

***IBB*K**

LT1507S

service manual



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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 Precautions for laser head

1. Do not stare at laser head directly, for laser emission will occur when laser head is working, which will Hurt your eyes!
2. Do not use wiping water or alcohol to clean laser head, and you may use cotton swab.

1.1.5 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 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.

1.2.2 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.

1.2.3 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.

1.2.4 Element substitution method

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

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 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.

1.2.7 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 ($\geq 100\text{MHE}$)
- ◆ SMD rework station
- ◆ Multimeter
- ◆ Soldering iron
- ◆ Pointed-month pincers
- ◆ Cutting nippers
- ◆ Forceps
- ◆ Electric screw driver
- ◆ Terminals connecting cord
- ◆ Headphone
- ◆ Microphone

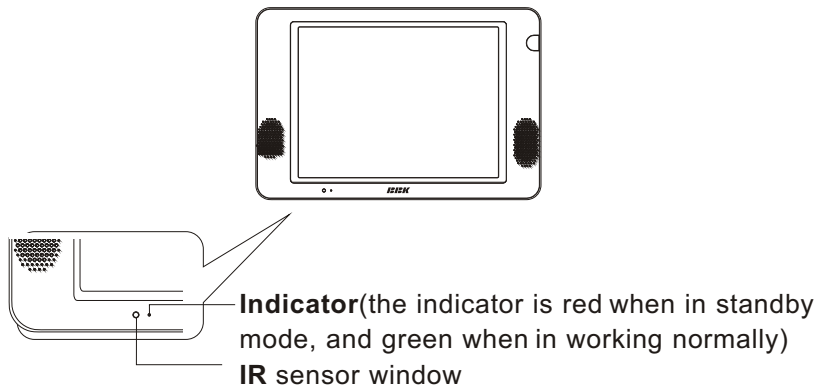
Chapter Two

Functions and Operation Instructions

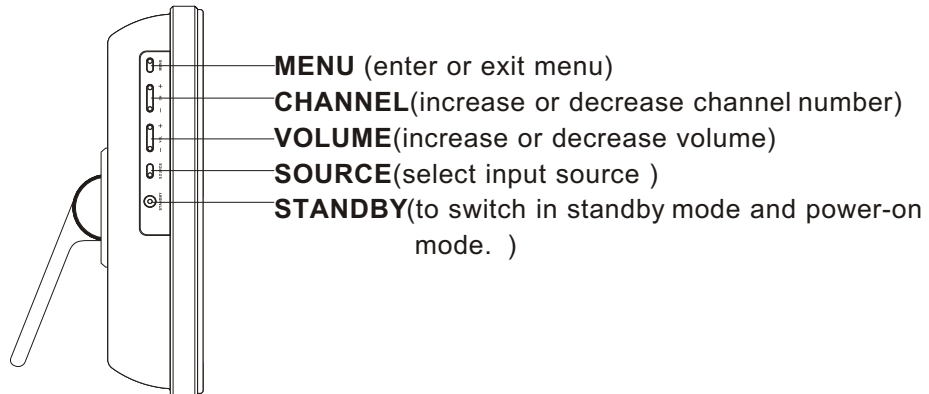
2.1 Section One TV SEGMENT

2.1.1 PANEL BUTTON FUNCTIONS

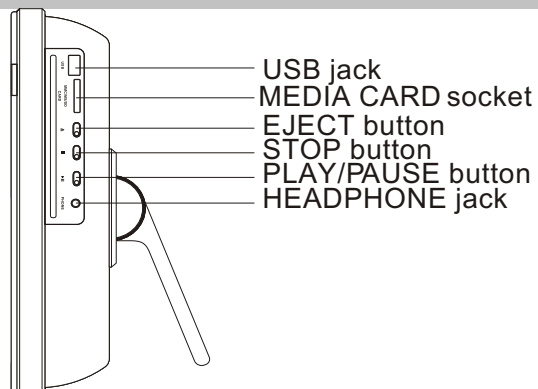
(1) FRONT PANEL



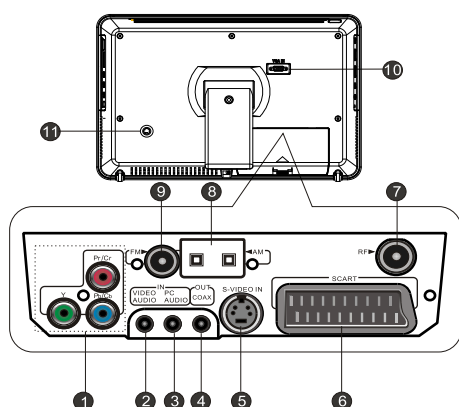
(2) LEFT PANEL



(3) RIGHT PANEL



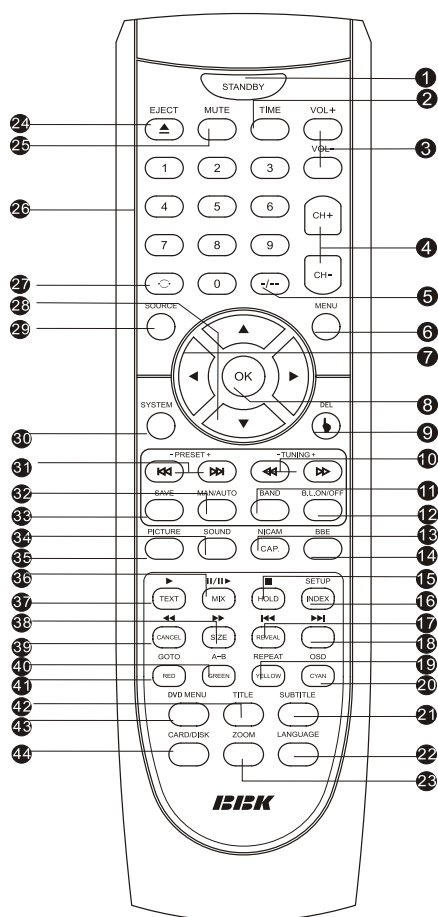
(4) REAR PANEL



- ① YPbPr or YCbCr input terminal
- ② Composite video/audio and S-VIDEO audio input
- ③ PC audio and YPbPr audio input
- ④ Coaxial digital audio output
- ⑤ S-VIDEO input
- ⑥ SCART connecting terminal
- ⑦ RF input terminal
- ⑧ AM antenna input
- ⑨ FM antenna input
- ⑩ VGA input terminal
- ⑪ 12V DC input terminal

2.1.2 REMOTE CONTROLLER

(1) REMOTE BUTTONS



- ②① **OSD/CYAN**
To display information /CYAN button.
- ②② **SUBTITLE**
To select subtitle language or switch JPEG display mode ,valid in DVD mode.
- ②③ **LANGUAGE**
To switch the output language or channel,valid in DVD mode.
- ②④ **ZOOM**
To zoom in and zoom out to the picture, valid in DVD mode.

- ① **STANDBY**
To switch between standby mode and power-on mode.
- ② **TIME**
To display the calendar and settings for timer of power on/off .
- ③ **VOLUME+/-**
To increase or decrease sound volume.
- ④ **CHANNEL+/-**
To increase or decrease program number valid in TV mode.
- ⑤ **TWO-DIGIT NUMBER BUTTON**
To switch between one or two-digit program number.
- ⑥ **MENU**
To enter and exit the menu, which is different in different signal modes.
- ⑦ **Left/Right cursor(menu adjustment)**
To move leftward/ rightward or adjust the selected item in the menu, or adjust sound volume (NOT IN DVD MODE) .
- ⑧ **OK button**
To confirm the selections.
- ⑨ **DEL/DIRECT PLAY**
Delete radio program in radio mode/ Play DVD directly in DVD mode.
- ⑩ **TUNING+/-**
To fine tuning and scanning, valid in radio mode.
- ⑪ **BAND**
To switch between AM and FM ,valid in radio mode.
- ⑫ **B.LON/OFF**
To set the screen on/off, valid in radio mode.
- ⑬ **NICAM/CAPTURE button**
Switch in NICAM, A2 and mono channel(It is effective in TV signal input with NICAM or A2 function) / Capture the currently played image and set it as the power-on logo in DVD mode.
- ⑭ **BBE**
To switch between BBE mode and BBE off.
- ⑮ **STOP/HOLD**
To stop playing ,valid in DVD mode/To lock teletext .
- ⑯ **SETUP/INDEX**
DVD function setup/To display main content page when playing the teletext .
- ⑰ **PREV/REVEAL**
To select the previous chapter or track/Display the hidden teletext information.
- ⑱ **NEXT**
To select the next chapter or track.
- ⑲ **REPEAT/YELLOW**
To repeat playback ,valid in DVD mode/ YELLOW button.

- 24 **EJECT**
Disc in /out ,valid in DVD mode.
- 25 **MUTE**
Sound mute switch.
- 26 **Number buttons**
To select program number.
- 27 **RETURN**
To exchange channel between the previous program and the current program, valid in TV mode.
- 28 **UP/DOWN cursor**
To select upward/downward in the menu or change the channel.
- 29 **SOURCE**
To select input source: TV, DVD, FM/AM,AV, S-VIDEO,SCART, YPbPr and PC-RGB.
- 30 **SYSTEM**
Select color system or sound system and press [◀/▶] buttons to change /Change DVD output picture system directly.
- 31 **PRESET+/-**
To select the saved program for AM/FM in radio mode .
- 32 **MAN/AUTO**
To select sound mode such as mono or stereo in FM.
- 33 **SAVE**
To save current frequency for AM/FM in radio mode.
- 34 **SOUND**
To select sound field modes: Standard, Music, Film, News and User, all these modes is valid when BBE OFF. If BBE is valid , the mode will be set to standard automatically.
- 35 **PICTURE**
To select different picture modes: Standard, Dynamic, Soft ,User (effect at TV, VIDEO , S-VIDEO, SCART)mode.
- 36 **PAUSE/STEP/MIX**
To pause playing/To step playback in pause mode, valid in DVD mode/To display TV and teletext in the same time.
- 37 **PLAY/TEXT**
To play normally, valid in DVD mode/To enable or disable the function of teletext.
- 38 **▶▶/SIZE**
To fast forward playback, valid in DVD mode /To magnify teletext page.
- 39 **◀◀/CANCEL**
To fast backward playback, valid in DVD mode /To cancel teletext.
- 40 **A-B/GREEN**
To segment repeat , valid in DVD mode/Green button.
- 41 **GOTO/RED**
To play from a certain time point, valid in DVD mode/RED button.
- 42 **TITLE**
To go to DVD titles, valid in DVD mode.
- 43 **DVD MENU**
To Go to the menu of DVD disc, valid in DVD mode.
- 44 **CARD/DISK**
To switch in card reader ,DVD and USB, valid in DVD mode.

2.1.3 TV MENU SETUP

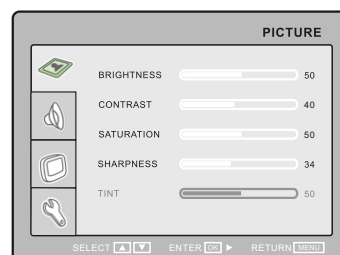
This product can store up to 100-channel programs (0~99). You can select your favorite channel through [CH+/-] or number buttons, and you can scan and store all of the channels through manual or automatic mode.

In TV mode, press[MENU] button on the remote control and menu 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 [▶] or [OK] button to enter this menu section.

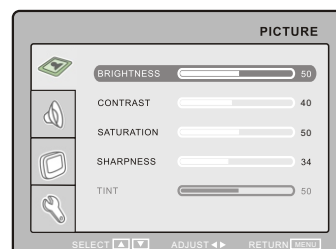
#Press [▲/▼] button on the remote control to select the item, and then press [◀/▶] button to adjust parameter value. Press [MENU] button to return to main menu sections.



(1) PICTURE

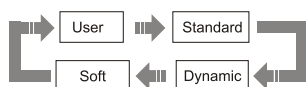
Select " " and menu will show as follows:

Press [▲/▼] button to select items and [◀/▶] button to adjust.



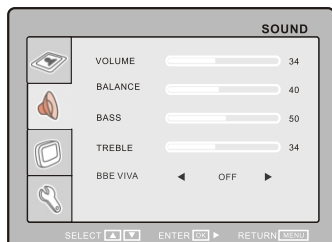
Item	Description
BRIGHTNESS	To adjust brightness.
CONTRAST	To adjust contrast.
SATURATION	To adjust color saturation.
SHARPNESS	To adjust picture sharpness
TINT	To adjust picture tint, only valid in N 3.58/N 4.43/PAL60 and display mode with V-scanning frequency equal 59.94 (please refer to P 51).

#There are four modes in picture mode: User, Standard, Dynamic and Soft. You can press [PICTURE] button to select any one of these modes.



(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
VOLUME	To adjust volume
BALANCE	To adjust balance of left and right channels.
BASS	To adjust bass(valid when BBE is set off)
TREBLE	To adjust treble(valid when BBE is set off)
BBE VIVA	To adjust BBE mode (with bass and treble invalid)

#Press [BBE] button or [◀/▶] in BBE item to set BBE "ON" or "OFF".

#There are five modes in sound mode: User, Standard, Music, Film, News. User may press [SOUND] button to select any one of these modes, the adjusted value is saved in User mode. When BBE mode is adjusted, the sound mode will go back to standard mode.



(3) TV SETTING

Select "📺" and tuning menu will show as follows:



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

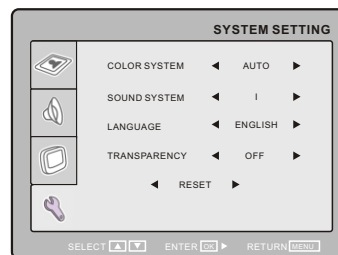
Item	Description
CHANNEL	To change the channel number.
SKIP	To select "Yes" or "No", You can select "Yes" to make current channel inaccessible while using [CH+/-] button to browse channels.
FINE TUNE	To adjust the channel frequency accurately to make the sound and picture effect better.
MANUAL SEARCH	To scan programs by manual.
AUTO SEARCH	To scan programs and store all of them automatically.

NOTES

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

(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	Can be changed between: "ENGLISH", "RUSSIAN".
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".

(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, "DUAL 1" 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.

2.1.4 AV, S-VIDEO, SCART AND YPbPr SETUP

(1) VIDEO SETTING MENU

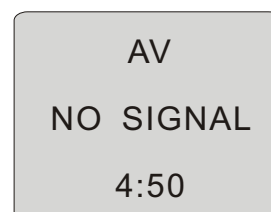
- # When in AV/S-VIDEO/SCART input mode, there are 6 color system modes for selection: "Auto", "PAL", "N 3.58", "N 4.43", "PAL60" and "SECAM". Select the right system for your video program. If you do not know which mode your video playback devices and video media is using, you should select the auto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

- # And the menu setup of YPbPr is the same as that of VGA menu, except " " section. Please refer to posterior pages. The " " section YPbPr used is the same as that of TV mode. Please refer to P10 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.



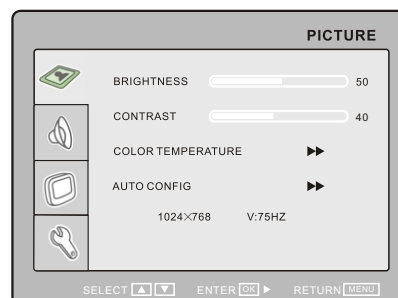
- # If the input channel is SCART, this unit will automatically recognise RGB or CVBS signal of SCART; when normal RGB signal appears, this unit will automatically switch into RGB display mode. For this unit is combined by multiple functions, when inserting into SCART socket, it will not automatically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

2.1.5 VGA SETUP

- # With the VGA mode supported up to 1024*768@75Hz, and speakers built in, you can use this unit as a multimedia PC monitor. When this unit works in VGA mode, the following setup can be done.
- # Press [MENU] button to enter main section. Press [▲/▼] button to select sections and then press [▶] button or [] button to enter. If all is done, please press [MENU] button twice to exit and your setup data will be saved automatically.

(1) PICTURE

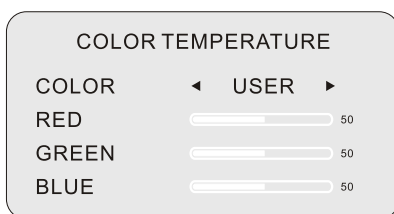
- Press [▲/▼] button to select " " , and press [▶]/[OK] button to enter.



- Press [◀/▶] button to adjust value of item.

Item	Description
BRIGHTNESS	To adjust brightness of picture .
CONTRAST	To adjust contrast of picture .
COLOR TEMPERATURE	Enter sub menu to adjust color temperature of picture. Press [◀/▶/OK] button to enter.
AUTO CONFIG	Auto config horizontal/vertical position, phase and frequency. Press [◀/▶/OK] button to activate.
STATUS	You can see some information about the input video here.

Here shows the color temperature sub menu.

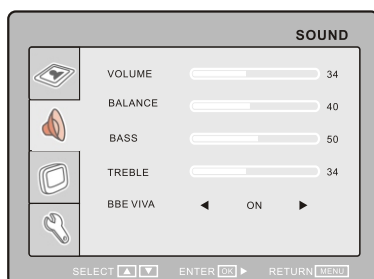


Press [▲/▼] button to select item and press[◀/▶] button to change and adjust value of item.

Item	Description
COLOR	Select color temperature mode: "User", "C6500", "C8700", "C9300".
RED	Adjust red value of color temperature
GREEN	Adjust green value of color temperature
BLUE	Adjust blue value of color temperature

(2) SOUND

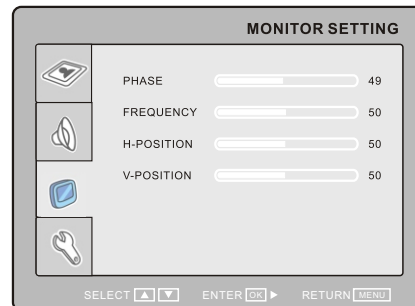
Press [▲/▼] button to select “” and press[▶/OK] button to enter.



The operation of SOUND section here is the same as that in TV mode. Please refer to P11.

(3) MONITOR SETTING

Press [▲/▼] button to select “” and press[▶/OK] button to enter.

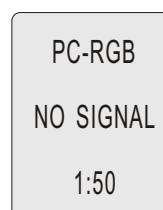


Press [▲/▼] button to select item and press[◀/▶] button to adjust value of item.

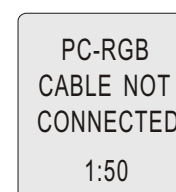
Item	Description
PHASE	To adjust phase.
FREQUENCY	To adjust frequency
H-POSITION	To adjust screen horizontal position
V-POSITION	To adjust screen vertical position

NOTE

#If you use this unit as a PC-monitor, and when your PC goes into standby mode, the screen will show as dexter. This unit will go into sleep mode with no signal inputted in 2 minutes. In this mode, the indicator will remains green, and the screen is turned off. You can wake it up by waking up you PC or pressing [MENU] or [SOURCE] button in the remote control.

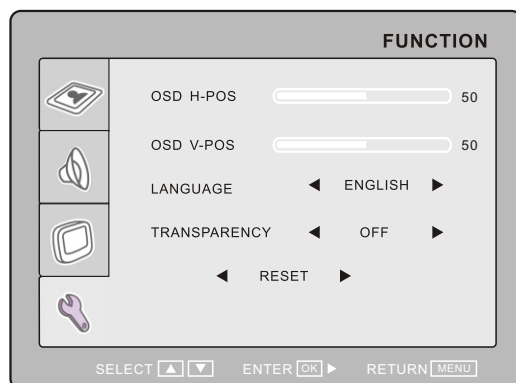


#If this product is not connected to any input devices, the screen will show as dexter. This unit will go into sleep mode in 2 minutes.



(4) FUNCTION

Press [▲/▼] button to select “” and press[▶/OK] button to enter.



Press [◀/▶] button to adjust value of item.

Item	Description
OSD H-POS	To adjust the horizontal position of OSD
OSD V-POS	To adjust the vertical position of OSD
LANGUAGE	Select OSD language [English / Russian/others]
TRANSPARENCY	To adjust transparency of OSD. it can be change from OFF to LEVEL6, 7 levels in total.
RESET	Reset all value that related to picture and sound to default .

2.2 Section Two DVD SEGMENT

2.2.1 DVD OPERATION

(1) Features

This player employs the new generation MTK decode chip with more convenient system and more stable operation. Super error correction slot-in loader with twin laser with good shockproof performance.

■ Brand-new AV Effects

- ① Compatible with MPEG 4 format discs to produce wonderful pictures.
- ② 108MHz/12bit video DAC with more vivid and brilliant pictures.
- ③ Progressive-scan video outputs to eliminate the flickers hardly overcome by interlacing scan and therefore your eyesight will be well-protected. At the same time, the pictures definition is sharply enhanced and the pictures will be finer, smoother and stabler.
- ④ Coaxial digital output terminal.

■ High Quality Digital Audio

- ① Coaxial digital audio output should be connected to power amplifier with DOLBY DIGITAL/DTS decoder.
- ② PCM Digital audio outputs to satisfy the fans' acoustic requirements.

■ Convenient Functions

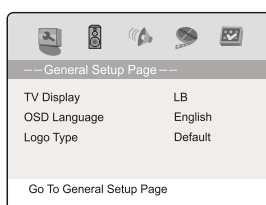
- ① The novel MP3 playback window GUI provides you a new way to appreciate Mp3 music.
- ② Direct entry into desired scenes (title/chapter/time/track search).
- ③ Multi-level zoom in/out playback function to provide you with brand-new enjoying way.
- ④ Multiple aspect ratios to fit TV sets of various screen ratios.
- ⑤ Parental lock function to prevent children from watching unsuitable discs.
- ⑥ Multiple dubbing languages and subtitle languages bring you the best entertainment status all the time.

■ Super compatible with VCD, SVCD, CD, Mp3, HDCD, KODAK PICTURE CD etc.

NOTE: * Some discs labelled with MPEG4 on the market actually are *.rm/*.ra/*.ram/*.rmm and others which are not compatible. Please take care when buying discs.

2.2.2 DVD FUNCTION SETUP

(1) GENERAL SETUP



1. TV display: this item is used to set the output picture ratio of this unit.

- Optional settings: Normal/Pan-Scan, Normal/Letterbox, Wide Screen; Default: Normal/Letterbox

2. OSD language: this item is used to set the information language displayed in the course of playback.

- Optional settings: English, French, German, Spanish, Italian; Default: English

3. Logo Type: This item is used to setup the sort of power-on logo

- Optional settings: Captured; Default: Default

NOTE

The Screen Logo refers that use the image selected by pressing the CAPTURE button as the power-on logo. In the operation of changing screen, if the power-on logo has not set in Screen Logo, the unit will automatically set the power-on logo as Screen Logo.

(2) SPEAKER SETUP



Downmix mode: this item is used to set this unit's DOWNMIX mode to change multi-channel audio into 2-channel audio output.

- Optional settings: Dolby Stereo, Stereo Default: Stereo

(3) AUDIO SETUP

When adjusting some audio setup items, some other audio setup items may be caused to change. This is because these audio setup items cannot be adjusted at the same time, but not the unit trouble.



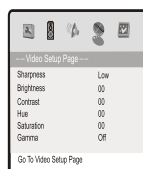
1. SPDIF output: this item is used to set the bit stream type of the digital output.

- Optional settings: RAW, PCM; Default: RAW

2. LPCM output: this item is used to set the output frequency of LPCM audio data to fit for different power amplifiers.

- Optional settings: 48K, 96K, 192K Default: 48K The output frequency is related to the actual signal frequency. The signal of 48K cannot output that of 96K.

(4) VIDEO SETUP



1. Sharpness: this item is used to set the sharpness of video outputs.

- Optional settings: High, Medium, Low; Default: Low

2. Brightness: this item is used to set the brightness of video outputs.

3. Contrast: this item is used to set the contrast of video outputs.

4. Hue: this item is used to set the hue of video outputs.

5. Saturation: this item is used to set the saturation of video outputs.

- How to adjust brightness, contrast, hue and saturation:

A. In picture setup page, press [▲/▼] button to select the item to be adjusted and press [OK] button to enter the corresponding item adjustment.

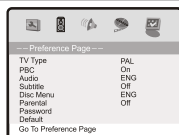
B. Press [◀▶] button to adjust the setup item.

C. After adjustment finishes, press [OK] button to return to picture setup page.

6. Gamma correction: this item is used to set the Gamma value of video output.

- Optional settings: High, Medium, Low, Off; Default: Off

(5) INITIAL SETUP



1. TV system: this item is used to set the unit's video output system.

- Optional settings: Auto, PAL, NTSC; Default: PAL

2. PBC: this item is used to set PBC state.

- When playing SVCD, VCD2.0 discs, if PBC is set On, this unit enters PBC playback mode; if PBC is set Off, the unit plays the disc according to track sequence.
- Optional settings: On, Off; Default: On

3. Audio: this item is used to set the preference audio language when playing.

4. Subtitle: this item is used to set the preference subtitle language when playing.

5. Disc menu language: this item is used to set the preference disc menu language when playing.

- Default of disc menu language: English
- Default of subtitle: English

NOTE

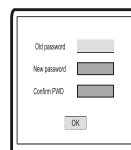
- Audio, subtitle and disc menu language are only effective to DVD disc.
- If the disc is not recorded with the language you appointed, the unit will apply the language that the disc appointed to play.
- Select other languages: press [▲/▼] button to move cursor to "OTHER" item, press [OK] button and then number buttons to input the language code you desired. After input finishes, press [OK] button again.

6. Parental: this item is used to set the parental control ratings to prevent children from watching the restricted contents. (In case the disc supports this function)

- Optional settings: KID SAFE, G, PG, PG 13, PGR, R, NC17, ADULT, Off; Default: Off

NOTE

- When changing the parental control ratings, a password is needed. Please refer to the following password item for details.
- 7. Password: this item is used to set a four digital password to enable you to change the parental control ratings.
- Default: 7890



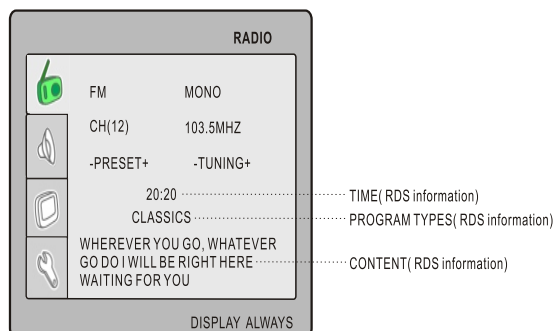
8. Default: this item is used to restore all settings to the default value except "Parental control" and "Password" in the setup menu.

2.2.3 RADIO OPERATION

With radio and RDS decoder built in, you can enjoy radio programs using this unit.

(1) RADIO

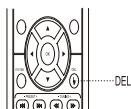
When in radio mode, press [MENU] button and a menu will show as follows:



Item	Description
FM/AM	Here shows the program information .You can switch between AM and FM by pressing [BAND] button .
CH	Here shows the channel and the frequency of it. Channels can be changed by pressing [PRESET+/PRESET-] buttons.
-PRESET+	Press [PRESET+/PRESET-] buttons to recall saved program
-TUNING+	Short press [TUNING+/TUNING-] buttons once to fine tune frequency, and long press to start scanning .

NOTES

- If the program you are listening to is in FM with stereo, by pressing [MAN/AUTO] button, you can switch between mono and stereo.
- You can store up to 20 programs in AM and in FM.
- The RDS information will display automatically in the section like above picture if there are RDS information in the radio program. You do not need to do any operation, and it will show always.
- Auto scanning function:
When in AM/FM mode, press "SAVE" button, then long press "TUNING-" or "TUNING+" buttons immediately, the backward or forward scanning will start automatically and roll back to the point where the auto scanning starts. The programs found will be saved as the preset programs.
- Manual scanning function:
When in AM/FM mode, long press "TUNING-" or "TUNING+" buttons, the backward or forward scanning will start and will stop when there are program found. You can save this program to current channel by pressing "SAVE" button.
Note: When you just saved a program to current channel, long press "TUNING-" or "TUNING+" buttons immediately will start auto scanning.
- There are up to 20 programs can be preset in this unit, and you can recall them in 2 ways:
Method 1.
For channel 1 ~ channel 9, press the number buttons in the remote control to access to them;
For channel 10 ~ channel 19, press "-/-" first, then press "0 ~ 9" to access to them; For channel 20, just press "-/-" twice to access to it.
Method 2.
You can press "preset-/preset+" to access to the preset program one by one.
During scanning, you can press [MENU] button to stop it.
- Program deleting function:
With this function, you can choose the unwanted program (for example: signal is bad) to delete. When you don't like the program you are listening to, you can delete it by press [DEL] button. After you delete a program, the program after the deleted one will fill in it. For example: The program in channel 3 is a bad one that you don't like, but the program of channel 4 is a nice one, so you can delete the channel 3 by press [DEL] button when channel 3 is now being played. When the channel 3 is deleted, the program of channel 4 will fill in channel 3, and the program of channel 5 will fill in channel 4, ..., the channel 20 will fill in channel 19. But the channel 20 will not change.
Preset program in this unit before you delete program 3 (P3):
P1, P2, P3, P4, P5, ..., P18, P19, P20
Preset program in this unit after you delete program 3 (P3):
P1, P2, P4, P5, P6, ..., P19, P20, P20

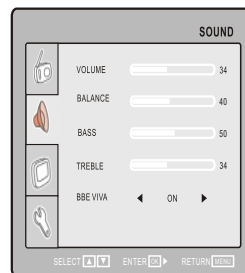


(2) SCREEN ON /OFF

When using radio function, users can turn off the screen by pressing [B.L.ON/OFF] button so as to save the life of the screen and save power.
Also you can press [B.L.ON/OFF] button to turn on the screen while it is off.

(3) SOUND

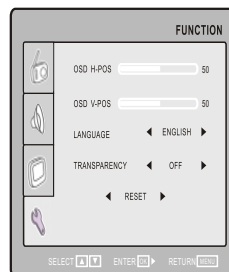
In main section press [▲/▼] button to select " ", press [▶/OK] button to enter.



The operation of sound options here is the same as that in TV mode. Please refer to P11.

(4) FUNCTION

Press [▲/▼] button to select " " and press [▶/OK] button to enter.



The operation of function options here is the same as that in VGA mode. Please refer to P21.

2.2.4 TIME SETTING

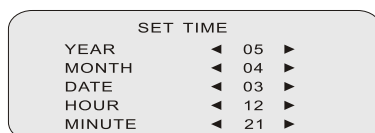
(1) TIME SETTING

At any display mode you press [TIME] button, calendar will show on the screen,



Item	Description
SET TIME	Press [▶/OK] button to go to the set time sub menu.
SET TIMER ON	Press [▶/OK] button to go to the set timer on sub menu.
SET TIMER OFF	Press [▶/OK] button to go to the set timer off sub menu.

Use [▲/▼] button to choose which value to change and use [◀/▶] button to change it. When new value is set, press [TIME] or [OK] button to exit and the value will be saved immediately.



With "TIMER ON" function, you can waken on this unit at a certain time from standby mode. You can go into "SET TIMER ON" sub menu by pressing [◀/▶/OK] button when cursor pointing at "SET TIMER ON". There are 3 items in this sub section.

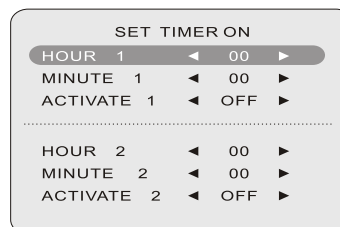
You can set two timers for power on. That means you can power on your LCD TV two times a day automatically.

You can set the hour and minute for auto power on here.

- HOUR 1 and MINUTE 1 set for the TIMER 1 for auto power on, ACTIVATE 1 can be set for activate setting for TIMER 1.
- You can choose ON/OFF and ONCE on ACTIVATE 1.

When ON is selected, timer 1 will always enable auto powering on .

When you select OFF ,timer function will be disable .If you select "ONCE", timer 1 will enable auto powering on and, after it powers on automatically for the first time, the setting will go to "OFF" automatically.



HOUR 2 and MINUTE 2 set for the TIMER 2 for auto power on ,ACTIVATE 2 can be set for activate setting for TIMER 2.

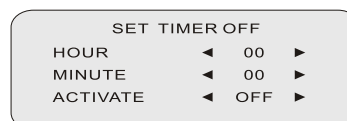
- You can choose ON/OFF and ONCE on ACTIVATE 2.
- When ON is selected, timer 2 will always enable auto powering on . When you select OFF ,timer function will be disable .If you select "ONCE", timer 2 will enable auto powering on and, after it powers on automatically for the first time, the setting will go to "OFF" automatically.

With "TIMER OFF" function, this unit can power off by itself at a certain time from working mode.

You can go into "SET TIMER OFF" sub menu by pressing [◀/▶/OK] buttons when cursor pointing at "SET TIMER OFF". There are 3 items in it .

- You can set the hour and minute for auto powering on here
- And you can set the "TIMER OFF " function activate option here. You can choose "ON/OFF" and "ONCE" here.

When "ON" is selected, timer will always enable auto powering off . When users select "OFF ", timer will disable powering off .



If you select "ONCE", timer will enable auto powering off and, after it powers off automatically for the first time, the setting will go to "OFF" automatically.

NOTE

- When you have set the "TIMER OFF" activated, a message will show when it is 1 minute left for powering off like: " STANDBY : 59S" . If you press [TIME] button during this status, you can cancel the power off this time. When the number is decreased to 0, this unit will go to standby mode automatically .
- When you set the ACTIVATE ON or ONCE, and the calendar's time comes to the timer's value, power on and power off event will occur; For example: If you set the POWER ON TIMER to 9:00, ACTIVATE ON, then when time in calendar goes to 9:00, this unit will power on from standby mode automatically.

2.2.5 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 30 kHz – 75 kHz 16 700 000
Display Mode	Optimum Mode	1024x768; 75 Hz
Inputs	Video Composite S-Video RGB/SCART Y Pb Pr VGA Audio Stereo Other interface USB Card reader	1+1(SCART) 1 1 1 1 2+1(SCART) 1 1
Outputs	Video Composite Audio Stereo Headphone Digital Coaxial	1(SCART) 1(SCART) 1 1
Color Systems	TV tuner Video inputs	PAL, SECAM PAL, SECAM, NTSC 3.58, NTSC 4.43, PAL60
Sound Systems	TV tuner	DK, I, BG, L
Radio	FM frequency range AM frequency range	65MHz-74MHz,87.5MHz-108MHz 530kHz-1710kHz
DVD	Disc type	CD-R/RW, DVD-R/RW, DVD+R/RW
	Formats	DVD-Video, DivX, XviD, SVCD, VCD, CD-DA, HDCD, MP3, WMA, Kodak Picture CD, JPEG
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 Operating Humidity Storage Temperature Storage Humidity	+5°C...+35 °C 10% – 80% –20°C...+45 °C 5% – 95%
Dimensions	438.7 mm x 163.1 mm x 295.7 mm	
Net Weight	7.4 kg	

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

#Because of disc quality and format difference, we cannot make sure smoothly read discs; some functions cannot be fulfilled for the disc speciality, but not machine trouble.

2.2.6 DISPLAY MODE

SUPPORTED PC INPUT MODE				
Resolution	Hor scanning frequency (KHz)	Ver scanning frequency (Hz)	Pixel frequency (MHz)	Format
640×350	31.5	70.0	25.17	DOS
720×400	31.5	70.0	28.32	DOS
640×480	31.5	60.0	25.18	DOS
640×480	37.9	72.0	31.50	VESA
640×480	37.5	75.0	31.50	VESA
800×600	35.1	56.2	36.00	VESA
800×600	37.9	60.0	40.00	VESA
800×600	48.1	72.0	50.00	VESA
800×600	46.9	75.0	49.50	VESA
1024×768	48.4	60.0	65.00	VESA
1024×768	56.5	70.11	75.00	VESA
1024×768	60.0	75.0	78.75	VESA

NOTES

- This product does not support the display mode not listed above. In order to achieve the best display effect, please select the above-listed 12 display modes input signal.
- Because of the difference of display card output signal (especially non-standard signal output), the display image may appear little disturbance which can be adjusted through " AUTO CONFIG " in the "PICTURE" menu by users.
- To prolong this unit's service life, you are suggested to use power management function of computer.

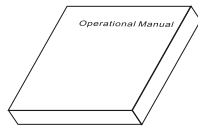
SUPPORTED VIDEO INPUT MODE			
Format	Hor scanning frequency	Ver scanning frequency	Vert scan type
720X480	31.47	59.94	480P
720X480	15.734	59.94	480i
720X576	31.25	50	576P
720X576	15.625	50	576i

NOTE

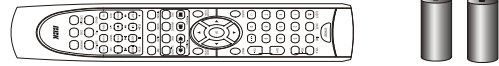
Specifications and design are subject to change without notice.

2.2.7 ACCESSORIES

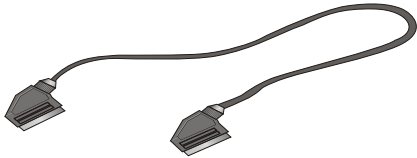
Please check the following accessories.



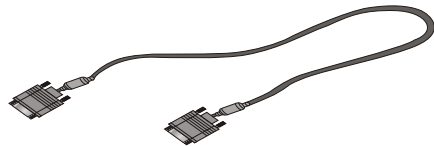
User manual



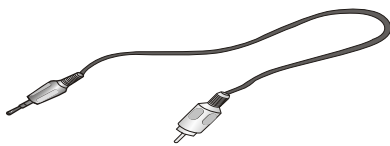
Remote control and battery



Scart cable (optional)



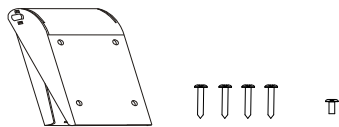
VGA cord



Coaxial digital audio cord



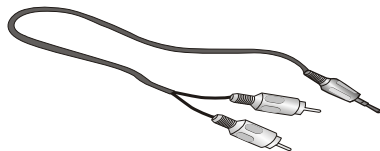
Power adaptor



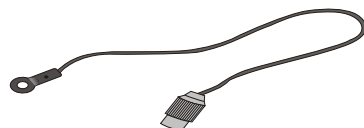
Wall Mount Holder Kit



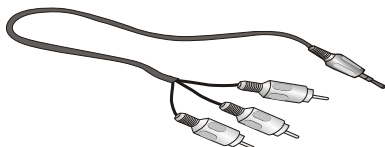
Kickstand Kit



Audio cord



FM antenna



AV cord



AM antenna

Chapter Three Principle and Servicing

The previous manual: TV part

Section One Principle of the player

3.1.1 Function and features

LT1507S7 is a multi-function 15-inch LCD TV with DVD playing function and Usb reading function. Electronic scheme of TV part adopts SVA150XG04TB 15" TFT + inverter components (INV203)+MST518VA+TVP5147+STV8216+TDA7266P+tuner JS-6B2/121+CPU (W79E632A40PNA40PN). Support PAL BG/DK/I, SECAM BG/DK/L/L' RF signals demodulating, PAL/NTSC/SECAM/PAL60 multi-system video signal, BG/DK/I/LL/L' accompanying system's FM, NICAM, A2 Stereo signal demodulating and accompany restore, with tuning (RDS) teletext display function; the supportable external input has SCART S-VIDEO and component video input mode. DVD part adopts MT1389B+64M (SDRAM)+16M FLASH+D5954 and HD62 loader.

3.1.2 Block diagram of the player

LT1507S is composed of TV and DVD function, shown in the figure 3.1.2.1, TV part in the picture supports tuning, teletext display, BBE sound effect processing and component video input functions. VGA terminal is used as software upgrading jack and the gray part in the block diagram is not used in this player, so we will not introduce in this manual. DVD part will be introduced in the next manual.

Derived machine of Lt1507 has LT1501S, LT1503S and LT1507S-2. Differences of these machines have: 1. LT1503S has built-in power board, LT1507S adopts power adapter for power supply and other parts are the same totally. 2. LT1501S deletes DVD/card read function on the basis of LT1503S and adds headphone board. Working principle of TV part is the same with LT1507S. 3. LT1507S-2 changes into SAV screen on the basis of LT1507, and inverter components and software are also changed. Lt1507-2 adopts inverter components of INV203, Lt1507 adopts purchased inverter components, working principle is the same but specification is different, so they cannot changed with each other.

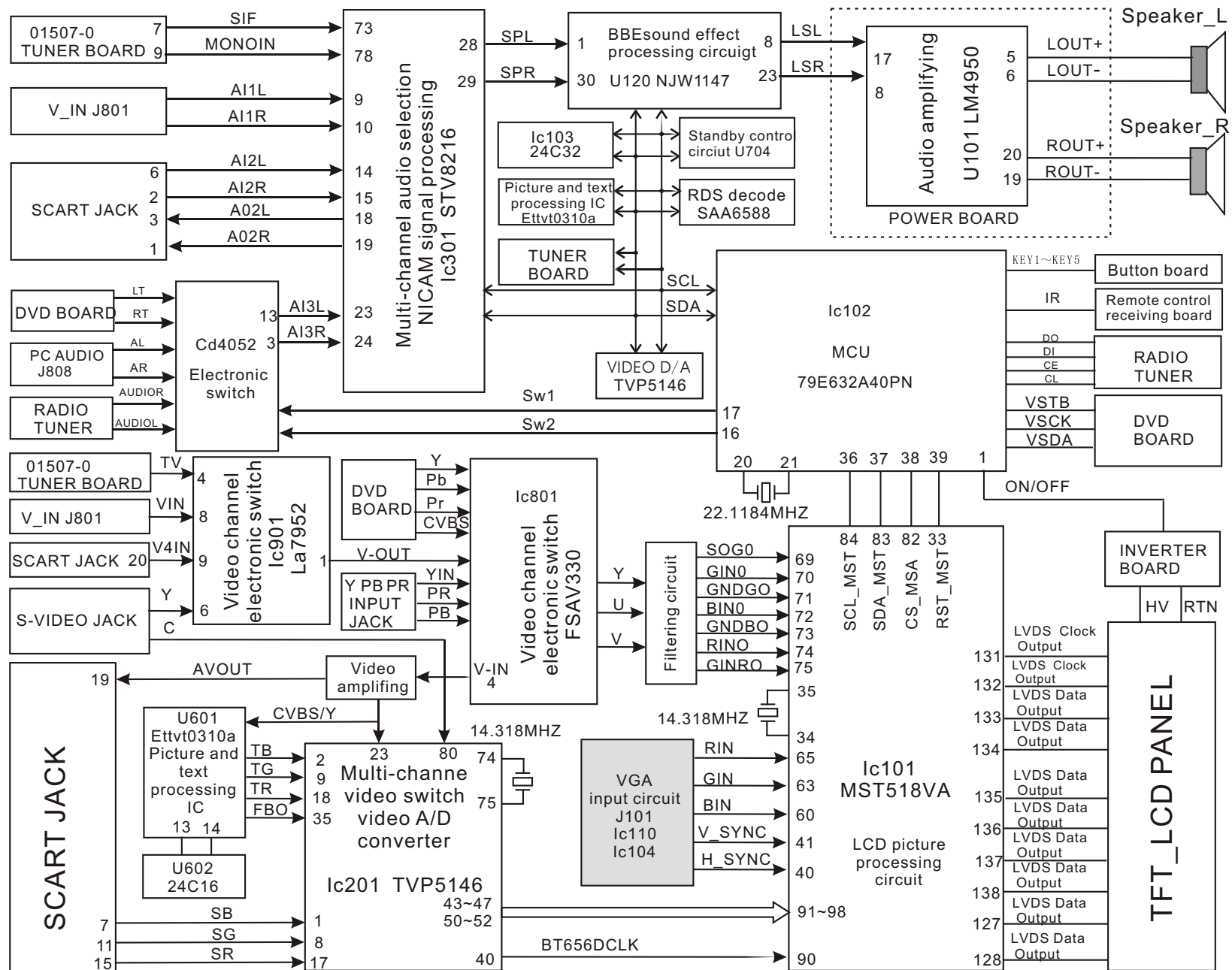


figure 3.1.2.1 Block diagram of the player

3.1.3 Function introduction to IC of the player

Function introduction to IC of the player is shown as in the following figure:

PCB board	Material code	Material name	Specs & Model	Quantity	Location	Description
AK083	8824629	IC	AZ431AZ-A TO-92	1	U3	3-end precision voltage stabilizer
	883304	IC	NCP1337 SOP	1	U1	Power case power IC
	10800118	Photoelectric coupler	HS817\$	1	U2	Photoelectric coupler
Main video board @21507-1UL	881456	IC	SAA6588 SO20	1	U701	RDS decoder
	882028	IC	AC1501 TO263-5L	1	IC501	5V voltage stabilizing IC
	882030	IC	STV8216 TQFP	1	IC301	Multi-channel sound source selection NICAM processing
	882053	IC	AK33 SOT-223	5	IC106, IC111, IC202, IC303, IC503	Voltage stabilizing IC
	882061	IC	PI5V330 QSOP	1	IC801	Video electronic switch
	882072	IC	FM3164 SOP	1	U703	RCT, electronic calendar IC
	882076	IC	LM1085-3.3 SOT-263	1	IC702	3.3V voltage stabilizing IC
	790126	SMD FET	FDS9435A SOP	1	Q709	MOS tube (power switch control)
	882112	IC	LA7952 SIP	1	IC901	Video electronic switch (video output selection)
	882121	IC	AK18 SOT-223	2	IC203, IC105	Voltage stabilizing IC
	882376	IC	TVP5146M1 PQFP	1	IC201	Video A/D converter
	883020	IC	ET-TVT 0310B PQFP	1	U601	Teletext decoder IC
	882515	IC	HEF4052BT SOP	1	U111	Audio input selection electronic switch
	882638	IC	MST518VA PQFP	1	IC101	LCD image processor
	882639	IC	NJW1147M SDMP30	1	U120	BBE sound effect processing circuit
	1020028	Tuner	JS-6B2/121	1	T1	Receive high frequency signals and change them into A/V signals
	882637	IC	W79E632A40PN PLCC	1	U15	MCU (programmable)
	900442	Software program EPROM	ROMLT1500S-0A(512B)	1	U704	Standby control IC
Power amplifier board @51509-1	882110	IC	LM4950 TO-263	1	U101	Audio power amplifying
	790021	FET	IRF7416 SOP	1	U504	TV main power switch pipe
	882028	IC	AC1501 TO263-5L	1	U503	DVD5V voltage stabilizing IC

Section Two Unit Circuit Principle

3.2.1 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 3.2.1.1:

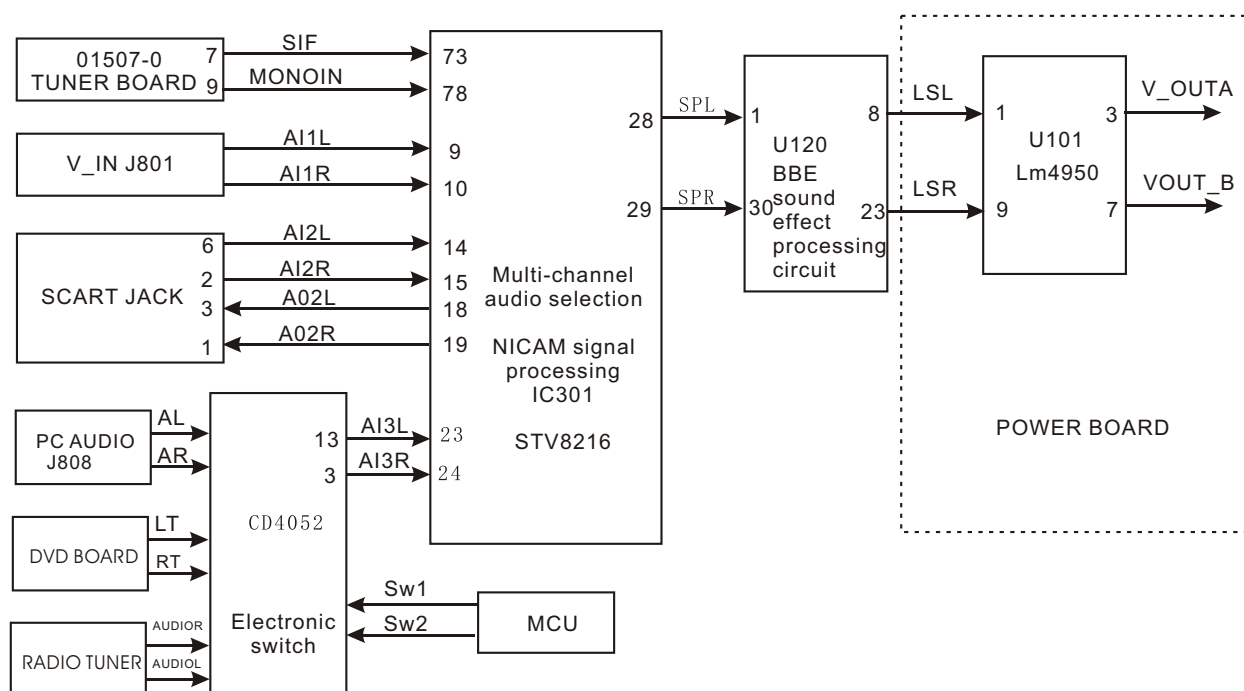


Figure 3.2.1.1 Audio processing circuit block diagram

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 to the current programme and then transmits 3-channel Audio signals together with the original FM accompanying sound, which is used in 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 3.2.1.2:

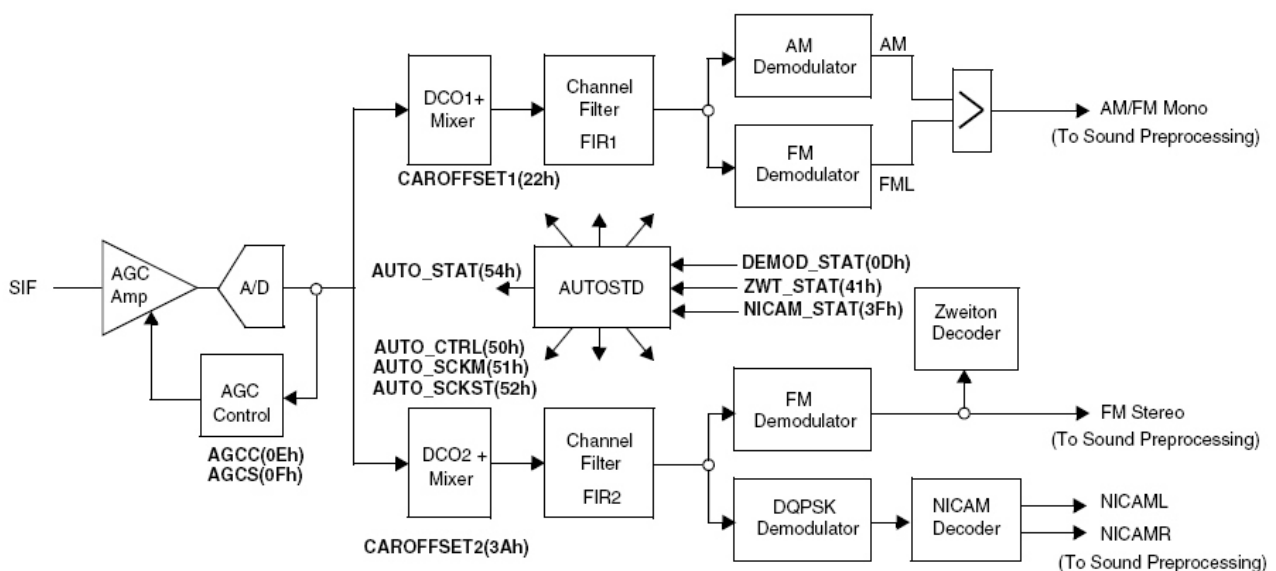


Figure 3.2.1.2 STV8216 internal block diagram

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.

