

DV828X(RU)

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 players, he should pay special attention to the power board with 220V 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 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.

1.1.4 About placement position

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

1.2 Maintenance method

1.2.1 Visualized method

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

1.2.2 Electric resistance method

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

1.2.3 Voltage method

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

1.2.4 Current method

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

1.2.5 Cutting method

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

1.2.6 Element substitution method

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

1.2.7 Comparison method

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

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

1.3 Required device for maintenance

- ◆ Digital oscillograph ($\geq 100\text{MHz}$)
- ◆ TV set
- ◆ SMD rework station
- ◆ Multimeter
- ◆ Soldering iron
- ◆ Pointed-nose pincers
- ◆ Cutting nippers
- ◆ Forceps
- ◆ Electric screw driver
- ◆ Terminal connecting cord
- ◆ Headphone
- ◆ Microphone

Chapter Two

Functions and Operation Instructions

2.1 Features

This player has employed the new generation DV decode chip with built-in Dolby Digital decoder which will bring you to a brand-new AV entertainments world. The 2-laser super error-correction mechanism supports CD-R.

2.1.1 Brand-new AV Effects

1. Compatible with DivX, MPEG4 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. Brightness, chroma and contrast adjustment functions to render your eyes more comfortable.
5. Digital echo Karaoke to enable your singing easier.
6. Composite Video, S-Video and Component Video outputs.
7. Built-In Dolby Digital decoder, separate 5.1Ch Outputs.
8. Dolby output for 2channel(DOWNMIX)
9. KTV song selection menu makes your operation easier.
10. Multiple song selection means by singers, type, language classification and number make you enjoy yourself .
11. Singing means of song selection and random playing provide you with wide performance stage.
12. Auto scoring and applause functions act as good entertainment help.
13. Dual-channel Karaoke system.
14. Support 1080I/720P high definition format output.

2.1.2 High Quality Digital Audio

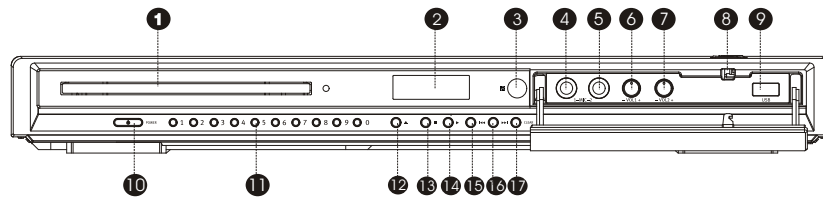
1. Optical and coaxial outputs for Digital audio.
2. DTS,Dolby Digital, PCM Digital audio outputs to satisfy the Fans acoustic requirements.

2.1.3 Many Convenient Features

1. Screen saver protects your TV set carefully.
2. The novel Mp3 playback window GUI provides you a new way to appreciate Mp3 music.
3. Multi-angle playback function makes it possible for you to view a scene from different camera angles.
4. It's possible to select the desired beginning, development and ending of a story.
5. Direct entry into desired scenes(title/chapter/track search).
6. Zooming function to zoom up any playing picture.
7. Multiple aspect ratios to fit TV sets of various screen ratios.
8. Parental lock function to prevent children from watching unsuitable discs.
9. Multiple dubbing languages and subtitle languages bring you the best entertainment status all the time.

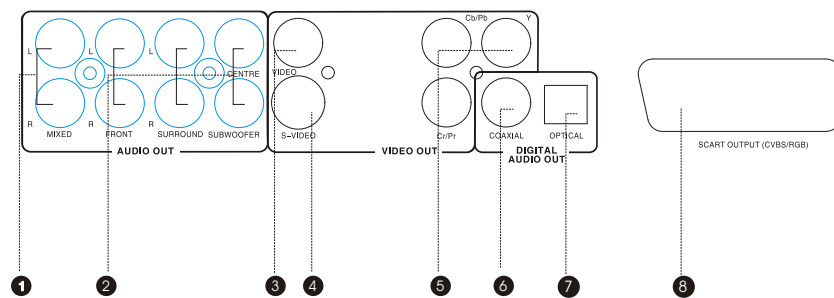
2.2 Control Button Locations and Explanations

2.2.1 Front Panel Illustration



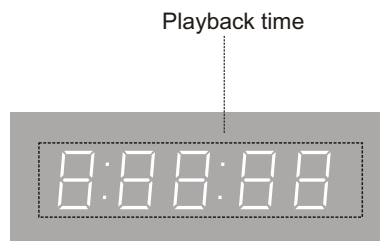
- | | | | |
|------------------|---------------------|----------------------|-----------------|
| ❶ Disc tray | ❸ VOL1 +/- button | ❷ POWER switch | ❶❹ PLAY button |
| ❷ Display window | ❹ VOL 2 +/- button | ❸❶ Number buttons | ❷❶ PREV button |
| ❸ IR SENSOR | ❶ Push button | ❷❶ OPEN/CLOSE button | ❷❶ NEXT button |
| ❹ MIC 1 jack | ❷ Slot flap for USB | ❸❶ STOP button | ❷❶ CLEAR button |
| ❶ MIC 2 jack | | | |

2.2.2 Rear Panel Illustration



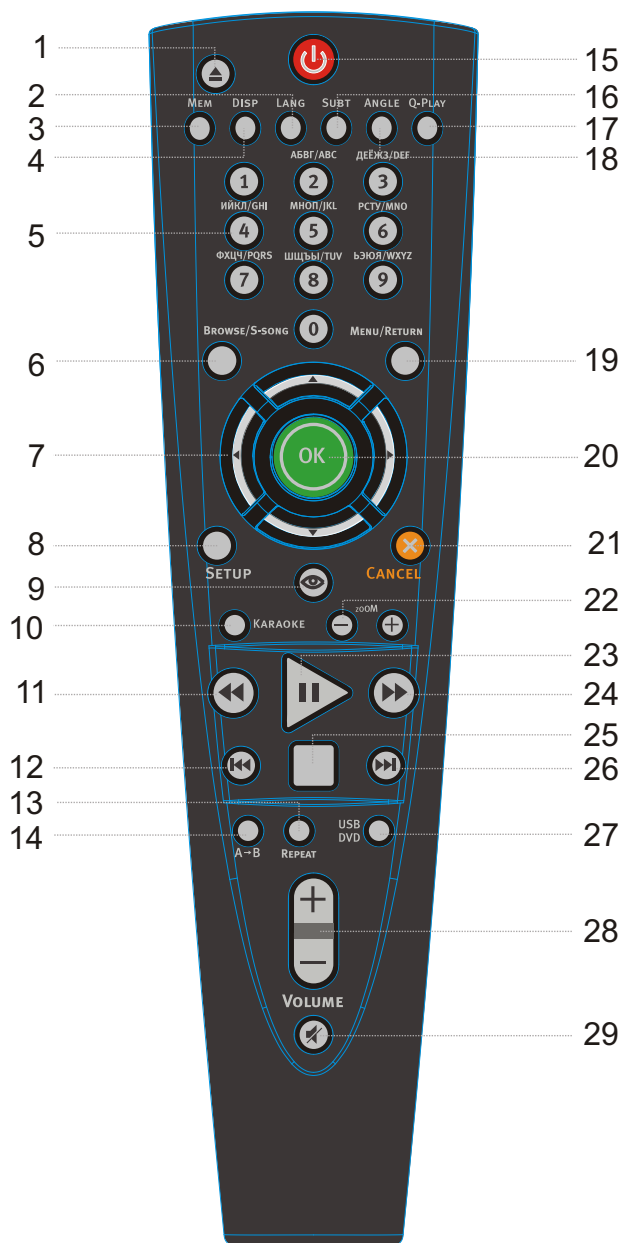
- | | | | |
|------------------------|------------------|---------------------------------------|-----------------------------------|
| ❶ Mixed Audio out jack | ❷ Video Out jack | ❶❶ Video Component /Y Pb Pr out jacks | ❷❶ Digital Audio Optical Out jack |
| ❷ 5.1CH Audio Out jack | ❸ S-Video | ❶❶ Digital Audio Coaxial Out jack | ❷❶ SCART out jack |

2.2.3 LED Display Window Illustration



2.2.4 Remote Control Illustration

- | | |
|--|--|
| ❶ [▲] Button
Open or close the disc tray. | ❷ MEMORY Button
Memorize position or skip to memory point to play/add song into personal collection. |
| ❷ LANG Button
Change the audio language or audio channel/switch English and Russian input means. | ❸ DISP Button
Display or hide disc information. |



- 27 **USB DVD Button**
- 28 **VOL +/- Button**
Increase/decrease volume level/open or close OKD Karaoke volume setup menu.
- 29 **MUTE Button**
Press once to mute, twice to unmute.

- 5 **NUMBER Buttons**
Input Russian English letter and number.
- 6 **BROWSE/S-Song Buttons**
switch new user interface/open or close the menu of songs been selected.
- 7 **CURSOR Buttons**
- 8 **SETUP Button**
Function Setup.
- 9 **[Eye] Button**
Open/close the virtual keyboard function/stimulate applause when playing OKD disc.
- 10 **KARAOKE Button**
Karaoke operation menu/open or close OKD Karaoke menu.
- 11 **[Fast Backward] Button**
Fast backward play.
- 12 **[Skip Backward] Button**
Skip backward/return to the previous song.
- 13 **PEPEAT Button**
Repeat play/Repeat play the song being played when playing OKD disc.
- 14 **A-B Button**
Repeat the select.
- 15 **[Standby] Button**
Press once to stand by, Press twice to play.
- 16 **SUBT Button**
Change subtitle language, Switch JPEG display mode.
- 17 **Q-PLAY Button**
Skip the advertisement/warning and play the DVD directly/enter personal collection menu when playing OKD.
- 18 **ANGLE Button**
Change camera angle, MP3/JPEG playback mode switch.
- 19 **MENU/RETURN Button**
Display DVD menu or open/close PBC/return to the previous menu.
- 20 **OK Button**
- 21 **Cancel Button**
Cancel personal information/cancel personal collection and songs been selected and cancel Russian、English letter and number that just being input.
- 22 **ZOOM Button**
Zoom in/out the displayed frame/increase or decrease voice volume when playing OKD.
- 23 **[Play/Pause] Button**
Play or pause playback.
- 24 **[Fast Forward] Button**
Fast backward play.
- 25 **[Stop] Button**
Stop playback/when playing OKD, after the current song stops playing, the next song begins to play.
- 26 **[Skip Forward] Button**
Skip forward/switch to the next song.

2.3 Accessories

AUDIO/VIDEO CORD	1PCS
REMOTE CONTROL	1PCS
AAA SIZE BATTERIES	2PCS
WARRANTY CARD	1PCS
USER MANUAL	1PCS

2.4 How to Play Karaoke Songs Disc (OKD)

2.4.1 Preparations for Playing OKD

After well connecting system according to the relevant requirements, turn on power of TV, and switch into AV state. If a power amplifier is connected, turn on its power at the same time.

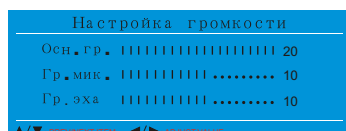
1. Press [POWER] button to switch on power, display screen is lightened, TV screen displays power-on picture and the player begins to search disc automatically.
2. Press [OPEN/CLOSE] button to eject disc tray, and then load the disc presented (OKD) into disc tray.
3. Press [OPEN/CLOSE] button to close disc tray, playback starts and the player automatically enters the main menu picture of song selection.

2.4.2 Preparations for Singing

1. Insert microphone into MIC jack of the player.



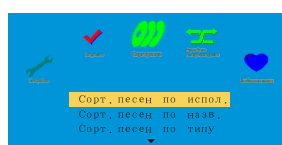
2. Set microphone switch at "ON" position in setup menu and press [VOL+/-] button on remote control to pop up "Настройка громкости". Press UP/DOWN buttons to move the cursor to "Гр.мик." item and then press LEFT/RIGHT button to adjust microphone volume. Press UP/DOWN button to move the cursor to "Гр.эха" item and then press LEFT/RIGHT button to adjust proper echo degree.



- # During the course of singing, speaker will have whistle sometimes, and now you may take microphone far away from the speaker or reduce microphone volume to remove whistle. Please do not make microphone face towards the speaker.
- # After singing finishes, firstly set the switch of microphone at "OFF" position, and then unplug microphone.

2.4.3 General Steps of Playing OKD

1. After reading OKD, the player directly enters (OKD) song selection system and the screen displays (OKD) disc main menu.

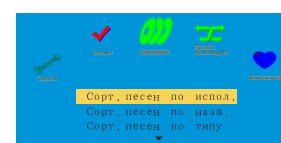


2. Pressing UP/DOWN buttons continuously may enter the previous or next page.

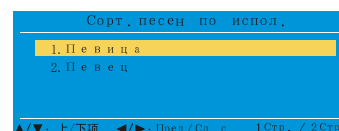


3. Press UP/DOWN button to select your desired menu, and press [OK] button to enter the submenu picture. If you want to select other menu, you may press [MENU/RETURN] button to back to the previous menu and select again. If you want to select other function icons, you may press [MENU/RETURN] button to back to "OKD" menu, and then press LEFT/RIGHT button to select. If you want to quit OKD menu, please press [KARAOKE] button.

2.4.4 How to select songs



1. Select song via singer: select song according to the name of the original singer.



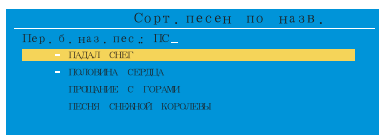
- # Enter the menu of "Сорт. песен по испол.", after selecting a singer of some kind, the name of the singer appears. Press UP/DOWN button to select your desired singer, and then press [OK] button to enter the songs menu of this singer. According to this menu, select your desired song, and then press [OK] button to add this song into the list of selected songs.

- # You may also use T9 input method to input the first letter of the singer's name according to the prompt on interface, and system will automatically search the relevant singers.

For instance, you want to search " ". Operation steps: press [LANG] button firstly to set the current input method to Russian input method, then press number button [2] third to input the first letter " " of " ", press number button [6] button second to input the first letter " " of " " and you may search " ".

2. Сорт. песен по назв.: search and select song according to the first letter of the song's name.

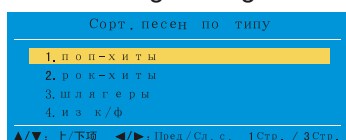
For instance, you want to search "ПАДАЛ СНЕГ". Operation steps: press [LANG] button firstly to set the current input method to Russian input method, then press number button [5] fourth to input the first letter "П" of "ПАДАЛ", press number button [6] button second to input the first letter "с" of "СНЕГ" and you may search "ПАДАЛ СНЕГ".



NOTE :If you want to search English song, press [LANG] button to switch to English input method and then search English songs by using the Above method.

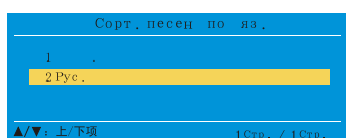
When you select songs via T9 input method, if you input incorrect letter, you may press [CANCEL] button to delete the wrongly inputted letter and then input new letter.

3. Сорт. песен по типу : select song according to the type that the song belongs to.



#Enter the menu of "Сорт. песен по типу", select your desired type and then press [OK] button to enter the songs menu of this type. According to this menu, select your desired song and then press [OK] button to add this song into the list of selected songs.

4. Сорт. песен по яз. : select song according to this song's language classification.



#Enter the menu of "Сорт. песен по яз.", select your desired language classification and then press [OK] button to enter the songs menu of this language classification. According to this menu, select your desired song and then press [OK] button to add this song into the list of selected songs.

5. Сорт. песен по ном.: select song directly according to its serial number. You may select your desired serial number in the presented song election book.

#According to the serial number of songs in the book, select item of "Сорт. песен по ном." during the course of playing songs, and the interface of selecting song via number displays. Press number buttons to input serial number of the song and then press [OK] button to confirm the selection.

NOTE

#When invalid serial number is inputted or the input has error, you may press [CANCEL] button to cancel and then press number button to input other serial number.

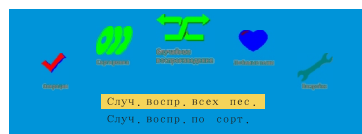
#If the player is in stop state, the song selected through pressing [OK] button by you will be played automatically.

#If you do not select songs in a long period, system will automatically play the entire disc at random. In menu interface, if you do not operate in a certain period, menu will disappear

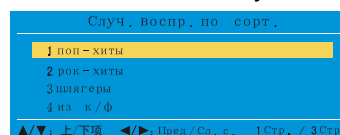
Automatically.

2.4.5 Random playback

There two options for random playback function: random playback for all and random playback for classification, shown in the following figure:



#You may select one option according to your own needs. If option of "Случ. воспр. всех пес." is selected, the player will play all songs in this disc randomly; if option of "Случ. воспр. по сорт." is selected, the player will play all songs in a certain classification randomly.

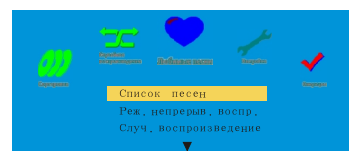


#If you want to start random playback for all or for classification, please stop the playback of all songs being played currently.

#During the course of random playback, you cannot enter song selection menu. If you want to quit random playback mode, please press [KARAOKE] button firstly, then press [STOP] button; after quitting random playback mode, press [STOP] button to enter song selection menu immediately.

2.4.6 My Favourite

In main menu interface of OKD disc, press LEFT/RIGHT button to select "Personal" icon, or quit the main menu of song selection and directly press [Q-PLAY] button to enter the interface of personal songs collection menu. There are 4 functional options in this interface: "Список песен Реж.", "Непрерыв. воспр.", "Случ. воспроизведение" and "Список по классиф.". When no song exists in personal songs collection, on "Songs list" item displays when playing songs.



#Enter songs list, you may select and play songs in personal songs collection, or add the song into the list of selected songs. Move the cursor to the song selected, press [CANCEL] button to cancel the selected song.

#If you want to play songs in personal songs collection continuously, please select "Continuous playback" item.

#Ranking list: when competition function (refer to page 27 for details) is on, score of singer's singing will be memorized and displays on the ranking list according to sequence of high score to low score, shown in the figure:

Список по классиф.			
Номер	Песня	Назв.	Счет
01	1272		098
02	0076		088
03	0183		070
04	0219		050
▲/▼: 上/下项		1Стр. / 1Стр.	

NOTE

#In setup men, after selecting "Default settings", all songs in personal songs collection and the content of ranking list will be cancelled (refer to page 21 for details).

2.4.7 Karaoke setting

Select " Меню настр. караоке " item and press [OK] button to enter Karaoke setup interface. There are 3 function setup items, shown in the following figure:

Меню настр. караоке		
1. Вокал, сопровождение	Выкл.	
2. Функ. аплодисменты	Выкл.	
3. Авто, подсчет баллов	Выкл.	
4. режим соревнования	Вкл.	
▲/▼: 上/下项 确认: 更改设置		

#Press UP/DOWN button to move cursor to the function item selected, and press [OK] button to turn on or off this function. After setup finishes, press [KARAOKE] button to quit setup menu.

1. Вокал, сопровождение : after selecting "ON", lyrics background will become light grey.
2. Функ. аплодисменты : when score is up to or over 60, applause will appear.
3. Авто, подсчет баллов : select "ON", after singing finishes, a score will be given to the singer automatically.
4. Competition: select "ON" and you may enter song selection system to select songs and begin game. Top left corner of the screen displays as in the picture:

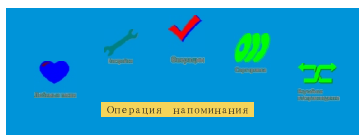
No: 0012 SCORE: 078 ROUND: 016

- No: Song number of challenger
- SCORE: Score of challenger
- ROUND: Challenge times

NOTE

#Applause function is available only when scoring function is turned on.

2.4.8 OPERATION PROMPTS



#" Операция напоминания " item gives a brief explanation

NOTE

#If abnormalities appear in the course of operation, press [SELECT SONG/MENU] button to quit OKD menu and then enter again.

Vocal adjust

When playing songs with voice, press [ZOOM-] button and voice volume decreases Gradually,

Minimum value is Level 1 and screen displays Level 6~Level 1 in turn; contrarily, press[ZOOM+] button, voice volume increases gradually and screen displays Level 1~Level 6 in turn. You may adjust voice volume according to whether you are familiar with the song to reach the purpose of learning to sing.NOTE:This function is available only when songs with vocal.

2.4.9 Various Playback Functions

1. Vocal

When playing OKD, if the song has vocal, you can press [LANG] button to switch vocal on or off.

2. Replay

When playing songs in OKD, press [Repeat] button and the player will play this song from beginning, which is convenient for you to sing repeatedly.

3. Add song to My favourite

Wen playing a cettain song on OKD, if you like this song and have a mind to add it into the personal songs collection, press [MEM] button.

#If you want to collect the song being played currently, firstly confirm whether you have quitted song selection song. If not, please press [KARAOKE] button to quit and then press [MEM] button to add it into personal songs collection.

#If you want to collect songs in the menu being browsed currently (not songs being played currently), move cursor to this song and then press [MEM] button to add it into personal songs collection.

4. Applause

In order to activate atmosphere and add singing pleasure, in the course of playing songs, you may press [] button andsystem will play applause immediately.

5. Next/switch song

During the course of playing songs, press [] button to switch and play the first song in the list of selected songs, and this song will automatically deleted from the list of selected songs.

#If no songs exist in the list of selected songs, this button is invalid.

6. Prev/replay

During the course of playing songs, if you want to replay the song that has been played before, you may press [] button. Each time when you press this button, system will return to the previous song. 5 songs at most are available for system to return.

7. Songs been selected

When playing OKD, press [BROWSE/S-SONG] and the list of songs which have been selected will display, with the song you selected just nowincluded. All songs are arranged according to the sequence of song selection.

#If the list of songs been selected has songs in it, press [] button and system will automatically skip to the next song.

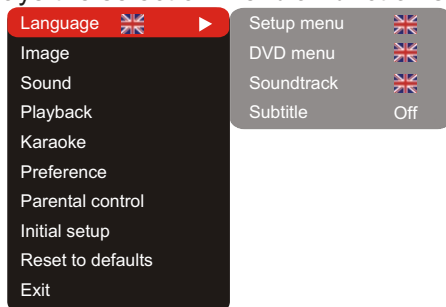
#f you want to delete any song from the list of songs been selected, move the cursor to the

Track that you want to delete and press [CANCEL] button to delete the track selected.
 #If you want a certain song in the list of selected songs to be played in the priority, firstly move the cursor to the track that you wish to play, and then press [OK] button to move the track selected to the first. Until the current song finishes playing, press [⏮] button and this song may be played immediately.

