004,R005
0090019	SMD RESISTOR	1/16W 4.7K $\pm$ 5% 0603	R002
0090181	SMD RESISTOR	1/16W 100O $\pm$ 5% 0603	R003
0310070	SMD CAPACITOR	50V 332 $\pm$ 10% 7R 0603	R001
0390292	INDUCTOR	22uH $\pm$ 20% 350mA 0307	L002,L001

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0260028	CD	CD11 16V220U±20%6×12 2.5	C001,C002
1020028	TUNER	JS-6B2/121	U001
1940043	SOCKET	9P 2.0mm STRAIGHT CURVING	CN001
1632352	PCB	01507-0	
LCD TV LT1500S (RU) SILVER			
USB CARD BOARD: 5449215			
0090135	SMD RESISTOR	1/8W 100O±5% 1206	R601,R602
0310598	SMD CAPACITOR	50V 102±20% 7R 0603	C601,C602
0310049	SMD CAPACITOR	50V 221±5% NPO 0603	C603,C604
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C605,C606
1980061	EARPHONE SOCKET	C3.5-01K	JT11
1940005	SOCKET	6P 2.0mm	XS601
1633503	PCB	1507-5	
LCD TV LT1500S (RU) SILVER			
VIDEO FREQUENCY BOARD: 1.0/Ver4.0			
0000276	CARBON FILM RESISTOR	1/4100O±5% SHAPED 10	R708
0090001	SMD RESISTOR	1/16W 0O±5% 0603	R908,R704,R852,R853,R750,R770,R753,R767, R761,R764,L712,L713,L714,R801,R807,R737,L 202~L207,R202,R120,R121,R1,R5,R772,R773
0090005	SMD RESISTOR	1/16W 33O±5% 0603	R205
0090006	SMD RESISTOR	1/16W 75O±5% 0603	R212,R214,R216,R221,R820,R101~R103,R211, R910,R800,R911
0090008	SMD RESISTOR	1/16W 220O±5% 0603	R802,R803,R804,R805,R806,R867,R812
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R813,R814,R815,R816,R818,R819
0090012	SMD RESISTOR	1/16W 560O±5% 0603	R301,R825
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R811,R913,R727,R109,R303,R306,R504
0090015	SMD RESISTOR	1/16W 1.2K±5% 0603	R775,R822
0090017	SMD RESISTOR	1/16W 2.2K±5% 0603	R747
0090018	SMD RESISTOR	1/16W 3.3K±5% 0603	R729,R741
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R931,R739,R740,R744,R745,R746,R902,R125, R124,R126,R129~R137,R151,R152,R153,R170 ~R174,R176~R179,R757,R758,R759,R785~R78 7,R783,R933,R934,R850,R847,R835,R834,R83 3,R832,R830,R831,R817,R754,R755,R760,R87 3,R2
0090020	SMD RESISTOR	1/16W 5.1K±5% 0603	R175,R159

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R106,R115,R160,R165,R181,R208,R320,R731,R748,R905,R906,R851,R846,R110,R180,R308,R502
0090024	SMD RESISTOR	1/16W 15K±5% 0603	R732,R501
0090026	SMD RESISTOR	1/16W 22K±5% 0603	R730,R849,R848
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R111,R112
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R104,R105,R302,R808,R840,R841,R842
0090104	SMD RESISTOR	1/16W 2.7K±5% 0603	R158
0090109	SMD RESISTOR	1/16W 1MO±5% 0603	R108,R150,R206,R307
0090114	SMD RESISTOR	1/8W 0O±5% 1206	R22,R23,L305,R505,R627,R11
0090189	SMD RESISTOR	1/16W 30K±5% 0603	R503
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R209,R210,R220,R705~R707,R712~R714,R304,R305,R122,R123
0090183	SMD RESISTOR	1/16W 3K±5% 0603	R903,R914
0090234	SMD RESISTOR	1/16W 390O±5% 0603	R141
0090538	SMD RESISTOR	1/4W 120O±5% 1206	R932,R935
0090555	SMD RESISTOR	1/40O±5% 1206	L718,L702
0090557	SMD RESISTOR	1/4W 18O±5% 1206	R250,R251,R252
0090642	SMD RESISTOR	1/4W 1.2K±5% 1206	R901
0090662	SMD RESISTOR	1/4W 47O±5% 1206	R143,R144,R145
0090745	PRECISION SMD RESISTOR	1/16W 220O±1% 0603	R100
0090766	PRECISION SMD RESISTOR	1/16W 120O±1% 0603	R200
1030032	SMD PRESS SENSITIVITY RESISTOR	EGA V051 0603	C822,C824,C844,C846,C848,C850
0100019	SMD RESISTOR NETWORKS	1/16W 33O±5% 8P	RP201,RP202
0260067	CD	CD11 50V2.2U±20%5×11 2	C335
0260102	CD	CD110 25V10U±20%5×11 2	C139,C303,C308,C311,C313,C316,C317,C328,C343,C905,C906,C907,C908,C105
0260428	SMD CD	16V10U±20%4×4×5.4	C125,C126
0260517	CD	CD11K 10V100U±20%5×11 2	C128,C161,C165,C248,C326,C705,C857,C901,C920
0260578	CD	CD11T 50V22U±20%5×11 2	C106
0260593	CD	CD112 105°C25V220U±20% 8×12 3.5	C502 ③
0260604	CD	CD112S 105°C25V220U±20% 8×12 3.5	C502 ③
0260607	CD	CD11K 25V220U±20%8×12 3.5	C502 ③
0260653	CD	CD11K 16V470U±20%8×14 3.5	C902