(2) Working principle

Power-on mute working principle: when power on, MUTE pin of MCU outputs high level, relay closes and loudspeaker cannot make sound normally. After power on normally, MUTE pin is low level, relay cuts off, 5/8 and 1/4 connects and machine sound outputs normally.

Power-off mute working principle: power-off mute circuit is composed of Q102/Q103. When machine works normally, Q102 cuts off, so Q103 cuts off, STBY is high level and machine sound output is normal. When power off, TC102 discharges through Q102 to make Q103 connected, STBY is low level and machine enters mute mode.

3.2.2 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 3.2.2.1:

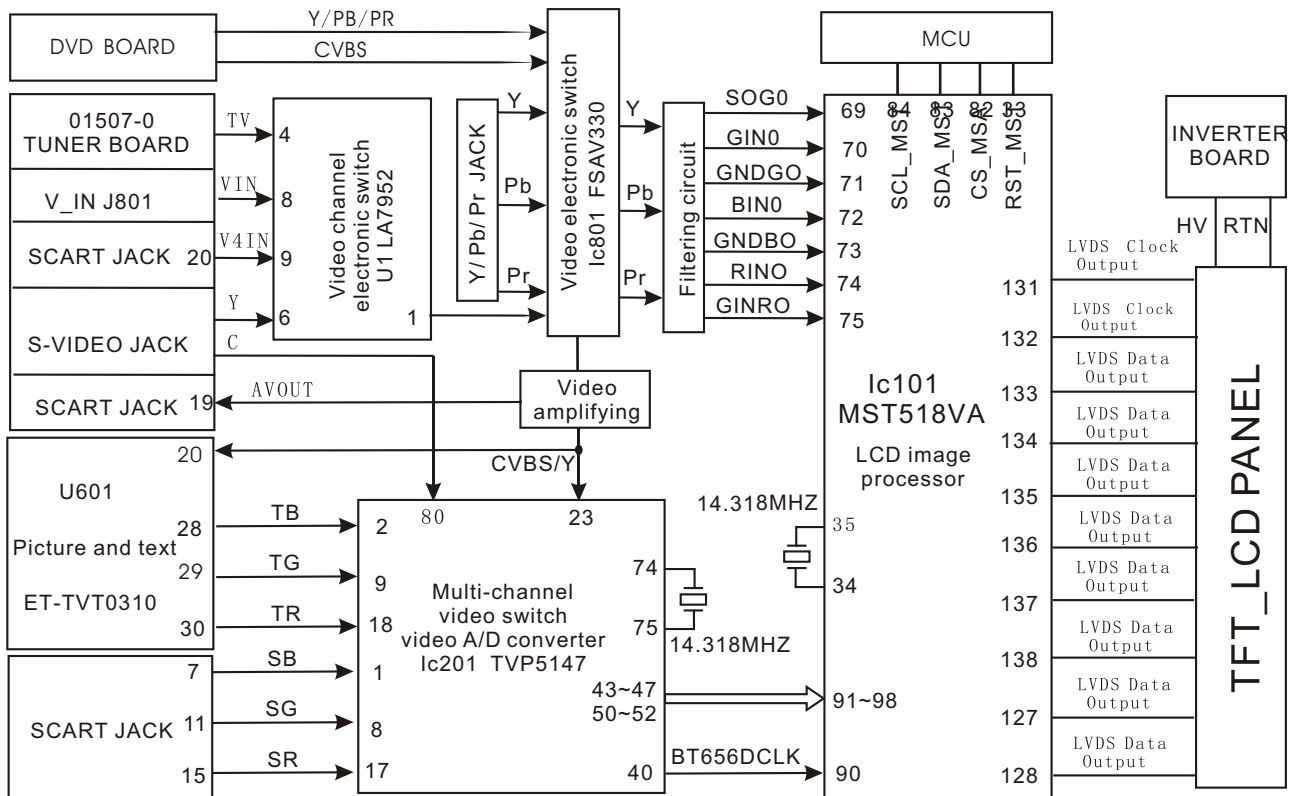


Figure 3.2.2.1 Video block diagram of the player

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.

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. Teletext processing circuit

(1) Teletext processing circuit block diagram is shown in the picture 3.2.2.2:

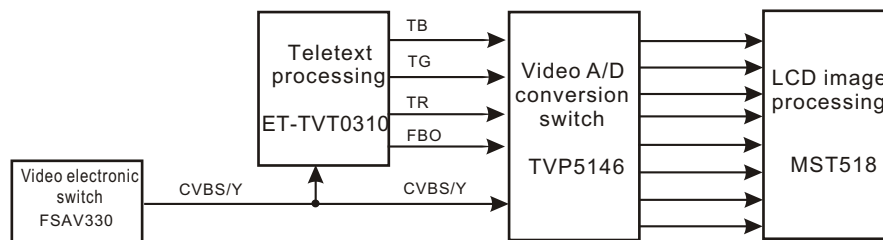


Figure 3.2.2.2 Teletext processing circuit block diagram

(2) Working principle: teletext processing circuit is composed of chip ET-TVT0310 and peripheral elements. This IC is responsible for teletext decoding. When machine is receiving teletext signals, TV signals revert into composite video signals through being demodulate by tuner. Teletext signals are included inside composite video signals. Composite video signals are divided into 2 ways: one way is inputted to TVP5146 through video electronic switch for A/D conversion, and the other way is inputted to U601, through internal A/D conversion, and then teletext information is decoded, pin 28, 29 and 30 of U601 output teletext information and superpose to video A/D converter and then get together with video signal to output in the means of digital video to MST518 directly for processing.

3.2.3 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 3.2.3.1:

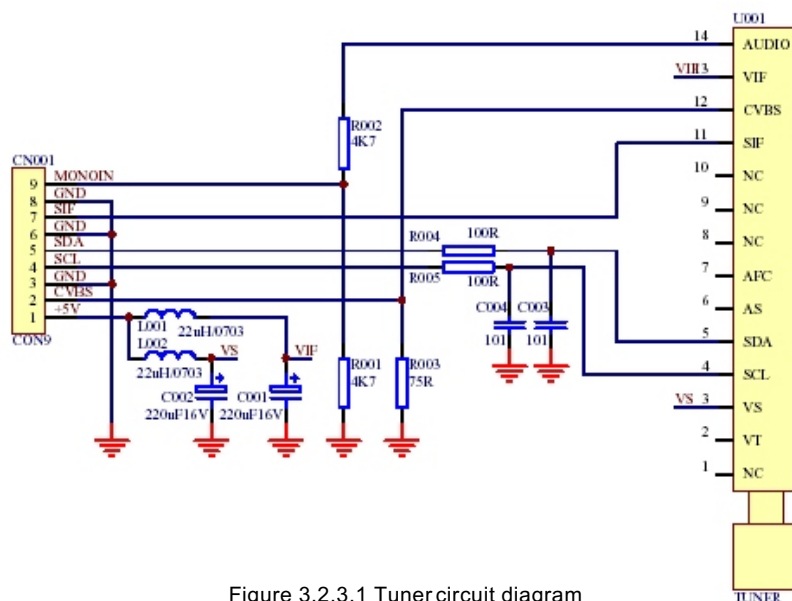


Figure 3.2.3.1 Tuner circuit diagram

(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	Pin	Name	Function
1	NC	NC	6	AS	GND	11	SIF	NICAM jack
2	VT	NC	7	AFC	NC	12	TUNER_CVBS	Video output
3	VS	(+)5V power supply pin	8	NC	NC	13	VIF	5V power is connected externally
4	SCL	SCL is connected with MCU	9	NC	NC			
5	SDA	SDA is connected with MCU	10	NC	NC	15	AUDIO	Audio output

3. Tuner jack and voltage stabilizing circuit

(1) Tuner jack and voltage stabilizing circuit is shown in the figure 3.2.3.2:

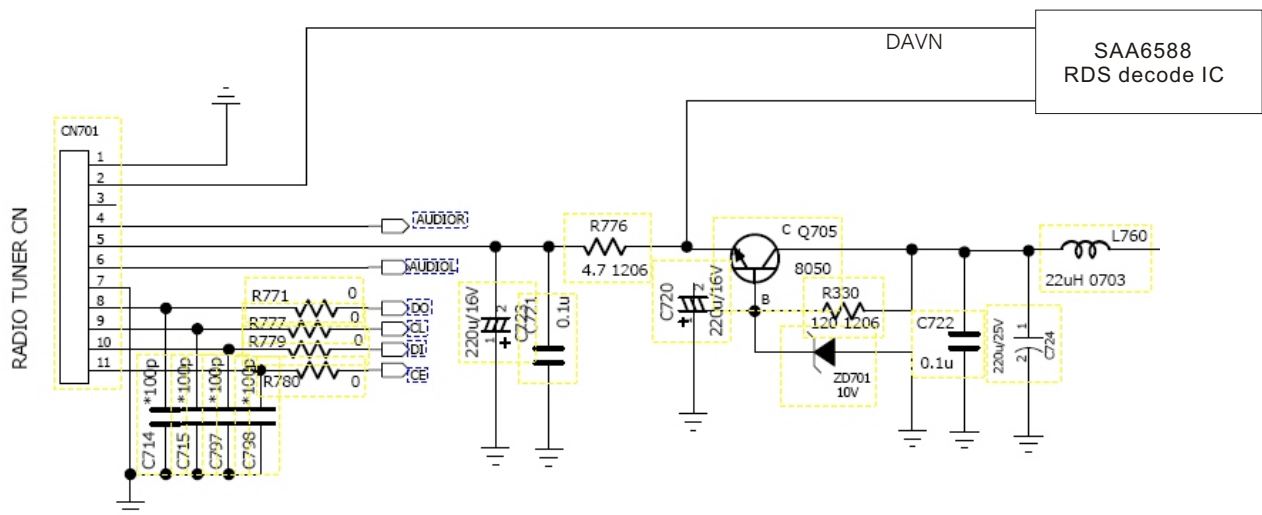


Figure 3.2.3.2 RADIO Tuner jack and voltage stabilizing circuit diagram

(2) Working principle: MCU controls tuner through DI data input jack, DO data output jack, CL clock signal and CE chip selection signal. When machine switched in tuning state, pin 12 of MCU (FM_ON) outputs a high level signal to make Q301 and Q300 saturated on, 12V power reaches voltage stabilizing circuit through C_E electrode of Q300 for voltage stabilizing. Voltage stabilizing circuit is composed of Q705 and ZD701. The power after being stabilized is supplied for tuner and SAA6588. Tuner performs the action of selecting channel and tuning under the control of MCU. Tuner outputs the analog audio signals after modulating from pin 4, 6 of Cn701. Audio signals input to sound source selection circuit CD4052, now CD4052 is controlled by MCU to input tuning audio signals to rear stage for processing and amplifying.

4. Tuning circuit

(1) Tuning circuit block diagram is shown in the picture 3.2.3.3:

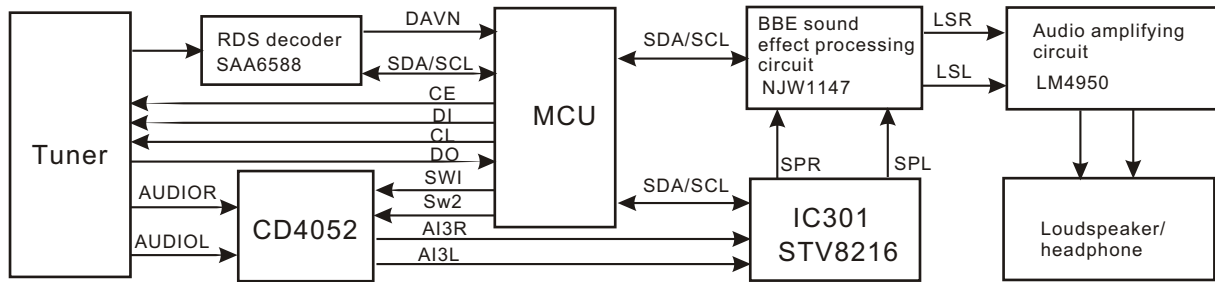


Figure 3.2.3.3 Tuning circuit block diagram

(2) RDS decode circuit is mainly used in the information in decode digital broadcasting. After radio station transmits digital information, it sends out through FM signals. After being modulated by tuning modulator, input from pin 2 of tuner to pin 16 of SAA6558 and perform RDS decode through SAA6558 and pin 8 of SAA6558 outputs digital information to MCU. MCU displays the received character information on screen to realize the restore of digital information. Audio L, R reaches STV8216 through electronic switch IC Cd4052 for NICAM processing and outputting SPR and SPL to NJW1147 for sound effect processing to rear stage for output.

3.2.4 Power circuit

Power circuit supplies voltage stabilizing and pure power for each unit circuit to ensure the normal working of the player. Power circuit block diagram is shown in the figure 3.2.4.1:

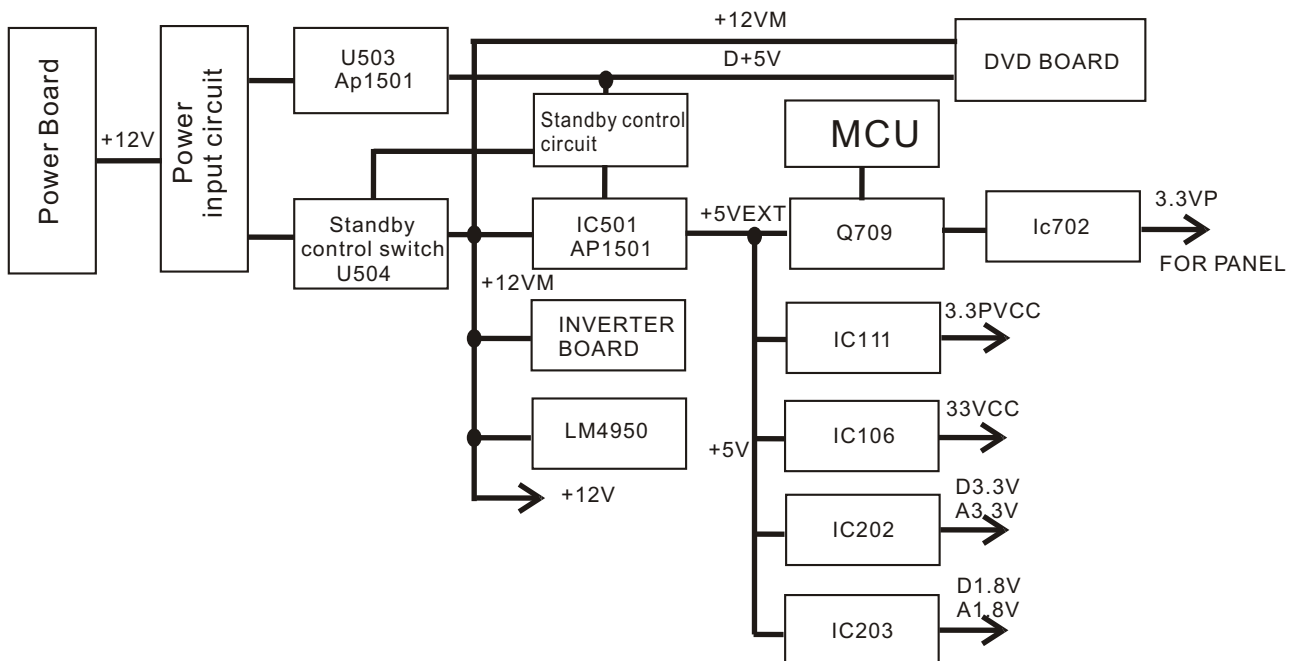
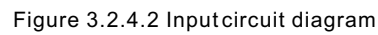


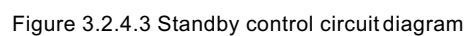
Figure 3.2.4.1 Power circuit block diagram

(1) Input circuit is shown in the picture 3.2.4.2:



2. Standby control circuit

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



(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 triggered by external low level and its pin 5 outputs a continuous low level signal, STB is high level and machine enters power-on state. After pressing POWER button again in power-on state, KEY6 ens is triggered by low level again, level of pin 5 of U704 will turn to high level, pin STB is low level and machine enters standby mode. Principle of remote control is the same basically and the remote control code inside this IC can only identify orders from POWER button.

3. Power control circuit

5V power outputted by Ap1501 is supplied for standby control IC U704 on video board. When power on and off, control pin STB level of standby control IC U704 realizes power on and off function. MOS tube Q502 (Q502 IS a P-Channel MOSFET) in the diagram is controlled by U704; when in standby state, U704 outputs high level, Q502 cuts off; when in power-on state, U704 outputs low level, Q502 is saturated on and power is supplied for rear stage through Q502 to realize power control.

4. Display screen power supply circuit

(1) Display screen power supply circuit is shown in the figure 3.2.4.4:

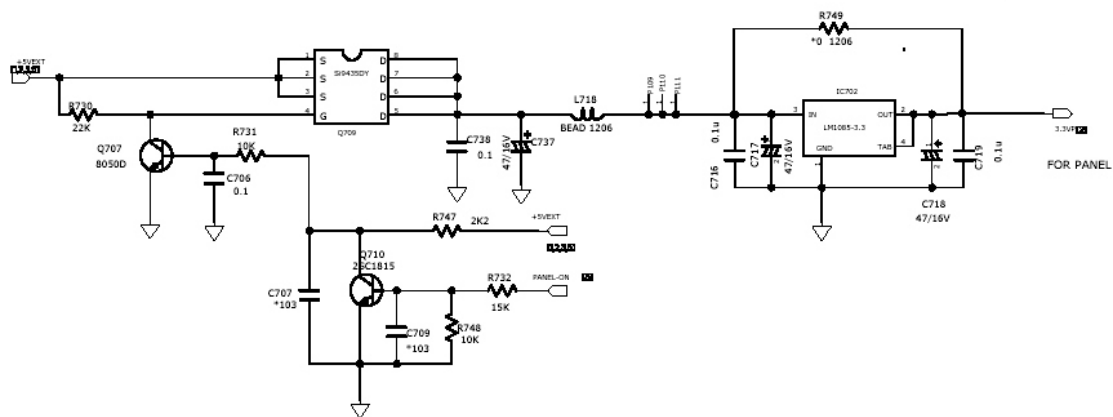


Figure 3.2.4.4 Display screen power supply circuit diagram

(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.

5. Inverter components control circuit

(1) Inverter components control circuit is shown in the figure 3.2.4.5:

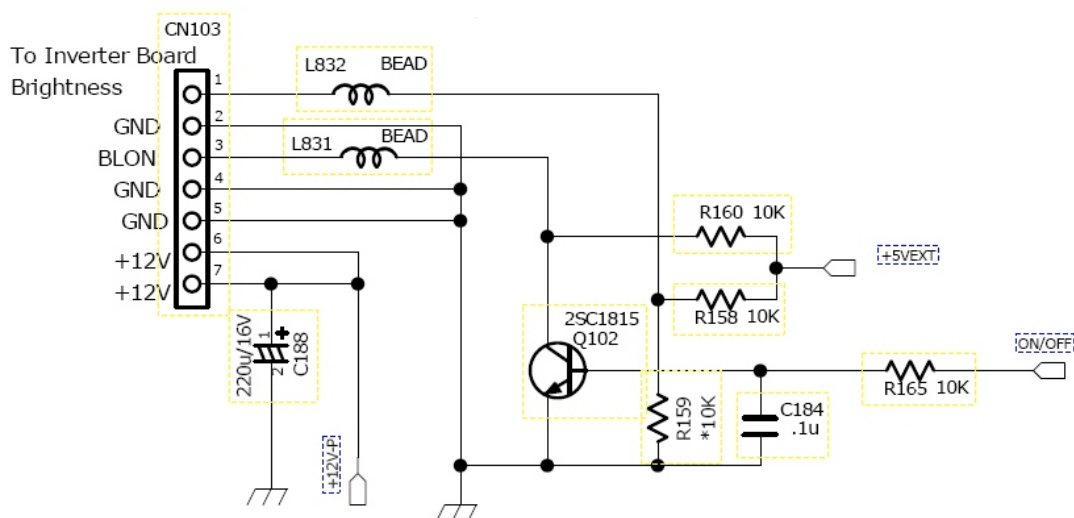


Figure 3.2.4.5 Inverter components control circuit diagram

(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.

6. 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.

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.

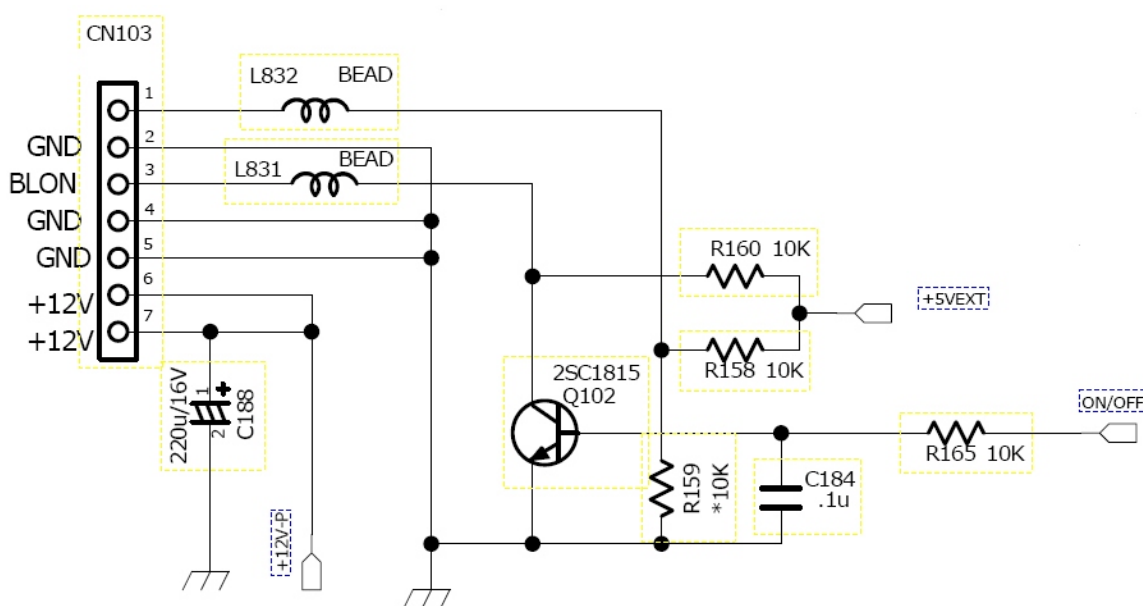


Figure 3.3.1.1 Boost control circuit diagram

[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 Cn505 has +12V voltage. Check CN501 flat cable holder and find that there is DVD5V voltage to video main board, which means DVD5V power circuit is OK. Then check power control circuit and whether U503 pin 4 has 5V voltage. Check U503 pin 1 has +12V voltage, so we doubt that U503 has trouble. Change U503, after inserting U503 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 1, 9 of U101 (Lm4950) and there is waveform input; while output pin 3, 7 have no waveform output. Then test the power supply loop,+12V is also normal, 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 U101, trouble is removed.

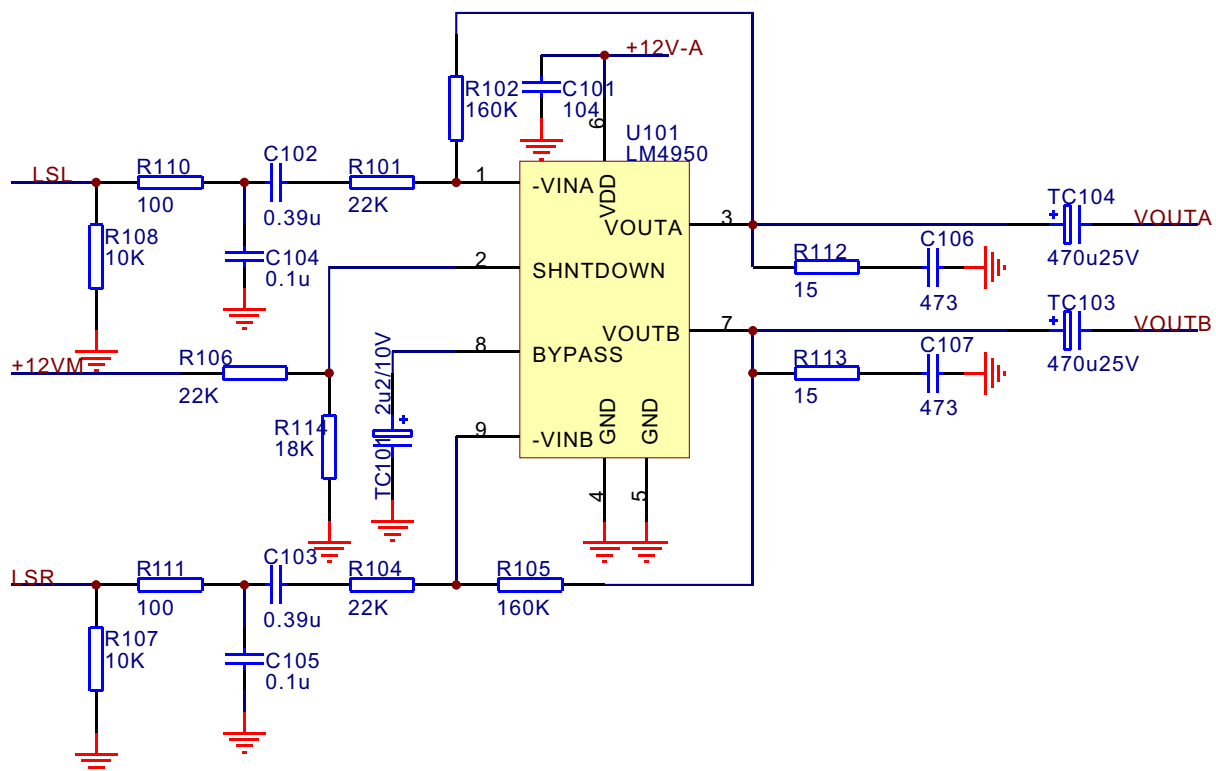


Figure 3.3.1.2 Audio amplifying circuit

[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.

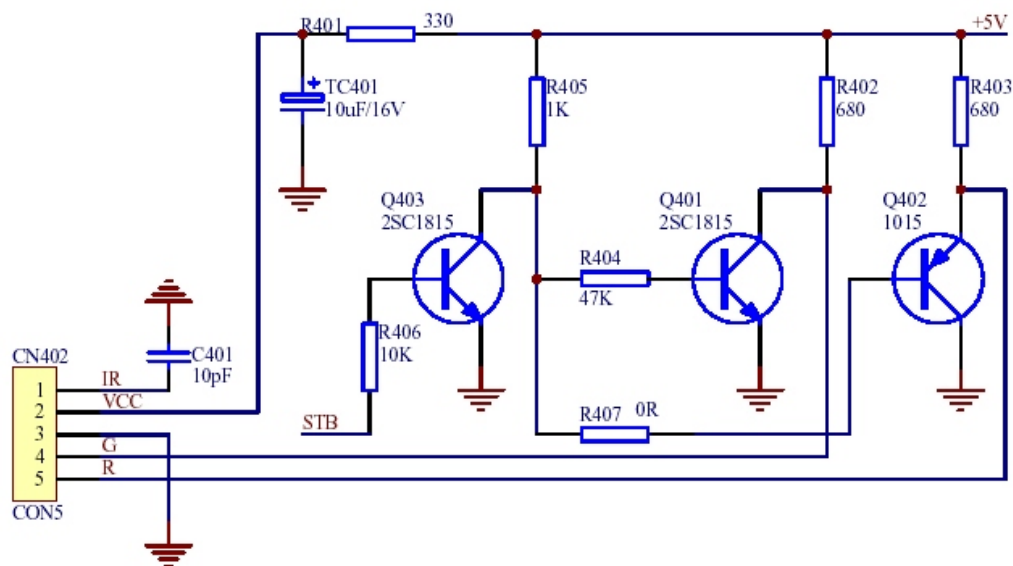


Figure 3.3.1.3 Indicator light control circuit

[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: use POWER button on remote controller or panel to power on and power off in each input mode and you may hear POP sound during the process.

Analysis and troubleshooting: according to servicing experience, when facing this trouble, firstly check mute circuit. As shown in the figure 3.3.1.4, when power on, MUTE signal is low level, which is added in base electrode of triode Q101 to make Q101 cut off, now MUTE end is low level and power-on quieting effect is realized. After machine power on normally, MUTE becomes high level and mute function turns off. When power off, voltage on two ends of TC102 cannot change suddenly, high level is kept to make triode Q102/Q103 connected to make Q101 reliable cutoff to realize mute function and also power-off quieting effect. Now it is the case that noise exists in both power on and power off, so we can judge that their common loop has trouble. After checking, triode Q101 is stricken through. Change the relevant model and trouble disappears.

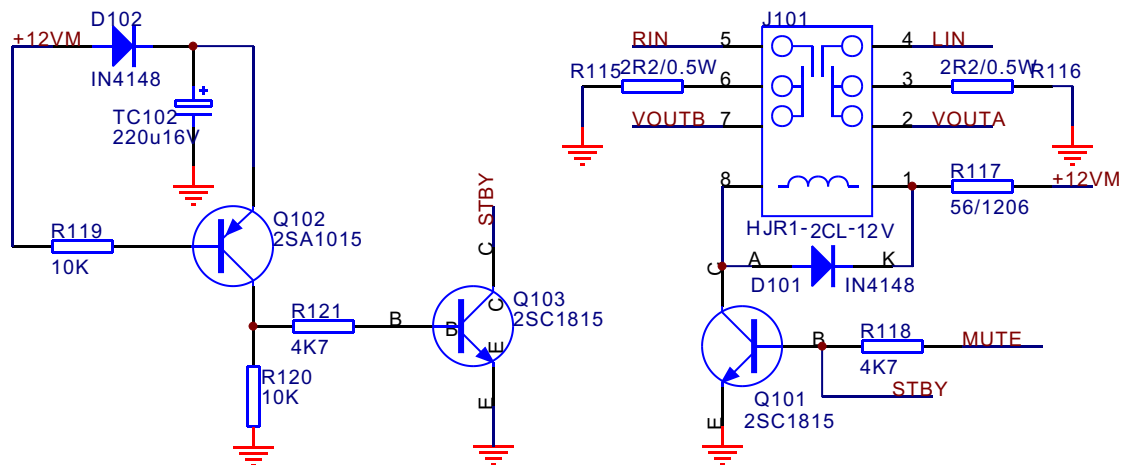


Figure 3.3.1.4 Mute circuit

[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)

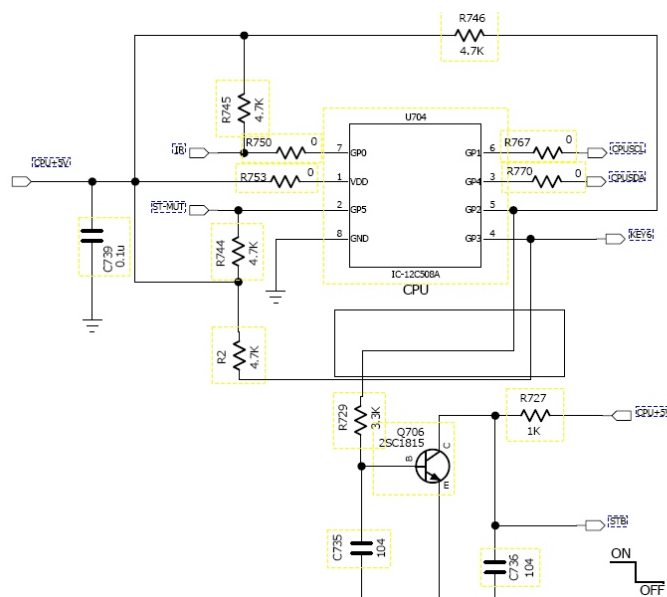


Figure 3.3.1.5 Standby control circuit diagram

[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 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: no sound when tuning

Description: when machine switches in tuning state, there is no sound and also noise. DVD and external input audio are normal.

Analysis and troubleshooting: according to trouble description, we decide trouble lies in tuning circuit. Firstly substitute a tuner and trouble does not disappear. Check tuner power supply circuit and there is no power supply voltage. Test Q705 collector electrode voltage and it is 12V. Test Q705 transmitter electrode voltage and it is 0V. Test Q705 base electrode and it is 10V, so we judge that Q705 has trouble. Change it and 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.

[Example 16] Symptom: white screen

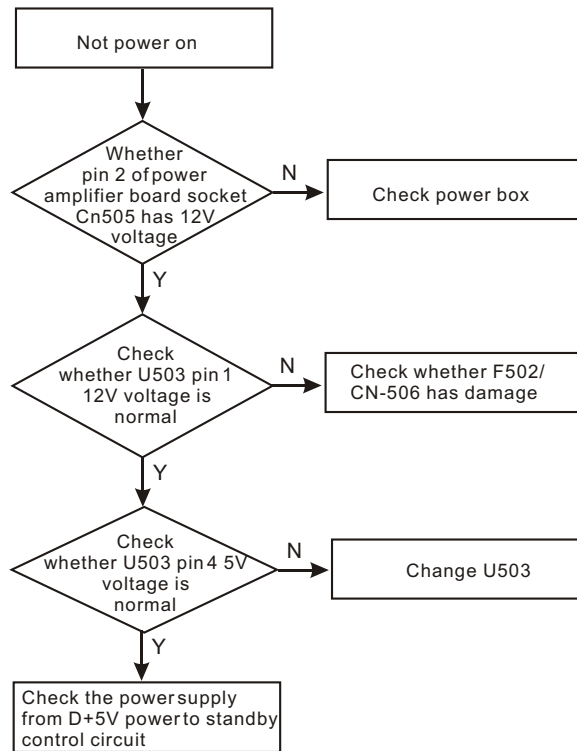
Description: after power on, display back light is on and machine display screen is white.

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.

3.3.2 Troubleshooting flow chart

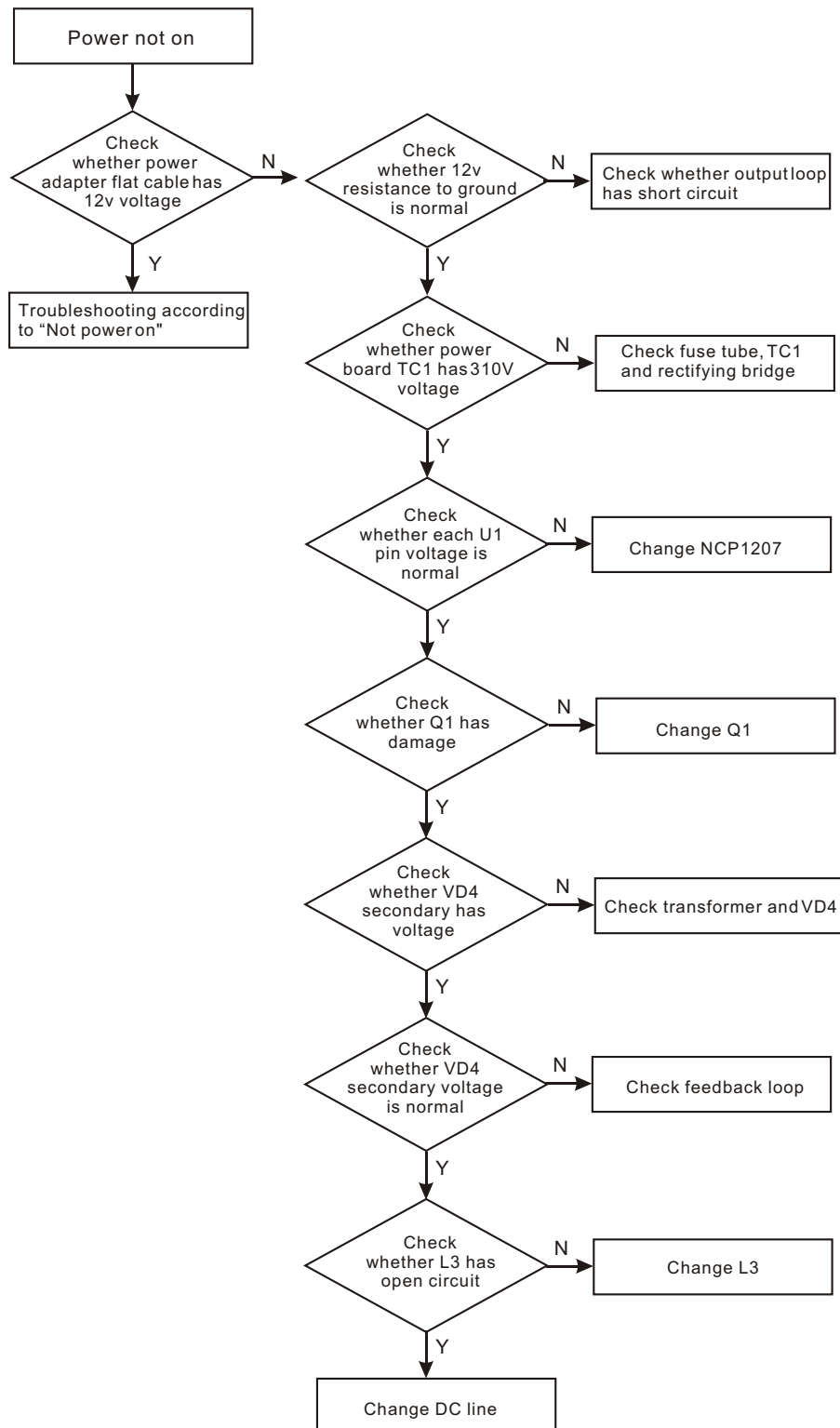
[Flow chart 1] Symptom: Not power on

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



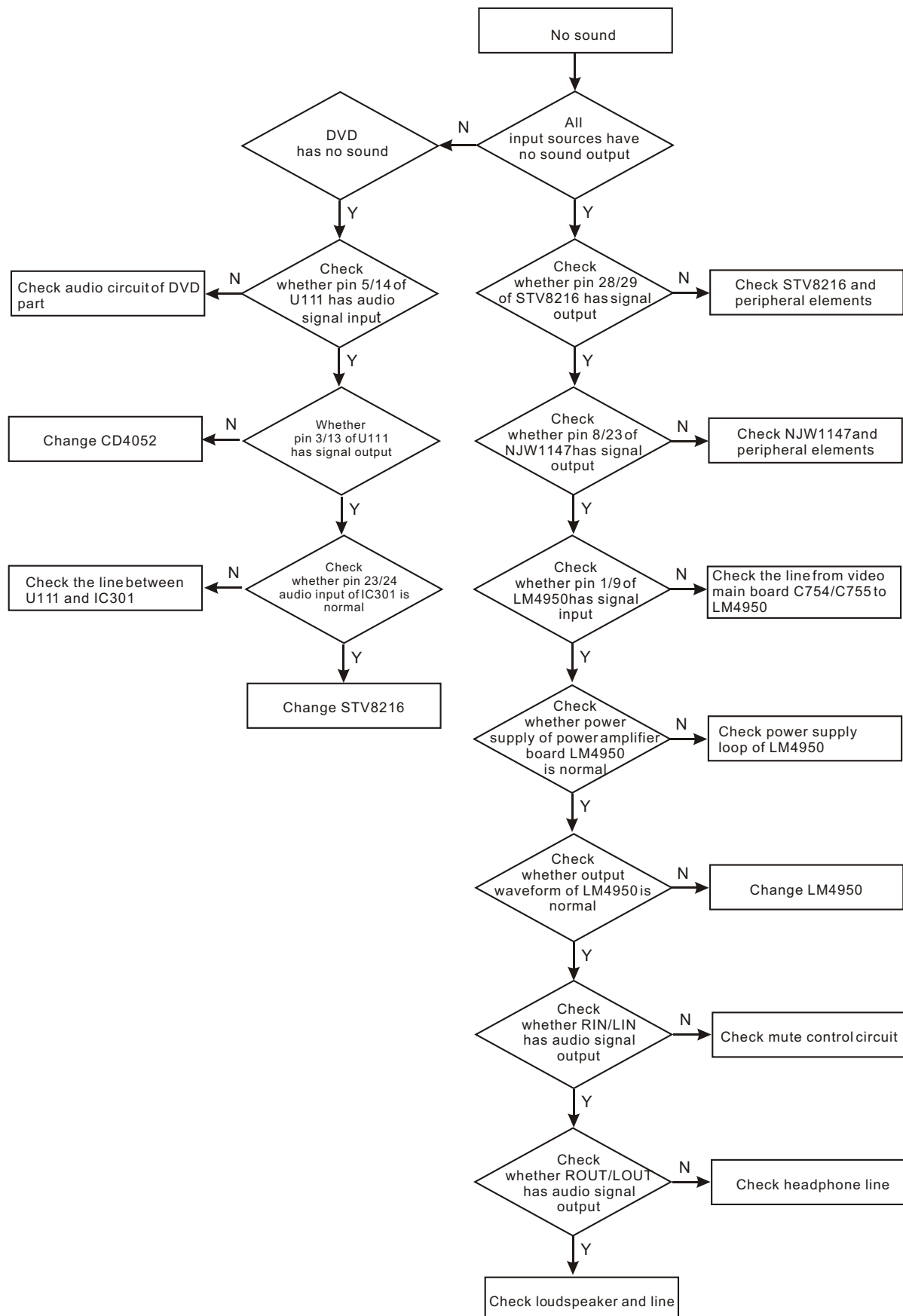
[Flow chart 2] Symptom: power not on

Description: power adapter's power is not on



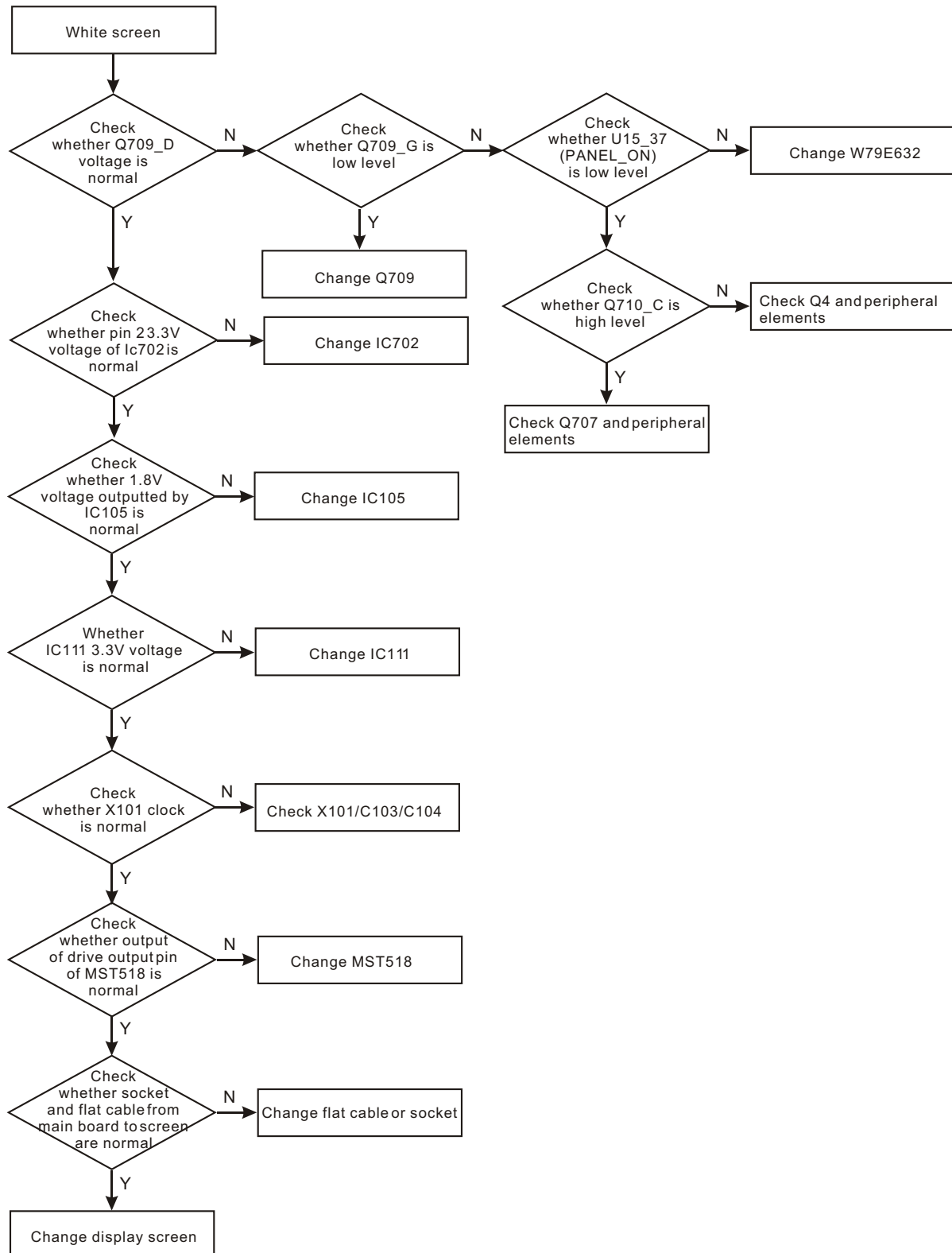
[Flow chart 3] Symptom: no sound

Description: there is image, but no audio output (LT1507S)