2.5 FUNCTION SETUP

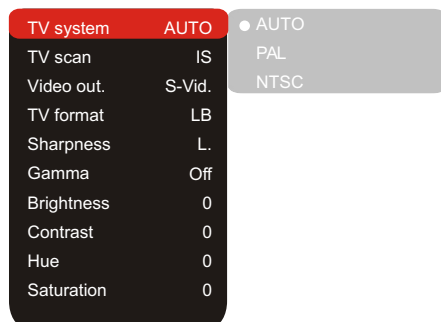
2.5.1 Function Setup

1. Press the [SETUP] button and the screen displays the selection menu of function setup.

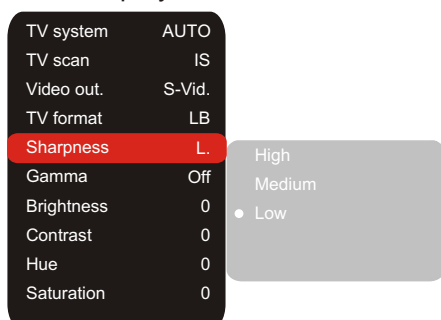


2. Press the [CURSOR] button to select the menu to be entered and press the [OK] or button to confirm. Or press the [CURSOR] button to Exit item and then press the [OK] button to exit

3. Press [UP/DOWN] arrow to select the desired item you want to set and press [OK]. For example, press [UP/DOWN] arrows to select IMAGE and press [OK]. The Image setting page appears on the screen.



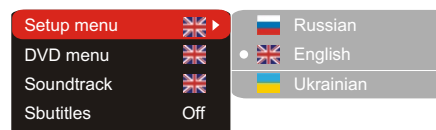
4. Press [UP/DOWN] arrow to select the SHARPNESS item. Press [OK] to confirm it. And then press [UP/DOWN] arrow to select the desired value. For example: Press [UP/DOWN] arrow to select "Medium", then press [OK], the TV screen display.



5. Press [LEFT] button if you want to return to the previous setup page.

6. Press [SETUP] to exit the setup menu.

2.5.2 Language



1. Setup menu: This item is used to set the prompts language on the screen.

#Optional setting: Russian, English, Ukrainian.

#Default: English.

2. DVD menu: To set the preference disc menu lang when playing.

#Optional setting: Russian, English, Estonian, Latvian, Kazakh, Romanian, Byelorussian, Ukrainian, Chinese, Others.

#Default: English.

3. Sountrack: To set the preference audio language when playing.

#Optional setting: Russian, English, Estonian, Latvian, Kazakh, Romanian, Byelorussian, Ukrainian, Chinese, Others.

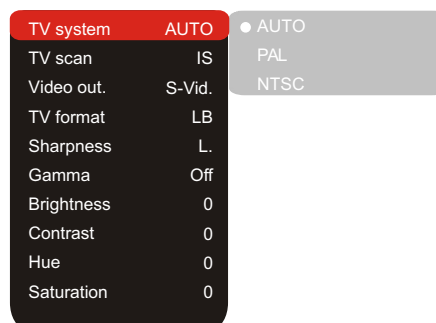
#Default: English.

4. Subtitles: To set the preference subtitle language when playing.

#Optional setting: Off, Russian, English, Estonian, Latvian, Kazakh, Romanian, Byelorussian, Ukrainian, Chinese, Others.

#Default: Off.

2.5.3 Image



1. TV system: This item is used to the video output system of this unit.

#Optional setting: Auto, PAL, NTSC.

#Default: AUTO.

2. TV scan : To set Progressive scan, Interlaced scan mode.

#Optional settings: Progressive, Interlaced, 720P, 1080I.

#Default: Interlaced.

3. Video output: To set the types of SCART out connector.

#Optional setting: S-Video, Component, SCART, #Default: Component.

#When using RGB outputs from the SCART interface, please select RGB. Other wise, please select Com-ponent, and when using S-Video output please select S-Video.

4.TV format:To set the aspect ratio of this player's output image.

#Optional setting: 4:3 Pan-scan, 16:9 letterb., 16:9 TV.

#Default: 16:9 letterb..

5.Sharpness:Used to set the sharpness of video outputs.

#Optional setting: High, Medium, Low.

#Default: Low.

6.Gamma emendation:This item is used to setup the Gamma value of video output.

#Optional setting: High, Medium, Low, Off.

#Default: Off.

7.Brightness:Used to set the brightness of video outputs.

8.Contrast:Used to set the contrast of video outputs.

9.Hue: Used to set the hue of video outputs.

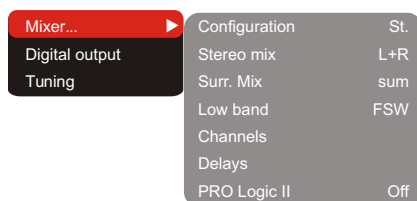
10.Saturation: Used to set the saturation of video outputs.

#Brightness, contrast, hue and saturation adjusting means:

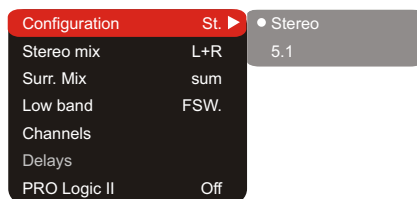
A.Press [UP/DOWN] arrow in the video setup menu to select the desired item you want to adjust. Press [OK] or [RIGHT] button to enter the item's adju-stment.

B.Press [UP/DOWN] arrow to adjust the setting value.

2.5.4 Sound



1.Mixer...



A.Configuration: To set this player's DOWNMIX mode to change multi-channel audio into two channel audio.

#Optional setting: Stereo, 5.1.

#Default: Stereo.

B.Stereo mix: To set the output means of the left or Right audio when playing a Dolby discwith separate two-channel audio.

#Optional setting: L+R, L, R.

#Default: L+R.

C.Surr. Mix: To set output means of the surround leftand right audio when playing a stereo disc.

#Optional setting: Off, sum, Virt. Surr.

#Default: Off.

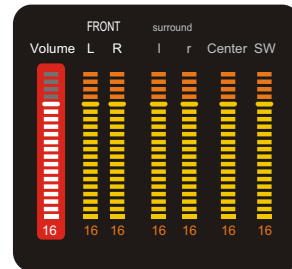
D.Low band: select the channel that you desire to output low frequency signal.

#Optional setting: Front F, Center C, Surround Sr, Subwoofer SW.

#Default: Front F, Subwoofer SW.

E.Channels: To set volume of each individual channel.

a. Press [UP/DOWN] navigation keys to select CHANNEL TRIM, then press the [OK] or [RIGHT]navigation key to select ENTER SETUP PAGE as shown in the TV screen:



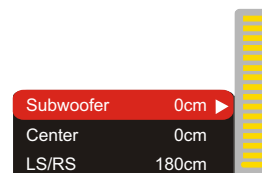
b.press [LEFT/RIGHT] navigation keys to select the desired channel to adjust.

c.Press [UP/DOWN] navigation keys to raise or lower volume of the channel.

d.Press [OK] or [LEFT] to return to the Mix.setup page.

F.Delays: To set delay time of the Center/ Surround/ Subwoofer Speaker.

a.Press [UP/DOWN] navigation keys to select Delays in Channels item, then press [OK] or [RIGHT]navigation key select ENTER SETUP PAGE as shown in the TV screen.



b.press [UP/DOWN] navigation keys to Select thedesired item oup Press [OK] or [RIGHT] button to enter setting.

c.Press [UP/DOWN] navigation keys to raise or lower volume.d. Press [OK] or [LEFT] to return to the Delays in channels setting page.

g.pro Logic II: To set PRO Logic II to ON or OFF. If the TITLE does not support this function, we recommend that you set this item to AUTO because it would become worse if the processing effects were added forcibly.

#Optional setting: AUTO, On, Off.

#Default: AUTO.

2.Digital output: select to set the format and stream form of digital audio output.

A.SPDIF format:

#Optional setting: RAW format, SPDIF/PCM.

#Default: RAW format.

B.LPCM

#Optional setting: 48 kHz 16 bit, 96 KHz 24 bit.192kHz 24bit.

#Default: 48 kHz 16 bit.

3. Tuning:

A. Max volume: set the maximum volume.

B. Equalizer: To set Equalizer modes.

#Optional setting: Off, Rock, Pop, Live, Dance, Techno, Classic, Soft.

#Default: Off.

C. Echo: To set different sound field effects.

#Optional setting: Off, Concert, Living room, Hall, Bathroom, Cave, Arena, Church.

#Default: Off.

D. Tone balance: to set the tone level to match your diapason when you're singing

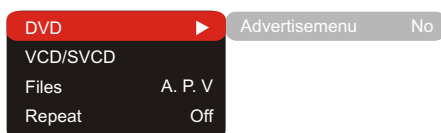
#Method to adjust tone control:

a. Press [UP/ DOWN] cursor buttons to select "tone" item in Audio Setting page, and then press [OK] or [RIGHT] button to enter Adjustment Menu.

b. Press [UP/DOWN] cursor button to adjust setting value.

c. Press [OK] or [LEFT] button to return to Audio Setting page after adjustments are done.

2.5.5 Playback



1. DVD: set whether information of advertisement and warnings at the beginning of DVD disc is skipped to play the movie directly.

Always skip ads

#Optional setting: Yes, NO

#Default: NO.

2. VCD/SVCD: To set the PCB status.

#When playing Super VCD or VCD2.0 discs, if the PCB is ON, the menu image displays.

#Optional setting: On, Off.

#Default: On.

3. Files: data disc may probably includes Mp3, JPEG and MPG format files in which you may select DVD player to read the filetype.

#Optional setting: Audio, Picture, Video.

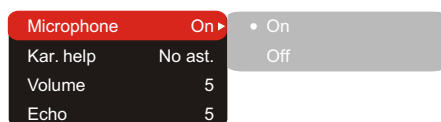
#Default: Audio, Picture, Video.

4. Repeat : select the repeat playback mode.

#Optional setting: Off, Single, all.

#Default: Off.

2.5.6 Karaoke



1. Microphone: switch on or off microphone.

#Optional setting: On, Off.

#Default: Off.

2. Kar. help: select accompany singing means.

#Optional setting: Channels L, Channels R, Channels No ast, Channels No voc.

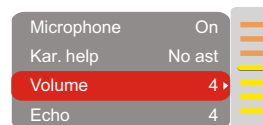
#Default: Channels No ast.

3. Volume:

A. In microphone setup page, press [UP/DOWN] cursor to select "Volume" item, and then press [OK] button to enter the adjustment menu.

B. Press [UP/DOWN] cursor to adjust the setup Value.

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

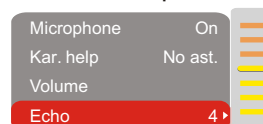


4. Echo:

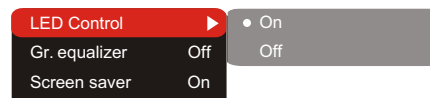
A. In microphone setup page, press [UP/DOWN] cursor to select "Echo" item, and then press [OK] button to enter the adjustment menu.

B. Press [UP/DOWN] cursor to adjust the Setup value.

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



2.5.7 Preference



1. LED Control: This item is used to set color of led on the front panel.

#Optional setting: On, Off.

#Default: On.

2. Gr. equalizer: This item is used to set whether the Dynamic Spectrum is allowed.

#Optional setting: On, Off.

#Default: Off.

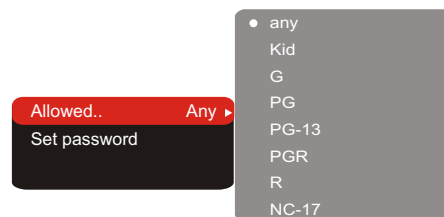
#Dynamic Spectrum display is invalid in Data disc, DVD AUDIO playback.

3. Screen saver: Open or close the screen saver function.

#Optional setting: On, Off.

#Default: On.

2.5.8 Parental control



1. Allowed.: To set the parental control ratings to prevent children from watching the restricted contents. (In case the disc supports this function.)

#Optional setting: any, Kid, G, PG, PG-13, PGR, R, NC-17.

#Default: any.

2.Set password: To set four digit password to enable you to change the parental control ratings.

#Default: 7890.

2.5.9 Initial setup

Press [UP/DOWN] arrow to select the desired option and Press [OK] button to confirm it.

NOTE

In this setup state, you may not press [LEFT] button to return to the previous menu.

2.5.10 Rest to defaults

Load factory settings

OK

Cancel

Reset to defaults: To restore all settings to the default value except for the parental control and password settings.

Exit

Press [UP/DOWN] arrow to select the Exit item. Press [OK] button to exit the setup menu.

2.5 Specifications

Playerable discs	DVD-Video, Super VCD, VCD, DivX 3.11, DivX4, DivX 5, DivX Pro, XviD, CD-DA, CD+G, DVD-Audio, HDCD, MP3, WMA, Kodak Picture, CD, JPEG		
Input	MIC input		
Output	Audio outputs	Analog audio output:	Stereo, output 5.1CH
		Digital audio output:	Coaxial, Optical
	Video outputs	Composite, S-Video, component Y C b Cr, progressive scan output Y Pb Pr, RGB/SCART	
	Headphones output		
Video Characteristics	Video amplitude	1.0Vp-p(75Ω)	
	S-Video amplitude	Y:1.0Vp-p(75Ω), C:0.286Vp-p(75Ω)	
	Component Video amplitude	Y:1.0Vp-p(75Ω), Cb/Cr:0.7Vp-p(75Ω)	
Audio characteristics	Frequency response	20~20KHz(±1 dB)	
	Signal-to-noise ratio	>100(dB)	
	THD	<0.01%	
Operating voltage	~110-250V, 50/60Hz		
Power consumption	14W		
General Specification	Dimensions:	430mm×266.4mm×50.6mm	
	Mass:	2.2kg	
Operating Temperature	5~35℃		
Operating Humidity	15~75%(no condensation)		

#Design and specifications are subject to change without notice.

#We do not guarantee that all discs can be played smoothly due to the disc quality, disc recording quality and recording format.

Chapter Three Principle and Servicing

Section One Principle of the Player

3.1.1 Block diagram of the player

DV828X(RU) is composed of decode circuit, servo circuit, audio circuit, video circuit, MIC circuit and power circuit. Block diagram of the player is shown in the figure 3.1.1.1:

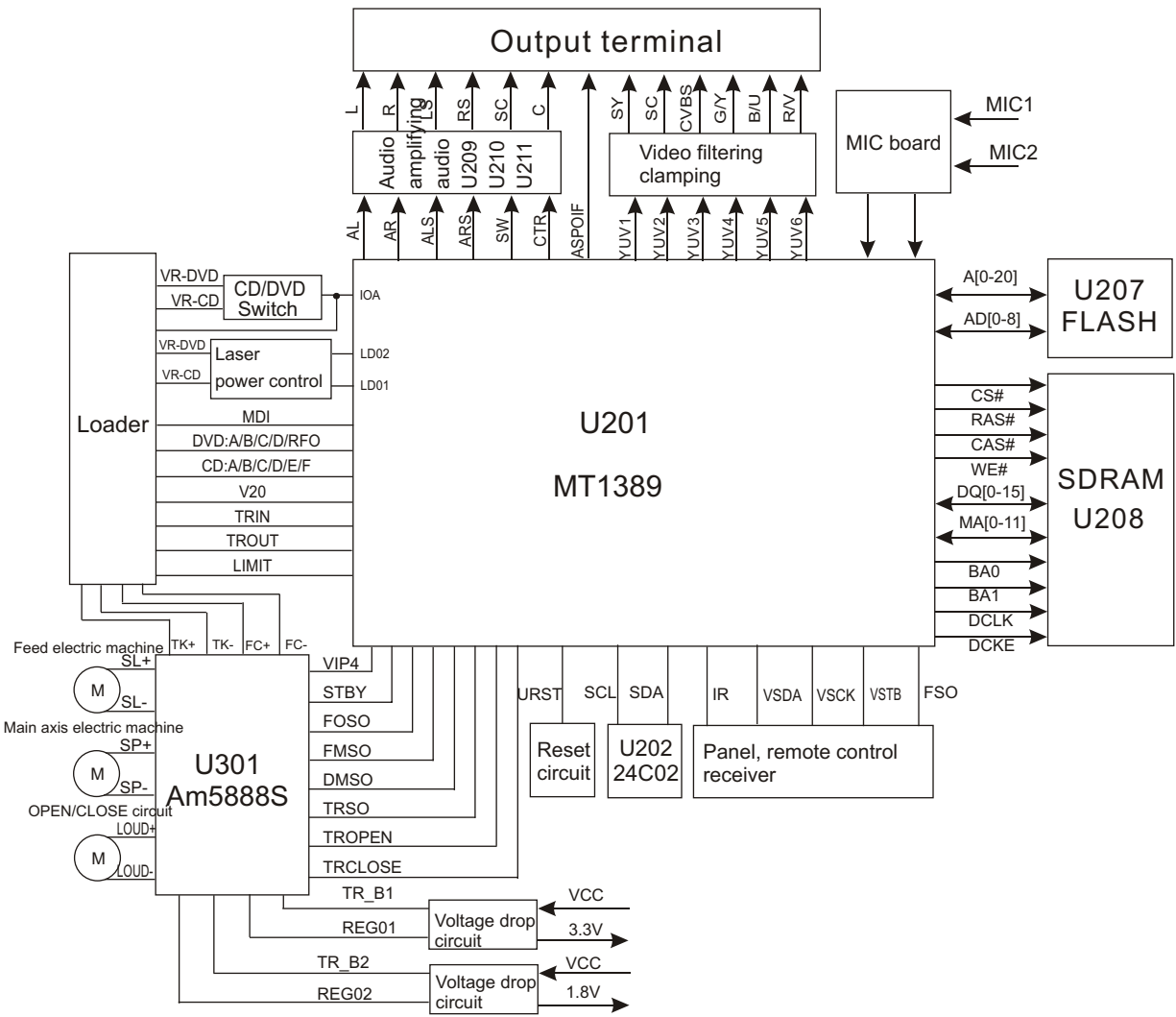


Figure 3.1.1.1 Block diagram of the player

3.1.2 PCB board composition diagram of the player

PCB board composition diagram of the player is shown in the figure 3.1.2.1:

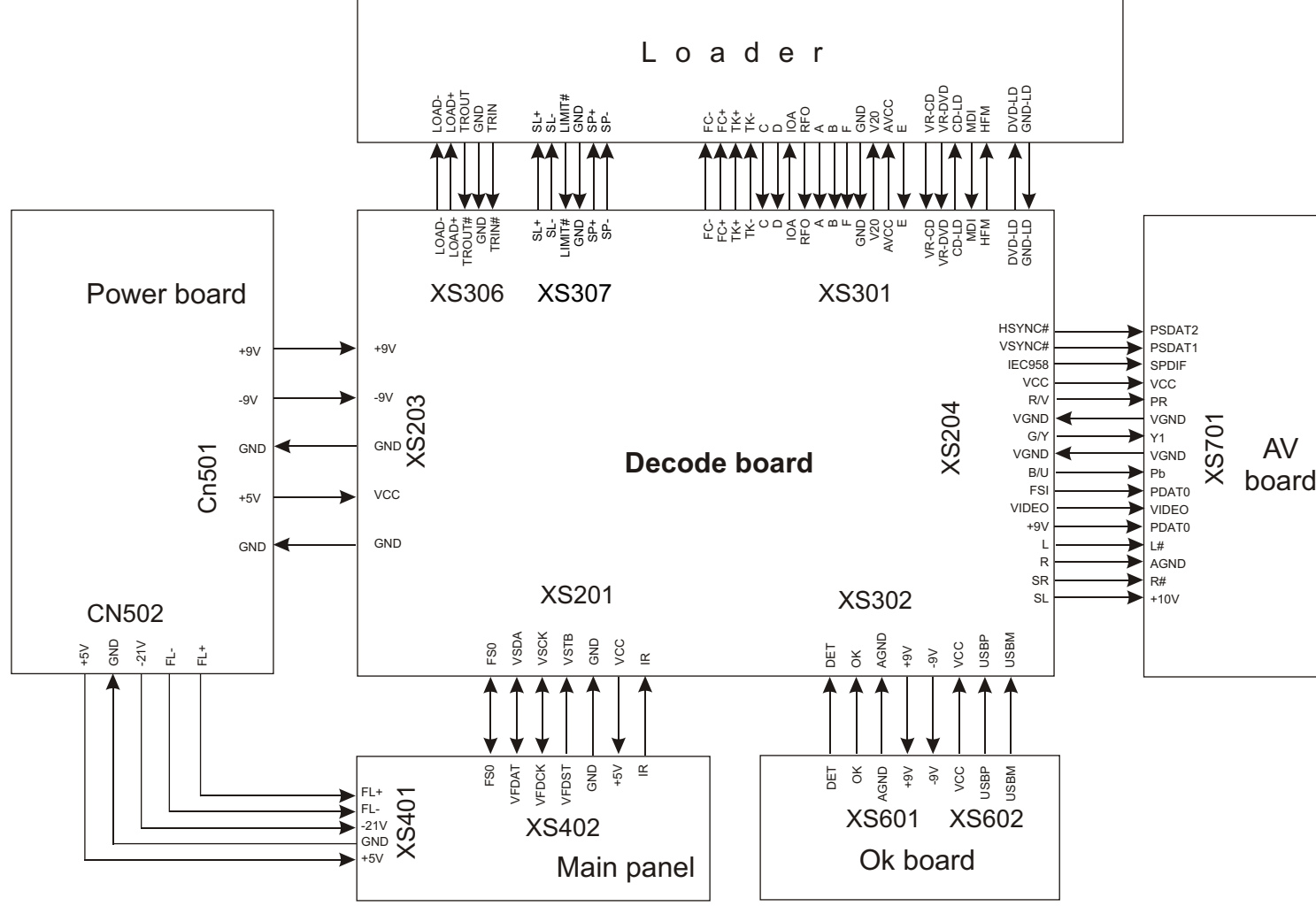


Figure 3.1.2.1 PCB board composition diagram of the player

3.1.3 Introduction to IC of the player

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

PCB semi-finished product	IC model	Location	Function
Decode board 2DV985-5	MT1389HD	U201	Decode chip
	24C02	U202	EEPROM
	CS5340	U203	A/D conversion
	HL139	U206	IIC command
	29LV160BE	U207	FLASH
	HY57V641620HGT-7	U208	SDRAM
	4558	U209,U210,U211	Operational amplifier (audio amplifying)
	AM5888S	U302	Servo drive
4973-2 4DV1200S-1	PT6961	U401	Panel control IC
	HS0038B3V	U403	Remote control receiver
Power board 5DV985-4	VIPER22	U501	Power switch IC
	HS817	U502	Photoelectric coupler
	LM431A	U503	Precision voltage stabilizer
OK board 6DV1200-0	KA4558	U601,U602	Operational amplifier (MIC amplifying)

Section Two Unit Circuit Principle

3.2.1 Laser head circuit

1. Laser head flat cable function introduction is shown in the following table:

Pn	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	hanging 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: loader DVD laser diode wave length is 650nm and that of CD laser diode is 790nm; if wave length is between 370nm and 750nm is visible light, laser during the course of reading DVD disc is visible light and that if IR light when reading CD disc.

(2) Principle of laser head pick-up signal: laser beam projects onto disc vertically. When focus of laser beam projects into disc, laser beam will produce reflection and reach light detect device through reflection loop and switch into electric signals through photo-electric conversion. The reflection loop produced in non-pit information area and pin information area on discs are different and reflect into different areas of light detect device, the photo-electric diode in different positions of light detect device will produce different signals to process light detect device diode signals and then produce digital signals.