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0260664	CD	CD11K 16V220U±20% 6.3×11 2.5	C351,C903,C188,C623,C510,C509,C183,C194,C193
0260754	CD	CD11K 25V47U±20%5×11 2	C162,C250,C251,C254,C255,C349,C717,C718,C737,C741,C136,C137,C318,C909,C1103,C700
0260763	NPCD	CD71T 25V4.7U±20% 5×11 2	C783,C784,C782,C785,C787,C788
0260764	CD	CD11T 50V1U±20%5×11 2	C306,C307,C314,C315
0310042	SMD CAPACITOR	50V 15P±5% NPO 0603	C200,C201
0310047	SMD CAPACITOR	50V 101±5% NPO 0603	C221,C222,C301,C330,C331,C158,C159
0310051	SMD CAPACITOR	50V 331±5% NPO 0603	C238,C257
0310057	SMD CAPACITOR	16V 104±10% 0603	C224,C225,C226,C227,C228,C229,C230,C795,C796,C501,C503,C223
0310066	SMD CAPACITOR	50V 102±10% 7R 0603	C791,C821,C823,C843,C845,C847,C849,C506,C852,C854
0310072	SMD CAPACITOR	50V 103±10% 7R 0603	C302,C508
0310085	SMD CAPACITOR	50V 20P±5% NPO 0603	C103,C104,C209,C210,C337,C338,C1105,C1106
0310188	SMD CAPACITOR	50V 10P±5% NPO 0603	C859,C860,C861,C862,C863,C864,C196,C198,C100,C195,C197,C199,C813,C814,C815,C816,C829,C830,C831,C832,C833,C834,C835,C836,C837,C838,C841,C842
0310192	SMD CAPACITOR	50V 56P±5% NPO 0603	C231,C239
0310197	SMD CAPACITOR	50V 561±10% 7R 0603	C246
0310049	SMD CAPACITOR	50V 221±5% NPO 0603	C807,C853
0310205	SMD CAPACITOR	50V 473±10% 0603	C792,C793,C794,C701,C713,C712
0310207	SMD CAPACITOR	50V 104 ±20% 7R 0603	C247,C249,C252,C504,C706,C738,C742,C748,C107,C108,C109,C110,C111,C112,C113,C114,C116,C117,C118,C119,C130,C131,C140,C141,C142,C143,C144,C146,C152,C160,C163,C164,C167,C202,C203,C204,C205,C206,C207,C208,C211,C212,C213,C214,C215,C216,C217,C218,C219,C220,C253,C256,C258,C309,C310,C312,C319,C321,C327,C329,C336,C339,C340,C341,C342,C350,C352,C354,C716,C719,C735,C736,C739,C851,C858,C904,C910,C930,C931,C934,C935,C990,C101,C102,C1104,C704,C184,C115,C120,C1101,C334,C505,C511
0310199	SMD CAPACITOR	50V 562±10% 7R 0603	C507
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C1109
0390170	SMD INDUCTOR	10UH±10% 1608	L301,L309
0390189	SMD INDUCTOR	2.7UH±10% 1608	L201
0390177	SMD INDUCTOR	2.2UH±10% 1608	L208,L215
0390286	SMD INDUCTOR	5.6uH±10% 1608	L811,L812,L822~L825,L828,L829