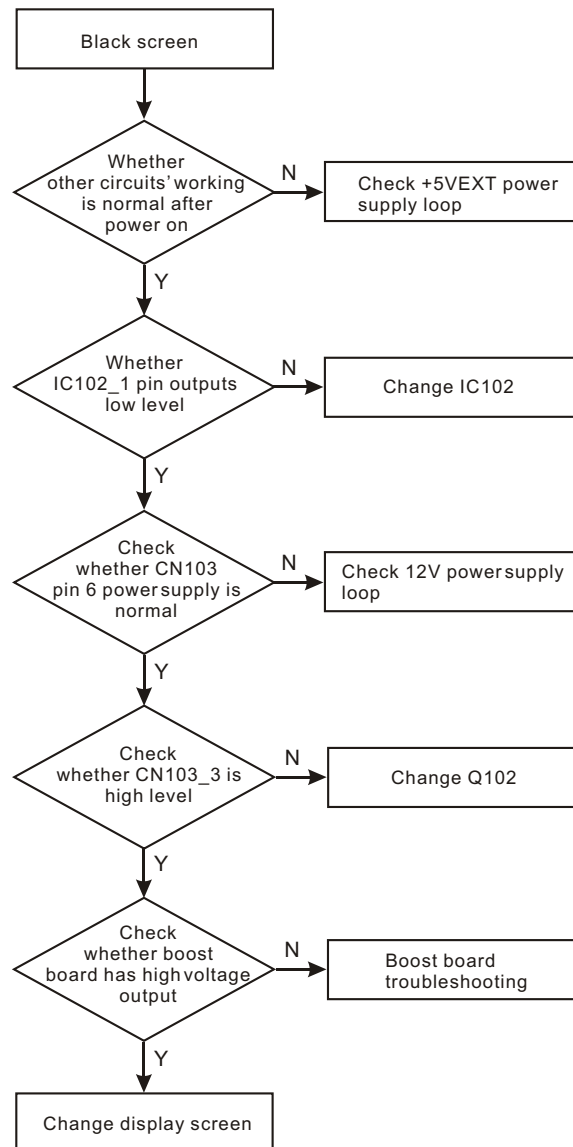
[Flow chart 4] Symptom: white screen

Description: screen is white and indicator light is on



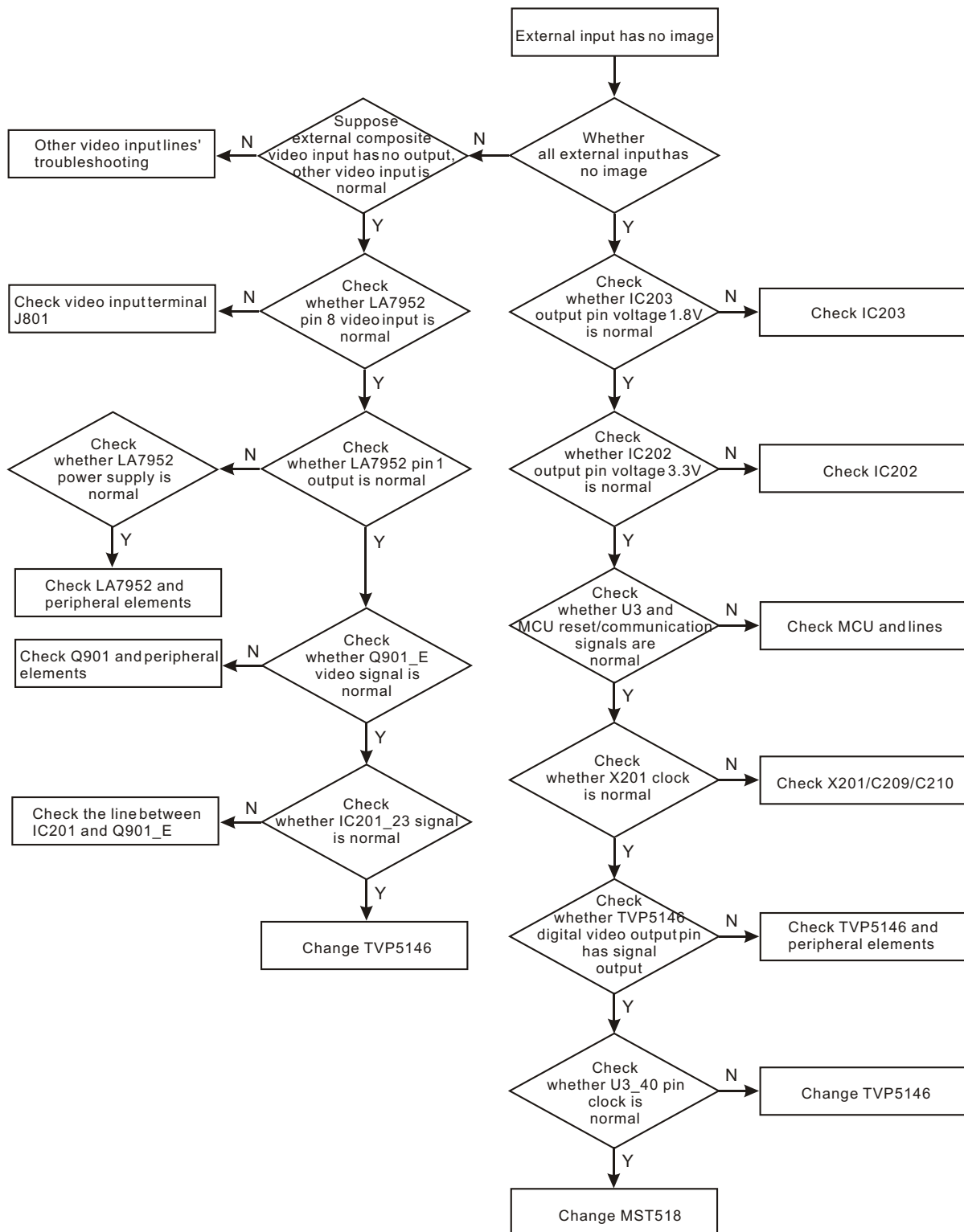
[Flow chart 5] Symptom: black screen

Description: display screen is black and indicator light is normal



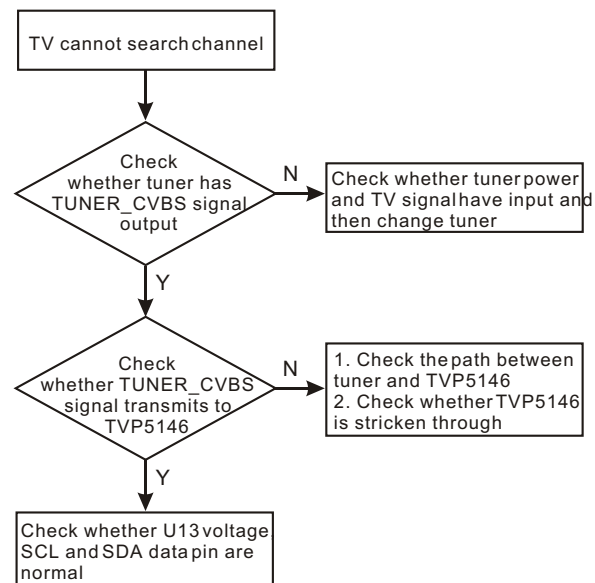
[Flow chart 6] Symptom: external input has no image

Description: external input has no image, but has sound



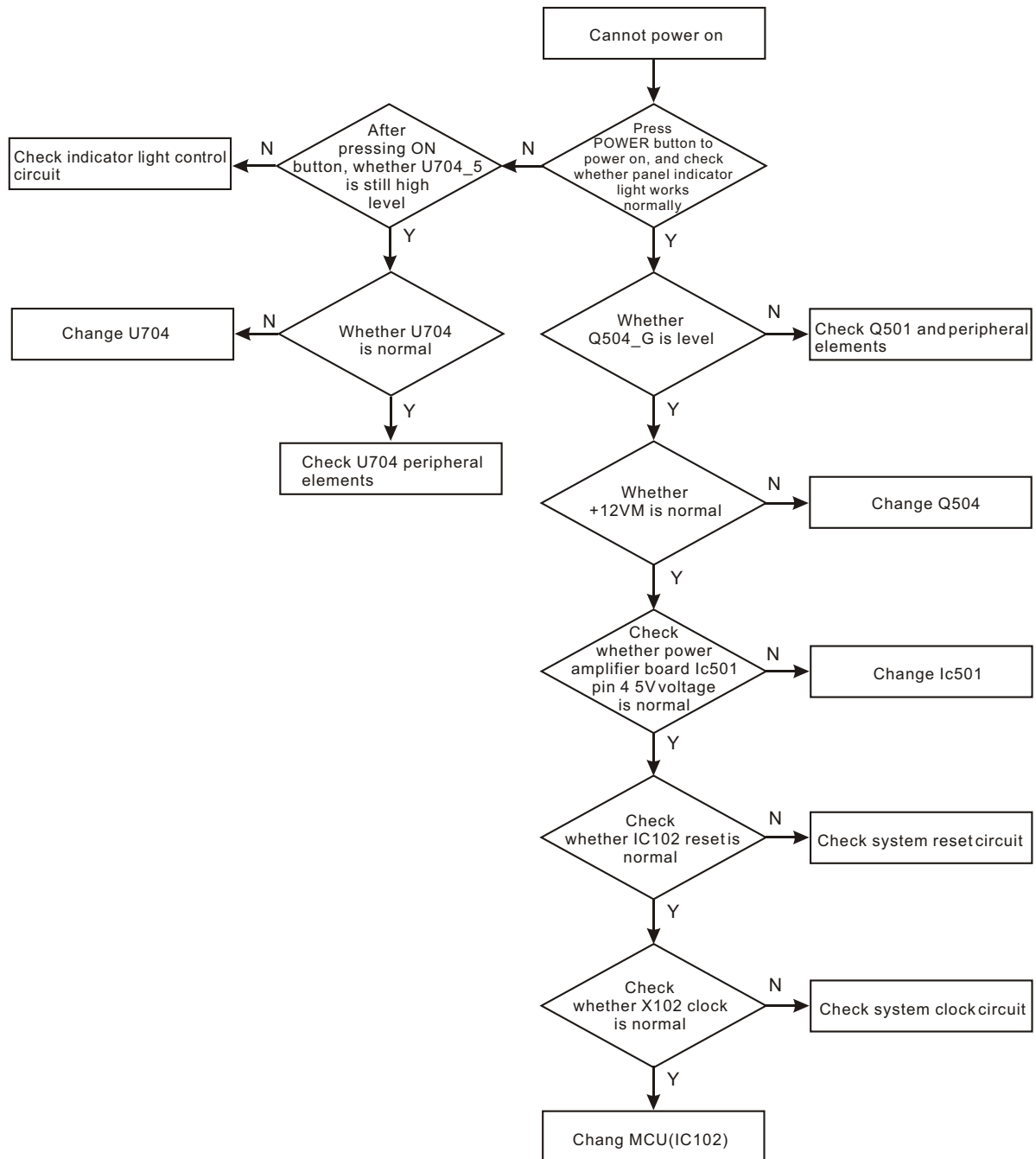
[Flow chart 7] Symptom: TV cannot search channel

Description: cannot search any channel



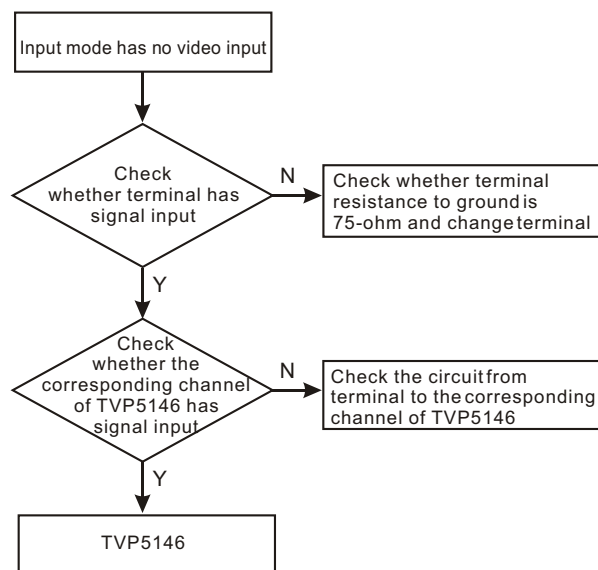
[Flow chart 8] Symptom: cannot power on

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



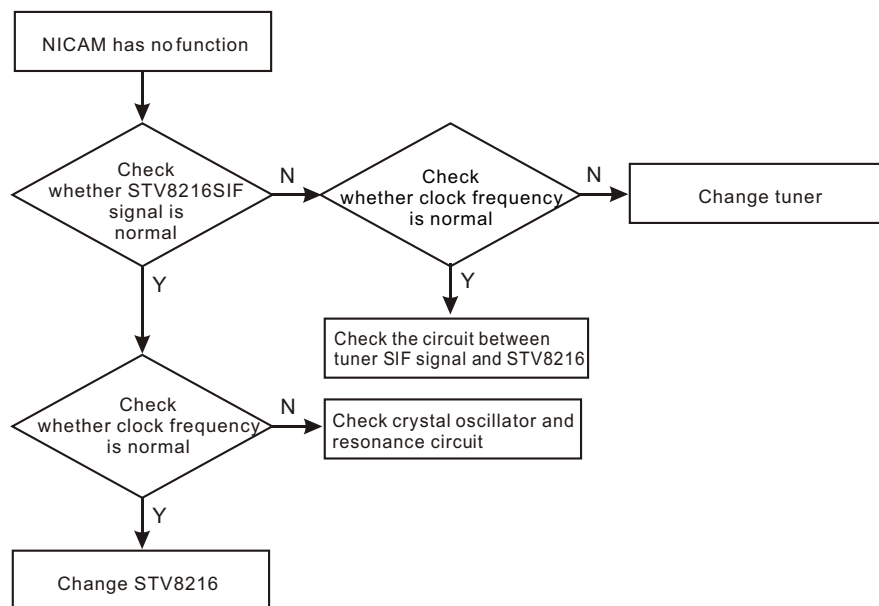
[Flow chart 9] Symptom: input mode has no video input

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



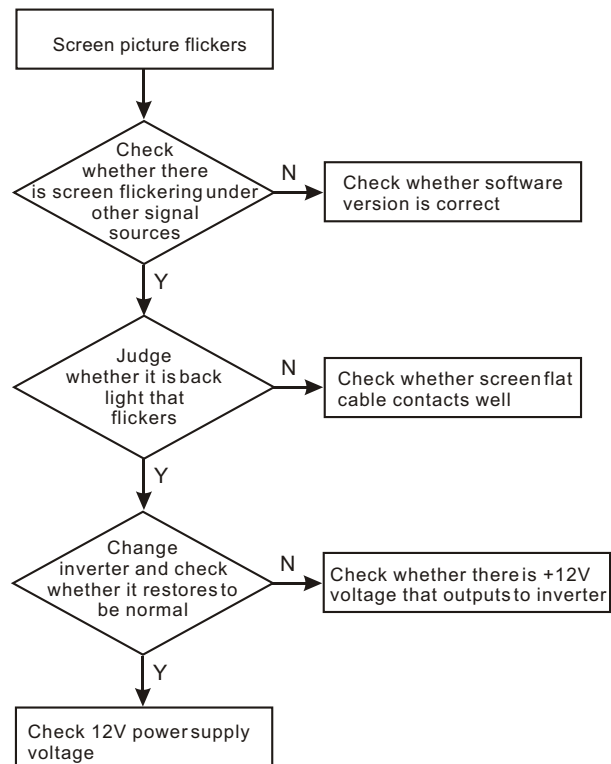
[Flow chart 10] Symptom: NICAM has no function

Description: NICAM function cannot be realized



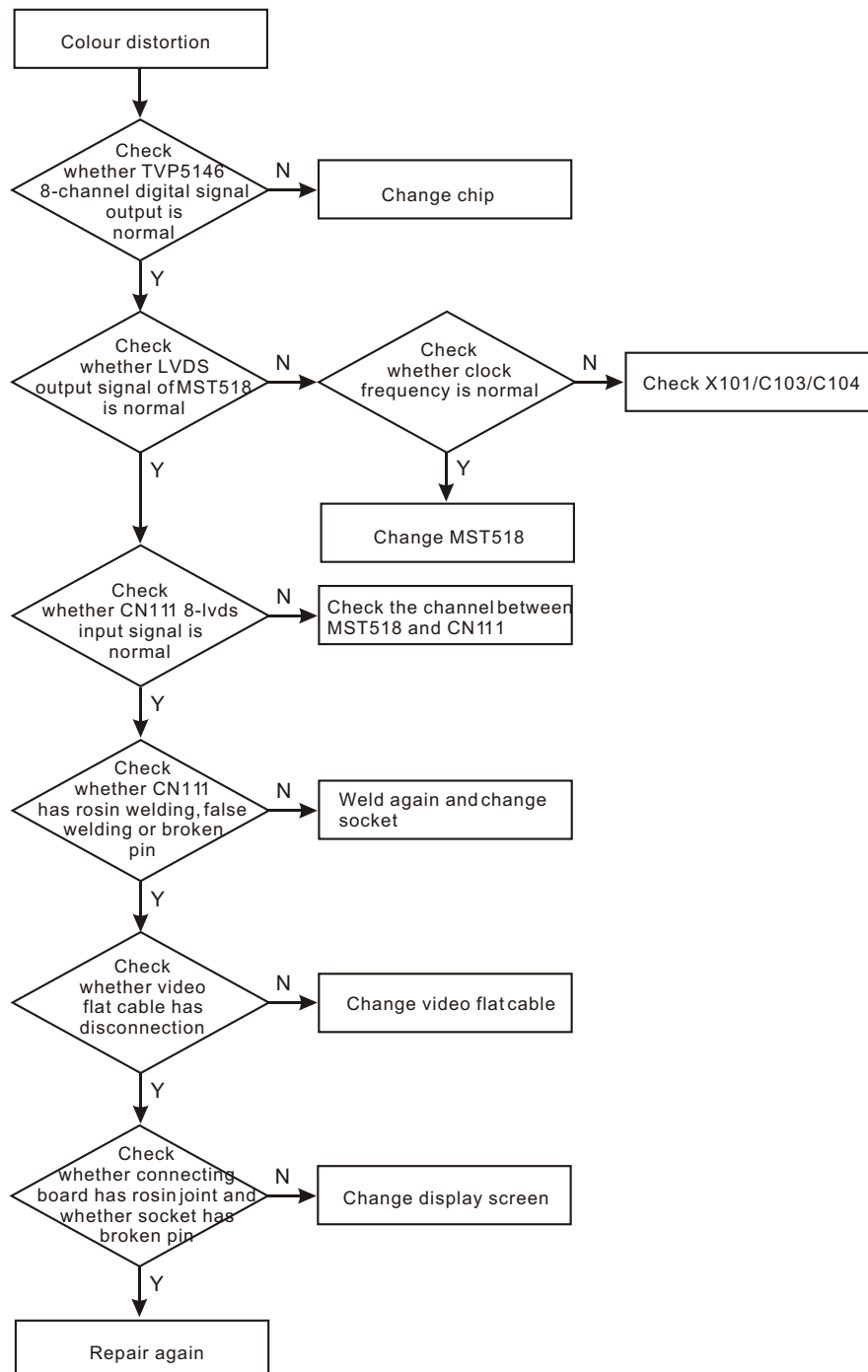
[Flow chart 11] Symptom: screen picture flickers

Description: screen picture flickers and sound is normal



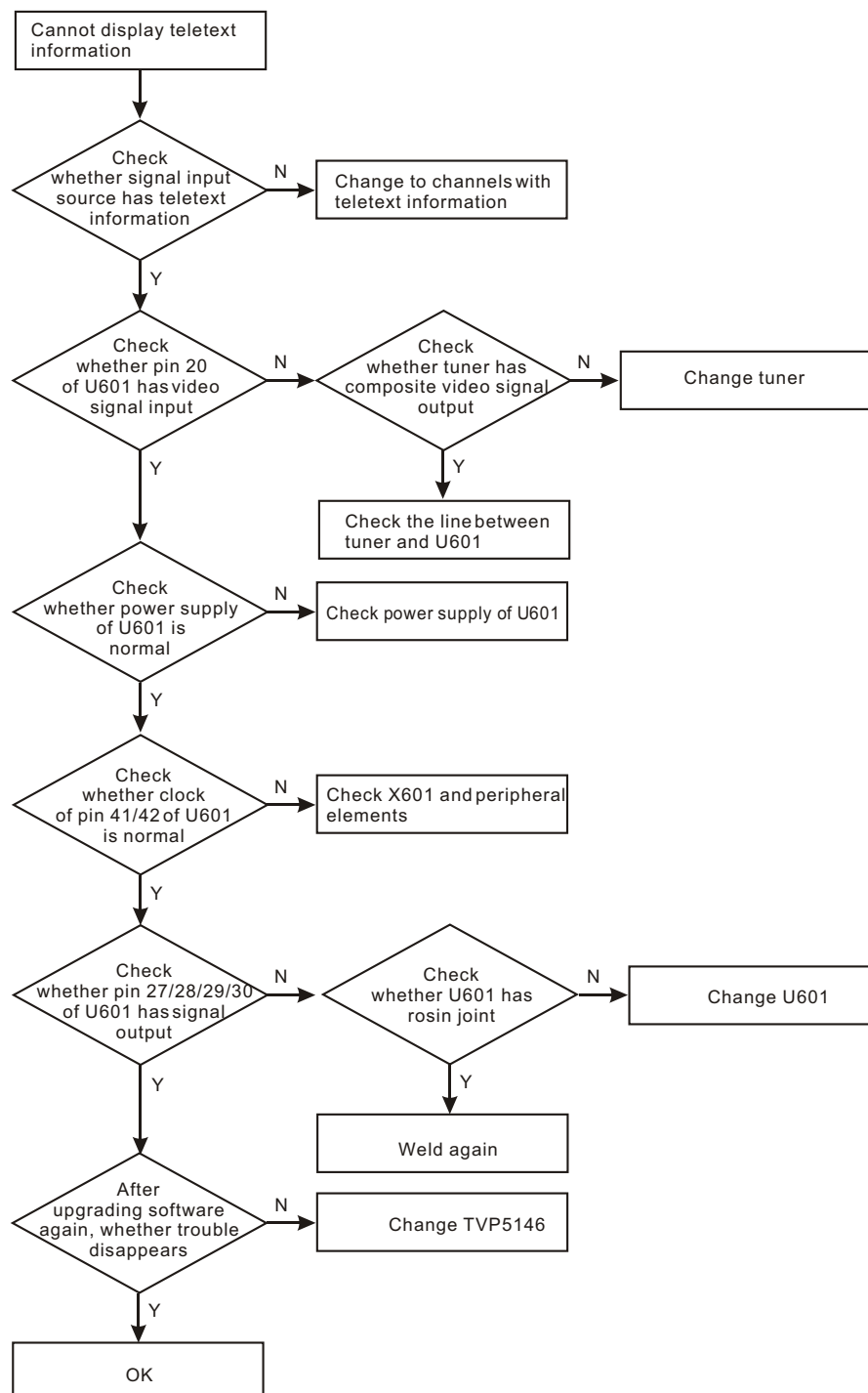
[Flow chart 12] Symptom: colour distortion

Description: picture colour has distortion



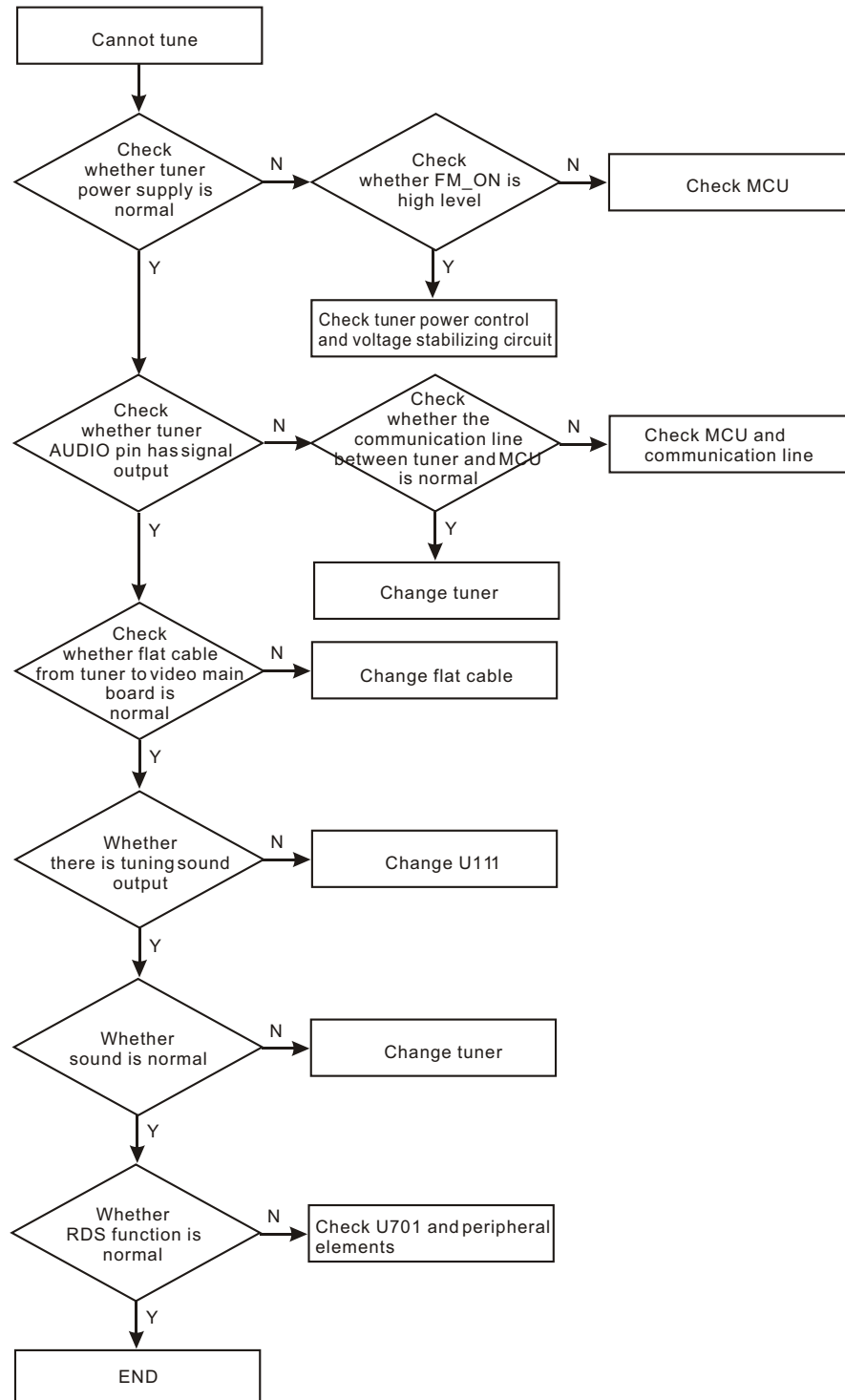
[Flow chart 13] Symptom: teletext cannot display

Description: teletext cannot display



[Flow chart 14] Symptom: cannot tune

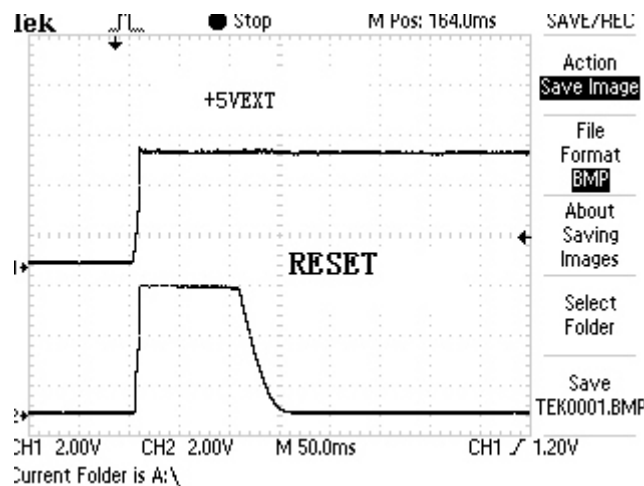
Description: after machine switches into tuning mode, no tuning function and external input audio is normal.



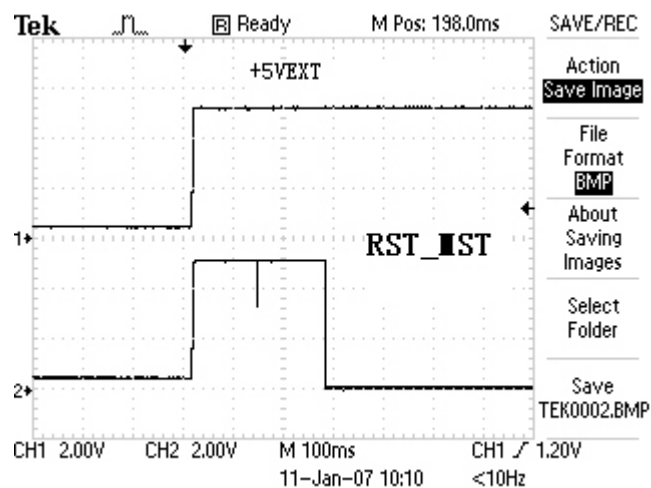
Section Four Waveform diagram

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.

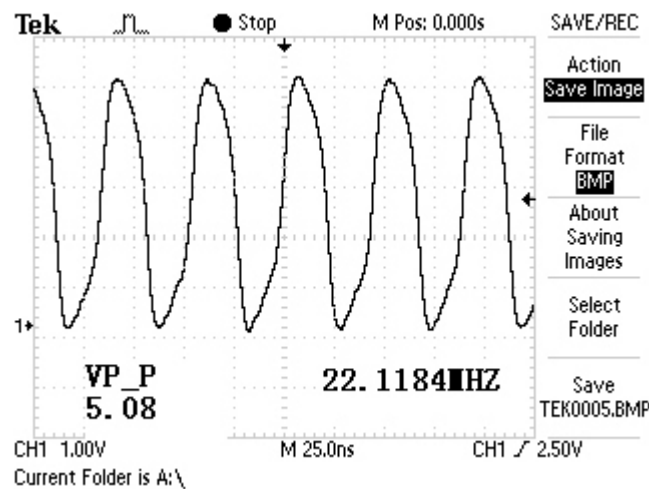
1. System reset signal waveform diagram: waveform comparison diagram for +5EXT and system reset pin during the course of power on.



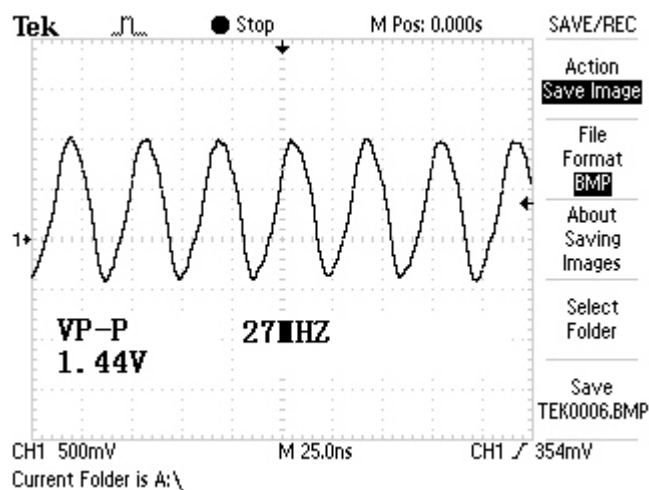
2. MST518 reset waveform diagram: waveform comparison diagram for :5VEXT and MST518 during the course of power on.



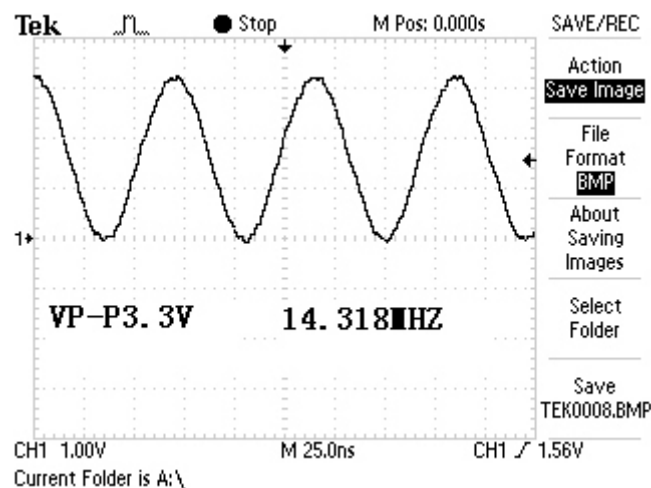
3. System clock waveform diagram: waveform diagram when :X102 is working (frequency 22.1184MHZ)



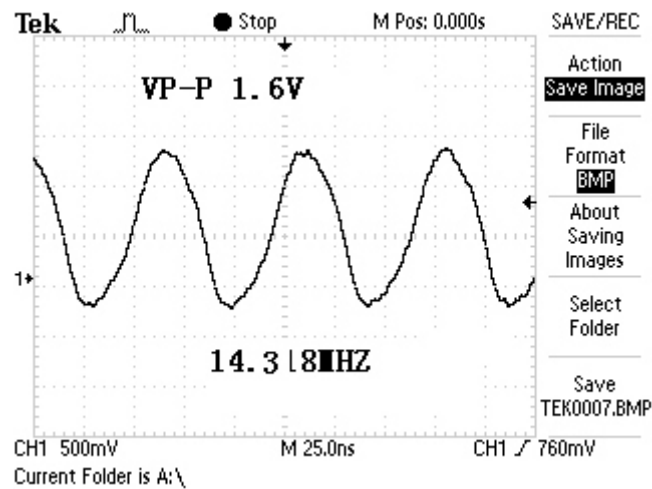
4. NICAM processing circuit clock signal waveform diagram: waveform diagram when :X301 is working (frequency 27MHZ)



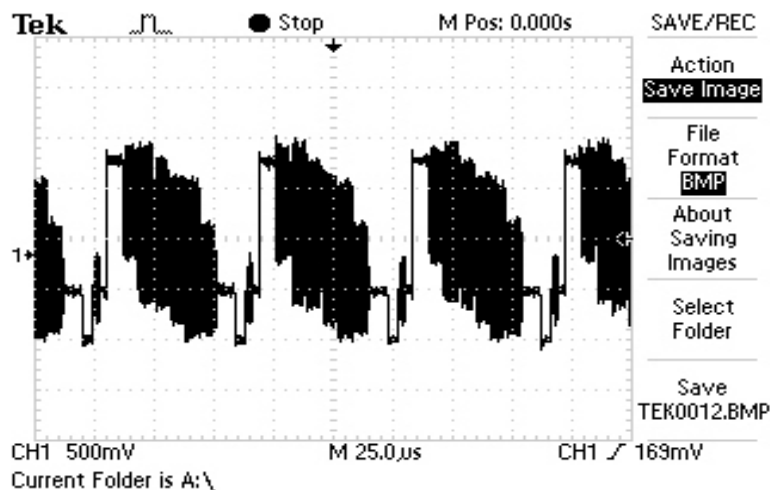
5. TVP5147 clock signal waveform diagram: waveform diagram when X201 is working frequency 14.318MHZ)



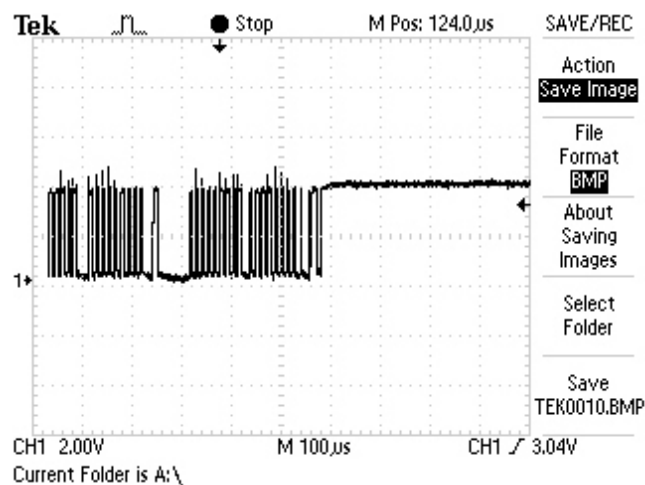
6. MST518 clock signal waveform diagram: waveform diagram when X101 is working (frequency 14.318MHZ)



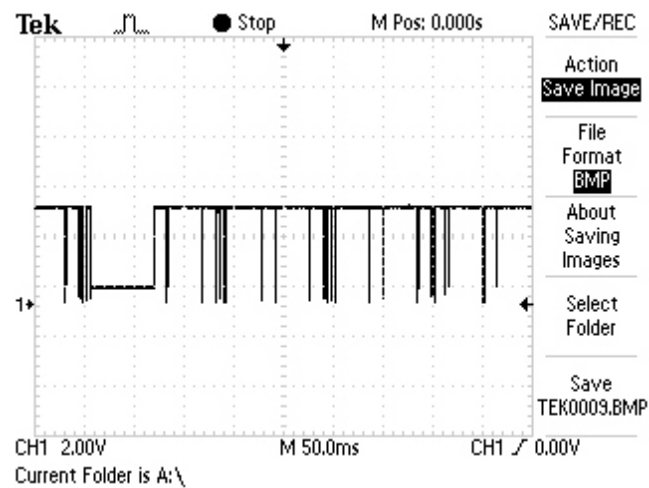
7. TVP5146_23: video signal waveform diagram for TVP5146_23 pin when machine is receiving standard signal source in TV mode.



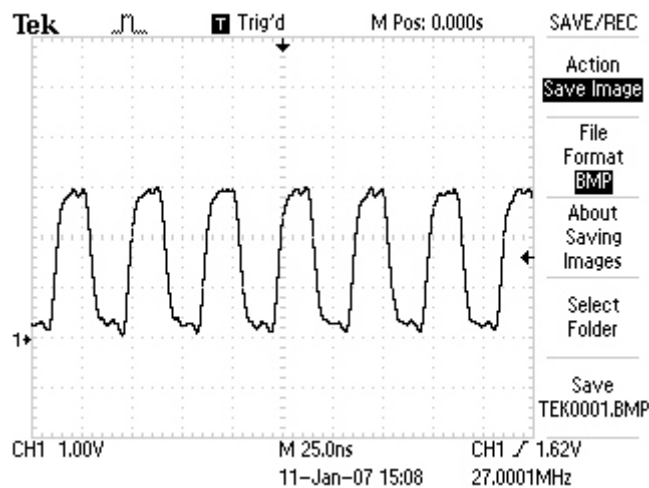
8. IC102_8: waveform diagram of SCL in IIC bus



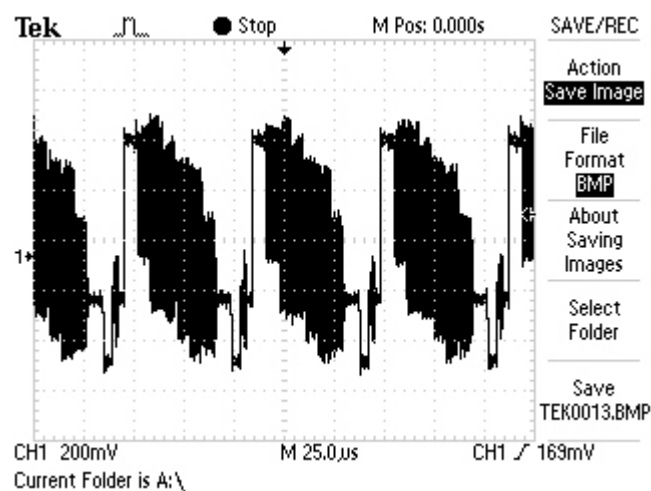
9. IC102_7: waveform diagram of SDA in IIC bus



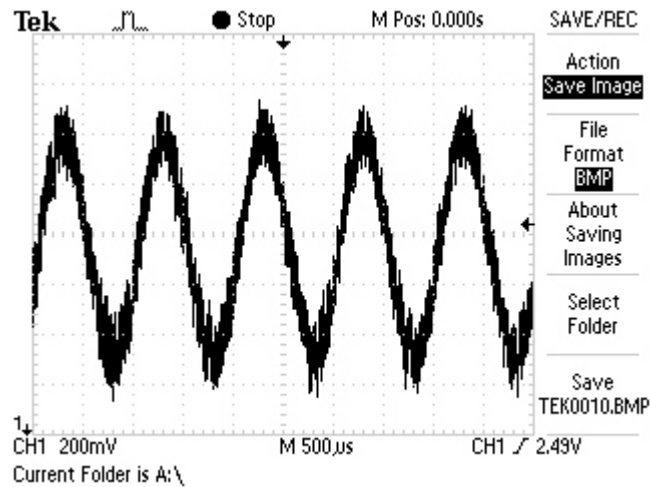
10. TVP5146_40: waveform diagram when TVP5146_40 pin outputs clock signal to MST518 (frequency 27MHZ)



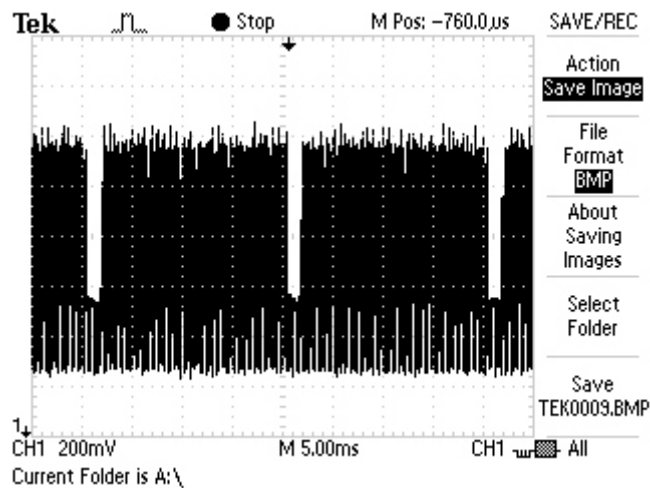
11. TV video signal waveform diagram: waveform diagram for video signals outputted by U901_1 pin when machine is receiving standard signal source in TV mode. :



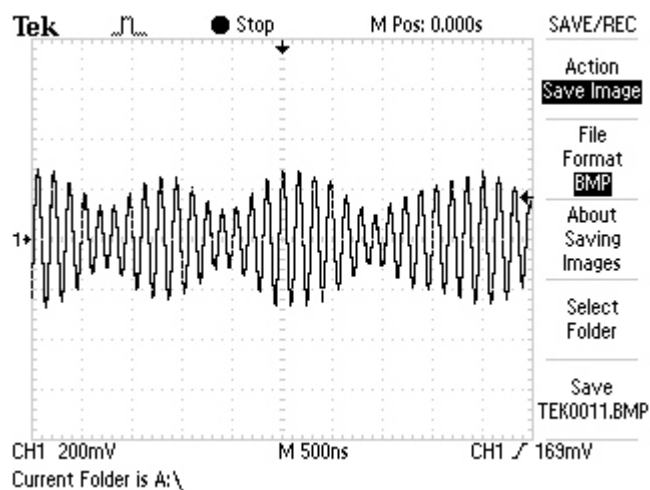
12. U001_14: waveform diagram for audio output pin of tuner when machine is receiving standard signal source in TV mode.



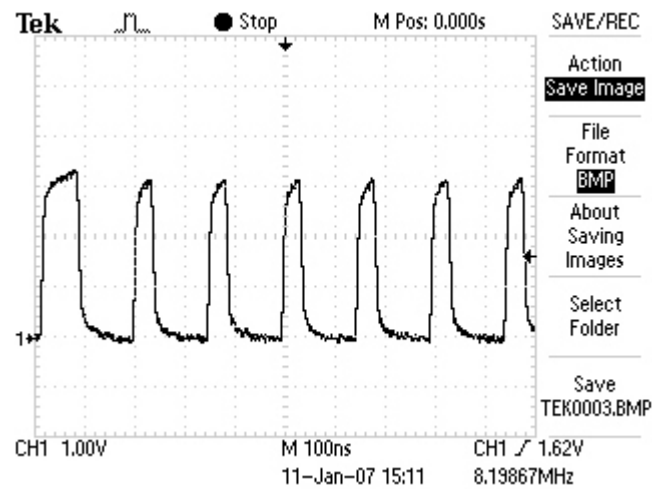
13. U001_12: waveform diagram for video signals outputted by pin 12 of tuner when machine is receiving TV signal in TV mode.



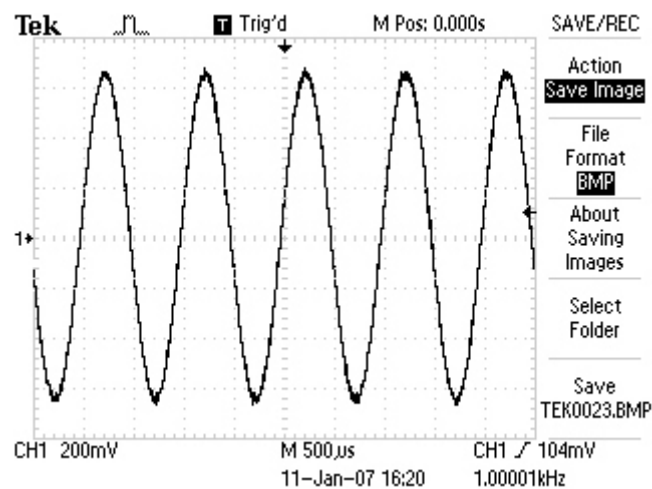
14. U001_11: output waveform diagram of NICAM output pin



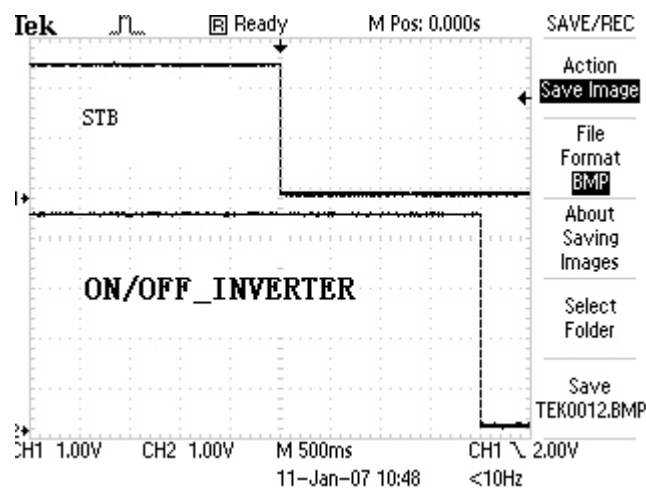
15. Digital video waveform diagram: waveform diagram for digital video signals outputted by TVP5146 (test point RP201)



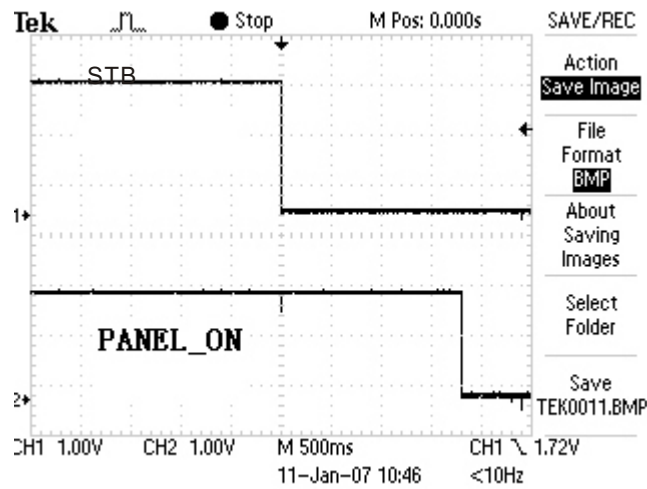
16. VOUTA: audio output waveform (test point POWER BOARD U101_3)



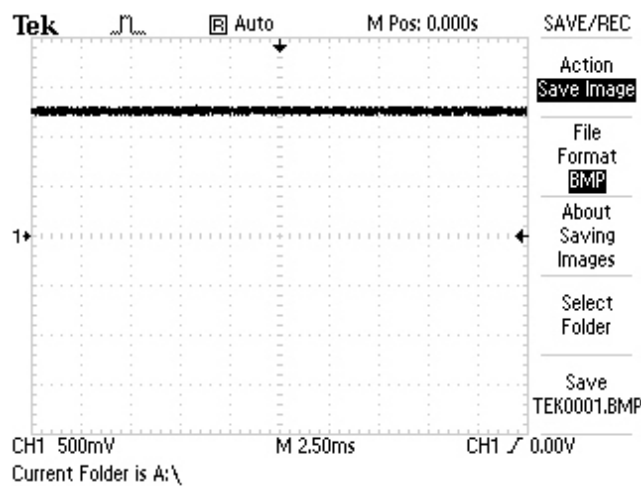
17. INVERTER: waveform comparison diagram for STB and ON/OFF_INVERTER signal when machine enters from standby to power-on



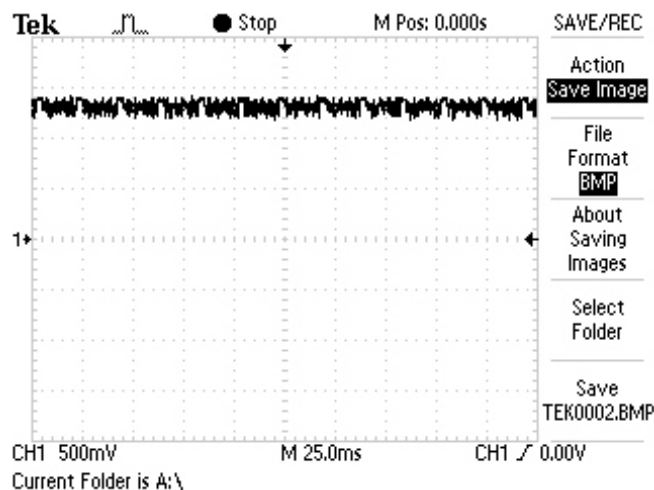
18. PANEL_ON: waveform comparison diagram for STB and PANEL_ON signal when machine enters from standby to power-on.