(3) Focus and trace winding: when laser head is reading signals normally, information side should be in the focus of laser beam. Because of disc error and some factors, such as high speed rotation and mechanical error, laser beam will deviate from information side unavoidably to produce phenomena of deflection and de-focusing; focus and trace coil are added to adjust laser beam to make it focus in information area correctly.

(4) RF signal formation: when reading disc normally, light detect device will have 160MV vague eye-shape waveform that are superposed on A, B, C, D, through being superposed by adder inside light detect device, output RF signals from RFO pin; frequency when reading DVD disc is far higher than that when reading CD disc and output range is about 1.4V.

3.2.2 Servo circuit

1. Servo system of this player adopts SANYO 65 loader and MTK decode solution (MT1389HD+FLASH (16M) +SDRAM (64M)), and its servo circuit is mainly composed of front end signal processing, digital signal processing and digital servo processing, digital signal processing IC MT1389 and drive circuit Am5888, in which Mt1389 is also the main part of decode circuit. Servo circuit block diagram is shown in the figure 3.2.2.1:

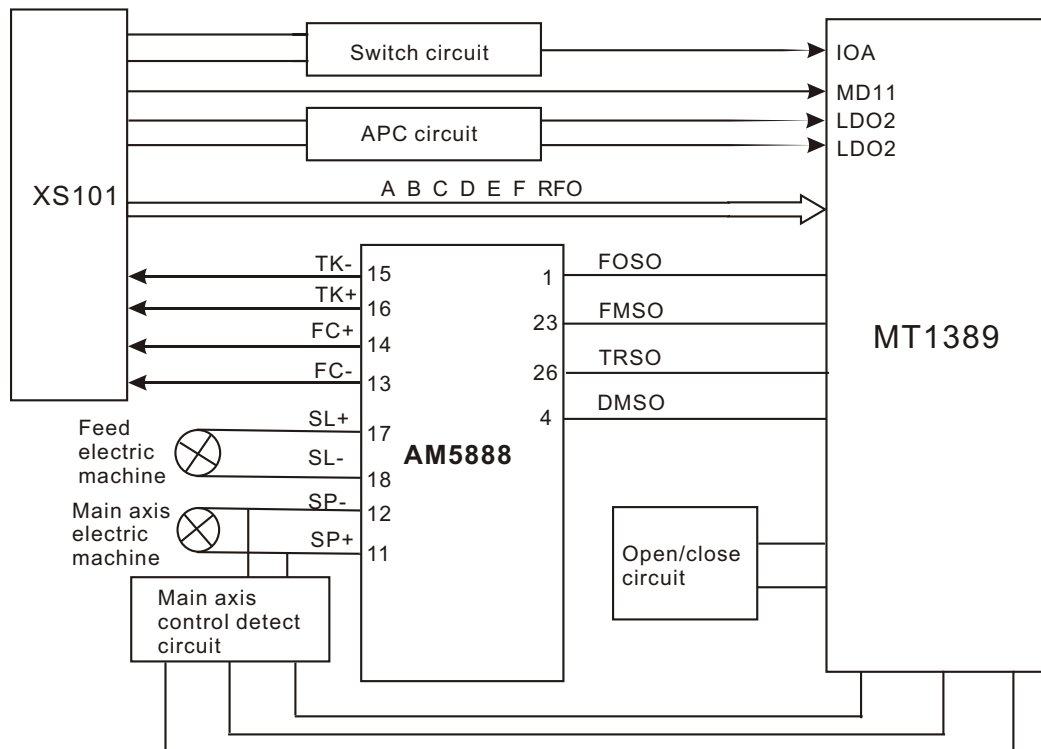


Figure 3.2.2.1 Servo circuit block diagram

2. Working principle: after power on or close to proper position (on loader frame for normal DVD, as for PDVD, on PCB at the lower part of door), loader laser head begins to reset; after laser head reaches proper position, detect switch will give a signal to Mt1389, Mt1389 begins to output focus, main axis and light emission signals, machine begins to rotate, laser head begins to identify disc information and decide whether disc is CD or DVD according to disc information to facilitate to output level from IOA pin to make disc switch circuit and laser head PD IC make the relevant control action. At the same time, Mt1389 adjusts laser output power through laser power control circuit.

After loader reading disc information, A, B, C, D, E, F signals are formed through photo-electric conversion and sent out to Mt1389 (DVD only has A, B, C, D signals), and then inputted from pin 2~11, 18, 19 of MT1389. After being amplified and processed by the pre-amplifier inside MT1389, now signals are separated to two parts for processing inside Mt1389. One part, through addition inside Mt1389 and amplifying and subtraction circuit, produces servo error signal, after being processed by digital servo

Signal circuit, corresponding servo control signals form to output FOO, TRO, DMO, FMO digital servo Control signals from pin 42, pin 41, pin 37, pin 38 of Mt1389 respectively, and FOSO, TRSO, DMSO, FMSO, through integration circuit composed by resistor capacitor, and send to servo driver circuit for amplification to bring along focus winding, trace winding, main axis electric machine and feed electric machine after drive amplification. 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. Normal DVD player has a open/close circuit to control the in and out of door to reach the purpose of conveying discs; PDVD adopts manual open means and whether it is close to proper position can be checked by detect switch.

3. Explanation to servo terms

(1) FOO: 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, so laser head is required to move upwards or downwards to make focus aim at data pit justly. When laser head is moving upwards or downwards, it means that pick-up is making focus acts.

(2) TRO: data information is saved in disc in form of tracks. When disc is rotating, trace deviation will produce and now laser head is required to be adjusted. In this process, it is objective, but the entire pick-up, that moves forwards or backwards, and the moving range is very small.

(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 tracks.

(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 in the figure 3.2.3.1:

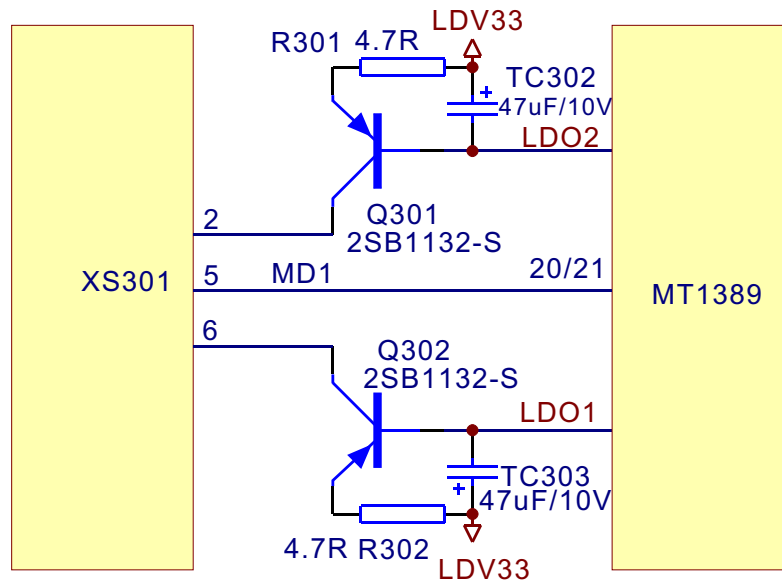


Figure 3.2.3.1 Laser power control circuit diagram

2. Working principle

Pin 20/21 of Mt1389 is laser power detect input pin, pin 21 is DVD laser power strong/weak detect signal input pin, pin 23 is VCD laser power drive control output pin and pin 22 is DVD laser power drive control output pin.

When reading VCD discs, laser power becomes weak, voltage of MDI pin decreases, voltage of pin 23 of Mt1389 decrease to make voltage of pin 19 of Xs301 increase to reach the purpose of promoting laser power. When laser power is too strong, voltage of MDII pin increases to make voltage of pin 23 of Mt1389 increase to make voltage of pin 19 of Xs301 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 output pin and working principle is the same with that when playing VCD disc.

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

Location	Read DVD disc	Read VCD disc	Location	Read DVD disc	Read VCD disc
V103_E	2.9V	3.2V	V104_B	3.2V	2.2V
V103_B	2.2V	3.2V	V104_E	3.2V	2.9V
V103_C	2.2V	0	MT1389_20	0.2V	0.2V
V104_C	0	2.2V			

3.2.4 CD/DVD switch circuit

1. CD/DVD switch circuit is shown in the figure 3.2.4.1:

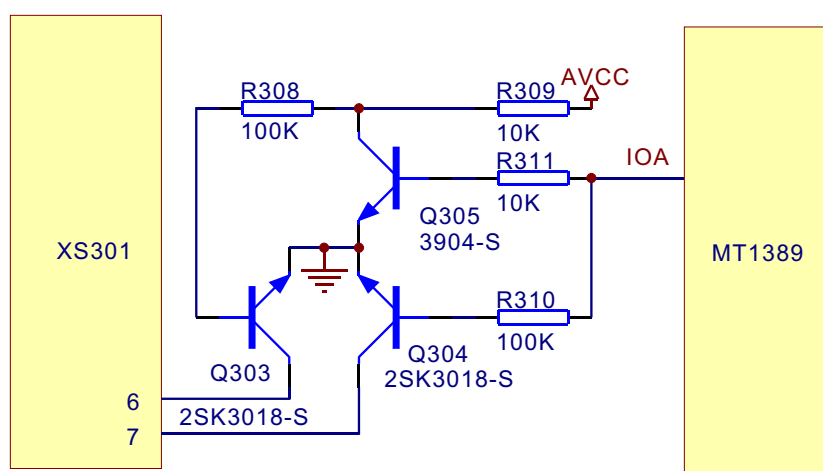


Figure 3.2.4.1 CD/DVD switch circuit diagram

2. Working principle: after loading disc into the machine, IOA end of ,Mt1389 is defaulted high level to make Q305 saturated on and form loop with CD laser power control circuit on loader. At the same time, IOA directly reaches loader PD IC for switch and disc begins to rotate. When servo processing system identifies that disc in machine is not CD, IQA pin outputs low level to make Q305 cut off, Q303 is on and forms loop with DVD laser power control circuit on loader to perform the action of reading DVD disc. After disc tray opens, IOA still keeps the state before opening disc. If the machine cannot identify which disc is in this machine, IQA pin will switch continuously until disc has been read or system judges that there is no disc in.

Note: Q303, Q304 are MOS pipe

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

State	Q305			Q303		
	Base electrode B	Collector C	Emitter E	Grid electrode G	Drain electrode D	Source electrode S
DVD dis c	0	3.86	0	3.81	0.18	0
VCD dis c	0.64	0.1	0	0	0	0
State	Q304			IOA		
	G	D	S			
DVD dis c	0	0	0	0		
VCD dis c	3.27	0.18	0	3.3		

3.2.5 Open/close door drive circuit

1. Open/close door drive circuit is shown in the following figure 3.2.5.1:

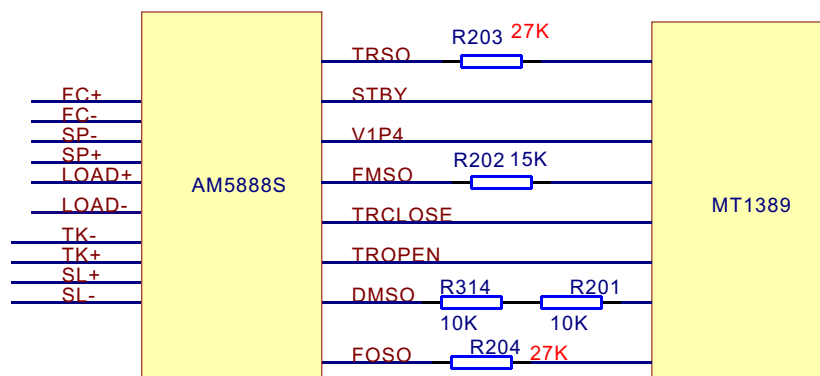


Figure 3.2.5.1 Open/close door drive circuit diagram

2. Working principle: when machine is reading discs normally, pin 6, 7, 9 of AM5888S are all 0V. After pressing OPEN button, pin 6 inputs high level, pin 10 LOAD+ outputs high level, electric machine rotates in positive direction and performs action of opening door. When closing door, pin 7 inputs high level, pin 9 LOAD- outputs high level and forms loop through electric machine, which reverses to carry out action of closing door. After closing to proper position, all pins are low level. Servo drive principle is the same with the drive of D5954 solution, so we will not repeat here.

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

State	Q306			Q307		
	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	Q308			Q309		
	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	Q310			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

3.2.6 Main axis control circuit

1. Main axis control circuit is shown in the figure 3.2.6.1:

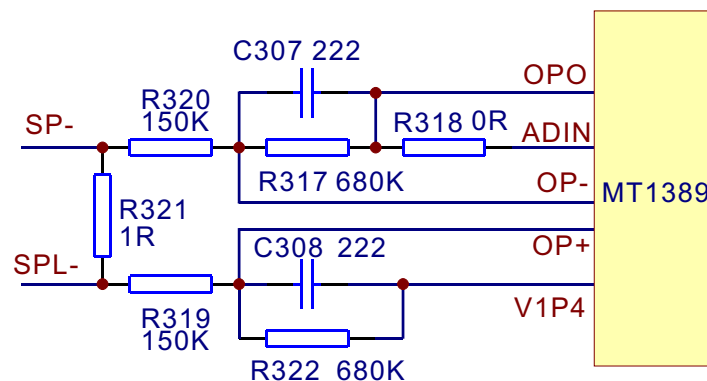


Figure 3.2.6.1 Main axis control circuit diagram

2. Function: disc is always in high speed rotation state when machine is reading discs, when it is necessary to open door and change another disc, MT1389 stops giving positive phase drive signals to main axis drive circuit, but disc is still rotating due to the function of inertia. If the action of opening door is carried out at this moment, disc will be worn, so the machine must apply brake to main axis. Whether disc has stopped rotating or whether it is rotating reversely, decode chip cannot judge, so a main axis control circuit is added to make decode chip can effectively monitor whether disc has stopped rotating.

3. Working principle: MT1389 has a built-in comparator composed of operational amplifier, in which OP+ is the in-phase input end, OP- is reverse input end, OPO is output end. When playing normally, electric machine is rotating in positive direction, voltage of OP+ is higher than OP-, voltage of OPO is more than 1.4V. When it is necessary to open disc door, main brake signals stop, electric machine is eternal magnet, so when rotating, inductive electromotive force produces on two ends, through R320, R319 sampling, to give to decode chip to make OPO output voltage lower than 1.4V and transmit to MT1389 ADIN input pin through R318; when ADIN is high level, main axis does not make any acts, when

ADIN is low level, MT1389 outputs an instant electric machine reverse braking signal to make main axis electric machine speed down, and such cycling goes on until main axis stops rotating. PDVD is manual means for door opening, so disc is still rotating after disc door opening but will stop soon.

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

Key point	Position	Normal working voltage (V)	Volateg change w hen disc out (V)
SP+	Pn 11 of AM5888S, pn 5 of XS307	3.79	3.79→0.70→1.80
SP-	Pn 12 of AM5888S, pn 6 of XS307	1.38	1.38→3.40→1.80
OP+	Pn 36 of MT1389	1.38	1.38→3.10→1.80
OP-	Pn 35 of MT1389	1.53	1.53→3.08→1.98
OPO	Pn 34 of MT1389	2.44	2.44→0.40→2.50
ADIN	Pn 47 of MT1389	2.44	2.41→0.41→2.44
DMSO	Pn 4 of AM5888S	1.42	1.42
VIP4	Pn 30 of MT1389	1.41	1.41

3.2.7 Decode circuit

1. Decode circuit block diagram is shown in the figure 3.2.7.1:

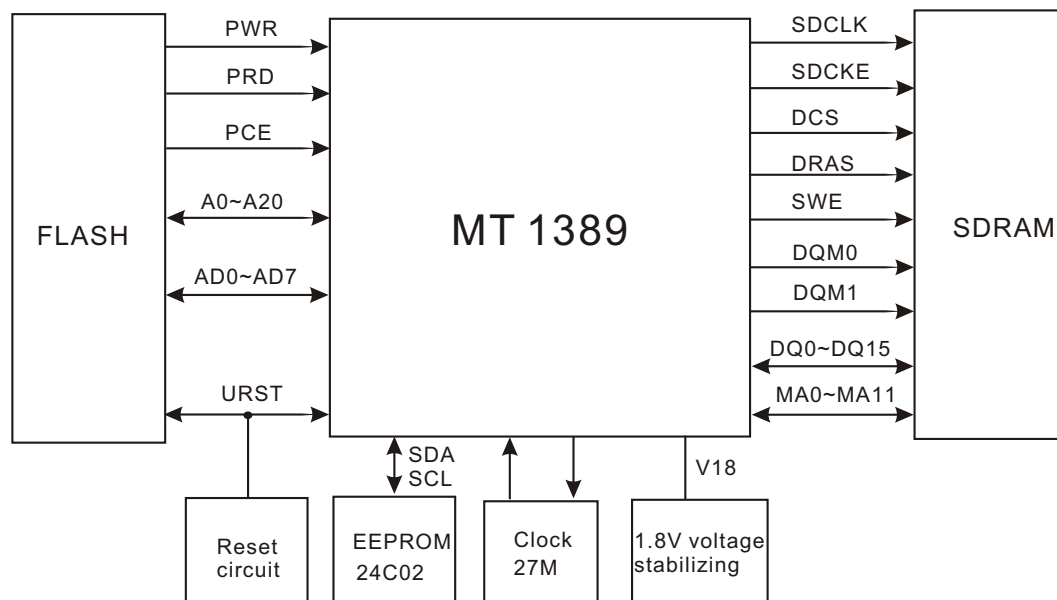


Figure 3.2.7.1 Decode circuit block diagram

2. Working principle: this decode circuit is mainly composed of Mt1389, SDRAM and FLASH. Important conditions for the working of decode circuit have:

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

(2) Clock: this system adopts 27M external clock input to produce the required clock signals through inside doubling circuit.

(3) Power: decode chip adopts 2 groups of power supply: 3.3V and 1.8V, in which 1.8V is mainly provided for internal logic control circuit, which is called core voltage by us.

After power on, reset circuit performs reset to Mt1389 built-in CPU (8032) and FLASH, decode chip outputs reset signals at the same time and performs reset to other circuits. After system reset, read signals are firstly sent to FLASH to read out information saved inside FLASH, machine displays powerOn picture, servo system begins to work and check whether door is closed to proper position and whether detect switch is shut, if not, action of closing door is performed. After detect switch is shut, machine begins to perform the preparations of disc reading and panel display.

Playback process: laser head picks up disc information from discs, through being processed by servo system, and sends to decode circuit for decoding, and signals after being decoded are saved in SDRAM. When machine required to replay signals, decode circuit calls out information inside SDRAM for output.

Save user information: information set by users is saved inside EEPROM and will be saved inside IC forever if users does not update or reset this information.

Audio, video output circuit: at present, Mt1389 integrates video D/A converter, Mt1389 integrates audio D/A converter inside, and manufacturers may select according to their own demands, therefore when in audio decode output, part is analog output and part is digital output. Please refer to circuit diagram and audio circuit for details.

3.2.8 Reset circuit

1. Reset circuit is shown in the figure 3.2.8.1:

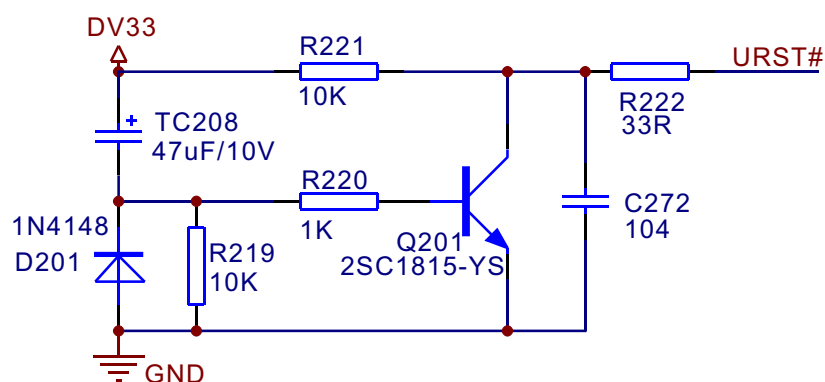


Figure 3.2.8.1 Reset circuit diagram

2. Working principle: after power on, voltage of Dv33 increases to 3.3V and main chip power supply is normal. Now, Tc208 cannot change voltage of Dv33 suddenly, base electrode of Q201 has current in, Q201 is saturated on, URST is low level. Dv33 charges Tc208 through emitter electrode of R219 and

Q201 to make voltage of cathode of Tc208 decreases gradually. When this voltage is below 0.7V, Q201 cuts off, URST changes into high level, and the process for URST from low to high is called low level effective reset signals by us. After power off, voltage of Dv33 decreases, Tc208 and Dv33 voltage decreases together, D201 performs surge discharge and clamping to TC208.

3. Key point voltage (unit: V)

Q201_B is low level when in normal conditions and changes from 3.3V to 0V at the moment of power on.

Q201_C is high level in when in normal conditions and changes from 0V to 3.3V at the moment of power on.

3.2.9 Video circuit

1. Video signals flow chart diagram is shown in the figure 3.2.9.1:

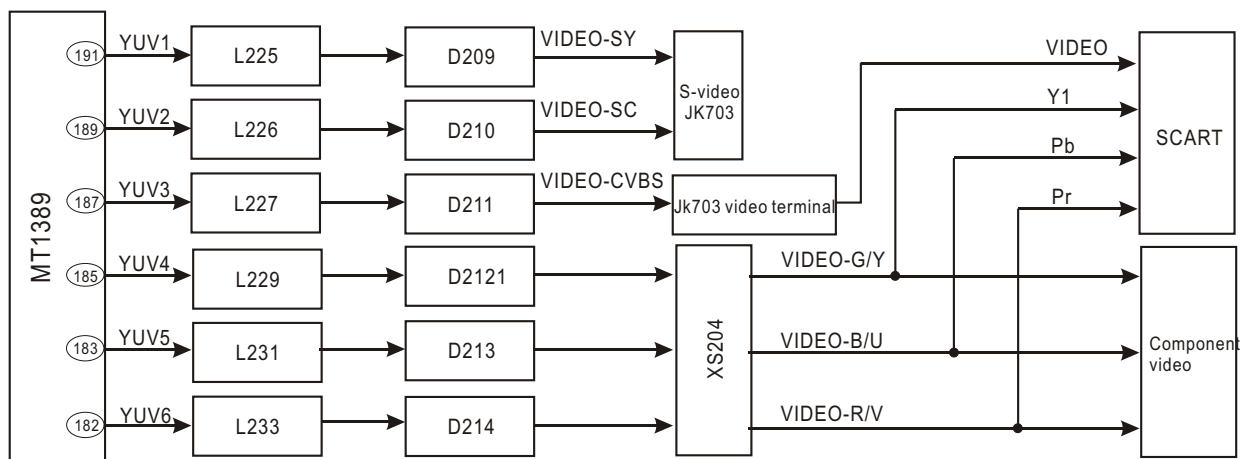


Figure 3.2.9.1 Video signal flow chart

2. Working principle: MT1389 has built-in video D/A conversion circuit, video output has R/B/G, Y/Pb/Pr, Y/Cb/Cr, CVBS, Y/C output mode, in which R/B/G, Y/Pb/Pr, Y/Cb/Cr, Y/C cannot output at the same time and need software to switch. CVBS is a separate output mode, 4-channel video signals outputted by MT1389, after video filtering and clamping, output to video terminal.