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0390052	MAGNETIC BEADS INDUCTOR	FB	L503,L504,L501
0390291	INDUCTOR	10uH±20% 350mA 0307	L701
0390287	SMD MAGNETIC BEADS	19O/100mHZ±25% 1608	L801~L807,L850,L809,L216,L217,L218,L830,L808,L815~L819,L821
0390300	SMD MAGNETIC BEADS	600O/100MHZ±25% 1608	L101,L102,L832,L831
0390301	SMD MAGNETIC BEADS	600O/100MHZ±25% 3216	L116,L106,L115,L117,L119,L209,L210,L212,L213,L303,L505,L703,L901,L990,L310,L902
0390424	SMD CORES INDUCTOR	10uH±20% 5.4A CDRH127	L502
0680082	SMD SCHOTTKY DIODE	S5822 DO-214AA	D501
0700001	SMD DIODE	LS4148	D110,D301,D112,D1
0700064	SMD TRIODE	B991 SO23	D210,D211,D212,D801,D802,D803
0700137	SMD VOLTAGE REGULATOR DIODE	11V±5% 1/2W MINIMELF	ZD901
0700147	SMD VOLTAGE REGULATOR DIODE	8.2V±5% 1/2W	ZD301
0780150	SMD TRIODE	UTC 8050S (D9-D)	Q901,Q904
0780197	SMD TRIODE	C1815	Q102,Q104,Q706,Q707,Q710,Q902,Q903,Q907,Q704,Q703,Q105,Q106,Q302,Q711
0780198	SMD TRIODE	2S1015	Q101
0790002	SMD FIELD EFFECT TRANSISTOR	2S3019F	Q720~Q721
0882030	IC	S8216 TQFP	IC301
0882485	IC	AZ11173.3 SO223	IC106, IC111,IC202,IC303
0882061	IC	PI5V330 QSOP	IC801
0883247	IC	AZ1084S-ADJ TO-263-3L	IC702
0882084	IC	SI9435 SO8	Q709 ④
0882167	IC	9435M SO8	Q709 ④
0882112	IC	L7952 SIP	IC901
0882121	IC	18 SO223	IC203,IC105
0882376	IC	TVP51461 PQFP	IC201
0882515	IC	HE4052BT SOP	U111
0882638	IC	MS518VA PQFP	IC101
0882945	IC	1430DN SOP	IC501
0880504	IC	24C32N SOP	IC103
0960234	SMD CRYSTAL OSCILLATOR	14.31818MHZ 49-S	X201,X101
0960236	SMD CRYSTAL OSCILLATOR	27.00MHz 49-S	X301
0960285	SMD CRYSTAL OSCILLATOR	22.1184MHZ±30PPM 49-S 20P	X102

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1910181	TERMINAL SOCKET	S TERMINAL D6 FLEX INSERT,WITH SHIELD,WHITE	J811
1860086	SCART SOCKET	112 FLEX INSERT,WHITE	J806
1910215	TERMINAL SOCKET	4-8.4-13/PB-15C	J1
1940005	SOCKET	6P 2.0mm	CN802
1940008	SOCKET	8P2.0mm	CN804
1940023	SOCKET	7P 2.0mm	CN103
1940044	SOCKET	9P 2.0mm	CN808
1940046	SOCKET	10P 2.0mm	CN102
1940283	SOCKET	20P 1.25mm SMD,HORIZONTAL	CN111
1980071	EARPHONE SOCKET	S066-060-300 WHITE	J801,J808
3580214	HEAT RADIATION PIECE	13×13×10	IC301
1633501	PCB	21507-5	
1860054	VGA SOCKER	15P VERTICAL,WITH BOLT	J101
5234712	HEAT CONDUCT DOUBLE-FACE GLUE	12.5×12.5×0.25 38810	IC301
LCD TV LT1500S (RU) SILVER			
PROGRAM FLASH ROMLT1500S-0A(128K) 0911803			
0882637	IC	79E63240PN PLCC	ABOVE IC SOCKET (IC102)
SOFTWARE PROGRAM EPROM ROMLT1500S-0A(512B) 0900442			
0881473	IC	12C508A SOP	U704