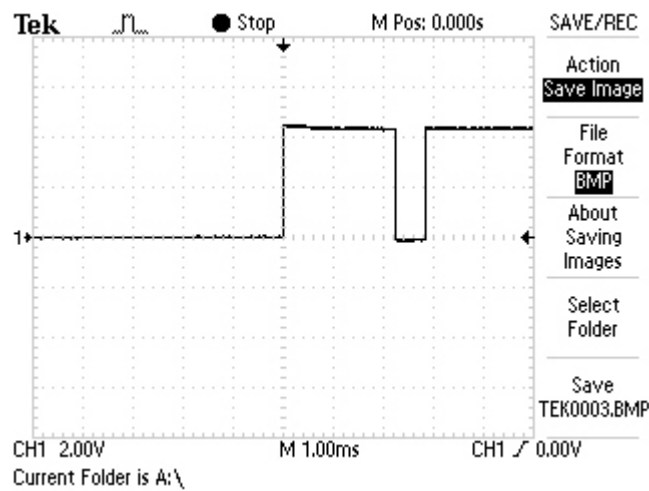
19. LVDS output clock signal waveform diagram (test point: pin 131 of MST518VA)



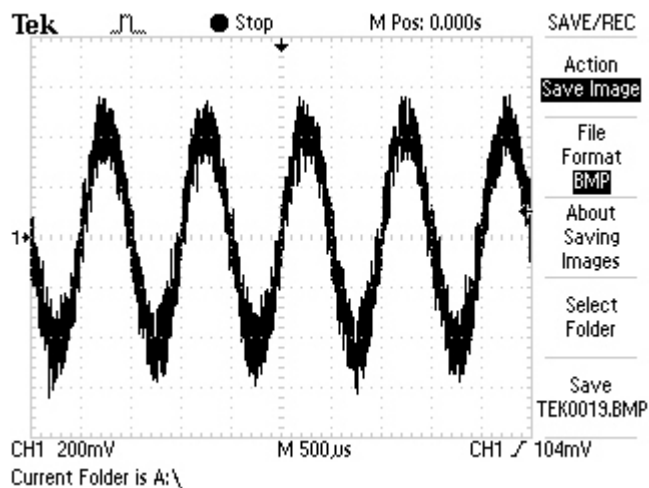
20. LVDS output data signal waveform diagram (test point: pin 138 of MST518VA)



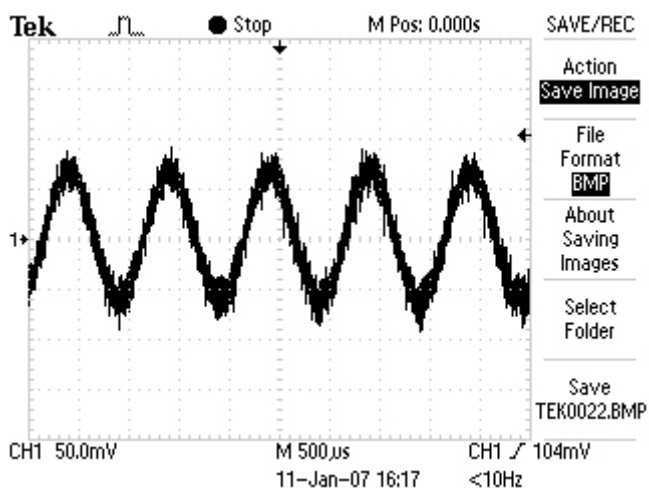
21. Waveform diagram when IR pin of remote controller is receiving remote control signals (button board CN401_2 or video main board Q106_E)



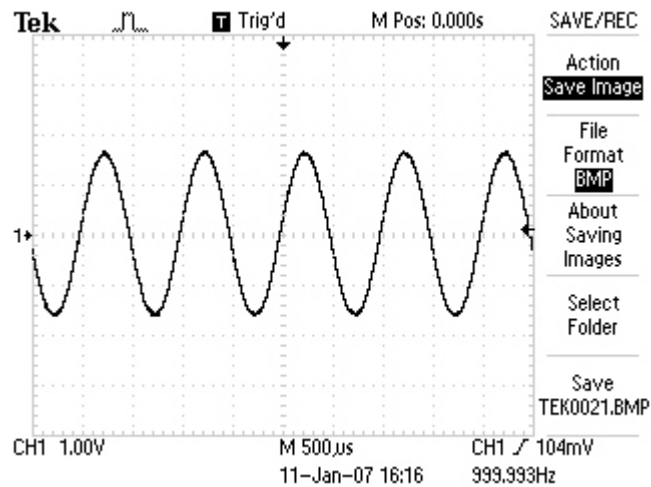
22. 8216_78: waveform diagram for audio signals from tuner when machine is receiving standard signal source in TV mode. (Test point: STV8216_78)



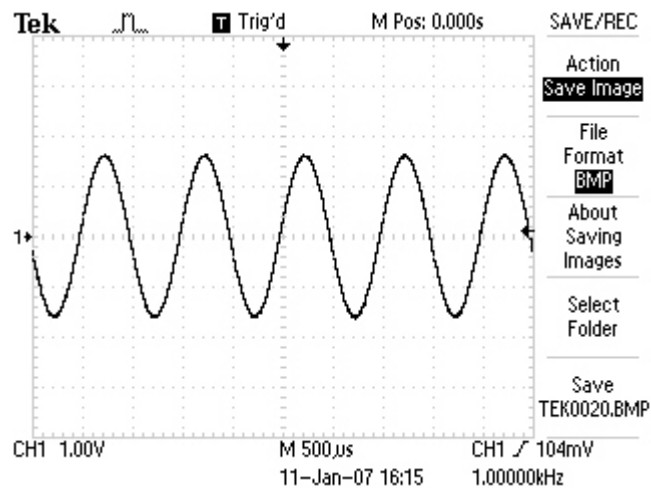
23. 8216_28: waveform diagram after the audio signals from tuner are processed by STV8216 and then output from pin 28/29 when machine is receiving standard signal source in TV mode.



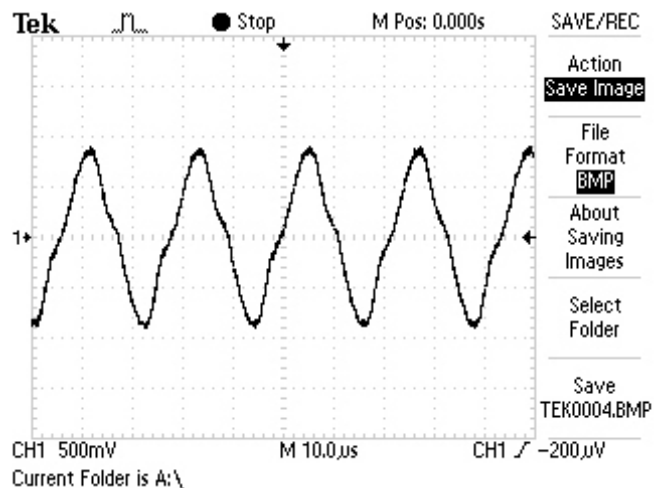
24. 8216_18: waveform diagram after audio signals from tuner are processed by STV8216 and output from pin 18/19 when machine is receiving standard signal source in TV mode.



25. 8216_1: waveform diagram after audio signals from tuner are processed by STV8216 and output from pin 1 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 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 MOVX 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.

3.5.4 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_2_x: Analog video input for CVBS/Y/G VI_3_x: Analog video input for CVBS/Pr/R/C VI_4_A: Analog video input for CVBS/Y Up to ten composite, 4 S-video and two composite or three component video 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_1_B	1		
VI_1_C	2		
VI_2_A	7		
VI_2_B	8		
VI_2_C	9		
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	79 10 15 24	I	Analog 1.8V return.

CH4_A18GND			
CH1_A18VDD	78 11 14 25	I	Analog power. Connect to 1.8V.
CH2_A18VDD			
CH3_A18VDD			
CH4_A18VDD			
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

3.5.5 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.

3.5.6 function introduction to LM4950 TO-263

1. Description

The LM4950 is a dual audio power amplifier primarily designed for demanding applications in flat panel monitors and TV's. It is capable of delivering 3.1 watts per channel to a 4 single-ended load with less than 1% THD+N or 7.5 watts mono BTL to an 8 Ω load, with less than 10% THD+N from a 12VDC power supply.

Boomer audio power amplifiers were designed specifically to provide high quality output power with a minimal amount of external components. The LM4950 does not require bootstrap capacitors or snubber circuits. Therefore, it is ideally suited for display applications requiring high power and minimal size.

The LM4950 features a low-power consumption active-low shutdown mode. Additionally, the LM4950 features an internal thermal shutdown protection mechanism along with short circuit protection.

The LM4950 contains advanced pop & click circuitry that eliminates noises which would otherwise occur during turn-on and turn-off transitions.

The LM4950 is a unity-gain stable and can be configured by external gain-setting resistors.

2. Features

Pop & click circuitry eliminates noise during turn-on and turn-off transitions

Low current, active-low shutdown mode

Low quiescent current

Stereo 3.1W output, $R_L = 4\Omega$

Mono 7.5W BTL output, $R_L = 8\Omega$

Short circuit protection

Unity-gain stable

External gain configuration capability

3. Pin Definitions

Pin	Symbol	Function
1	VINA	Audio input channel A
2	SHUTDOWN	SHUTDOWN CONTROL
3	VOUTA	Audio output channel A
4	GND	GND
5	GND	GND
6	VDD	power
7	VOUTB	Audio output channel B
8	BYPASS	BYPASS
9	VINB	Audio input channel B

3.5.7 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

3.5.8 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. Feature

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.

3.5.9 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, 125 Ω (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, $r_{ON} = 5\Omega$ (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

3.5.10 function introduction to SAA6588

1. DESCRIPTION

Today most FM radio stations in Europe and meanwhile also many FM/AM radio broadcasting stations in the USA transmit the inaudible European RDS (Radio Data System) or the USA RBDS (Radio Broadcast Data System) informations respectively. Likewise nowadays receivers, most car radios and also some home and portable radios on the market include at least some of the RDS features.

The RDS/RBDS system offers a large range of applications by its many functions to be implemented. For car radios the most important are: Program Service (PS) name. Traffic Program (TP) identification. Traffic Announcement (TA) signal. Alternative Frequency (AF) list. Program Identification (PI). Enhanced Other Networks (EON) information.

2. FEATURES

- # Integrated switched capacitor filters
- # Demodulation of the European Radio Data System
- # (RDS) or the USA Radio Broadcast Data System(RBDS) signal
- # RDS and RBDS block detection
- # Error detection and correction
- # Fast block synchronization
- # Synchronization control (flywheel)
- # Mode control for RDS/RBDS processing
- # Different RDS/RBDS block information output modes(e.g. A-block output mode)
- # Fast I²C-bus interface
- # Multi-path detector
- # Signal quality detector with sensitivity adjustment
- # Pause detector with pause level and time adjustment
- # Alternatively oscillator frequency: $n \times 4.332 \text{ MHz}$ ($n = 1 \text{ to } 4$)
- # UART compatible with 17.328 MHz ($n = 4$)
- # CMOS device

3. Pin Definitions

SYMBOL	PIN	DESCRIPTION	SYMBOL	PIN	DESCRIPTION
MRO	1	multi-path rectifier output	PSWN	11	pause switch output (active LOW)
MPTH	2	multi-path detector output	MAD	12	slave address (LSB) input
TCON	3	test control input pin	AFIN	13	audio signal input
OSCO	4	oscillator output	VDDA	14	analog supply voltage (5 V)
OSCI	5	oscillator input	VSSA	15	analog ground (0 V)
VSSD	6	digital ground (0 V)	MPX	16	multiplex input signal
VDDD	7	digital supply voltage (5 V)	Vref	17	reference voltage output
DAVN	8	data available output (active LOW)	SCOUT	18	band-pass filter output
SDA	9	I2C-bus serial data I/O	CIN	19	comparator input
SCL	10	I2C-bus serial clock input	LVIN	20	level input

3.5.11 function introduction to PI5V330

1. Description

Pericom Semiconductor's PI5V series of mixed signal video circuits are produced in the Company's advanced CMOS low-power technology, achieving industry leading performance.

The PI5V330 is a true bidirectional Quad 2-channel multiplexer/de multiplexer that is recommended for both RGB and composite video switching applications. The Video Switch™ can be driven from a current output RAMDAC or voltage output composite video source. Low ON-resistance and wide bandwidth make it ideal for video and other applications. Also this device has exceptionally high current capability which is far greater than most analog switches offered today. A single 5V supply is all that is required for operation. The PI5V330 offers a high-performance, low-cost solution to switch between video sources. The application section describes the PI5V330 replacing the HC4053 multiplier and buffer/amplifier.

2. Features

- # High-performance, low-cost solution to switch between video sources
- # Wide bandwidth: 200 MHz
- # Low ON-resistance: 3?
- # Low crosstalk at 10 MHz: -58 dB
- # Ultra-low quiescent power (0.1 μ A typical)
- # Single supply operation: +5.0V
- # Fast switching: 10 ns
- # High-current output: 100 mA
- # Packages available:

- 16-pin 300-mil wide plastic SOIC (S)
- 16-pin 150-mil wide plastic SOIC (W)
- 16-pin 150-mil wide plastic QSOP (Q)

3. Pin Product

Pin Name	Description	Pin Name	Description	Pin Name	Description
S1A, S2A	Analog Video I/O	IN	Select Input	DC, DD	
S1B, S2B		EN	Enable	GND	Ground
S1C, S2C		DA, DB,	Analog Video I/O	VCC	Power
S1D, S2D					

4. Truth Table

EN	IN	ON Switch
0	0	S1A, S1B, S1C, S1D
0	1	S2A, S2B, S2C, S2D
1	X	Disabled

3.5.12 function introduction to FM3164

1. Description

The FM31xxx is a family of integrated devices that includes the most commonly needed functions for processor-based systems. Major features include nonvolatile memory available in various sizes, real time clock, low-VDD reset, watchdog timer, nonvolatile event counter, lockable 64-bit serial number area, and general purpose comparator that can be used for an early power-fail (NMI) interrupt or other purpose. The family operates from 2.7 to 5.5V. Each FM31xxx provides nonvolatile RAM available in sizes including 4Kb, 16Kb, 64Kb, and 256Kb versions. Fast write speed and unlimited endurance allow the memory to serve as extra RAM or conventional nonvolatile storage. This memory is truly nonvolatile rather than battery backed.

The real-time clock (RTC) provides time and date information in BCD format. It can be permanently powered from external backup voltage source, either a battery or a capacitor. The timekeeper uses a common external 32.768 kHz crystal and provides a calibration mode that allows software adjustment of timekeeping accuracy.

The processor companion includes commonly needed CPU support functions. Supervisory functions include a reset output signal controlled by either a low VDD condition or a watchdog timeout. /RST goes active when VDD drops below a programmable threshold and remains active for 100 ms after VDD rises above the trip point. A programmable watchdog timer runs from 100 ms to 3 seconds. The watchdog timer is optional, but if enabled it will assert the reset signal for 100 ms if not restarted by the host before the timeout.

A flag-bit indicates the source of the reset. A general-purpose comparator compares an external input pin to the onboard 1.2V reference. This is useful for generating a power-fail interrupt (NMI) but can be used for any purpose. The family also includes a programmable 64-bit serial number that can be locked making it unalterable. Additionally it offers a dual battery-backed event counter that tracks the number of rising or falling edges detected on dedicated input pins.

2. Features

High Integration Device Replaces Multiple Parts

- Serial Nonvolatile Memory
- Real-time Clock (RTC)
- Low Voltage Reset
- Watchdog Timer
- Early Power-Fail Warning/NMI
- Two 16-bit Event Counters
- Serial Number with Write-lock for Security

Ferroelectric Nonvolatile RAM

- 4Kb, 16Kb, 64Kb, and 256Kb versions
- Unlimited Read/Write Endurance
- 10 year Data Retention
- NoDelay™ Writes

Real-time Clock/Calendar

- Backup Current under 1 μ A
- Seconds through Centuries in BCD format
- Tracks Leap Years through 2099
- Uses Standard 32.768 kHz Crystal (6pF)
- Software Calibration
- Supports Battery or Capacitor Backup

Processor Companion

- Active-low Reset Output for VDD and Watchdog
- Programmable VDD Reset Trip Point
- Manual Reset Filtered and De-bounced
- Programmable Watchdog Timer
- Dual Battery-backed Event Counter Tracks

System Intrusions or other Events

- Comparator for Early Power-Fail Interrupt
- 64-bit Programmable Serial Number with Lock

3. Pin Product

Pin Name	Function	Pin Name	Function	Pin Name	Function
CNT1, CNT2	Event Counter Inputs	CAL/PFO	Clock Calibration and Early	SCL	Serial Clock
A0, A1	Device Select inputs	PFI	Early Power-fail Input	VBAK	Battery-Backup Supply
/RST	Power-fail Output	X1, X2	Crystal Connections	VDD	Supply Voltage
	Reset Input/Output	SDA	Serial Data	VSS	Ground

3.5.13 function introduction to ET--TVT0310A

1. Description

The ET-TVT0310A device is a ten page intelligent single-chip Teletext decoder for use with 625 line TV transmissions having Teletext in the Vertical Blanking Interval (VBI). The device integrates an on-chip digital data slicer and a decoder to provide a flexible Teletext solution incorporating internal software to implement FLOF and TOP Teletext decoding automatically. Additionally, the ET-TVT0310A supports decoding of Video Programming System (VPS) signals, and Wide Screen Signaling (WSS) data capture and storage. The ET-TVT0310A is part of the ET Teletext family of devices. This chip supports all the languages of the ET family of devices comprising the Latin, Cyrillic, Arabic and Greek alphabets. A full list of languages supported is shown on Page 16.

On-chip processing of packet 26 characters (flicker free) is automatically implemented as required. All Teletext including packet 26 is processed in ‘ real time ’ without the need for any additional memory. This allows the decoder to store up to ten pages of Teletext irrespective of the language selected and the mode of operation. The decoder is controlled by an on-chip 11.5 MIPS micro-coded processor which manages all the Teletext processing requirements, including ghost row processing and TOP table processing. The output of the device is RGB and blanking signals.

Device management is by simple high level commands for most features. The commands are described in the Software Application Guide and allow the TV micro-controller to communicate with ET-TVT0310A through an I2C interface. These commands have been designed to give a backward software compatibility between the single chip ET-TVT0310A and two chip solutions (e.g. ET206 + ET417).

In addition to the FLOF and TOP modes, the ET-TVT0310A decoder has a default Normal mode for any TV channel that is not transmitting FLOF or TOP. The decoder is ideally suited to VCR applications as it is able to receive and decode PDC information from packets 26 and 8/30 and store this information inside the decoder. In this mode of operation, memory can also be assigned for menu pages (pages downloaded from main microprocessor).

2. Features

Single chip Teletext system with Integrated digital data slicer.

- # Ten pages of on-chip display RAM.
- # Multi-alphabet solution : Latin, Cyrillic, Arabic and Greek.
- # Minimum software requirement.
- # Automatic Full Level One Features (FLOF) & Table Of Pages (TOP) decoding.
- # Flicker-free packet 26 processing on chip.
- # Program delivery control (PDC).
- # Menu page capability.
- # Instantaneous page memory clear.
- # Two Digital PLLs to manage the composite synchronization signal.
- # Backward Software Compatible with other ET Teletext solutions.
- # Direct access to subtitles.
- # VPS data decoding.
- # WSS data capture and store.

3. Pin description

Name		Type	Description
5/33	VDD5V1, VDD5V2_	Power_	Digital power supply._
38/43/46/47/22	VDD3V1, VDD3V2, VDD3V3,_ VDD3V4, VDD3V5_	Power_	Digital power supply._
10/17/21	VDDA1, VDDA2, VDDA3_	Power_	Analog power supply._
48/23	GND5V1, GND5V2_	Power_	Digital ground._
7/12/14/18	GNDA1A, GNDA1B, GNDA2,_ GNDA3_	Power_	Analog ground._
6/34/36/44	GND3V1, GND3V2, GND3V3,_ GND3V4, GND3V5_	Power_	Digital ground._
52	CHIPSEL0_	Input_	LSB of the chip select bus (see Table 9)._
1	CHIPSEL1_	Input_	MSB of the chip select bus (see Table 9)._
24	STDBYM_	Input_	Standby pin : active low._
32	RSTB_	Input_	Reset pin : active low. Internal pull-up to VDD5Vx_
37	PLLRC1_	Input_	PLL1 input._
45	PLLRC2_	Input_	PLL2 input._
41	OSCIN_	Input_	Oscillator input._
25	TSTIO_	Input_	If TSTIO is high, RED, GREEN, BLUE, BLANK, MUTE are in high_ impedance state when ET-TVT0310A is in picture mode._ If TSTIO is low, those outputs are activelow when

			ET-TVT0310A is in_ picture mode._
26	SCEN_	Input_	Test pin. Must be always set to low._
49	TSTAPP_	Input_	Test pin. Must be always set to low._
11	VINP_	Input_	Analog input for video._
20	VIDEOIN_	Input_	Analog VIDEO input which is connected to SYNC when_ ET-TVT0310A is not in textmode
19	SYNC_	Output_	Digital composite synchronization generated by ET-TVT0310A in text_ mode and VIDEOIN in other modes._
27	BLANK_	Output_	Blanking signal. This pin is high when teletext information is displayed_ on RGB lines._
28	BLUE_	Output_	Display signal._
29	GREEN_	Output_	Display signal._
30	RED_	Output_	Display signal._
31	MUTE_	Output_	Audio mute control. This signal is low when just text is display on the_ screen and bad video is detected. It is intended to be connected to the_ TV audio muting circuit._
42	OSCOUT_	Output_	Oscillator output._
4	TDO_	Output_	Test pin. Not connected._
5	VREFP_	Output_	Reference output voltage._
9	VREFN_	Output_	Reference output voltage._
15	VBG_	Output_	Reference output voltage._
16	VCM_	Bi-directional_	Input/output for common mode voltage decoupling and bypassing._
2	SCL_	Bi-directional_	I ² C clock line. Open drain pin._
3	SDA_	Bi-directional_	I ² C data line. Open drain pin._
50	FLAG1_	Bi-directional_	System information. User can configure this pin using the I ² C_ commands to output Line23 flag._
51	FLAG2_	Bi-directional_	System information. User can configure this pin using the I ² C_ commands to output ODD/EVEN field flag._

3.5.14 function introduction to NJW1147

1. DESCRIPTION

The **NJW1147** is a TV audio processor with BBE ViVA High Definition 3D Sound process. BBE's

traditional sound clarity enhancement technology is combined with the new ViVA 3D process to create an authentic and exciting spatial effect. BBE ViVA is compatible with news, music and movie programs as well as video games.

The NJW1147 contains all necessary functions to process TV audio signal such as volume control, tone control, balance, mute, AGC and NJRC's proprietary surround sound process, eala. The eala reproduces a natural surround sound with clear vocal orientation. The total modes and variables are controlled by the I²C bus interface.

2. FEATURES

Operating Voltage 8 to 13V

I²C BUS Interface

BBE Sound Enhancement (Low Boost and High Boost: 15dB max.)

BBE ViVA High Definition 3D Sound

eala (NJRC Original Surround)

AGC Circuit (It reduces volume difference among input sources.)

Simulated Surround

Bi-CMOS Technology;

3. PIN FUNCTION

No.	Symbol	Function	No	Symbol	Function
1	INa	Ach Input	16	Vcc	Power Supply Pin
2	BBE1a	Ach BBE Filter1 (Process)	17	AUX1	Auxiliary Output1
3	BBE2a	Ach BBE Filter2 (Lo Contour)	18	AUX0	Auxiliary Output0
4	BBE OUTa	Ach Output for the Other Accessories	19	CTL	Pop Noise reduction for Bass Control
5	TONE INa	Ach Input From the Other Accessories	20	CTH	Pop Noise reduction for Treble Control
6	TONE-Ha	Ach Treble Filter	21	VREF	Reference Voltage
7	TONE-La	Ach Bass Filter	22	SR-FIL	Surround Filter
8	OUTa	Ach Output	23	OUTb	Bch Output
9	AGC	AGC Filter	24	TONE-Lb	Bch Bass Filter
10	SS-FIL	Simulated Stereo Filter	25	TONE-Hb	Bch Treble Filter
11	CVB	Pop Noise Reduction for Volume & Balance	26	TONE INb	Bch Input from the Other Accessories
12	CVA	Pop Noise Reduction for Volume & Balance	27	BBE OUTb	Bch Output for the Other Accessories
13	SDA	SDA Data Input (I2C BUS)	28	BBE2b	Bch BBE Filter2 (Process)
14	SCL	SCL Data Input (I2C BUS)	29	BBE1b	Bch BBE Filter1 (Lo Contour)
15	GND	GND	30	INb	Bch Input

Section Three Servicing and Principle

The next manual: DVD part

Section One Principle of the player

3.1.1 DVD part block diagram

DVD part block diagram is shown in the figure 3.1.1.1:

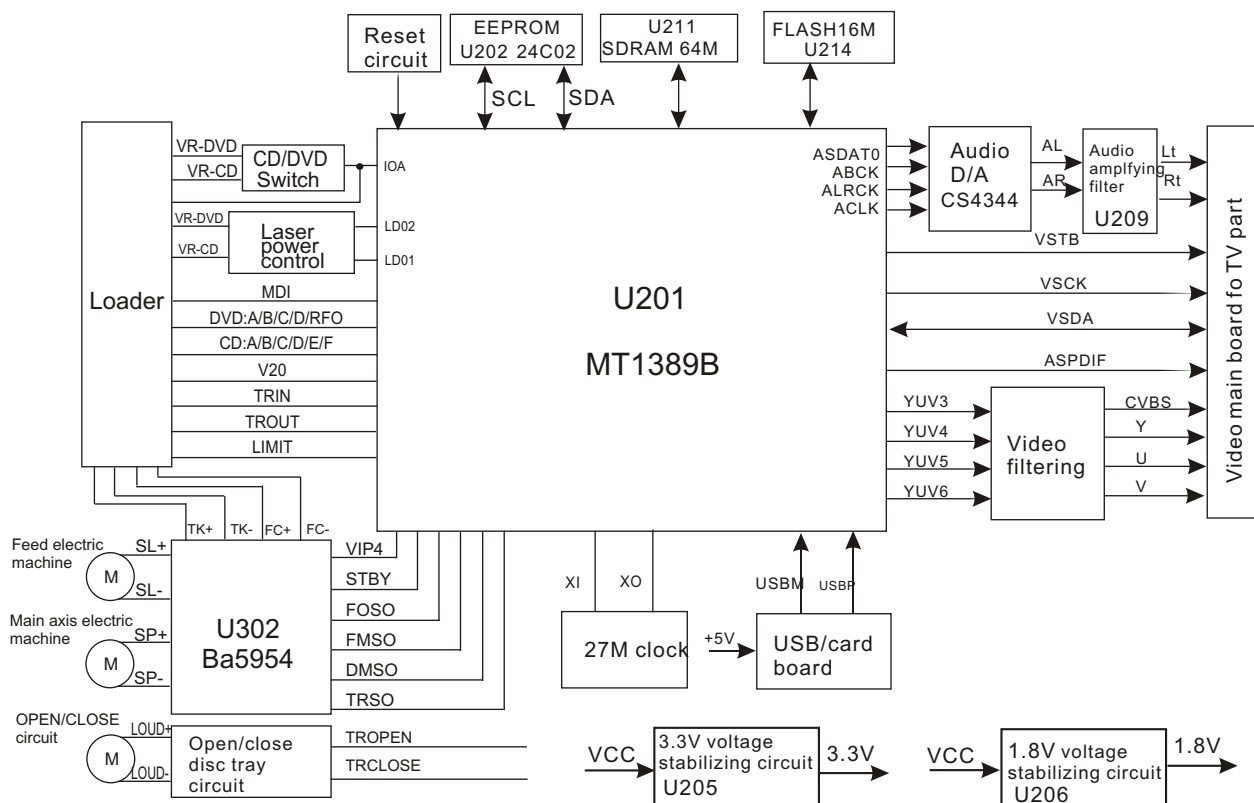


Figure 3.1.1.1 DVD part block diagram

3.1.2 Function introduction to IC of the player

Function introduction to IC of the player is shown as in the following figure:

PCB board	Material code	Material name	Specs & Model	Quantity	Location	Description
DVD decode board @2D1507-1UL	880768	IC	C4558 SOP	1	U109	Operational amplifier (audio amplifying)
	880322	IC	MM74HCU04M SOP	1	U103	Phase inverter
	881182	IC	LM1117MP-ADJ SOT-223	1	U105	1.8V voltage stabilizing IC
	881378	IC	BA5954FP HSOP	1	U202	Servo drive
	881415	IC	HY57V641620HGT-7 TSOP	1	U108	SDRAM
	790126	SMD FET	FDS9435A SOP	1	U104	DVD main power control switch pipe
	881914	IC	RT9701CB SOT 25	1	U102	USB power control IC
	881990	IC	MT1389FE/B (B version) QFP	1	U201	Decode chip
	882076	IC	LM1085-3.3 SOT-263	1	U106	3.3V voltage stabilizing IC
	882380	IC	CS4344 TSSOP	1	U107	Audio D/A converter
	882150	IC	24CC02A SOP	1	U101	2K memorizer to memorize user set information
	911530	Software program	LT1503SRU2-0(16M)	1	U110	DVD software program
6A1507-1	882202	IC	AU9362A21-MCL QFP	1	U1	card read IC
	882425	IC	ADG713 TSSOP	1	U3	USB switch

Section Two Unit Circuit Principle

3.2.1 Introduction to laser head

1. Function introduction to laser head flat cable is shown as the following table:

Pin	Name	Signal flow direction	DVD disc	CD disc	No disc	Function description
1	F-	Input loader	2.52	2.34	0.46	Focus error signal is added to two sides of pick-up focus coil
2	F+	Input loader	2.49	2.49	0.93	
3	T+	Input loader	2.53	2.51	0.94	Trace error signal is added to two sides of pick-up trace coil
4	T-	Input loader	2.58	2.51	0.93	
5	C	Input MT1389	2.2	2.25	2.04	Disc data signal
6	D	Input MT1389	2.2	3.2	2.04	Disc data signal
7	IOA	Input MT1389	0.01	3.2	3.21	Disc identification signal, CD is 3.3V, DVD is 0V
8	RF	Input MT1389	2.21	2.53	1.28	The sum of disc data signal
9	A	Input MT1389	2.17	2.22	2.04	Disc data signal
10	B	Input MT1389	2.19	2.27	2.04	Disc data signal
11	F	Input MT1389	2.07	2.44	2.03	Supplementary signal used in trace
12	GND	Ground	0.01	0.01	0	Grounding
13	V20	Input loader	2.04	2.06	2.03	Reference voltage
14	Vcc	Input loader	5.04	5.04	5.02	Supply voltage for loader
15	E	Input MT1389	2.06	2.45	2.03	Disc data signal
16	Blanking	handling in air	0.01	0	0	unused
17	VR-CD	Input loader	0.21	0.01	0	Through the handling inside loader, make sure MD11 is 180mV when reading CD
18	VR-DVD	Input loader	0.01	0.2	0	Through the handling inside loader, make sure MD11 is 180mV when reading DVD
19	LD-CD	Input loader	0.09	2.1	0	CD laser power control signal
20	MDII	Input MT1389	0.21	0.2	0	CD and DVD laser power monitoring signal
21	HFM	Input loader	5.04	5.04	5.02	High frequency overlapping signal produces laser with different wave length inside loader

22	Blanking	unused	0.01	0.1	0	
23	LD-DVD	Input loader	2.21	0.1	0	DVD laser power control signal
24	GND	unused	0.01	0.01	0	Grounding

Note: 1) When reading DVD, there are only A, B, C, D signals.

2) When reading CD, there are A, B, C, D, E, F signals.

3) $RFO=A+B+C+D$.

4) Focus error signal= $(A+C)-(B+D)$ Trace error signal= $E-F$.

2. Working principle

(1) Laser tube: wave length of loader DVD laser diode is 650nm, wave length of CD laser diode is 790nm, the wave length which is within 370nm and 750nm is visible light, the laser in the course of reading DVD disc is visible light, and that when reading CD disc is infrared light.

(2) Principle about laser head picks up signal: laser beam projects onto disc, when laser beam focus projects onto disc vertically, laser beam will produce reflection, reach on light sensor through reflection loop and converse into electronic signal through photoelectric cell. For the reflection loop produced in non pit information area and pit information area in disc has difference and reflects into different position of light sensor, photoelectric diode in different positions on light sensor will produce different signals to process all signals on light sensor and then produce digital signals.

(3) Focus, trace coil: when laser head is reading signals normally, information side should be in the focus of laser beam, because of factors of disc error, high speed rotation and machine error, it is unavoidable that laser beam focus deviates from information face to produce phenomena of orbit boas and refocusing. Focus , trace coil is added on loader to adjust laser beam to make it correctly focus in information area.

(4) Formation of RF signal: when disc reading is normal, light sensor will have 160MV, vague and eye pattern waveform which is added on A, B, C, D respectively, and output RF signal from FRO pin after being overlapped by adder inside light sensor, the frequency when reading DVD disc is much higher than that when reading CD disc, output amplitude is about 1.4V.

3.2.2 Servo circuit

1. Servo system of this player adopts SANYO loader + MTK decode solution (MT1389E+FLASH (16M) + SDRAM (64M)), and its servo circuit is mainly composed of front end signal processing, digital servo processing, digital signal processing IC MT1389E and drive circuit D5954, in which MT1389E is also the main composed part of decode circuit. Servo circuit block diagram is shown as in the following figure 3.2.2.1:

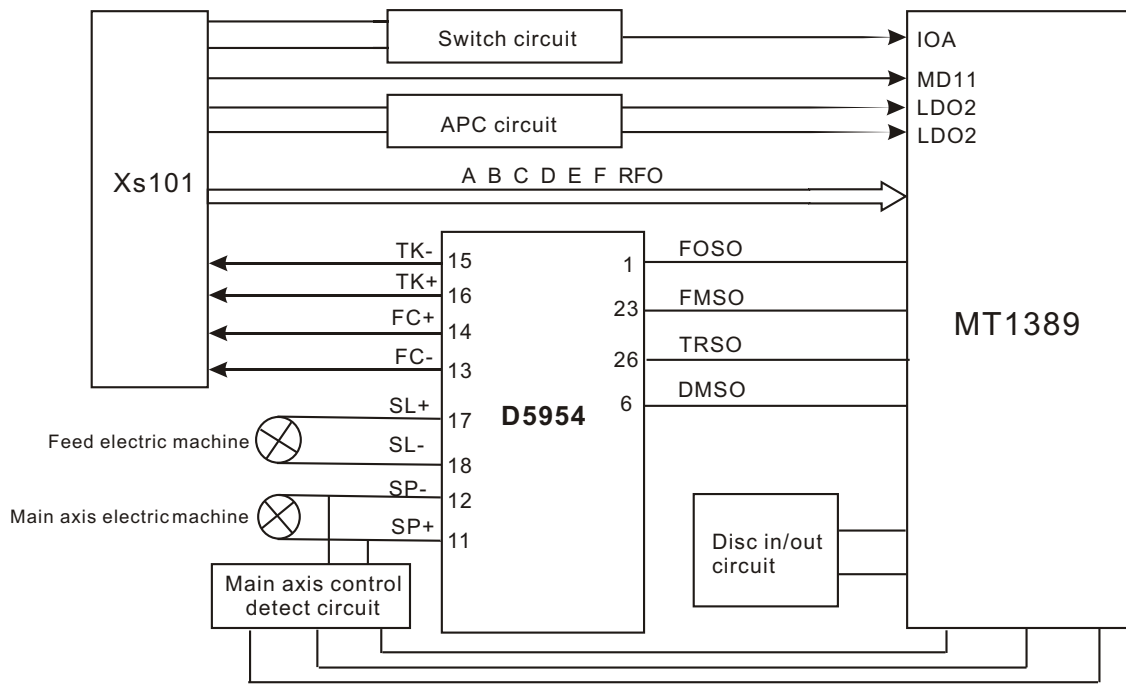


Figure 3.2.2.1 Servo circuit block diagram

2. Working principle

After power on, machine displays “OPEN”. After loading disc, loader pick-up begins to reset. After pick-up goes to the proper position, detect switch will give a signal to MT1389, MT1389 begins to output focus, main axis and laser signals, disc begins rotating and pick-up begins to identify disc information and judge whether disk is CD disc or DVD disc according to disc information in order to output level from pin IOA and control disc switch circuit and pick-up PD IC to make the corresponding action, meanwhile Mt1389 adjusts laser output power through laser power control circuit.

After loader reads disc information, A, B, C, D, E and F signal are formed through photoelectric conversion to MT1389 (DVD only has A, B, C, D signals) and RF signal and output from pin 2~11, 18, 19 of MT1389 respectively, after amplifying processing of pre-amplifier inside MT1389, now signals are divided into 2 ways inside MT1389: one part, through summation amplifying and subtraction circuit inside MT1389, produces servo error signal, after digital servo signal circuit processing, forms corresponding servo control signals, outputs FOO, TRO, DMO and FMSO servo control signal from pin 42, 41, 37 and 38 of MT1389 respectively and then send to servo drive circuit for drive amplifying through the integration circuit composed by resistor and capacitor and bring along focus coil, trace coil, main axis electric machine and feed electric machine after drive amplifying. Among these, focus and trace servo Are used to correct objective position accurately; feed servo is used to bring along laser head to make radial large-scale move which belongs to the preliminary adjustment to laser head position; and main axis servo is used to control main axis electric machine to make it read signals in means of Constant Linear velocity and bring along disc to rotate. After processing of amplification by VGA voltage control amplifier and equalization frequency compensation inside MT1389, another part of signals are changed into digital signals through internal A/D converter. When loader is reading CD/VCD signals,

These signals are conducted EFM demodulation inside MT1389, and then outputted to latter stage for AV decoding after finishing CIRC (Cross-Interleaved Reed-Solomon Code) error correction inside. When loader is reading DVD signals, these signals are conducted ESM demodulation inside MT1389, and then sent to latter stage for decoding after finishing RSPC error correction inside. General DVD players have a disc in/out circuit to control disc tray door in/out acts to reach the purpose of making disc in and out. For PDVD, we adopt manual disc in/out means and we can judge whether disc in to proper position through detect switch.

3. Explanation to servo terms

(1) FOO: for disc make differences, and when rotating disc may probably move upwards or downwards slightly to make the focus of laser emitted by laser head cannot justly fall on data pit of disc, now focus point of objective lens is required to adjust to make focus aim at data pit exactly. The acts are mainly to make objective lens move upwards and downwards.

(2) TRO: data information is saved in disc in form of tracks. When disc is rotating, disc deviation will produce, now laser head is required to adjust. In this process, objective lens makes forward and backward movement with small moving range.

(3) FMO: similar to acts of trace, the acts of feed are larger than those of trace. Feed conducts a large scale movement firstly, and then trace moves slightly in this range. Feed moves for a while, and does not move for another while; but trace moves all the time. Feed is rough adjustment and trace is fine. And acts are obvious when power on and selecting track.

(4) DMO: it is the top that holds up disc. Its rotation speed decides that of disc. Its rotation is generated by an individual DC electric machine, in which rotation speed of DVD is twice over that of CD.

3.2.3 Laser power control circuit

1. Laser power control circuit is shown as in the following figure 3.2.3.1:

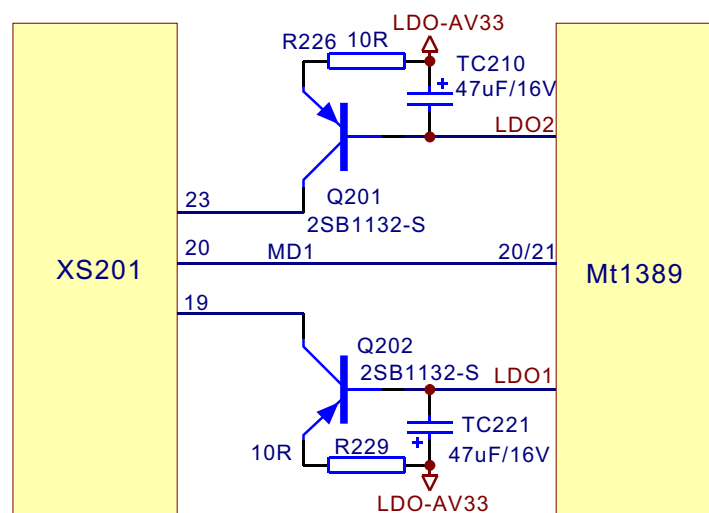


Figure 3.2.3.1 Laser power control circuit diagram

2. Working principle

Pin 20/21 of MT1389 is laser power detect signal input pin, pin 21 is DVD laser power strong/weak detect signal input pin, pin 23 is VCD laser power drive control output pin, pin 22 is DVD laser power drive control output pin.

When reading VCD disc, laser power becomes weak, voltage of MDII pin decreases, voltage decrease of pin 23 of MT1389 makes voltage of pin 19 of XS201 increase to reach the purpose of raising laser power. When laser power is too strong, voltage of MDII pin increases to lead to voltage of pin 23 of MT1389 increase to make voltage of pin 19 of XS201 decrease to reach the purpose of reducing laser power to form an auto power control circuit.

When reading DVD disc, pin 21 is detect signal input pin, pin 22 is drive control input pin, and the working principle is the same with that when playing VCD disc.

3. Key point voltage (unit: V) is shown as the following table:

Location number	Read DVD disc	Read VCD disc	Location number	Read DVD disc	Read VCD disc
Q201_E	2.9V	3.2V	Q202_B	3.2V	2.2V
Q201_B	2.2V	3.2V	Q202_E	3.2V	2.9V
Q201_C	2.2V	0	MT1389_20	0.2V	0.2V
Q202_C	0	2.2V			

3.2.4 CD/DVD conversion circuit

1. CD/DVD conversion circuit is shown as in the following figure 3.2.4.1:

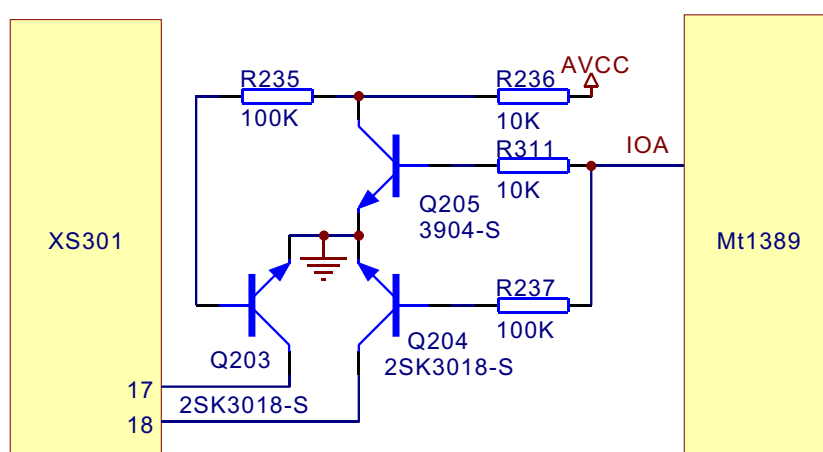


Figure 3.2.4.1 CD/DVD conversion circuit diagram

2. Working principle

After loading disc in the player, IOA port of Mt1389 is defaulted high level to make Q205 saturation on and form loop together with CD laser power control circuit on CD. At the same time, IOA also goes to

Loader PD IC to switch, disc begins to rotate, when servo management system recognizes that the disc in player is not CD disc, IQA pin outputs low level to make Q205 cut off and make Q203 on, and form loop together with DVD laser power control circuit on loader to perform disc reading acts. After disc tray door opens, IOA keeps the state before opening disc tray door. If the player cannot recognize which disc it is, IQA pin will switch continuously until reading disc or system judges that there is no disc.

Note: Q203 and Q204 are MOS tube

3. Key point voltage (unit: V) is shown as the following table:

State	Q205			Q203			Q204			IOA
	Base electrode B	Collector C	Emitter E	Grid electrode G	Drain electrode D	Source electrode S	G	D	S	
DVD disc	0	3.86	0	3.81	0.18	0	0	0	0	0
VCD disc	0.64	0.1	0	0	0	0	3.27	0.18	0	3.3

3.2.5 Slot-in circuit

LD1506S adopts dual slot-in and sealed-style all-steel with compact structure. There is a all-steel disc pressing system, in which disc is tightly pressed through 3 small steel plates, thus it is applicable to those discs with problem. It is really full-compatible with reading 12cm large disk and also 8cm small disk. The player adopts light induction style to read disk. As long as you place the disc on the door, the loader will absorb it in automatically.

1. Slot-in circuit is shown in the figure 3.2.5.1:

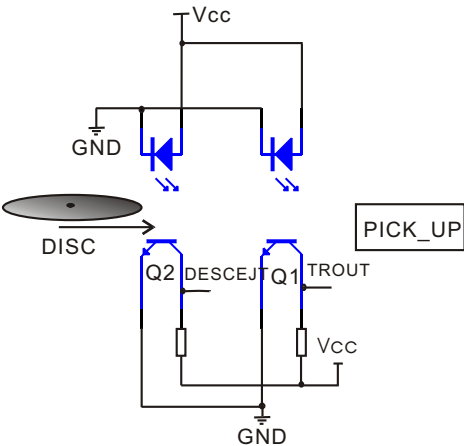


Figure 3.2.5.1 Slot-in circuit diagram

2. Working principle: there are two light emission fluorescent tubes on top of the opening of slot-in loader disk and there are two photoelectric tubes at bottom on two ends of disc opening. After loading a disk, the disk holds up the light emitted from light emission tube to make the corresponding photoelectric

Diode (Q2) of this light emission tube cannot receive lights. Detect signal DISCEJT on loader outputs high level to decode board. When DISCEJT pin of Mt1389 detects that DISCEJT signal is high level, output disc tray in control signal. After disc tray enters to proper position, mechanical structure of loader touches disc tray in switch, TRIN becomes high level from low level, decode chip stops outputting disc tray in signals and machine begins to read disc. When disc tray is out, transmission structure conveys disc outwards. When disc passes through the detecting of the photoelectric tube (Q1) inside loader, after disc is out to the appointed position, TROUT becomes low level and disc tray out stops.

Note: in order to understand more simply, this schematic diagram has some difference from real circuit, so please note.