Shown in the figure 3.2.9.2, capacitor C287, C288 and inductor L227 compose a low-pass filter to filter high frequency interference signals except for useful signals; dual diode D211 composes a clamping circuit. It is known from features of diode that the most range of composite video signal CVBS cannot be over 5.7 and cannot lower than -0.7 in minimum, thus high voltage signals from TV set can be prevented from burning down the player.

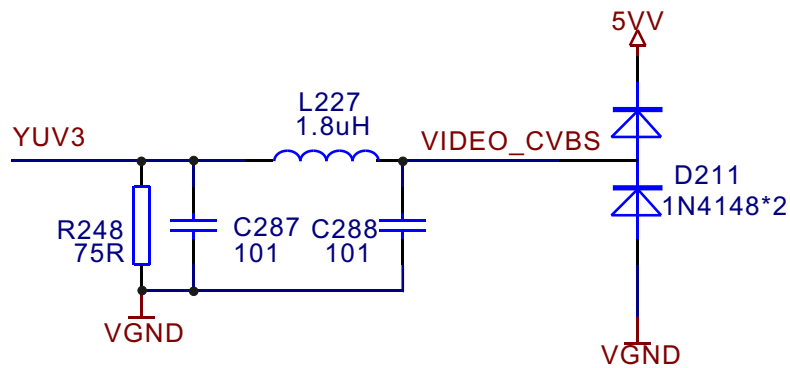


Figure 3.2.9.2 Video output circuit

3.2.10 Audio circuit

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

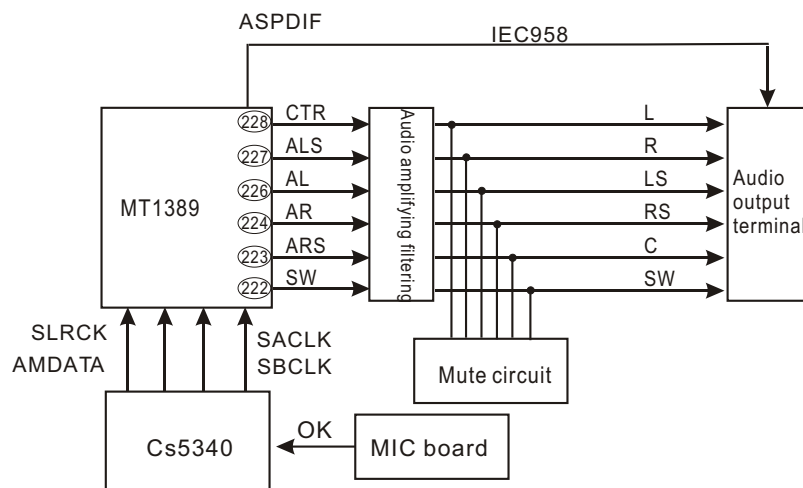


Figure 3.2.10.1 Audio circuit block diagram

2. Working principle: Mt1389 has built-in audio DAC conversion circuit, analog audio signals output directly from decode chip, through audio amplifying and filtering circuit, output audio signals directly to AV output board. Audio L, R signals are divided into two channel, in which one channel outputs to audio output terminal and the other channel outputs to headphone amplifying circuit on MIC board.

3. External Karaoke signal input and output

After MIC signals are being amplified by 4558, through CS5340 A/D conversion circuit, they switch into digital audio signals to input to decode chip for echo and volume processing circuit and output with audio signals L/R to reach the purpose of Karaoke.

3.2.11 Mute circuit

1. Mute circuit diagram is shown in the figure 3.2.11.1:

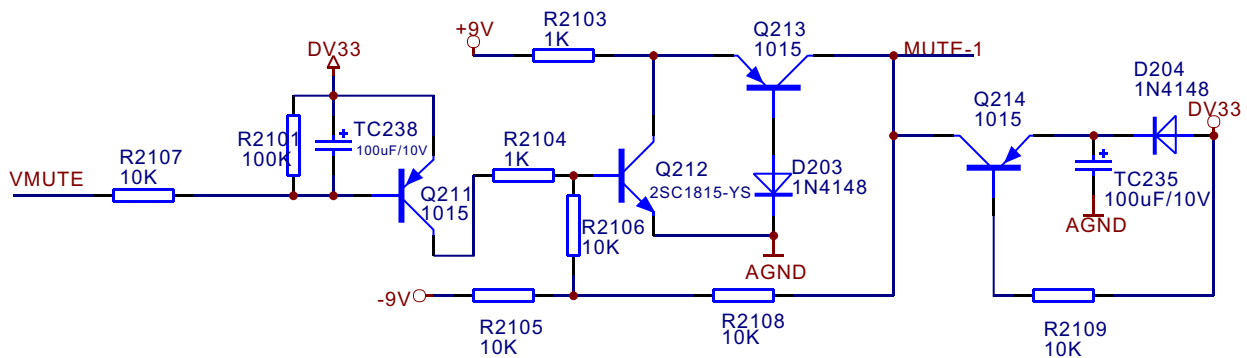


Figure 3.2.11.1 Mute circuit

2. Quieting circuit working principle:

When the player is working normally, shown in the figure 3.2.11.1, when chip is outputting analog audio signals, it outputs a low level signal at the same time to VMUTE to make Q211 on, voltage of Q211B electrode is about 2.7V, voltage of Q211 collector electrode is about 3.3V, so Q212 is also on; voltage of B electrode is about 0.7V, voltage of Q213 E electrode is close to zero, Q213 cuts off, MUTE-1 is negative voltage, which is added to base electrode of mute pipe of audio output end to make mute pipe cut off and audio signals output after being amplified by 4558. When in mute, MT1389 has no audio signals that output to operational amplifier, so audio output end of the player should have no audio output; electronic elements in circuit and IC will produce some noise to transmit to audio output end of the player, in order to filter these noise, decode chip outputs a high level signal to VMUTE to make Q211 cut off, so Q212 cuts off, +5V power transmits through E C electrode of Q213 to base electrode of switch pipe Q205-Q210 and circuit is in mute.

When the machine is not playing discs, decode chip outputs a high level signal to VMUTE to make circuit enter mute.

3. Power-off quieting working principle:

Shown in the figure 3.2.11.1, when the player is working normally, D204 is on, +5V charges capacitor TC235 through D204, now voltage of emitter electrode of Q214 is lower than voltage of base electrode and Q214 cuts off. When power off, +5V disappears, Q214 base electrode changes to low level, and its emitter base changes into high level because of discharge of TC235, now Q214 is on, collector electrode of Q214 (AMUTE) outputs high level to add to the base electrode of switch pipe Q205-Q210, switch is saturated, the noise produced in the course of power on and off is bypassed to ground, and power-off quieting function is realised.

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

Keypoint	E	F	G	H	I	J	K	L	M
No mute	2.5	3.2	0.7	0.12	-0.15	-4.27	-4.27	4.9	4.9
Mute	3.2	-3.86	-3.87	1.4	0.7	1.3	-4	4.9	4.9

3.2.12 Power circuit

1. Power circuit block diagram is shown in the figure 3.2.12.1:

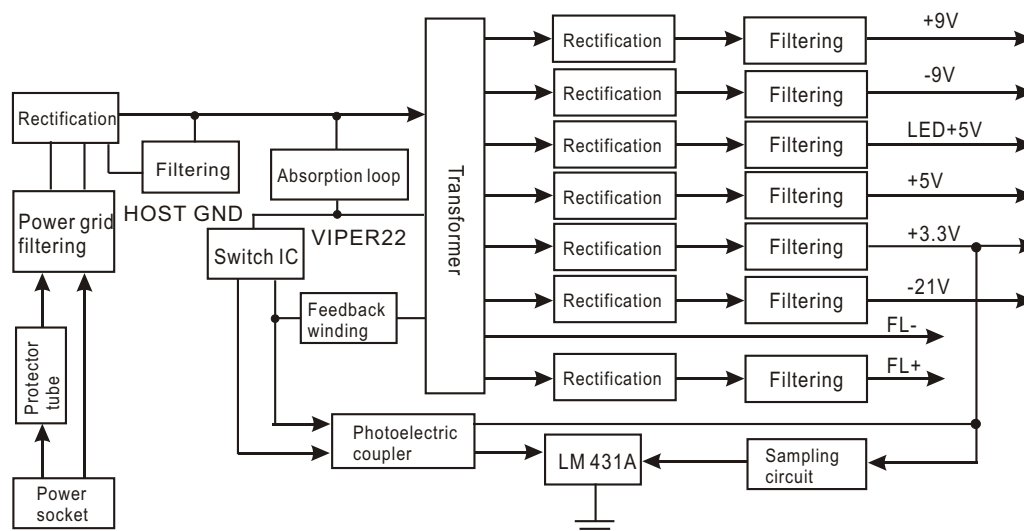


Figure 3.2.12.1 Power circuit block diagram

2. Working principle

(1) Power grid filtering circuit: various electromagnetic radiation exists in surrounding, so it will produce interference to inputted AC current. The function of power grid filtering circuit is to filter these interferences to make those that enter bridge rectification circuit are comparatively pure 220V AC power.

(2) Bridge rectifying and filtering circuit: the function of this circuit is to switch city power into DC power. Voltage after rectifying and filtering is 1.414 times of input power, so the DC voltage on two ends of TC501 is equal to 300V.

(3) Absorption loop: power always works in on/off state, so very high peak voltage will produce in the course of power on and off. In order to protect switch IC better, a peak absorption loop is added.

(4) Filtering circuit: the function is to produce a comparatively stable and small ripple DC voltage. In filtering circuit, "Π"-type filter is adopted most of the time. The features of capacitor filtering are that when load resistance is high and current is small, filtering is obvious; as for inductor filtering, when load resistance is small and current is large, filtering is obvious. To constitute capacitor into "Π"-type filter, better filtering effect may be achieved.

(5) Feedback loop: the time length of “on” and “off” in the same cycle inside switch module VEPR22 is decided by feedback loop. Feedback loop samples +3.3V output voltage; when output level is too high, voltage after being sampled is on high side, through feedback loop, space occupation ratio of pin 3 signal of VEPR22 is changed, “on” time reduced and output voltage begins to decrease. When output voltage is too low, voltage after being sampled is on low side, through feedback loop, space occupation ratio of VEPR22 increases, output voltage increases. Through the function of feedback loop, power board outputs stable voltage. LM431 used in this power is a 2.5V comparator. Compare sampling voltage with this 2.5V voltage, when sampling voltage is more than 2.5V (output voltage is on high side), LM431 is on, light emission diode in photoelectric coupler begins to emit light to make the other end of photoelectric coupler begin to be on; light emission of light emission diode is stronger, the degree of “on” is larger, the time of “on” of switch module VEPR22 decreases, output voltage begins to reduce. When sampling voltage is lower than 2.5V (output voltage is on low side), LM431 cuts off, “on” time of VEPR22 increases and output voltage increases, thus, through the auto control function of feedback loop, power board can output comparatively stable voltage.

3.2.13 MIC circuit

1. MIC circuit block diagram is shown in the figure 3.2.13.1:

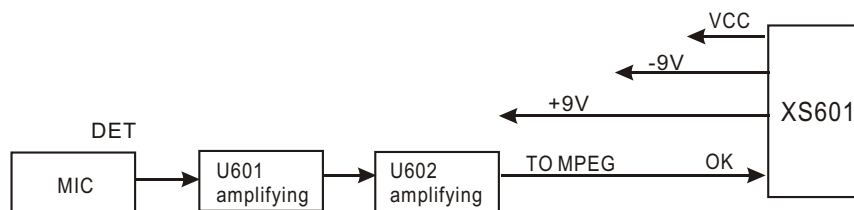


Figure 3.2.13.1 MIC circuit block diagram

2. Working principle: after inserting microphone, DET signals change from high level to low level, Q602 cuts off and makes mute circuit of decode part turn off; audio signals may output whether disc reading is available. If this signal has trouble, microphone will have no sound when playing stops; after being filtered, signals inputted by microphone output to U601 and signals after being amplified output from U601, through being amplified for the second time, outputted by pin 7 of U602 to send to decode board directly for Karaoke signal processing and then overlap with audio signals and output to fulfill Karaoke signal.

After unplugging microphone, DET signals change from low level to high level, Q602 is saturated on, MIC signal is in mute state to prevent the output of interfering audio.

3.2.14 USB jack circuit

1. USB jack circuit block diagram is shown in the figure 3.2.14.1:

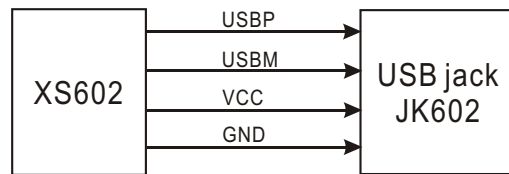


Figure 3.2.14.1 USB jack circuit block diagram

2. Working principle: USB jack is composed of two data lines of USBP and USBM, one power supply line VCC and grounding line (outside casing). Pin 48, 49 of MT1389 is USB data jack, which outputs to USB jack of USB board through XS602 and may read data inside USB device.

3.1.15 AV output board circuit

1. AV output board is mainly composed of SCART output terminal, ode switch circuit and filtering circuit. AV output board outputs different signals to connect with the relevant external devices. AV output board circuit block diagram is shown in the figure 3.1.15.1:

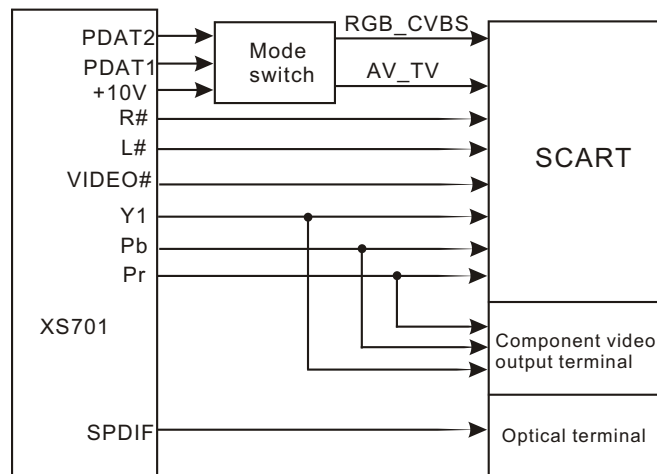


Figure 3.1.15.1 AV output board circuit block diagram

2. Introduction to SCART terminal

(1) Working principle: SCART terminal integrates video and audio all together and it may transmit video and audio signals at the same time. The operation is convenient, 21 pins in all and lies in the central part on the rear side of the player.

(2) SCART terminal pin function is shown as the following table:

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				

(3) SCART terminal function selection is shown as the following table:

PDAT0	PDAT1	PDAT2	Pin 8 of SCART terminal	Function
0	x	0	10V	AV4:3
0	x	1	7.5V	AV16:9
1	x	0	0.90V	TV
1	x	1	0.85V	TV
x	0	x	x	CVBS MODE
x	1	x	x	RGB MODE

Note: PDAT0 and PDAT2 are used to control input voltage of pin 8 of SCART terminal; PDAT1 is used to control voltage change of pin 16 of SCART terminal and the voltage on pin 16 controls SCART terminal to select RGB mode or CVBS mode.

3.2.16 Panel control circuit

1. Panel control circuit block diagram is shown in the figure 3.2.16.1:

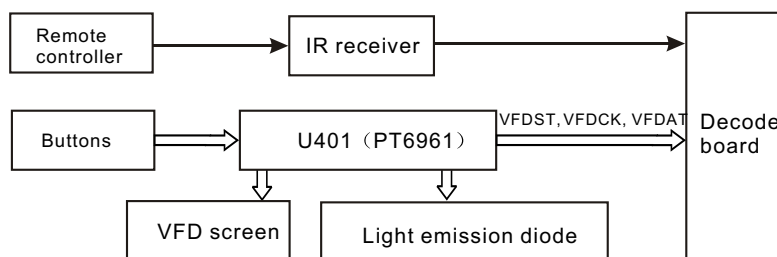


Figure 3.2.16.1 Panel control circuit block diagram

2. Working principle

Panel control components are divided into main panel and subsidiary panel. Main panel is mainly composed of LED screen, drive chip Pt6961, remote control IR sensor, button and indicator light; subsidiary panel is composed of power button and power indicator light.

Function of U401 (PT6961) is to process data signals send from decode board to drive display screen to display the corresponding state, and scan panel buttons at the same time, process button information and then send to CPU in the means of data signal to control the player to make the relevant action.

Pin 2 of remote control receiver HS0038B3V is 5V power supply pin, pin 1 is grounded, pin 3 is output pin; receiver processes button information of remote control and then outputs from pin 3 to send to decode board directly.

Section Three Servicing Cases

3.3.1 Servicing cases

[Example 1] Symptom: not read disc

Description: not read any disc

Analysis and troubleshooting: check laser head, light emission, feed, main axis and trace and they are all normal but there is no focus action; use multimeter to test pin 13, 14 of U301 (5888) and voltage is normal (about 1.4V), test pin 1, 2 of Xs301 and voltage is also normal, check nerve flat cable and touch is good, so it is judged that laser head focus winding is burnt down; after changing loader, trouble is removed.

[Example 2] Symptom: power not on

Description: +5V, +9V, -9V, +3.3V have no output

Analysis and troubleshooting: check power board and find that each path voltage has no output, check and find that 220V voltage input is normal, bridge rectification circuit has no voltage output; use multimeter to test fuse tube and it has open circuit, change fuse tube and trouble is not removed, test anode of TC501 and there is still no voltage output, fuse tube has been burnt down, check 4 diode of bridge rectification circuit and they are all normal, TC501 has no abnormalities of leakage and stricken through, test pin 1 and 8 of U50 (switch IC) and it has short circuit, this IC has been stricken through; after changing IC, trouble is removed.

[Example 3] Symptom: no MIC

Description: when reading discs, sound and picture are normal

Analysis and troubleshooting: power on, use remote controller to turn on MIC, insert microphone and speak, use oscillograph to test pin 4 (OK) of MIC board XS601 and find that there is no signal output, Check voltage of pin 4, 8 (+9V, -9V) of U601 and it is normal; use oscillograph to test pin 5 o U601 (4558) and there is signal input, test pin 7 of U601 and there is no signal output, after changing U601, trouble is removed.

[Example 4] Symptom: no sound

Description: picture output is normal

Analysis and troubleshooting: test pin 1, 7 of operational amplifier of sound output circuit and there is no signal output; test power supply voltage of operational amplifier and it is 9V, which is on low side;

After removing load, test power board 9V voltage output and it is normal, so we confirm that trouble lies in decode board part. Only U209 of decode board has +9V power supply, test resistance to ground of pin 8 and it is 86, which is infinite in normal conditions; after changing U209, trouble is removed.

[Example 5] Symptom: power not on

Description: switch on power, picture of the player has no output, panel has no OSD and panel buttons have no function.

Analysis and troubleshooting: check power board and find that each path voltage has no output, check and find that 220V voltage input is normal, check bridge rectification circuit and voltage output is normal, test anode of TC501 and voltage is 310V, which is normal, test pin 1, 8 of U501 (switch IC) and they are short-circuited, this IC has been stricken through; after changing IC, trouble is removed.

[Example 6] Symptom: not read disc

Description: not read any disc

Analysis and troubleshooting: check laser head, light emission, feed, main axis and trace and they are all normal, but there is no focus action; use multimeter to test pin 13, 14 of U302 (5888) and voltage is 2.28V, 2.36V, which is normal; test pin 1,2 of Xs301 and voltage is also normal; check nerve flat cable and contact is good, so we judge that laser head focus winding has been burnt down, after changing loader, trouble is removed.

[Example 7] Symptom: AV output has no colour

Description: when in AV output, there is only black and white picture output without colour, other video port output also has abnormality.

Analysis and troubleshooting: test other port output and there is still no colour, which means that trouble should lie in decode circuit; check decode chip and each voltage is normal; according to circuit working principle, this trouble often appear due to the influence of clock frequency; use electric iron to heat 27M crystal oscillograph and find that picture has flickering and colour appears sometimes; after changing 27M crystal oscillograph, trouble is removed.

[Example 8] Symptom: not read CD disc

Description: can play DVD disc and MP3 disc, not read CD disc

Analysis and troubleshooting: check laser head, focus, feed, main axis and trace and they are normal, test Q302 emitter electrode voltage and it is on low side, which should be 3.1V in normal conditions, so we doubt that R302 resistor has been damaged, use multimeter to test the resistance value and it is infinite, after changing resistor, trouble is removed.

[Example 9] Symptom: not read DVD disc

Description: all discs can be read, except for DVD disc

Analysis and troubleshooting: check laser head, focus, feed, main axis and trace and they are all normal but no light emission; check emitter electrode voltage of Q301 and it is 3.3V, which is normal, and collector electrode voltage is 2.2V, which is normal; check inductor L312 between collector electrode and pin 2 of Xs301 and find that inductor has open circuit; after changing inductor, trouble is removed.

[Example 10] Symptom: noise appear when power off

Description: at the moment of power off, audio output had noise and TV speaker has a bump sound.

Analysis and troubleshooting: when this kind of trouble appears, trouble lies in power-off noise removing circuit; firstly, test MUTE-1 voltage of C electrode of Q214 at the moment of power off and find that this point voltage changes from -7.8V to 0.5V gradually; use multimeter to test circuit elements around Q214 and find that D204 1N4148 diode has been stricken through, after changing it, trouble is removed.

3.3.2 Troubleshooting flow chart

1. Troubleshooting process for “Power not on” is shown in the figure 3.3.2.1:

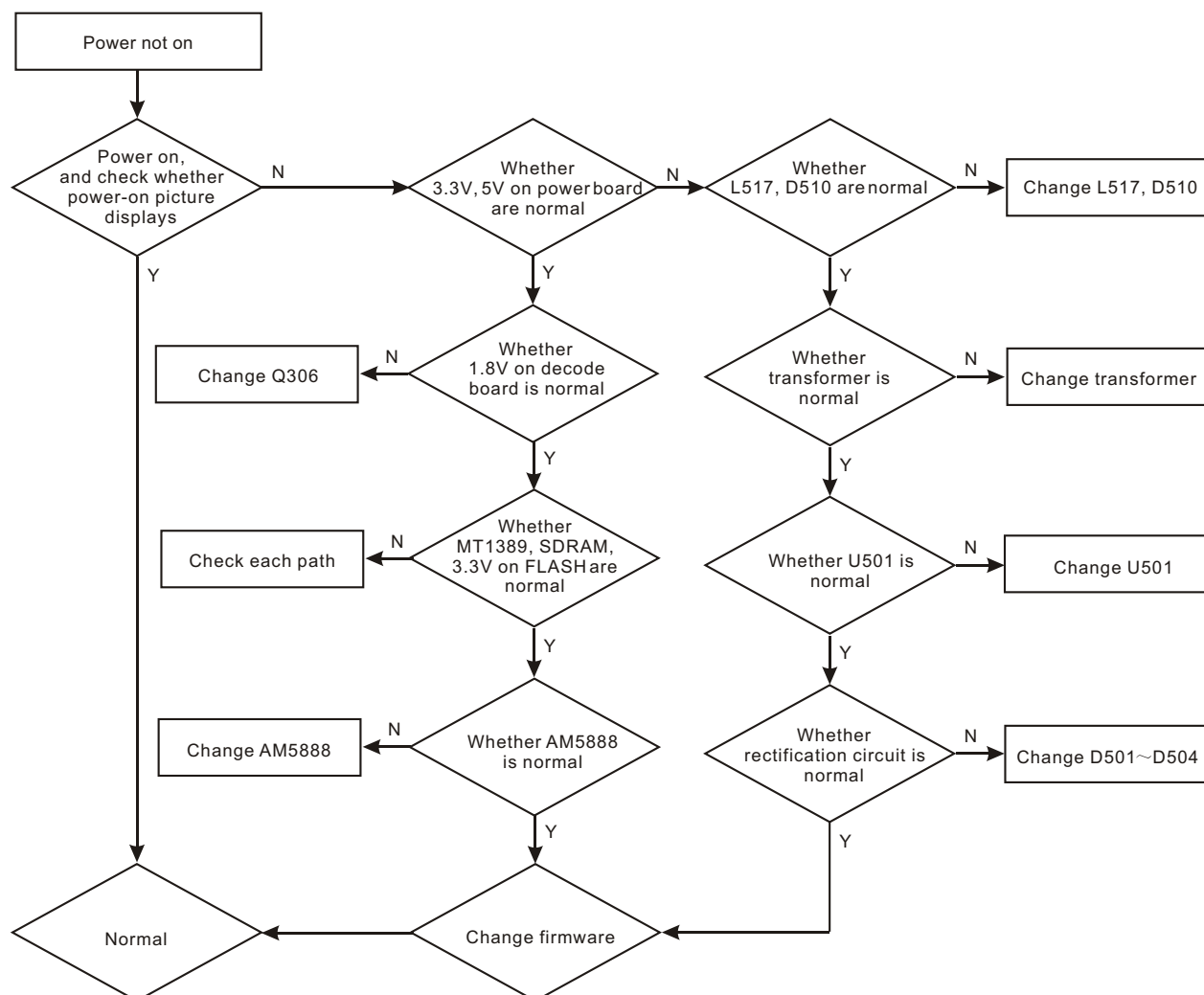


Figure 3.3.2.1 Troubleshooting flow chart for “Power not on”

2. Troubleshooting process for “Not start up” is shown in the figure 3.3.2.2:

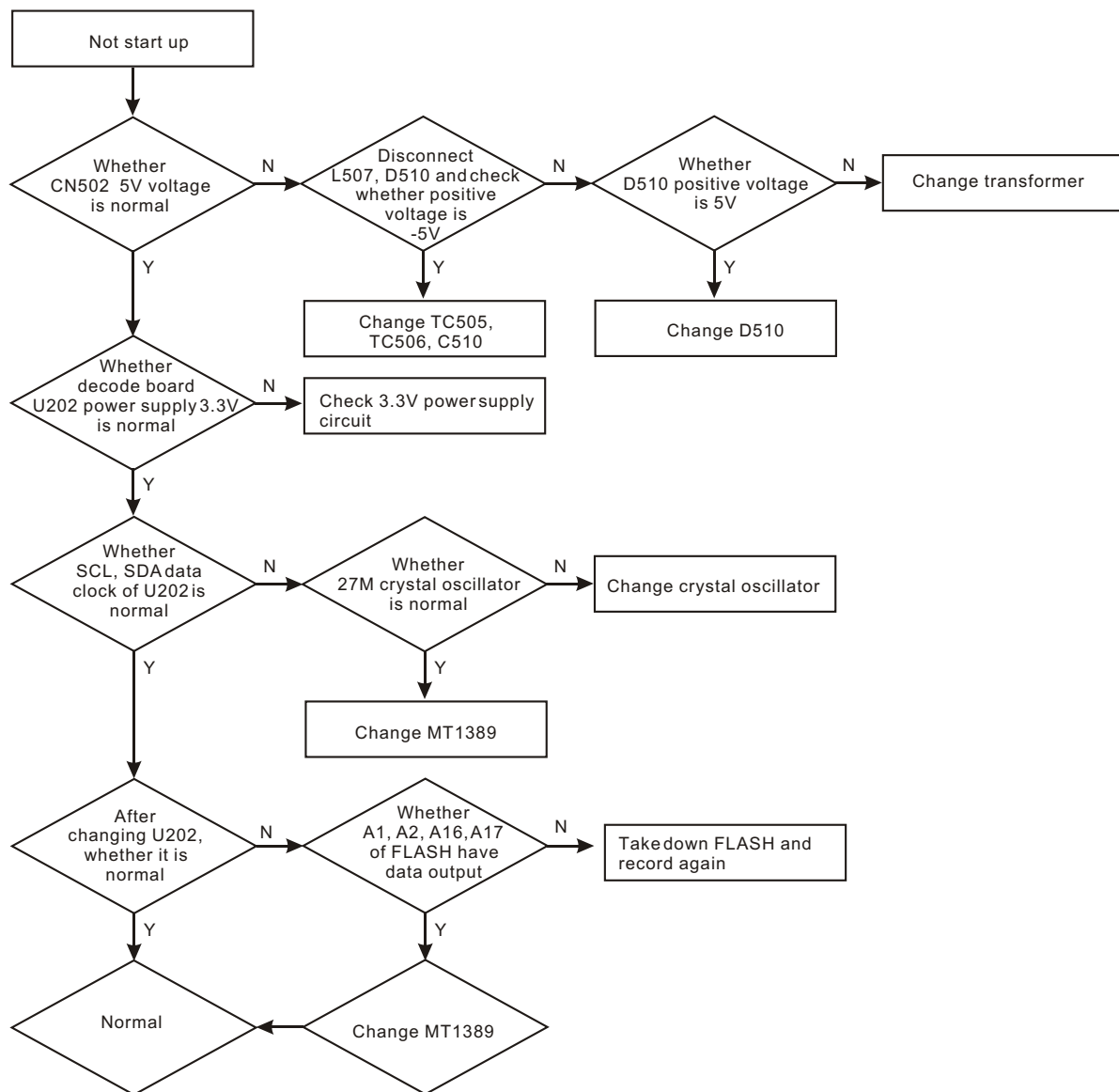


Figure 3.3.2.2 Troubleshooting flow chart for “Not start up”

3. Troubleshooting process for “Power not on” is shown in the figure 3.3.2.3:

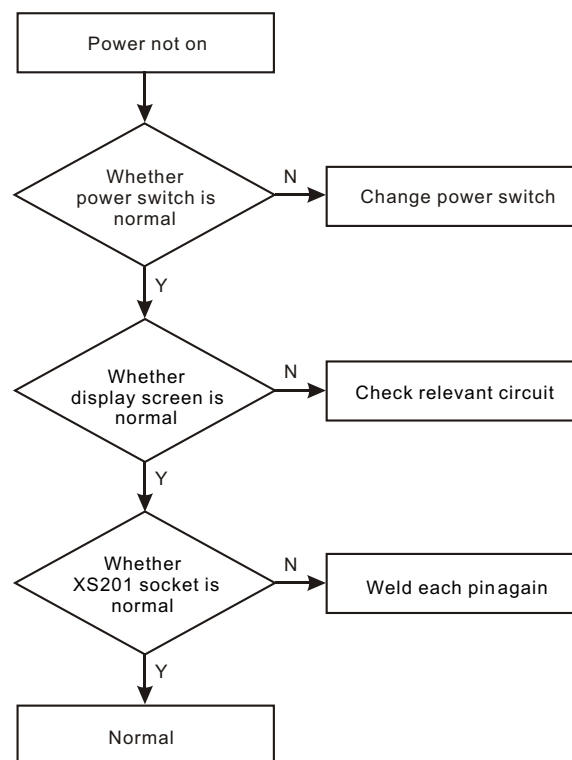


Figure 3.3.2.3 Troubleshooting flow chart for “Power not on”

4. Troubleshooting process for "Not read disc" is shown in the figure 3.3.2.4:

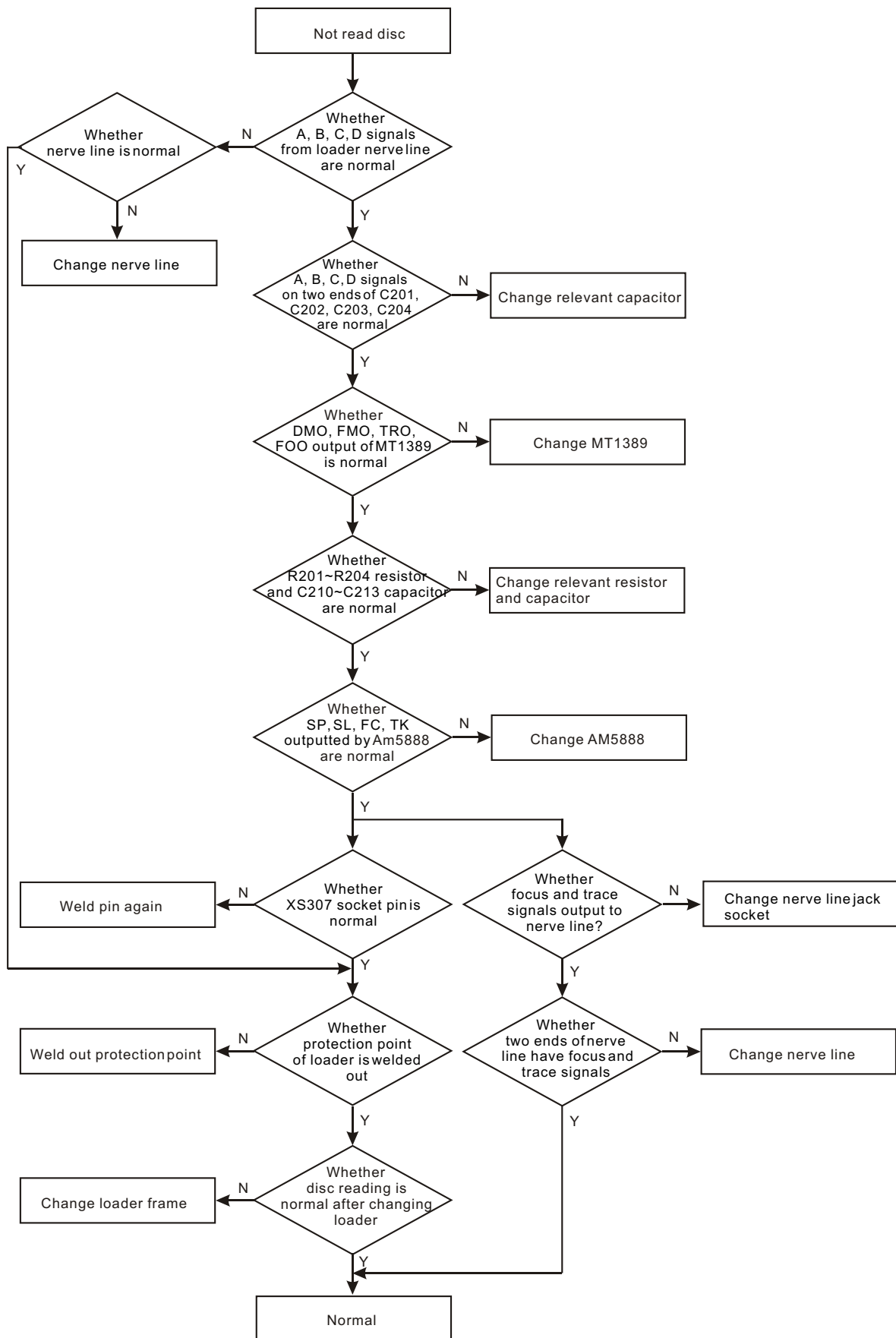
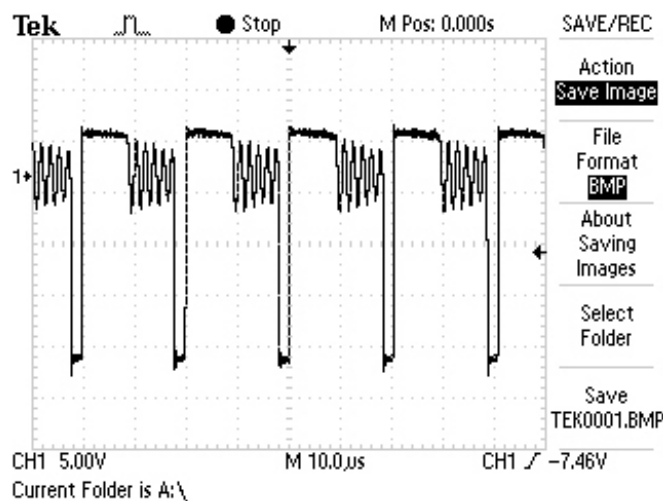


Figure 3.3.2.4 Troubleshooting process for "Not read disc"

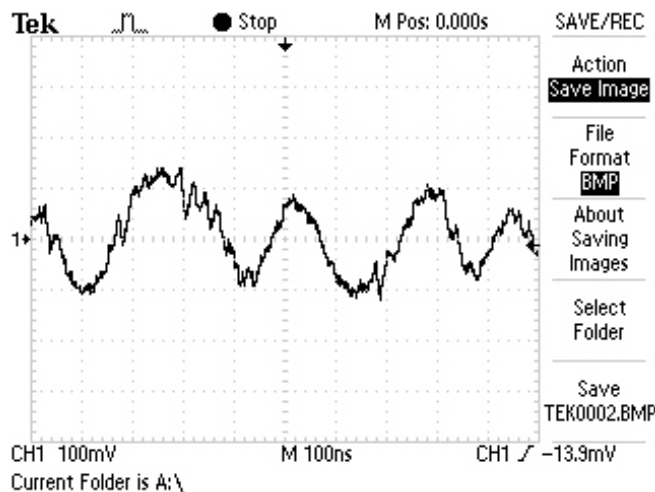
Section Four Waveform diagram

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.

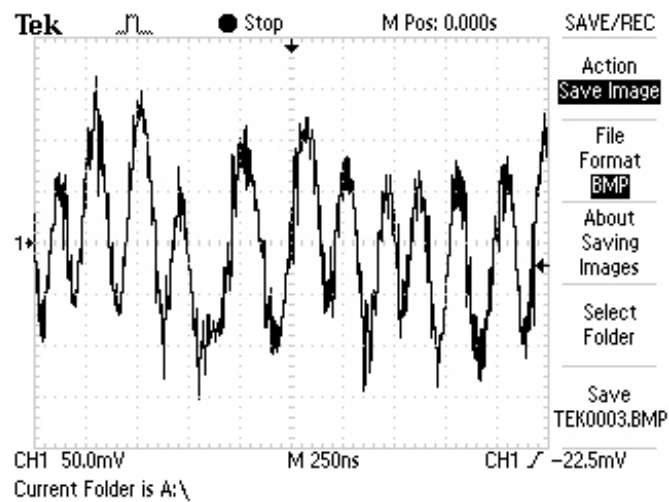
1. Waveform diagram for pulse DC of power board D513 anode



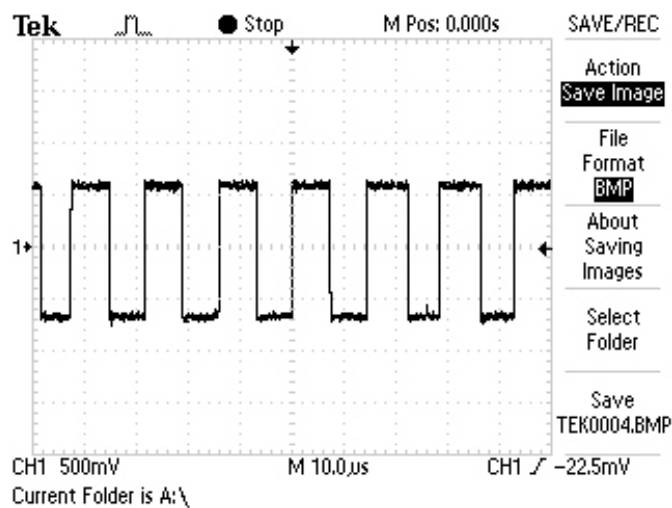
2. RFO signal waveform diagram of pin 17 of XS301



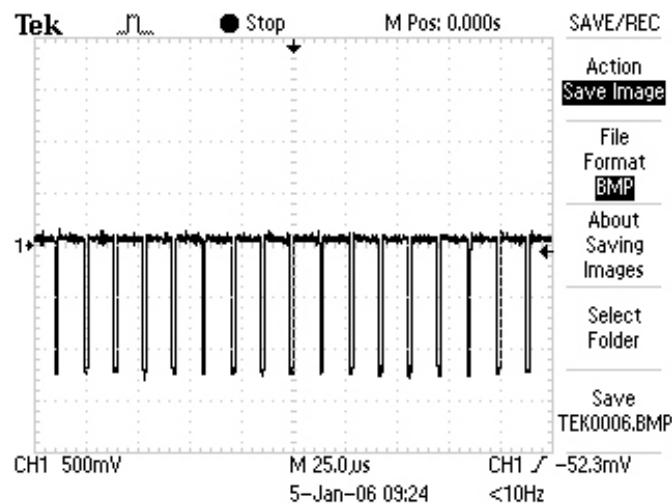
3. Asignal waveform diagram of pin 15 of XS301(B、C、D、E、F)



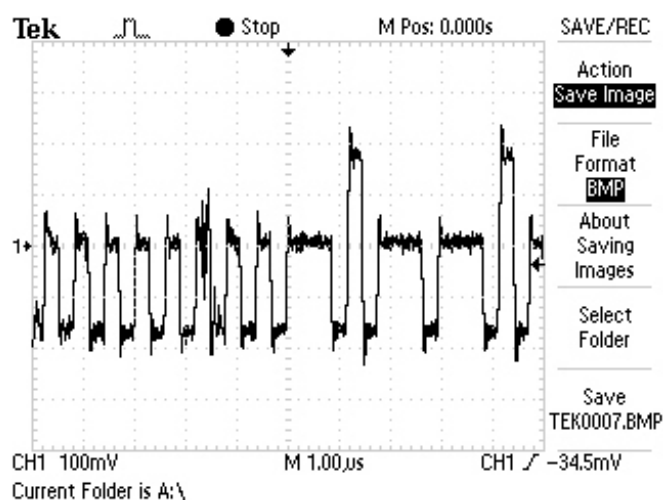
4. DMO signal (when there is main axis rotation) waveform diagram of pin 37 of U201 (Mt1389)



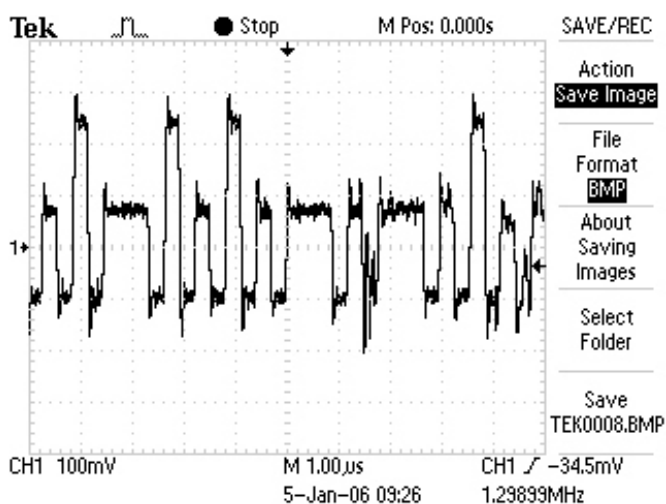
5. FMO signal (when there is feed) waveform diagram of pin 38 of U201 (MT1389)



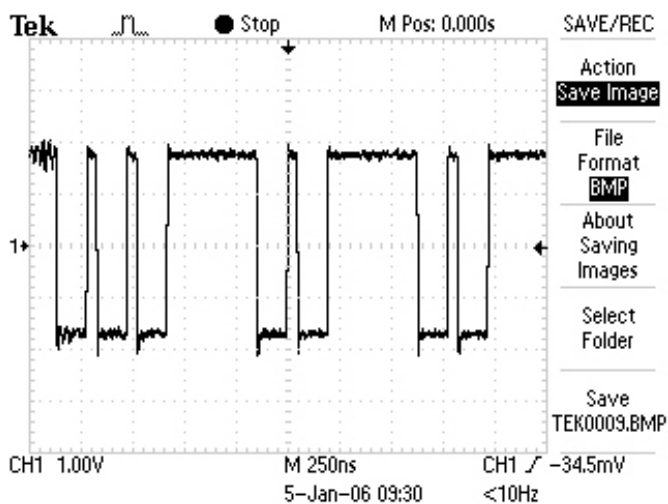
6. TRO signal (when there is trace) waveform diagram of pin 41 of U201 (MT1389)



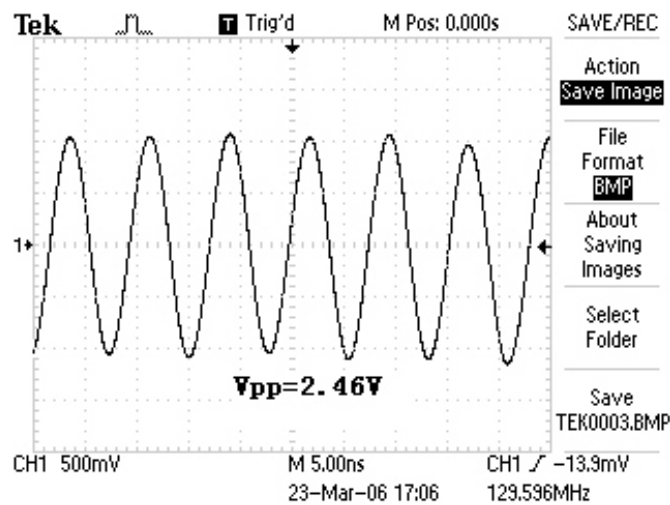
7. FOO signal (when there is focus) waveform diagram of pin 42 of U201 (MT1389)



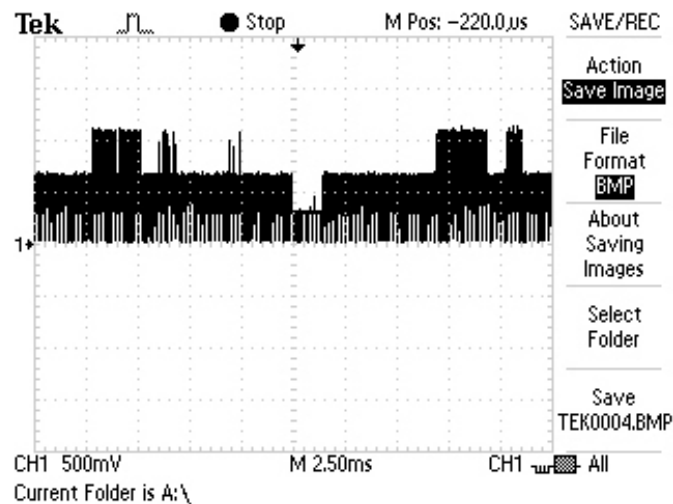
8. Waveform diagram of pin 29 (when no disc in) of U207(FLASH)