3.2.6 Disc in/out circuit

1. Disc in/out circuit is shown as the following figure 3.2.6.1:

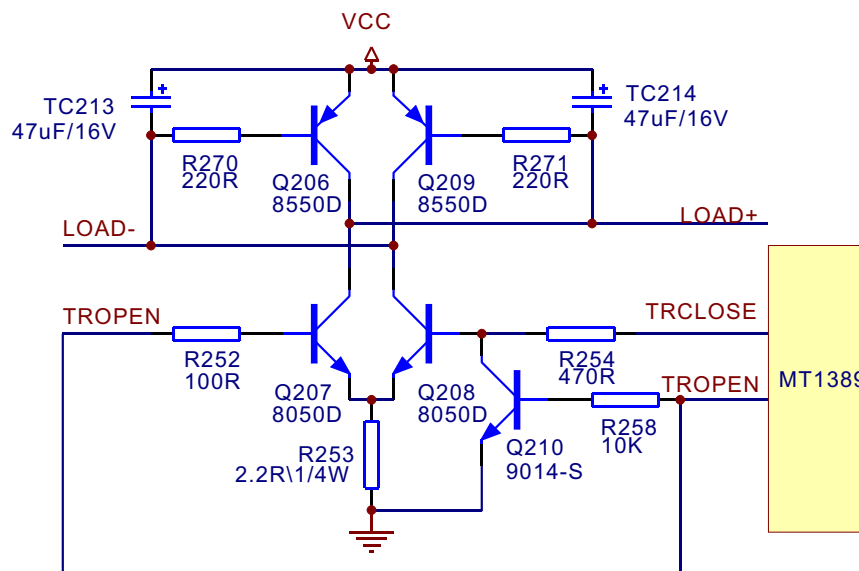


Figure 3.2.6.1 Disc in/out circuit diagram

2. Working principle: INDISC, OUTDISI are disc in/out control signals and are connected to pin 39, 51 of U201 (MT1389) respectively. LOAD+, LOAD- connect with two ends of electric machine to control. When users are performing disc out operation, servo control chip U201 (MT1389) sends out control signal through pin 39, 51 and changes level of LOAD+, LOAD- to change the rotation direction of electric machine to realize disc in/out function. The working process of disc in/out circuit is shown as follows:

OUT disc : VCC?Q206CE electrode on?LOAD+ ?Electric machine?LOAD- ?Q208CE electrode on?R253?Ground

When not opening disc tray, pin 39 and 51 of U201 (MT1389) are low level. When opening disc tray, pin39 of U201 (MT1389) sends a high level; Q208 is on; Q208 collector electrode changes into low

Level; LOAD- changes into low level; Q206 base electrode changes into low level; Q206 is on. Q206 collector electrode changes into high level and LOAD+ changes into high level.

IN disc: VCC?Q209CE electrode on?LOAD- ?Electric machine?LOAD+ ?Q207CE electrode on?R253?Ground

When closing disc tray, pin 51 of U201 (MT1389) sends a high level; Q207 is on; collector electrode changes into low level; LOAD+ is low level; base electrode through R230 and Q209 is low level; Q209 is on; Q209 collector electrode changes into high level; LOAD- changes into high level.

The function of Q210 is interlock IN DISC and OUT DISC signal to ensure the two are not high level at the same time. When the two are high level input, base electrode of Q208 is made to low level through Q210 on to ensure the normal working of disc in/out circuit. The function of electrolytic capacitor TC213 and TC214 is to avoid the sudden change of the voltage on two ends of disc in/out electric machine to make disc in/out acts smooth.

3. Key point voltage (unit: V) is shown as the following table:

State	Q206			Q209		
	Base electrode B	Collector C	Emittor E	Base electrode B	Collector C	Emittor E
Read disc	5.06	5	5.06	5.01	5.03	5.06
Open disc tray to proper position	4.79	4.77	5.06	4.77	4.79	5.06
Open disc tray	4.74→5.05→4.74	4.76→0.2→4.76	5.06	4.76→4.33→4.76	4.76→5.02→4.76	5.06
Close disc tray	4.74→4.33→4.74	4.76→5.05→4.76	5.06	4.76→5.03→4.76	4.79→0.2→4.79	5.06
State	Q207			Q208		
	Base electrode B	Collector C	Emittor E	Base electrode B	Collector C	Emittor E
Read disc	0	5	0	0	5.03	0
Open disc tray to proper position	0	4.77	0	0	4.79	0
Open disc tray	0→0.93→0	4.76→0.2→4.76	0	0	4.79→5.02→4.79	0
Close disc tray	0	4.76→5.05→4.76	0	0→0.93→0	4.79→0.2→4.79	0
State	Q210			OUT	IN	
	Base electrode B	Collector C	Emittor E			
Read disc	0	0	0	0	0	
Open disc tray to proper position	0	0	0	0	0	
Open disc tray	0→0.63→0	0	0	0→3.12→0	0	
Close disc tray	0	0→0.93→0	0	0	0→3.12→0	

3.2.7 Main axis control circuit

1. Main axis control circuit is shown as in the following figure 3.2.7.1:

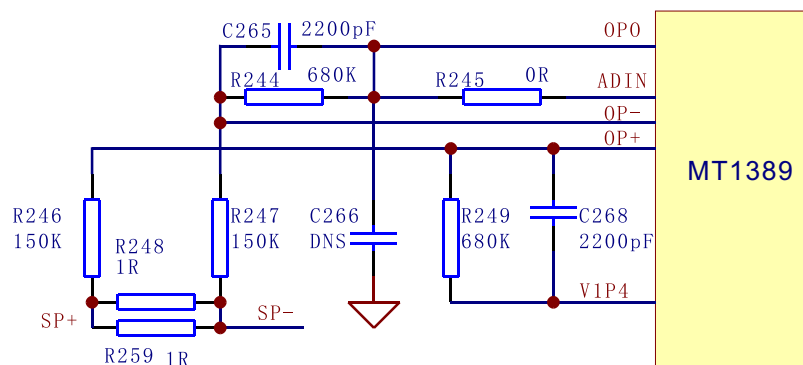


Figure 3.2.7.1 Main axis control circuit diagram

2. Function: disc is always in high speed rotation in the course of disc reading, when you need to open the door to change disc, MT1389 stops the positive direction drive signal which is given to main axis drive circuit, for the function of inertia disc is still rotating. If disc out order is performed at this time, disc will be abrasively damaged. Therefore, machine must be baking to main axis, that whether disc has stopped rotating and whether disc is reversing, decode chip of the machine cannot recognize. So a main axis control circuit is added to make decode chip can effective monitor that whether disc has stopped rotating.

3. Working principle: MT1389 has a comparator inside composed of operational amplifier, in which OP+ is the in-phase input end of operational amplifier, OP- is reverse input end, OPO is output end, when playing disc normally, for electric machine is positive direction rotating, voltage of OP+ is higher than that of OP-, voltage of OPO is more than 1.4V. When disc out is needed, main axis drive signal stops, for electric machine is permanent magnetic, when in rotating, induced electromotive force produces in two ends to give to decode chip through R246, R247 sampling to make OPO output less than 1.4V voltage and transmit to input pin of MT1389 ADIN through R245. When ADIN is high level, main axis drive output end has not any drive signal output, when ADIN is low level, MT1389 outputs a reversing drive signal to main axis drive circuit to make main axis electric machine speed down. Thus circular working goes on until main axis stops rotating. PDVD is manual disc out means, so after disc out, disc is still rotating, but will stop very son.

4. Key point voltage (unit: V) is shown as the following table:

Key point	Position	Normal working voltage (V)	Volateg change when disc out (V)
SP+	Pin 11 of D5954, pin 5 of XS203	3.79	3.79→0.70→1.80

SP-	Pin 12 of D5954, pin 6 of XS203	1.38	1.38→3.40→1.80
OP+	Pin 36 of MT1389	1.38	1.38→3.10→1.80
OP-	Pin 35 of MT1389	1.53	1.53→3.08→1.98
OPO	Pin 34 of MT1389	2.44	2.44→0.40→2.50
ADIN	Pin 40 of MT1389	2.44	2.41→0.41→2.44
DMSO	Pin 5 of D5954	1.42	1.42
VIP4	Pin 30 of MT1389	1.41	1.41

3.2.8 Decode circuit

1. Decode circuit block diagram is shown as in the following figure 3.2.8.1:

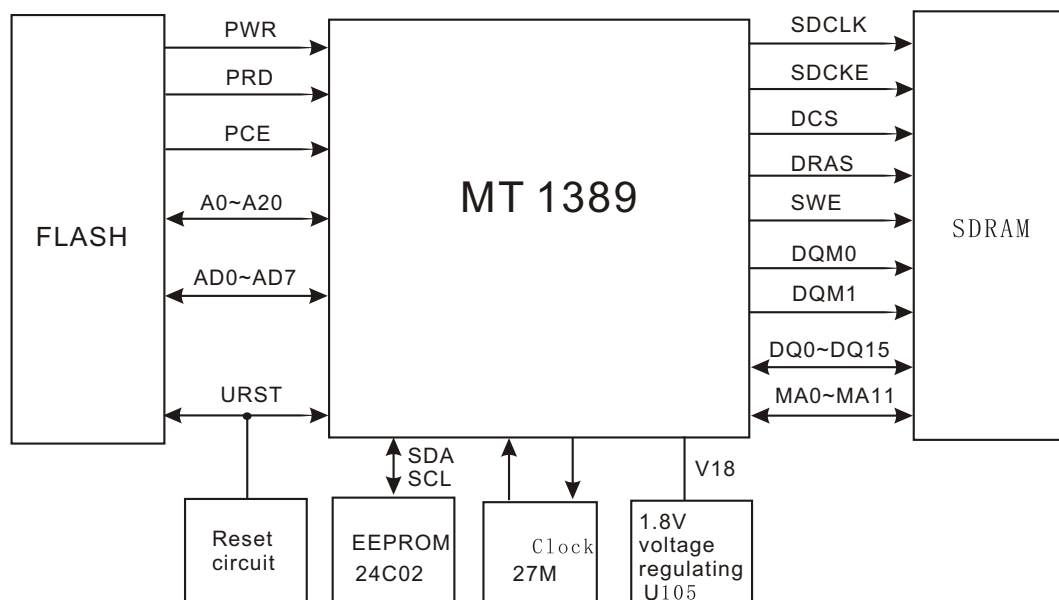


Figure 3.2.8.1 Decode circuit block diagram

2. Working principle: this decode circuit is mainly composed of MT1389, SDRAM and FLASH. Working condition of decode circuit has:

(1) Reset: refer to reset circuit working principle for details.

(2) Clock: this system adopts 27M external clock input, and produces clock signal required by system inside through internal frequency doubling circuit.

(3) Power: decode chip adopts two groups power supply of 3.3V and 1.8V, in which 1.8V mainly supply power for internal logic control circuit and we call it core voltage.

After power on, reset circuit performs reset to MT1389 built-in CPU (8032) and FLASH, decode chip outputs reset signal at the same time and performs reset to other circuit. After system reset, it firstly sends out read signal to FLASH to read out information saved in FLASH, the machine displays power-

On picture, servo system begins to work to check whether machine closes door to proper position and whether detect switch has been closed, if not, the door close action is performed. After detect switch of door is closed, the machine begins to perform preparations of disc reading and performs panel display at the same time of working.

Playback process: laser head picks up disc signal from disc, after servo system processing, then send to decode circuit for decoding, signal after being decoded is saved in SDRAM for the moment. When machine needs to replay signal, decode circuit calls information inside SDRAM to perform D/A conversion and then output.

User information storage: information content set by user is saved inside EEPROM, if user does not refresh or reset this information, it will saved in IC permanently.

Audio, video output circuit: at present, MT1389 all integrates video D/A converter, MT1389E inside integrates audio D/A converter, manufactures select according to their own needs. Please refer to circuit principle diagram and audio circuit explanation for details.

3.2.9 Video circuit

1. Video signal flow chart diagram is shown as in the following figure 3.2.9.1:

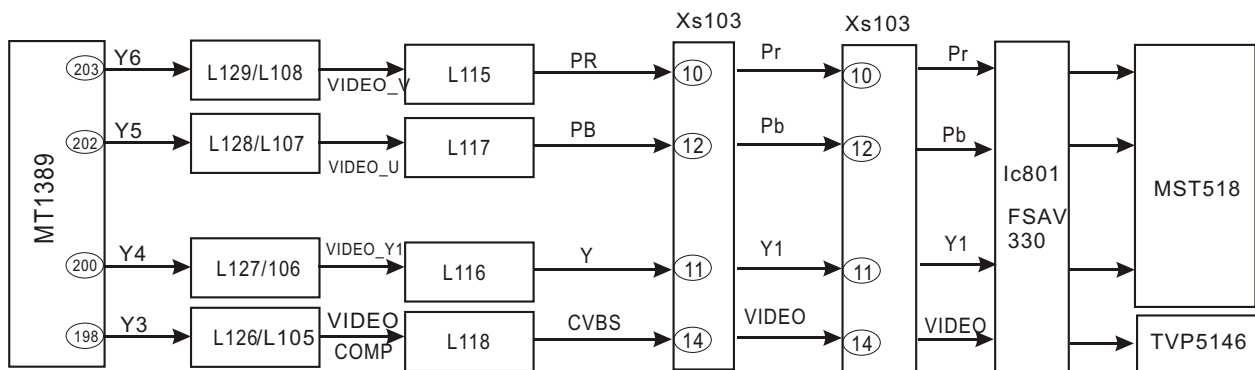


Figure 3.2.9.1 Video signal flow chart

2. Working principle: MT1389 has built-in video D/A conversion circuit, video output has Y/Pb/Pr Y/Cb/Cr CVBS Y/C output mode. This player adopts component video/composite video mode to output to video main board of TV part and other video output mode is not used. When DVD player is working, machine outputs video signal, after being filtered by the low-pass filter composed by C139&C140/L127, transmit to video main board through socket XS103 for processing to restore into complete video image to display through LCD screen. As for component video circuit working principle, we will not introduce.

3.2.10 Audio circuit

1. Audio signal process block diagram is shown in the figure 3.2.10.1:

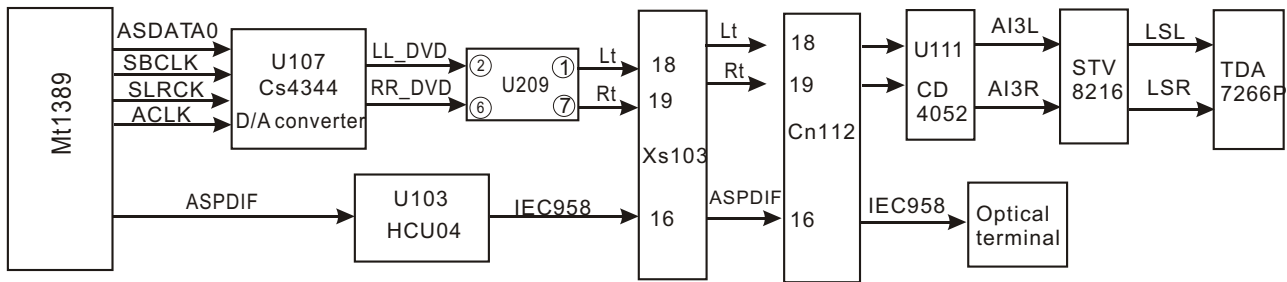


Figure 3.2.10.1 Audio signal flow chart block diagram

2. Working principle: MT1389B has no built-in audio D/A converter, so a separate D/A converter (CS4344) is added on its output end to convert digital audio signal into analog audio signal. After being amplified by U209, analog audio signal outputs to video main board for channel selection, and then input to audio power amplifying IC TDA7266P for power amplifying to drive loudspeaker to make sound. After being shaped by U103, digital audio signal outputs to coaxial terminal (J808) of video main board through XS103 to output directly.

3.2.11 Mute circuit

1. Mute circuit is shown in the figure 3.2.11.1:

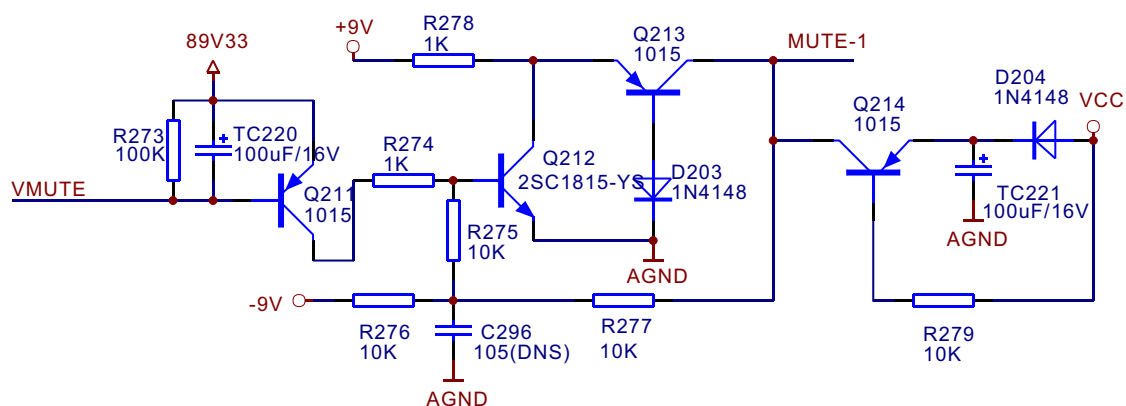


Figure 3.2.11.1 Mute circuit

2. Quieting circuit working principle:

When the player is playing normally, shown in the figure 3.2.12.1, MT1389E outputs analog audio signal and outputs a low level signal at the same time to VMUTE to make Q211 connected. B electrode voltage of Q211B is about 2.7V, collector electrode voltage of Q211 is about 3.3V, so Q212 is also connected. B electrode voltage is about 0.7V, E electrode voltage of Q213E is close to zero, Q213 cuts

Off and MUTE—1 is negative voltage, which is added to base electrode of audio output end mute tube to make mute tube cut off and audio signals output after being amplified by 4558. When pressing MUTE button on remote controller, Mt1389 has no audio signal that outputs to operational amplifier, so audio output end of the player has no audio signal output. But the electronic elements in circuit will have some noise when working and will transmit to audio output end of this player, to filter these noise, decode chip outputs a high level signal to VMUTE to make Q211 cut off, so Q212 cuts off, +5V power is sent to base electrode of switch tube Q205-Q210 through E C electrode of Q213 and mute circuit is in mute state.

When no disc is in or machine stops playing, MT1389E outputs a high level signal to VMUTE to make audio circuit enter mite state.

3. Power-off quieting working principle:

As shown in the figure 3.2.12.1, when the player is working normally, D204 is connected, +5V charges the capacitor Tc221 through D20, now transmitters voltage of Q214 is lower than base electrode voltage and Q214 cuts off. When power off, +5V disappears, base electrode of Q214 becomes low level and its transmitter electrode becomes high level because of Tc221 discharge, now Q214 is connected, collector electrode of Q214 (AMUTE) outputs high level to add on base electrode of switch pipe Q205-Q210, switch pipe is saturated, noise from power on/off process is by-passed to ground and power off quieting function is realized.

3.2.12 Reset circuit

1. Reset circuit is shown in the figure 3.2.12.1:

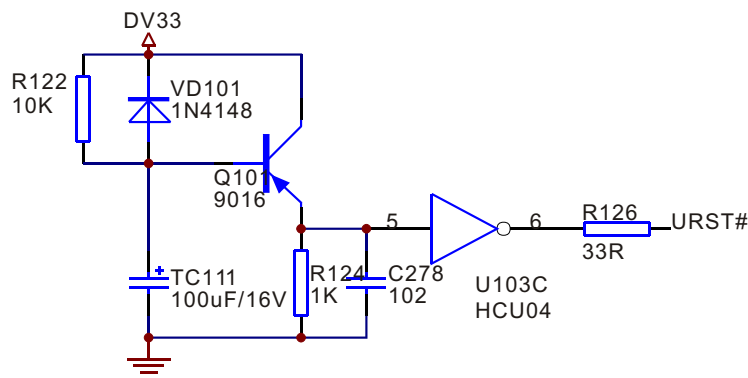


Figure 3.2.12.1 Reset circuit diagram

2. Working principle: when power on, voltage on two ends of TC325 cannot change suddenly, Q101 is saturated on, pin 5 of U103 is high level, pin 6 outputs low level to decode chip and FLASH for reset. After C235 is fully charged, Q101 enters cutoff state, pin 6 of U103 outputs low level and reset finishes. After power off, TC235 discharges through VD101 to ensure reliable reset when power on next time.

3.2.13 DVD power control circuit

1. DVD power control circuit is shown in the figure 3.2.13.1:

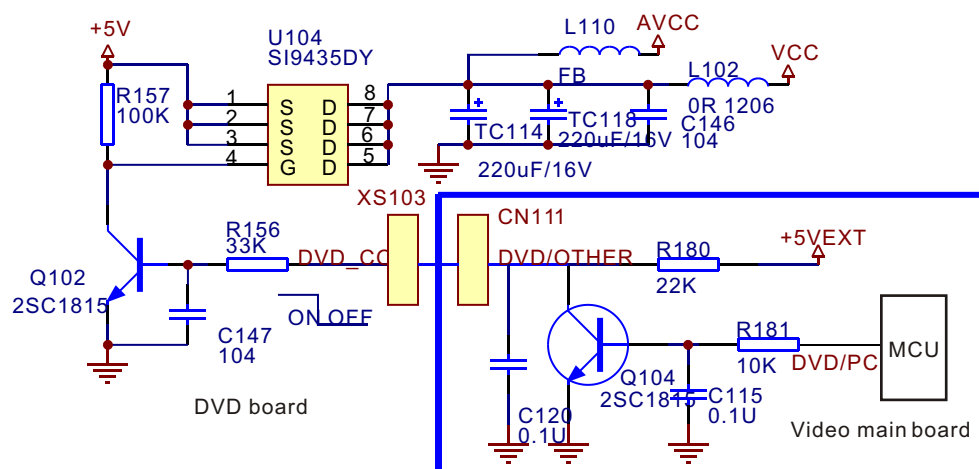


Figure 3.2.13.1 DVD power control circuit

2. Working principle: when machine enters standby state, MCU DVD/PC pin outputs high level signal, video main board U104 cuts off, DVD has no power supply and cannot work. When machine enters power-on state, DVD/PC pin also keeps high level signal, DVD board has no power supply and still cannot work normally. When machine switched in DVD working mode, DVD/PC port is low level, video main board Q102/U104 is connected, DVD board power supply is normal and enters working state.

3.2.14 Card read circuit

1. Card read circuit block diagram is shown in the figure 3.2.14.1:

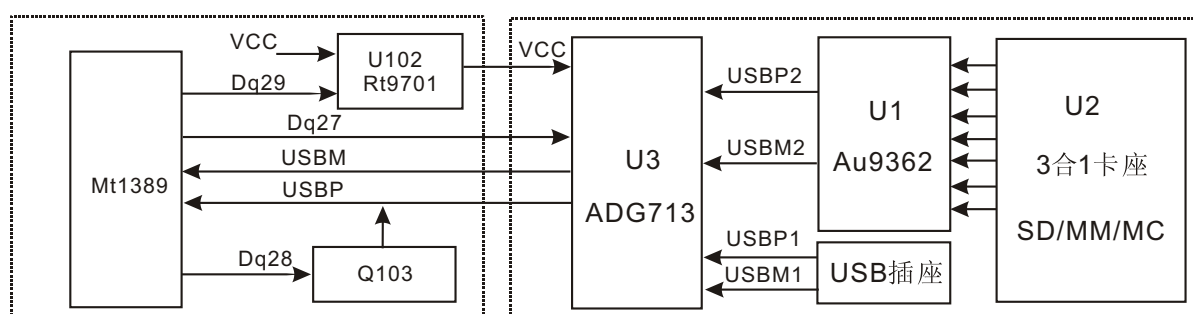


Figure 3.2.14.1 Card read circuit block diagram

2. Working principle: MT1389B cannot support card read function directly, so a card read IC AU9362 is added on USB/card board to support multiple memory cards such as SM/MS/SD/C/MMC. This player supports MC/SD/MMC card read and USB read function. When machine is set in DVD state, switch m

Machine in USB read or card read state, MT1389 (DQ29) outputs a high level signal to U102, pin 2 of U102 output power to supply for card read board for working. When machine is set in card read state, user inserted AD card, detect pin SD CDN on card holder is low level, Q1 is connected, SD card receives power supply at pin 10 on card holder, machine begins to read data of SD card and the data transmits in USB data after being processed by AU9362 to switch ADG713 and then to MT1389 through switching for decoding. ADG713 is an electronic switch; when C_USB_S is high level, ADG713 switched in external USB. When machine is set in card read state, C_USB_S is low level, ADG713 switches in card read state. This signal is controlled by DQ27 port outputted by MT1389.

Section Three Servicing Cases

3.3.1 Servicing cases

[Example 1] Symptom: DVD has no sound output

Description: disc read is normal, image output is normal, DVD playing has no sound output and other external inputs are normal.

Analysis and troubleshooting: according to trouble symptom, trouble may lie in DVD board and audio jack part. Firstly check whether pin 18/19 of video main board CN112 has audio waveform and then can judge trouble lies in DVD board. Check pin 18/19 of DVD board XS103 and find that there is no audio signal waveform. Test TC113/TC112 audio waveform and it is normal, so we judge trouble lies in U109 and peripheral elements. Firstly check power supply of U109 and find that +12V power is normal, so we doubt U109 has trouble. Change it and trouble is removed.

[Example 2] Symptom: disc tray ejects out automatically

Description: after power on, load disc and disc tray ejects out automatically.

Analysis and troubleshooting: connect with video terminal, power on and load disc. After disc tray ejects in, TV screen displays "Loading" and then "Eject" after about 9 seconds. Disc ejects out, use DVD, CD, VCD disc to test and this phenomenon still exists, so we doubt pick-up has trouble because of aging and cannot read disc. After changing loader, trouble is removed. (If slot-in loader cannot read disc, disc will eject out automatically)

[Example 3] Symptom: do not read USB

Description: after machine switches in USB state, it does not read USB but other functions are normal.

Analysis and troubleshooting: firstly check card read function of the player and find it is normal, so we judge that trouble lies in USB/card board. Use multimeter to test USB terminal and find grounding and +5V voltage are both normal. Test line of USBM1/USBP1 and it is normal, so we doubt USB trouble has trouble. Change USB socket and trouble does not disappear. After analysis, we judge U3 has trouble. After changing it, trouble is removed.

[Example 4] Symptom: do not read DVD disc

Description: CD disc read is normal, after loading DVD disc, it ejects out automatically.

Analysis and troubleshooting: use multimeter to test Q202 and transmitter electrode voltage is 3.3V, which is normal; collector voltage is 2.2V and it is normal. Test inductor L218 between collector electrode and pin 23 of XS201 and find inductor has open-circuit. After changing inductor, trouble is removed.

[Example 5] Symptom: do not read MP3

Description: DVD disc read is normal. After loading Mp3 disc, it ejects out automatically. VCD disc read is normal.

Analysis and troubleshooting: according to trouble symptom, servo circuit of this machine is normal and main trouble lies in loader position. After changing loader, trouble is removed.

[Example 6] Symptom: DVD has no output

Description: DVD has no output and other functions are normal.

Analysis and troubleshooting: check each voltage output of DVD board and they are all normal. Use oscillograph to test crystal oscillation output waveform of U103 pin 4 (27MHz) and find output waveform is a horizontal line. Test pin of X101 and find crystal oscillation does not have oscillation, so we doubt crystal oscillator X101 has trouble. After changing crystal oscillator, trouble is not removed. Use multimeter to test and find resistance to ground of C118 becomes small, so we doubt C118 has electricity leakage. After changing C118, trouble is removed.

[Example 7] Symptom: DVD has no output

Description: DVD has no output and other functions are normal.

Analysis and troubleshooting: check voltage inputted by power amplifier board and it is normal. Check decode board reset circuit and it is normal. Check 27M clock circuit and it is normal. Check U105 output circuit, shown in the figure 3.3.1.1, and find there is only 1.4V and core voltage is abnormal (1.9V when in normal cases). After changing U105, voltage is normal and trouble is removed.

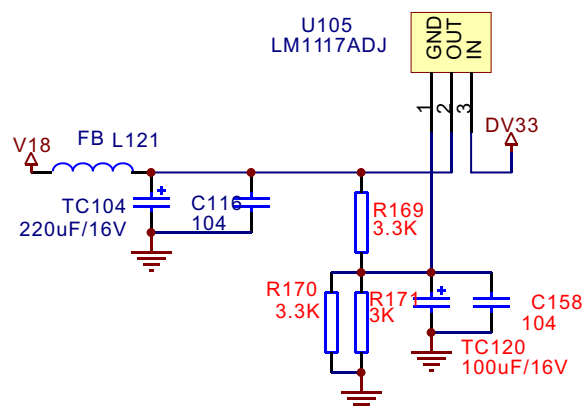


Figure 3.3.1.1 Voltage stabilizing diagram

[Example 8] Symptom: DVD has no image

Description: DVD disc read is normal, but no image output. After switching in TV state, image output is normal.

Analysis and troubleshooting: according to trouble symptom, trouble lies in DVD part. Test component video signal on DVD board XS103 and find brightness signal in the three-channel signals has no output. According to servicing method, test L106 and find this inductor has no signal output. Test resistor to ground of this circuit and it is 75-ohm, so we doubt MT1389 has trouble. After changing MT1389, trouble is removed.

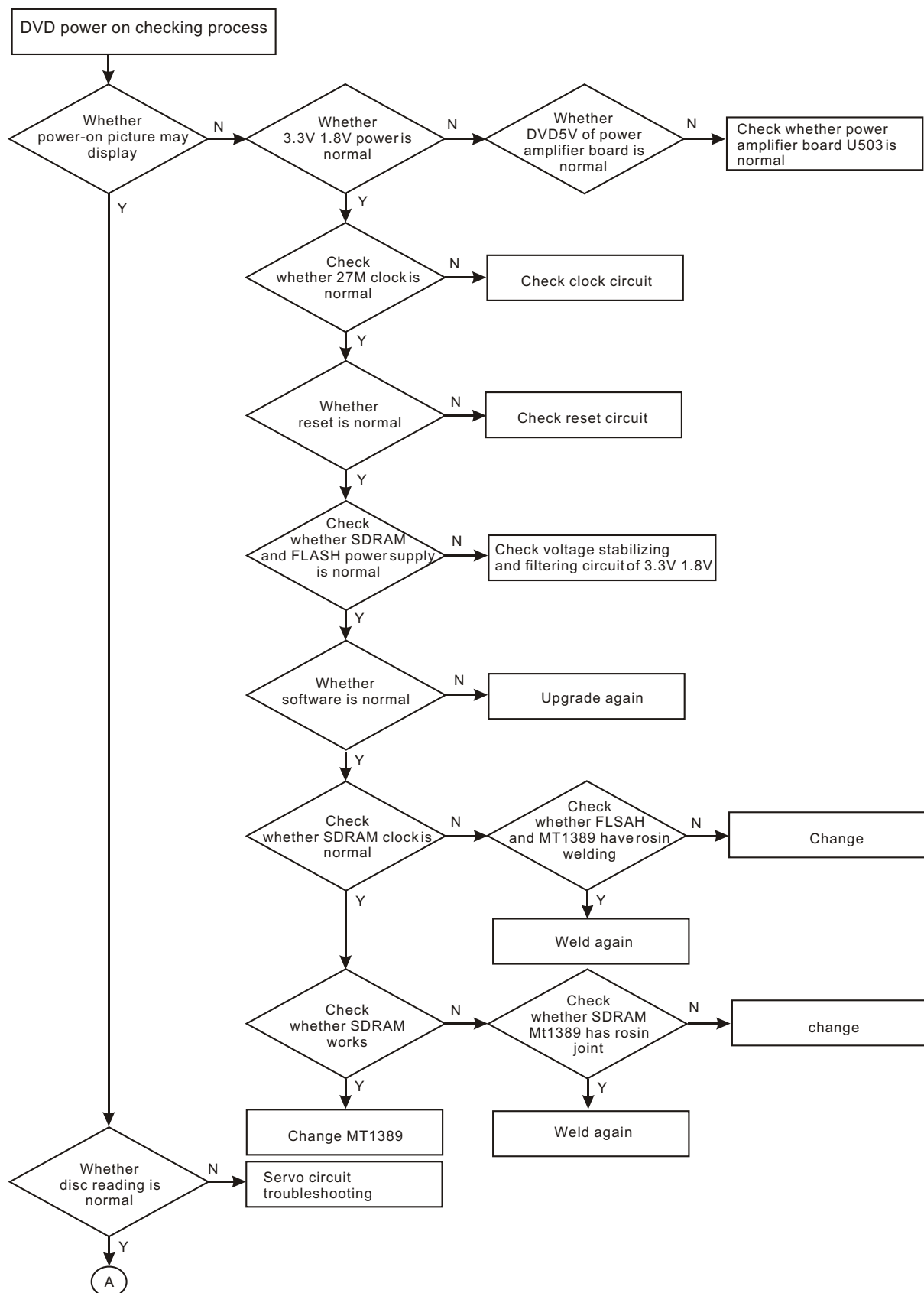
[Example 9] Symptom: DVD has no image

Description: DVD disc read is normal, but no image output. After switching in TV state, image output is normal.

Analysis and troubleshooting: according to trouble symptom, trouble lies in DVD part. Firstly check DVD power VCC and find there is no power supply, so we judge trouble lies in power supply circuit. Test power board DVD5V and it is normal. Test collector electrode of video main board Q102 and it is low level. According to working principle, we analyse that U104 must be connected in DVD state, so we doubt U104 has trouble. Change is and trouble is removed.

3.3.2 Troubleshooting flow chart

1. Troubleshooting process for “DVD power on check process” is shown in the figure 3.3.2.1:



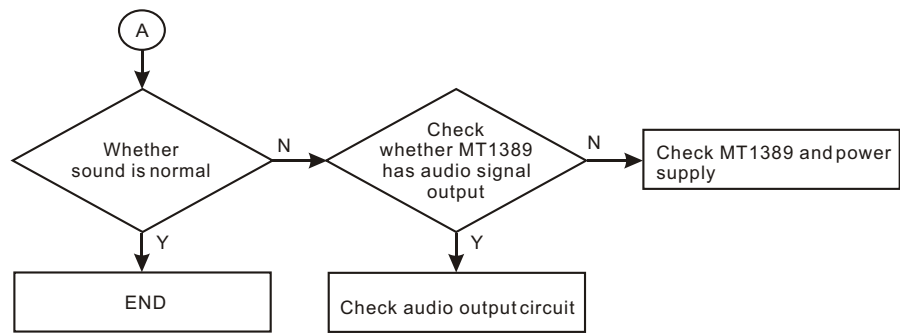
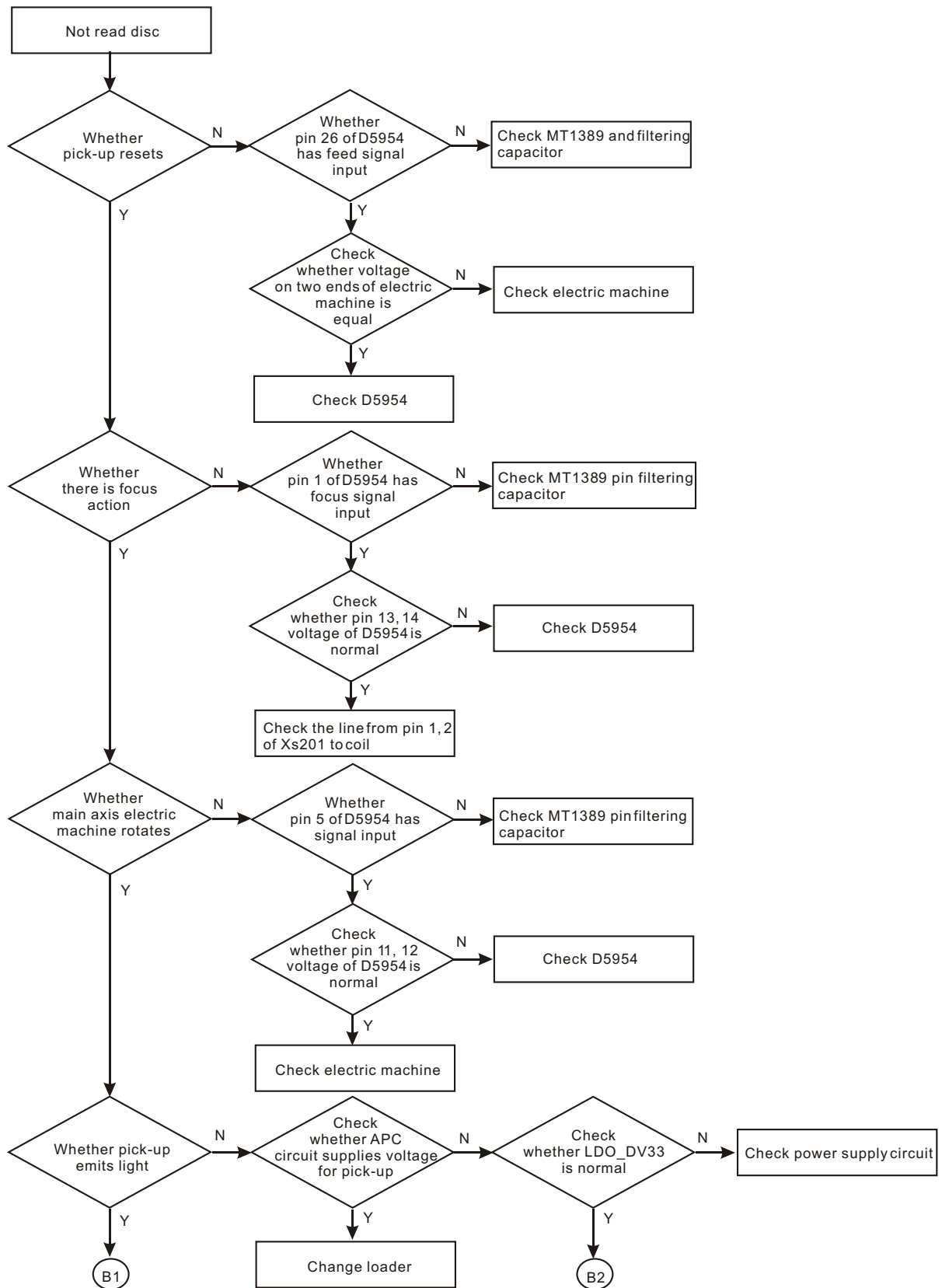


Figure 3.3.2.1 Troubleshooting flow chart for the player

2. Troubleshooting process for “Not read disc” is shown in the figure 3.3.2.2:



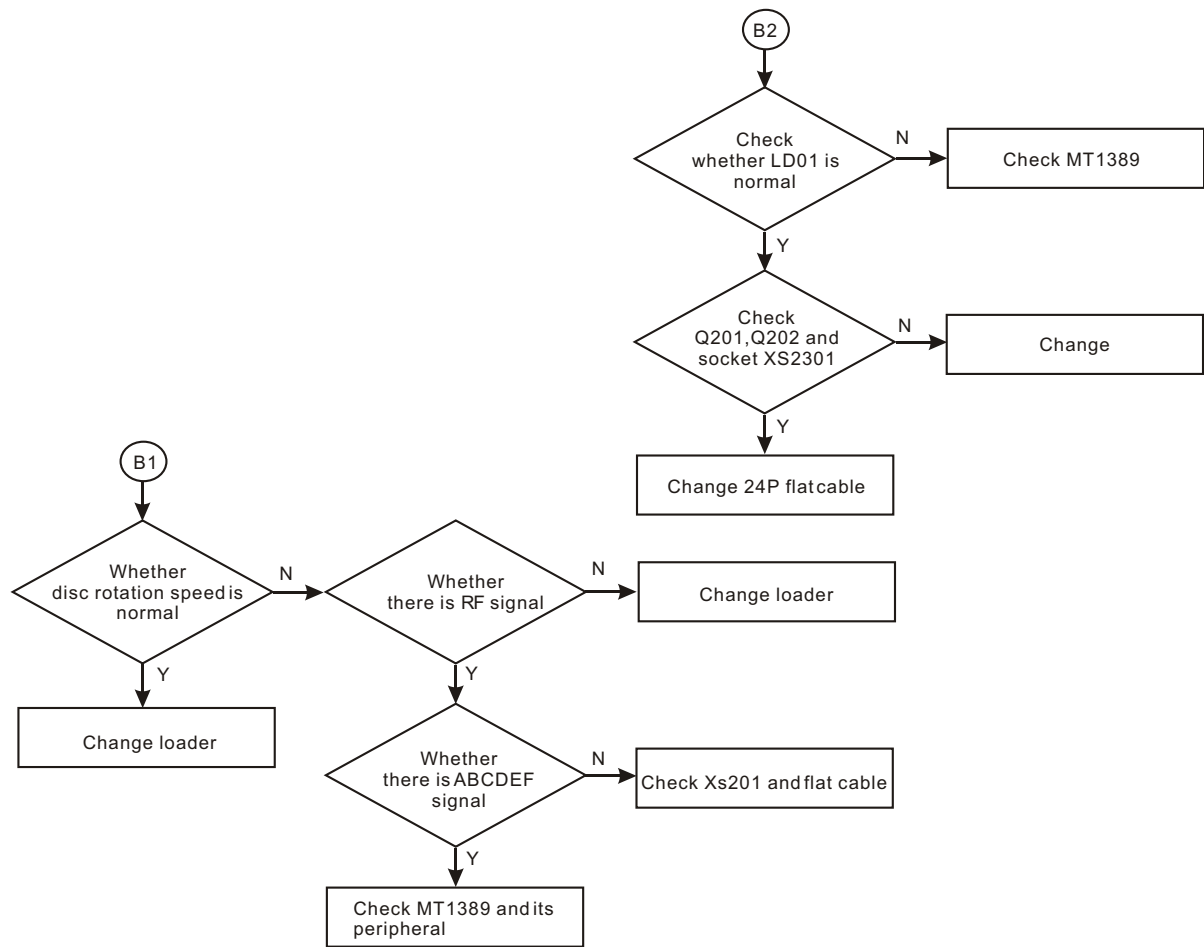


Figure 3.3.2.2 “Troubleshooting flow chart for “Not read disc”

3. Troubleshooting process for “DVD has no video output” is shown in the figure 3.3.2.3:

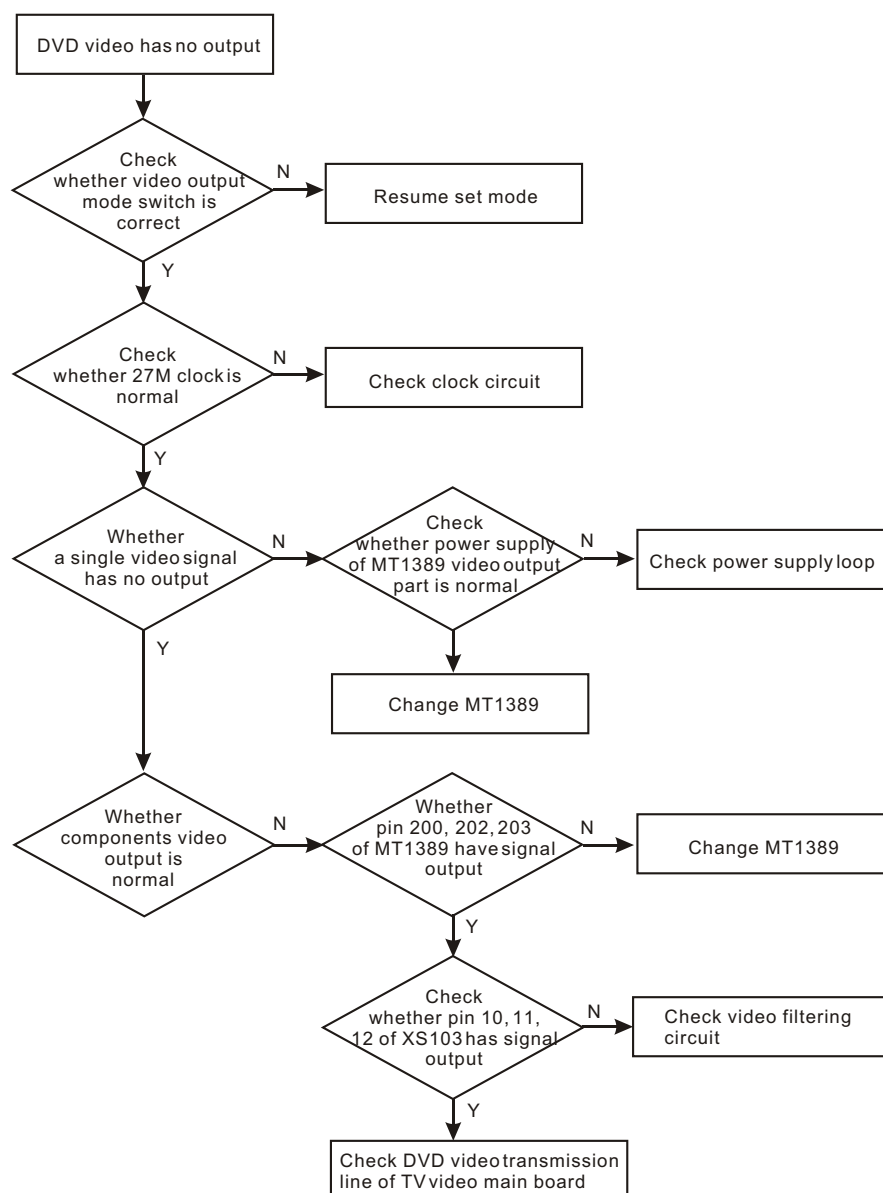


Figure 3.3.2.3 Troubleshooting flow chart for “DVD has no video output”

4. Troubleshooting process for “DVD has no sound output” is shown in the figure 3.3.2.4:

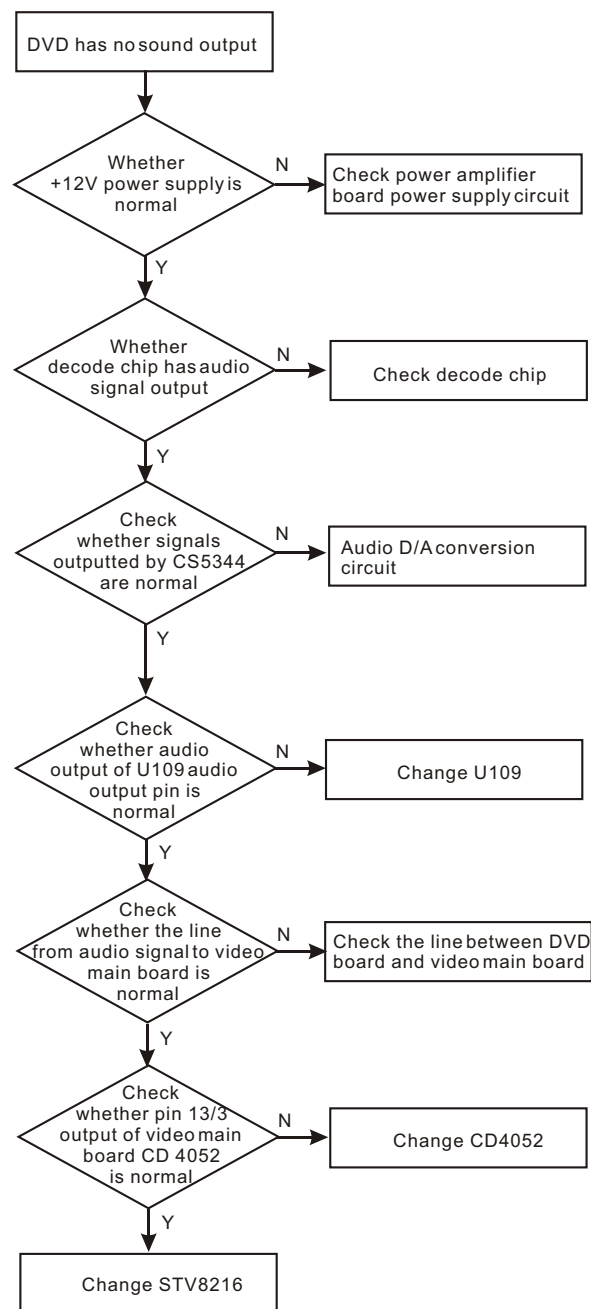


Figure 3.3.2.4 Troubleshooting flow chart for “DVD has no sound output”

5. Troubleshooting process for “DVD left channel has no sound” is shown in the figure 3.3.2.5:

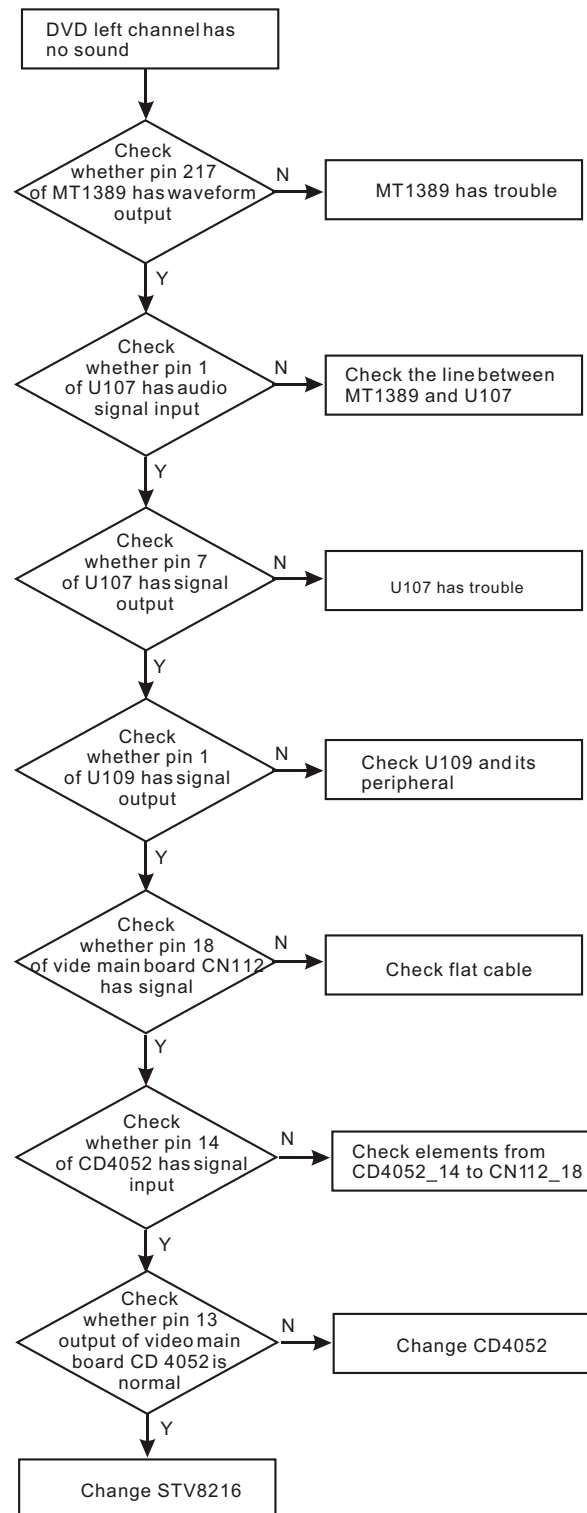
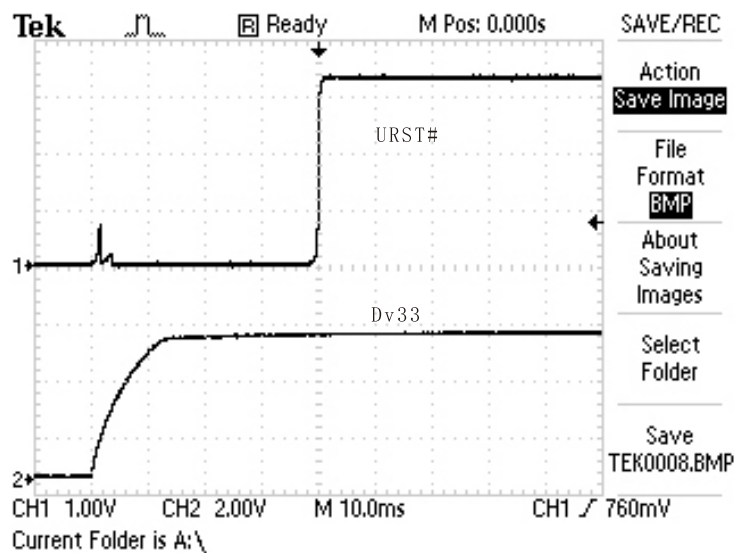


Figure 3.3.2.5 Troubleshooting flow chart for “DVD left channel has no sound”

Section Four Waveform diagram

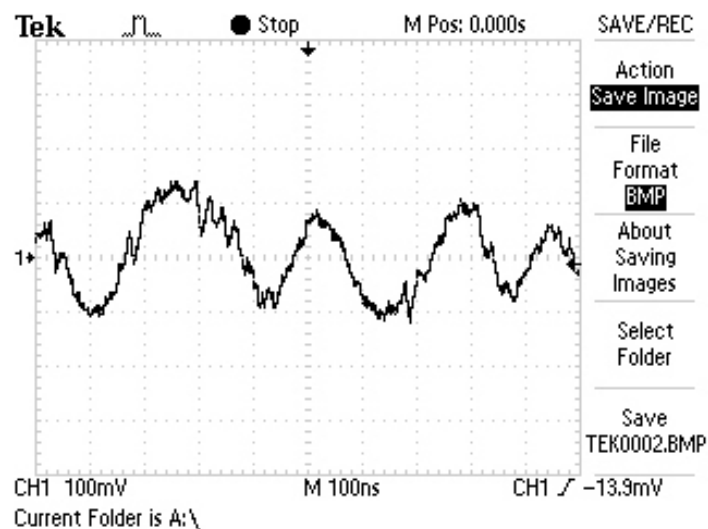
This section collects signal waveform diagram of audio, video and each unit circuit with the purpose to help servicing personnel to judge where trouble lies in accurately and quickly to improve servicing skills. For the difference of oscillograph's type, model and tuner, a certain difference may exist,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

1. Reset waveform diagram

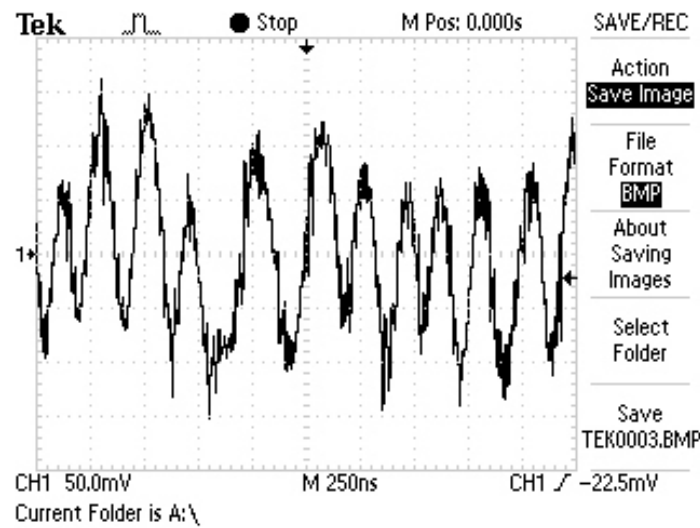


2. Decode board

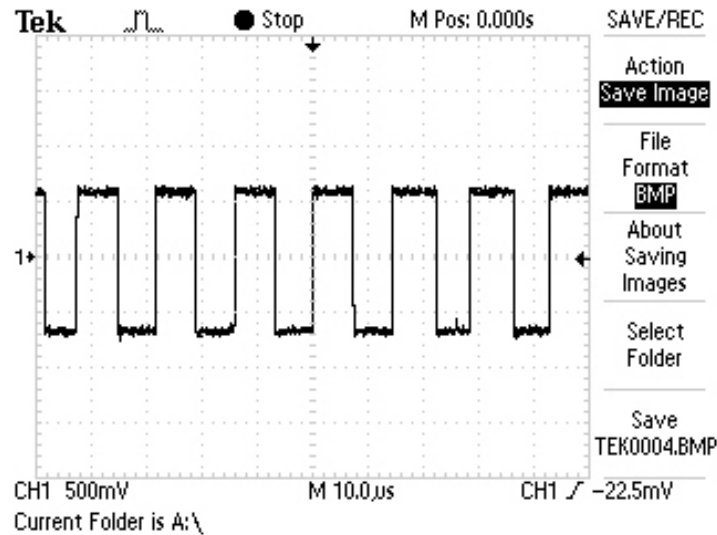
(1) RFO signal waveform diagram of pin 8 of Xs201



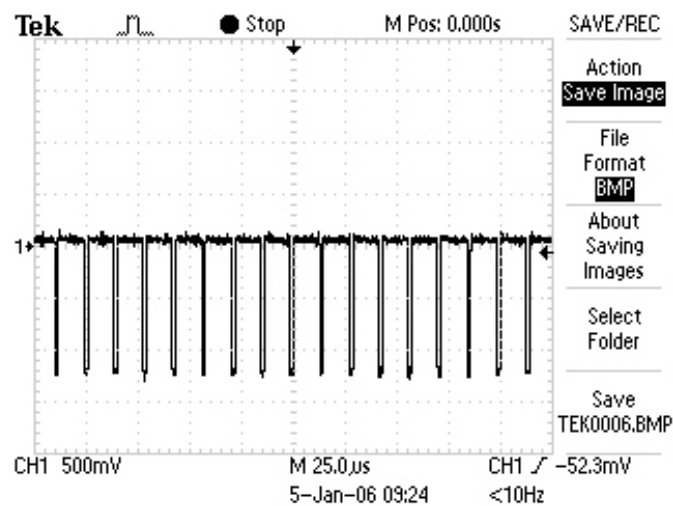
(2) A signal waveform diagram of pin 9 of Xs201(B、C、D、E、F)



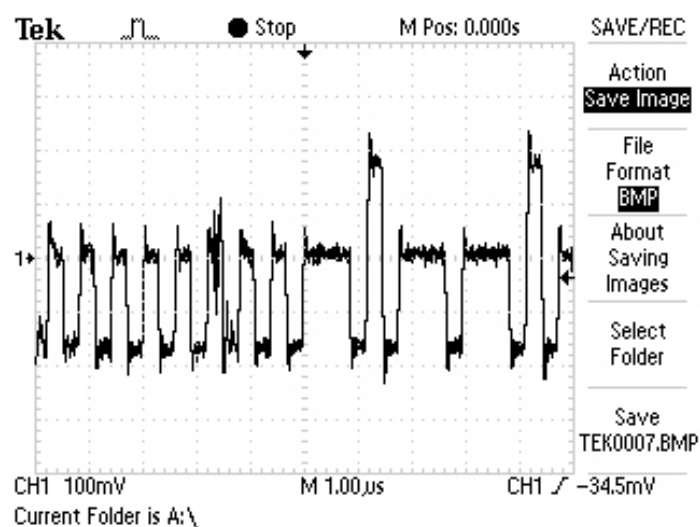
(3) DMO signal (when there is main axis rotation) waveform diagram of pin 37 of U201 (MT1389)



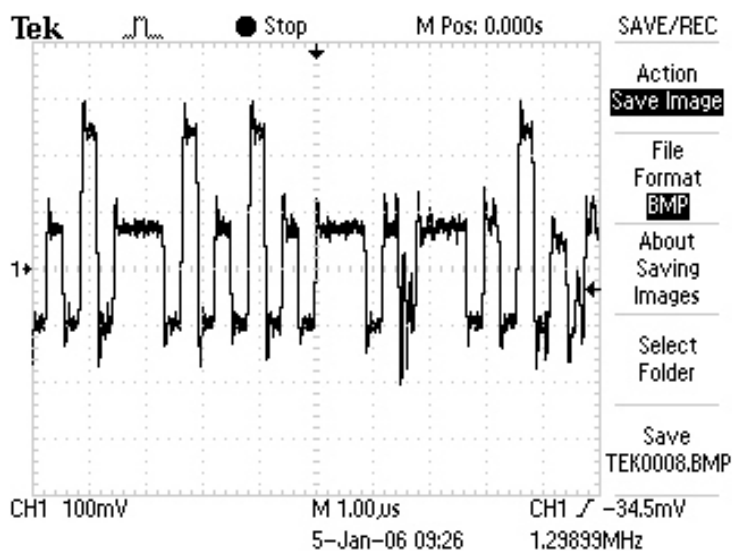
(4) FMO signal (when there is feed) waveform diagram of pin 38 of U201 (MT1389)



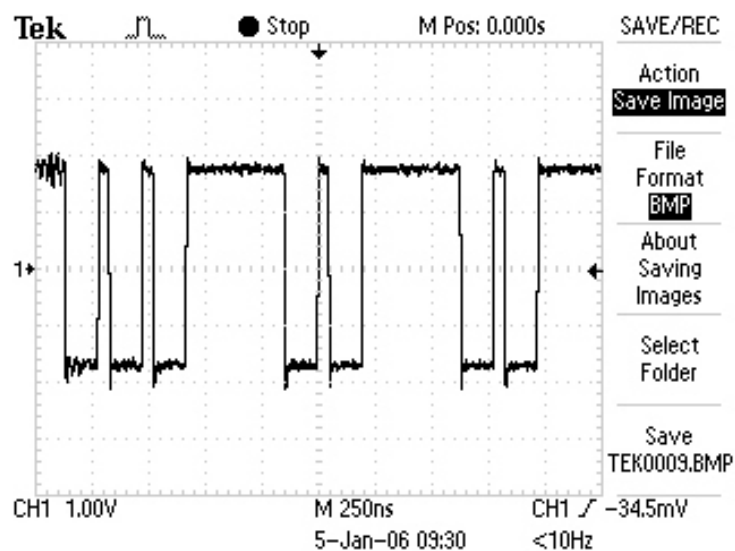
(5) TRO signal (when there is trace) waveform diagram of pin 41 of U201 (MT1389)



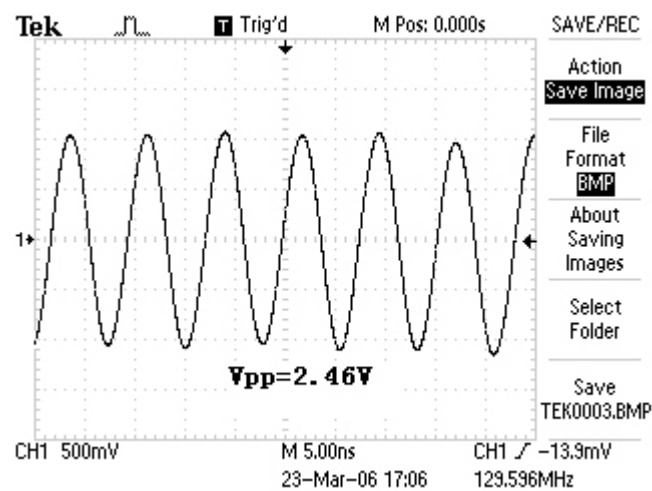
(6) FOO signal (when there is focus) waveform diagram of pin 42 of U201 (MT1389)



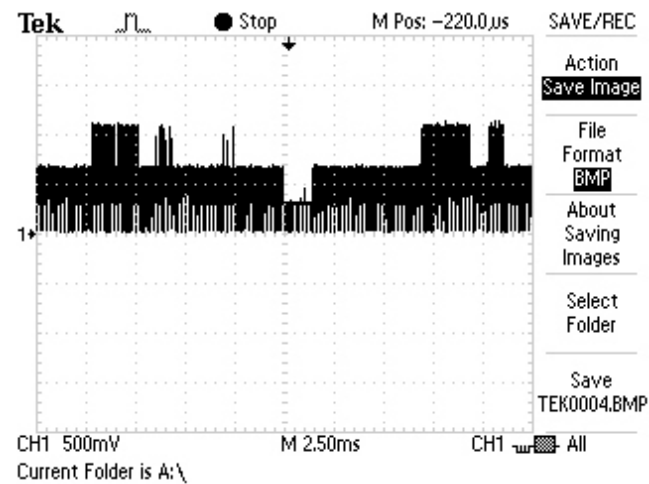
(7) Waveform diagram of pin 29 (when no disc in) of U110 (FLASH)



(8) Waveform diagram of pin 38 of U211 (SDRAM)

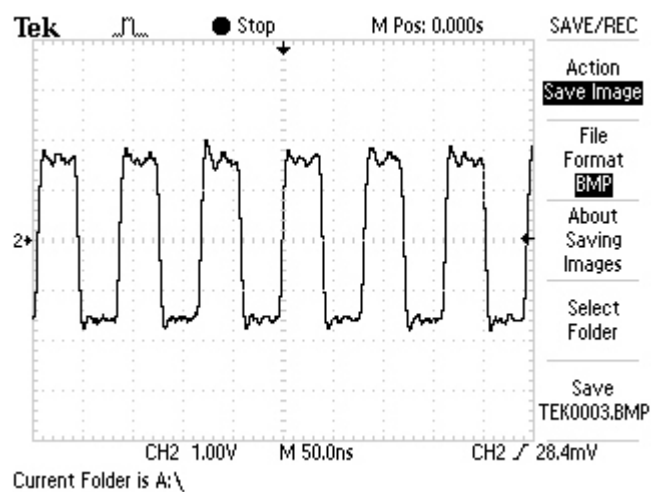


3. Video signal waveform diagram

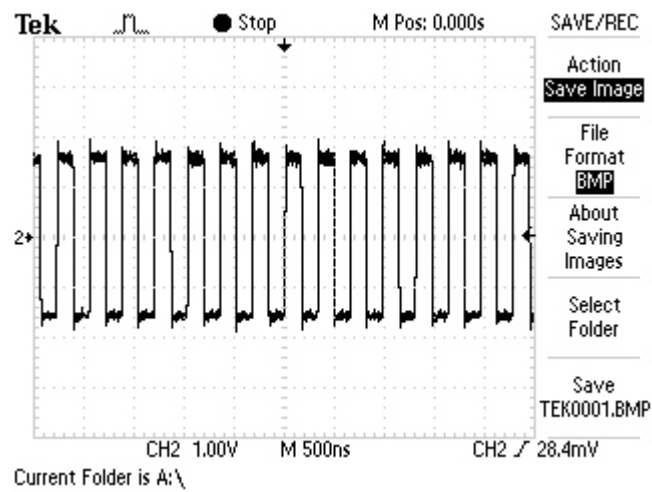


4. Waveform diagram for audio signal

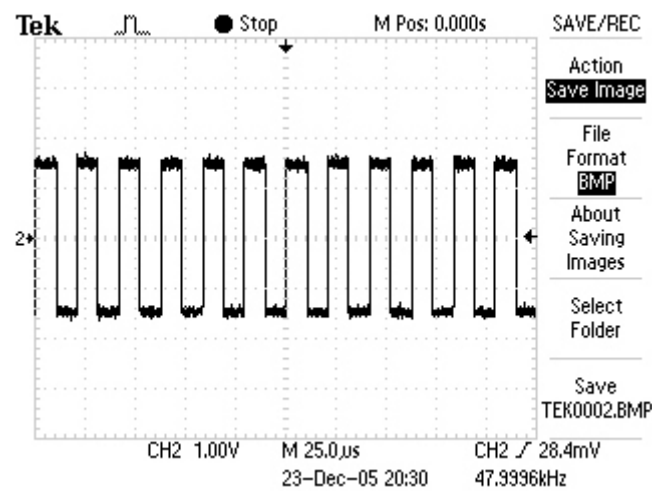
(1) ACLK (12.2878MHZ): waveform diagram for external clock signal



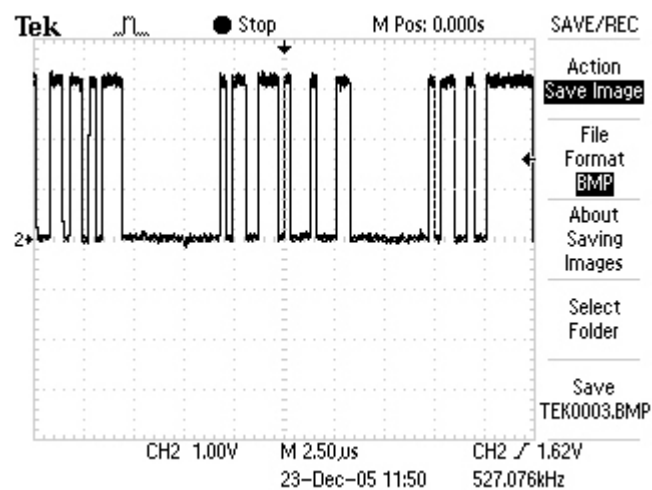
(2) ABCK (3.07195MHZ): waveform diagram for bit clock signal



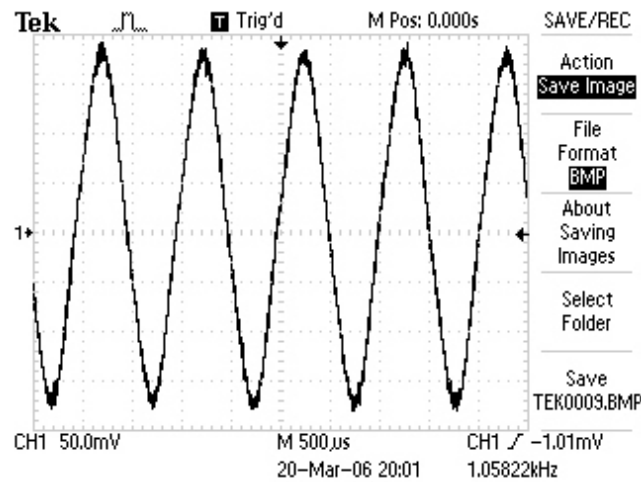
(3) ALRCK (48KHZ): waveform diagram for left/right channel clock signal



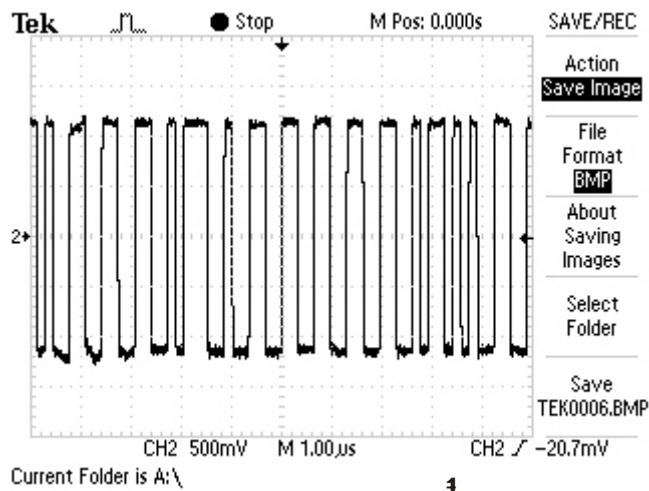
(4) SDATAO: waveform diagram for mixed left/right channel digital signal



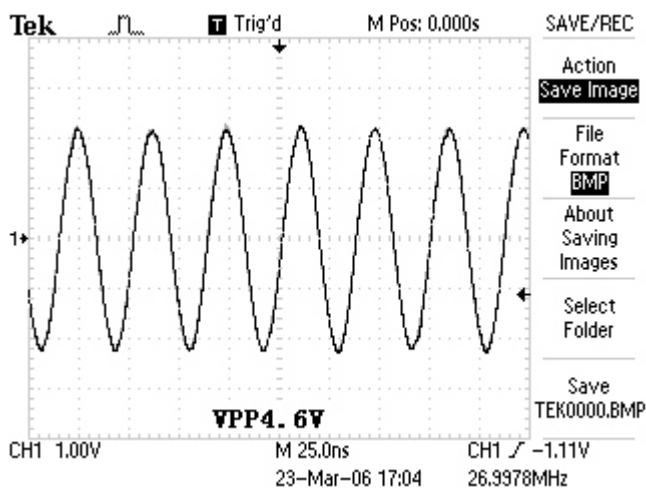
(5) 1KHZ analog audio signal waveform diagram (you are recommended to use test disc, if not, the tested waveform will change at any time to affect judgment), waveform of other channels is the same except subwoofer.



(6) SPDIF: waveform diagram for optical/coaxial digital audio signal



5. 27M clock signal waveform diagram,



Section Five Function Introduction to IC

3.5.1 function introduction to MT1389B

1. Description

MT1389 (U201) adopts LQFP 256 pin packaging and 3.3v/1.8v dual voltage working mode and it is a good-performance large –capacity CD—ROM front end processing CMOS integrated circuit and single chip special for CD/VCD/DVD player, including focus servo error amplifying, trace servo error amplifying and horizontal output servo control.

2. Features

- ◆ RF small signal front stage processing and the main function is to process and amplify A, B, C, D, E, F signals from laser head and then adjust laser output power automatically to identify VCD disc and DVD disc.
- ◆ Digital servo processing: focus, trace, feed and main servo control signal may be produced to finish EFM/EFM+ demodulating to RF signal.
- ◆ MPEG—1/MPEG—2/MPEG—4/JPEG Video decode: this chip can not only decode VCD, DVD, but also realize MPEG 4 network video decoding, compatible with “Network movie discs” and read JPEG picture to realize digital album playback function.
- ◆ In audio aspect, AC-3/DTS dual decode can be fulfilled, read MP3 actively, compatible with DVD—Audio decode to achieve high resolution sound quality 1000 times higher than that of CD disc.
- ◆ By using chip’s built-in 8032 micro processor, MT1389 may control system of the player to greatly simplify circuit design.

3. PIN Description

Pin	Name	Function	Data direction	Remark
1	AGND	Analog ground		
2	DVDA	DVD-RF high frequency AC coupling signal A	I	A, B, C, D signals from loader
3	DVDB	DVD-RF high frequency AC coupling signal B	I	Are coupled by capacitor C201,
4	DVDC	DVD-RF high frequency AC coupling signal C	I	C202, C203, C204
5	DVDD	DVD-RF high frequency AC coupling signal D	I	

6	DVDRFIP	DVD-RF high frequency AC coupling signal RFIP input	I	unused
7	DVDRFIN	DVD-RF high frequency AC coupling signal RFIN input	I	
8	MA	DVD-RAM main light beam RF DC signal input A	I	A, B, C, D signals from loader
9	MB	DVD-RAM main light beam R DC signal input B	I	Are coupled by resistor R201, R202, R203, R204
10	MC	DVD-RAM main light beam RF DC signal input C	I	
11	MD	DVD-RAM main light beam RF DC signal input D	I	
12	SA	DVD-RAM subsidiary light beam RF DC signal input A	I	unused
13	SB	DVD-RAM subsidiary light beam RF DC signal input B	I	
14	SC	DVD-RAM subsidiary light beam RF DC signal input C	I	
15	SD	DVD-RAM subsidiary light beam RF DC signal input D	I	
16	CDFON	CD focus error negative phase input	I	
17	CDFOP	CD focus error positive phase input	I	
18	TNI	3 light beam subsidiary PD signal negative phase input	I	E, F signals input directly
19	TPI	4 light beam subsidiary PD signal positive phase input	I	
20	MDI1	Laser power monitoring input 1	I	
21	MDI2	Laser power monitoring input 2	I	
22	LDO2	Laser power output 2	O	
23	LDO1	Laser power output 1	O	
24	SVDD3	Servo 3.3V power		
25	CSO/RFOP	Main servo signal output/RF positive phase output	O	R2165 is not used, so this two pins are not used
26	RFLVL/RFON	RF level output/RF negative phase output	O	
27	SGND	Servo ground		
28	V2REFO	Reference voltage 2.8V	O	
29	V20	Reference voltage 2.0V	O	

30	VREFO	Reference voltage 1.4V	O	
31	FEO	Focus error signal output	O	R2166 unused
32	TEO	Trace error signal output	O	
33	TEZISLV	Trace zero-passage error input	I	Joint welding with capacitor C207 connected here will cause no disc reading
34	OP_OUT	Sensor signal amplifying output	O	Input and output of main axis braking circuit
35	OP_INN	Sensor signal negative phase input	I	
36	OP_INP	Sensor signal positive phase input	I	
37	DMO	Main axis control signal output	O	
38	FMO	Feed control signal output	O	
39	TROPEN PWM	CLOSE signal output	O	
40	PWMOUT1/ADIN9	The first path PWM signal output/AD general input	I	unused
41	TRO	Trace control signal output	O	
42	FOO	Focus control signal output	O	
43	USB_VSS	USB ground		
44	USBP	USB data	I/O	unused
45	USBM	USB data	I/O	
46	USB_VDD3	USB 3.3V power		
47	FG/ADIN8	Hall sensor signal input/AD general input	I	
48	TDI/ADIN4	Open-to-position detect signal input/AD general input	I	
49	TMS/ADIN5	Close-to-position detect signal input /AD general input	I	
50	TCK/ADIN6	BA5954 enable signal output/AD general input	O	
51	TDO/ADIN7	OPEN signal outout/AD general input	O	
52	DVDD18	Digital 1.8V power		
53	IOA2	Micro controller address bit 2	O	FLASH address signal
54	IOA3	Micro controller address bit 3	O	
55	IOA4	Micro controller address bit 4	O	
56	IOA5	Micro controller address bit 5	O	
57	IOA6	Micro controller address bit 6	O	
58	IOA7	Micro controller address bit 7	O	

59	HIGHA0	Micro controller address bit 0	O	
60	IOA18	Micro controller address bit 18	O	
61	IOA19	Micro controller address bit 19	O	
62	DVSS	Digital ground		
63	APLLCAP	Analog lock-latched loop external capacitor		
64	APLLVSS	Analog lock-latched loop ground		
65	APLLVDD3	Analog phase-locked loop 3.3V power		
66	IOWR	FLASH read-write control signal	O	Output PWR#, through zero-ohm resistor R297, change to DWR# signal to control FLASH
67	A16	FLASH address bit 16	O	FLASH data signal
68	HIGHA7	Micro controller address bit 7	O	
69	HIGHA6	Micro controller address bit 6	O	
70	HIGHA5	Micro controller address bit 5	O	
71	HIGHA4	Micro controller address bit 4	O	
72	HIGHA3	Micro controller address bit 3	O	
73	DVDD3	Digital 3.3V power		
74	HIGHA2	Micro controller address bit 2	O	FLASH address signal
75	HIGHA1	Micro controller address bit 1	O	FLASH address signal
76	IOA20	Micro controller address bit 20	O	
77	IOCS	FLASH chip selection	O	Output PCE#, through zero-ohm resistor R298, change to DCE# signal to control FLASH
78	IOA1	Micro controller address bit 1	O	FLASH address signal
79	IOOE	FLASH output enable	O	Output PRD#, through zero-ohm resistor R299, change to DRD# signal to control output of FLASH
80	DVDD3	Power		
81	AD0	Micro controller address/data bit 0	I/O	FLASH data signal
82	AD1	Micro controller address/data bit 1	I/O	
83	AD2	Micro controller address/data bit 2	I/O	
84	AD3	Micro controller address/data bit 3	I/O	
85	DVSS	Ground		

86	AD4	Micro controller address/data bit 4	I/O	FLASH data signal
87	AD5	Micro controller address/data bit 5	I/O	
88	AD6	Micro controller address/data bit 6	I/O	
89	IOA21/ADIN0	Micro controller address bit 21/AD general input	O	FLASH data signal
90	ALE	Micro controller address enable	O	unused
91	AD7	Micro controller address/data bit 7	I/O	FLASH data signal
92	A17	FLASH address bit 17	O	FLASH address signal
93	IOA0	Micro controller address bit 0	O	
94	DVSS	Digital ground		
95	UWR	Microcontroller write operation		unused
96	URD	Microcontroller read operation		
97	DVDD18	Digital 1.8V power		
98	UP1_2	Micro controller port		unused
99	UP1_3	Micro controller port	O	Panel communication clock
100	UP1_4	Micro controller port	I/O	Panel communication data
101	UP1_5	Micro controller port	O	Panel communication enable
102	UP1_6	Micro controller port	O	I2C clock
103	UP1_7	Micro controller port	I/O	I2C data
104	UP3_0	Micro controller port	O	HDMI clock
105	UP3_1	Micro controller port	O	HDMI data
106	UP3_4	Micro controller port	I/O	unused
107	UP3_5	Micro controller port	I/O	Serial communication port
108	DVDD3	Power		
109	ICE	Micro controller correction mode enable		Ground through 1K resistor R213
110	PRST	Reset input	I	
111	IR	Remote control signal input	I	
112	INT0	Micro controller intermission 0	I	1392 intermission control
113	DQM0	DRAM input/output screen-shielded signal	O	
114	DQS0	DRAM input/output screen-shielded signal	O	
115	RD7	DRAM data	I/O	SDRAM data line
116	DVSS	Ground		
117	RD6	DRAM data	I/O	SDRAM data line

118	RD5	DRAM data	I/O	
119	DVSS	Ground		
120	RD4	DRAM data	I/O	SDRAM data line
121	RD3	DRAM data	I/O	
122	DVDD18	Digital 1.8V power		
123	RD2	DRAM data	I/O	SDRAM data line
124	RD1	DRAM data	I/O	
125	RD0	DRAM data	I/O	
126	RD15	DRAM data	I/O	
127	DVDD3	Digital 3.3V power		
128	RD14	DRAM data	I/O	SDRAM data line
129	RD13	DRAM data	I/O	
130	RD12	DRAM data	I/O	
131	RD11	DRAM data	I/O	
132	RD10	DRAM data	I/O	
133	RD9	DRAM data	I/O	
134	DVSS	Ground		
135	RD8	DRAM data	I/O	SDRAM data line
136	DQS1	DRAM input/output screen-shielded signal	O	
137	DQM1	DRAM input/output screen-shielded signal	O	
138	RWE	DRAM wrote enable	O	Output WE#, through 33-ohm resistor R216, change to DWE# to control the write of SDRAM
139	CAS	DRAM line address selection	O	Output CAS#, through 33-ohm resistor R267, change to DCAS# to control the line address selection of SDRAM
140	RAS	DRAM row address selection	O	Output RAS#, through 33-ohm resistor R266, change to DRAS# to control the row address selection of SDRAM
141	DVDD3	Digital 3.3V power		
142	RCS	DRAM chip selection	O	Output CS#, through 33-ohm resistor R265, change to DCS# to control the chip selection of SDRAM

143	BA0	DRAM segment address 0	O	
144	DVSS	Ground		
145	BA1	DRAM segment address 1	O	SDRAM address line
146	RA10	DRAM address	O	
147	RA0	DRAM address	O	
148	DVSS	Ground		
149	RA1	DRAM address	O	SDRAM address line
150	RA2	DRAM address	O	
151	RA3	DRAM address	O	
152	DVDD18	Digital 1.8V power		
153	RVREF/ADIN3	Reference voltage/AD general input	I	unused
154	RCLKB	DRAM clock	O	
155	DVDD3	Digital 3.3V power		
156	RCLK	DRAM clock	O	
157	CKE	DRAM clock enable	O	
158	RA11	DRAM address	O	SDRAM address line
159	RA9	DRAM address	O	
160	RA8	DRAM address	O	
161	DVSS	Digital ground		
162	RA7	DRAM address	O	SDRAM address line
163	DVSS	Digital ground		
164	RA6	DRAM address	O	SDRAM address line
165	RA5	DRAM address	O	
166	RA4	DRAM address	O	
167	DVDD3	Digital 3.3V power	O	
168	RD13/ASDATA5	Digital video signal	I	Y7
169	RD30	Digital video signal	O	Y6
170	RD29	Digital video signal	O	Y5
171	RD28	Digital video signal	O	Y4
172	RD27	Digital video signal	O	Y3
173	DVDD18	Digital 1.8V power		
174	RD26	Digital video signal	O	Y2

175	DVSS	Digital ground	I	Ground
176	RD25	Digital video signal	O	Y1
177	RD24	Digital video signal	O	Y0
178	DQM3	DRAM input/output shielded signal	O	R225 is not used, so this signal is not used in this player
179	DQM2	DRAM input/output shielded signal	O	unused
180	RD23	DRAM data	I/O	C7
181	RD22	DRAM data	I/O	C6
182	DVDD3	Digital 3.3V power		
183	RD21	DRAM data		unused
184	RD20	DRAM data		VOICCE-DET#
185	RD19	DRAM data		FS0
186	RD18	DRAM data		PWDN electricity failure control
187	RD17	DRAM data		FS3
188	RD16	DRAM data		FS1
189	DACVDDC	DA conversion 3.3V power		
190	VREF	Reference voltage		
191	FS			
192	YUV0/CIN			unused
193	DACVSSC	DA conversion ground		
194	YUV1/Y	Video signal YUV1 output/Y signal output	O	Provide Y signal to S-video
195	DACVDDB	DA conversion 3.3V power		
196	YUV2/C	Video signal YUV2 output/C signal output	O	Provide C signal to S-video
197	DACVSSB	DA conversion ground		
198	YUV3/CVBS	Video signal YUV3 output/CVBS signal output	O	Provide for video output port (VIDEO)
199	DACVDDA	DA conversion 3.3V power		
200	YUV4/G	Video signal YUV4 output /G signal output	O	Provide Y1 signal for component video output port
201	DACVSSA	DA conversion ground		
202	TUV5/B	Video signal YUV5 output /B signal output	O	Provide Pb signal for component video output port
203	YUV6/R	Video signal YUV6 output /R signal output	O	Provide Pr signal for component video output port

204	DVDD3	Digital 3.3V power		
205	VSYNC/ADIN1	Field synchronous signal output /AD general input	O	Provide VSYNC
206	YUV7/ASDATA5	Video signal YUV7 output/audio serial data		unused
207	HSYNC/ADIN2	Row synchronous signal output /AD general input	O	Provide HSYNC
208	SPMCLK		I	DISCEJT
209	SPDATA			unused
210	SPLRCK			unused
211	SPBCK/ASDATA5			unused
212	DVDD3	Digital 3.3V power		
213	ALRCK	Audio left/right channel clock	O	Output audio left/right channel clock
214	ABCK	Audio bit clock	O	Output audio bit clock
215	ACLK	Audio DAC external clock	O	Output audio DAC external clock
216	DVSS	Digital ground		
217	ASDATA0	Audio serial data	O	Output audio R/L serial data
218	ASDATA1	Audio serial data	O	Output audio SR/SL serial data
219	ASDATA2	Audio serial data	O	Output audio C/SW serial data
220	ASDATA3	Audio serial data		Output composite audio R/L serial data
221	DVDD18	Digital 1.8V power		
222	ASDATA4	Audio serial data	O	Give audio IV reset signal
223	DVSS	Digital ground		
224	MC_DATA	MIC digital audio input	I	MIC digital audio input
225	SPDIF	Digital audio signal output	O	Digital audio signal output
226	RFGND18	RF signal ground		
227	RFVDD18	RF signal 1.8V power		
228	XTALO	Clock output	O	
229	XTALI	Clock input	I	
230	JITFO	RF small signal output	O	
231	JITFN	RF signal positive phase amplifying input	I	
232	PLLSS	Phase locked loop ground		
233	IDACEXP			
234	PLLDD3	Phase locked loop 3.3V power		
235	LPFON	Amplifier loop filtering output	O	

236	LPFIP	Amplifier loop filtering input	I	
237	LPFIN	Amplifier loop filtering input	I	
238	LPFOP	Amplifier loop filtering output	O	
239	ADCVDD3	Analog conversion 3.3V power		
240	S_VCM			
241	ADCVSS	A/D conversion ground		
242	S_VREFP			
243	S_VREFN			
244	RFVDD3	RF 3.3V power		
245	RFRPDC	DC RF error signal input		
246	RFRPAC	AC RF error signal input		
247	HRFZC	High frequency RF signal zero-passage detect		
248	CRTPLP			
249	RFGND	RF ground		
250	CEQP			
251	CEQN			
252	OSP			
253	OSN			
254	RFGC			
255	IREF	Reference power		
256	AVDD3	Analog 3.3V power		

3.5.2 function introduction to FLASH(U110)

FLASH 16Mbit memorizer, FLASH function pin are shown as follows:

Pin	Name	Function	Voltage (when no disc)	Data direction
1-9, 16-25, 48	AO-A19	20 bit address bus		I
11	WE	Write enable signal, low level is effective	3.23V	I
12	RESET	Reset, low level is effective	3.23V	I
10, 13, 14	NC	Blank pin		
15	RY/BY	Ready/system busy	3.23V	O
26	CE	Chip enable, low level effective	0V	I

27、46	VSS	Ground		
28	OE	Output enable signal , low level is effective	0V	I
29-3, 6, 38-44	DQ0-DQ14	15 bit data bus		O
37	VCC	5V power supply	+5V	
45	DQ15/A-1	Take word extend mode as data line, and bit extend mode as address line		I/O
47	BYTE	Select 8-bit or 16-bit output mode. High level is 16-bit output and low level is 8-bit output		I

3.5.3 function introduction to SDRAM (HY57V641620HGT-7 TSOP)

The function of SDRAM (U108) in the player is to save program taken out by Mt1389 from FLASH and information of picture and sound taken out from disc when the player is working to form damping, add the stability of information output and add anti-vibration of the player. The pin function and real voltage are shown as the following table:

Pin	Name	Function	Data direction	Voltage when no disc	Pin	Name	Function	Data direction	Voltage when no disc
1	VDD	3.3V power supply		3.18	28	VSS	Ground		0.01
2	DQ0	Data bus	I/O	0.94	29	MA4	Address bus	I	1.65
3	VDDQ	3.3V power supply	I/O	3.19	30	MA5	Address bus	I	1.74
4	DQ1	Data bus	I/O	0.9	31	MA6	Address bus	I	1.49
5	DQ2	Data bus	I/O	1.3	32	MA7	Address bus	I	1.22
6	VSSQ	Ground		0	33	MA8	Address bus	I	0.05
7	DQ3	Data bus	I/O	1.2	34	MA9	Address bus	I	0.04
8	DQ4	Data bus	I/O	1.5	35	MA11	Address bus	I	0.04
9	VDDQ	3.3V power supply		3.18	36	NC	Blank pin		0.01
10	DQ5	Data bus	I/O	0.7	37	CKE	Clock enable signal	I	1.22
11	DQ6	Data bus	I/O	0.45	38	CLK	System clock input	I	1.68
12	VSSQ	Ground		0	39	UDQM	Data in/out screen-shielded signal	I	2.42
13	DQ7	Data bus	I/O	0.8	40	NC	Blank pin		0.01
14	VDD	3.3V power supply		3.14	41	VSS	Ground		0.01
15	LDQM	Data in/out screen-shielded signal	I	2.46	42	DQ8	Data bus	I/O	0.6

16	WE	Write control signal	I	3.17	43	VDDQ	3.3V power supply		3.19
17	CAS	Line address gating signal	I	3.01	44	DQ9	Data bus	I/O	0.91
18	RAS	Row address gating signal	I	3.13	45	DQ10	Data bus	I/O	0.8
19	CS	Chip selection signal	I	2.95	46	VSSQ	Ground		0.01
20	SD-BS0	Section address 0 gating signal	I	1.8	47	DQ11	Data bus	I/O	0.79
21	SD-BS1	Section address 1 gating signal	I	2	48	DQ12	Data bus	I/O	1.16
22	MA10	Address bus	I	0.04	49	VDDQ	3.3V power supply		3.19
23	MA0	Address bus	I	0.36	50	DQ13	Data bus	I/O	1.15
24	MA1	Address bus	I	0.35	51	DQ14	Data bus	I/O	1.24
25	MA2	Address bus	I	2.38	52	VSSQ	Ground		0.01
26	MA3	Address bus	I	1.59	53	DQ15	Data bus	I/O	0.68
27	VDD	3.3V power supply		3.19	54	VSS	Ground		0.01

3.5.4 function introduction to D5954

D5954 (U202) is a servo drive IC with built-in 4-channel drive circuit. Digital focus, trace, feed and main axis drive signal outputted by MT1389 is sent to D5954 for amplifying through RC integration circuit. The focus, trace, feed and main axis drive signal being amplified by D5954 is sent to loader to fulfil the corresponding servo work. The introduction to function pin is shown as the following table:

SN	Name	Function	Voltage when no disc (V)	DVD disc voltage (V)	CD disc voltage (V)
1	VINFC	Focus control signal input	1.41	1.4	1.45
2	CF1	External feedback loop	2.3	2.54	2.43
3	CF2	External feedback loop	2.01	2.56	2.43
4	VINSL+	Forward control input, connected to reference	1.41	1.42	1.42
5	VINSL-	Main axis control signal input	1.4	1.42	1.42
6	VOSL	External feedback resistor	1.4	1.17	1.21
7	VINFFC	Focus feedback signal input	1.92	2.59	2.36
8	VCC	5V power supply	5.38	5.04	5.01
9	PVCC1	5V power supply	5.38	5.04	5.03
10	PGND	Ground	0.01	0.01	0.01
11	VOSL-	Main axis drive reverse voltage output	1.87	3.71	3.54
12	VO2+	Main axis drive forward direction voltage	1.87	1.24	1.4

		output			
13	VOFC-	Focus drive reverse voltage output	3.3	2.6	2.33
14	VOSC+	Focus drive forward voltage voltage output	3.3	2.46	2.68
15	VOTK+	Trace drive forward direction voltage output	3.39	2.56	2.51
16	VOTK-	Trace drive reverse voltage output	3.52	2.48	2.51
17	VOLD+	Feed drive forward direction voltage output	0.93	2.56	2.5
18	VOLD-	Feed drive reverse voltage output	0.93	2.59	2.62
19	PGND	Ground	0.01	0.01	0.01
20	VINFTK	Trace feedback signal input	3.73	2.5	2.53
21	PVCC2	5V power supply	5.38	5.08	5.07
22	PREGND	Ground	0	0.01	0.01
23	VINLD	Feed control signal input	1.4	1.41	1.4
24	CTK2	External feedback loop	2.41	2.52	2.53
25	CTK1	External feedback loop	2.51	2.52	2.53
26	VINTK	Trace control signal input	1.42	1.42	1.41
27	BIAS	1.4V reference voltage input	1.41	1.42	1.42
28	STBY	Enable control signal	0	3.18	3.19

Note: pin 28 is enable restrain pin, and U302 (D5954) is high level when starting up, low level when not starting up, and pin 4 is 1.4V reference voltage.

3.5.5 function introduction to 4558/4580(U109)

4558/4580 includes two integrated operational amplifiers inside, and pin function is shown as the following table:

Pin	Function	Signal flow	Pin	Function	Signal flow
1	Output of operational amplifier A	O	5	Output of operational amplifier B	O
2	Cathode input of port operational amplifier A	I	6	Cathode input of port operational amplifier B	I
3	Anode input port of operational amplifier A	I	7	Anode input of port operational amplifier B	I
4	minus 9V voltage input	I	8	(+) 9V voltage input	I

3.5.6 function introduction to 24CC02A SOP (U101)

1. IS24C02 is a writable and programmable read-only memorizer, with its casing and pin function shown in the following figure 3.5.6.1:

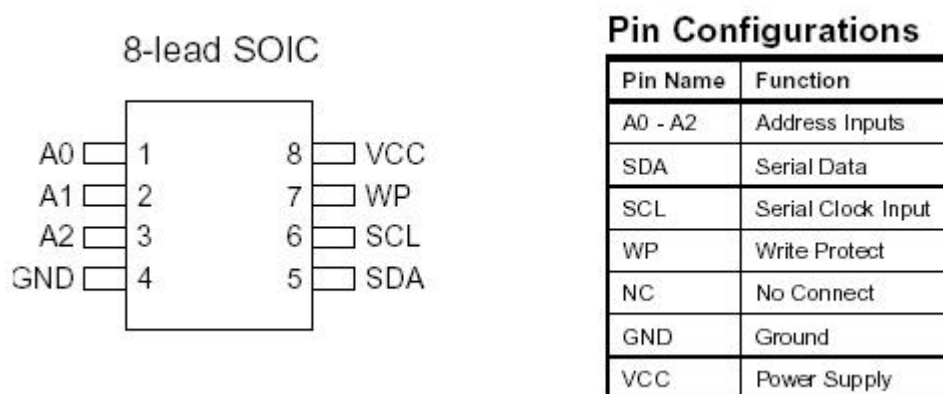


Figure 3.5.6.1 Casing and pin function explanation

2. The function of 24LLC02 is to keep some setup status of machine, such as system information of sound and language selection, not losing after power on and still keeping the information set last time when power on the next time. The circuit schematic diagram is shown as the figure3.5.6.2:

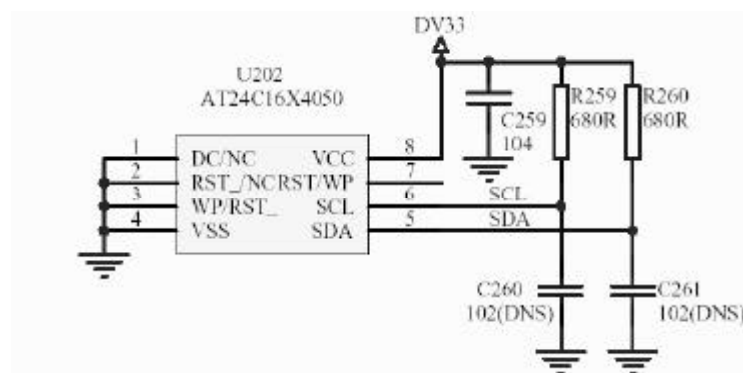


Figure 3.5.6.2 Circuit schematic diagram

3.5.7 function introduction to cs4344

1 Description

The CS4344 family members are complete, stereo digital- to-analog output systems including interpolation, multi-bit D/A conversion and output analog filtering in a 10-pin package. The CS4344/5/6/8 support all major audio data interface formats, and the individual devices differ only in the supported interface format.