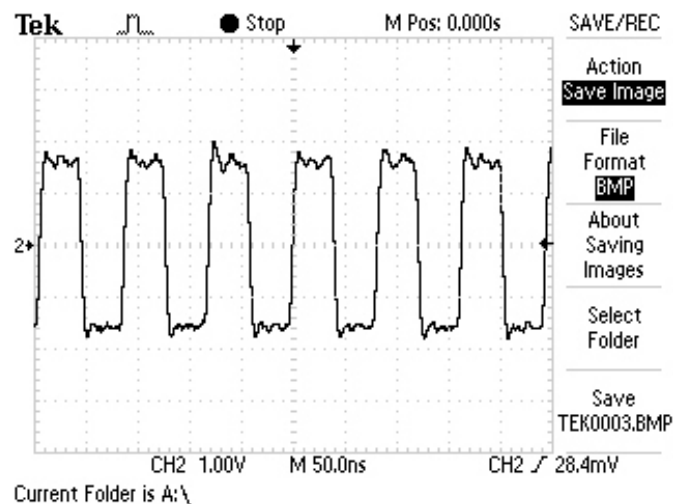
9. Waveform diagram of pin 38 of U208 (SDRAM)



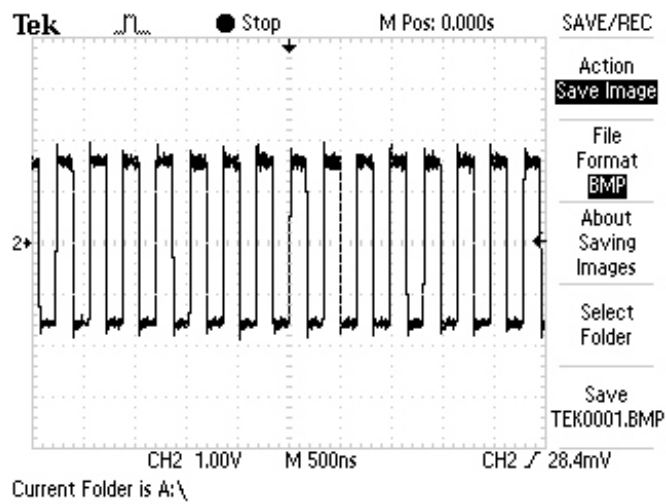
10. Video signal waveform diagram



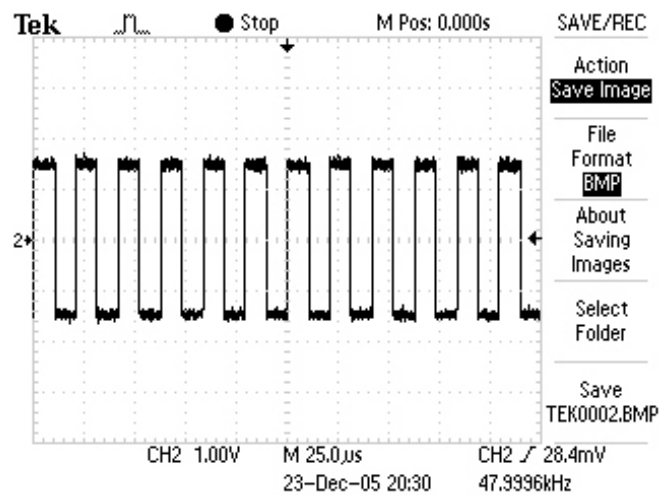
11. ACLK (12.2878MHz): waveform diagram for external clock signal



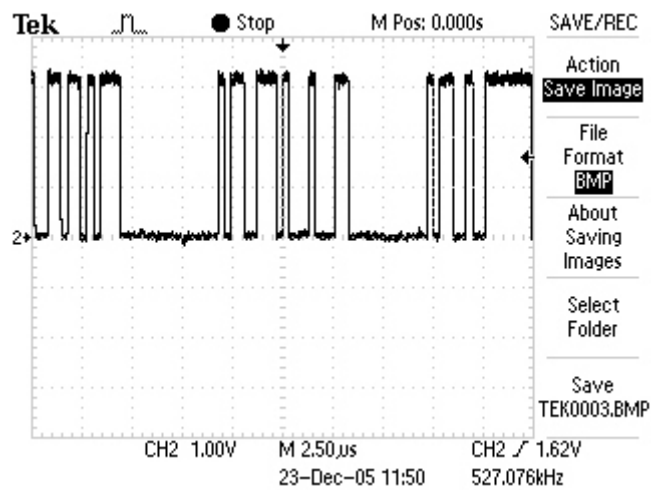
12. ABCK (3.07195MHZ): waveform diagram for bit clock signal



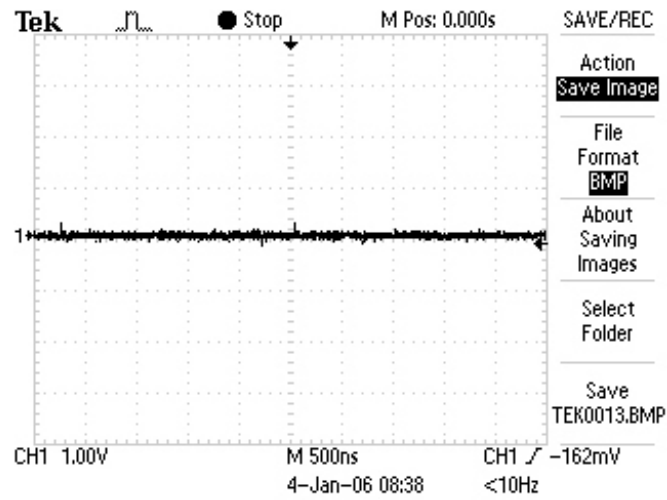
13. ALRCK (48KHZ): waveform diagram for left/right channel clock signal



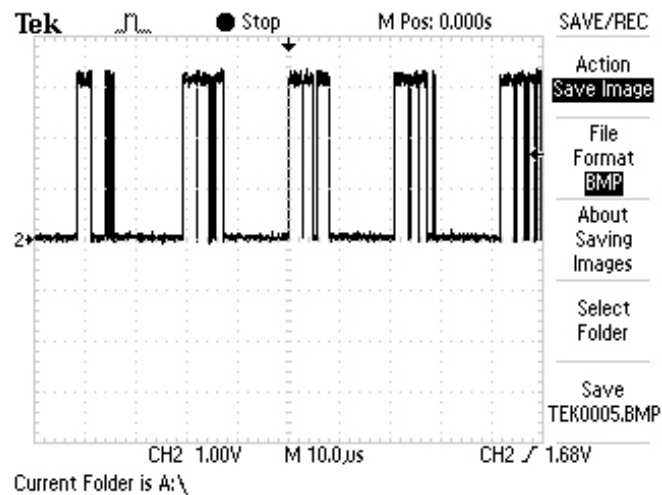
14. SDATA0: waveform diagram for mixed left/right channel digital signal



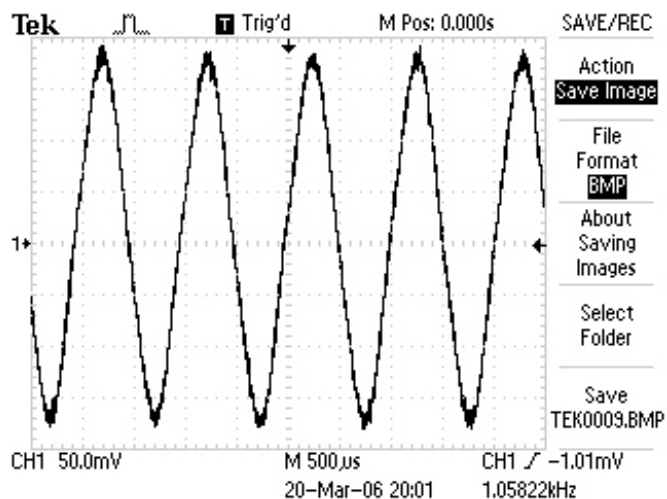
15. SDATA1: waveform diagram for surround left/right channel digital signal (now the disc being played is 2.1CH, and this signal has no output; if 5.1CH, the form is the same with that of SDATA0)



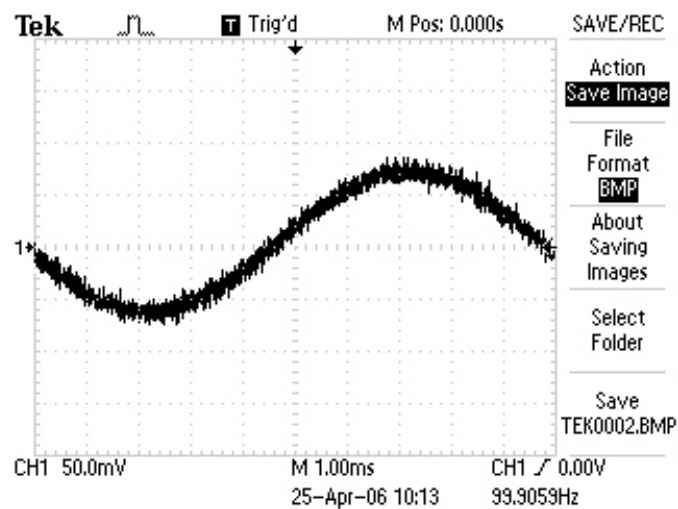
16. SDATA2: waveform diagram for centre subwoofer digital signal



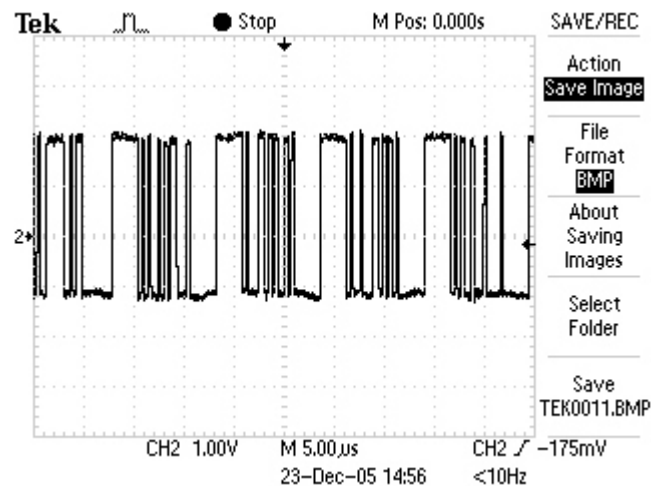
17. 1KHZ audio signal output waveform diagram (test disc is recommended to use; if not, the test waveform will change at any time to affect judgment).



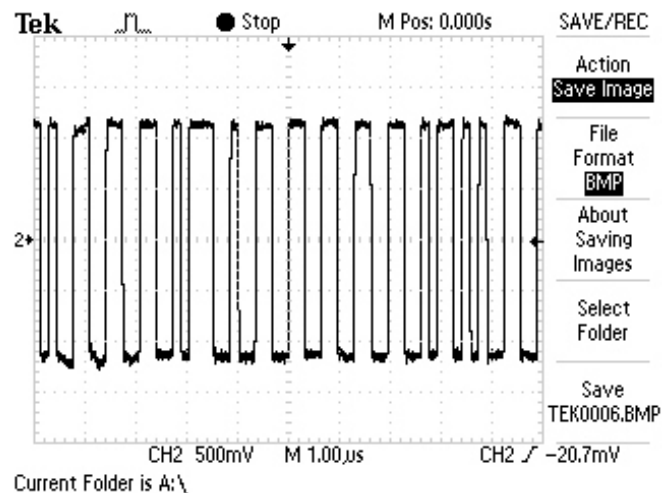
18. LEF#: waveform diagram for subwoofer channel analog signal



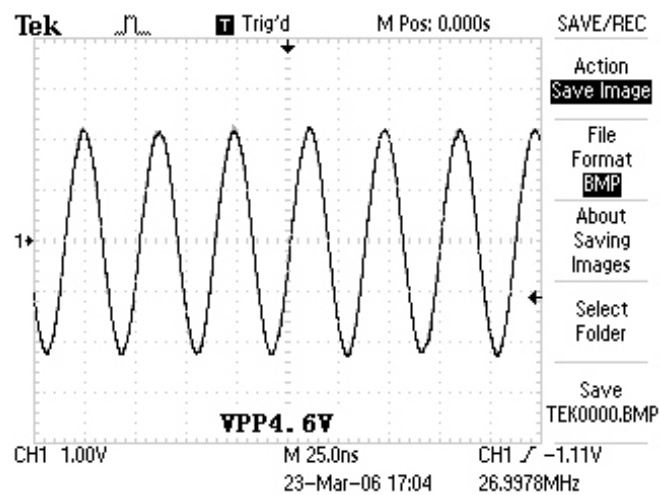
19. AMDAT: waveform diagram for microphone signal after 5340 A/D conversion



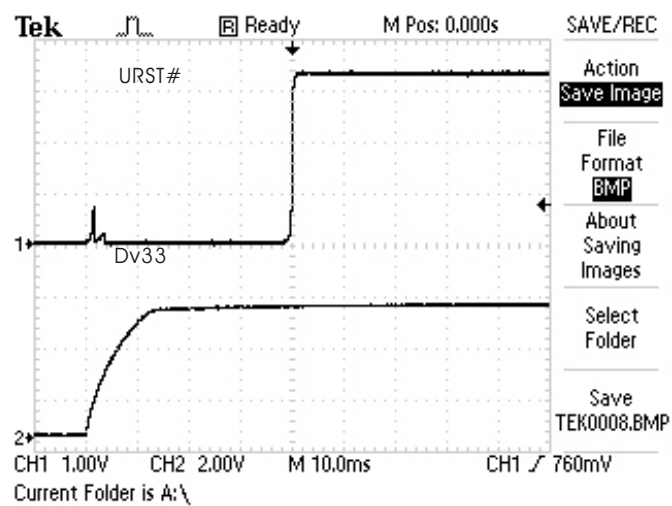
20. SPDIF: waveform diagram for optical/coaxial digital audio signal



21. 27M clock signal waveform diagram.



22. Reset circuit waveform diagram.



Section Five Function Introduction to IC

3.5.1 function introduction to MT1389HD

1. Description

MT1389HD is a cost-effective DVD system-on-chip (SOC) which incorporates advanced features like MPEG-4 video decoder, high quality TV encoder and state-of-art de-interlace processing.

Based on MediaTek's world-leading DVD player SOC architecture, the MT1389E is the 3rd generation of the DVD player SOC. It integrates the MediaTek 2nd generation front-end analog RF amplifier and the Servo/MPEG AV decoder.

To enrich the feature of DVD player, the MT1389 equips a simplified MPEG-4 advanced simple profile (ASP) video decoder to fully support the DivX1 Home Theater profile. It makes the MT1389-based DVD player be capable of playback MPEG-4 content which become more and more popular.

The progressive scan of the MT1389HD utilized advanced motion-adaptive de-interlace algorithm to achieve the best movie/video playback. It also supports a 3:2 pull down algorithm to give the best film effect. The 108MHz/12-bit video DAC provides users a whole new viewing experience.

2. General Feature lists

(1)Integration DVD player single chip

High performance analog RF amplifier

Servo controller and data channel processing

MPEG-1/MPEG-2/JPEG video

Dolby AC-3/DTS Decoder

Unified memory architecture

Versatile video scaling & quality enhancement

OSD & Sub-picture

Built-in clock generator

Built-in high quality TV encoder

Built-in progressive video processor

Audio effect post-processor

Built-in 5.1-ch Audio DAC

(2)High Performance Analog RF Amplifier

Programmable fc

Dual automatic laser power control

Defect and blank detection

RF level signal generator

(3)Speed Performance on Servo/Channel Decoding

DVD-ROM up to 4XS

CD-ROM up to 24XS

(4)Channel Data Processor

Digital data slicer for small jitter capability

Built-in high performance data PLL for channel data demodulation

EFM/EFM+ data demodulation

Enhanced channel data frame sync protection & DVD-ROM sector sync protection

(5)Servo Control and Spindle Motor Control

Programmable frequency error gain and phase error gain of spindle PLL to control spindle motor on CLV and CAV mode

Built-in ADCs and DACs for digital servo control

Provide 2 general PWM

Tray control can be PWM output or digital output

(6)Embedded Micro controller

Built-in 8032 micro controller

Built-in internal 373 and 8-bit programmable lower address port

1024-bytes on-chip RAM

Up to 2M bytes FLASH-programming interface

Supports 5/3.3-Volt. FLASH interface

Supports power-down mode

Supports additional serial port

(7)DVD-ROM/CD-ROM Decoding Logic

High-speed ECC logic capable of correcting one error per each P-codeword or Q-codeword

Automatic sector Mode and Form detection

Automatic sector Header verification

Decoder Error Notification Interrupt that signals various decoder errors

Provide error correction acceleration

(8)Buffer Memory Controller

Supports 16Mb/32Mb/64Mb SDRAM

Supports 16-bit SDRAM data bus

Provides the self-refresh mode SDRAM

Block-based sector addressing

(9)Video Decode

Decodes MPEG1 video and MPEG2 main level, main profile video (720/480 and 720x576)Decodes

MPEG-4 Advanced Simple Profile

Support DivX 3.11/4.x/5.x Home Theater Profile

Support Nero-Digital

Smooth digest view function with I, P and B picture decoding

Baseline, extended-sequential and progressive JPEG image decoding

Support CD-G titles

(10)Video/OSD/SPU/HLI Processor

Arbitrary ratio vertical/horizontal scaling of video, from 0.25X to 256X

65535/256/16/4/2-color bitmap format OSD,

256/16 color RLC format OSD

Automatic scrolling of OSD image

(11)Audio Effect Processing

Dolby Digital (AC-3)/EX decoding

DTS/DTS-ES decoding

MPEG-1 layer 1/layer 2 audio decoding

MPEG-2 layer1/layer2 2-channel audio

High Definition Compatible Digital (HDCCD)

Windows Media Audio (WMA)

Dolby ProLogic II

Concurrent multi-channel and downmix out

IEC 60958/61937 output

PCM / bit stream / mute mode

Custom IEC latency up to 2 frames

Pink noise and white noise generator

Karaoke functions

Microphone echo

Microphone tone control

Vocal mute/vocal assistant

Key shift up to +/- 8 keys

Chorus/Flanger/Harmony/Reverb

Channel equalizer

3D surround processing include virtual surround and speaker separation

(12)TV Encoder

Four 108MHz/12bit DACs

Support NTSC, PAL-BDGHINM, PAL-60

Support 525p, 625p progressive TV format

Automatically turn off unconnected channels

Support PC monitor (VGA)

Support Macro vision 7.1 L1, Macro vision 525P and 625P

CGMS-AWSS

Closed Caption

(13)Progressive Scan Video

Automatic detect film or video source

3:2 pull down source detection

Advanced Motion adaptive de-interlace

Minimum external memory requirement

(14)Outline

216-pin LQFP package

3.3/1.8-Volt. Dual operating voltages

3. Pin Definitions

PIN	Main	Alt	Type	Description
RF interface (26)				
231	RFGND18		Ground	Analog ground
132	RFVDD 18		Power	Analog power 1.8V
252	OSP		Analog output	RF Offset cancellation capacitor connecting
253	OSN		Analog output	RF Offset cancellation capacitor connecting
254	RFGC		Analog output	RF AGC loop capacitor connecting for DVD-ROM
255	IREF		Analog input	Current reference input. It generates reference current for RF path. Connect an external 15K resistor to this pin and AVSS
256	AVDD3		Power	Analog power 3.3V
1	AGND		Ground	Analog ground
2	DVDA		Analog input	AC couple input path A
3	DVDB		Analog input	AC couple input path B
4	DVDC		Analog input	AC couple input path C
5	DVDD		Analog input	AC couple input path D
6	DVDRFIP		Analog input	AC coupled DVD RF signal input RFIP

7	DVDRFIN		Analog input	AC coupled DVD RF signal input RFIN
8	MA		Analog input	DC coupled main beam RF signal input A
9	MB		Analog input	DC coupled main beam RF signal input B
10	MC		Analog input	DC coupled main beam RF signal input C
11	MD		Analog input	DC coupled main beam RF signal input D
12	SA		Analog input	DC coupled sub-beam RF signal output A
13	SB		Analog input	DC coupled sub-beam RF signal output B
14	SC		Analog input	DC coupled sub-beam RF signal output C
15	SD		Analog input	DC coupled sub-beam RF signal output D
16	CDFON		Analog input	CD focusing error negative input
17	CDFOP		Analog input	CD focusing error positive input
18	TNI		Analog input	3 beam satellite PD signal negative input
19	TPI		Analog input	3 beam satellite PD signal positive input
ALPC (4)				
20	MIDI1		Analog input	Laser power monitor input
21	MIDI2		Analog input	Laser power monitor input
22	LDO2		Analog output	Laser driver output
23	LDO1		Analog output	Laser driver output
ADC Power (2)				
244	ADCVDD3		Power	Analog 3.3V Power for ADC
245	ADCVSS		Ground	Analog ground for ADC
VPLL (3)				
43	VPLLVSS		Ground	Analog ground for VPLL
44	CAPPAD		Analog In/Out	VPLL External Capacitance connection
45	VPLLVDD3		Power	Analog 3.3V Power for VPLL
Reference voltage (3)				
28	V2REFO		Analog output	Reference voltage 2.8V
29	V20		Analog output	Reference voltage 2.0V
30	VREFO		Analog output	Reference voltage 1.4V
Analog monitor output (7)				
24	SVDD3		Power	Analog power 3.3V
25	CSO	RFOP	Analog output	1) Central servo 2) Positive main beam summing output
26	RFLVL	RFON	Analog output	1) RFRP low pass, or

				2) Negative main beam summing output
27	SGND		Ground	Analog ground
31	FEO		Analog output	Focus error monitor output
32	TEO		Analog output	Tracking error monitor output
33	TEZISLV		Analog output	TE slicing Level
Analog monitor output (6)				
246	RFVDD3		Analog output	Analog Power
247	RFRPDC		Analog Input	RF ripple detect output
248	RFRPAC		Analog output	RF ripple detect input(through AC-coupling)
249	HRFZC		Analog output	High frequency RF ripple zero crossing
250	CRTPLP		Analog output	Defect level filter capacitor connecting
251	RFGND		Ground	Analog Power
RF Data PLL Interface (9)				
235	JITFO		Analog output	Output terminal of RF jitter meter
236	JITFN		Analog Input	Input terminal of RF jitter meter
237	PLLVSS		Ground	Ground pin for data PLL and related analog circuitry
238	IDACEXLP		Analog output	Data PLL DAC Low-pass filter
239	PLLVDD3		Power	Power pin for data PLL and related analog circuitry
240	LPFON		Analog Output	Negative output of loop filter amplifier
241	LPFIP		Analog input	Positive input terminal of loop filter amplifier
242	LPFIN		Analog input	Negative input terminal of loop filter amplifier
243	LPFOP		Analog output	Positive output of loop filter amplifier
Motor and Actuator Driver Interface (10)				
34	OP_OUT		Analog output	Op amp output
35	OP_INN		Analog input	Op amp negative input
36	OP_INP		Analog input	Op amp positive input
37	DMO		Analog output	Disk motor control output. PWM output
38	FMO		Analog output	Feed motor control. PWM output
39	TROPENPW M		Analog output	Tray PWM output/Tray open output
40	PWMOUT1	ADIN0	Analog output	1) 1st General PWM output 2) AD input 0
41	TRO		Analog output	Tracking servo output. PDM output of tracking servo compensator

42	FOO		Analog output	Focus servo output. PDM output of focus servo compensator
50	FG (Digital pin)	ADIN1 GPIO	LVTTTL3.3 Input, Schmitt input, pull up, with analog input path for ADIN1	1) Monitor hall sensor input 2) AD input 1 3) GPIO
General Power/Ground (18)				
55 93 142 160 174 213	DVDD18		Power	1.8V power pin for internal digital circuitry
81 178	DVSS		Ground	1.8V ground pin for internal digital circuitry
65 96 118 131 145 156 170 208	DVDD3		Power	3.3V power pin for internal digital circuitry
90 148	DVSS		Ground	3.3V ground pin for internal digital circuitry
Micro Controller and Flash Interface (48)				
62	HIGHA0		In/Out 4~16mA,SRPU	Microcontroller address 8
74	HIGHA1		In/Out 4~16mA,SRPU	Microcontroller address 9
73	HIGHA2		In/Out 4~16mA,SRPU	Microcontroller address 10
72	HIGHA3		In/Out 4~16mA,SRPU	Microcontroller address 11
71	HIGHA4		In/Out 4~16mA,SRPU	Microcontroller address 12
70	HIGHA5		In/Out 4~16mA,SRPU	Microcontroller address 13
69	HIGHA6		In/Out 4~16mA,SRPU	Microcontroller address 14
68	HIGHA7		In/Out 4~16mA,SRPU	Microcontroller address 15
89	AD7		In/Out 4~16mA,SRPU	Microcontroller address/data 7

86	AD6		In/Out 4~16mA,SRPU	Microcontroller address/data 6
85	AD5		In/Out 4~16mA,SRPU	Microcontroller address/data 5
84	AD4		In/Out 4~16mA,SRPU	Microcontroller address/data 4
83	AD3		In/Out 4~16mA,SRPU	Microcontroller address/data 3
82	AD2		In/Out 4~16mA,SRPU	Microcontroller address/data 2
80	AD1		In/Out 4~16mA,SRPU	Microcontroller address/data 1
79	AD0		In/Out 4~16mA,SRPU	Microcontroller address/data 0
92	IOA 0		In/Out 4~16mA,SRPU	Microcontroller address
77	IOA 1		In/Out 4~16mA,SRPU	Microcontroller address 1/ IO
56	IOA 2		In/Out 4~16mA,SRPU	Microcontroller address 2/ IO
57	IOA 3		In/Out 4~16mA,SRPU	Microcontroller address 3/ IO
58	IOA 4		In/Out 4~16mA,SRPU	Microcontroller address 4/ IO
59	IOA 5		In/Out 4~16mA,SRPU	Microcontroller address 5/ IO
60	IOA 6		In/Out 4~16mA,SRPU	Microcontroller address 6/ IO
61	IOA 7		In/Out 4~16mA,SRPU	Microcontroller address 7/ IO
67	A16		In/Out 4~16mA,SRPU	Flash address 16
91	A17		In/Out 4~16mA,SRPU	Flash address 17
63	A18		In/Out 4~16mA, SRPD,SMT	Flash address 18 /IO
64	A19		In/Out 4~16mA, SRPD,SMT	Flash address 19 /IO
75	A20	YUV0	In/Out 4~16mA, SRPD,SMT	5) Flash address 20 /IO 6) While External Flash size <= 1MB: I) Alternate digital video YUV output 0
87	A21	YUV7 GPIO	In/Out 4~16mA, SRPD,SMT	7) Flash address 21 /IO 8) While External Flash size <= 2MB: I) Digital video YUV output 7 II) GPIO
88	ALE		In/Out 4~16mA, SRPD,SMT	Microcontroller address latch enable
78	IOOE#		In/Out 4~16mA, SRPD,SMT	Flash output enable, active low / IO
66	IOWR#		In/Out 4~16mA, SRPD,SMT	Flash write enable, active low / IO
76	IOCS#		In/Out 4~16mA, SRPD,SMT	Flash chip select, active low / IO

94	UWR#		In/Out 4~16mA, SRPD,SMT	Microcontroller write strobe, active low
95	URD#		In/Out 4mA, SRPD,SMT	Microcontroller read strobe, active low
97	UP1_2		In/Out 4~16mA, SRPD,SMT	Microcontroller port 1-2
98	UP1_3		In/Out 4mA, SRPD,SMT	Microcontroller port 1-3
99	UP1_4		In/Out 4mA, SRPD,SMT	Microcontroller port 1-4
100	UP1_5		In/Out 4mA, SRPD,SMT	Microcontroller port 1-5
101	UP1_6	SCL	In/Out 4mA, SRPD,SMT	1) Microcontroller port 1-6 2) I2C clock pin
102	UP1_7	SDA	In/Out 4mA, SRPD,SMT	1) Microcontroller port 1-7 1) I2C data pin
103	UP3_0	RXD	In/Out 4mA, SRPD,SMT	1) Microcontroller port 3-0 2) 8032 RS232 RxD
104	UP3_1	TXD	In/Out 4mA, SRPD,SMT	1) Microcontroller port 3-1 2) 8032 RS232 TxD
105	UP3_4	RXD SCL	In/Out 4mA, SRPD,SMT	1) Microcontroller port 3-4 2) Hardwired RD232 RxD 3) I2C clock pin
106	UP3_5	RXD SDA	In/Out 4~16mA, SRPD,SMT	1) Microcontroller port 3-5 2) Hardwired RD232 TxD 3) I2C data pin
109	IR		Input SMT	IR control signal input
110	INT0#		In/Out 4~16mA, SRPD,SMT	Microcontroller external interrupt 0, active low
Audio interface (28)				
204	SPMCLK	SCLK0	In/Out	1) Audio DAC master clock of SPDIF input 2) While SPDIF input is not used: I) Serial interface port 0 clock pin II) GPIO
205	SPDATA	SDIN0	In/Out	1) Audio data of SPDIF input 2) While SPDIF input is not used:

				I) Serial interface port 0 data-in II) GPIO
206	SPLRCK	SDO0	In/Out	1) Audio left/right channel clock of SPDIF input 2) While SPDIF input is not used: I) Serial interface port 0 data-out II) GPIO
207	SPBCK	SDCS0 ASDATA 5	In/Out	1) Audio bit clock of SPDIF input 2) While SPDIF input is not used: I) Serial interface port 0 chip select II) Audio serial data 5 part I : DSD data sub-woofer Channel or Microphone output III) GPIO
209	ALRCK		In/Out 4mA, PD,SMT	1) Audio left/right channel clock 2) Trap value in power-on reset: I) 1: use external 373 II) 0: use internal 373
210	ABCK	Fs64	In/Out 4mA, SMT	1) Audio bit clock 2) Phase de-modulation
211	ACLK		In/Out 4mA, SMT	Audio DAC master clock
197	ASDATA0		In/Out 4mA, PD,SMT	1) Audio serial data 0 (Front-Left/Front-Right) 2) DSD data left channel 3) Trap value in power-on reset: I) 1: manufactory test mode II) 0: normal operation 4) While using external channels:) GPO_2
202	ASDATA1		In/Out 4mA, PD,SMT	2) Audio serial data 0 (Front-Left/Front-Right) 2) DSD data right channel 3) Trap value in power-on reset: I) 1: manufactory test mode II) 0: normal operation 4) While using external channels: I) GPO_2
203	ASDATA2		In/Out 4mA, PD,SMT	1) Audio serial data 1 (Left-Surround/Right-Surround) 2) DSD data left surround channel 3) Trap value in power-on reset: I) 1: manufactory test mode II) 0: normal operation

				4) While using external channels: I) GPO_1
212	ASDATA3		In/Out 4mA, PD,SMT	1) Audio serial data 2 (Center/LFE) 2) DSD data right surround channel 3) Trap value in power-on reset: I) 1: manufactory test mode II) 0: normal operation 4) While only 2 channels output: I) GPO_0
214	ASDATA4	INT1#	In/Out 4mA, PD,SMT	1) Audio serial data 3 (Center-back/ Center-left-back/Center-right-back, in 6.1 or 7.1 mode) 2) DSD data center channel 18) While only 2 channels output: I) Digital video YUV output 6 II) GPIO
215	MC_DATA	INT2#	In/Out 2mA, PD,SMT	1) Microphone serial input 2) While not support Microphone: I) Microcontroller external interrupt 2 II) GPIO
216	SPDIF		Output 4~16mA, SR: ON/OFF	S/PDIF output
217	APLLVDD3		Power	3.3V Power pin for audio clock circuitry
218	APLLCAP		Analog In/Out	APLL External Capacitance connection
219	APLLVSS		Ground	Ground pin for audio clock circuitry
220	ADACVSS2		Ground	Ground pin for AUDIO DAC circuitry
221	ADACVSS1		Ground	Ground pin for AUDIO DAC circuitry
222	ARF		Output	1) AUDIO DAC Sub-woofer channel output 2) While internal AUDIO DAC not used: GPIO
223	ARS	GPIO	Output	1) AUDIO DAC Right Surround channel output 2) While internal AUDIO DAC not used: a. SDATA3 b. GPIO
224	AR	GPIO	Output	1) AUDIO DAC Right channel output 2) While internal AUDIO DAC not used: a. SDATA1

				b. GPIO
225	AVCM		Analog	AUDIO DAC reference voltage
226	AL	GPIO	Output	1) AUDIO DAC Left Surround channel output 2) While internal AUDIO DAC not used: a. SDATA2 b. GPIO
227	ALS	GPIO	Output	1) AUDIO DAC Left Surround channel output 2) While internal AUDIO DAC not used: a. SDATA0 b. GPIO
228	ALF	GPIO	Output	1) AUDIO DAC Center channel output 2) While internal AUDIO DAC not used: GPIO
229	ADACVDD1		Power	3.3V power pin for AUDIO DAC circuitry
230	ADACVDD2		Power	3.3V power pin for AUDIO DAC circuitry
Video Interface (18)				
196	DACVDDC		Power	3.3V power pin for VIDEO DAC circuitry
195	VREF		Analog	Bandgap reference voltage
194	FS		Analog	Full scale adjustment
193	YUV0	CIN	Output 4MA, SR	1) Video data output bit 0 2) Compensation capacitor
192	DACVSSC		Ground	Ground pin for VIDEO DAC circuitry
191	YUV1	Y	Output 4MA, SR	1) Video data output bit 1 2) Analog Y output
190	DACVddb		Power	3.3V power pin for VIDEO DAC circuitry
189	YUV2	C	Output 4MA, SR	1) Video data output bit 2 2) Analog chroma output
188	DACVSSB		Ground	Ground pin for VIDEO DAC circuitry
187	YUV3	CVBS	Output 4MA, SR	1) Video data output bit 3 2) Analog composite output
186	DACVDDA		Power	3.3V power pin for VIDEO DAC circuitry
185	YUV4	Y/G	Output 4MA, SR	1) Video data output bit 4 2) Green or Y
184	DACVSSA		Ground	Ground pin for VIDEO DAC circuitry
183	YUV5	B/Cb/Pb	Output 4MA, SR	1) Video data output bit 5 2) Blue or CB

182	YUV6	R/Cr/Pr	Output 4mA, SR	1) Video data output bit 6 2) Red or CR
181	VSYN	V_ADIN1	Output 4mA, SR	1) Vertical sync input/output 2) While no External TV-encoder: I) Vertical sync for video-input II) Version AD input port 1 III) GPIO
180	YUV7	INT3# ASDATA 5	Output 4mA, SR	1) Video data output bit 7 2) While no External TV-encoder: I) Microcontroller external interrupt 3 II) Audio serial data 5 part II : DSD data sub-woofer channel or Microphone output III) GPIO
179	HSYN	INT4# V_ADIN2	Output 4mA, SR	1) Horizontal sync input/output 2) While no External TV-encoder: I) Horizontal sync for video-input II) Version AD input port 2 III) GPIO IV) Microcontroller external interrupt 4
Video Interface (12)				
160	DACVDDC		Power	3.3V power pin for video DAC circuitry
161	VREF		Analog	Bandgap reference voltage
162	FS		Analog	Full scale adjustment
163	DACVSSC		Ground	Ground pin for video DAC circuitry
164	CVBS		In/Out 4mA, SR	Analog composite output
165	DACVddb		Power	3.3V power pin for video DAC circuitry
166	DACVSSB		Ground	Ground pin for video DAC circuitry
167	DACVDDA		Power	3.3V power pin for video DAC circuitry
168	Y/G		In/Out 4mA, SR	Green, Y, SY, or CVBS
169	DACVSSA		Ground	Ground pin for video DAC circuitry
170	B/CB/PB		In/Out 4mA, SR	Blue, CB/PB, or SC
171	R/CR/PR		In/Out 4mA,	Red, CR/PR, CVBS, or SY

			SR	
MISC (12)				
108	PRST#		In/Out PD,SMT	Power on reset input, active low
107	ICE		In/Out PD,SMT	Microcontroller ICE mode enable
233	XTALO		Output	27MHz crystal output
234	XTALI		Input	27MHz crystal input
46	USB_VSS		USB Ground	USB ground pin
47	USBP		Analog In/Out	USB port DPLUS analog pin
48	USBM		Analog In/Out	USB port DMINUS analog pin
49	USB_VDD3		Analog In/Out	USB Power pin 3.3V
201	GPIO3		In/Out Pull-Down	GPIO
200	GPIO4		In/Out Pull-Down	GPIO
199	RCLKB	GPIO5	In/Out Pull-Down	GPIO
198	RVREF	GPIO6	In/Out Pull-Down	GPIO
Dram Interface (58) (Sorted by position)				
176	C_0	IO_0(RD1 6)	In/Out Non-pull	1) Digital Video output C bit 0 2) GPIO
175	C_1	IO_1(RD1 7)	In/Out Non-pull	1) Digital Video output C bit 1 2) GPIO
173	C_2	IO_2(RD1 8)	In/Out Non-pull	1) Digital Video output C bit 2 2) GPIO
172	C_3	IO_3(RD1 9)	In/Out Non-pull	1) Digital Video output C bit 3 2) GPIO
171	C_4	IO_4(RD2 0)	In/Out Non-pull	1) Digital Video output C bit 4 2) GPIO
169	C_5	IO_5(RD2 1)	In/Out Non-pull	1) Digital Video output C bit 5 2) GPIO
168	C_6	IO_6(RD2 2)	In/Out Non-pull	1) Digital Video output C bit 6 2) GPIO
167	C_7	IO_7(RD2 3)	In/Out Non-pull	1) Digital Video output C bit 7 2) GPIO
177	IO_17	(DQM2)	In/Out Pull- Up	GPIO
166	YUVCLK	IO_8(DQ M3)	In/Out Pull- Up	1) Digital Video output Clock 2) GPIO

165	Y_0	IO_9(RD2 4)	In/Out Non-pull	1) Digital Video output Y bit 0 2) GPIO
164	Y_1	IO_10(RD 25)	In/Out Non-pull	1) Digital Video output Y bit 1 2) GPIO
163	Y_2	IO_11(RD 26)	In/Out Non-pull	1) Digital Video output Y bit 2 2) GPIO
162	Y_3	IO_12(RD 27)	In/Out Non-pull	1) Digital Video output Y bit 3 2) GPIO
161	Y_4	IO_13(RD 28)	In/Out Non-pull	1) Digital Video output Y bit 4 2) GPIO
159	Y_5	IO_14(RD 29)	In/Out Non-pull	1) Digital Video output Y bit 5 2) GPIO
158	Y_6	IO_15(RD 30)	In/Out Non-pull	1) Digital Video output Y bit 6 2) GPIO
157	Y_7	IO_16(RD 31)	In/Out Non-pull	1) Digital Video output Y bit 7 2) GPIO
155	RA4		In/Out	DRAM address 4
154	RA5		In/Out	DRAM address 5
153	RA6		In/Out	DRAM address 6
152	RA7		In/Out	DRAM address 7
151	RA8		In/Out	DRAM address 8
150	RA9		In/Out	DRAM address 9
149	RA11		In/Out	DRAM address bit 11
147	CKE		In/Out Pull-Down	DRAM clock enable
146	RCLK		In/Out	Dram clock
144	RA3		In/Out	DRAM address 3
143	RA2		In/Out	DRAM address 2
141	RA1		In/Out	DRAM address 1
140	RA0		In/Out	DRAM address 0
139	RA10		In/Out	DRAM address 10
138	BA1		In/Out	DRAM bank address 1
137	BA0		In/Out	DRAM bank address 0
136	RCS#		output	DRAM chip select, active low
135	RAS#		output	DRAM row address strobe, active low
134	CAS#		output	DRAM column address strobe, active low

133	RWE#		output	DRAM Write enable, active low
132	DQM1		In/Out	Data mask 1
130	IO_18	(DQS1)	In/Out Non-pull	GPIO
129	RD8		In/Out	DRAM data 8
128	RD9		In/Out	DRAM data 9
127	RD10		In/Out	DRAM data 10
126	RD11		In/Out	DRAM data 11
125	RD12		In/Out	DRAM data 12
124	RD13		In/Out	DRAM data 13
123	RD14		In/Out	DRAM data 14
125	RD15		In/Out	DRAM data 15
121	RD0		In/Out	DRAM data 0
120	RD1		In/Out	DRAM data 1
119	RD2		In/Out	DRAM data 2
117	RD3		In/Out	DRAM data 3
116	RD4		In/Out	DRAM data 4
115	RD5		In/Out	DRAM data 5
114	RD6		In/Out	DRAM data 6
113	RD7		In/Out	DRAM data 7
112	IO_19	(DQS0)	In/Out	GPIO
111	DQM0		In/Out Non-pull	Data mask 0
JTAG Interface(4)				
51	TDI	V_ADIN4	In/Out Non-pull	1) Serial interface port 3 data-out 2) Version AD input port 4 3) GPIO
52	TMS	V_ADIN5	In/Out Non-pull	1) Serial interface port 3 data-out 2) Version AD input port 5 3) GPIO
53	TCK	V_ADIN6	In/Out Non-pull	1) Serial interface port 3 data-out 2) Version AD input port 6 3) GPIO
54	TDO	V_ADIN7	In/Out Non-pull	1) Serial interface port 3 data-out 2) Version AD input port 7 3) GPIO

3.5.2 function introduction to AT24C02

1. Description

The AT24C02 provides 2048 bits of serial electrically erasable and programmable read-only memory (EEPROM) organized as 256 words of 8 bits each. The device is optimized for use in many industrial and commercial applications where low-power and low-voltage operation are essential. The AT24C02 is available in space-saving 8-lead PDIP,

8-lead MAP, 8 lead TSSOP and 8-ball dBG2 packages and is accessed via a 2-wire serial interface. In addition, the entire family is available in 2.7V (2.7V to 5.5V) and 1.8V (1.8V to 5.5V) versions.

2. Features

- ◆ Low-voltage and Standard-voltage Operation
 - 2.7 (VCC = 2.7V to 5.5V)
 - 1.8 (VCC = 1.8V to 5.5V)
- ◆ Internally Organized, 256 x 8 (2K),
- ◆ 2-wire Serial Interface
- ◆ Schmitt Trigger, Filtered Inputs for Noise Suppression
- ◆ Bi-directional Data Transfer Protocol
- ◆ 100 kHz (1.8V) and 400 kHz (2.5V, 2.7V, 5V) Compatibility
- ◆ Write Protect Pin for Hardware Data Protection
- ◆ 8-byte Page (1K, 2K), Write Modes
- ◆ Partial Page Writes are Allowed
- ◆ Self-timed Write Cycle (5 ms max)
- ◆ High-reliability
 - ◆ – Endurance: 1 Million Write Cycles
 - ◆ – Data Retention: 100 Years
- ◆ Automotive Grade, Extended Temperature and Lead-Free Devices Available
- ◆ 8-lead PDIP, 8-lead JEDEC SOIC, 8-lead MAP, 5-lead SOT23,
- ◆ 8-lead TSSOP and 8-ball dBG2™ Packages

3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	A0	I	To Ground
2	A1	I	To Ground
3	A2	I	To Ground
4	VSS	I	To Ground
5	SDA	I/O	Serial Data input

6	SCL	I/O	Serial SCL input
7	TEST	I/O	Test port
8	VDD	I	Positive Power Supply

3.5.3 function introduction to CS5340

1. Description

The CS5340 is a complete analog-to-digital converter for digital audio systems. It performs sampling, analog-to-digital conversion and anti-alias filtering, generating 24-bit values for both left and right inputs in serial form at sample rates up to 200kHz per channel.

The CS5340 uses a 5th-order, multi-bit Delta-Sigma modulator followed by digital filtering and decimation, which remove the need for an external anti-alias filter.

The CS5340 is ideal for audio systems requiring wide dynamic range, negligible distortion and low noise, such as set-top boxes, DVD-karaoke players, DCD recorders, A/V receivers, and automotive applications.