The CS4344 family is based on a fourth order multi-bit delta-sigma modulator with a linear analog low-pass filter.

This family also includes auto-speed mode detection using both sample rate and master clock ratio as a method of auto-selecting sampling rates between 2 kHz and 200 kHz.

The CS4344 family contains on-chip digital de-emphasis, operates from a single +3.3 V or +5 V power supply, and requires minimal support circuitry. These features are ideal for DVD players & recorders, digital televisions, home theater and set top box products, and automotive audio systems.

2. Features

- # Multi-bit Delta-Sigma Modulator
- # 24-bit Conversion
- # Automatically Detects Sample Rates up to 192 kHz.
- # 105 dB Dynamic Range
- # -90 dB THD+N
- # Low Clock-Jitter Sensitivity
- # Single +3.3 V or +5 V Power Supply
- # Filtered Line-Level Outputs
- # On-chip Digital De-emphasis
- # Popguard™ Technology
- # Small 10-pin TSSOP Package

3. PIN DESCRIPTIONS

Pin Name	pin	Pin Description
SDIN	1	Serial Audio Data Input (Input) - Input for two's complement serial audio data.
DEM/SCLK	2	De-Emphasis/External Serial Clock Input (Input) - used for de-emphasis filter control or external serial clock input.
LRCK	3	Left Right Clock (Input) - Determines which channel, Left or Right, is currently active on the serial audio data line.
MCLK	4	Master Clock (Input) - Clock source for the delta-sigma modulator and digital filters.
VQ	5	Quiescent Voltage (Output) - Filter connection for internal quiescent voltage.
FILT+	6	Positive Voltage Reference (Output) -Positive reference voltage for the internal sampling circuits.
AOUTL	7	Left Channel Analog Output (Output) - The full scale analog output level is specified in the Analog Characteristics specification table.
GND	8	Ground (Input) - ground reference.
VA	9	Analog Power (Input) -Positive power for the analog and digital sections.
AOUTR	10	Right Channel Analog Output (Output) - The full scale analog output level is specified in the Analog Characteristics specification table.

3.5.8 function introduction to au9362

1. Description

The AU9362 is a single chip USB flash memory reader controller which supports not only the widely used flash memory cards and then manipulating flexible others such as Compact Flash (CF) card, Micro Drive (MD), SmartMedia Card (SMC), XD Picture Card, Memory Stick (MS), Memory Stick Duo, Memory Stick PRO, Secure Digital (SD) and Multimedia Card (MMC), It can be used as removable storage disks in enormous data exchange applications between PC and PC or PC and various consumer electronic appliances.

The AU9362 reads digital data saved on memory card while users can manipulating electronic devices such as digital cameras, MP3 players, PDAs and mobile phones... etc. In addition AU9362 that users can transfer manifold information such as data, graphics, text s or digital images from one electronic device to another quickly and easily. With AU9362, users' knowledge will be further enhanced by the Plug-and-Play nature built into latest operation systems such as Windows 2000/XP and Mac OS X. By integrating of various analog components, the AU9362 is the most powerful and most effective solution for various flash memory reader.

2. Features

- # Fully compliant with USB v1.1 specification and USB Device Class Definition for Mass Storage, Bulk-Transport v1.0

- # Fully compliant with Compact Flash (CF) v1.4 Specification

- # Fully compliant with Secure Digital (SD) v1.0 Specification.

- # Fully compliant with Memory Stick (MS) v1.3 Specification.

- # Fully compliant with Memory Stick PRO v1.0 Specification.

- # Fully compliant with Memory Stick ROM Format v1.0 Specification.

- # Fully compliant with Memory Stick Duo Format v1.01 Specification.

- # Fully compliant with Smart Media Card (SMC) Standard 2000 Specification.

- # Support 1 piece NAND type flash memory up to 2Gbit capacity.

- # Support Mask ROM Card capacity from 2MB to 256MB.

- # Work with default driver from Windows ME, Windows XP, Mac OS 9, and Mac OS X. Windows 98, Windows 2000 are supported by vendor driver from Alcor.

- # Ping-pong FIFO implementation for concurrent bus operation

- # Support multiple sectors transfer to 4GB to optimize performance

- # Support optional external EEPROM for USB VID, PID and string customization

- # Support slot to slot read/write operation.

- # Support auto-detecting slot with card inserted on Win 2000 without driver.

- # Capable of handling 8 sets of built-in PID, VID and strings to minimize inventory control and improve lead production lead time

- # Support 5 different LEDs for bus activity indication of 5 separated slots.

Each slot can be enables/disabled by 5 independent pins to fit all the different card readers' combinations requirement.

Integrated 4 power switches and power management circuit for each slot to meet USB 500uA power consumption during suspend with card in the slot.

Runs at 12MHz, built-in 48 MHz PLL

Built-in 3.3V regulator

64-pin LQFP package

3.Pin Description

Pin	Pin Name	I/O Type	Description
1	VCCA	PWR	Analog 3.3V input.
2	GNDA	PWR	Ground. Analog ground.
3	XTAL1	I	Crystal Oscillator Input (12MHz).
4	XTAL2	O	Crystal Oscillator Output (12MHz).
5	VCC2CARD	O	Connect to Card Power.
6	VCC5V	PWR	5V power supply from USB connector.
7	VCC3V	PWR	Internally regulated 3.3V power supply output. It is used to pull up USB_DP externally, as well as being the power supply for VCCK and VCCA.
8	GNDIO	PWR	Chip I/O Ground.
9	USB_DM	I/O	USB DM.
10	USB_DP	I/O	USB DP.
11	SMWRN	O	SMC Write Enable.(0: write enable, 1: write disable.)
12	SMALE	O	SMC Address Latch Enable. (0: ALE closed, 1: ALE open.)
13	SMCLE	O	SMC Command Latch Enable. (0: CLE closed, 1: CLE open.)
14	SMRDN	O	SMC Read Enable. (0: read enable, 1: read disable.)
15	SMRBN	I	SMC Ready/Busy. (0: busy, 1: ready.)
16	SMDATA0	I/O	SMC Data0.
17	SMDATA4	I/O	SMC Data4.
18	SMDATA5	I/O	SMC Data5.
19	SMDATA6	I/O	SMC Data6.
20	ROMD3/ XDSLOTEN	I/O	ROM Data3. XD card slot enable.(0: disable, 1: enable.)
21	SMDATA7	I/O	SMC Data7.
22	SMDATA3	I/O	SMC Data3.

23	SMDATA2	I/O	SMC Data2.
24	ROMD6/ XDWPN	I/O	ROM Data6. XD Write protect (0: protect, 1: not protect.)
25	SMDATA1	I/O	SMC Data1.
26	CFD0	I/O	CF Card Data0.
27	CFD1	I/O	CF Card Data1.
28	CFD2	I/O	CF Card Data2.
29	CFD3	I/O	CF Card Data3
30	CFD4	I/O	CF Card Data4.
31	CFD5	I/O	CF Card Data5.
32	CFD6	I/O	CF Card Data6.
33	CFD7	I/O	CF Card Data7.
34	CFCDN	I	CF Card Detect. Internal pull-up pad.
35	CFWRN	O	CF Card IOWRN.
36	CFWEN	O	CF Card WE.
37	CFOEN	O	CF Card OE.
38	CFWTN	I	CF Card WAIT.
39	CFAD9	O	CF Card Addr9.
40	CFAD3	O	CF Card Addr3.
41	CFAD2	O	CF Card Addr2.
42	CFAD1	O	CF Card Addr1.
43	CFAD0	O	CF Card Addr0.
44	CFRDN	O	CF Card IORD.
45	XDCEN	O	XD Card Enable. (0: enable, 1: disable.)
46	SMCDN	I	SMC Card Detect. Internal pull-up pad.
47	SMWPN	I	SMC Write Protect. (0: protected, 1: not protected.)
48	EEPCLK	O	EEPROM Serial Clock.
49	EEPDATA	I/O	EEPROM Serial Data.
50	SMCEN	O	SMC Enable. (0: disable, 1: enable.)
51	SDCMD	I/O	SD CMD.
52	SDCLK	O	SD CLK.
53	SDDATA	I/O	SD Data.
54	SDCDN	I	SD Card Detect. Internal pull-up pad.

55	SDWP	I	SD Write Protect.
56	GPON7	I/O	General Purpose Out, used as activity LED.
57	XDCDN	I	XD Card Detect. Internal pull-up pad.
58	VCCK	PWR	Core 3.3V Input.
59	GNDK	PWR	Ground.
60	VCCMS	PWR	MS 3.3V Input.
61	MSINS	I	MS Card INS. Internal pull-up pad.
62	MSBS	O	MS Card BS.
63	MSCLK	O	MS Card SCLK.
64	MSDATA	I/O	MS Card DATA.

Chapter Four

Disassembly and Assembly Process

TV manufactured in BBK are largely identical but with minor differences and are mainly composed of loader components, control panel components, decode and servo board components, power board components, video board components, In order to speed up the compilation of “Service Manual”, we shall not give repeat explanation to model with minor differences in chapter four “Disassembly and Assembly Process” for the later compiled service manuals. For disassembly and assembly process in this chapter, please refer to chapter 4 of “LD1506SI Service Manual” .

The pictures of this model are shown as follows:

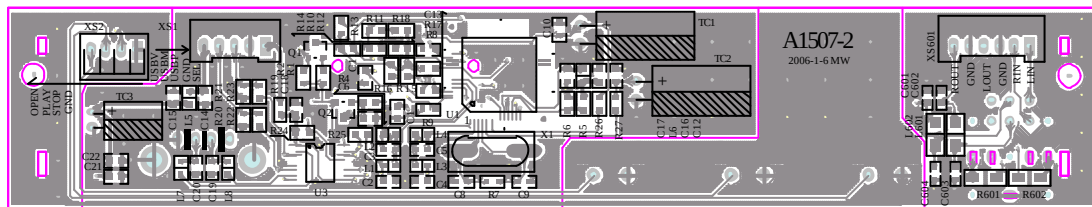


Chapter Cinque

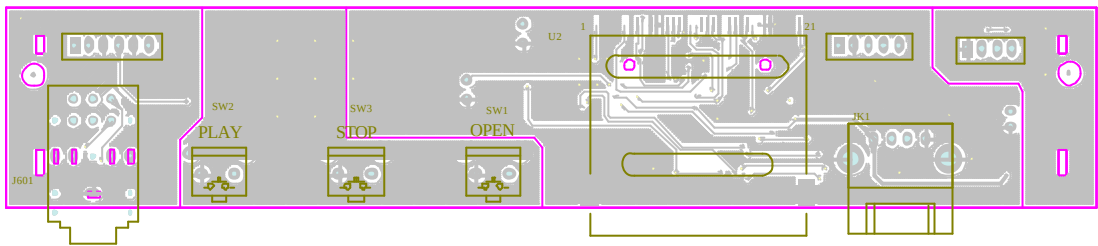
PCB board & Circuit diagram

Section One PCB board

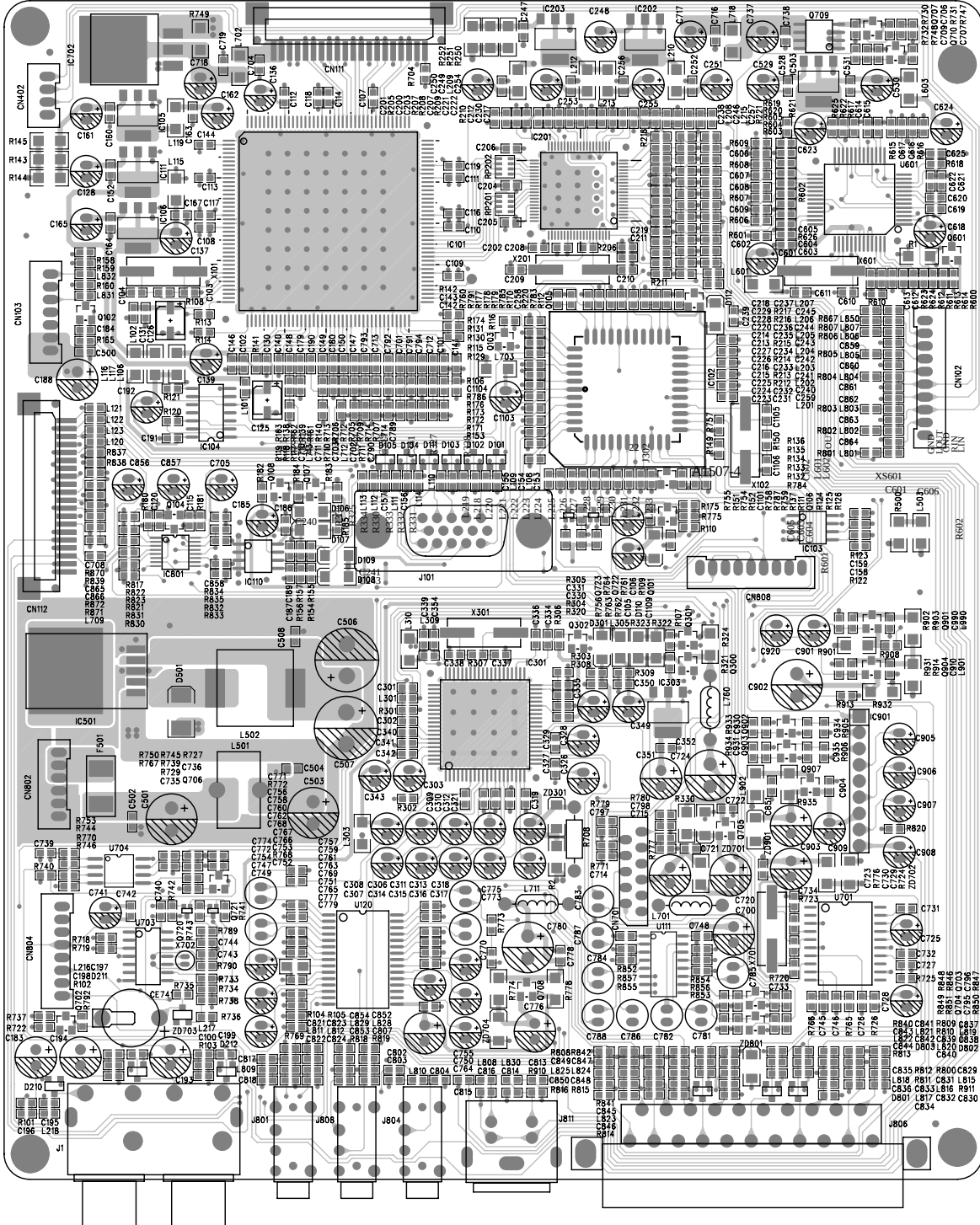
5.1.1 Surface layer of CARD Board



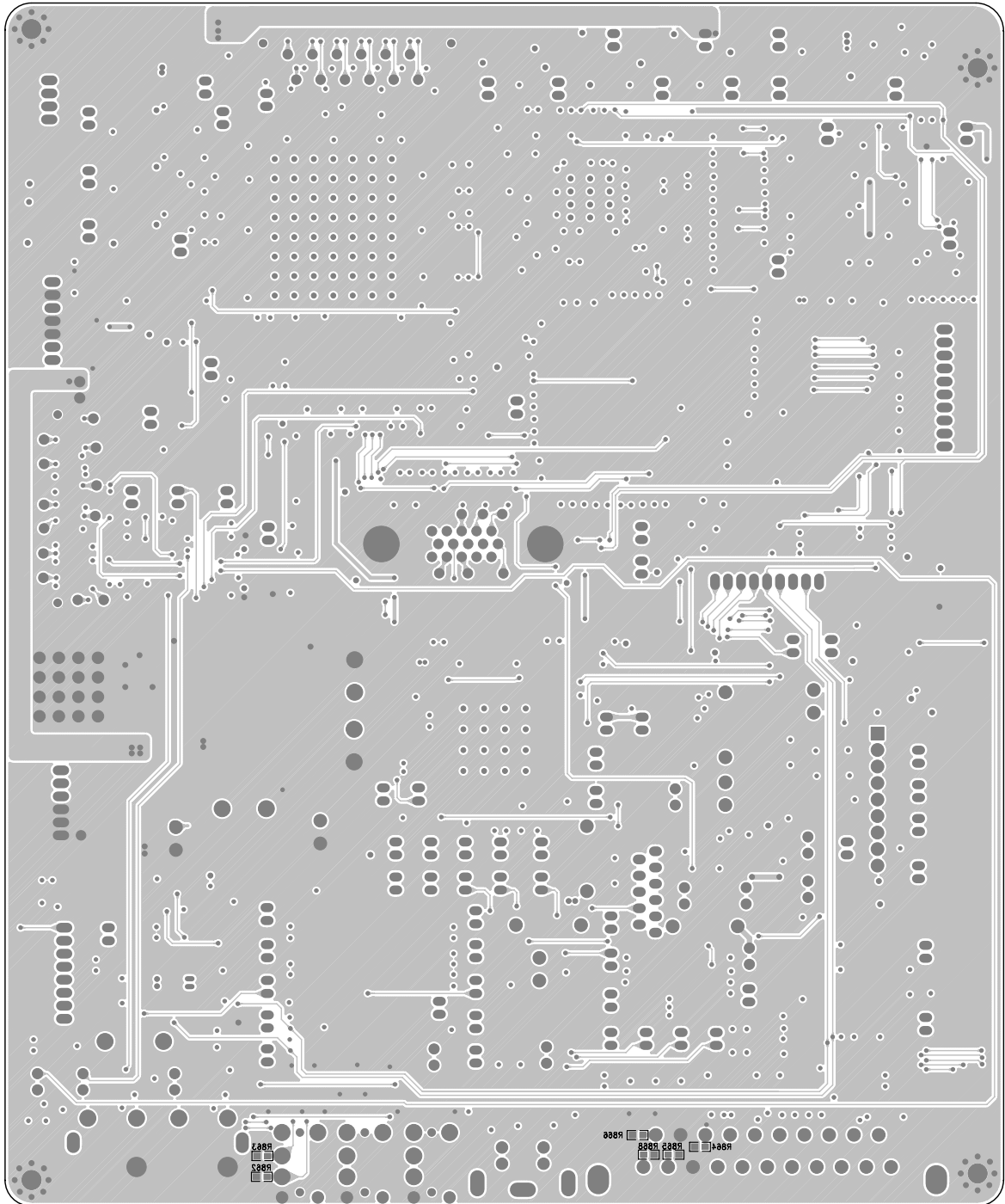
5.1.2 Bottom layer of CARD Board



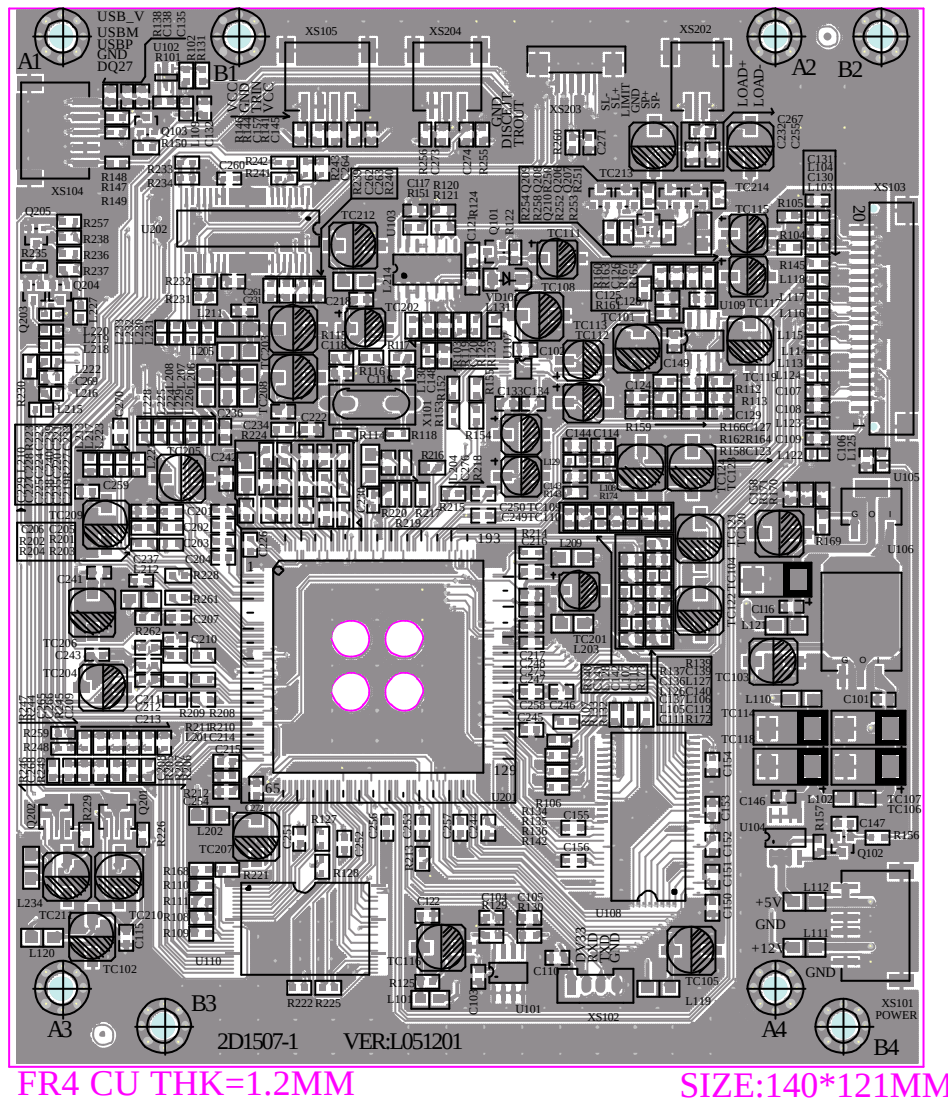
5.1.3 Surface layer of Video Board



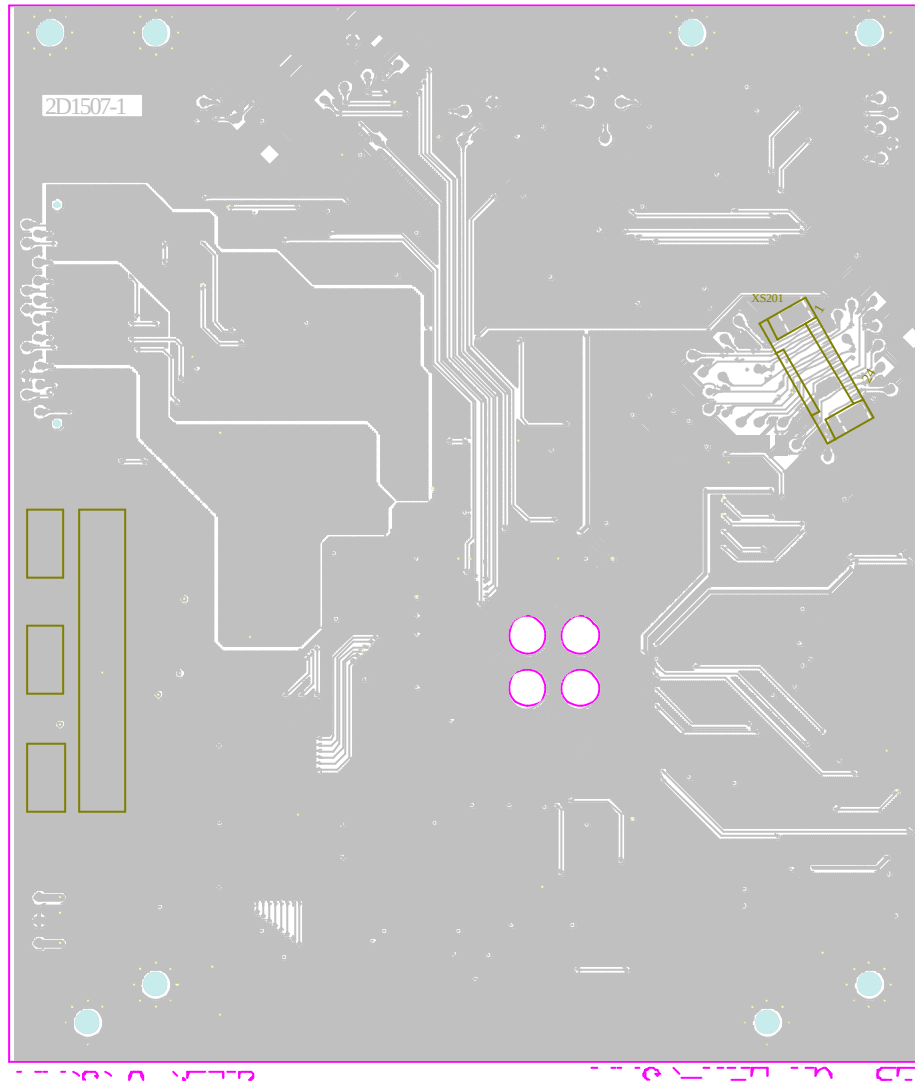
5.1.4 Bottom layer of Video Board



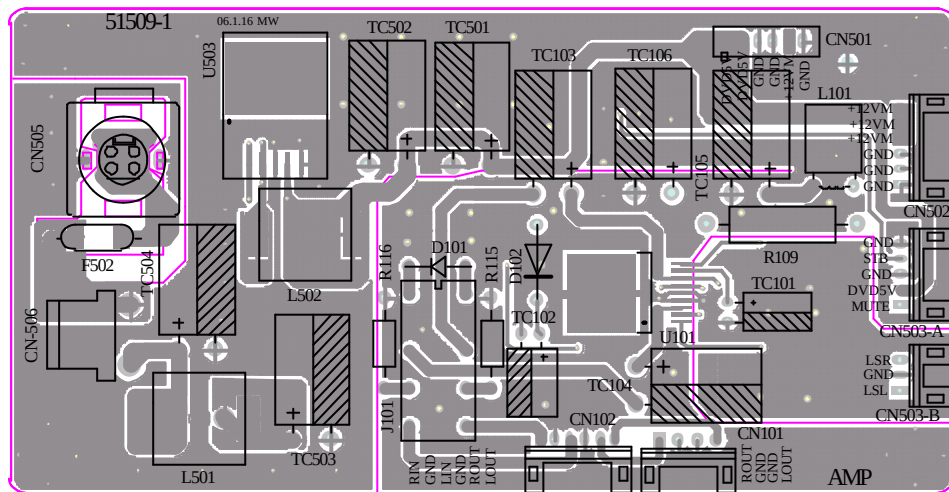
5.1.5 Surface layer of DVD Board



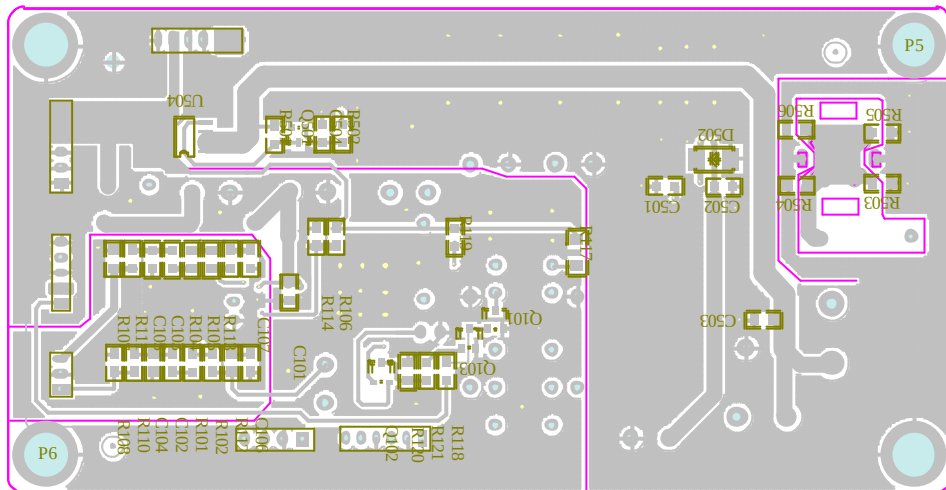
5.1.6 Bottom layer of DVD Board



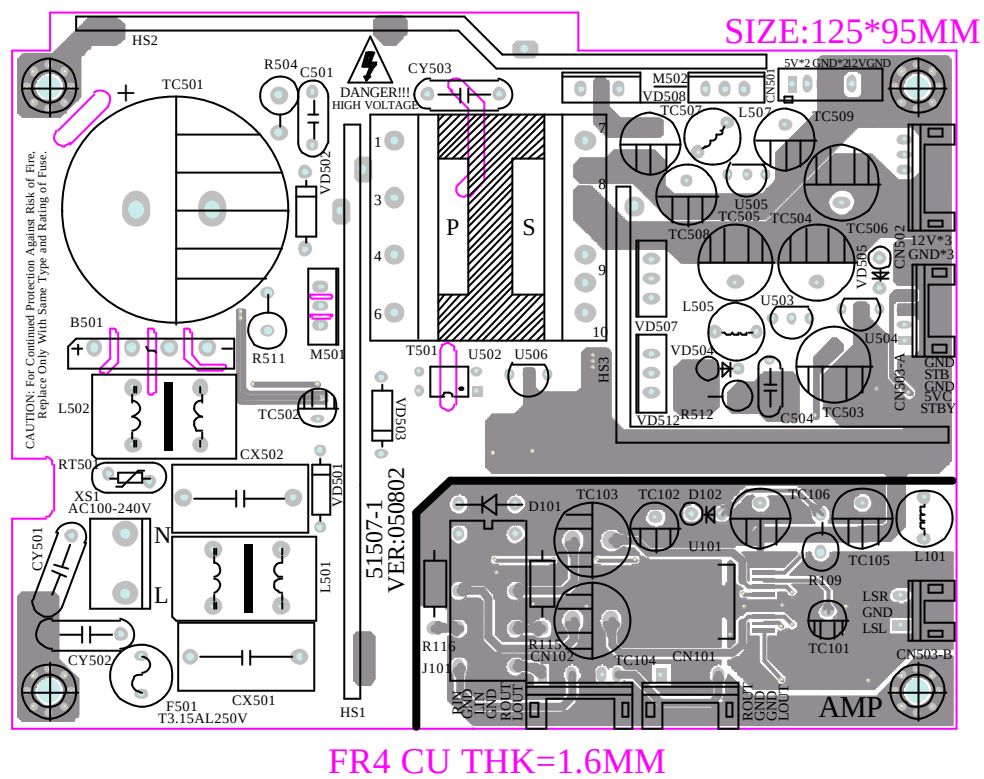
5.1.7 Surface layer of power amplifying Board



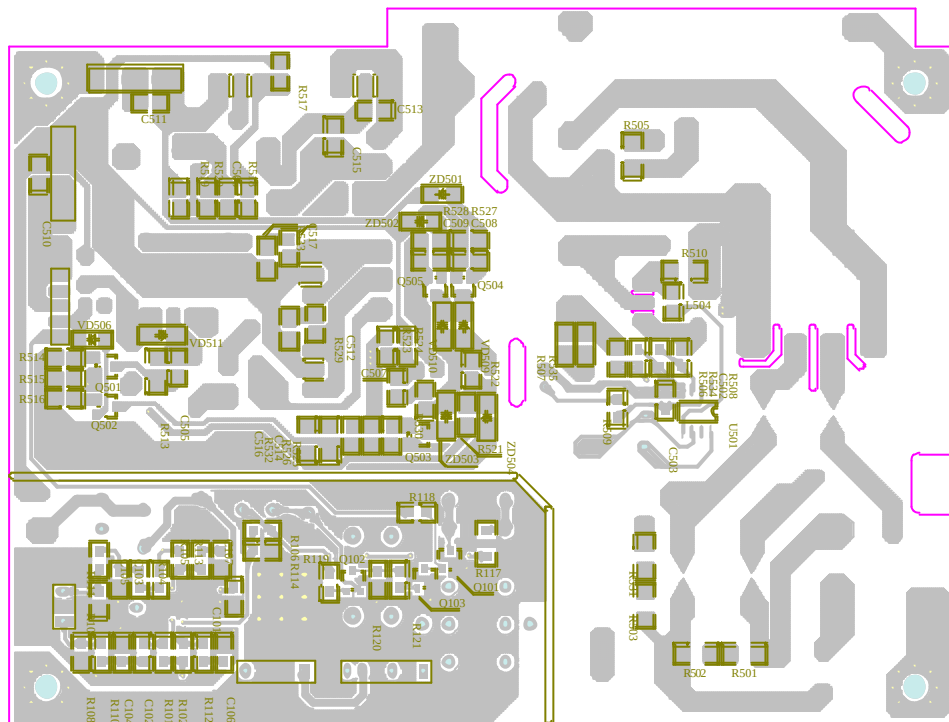
5.1.8 Bottom layer of power amplifying Board



5.1.9 Surface layer of power Board

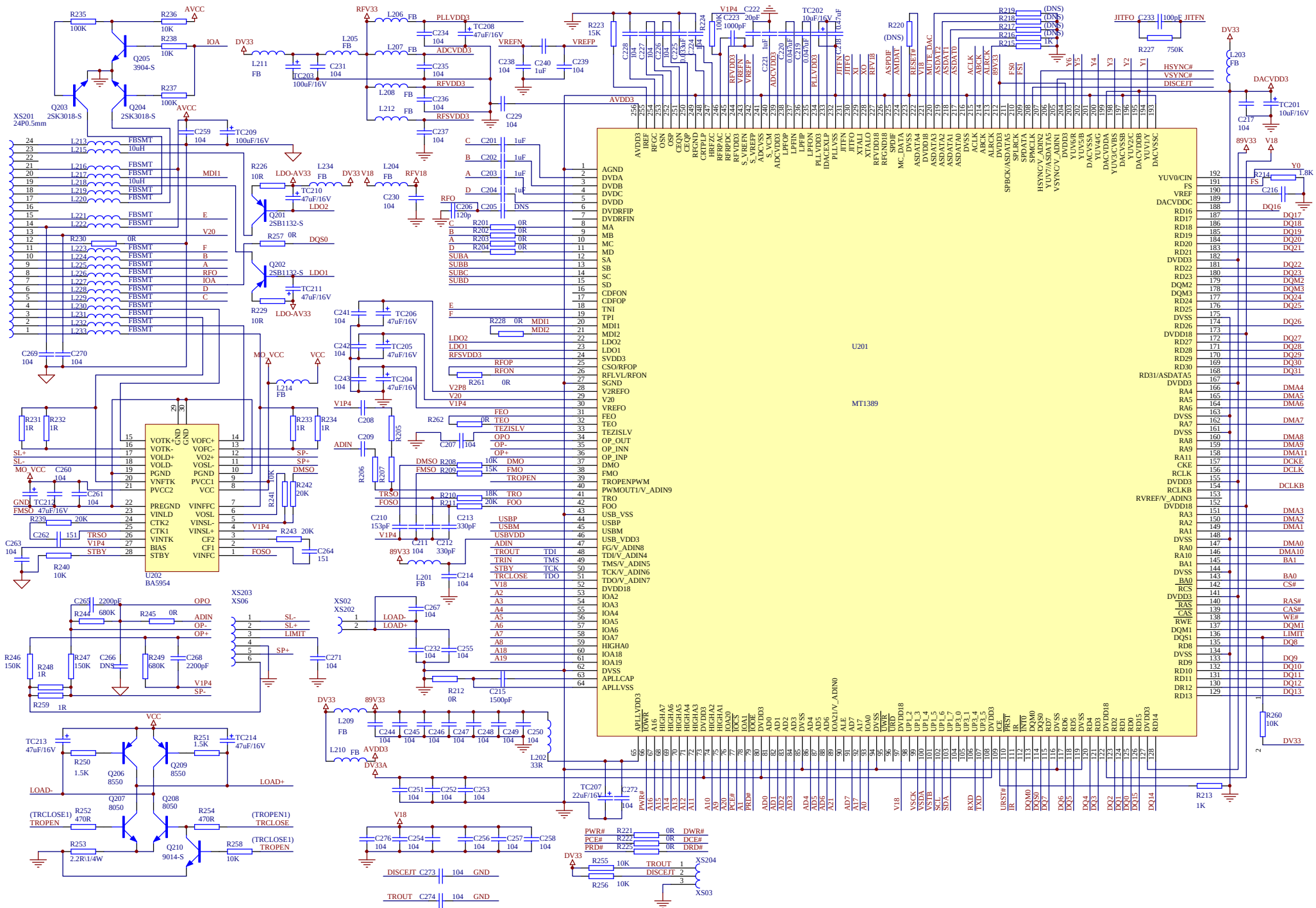


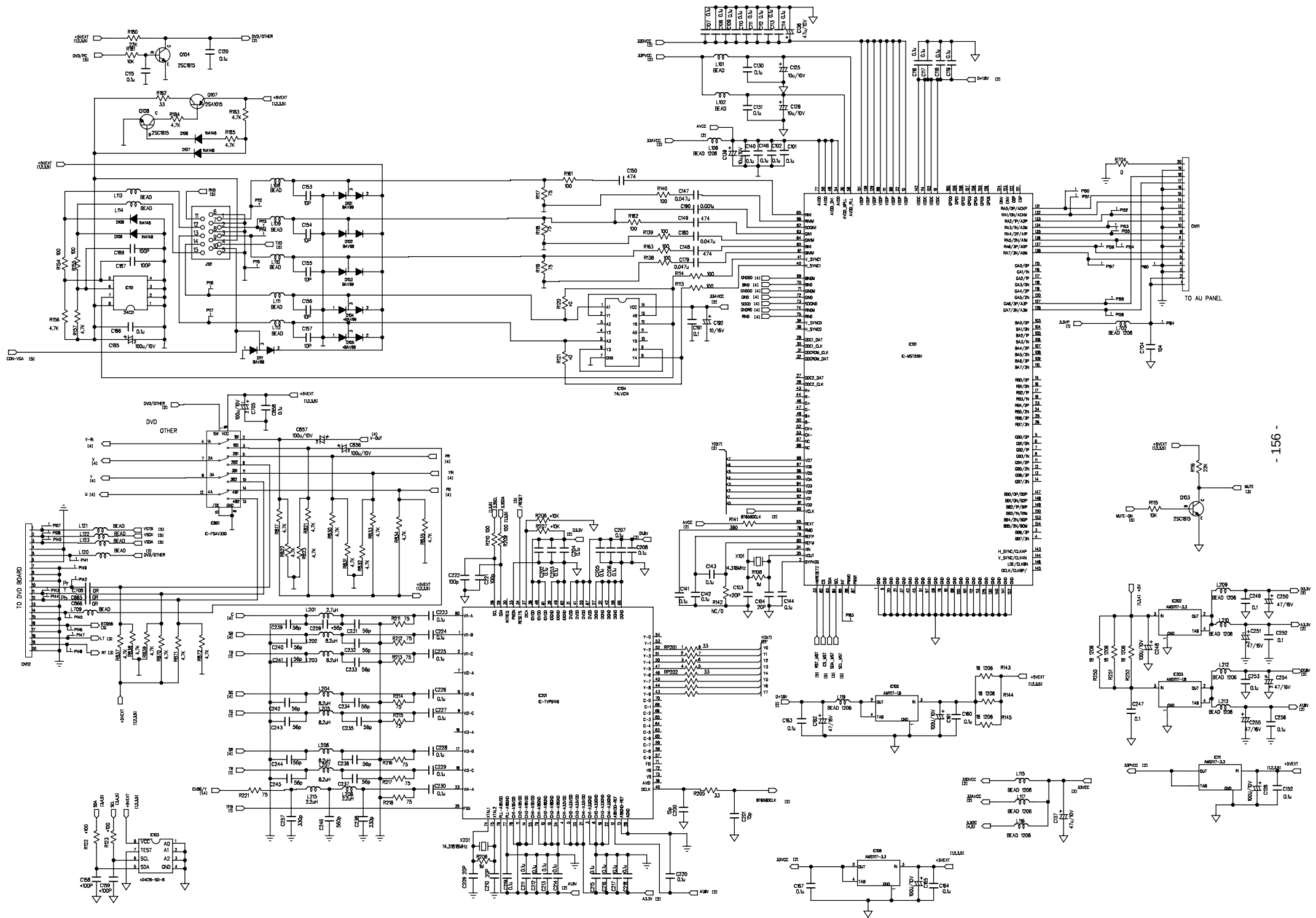
5.1.10 Bottom layer of power Board

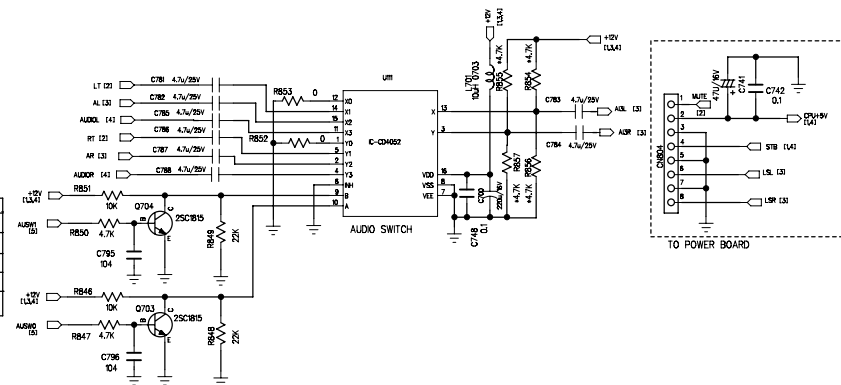
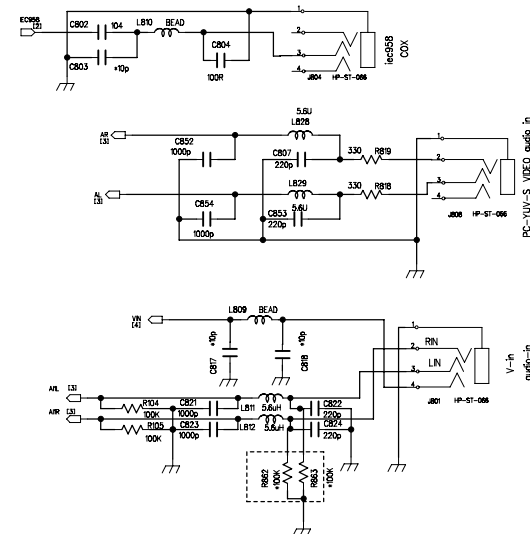


5.2.1 DVD board

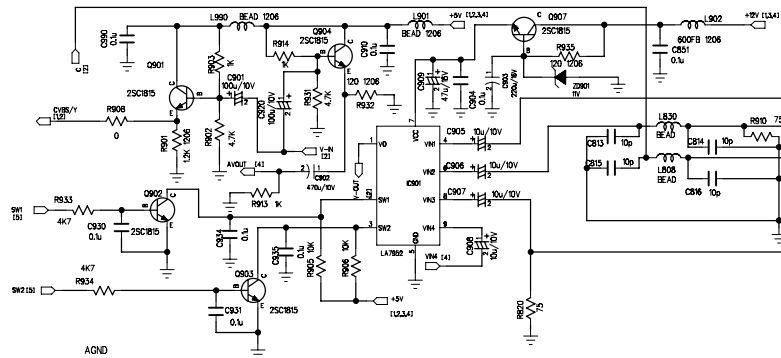




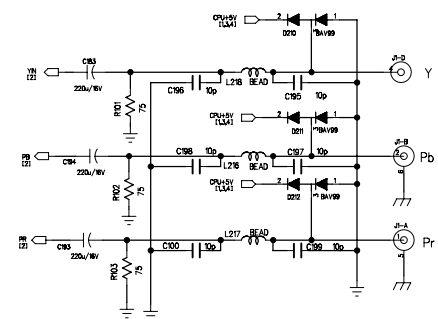
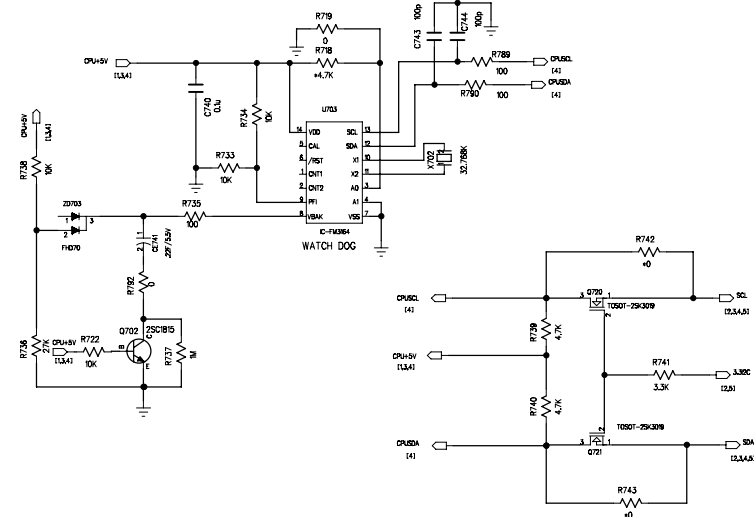
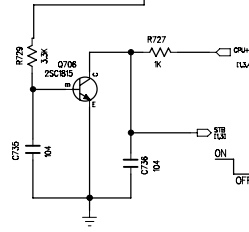
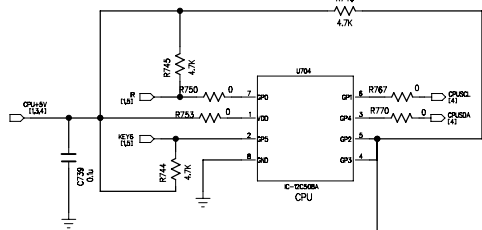
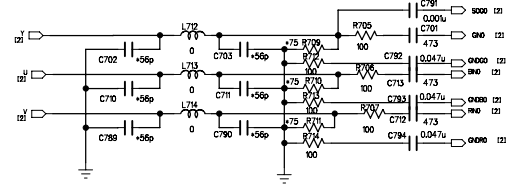
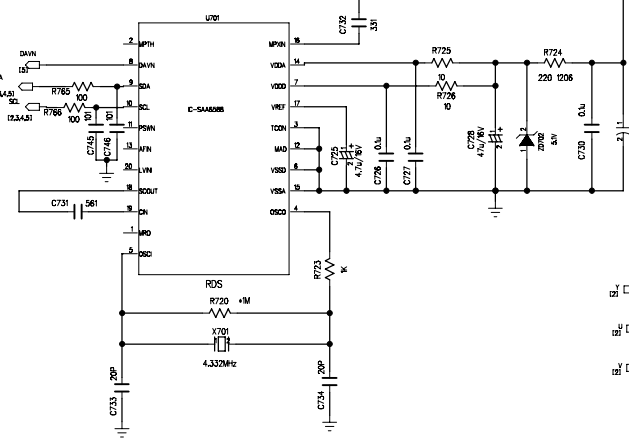
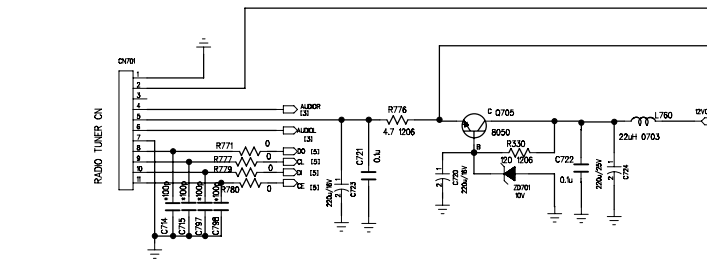
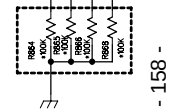
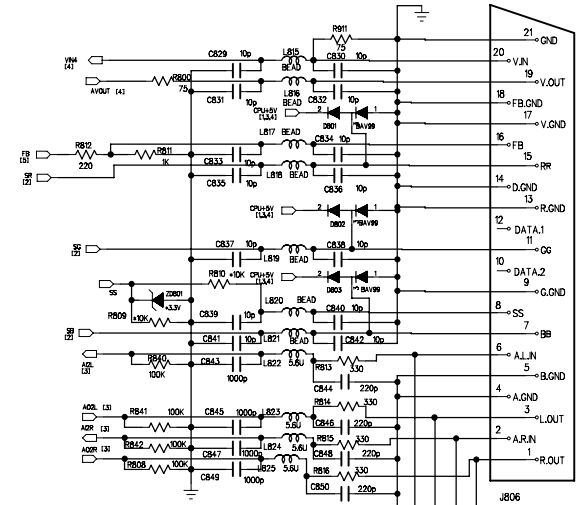
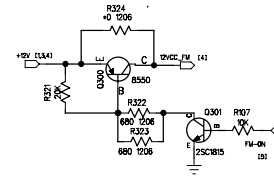


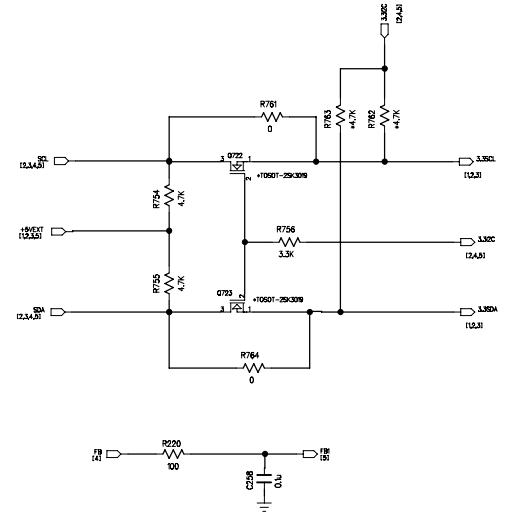
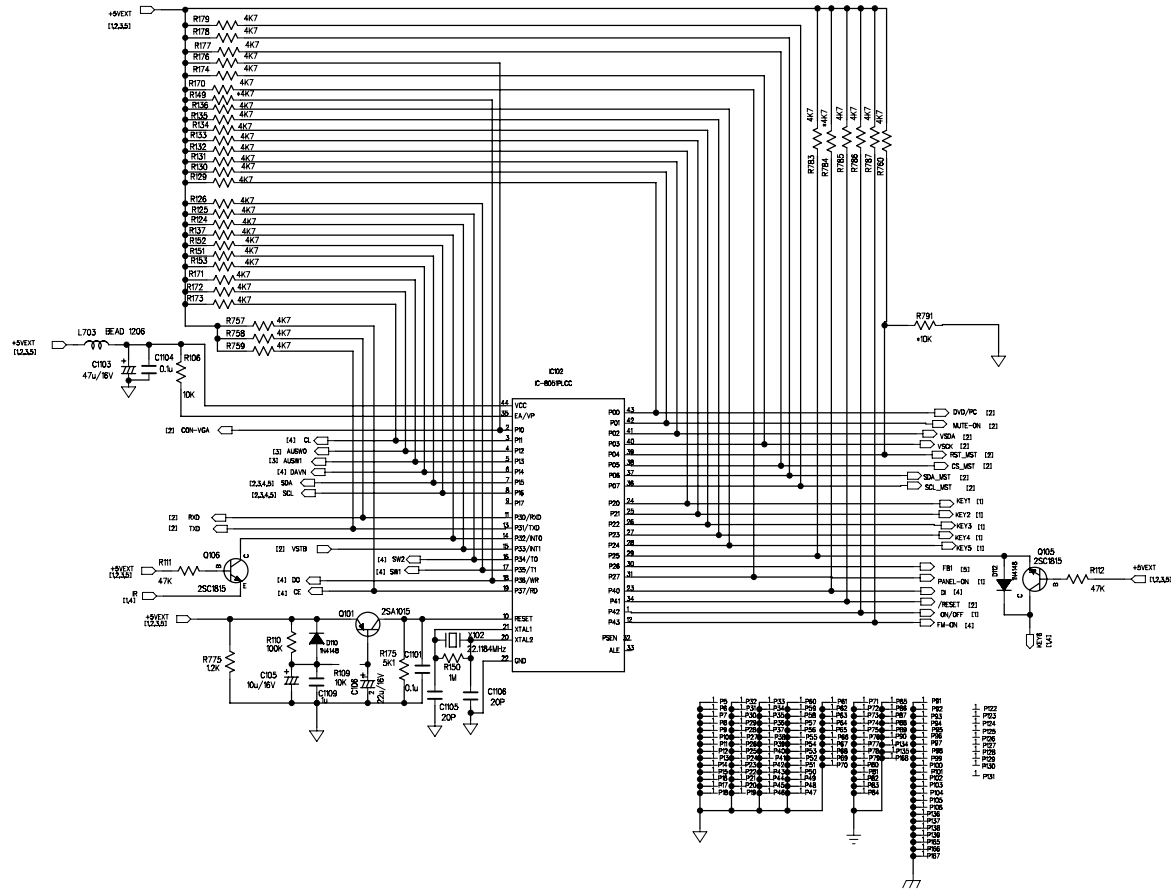


AUSW1	AUSW0	OUT
1	1	NONE
1	0	DVDAU
0	1	PCAU
0	0	TJAU
*	*	NONE

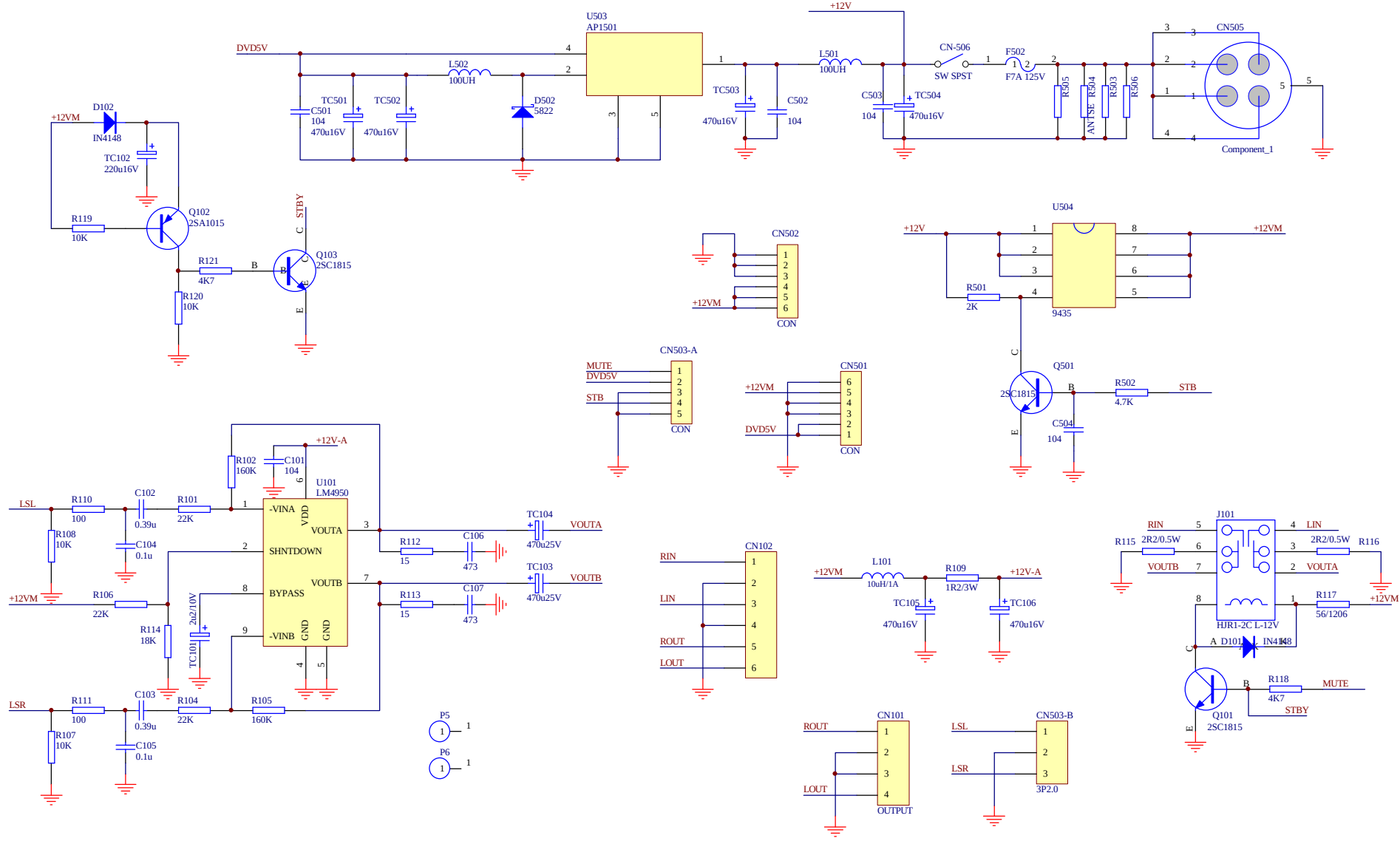


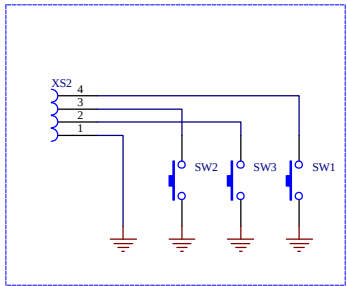
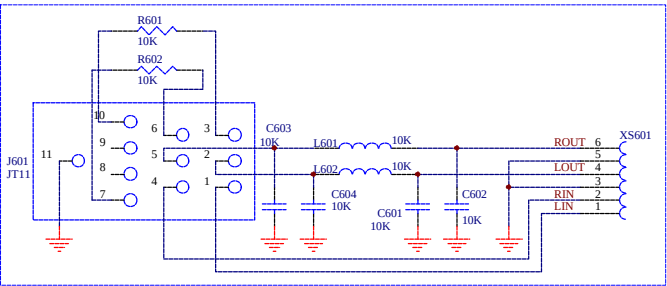
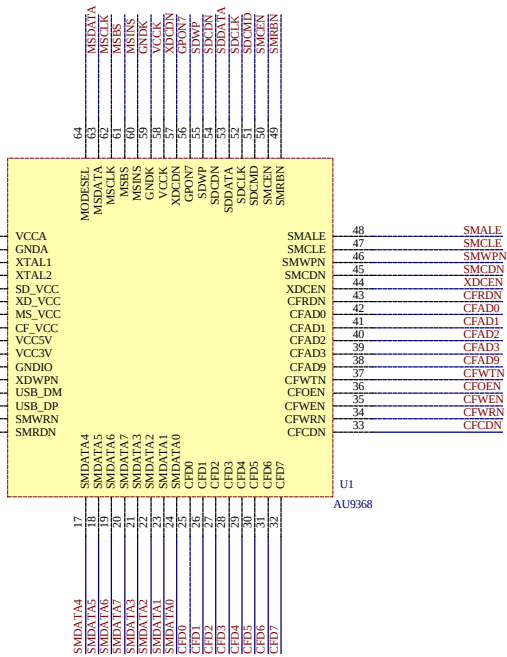
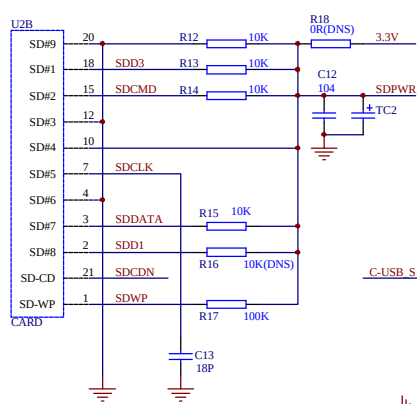
SW1	SW2	VN1	VN2	VN3	VN4
H	H	ON	OFF	OFF	OFF
L	H	OFF	ON	OFF	OFF
H	L	OFF	OFF	ON	OFF
L	L	OFF	OFF	OFF	ON



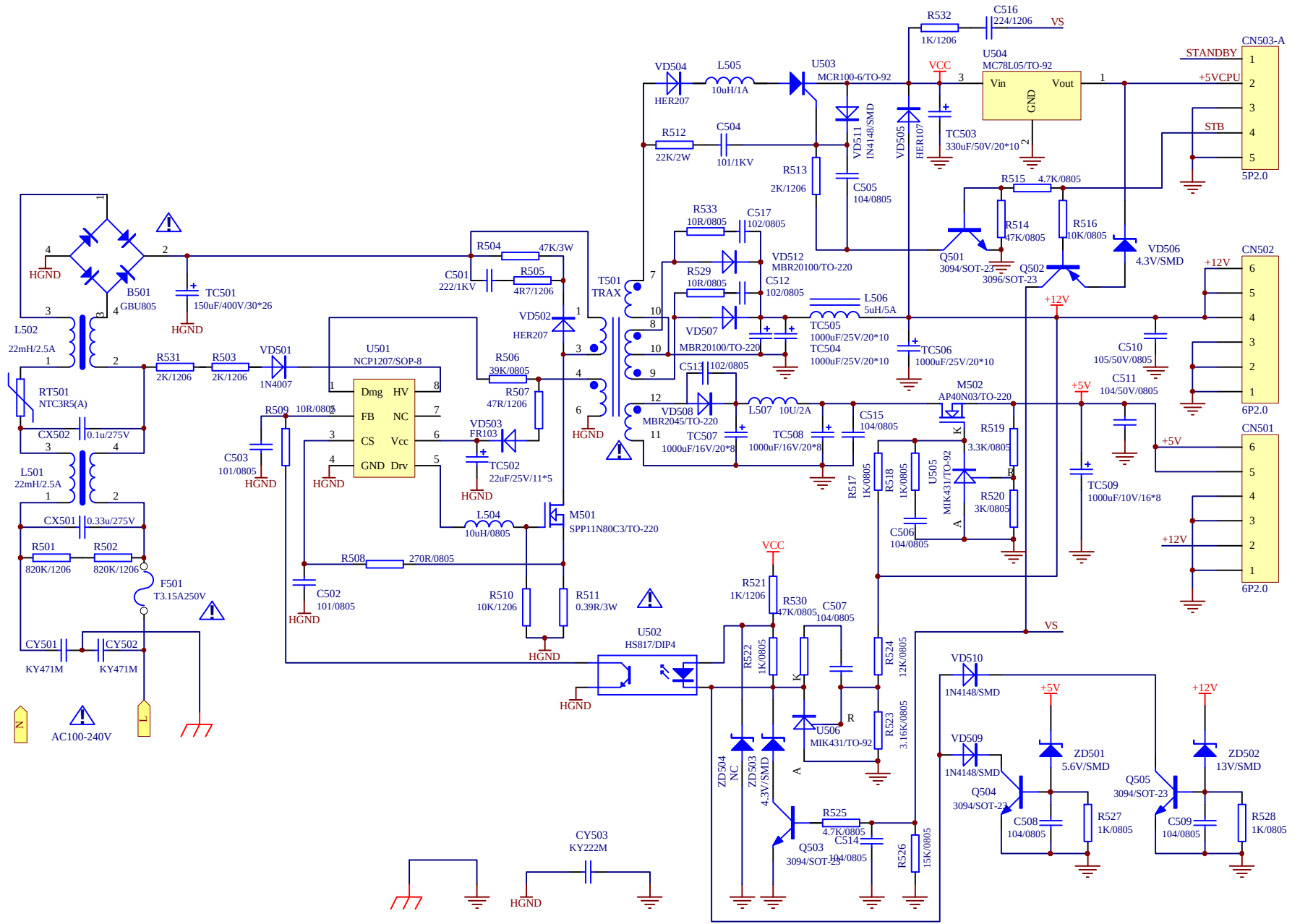


5.2.3 power amplifying board





5.2.5 Power board



Chapter six BOM List

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
LT1507S(RU)-2 SILVER			
CARD READER BOARD:		5446786	
0090001	SMD RESISTOR	1/16W 00±5% 0603	R6
0090135	SMD RESISTOR	1/8W 100O±5% 1206	R601,R602
0090313	SMD RESISTOR	1/16W 6.8O±5% 0603	R1
0090005	SMD RESISTOR	1/16W 33O±5% 0603	R22,R23
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R19
0090016	SMD RESISTOR	1/16W 1.5K±5% 0603	R25
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R13,R12,R10,R9,R14,R15
0090028	SMD RESISTOR	1/16W 33K±5% 0603	R20,R21
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R24,R17,R4
0090109	SMD RESISTOR	1/16W 1MO±5% 0603	R7
0260206	CD	CD11C 10V100U±20%5×7 2	TC2,TC3
0310085	SMD CAPACITOR	50V 20P±5% NPO 0603	C13
0310190	SMD CAPACITOR	50V 27P±5% NPO 0603	C9,C8
0310047	SMD CAPACITOR	50V 101±5% NPO 0603	C15,C14,C5,C4,C3,C2,C16,C17
0310598	SMD CAPACITOR	50V 102±20% 7R 0603	C18,C602,C601
0310049	SMD CAPACITOR	50V 221±5% NPO 0603	C604,C603
0310222	SMD CAPACITOR	25V 104±20% 7R 0603	C10,C12,C22,C6,C21,C1,C7
0390095	SMD MAGNETIC BEADS	FC160822105	L6,L5,L1,L4,L7,L8,L3,L2
0390301	SMD MAGNETIC BEADS	600O/100MHZ±25% 3216	L602,L601
0882202	IC	AU936221-MCL QFP	U1
0882425	IC	ADG713 TSSOP	U3
0960237	SMD CRYSTAL OSCILLATOR	12.00MHz 49-S	X1
0790041	SMD FIELD EFFECT TRANSISTOR	SI2305DS SO23	Q1,Q2
1860074	USB SOCKET	2UB-0001000	JK1
1940024	SOCKET	5P 2.0mm	XS1
1940005	SOCKET	6P 2.0mm	XS601
2150254	FLAT CABLE	4P220 2.0 2 4P SHIELD,WITH WELD PIECE/WITH L NEEDLE	CARD READER: XS2, DECODE BOARD: CN402
1632979	PCB	1507-1	

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1980061	EARPHONE SOCKET	C3.5-01K	J601
1990035	3-11CARD HOLDER	SD/MS/MMC R009-020-L3	U2
1340144	LIGHT TOUCH RESTORE SWITCH	HORIZONTAL TSVB-2	SW1,SW2,SW3
LT1507S(RU)-2 SILVER			
DVD DECODE BOARD: @2D1507-1 UL 1.5/Ver2.1			
0090001	SMD RESISTOR	1/16W 00±5% 0603	R117,R115,R128,R127,R103,R151,L126,R121,R125,R145,R201,R202,R203,R204,R212,R221,R222,R225,R228,R230,R245,R257,L105~L108,L127,L128,L129
0090555	SMD RESISTOR	1/400±5% 1206	L110
0090003	SMD RESISTOR	1/16W 100±5% 0603	R226,R229,R131
0090005	SMD RESISTOR	1/16W 330±5% 0603	R106,R107,R126,R132,R133,R134,R135,R136,R142,R152,R153,R154,R155
0090006	SMD RESISTOR	1/16W 750±5% 0603	R137,R139,R140,R143,C139,C141,C143
0090009	SMD RESISTOR	1/16W 3300±5% 0603	R104,R105
0090013	SMD RESISTOR	1/16W 6800±5% 0603	R129,R130
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R124,R213,R215
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R108,R109,R110,R164,R165
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R122,R158,R160,R162,R163,R208,R236,R238,R240,R241,R255,R256,R258,R260,R150,R112,R113,R168
0090024	SMD RESISTOR	1/16W 15K±5% 0603	R209,R223
0090025	SMD RESISTOR	1/16W 20K±5% 0603	R211,R239,R242,R243
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R166,R167
0090028	SMD RESISTOR	1/16W 33K±5% 0603	R144,R156
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R116,R157,R224,R235,R237
0090114	SMD RESISTOR	1/8W 00±5% 1206	L112,L102
0090181	SMD RESISTOR	1/16W 1000±5% 0603	R250,R141,R146,R251,R252,R254
0090188	SMD RESISTOR	1/16W 18K±5% 0603	R210
0090197	SMD RESISTOR	1/16W 150K±5% 0603	R246,R247
0090249	SMD RESISTOR	1/16W 5100±5% 0603	R214
0090272	SMD RESISTOR	1/16W 10±5% 0603	R231,R232,R233,R234,R248,R259
0090646	SMD RESISTOR	1/8W 330±5% 1206	L202
0090663	SMD RESISTOR	1/82.20±5% 1206	R253
0090319	PRECISION SMD RESISTOR	1/16W 750K±1% 0603	R227
0090231	PRECISION SMD RESISTOR	1/16W 680K±1% 0603	R244,R249

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090516	PRECISION SMD RESISTOR	1/16W 3.3K±1% 0603	R169,R170
0090549	PRECISION SMD RESISTOR	1/16W 3k±1% 0603	R171
0260425	SMD CD	16V100U±20%6.3×6.3×5.4	TC108,TC101,TC102,TC103,TC119,TC203,TC209,TC121~TC124
0260426	SMD CD	16V47U±20%5×5×5.4	TC105,TC116,TC204,TC205,TC206,TC208,TC210,TC211,TC212,TC213,TC214,TC207
0260428	SMD CD	16V10U±20%4×4×5.4	TC109,TC110,TC112,TC113,TC115,TC117,TC201,TC202,TC111
0310045	SMD CAPACITOR	50V 47P±5% NPO 0603	C136,C106,C107,C108,C109,C137
0310047	SMD CAPACITOR	50V 101±5% NPO 0603	C127,C128,C233
0310048	SMD CAPACITOR	50V 151±5% NPO 0603	C264,C262
0310051	SMD CAPACITOR	50V 331±5% NPO 0603	C212,C213
0310055	SMD CAPACITOR	16V 333±10% 7R 0603	C225
0310056	SMD CAPACITOR	16V 473±10% 7R 0603	C219,C220
0310066	SMD CAPACITOR	50V 102±10% 7R 0603	C121,C123,C125,C223
0310067	SMD CAPACITOR	50V 152±10% 7R 0603	C124,C126,C215
0310068	SMD CAPACITOR	50V 222±10% 7R 0603	C265,C268
0310207	SMD CAPACITOR	50V 104 ±20% 7R 0603	C101,C102,C103,C110,C115,C116,C117,C122,C129,C132,C133,C134,C135,C145,C146,C147,C149,C150,C151,C152,C153,C154,C155,C156,C157,C207,C211,C214,C217,C224,C226,C227,C228,C229,C230,C231,C232,C234,C235,C236,C237,C238,C239,C241,C242,C243,C244,C245,C246,C247,C248,C249,C250,C251,C252,C253,C254,C255,C256,C257,C258,C259,C260,C261,C263,C267,C269,C270,C271,C272,C274,C275,C276,C216,C158
0310085	SMD CAPACITOR	50V 20P±5% NPO 0603	C222
0310190	SMD CAPACITOR	50V 27P±5% NPO 0603	C118,C119
0310201	SMD CAPACITOR	50V 153±10% 7R 0603	C210
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C201,C202,C203,C204,C221,C240
0310362	SMD CAPACITOR	16V474 +80%-20% Y5V 0603	C218
0310381	SMD TANTALUMCAPACITOR	10V220U±20%7343(E)	TC104,TC106,TC107,TC114,TC118
0390170	SMD INDUCTOR	10UH±10% 1608	L215,L218
0390300	SMD MAGNETIC BEADS	600O/100MHZ±25% 1608	L115,L116,L117,L118,L122,L123,L124,L125,L131,L213,L216,L217,L219,L220,L221,L222,L223,L224,L225,L226,L227,L228,L229,L230,L231,L232,L233,L109,L201,L103,L104,R147,R148,R149
0390301	SMD MAGNETIC BEADS	600O/100MHZ±25% 3216	L119,L120,L121,L203,L204,L205,L206,L207,L208,L209,L210,L211,L212,L214,L234,L111
0700001	SMD DIODE	LS4148	VD101

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0780040	SMD TRIODE	3904(100-300) SO23	Q205
0780062	SMD TRIODE	9014C	Q210
0780115	SMD TRIODE	2SB1132	Q201,Q202
0780129	SMD TRIODE	8550D	Q206,Q209,Q101
0780085	SMD TRIODE	8050D	Q207,Q208 ①
0780150	SMD TRIODE	UTC 8050S (D9-D)	Q207,Q208 ①
0780193	SMD TRIODE	2S3018	Q103,Q203,Q204
0780197	SMD TRIODE	C1815	Q102
0960236	SMD CRYSTAL OSCILLATOR	27.00MHz 49-S	X101
0880768	IC	C4558 SOP	U109 ②
0880185	IC	NJ4558M SOP	U109 ②
0880562	IC	4580 SOP	U109 ②
0880361	IC	4558 SOP	U109 ②
0880322	IC	M74HCU04M SOP	U103 ③
0880513	IC	HCU04 SOP	U103 ③
0880165	IC	74HCU04D SOP	U103 ③
0881182	IC	L1117ADJ SO223	U105
0881378	IC	B5954FP HSOP	U202 ④
0881459	IC	D5954 SOP	U202 ④
0881415	IC	HY57V641620HG7 TSOP	U108 ⑤
0881329	IC	HY57V641620HG6 TSOP	U108 ⑤
0881189	IC	48LC4162-7 SOP	U108 ⑤
0882167	IC	9435M SO8	U104 ⑥
0881867	IC	FDS9435A SOP	U104 ⑥
0881914	IC	R9701CB SO25	U102
0881990	IC	1389FE/B (B) QFP	U201
0882076	IC	L1085-3.3 SO263	U106 ⑦
0882472	IC	AZ1084S-3.3 TO-263	U106 ⑦
0882380	IC	4344 TSSOP	U107
0882150	IC	24CC02A SOP	U101 ⑧
0881031	IC	24C02N SOP	U101 ⑧
1940094	CABLE SOCKET	24P 0.5mm SMD SUBMIT MEET WITH CLASP	XS201

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1940198	CABLE SOCKET	6P 1.0mm SMD,SUBMIT MEET WITH CLASP	XS203
1940241	SOCKET	4P 2.0mm SMD	XS105
1940242	SOCKET	3P 2.0mm SMD	XS204
1940244	SOCKET	6P 2.0mm SMD	XS101
1940243	SOCKET	2P 2.0mm SMD	XS202
1940283	SOCKET	20P 1.25mm SMD,HORIZONTAL	XS103
1940272	SOCKET	5P 2.0mm SMD	XS104
1632535	PCB	@2D1507-1 UL	
LT1507S(RU)-2 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	
LT1507S(RU)-2 SILVER			
POWER BOARD: 5447490			
0090057	SMD RESISTOR	1/10W 4.7K±5% 0805	R121,R502,R501
0090052	SMD RESISTOR	1/10W 2.2K±5% 0805	R118
0090143	SMD RESISTOR	1/10W 1.5K±5% 0805	R110,R111
0090063	SMD RESISTOR	1/10W 10K±5% 0805	R107,R108,R119,R120
0090040	SMD RESISTOR	1/10W 15O±5% 0805	R112,R113

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090066	SMD RESISTOR	1/10W 18K±5% 0805	R114
0090727	SMD RESISTOR	1/4W 820±5% 1206	R117
0090087	SMD RESISTOR	1/10W 360K±5% 0805	R102,R105
0090068	SMD RESISTOR	1/10W 22K±5% 0805	R106
0090069	SMD RESISTOR	1/10W 27K±5% 0805	R101,R104
0010257	METAL OXIDE FILM RESISTOR	1/2W 2.20±5% R 12.5×7	R115,R116
0010305	METAL OXIDE FILM RESISTOR	31.20±5%	R109
0310144	SMD CAPACITOR	50V 104±10% 7R 0805	C501~C504,C101
0310033	SMD CAPACITOR	50V 103±10% 7R 0805	C104,C105
0310172	SMD CAPACITOR	25V 334 +80%-20% Y5V 0805	C102,C103
0310036	SMD CAPACITOR	50V 473±10% 7R 0805	C106,C107
0260765	CD	CD288Z 25V470U±20%10×16 5	TC103,TC104,TC502,TC503,TC504,TC501
0260773	CD	CD11K 50V2.2U±20%5×11 2	TC101
0260664	CD	CD11K 16V220U±20% 6.3×11 2.5	TC106
0260790	CD	CD11 105°C 50V47U M 6×12 2.5	TC102
1050017	HEAT SENSITIVITY RESISTOR	NTC 10(5A)±20% 10D 5	RT100
0570006	DIODE	1N4148	D101,D102
0780198	SMD TRIODE	2S1015	Q102
0680082	SMD SCHOTTKY DIODE	S5822 DO-214AA	D502
0780197	SMD TRIODE	C1815	Q101,Q103,Q501
0410153	CHOKE COIL	VERTICAL 1.5uH±20% 7A 6mm	L501
0410154	VERTICAL SCREEN SHIELD FILTERING INDUCTOR	100uH±20% 3A SMD	L502
2310003	FUZE	125V 7A	F502
0882110	IC	L4950 TO-263	U101
0790021	FIELD EFFECT TRANSISTOR	IR7416 SOP	U504 ⑨
0790097	FIELD EFFECT TRANSISTOR	AO4419 SO8	U504 ⑨
0882028	IC	AC1501 TO263-5L	U503
1940012	SOCKET	4P 2.5mm STRAIGHT CURVING	CN101
1940135	SOCKET	6P 2.0mm STRAIGHT FLEX	CN502,CN102
1940160	SOCKET	5P 2.0mm STRAIGHT FLEX	CN503-A
1940216	SOCKET	3P 2.0mm FLEX INSERT	CN503-B
1910163	TERMINAL SOCKET	S TERMINAL D34 STRAIGHT INSERT	CN505

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1250042	RELAY	HJR-2CL-12VDC	J101
2121876	SOFT FLAT CABLE	6P70 2.0 2 PIN,WITH NEEDLE,REVERSE	TO DVD DECODE BOARD
2100059	CONNETION CORDS	F 1.0 SHAPED 7.5mm	CN-506
1633273	PCB	@51509-2 UL	PCB
LT1507S(RU)-2 SILVER			
RECEIVING BOARD OF REMOTE CONTROL: 5446787			
0620172	BICOLOR SMD DIODE	LTST-C155KGJRKT	D901
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
LT1507S(RU)-2 SILVER			
TUNER: 01507-0 1.1/Ver2.0 5446788			
0090001	SMD RESISTOR	1/16W 00±5% 0603	R004,R005
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R002
0090181	SMD RESISTOR	1/16W 1000±5% 0603	R003
0310070	SMD CAPACITOR	50V 332±10% 7R 0603	R001
0390292	INDUCTOR	22uH±20% 350mA 0307	L002,L001
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	
LT1507S(RU)-2 SILVER			
VIDEO FREQUENCY BOARD : @21507-1 UL 1.8/Ver4.2			
0090001	SMD RESISTOR	1/16W 00±5% 0603	R605,R612,R613,R619,R908,R704,R852,R853,R750,R770,R753,R767,R771,R777,R779,R719,R780,R761,R764,L712,L713,L714,C866,C708,R801,R807,C865,R792,R737,L202~L207,R120,R121
0090003	SMD RESISTOR	1/16W 100±5% 0603	R725,R726
0090005	SMD RESISTOR	1/16W 330±5% 0603	R205,R182
0090006	SMD RESISTOR	1/16W 750±5% 0603	R117,R118,R119,R212,R214,R216,R218,R221,R800,R820,R910,R911,R101~R103,R211
0090008	SMD RESISTOR	1/16W 2200±5% 0603	R802,R803,R804,R805,R806,R812,R867,R606,R607,R608,R213,R215,R217,L810
0090009	SMD RESISTOR	1/16W 3300±5% 0603	R814,R816,R813,R815,R818,R819
0090012	SMD RESISTOR	1/16W 5600±5% 0603	R301

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090183	SMD RESISTOR	1/16W 3K±5% 0603	R903,R914
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R609,R617,R723,R811,R913,R602,R603,R604,R727,R109,R303,R306,R184
0090015	SMD RESISTOR	1/16W 1.2K±5% 0603	R775,R822
0090017	SMD RESISTOR	1/16W 2.2K±5% 0603	R747,R116
0090018	SMD RESISTOR	1/16W 3.3K±5% 0603	R729,R741
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R931,R156,R157,R739,R740,R744,R745,R746,R902,R125,R124,R126,R129~R137,R151,R152,R153,R170~174,R176~R179,R757,R758,R759,R785~R787,R783,R933,R934,R850,R847,R835,R834,R833,R832,R830,R831,R817,R837,R838,R839,R870,R871,R872,R821,R823,R754,R755,R760,R183,R185
0090020	SMD RESISTOR	1/16W 5.1K±5% 0603	R175,R159
0090104	SMD RESISTOR	1/16W 2.7K±5% 0603	R158
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R106,R107,R115,R160,R165,R181,R208,R320,R600,R618,R731,R733,R734,R738,R748,R905,R906,R851,R846,R110,R180,R625,R308
0090024	SMD RESISTOR	1/16W 15K±5% 0603	R732
0090025	SMD RESISTOR	1/16W 20K±5% 0603	R321,R622
0090026	SMD RESISTOR	1/16W 22K±5% 0603	R730,R849,R848
0090027	SMD RESISTOR	1/16W 27K±5% 0603	R736
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R104,R105,R302,R808,R840,R841,R842,R623,R624
0090109	SMD RESISTOR	1/16W 1M0±5% 0603	R108,R150,R206,R307
0090114	SMD RESISTOR	1/8W 00±5% 1206	R1,R2,L305,R500
0090642	SMD RESISTOR	1/4W 1.2K±5% 1206	R322,R323,R901
0090181	SMD RESISTOR	1/16W 1000±5% 0603	R113,R114,R154,R155,R161,R162,R163,R209,R210,R220,R601,R615,R616,R735,R765,R766,R768,R769,R789,R790,R705~R707,R712~R714,R138,R139,R140,R304,R305,C804
0090555	SMD RESISTOR	1/400±5% 1206	L718,L702
0090662	SMD RESISTOR	1/4W 470±5% 1206	R143,R144,R145
0090232	SMD RESISTOR	1/16W 1500±5% 0603	R610
0090234	SMD RESISTOR	1/16W 3900±5% 0603	R141
0090538	SMD RESISTOR	1/4W 1200±5% 1206	R330,R932,R935
0090557	SMD RESISTOR	1/4W 180±5% 1206	R250,R251,R252,R778
0090628	SMD RESISTOR	1/8W 2200±5% 1206	R724
0090661	SMD RESISTOR	1/4W 4.70±5% 1206	R776
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R111,R112

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0100019	SMD RESISTOR NETWORKS	1/16W 330±5% 8P	RP201,RP202
0310042	SMD CAPACITOR	50V 15P±5% NPO 0603	C200,C201
0310044	SMD CAPACITOR	50V 33P±5% NPO 0603	C610,C611
0310045	SMD CAPACITOR	50V 47P±5% NPO 0603	C606
0310047	SMD CAPACITOR	50V 101±5% NPO 0603	C187,C189,C221,C222,C301,C330,C331,C616,C617,C743,C744,C752,C753,C745,C746
0310049	SMD CAPACITOR	50V 221±5% NPO 0603	C807,C853
0310057	SMD CAPACITOR	16V 104±10% 0603	C223,C224,C225,C226,C227,C228,C229,C230,C802,C795,C796
0310051	SMD CAPACITOR	50V 331±5% NPO 0603	C238,C257,C732
0310066	SMD CAPACITOR	50V 102±10% 7R 0603	C791,C190,C821,C823,C843,C845,C847,C849,C852,C854
0310068	SMD CAPACITOR	50V 222±10% 7R 0603	C604,C613
0310070	SMD CAPACITOR	50V 332±10% 7R 0603	C768,C756,C757,C769
0310072	SMD CAPACITOR	50V 103±10% 7R 0603	C302
0310207	SMD CAPACITOR	50V 104 ±20% 7R 0603	C191,C247,C249,C252,C500,C502,C504,C508,C706,C738,C742,C748,C762,C763,C766,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,C186,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,C528,C531,C601,C605,C614,C615,C619,C621,C622,C625,C716,C719,C721,C722,C726,C727,C730,C735,C736,C739,C740,C751,C777,C778,C851,C858,C904,C910,C930,C931,C934,C935,C990,C101,C102,C1104,C704,C184,C115,C120,C1101,C334
0310085	SMD CAPACITOR	50V 20P±5% NPO 0603	C103,C104,C209,C210,C337,C338,C733,C734,C1105,C1106
0310188	SMD CAPACITOR	50V 10P±5% NPO 0603	C153,C154,C155,C156,C157,C813,C814,C815,C816,C829,C830,C831,C832,C833,C834,C835,C836,C837,C838,C841,C842,C859,C860,C861,C862,C863,C864,C195,C197,C199,C196,C198,C100
0310192	SMD CAPACITOR	50V 56P±5% NPO 0603	C231,C239
0310197	SMD CAPACITOR	50V 561±10% 7R 0603	C246,C731
0310202	SMD CAPACITOR	50V 223±10% 0603	C612,C603
0310204	SMD CAPACITOR	50V 333±10% 0603	C758,C759
0310205	SMD CAPACITOR	50V 473±10% 0603	C147,C179,C180,C792,C793,C794,C701,C713,C712,C148,C149,C150
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C1109
0310245	SMD CAPACITOR	50V 121±10% 7R 0603	C233,C235,C237

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0310593	SMD CAPACITOR	10V 474±10% 5R 0603	C620
0310658	SMD CAPACITOR	25V 105±10% 7R 0805	C767
0310198	SMD CAPACITOR	50V 472±10% 7R 0603	C760,C761
0390177	SMD INDUCTOR	2.2UH±10% 1608	L208,L215
0390170	SMD INDUCTOR	10UH±10% 1608	L301,L309
0390189	SMD INDUCTOR	2.7UH±10% 1608	L201
0390286	SMD INDUCTOR	5.6uH±10% 1608	L822~L825,L828,L829,L811,L812
0390287	SMD MAGNETIC BEADS	19O/100mHZ±25% 1608	L108~L114,L120~L123,L709,L801~L809,L815~L819,L821,L830,L850,L216,L217,L218
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,L503,L601,L603,L703,L901,L990,L310,L902
0260428	SMD CD	16V10U±20%4×4×5.4	C125,C126
0680082	SMD SCHOTTKY DIODE	S5822 DO-214AA	D501
0700004	SMD VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W	ZD702
0700001	SMD DIODE	LS4148	D108~D110,D301,D106,D107,D112
0700064	SMD TRIODE	B991 SO23	D101~D103,D111,D210,D211,D212,D801,D802,D803
0700118	SMD TRIODE	70 SO23	ZD703
0700121	SMD VOLTAGE REGULATOR DIODE	10V±5% 1/2W	ZD701
0700137	SMD VOLTAGE REGULATOR DIODE	11V±5% 1/2W MINIMELF	ZD901
0700147	SMD VOLTAGE REGULATOR DIODE	8.2V±5% 1/2W	ZD301
0780129	SMD TRIODE	8550D	Q300
0780197	SMD TRIODE	C1815	Q102,Q103,Q104,Q301,Q706,Q707,Q710,Q902,Q903,Q907,Q704,Q703,Q105,Q106,Q302,Q108
0780085	SMD TRIODE	8050D	Q705,Q901,Q904 ⑩
0780150	SMD TRIODE	UTC 8050S (D9-D)	Q705,Q901,Q904 ⑩
0780198	SMD TRIODE	2S1015	Q101,Q601,Q107
0790002	SMD FIELD EFFECT TRANSISTOR	2S3019F	Q720~Q721
0960234	SMD CRYSTAL OSCILLATOR	14.31818MHZ 49-S	X201,X101
0960236	SMD CRYSTAL OSCILLATOR	27.00MHZ 49-S	x301
0960250	SMD CRYSTAL OSCILLATOR	13.875MHZ±20PPM 49-S	X601
0960285	SMD CRYSTAL OSCILLATOR	22.1184MHZ±30PPM 49-S 20P	X102

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0960288	SMD CRYSTAL OSCILLATOR	4.332MHZ±20PPM 49-S 20P	X701
2300032	SMD FUSE	FUSE 5A 125V	F501
0000276	CARBON FILM RESISTOR	1/41000±5% SHAPED 10	R708
0260763	NPCD	CD71T 25V4.7U±20% 5×11 2	C783,C784,C772,C773,C774,C775,C781,C782,C785,C786,C787,C788
0260754	CD	CD11K 25V47U±20%5×11 2	C162,C250,C251,C254,C255,C349,C529,C530,C602,C618,C624,C717,C718,C737,C741,C136,C137,C318,C728,C909,C1103,C700
0260664	CD	CD11K 16V220U±20% 6.3×11 2.5	C351,C720,C723,C729,C779,C903,C188,C183,C194,C193
0260653	CD	CD11K 16V470U±20%8×14 3.5	C902
0260578	CD	CD11T 50V22U±20%5×11 2	C750,C106
0260764	CD	CD11T 50V1U±20%5×11 2	C306,C307,C314,C315
0260102	CD	CD110 25V10U±20%5×11 2	C192,C139,C303,C308,C311,C313,C316,C317,C328,C343,C905,C906,C907,C908,C105,C623
0260755	CD	CD11K 50V4.7U±20%5×11 2	C725,C747,C749,C754,C755,C764,C765
0260517	CD	CD11K 10V100U±20%5×11 2	C128,C161,C165,C248,C326,C705,C856,C857,C901,C920,C185
0260765	CD	CD288Z 25V470U±20%10×16 5	C506,C507
0260067	CD	CD11 50V2.2U±20%5×11 2	C335
0260593	CD	CD112 105°C25V220U±20% 8×12 3.5	C503 (11)
0260604	CD	CD112S 105°C25V220U±20% 8×12 3.5	C503 (11)
0260549	FARADCAPACITOR	SD 5.5V 0.22 11×6 10	CE741
0410153	CHOKE COIL	VERTICAL 1.5uH±20% 7A 6mm	L501
0410154	VERTICAL SCREEN SHIELD FILTERING INDUCTOR	100uH±20% 3A SMD	L502
0390292	INDUCTOR	22uH±20% 350mA 0307	L711,L760
0390291	INDUCTOR	10uH±20% 350mA 0307	L701
0881456	IC	SA6588 SO20	U701
0882028	IC	AC1501 TO263-5L	IC501
0882030	IC	S8216 TQFP	IC301
0882053	IC	33 SO223	IC106, IC111,IC202,IC303,IC503
0882061	IC	PI5V330 QSOP	IC801
0882072	IC	3164 SOP	U703 (12)
0882706	IC	31256 SOP	U703 (12)
0882076	IC	L1085-3.3 SO263	IC702 (13)
0882472	IC	AZ1084S-3.3 TO-263	IC702 (13)

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0882084	IC	SI9435 SO8	Q709 (14)
0882167	IC	9435M SO8	Q709 (14)
0882112	IC	L7952 SIP	IC901
0882121	IC	18 SO223	IC203,IC105
0882376	IC	TVP51461 PQFP	IC201
0883020	IC	ETV0310B PQFP	U601
0882515	IC	HE4052BT SOP	U111
0882638	IC	MS518VA PQFP	IC101
0882639	IC	NJ1147M 30	U120
0960289	CMETAL OXIDE FILM RESISTORSTAL OSCILLATOR	32.768KHz±20ppm 2×6 6P	X702
1030032	SMD PRESS SENSITIVITY RESISTOR	EGA V051 0603	C822,C824,C844,C846,C848,C850
1860054	VGA SOCKER	15P VERTICAL,WITH BOLT	J101
1860086	SCART SOCKET	112 FLEX INSERT,WHITE	J806
1910181	TERMINAL SOCKET	S TERMINAL D6 FLEX INSERT,WITH SHIELD,WHITE	J811
1940008	SOCKET	8P2.0mm	CN804
1940044	SOCKET	9P 2.0mm	CN808
1940005	SOCKET	6P 2.0mm	CN802
1940022	SOCKET	4P 2.0mm	CN402
1940023	SOCKET	7P 2.0mm	CN103
1980071	EARPHONE SOCKET	S066-060-300 WHITE	J801,J804,J808
1940046	SOCKET	10P 2.0mm	CN102
1940072	CABLE SOCKET	6/5P 1.25mm DUAL RANK STRAIGHT INSERT	CN701
1940283	SOCKET	20P 1.25mm SMD,HORIZONTAL	CN111,CN112
1910215	TERMINAL SOCKET	4-8.4-13/PB-15C	J1
3580214	HEAT RADIATION PIECE	13×13×10	IC301
5234712	HEAT CONDUCT DOUBLE- FACE GLUE	12.5×12.5×0.25 38810	IC301
1632534	PCB	@21507-1 UL	
LT1507S(RU)-2 SILVER			
DC-TO-AC INVERTER BOARD : 5462430			
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R37,R38
0090003	SMD RESISTOR	1/16W 100±5% 0603	R23,R24

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090258	SMD RESISTOR	1/16W 560K±5% 0603	R6
0090027	SMD RESISTOR	1/16W 27K±5% 0603	R8,R16
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R17,R18,R11
0090050	SMD RESISTOR	1/10W 1K±5% 0805	R28,R29
0090025	SMD RESISTOR	1/16W 20K±5% 0603	R1,R2,R5,R25,R21,R27,R33,R34
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R19
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R3,R9,R22
0090201	SMD RESISTOR	1/16W 220K±5% 0603	R10
0090193	SMD RESISTOR	1/16W 82K±5% 0603	R20
0090197	SMD RESISTOR	1/16W 150K±5% 0603	R12
0090192	SMD RESISTOR	1/16W 51K±5% 0603	R13,R4
0090211	SMD RESISTOR	1/16W 680K±5% 0603	R15
0200394	PORCELAIN CAPACITOR	3000V 10P±0.5P 7.5mm	C19,C21
0310072	SMD CAPACITOR	50V 103±10% 7R 0603	C9,C12
0310207	SMD CAPACITOR	50V 104 ±20% 7R 0603	C4
0310037	SMD CAPACITOR	50V 104±20% 0805	C2
0310483	SMD CAPACITOR	10V 105±10% 5R 0603	C3
0310658	SMD CAPACITOR	25V 105±10% 7R 0805	C11,C14,C6,C13
0310323	SMD CAPACITOR	50V 392±10% 7R 0603	C7,C20,C22
0310839	SMD CAPACITOR	16V 106±10% 5R 1206	C15,C16
0310196	SMD CAPACITOR	50V 471±10% 0603	C10
0310256	SMD CAPACITOR	50V 683±20% 7R 0603	C8
0260696	CD	CD288 25V 220U±20% 8×12 C5	C1
0790106	SMD FIELD EFFECT TRANSISTOR	AO4822 SO8	Q4
0780040	SMD TRIODE	3904(100-300) SO23	Q3
0790044	SMD FIELD EFFECT TRANSISTOR	27002E SO23	Q2
0780041	SMD TRIODE	3906(100-300) SO23	Q1
0700168	SMD DUAL DIODE	B70 SO23	D3
0700167	SMD DUAL DIODE	B56 SO23	D1,D2,D4
2300070	SMD FUSE	@5A 32V 1206 UL	F1
0460631	INVERSION TRANSFORMER	@EEL19-203 SJ	T1
0883192	IC	1008 TSSOP	U1

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
2122346	HIGH VOLTAGE FLAT CABLE	3P120 4.0 1(4000HM)2 CORD	CN3
2122347	HIGH VOLTAGE FLAT CABLE	3P50 4.0 1(4000HM)2 CORD	CN2
1940209	SOCKET	7P 2.0mm RIGHANGLE	CN1
5120635	WHITE GLUE	607	POSITION OF OUTPUT HIGH VOLTAGE TERMINAL CN2, CN3 AND PCB; OUTPUT HIGH VOLTAGE CAPACITOR C19, C21; INVERTER TRANSFORMER OUTPUT TERMINAL
1633433	PCB	@5 203-1 UL	
LT1507S(RU)-2 SILVER			
PROGRAM FLASH ROMLT1507SRU2-0(128K) 0911796			
0882637	IC	79E63240PN PLCC	ABOVE IC SOCKET (IC102)
SOFTWARE PROGRAM EPROM ROMLT1503S-0(512B) 0900401			
0881473	IC	12C508A SOP	U704
SOFTWARE PROGRAM EPROM ROMLT1503S-0(128B) 0900402			
0882054	IC	24C21-10SI-2.5 SOIC	IC110 (15)
0882153	IC	LC21A SOIC	IC110 (15)
DVD PROGRAM FLASH ROMLT1503SRU2-0(16M) 0911530			
0881651	IC	29160EB 706 TSOP	U110 (16)
0881650	IC	29LV160BE-70PFTN TSOP	U110 (16)