2. Features

- ◆ Advanced multi-bit Delta-Sigma architecture
- ◆ 24-bit conversion
- ◆ Supports all audio sample rates including 192 kHz
- ◆ 101dB Dynamic Range at 5V
- ◆ -94 dB THD+N
- ◆ High pass filter to remove DC offsets
- ◆ Analog/digital core supplies from 3.3V to 5V
- ◆ Supports logic levels between 2.5V and 5V
- ◆ Linear phase digital anti-alias filtering
- ◆ Auto-mode selection
- ◆ Pin compatible with the CS5431

3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1, 16	M0, M1	I	Mode Selection
2	MCLK	I	Master Clock
3	VL	I	Logic Power
4	SDOUT	O	Serial Audio Data Output
5, 14	GND	I	Ground
6	VD	I	Digital Power

7	SCLK	I/O	Serial Clock
8	LRCK	I/O	Left Right Clock
9	/RST	I	Reset
10, 12	AINL, AINR	I	Analog Input
11	VQ	O	Quiescent Voltage
13	VA	I	Analog Power
15	FILT+	O	Positive Voltage Reference

3.5.4 function introduction to 29LV160BE

The 29LV160BE is a 16Mbit FLASH memorizer, and the damage of U214 may cause troubles, such as power not on, no disc reading and power on picture mosaic. Pin function is shown as the following table:

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

3.5.5 function introduction to HY57V641620HGT-7

64M 16-bit memorizer SDRAM with the player and the working clock frequency is 166/143MHZ. The function of 16SDRAM in DVD players is to memorizer the program of AML3298 taken out from FLASH and information of image and sound taken out from disc to form buffer, add the stability of information output and add anti-shaking effect of player. Pin function introduction is shown as the following table:

Pin	Name	Function	Signal flow	Pin	Name	Function	Signal flow
1	VDD	3.3V power supply		28	VSS	Ground	
2	DQ0	Data bus	I/O	29	MA4	Address bus	I
3	VDDQ	3.3V power supply	I/O	30	MA5	Address bus	I
4	DQ1	Data bus	I/O	31	MA6	Address bus	I
5	DQ2	Data bus	I/O	32	MA7	Address bus	I
6	VSSQ	Ground		33	MA8	Address bus	I
7	DQ3	Data bus	I/O	34	MA9	Address bus	I
8	DQ4	Data bus	I/O	35	MA11	Address bus	I
9	VDDQ	3.3V power supply		36	NC	Blank	
10	DQ5	Data bus	I/O	37	CKE	Clock enable signal	I
11	DQ6	Data bus	I/O	38	CLK	System clock input	I
12	VSSQ	Ground		39	UDQM	Data input/output screen-shielded signal	I
13	DQ7	Data bus	I/O	40	NC	Blank	
14	VDD	3.3V power supply		41	VSS	Ground	
15	LDQM	Data input/output screen-shielded signal	I	42	DQ8	Data bus	I/O
16	WE	Write control signal	I	43	VDDQ	3.3V power supply	
17	CAS	Line address gating signal	I	44	DQ9	Data bus	I/O
18	RAS	Row address gating signal	I	45	DQ10	Data bus	I/O
19	CS	Chip selection signal	I	46	VSSQ	Ground	
20	SD-BS0	Segment address 0 gating signal	I	47	DQ11	Data bus	I/O
21	SD-BS1	Segment address 1 gating signal	I	48	DQ12	Data bus	I/O
22	MA10	Address bus	I	49	VDDQ	3.3V power supply	
23	MA0	Address bus	I	50	DQ13	Data bus	I/O
24	MA1	Address bus	I	51	DQ14	Data bus	I/O
25	MA2	Address bus	I	52	VSSQ	Ground	
26	MA3	Address bus	I	53	DQ15	Data bus	I/O
27	VDD	3.3V power supply		54	VSS	Ground	

3.5.6 function introduction to 4580

1. Description

The 4580 is the dual operational amplifier, specially designed for improving the tone control, which is most suitable for the audio application.

Featuring noiseless, higher gain bandwidth, high output current and low distortion ratio, and it is most suitable not only for acoustic electronic parts of audio pre-amp and active filter, but also for the industrial measurement tools. It is also suitable for the head phone amp at higher output current, and further more, it can be applied for the handy type set operational amplifier of general purpose in application of low voltage single supply type which is properly biased of the low voltage source.

2. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	A Output	O	A Output
2	A Input-	I	A Input-
3	A Input+	I	A Input+
4	V-	I	Supply Voltage -
5	B Input+	I	B Input+
6	B Input-	I	B Input-
7	BOutput	O	BOutput
8	V+	I	Supply Voltage +

3.5.7 function introduction to AM5888S

1. Description

The AM5888S is a five-channel BTL driver IC for driving the motors and actuators such as used in DVD player and consists of two independent precision voltage regulators with adjustable range from 1.5V to 4 V. It supports a variety of applications. Also, Pb free package is selectable (Please refer to Marking Identification).

2. Fetures

◆ Two channels are voltage-type BTL drivers for actuators of tracking and focus. Two channels are voltage-type BTL driver for sled and spindle motors. It is also built-in one channel bi-direction DC motor driver for tray.

◆ Wide dynamic range [9.0V (*typ.*) when $V_{cc1}=V_{cc2}=12V$, at $R_L=20\Omega$, load].

◆ Separating power of V_{cc1} and V_{cc2} is to improve power efficiency by a low supply voltage for tracking, focus, and spindle.

◆ Level shift circuit built-in.

◆ Thermal shut down circuit built-in.

◆ Mute mode built-in.

◆ Dual actuator drivers:

A general purpose input OP provides differential input for signal addition. The output structure is two power OPAMPS in bridge configuration.

◆ Sled motor driver: A general purpose input OP provides differential input for signal addition. The output structure is one power OPAMP in bridge configuration.

◆ Spindle driver: Single input linear BTL driver. The output structure are two power OPAMPS in bridge configuration.

◆ Tray in-out driver: The DC motor driver supports forward/reverse control for tray motor.

◆ 2 Built-in regulator controllers: Adjustable range 1.5V ~ 4V

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	VINFC	I	Input for focus drive
2	TRB_1	O	Connect to external transistor base
3	REGO2	O	Regulator voltage output, connect to external transistor collector
4	VINSL	I	Input for the sled driver
5	REGO1	O	Regulator voltage output, connect to external transistor collector
6	FWD	I	Tray driver forward input
7	REV	I	Tray driver reverse input
8	VCC1	I	Vcc for pre-drive block and power block of sled and tray
9	VOTR-	O	Tray driver output (-)
10	VOTR+	O	Tray driver output (+)
11	VOSL+	O	Sled driver output (+)
12	VOSL-	O	Sled driver output (-)
13	VOFC-	O	Focus driver output (-)
14	VOFC+	O	Focus driver output (+)
15	VOTK+	O	Tracking driver output (+)
16	VOTK-	O	Tracking driver output (-)
17	VOLD+	O	Spindle driver output (+)
18	VOLD-	O	Spindle driver output (-)
19	VCC2	I	Vcc for power block of spindle, tracking and focus
20	NC		No Connection

21	VCTL	I	Speed control input of tray driver
22	GND	I	Ground
23	VINLD	I	Input for spindle driver
24	NC		No Connection
25	TRB_2	O	Connect to external transistor base
26	VINTK	I	Input for tracking driver
27	BIAS	I	Input for reference voltage
28	MUTE	I	Input for mute control

3.5.8 function introduction to PT6961

1. DESCRIPTION

PT6961 is an LED Controller driven on a 1/7 to 1/8 duty factor. Eleven segment output lines, six grid output lines, 1 segment/grid output lines, one display memory, control circuit, key scan circuit are all incorporated into a single chip to build a highly reliable peripheral device for a single chip microcomputer. Serial data is fed to PT6961 via a four-line serial interface. Housed in a 32-pin SO Package, PT6961 pin assignments and application circuit are optimized for easy PCB Layout and cost saving advantages.

2. FEATURES

- ◆ CMOS Technology
- ◆ Low Power Consumption
- ◆ Multiple Display Modes (12 segment, 6 Grid to 11 segment, 7 Grid)
- ◆ Key Scanning (10 x 3 Matrix)
- ◆ 8-Step Dimming Circuitry
- ◆ Serial Interface for Clock, Data Input, Data Output, Strobe Pins
- ◆ Available in 32-pin, SOP Package

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	OSC	I	Oscillator Input P in
2	DOUT	O	Data output
3	DIN	I	Data input
4	CLK	I	Clock input
5	STB	I	Serial interface strobe
6	K1	I	Key data input

7	K2	I	Key data input
8	K3	I	Key data input
9	VDD	I	Power supply
10	SG1/KS1	O	Segment output
11	SG2/KS2	O	Segment output
12	SG3/KS3	O	Segment output
13	NC		
14	SG4/KS4	O	Segment output
15	SG5/KS5	O	Segment output
16	SG6/KS6	O	Segment output
17	SG7/KS7	O	Segment output
18	SG8/KS8	O	Segment output
19	SG9/KS9	O	Segment output
20	SG10/KS10	O	Segment output
21	SG11	O	Segment output
22	SG12/GR7	O	Segment output
23	GR6	O	Grid output
24	GR5	O	Grid output
25	VDD	I	Power input
26	GND	I	Ground
27	GR4	O	Grid output
28	GR3	O	Grid output
29	GND	I	Ground
30	GR2	O	Grid output
31	GR1	O	Grid output
32	GND	I	Ground

3.5.9 function introduction to VIPER22A

1. DESCRIPTION

The VIPer22A combines a dedicated current mode PWM controller with a high voltage Power MOSFET on the same silicon chip. Typical applications cover off line power supplies for battery charger adapters, standby power supplies for TV or monitors, auxiliary supplies for motor control, etc. The internal control circuit offers the following benefits:

– Large input voltage range on the VDD pin accommodates changes in auxiliary supply voltage. This feature is well adapted to battery charger adapter configurations.

– Automatic burst mode in low load condition.

– Overvoltage protection in hiccup mode.

2. FEATURES

◆ FIXED 60 KHZ SWITCHING FREQUENCY

◆ 9V TO 38V WIDE RANGE VDD VOLTAGE

◆ CURRENT MODE CONTROL

◆ AUXILIARY UNDERVOLTAGE LOCKOUT WITH HYSTERESIS

◆ HIGH VOLTAGE START UP CURRENT SOURCE

◆ OVERTEMPERATURE, OVERCURRENT AND OVERVOLTAGE PROTECTION WITH

AUTORESTART

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	SOURCE	O	Power MOSFET source and circuit ground reference.
2	SOURCE	O	Power MOSFET source and circuit ground reference.
3	FB	I	Feedback input.
4	VDD	I	Power supply of the control circuits.
5	DRAIN	I	Power MOSFET drain.
6	DRAIN	I	Power MOSFET drain.
7	DRAIN	I	Power MOSFET drain.
8	DRAIN	I	Power MOSFET drain.

3.5.10 function introduction to HS817

U502 (HS817) is a photoelectric coupler, shown as the figure 3.5.10.1. The right side is a light emitting diode, which sends out light of different intensity according to the strength of voltage inputted from the right side, generates photocurrent of different intensity on the left side according to light of different intensity, and outputs from position D. The higher of the voltage inputted from the right side, the stronger of the light emitted from light emitting diode and the larger of the photocurrent produced from position D. The lower of the voltage inputted from the right side of photoelectric coupler, the weaker of the light emitted from light emitting diode and the weaker of the current outputted from position D.

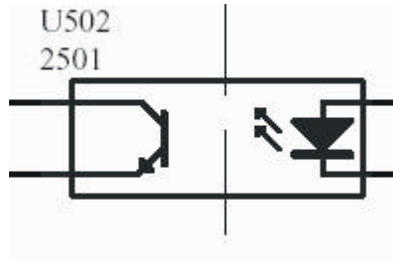


Figure 3.5.10.1 HS817 outside drawing

3.5.11 function introduction to LM431A

U503 (LM431A) is a 2.5V comparator, shown as the figure 3.5.11.1. Compared the inputted voltage of R end with 2.5V, when voltage of R end is more than 2.5V, KA end is on and photoelectric coupler starts to send out photocurrent; when voltage of R end is less than 2.5V, KA end is cutoff and photoelectric coupler does not send out photocurrent. CPU+3.3V in power board circuit must be kept in 3.3V, for the function of comparator. No matter more than or less than 3.3V, through on and off status of comparator, it will control the on state of the output end of photoelectric coupler LM431A to adjust the output space occupation ratio of switch module to control the output voltage of transformer and masthead the power.

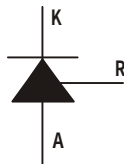


Figure 3.5.11.1 LM431A outside drawing

Chapter Four

Disassembly and Assembly Process

DVD players 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, power amplifier board components, MIC board components and AV 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 “DK1005S Service Manual” or “DK1020S Service” .

The pictures of this model are shown as follows:

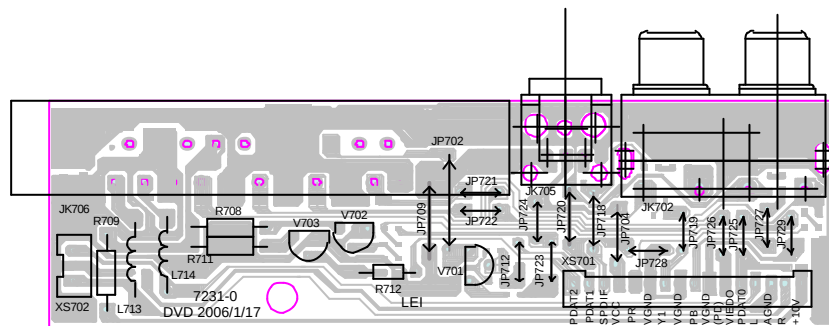


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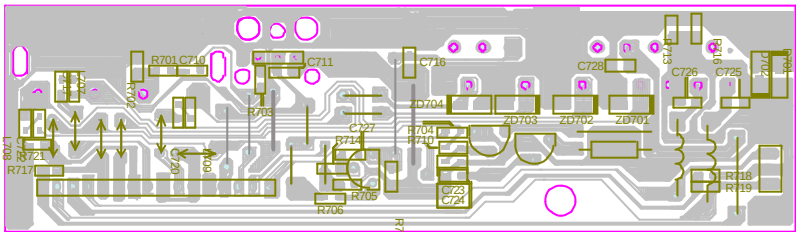
PCB board & Circuit diagram

Section One PCB board

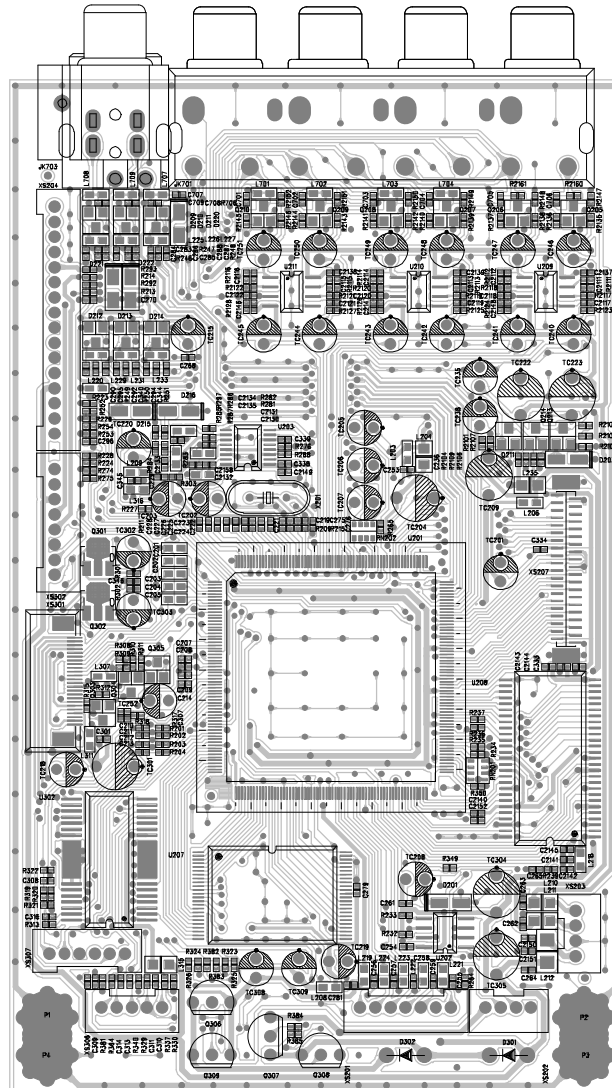
5.1.1 Surface layer of AV Board



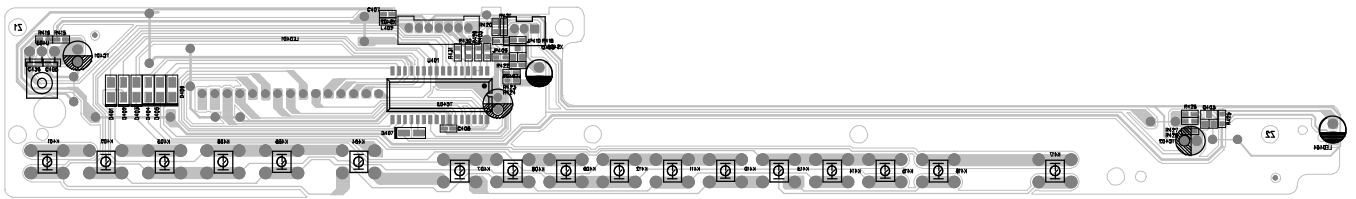
5.1.2 Bottom layer of AV Board



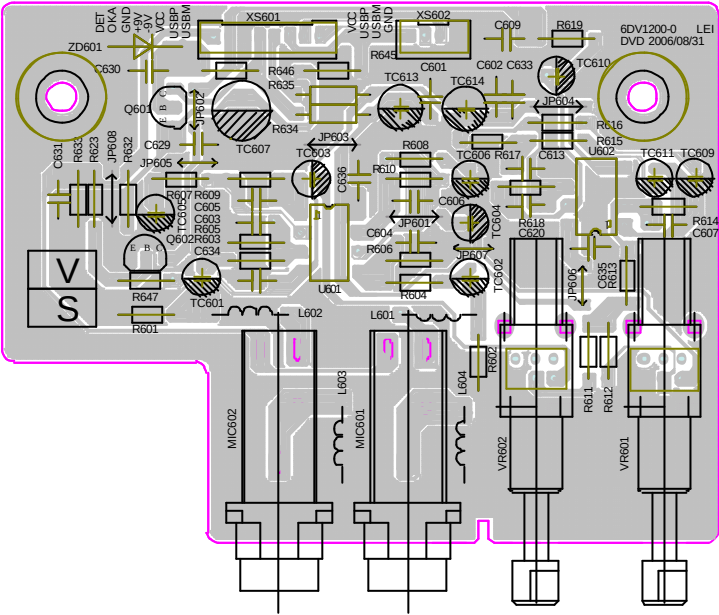
5.1.3 Surface layer of DECODE&SERVO Board



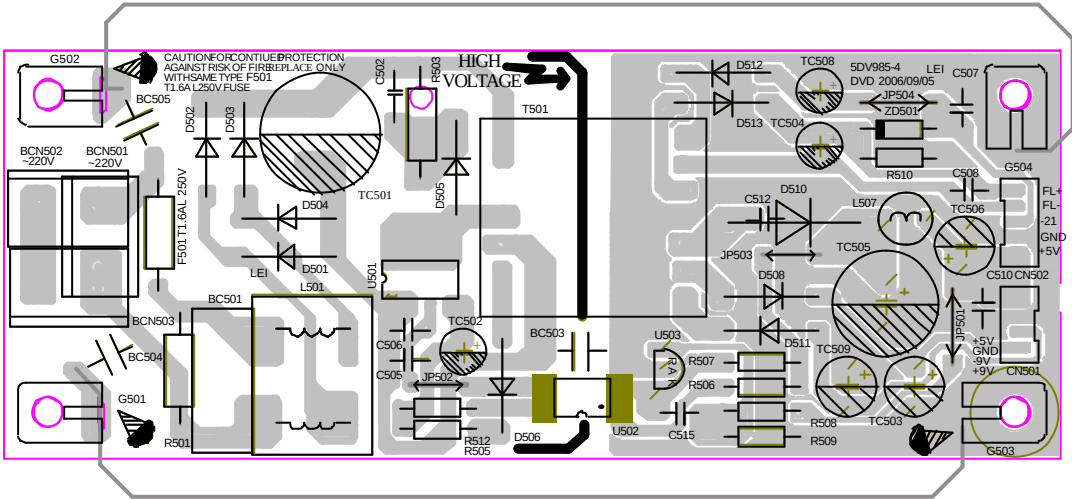
5.1.5 KEY SCAN Board



5.1.6 MIC Board

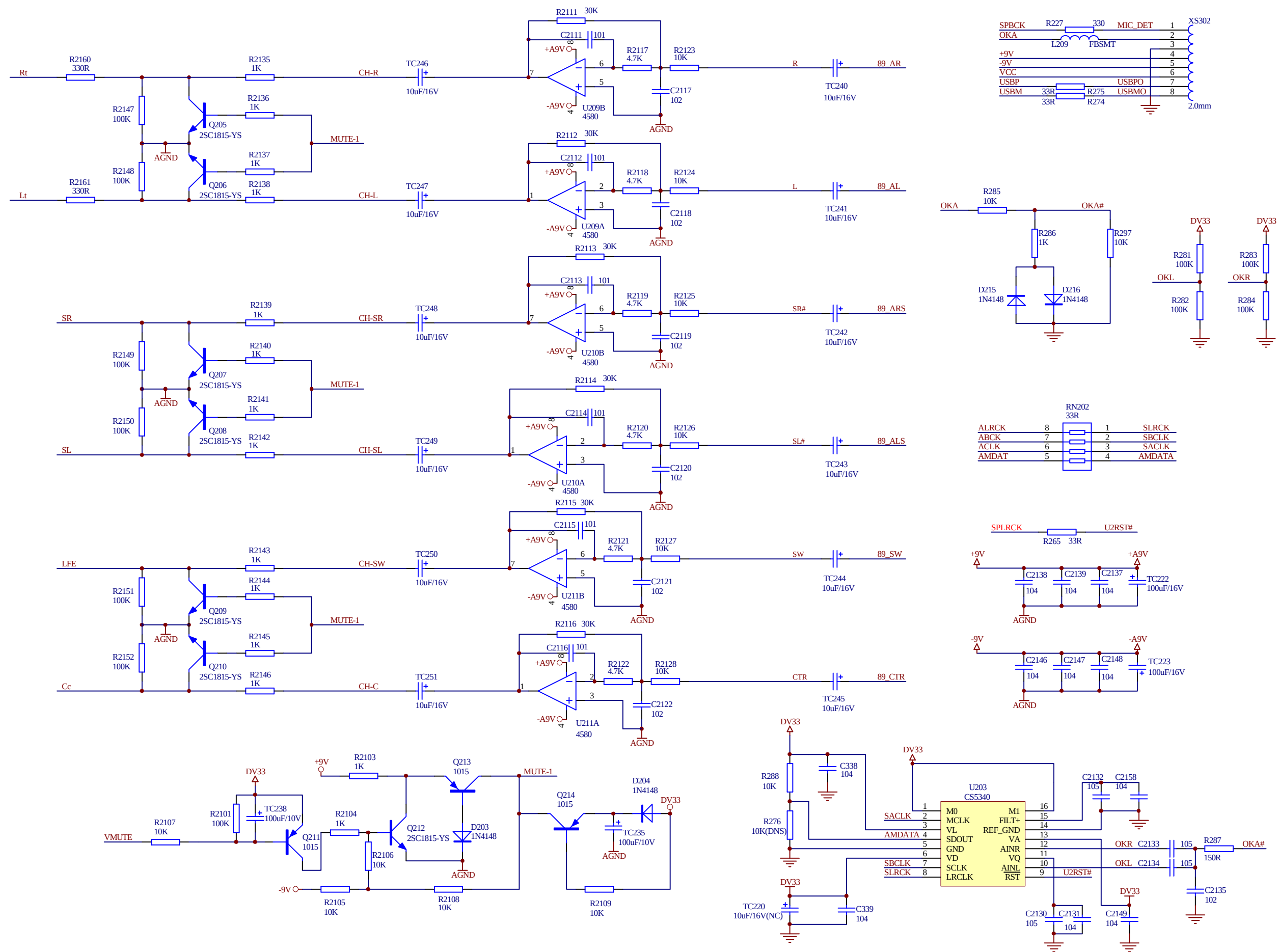


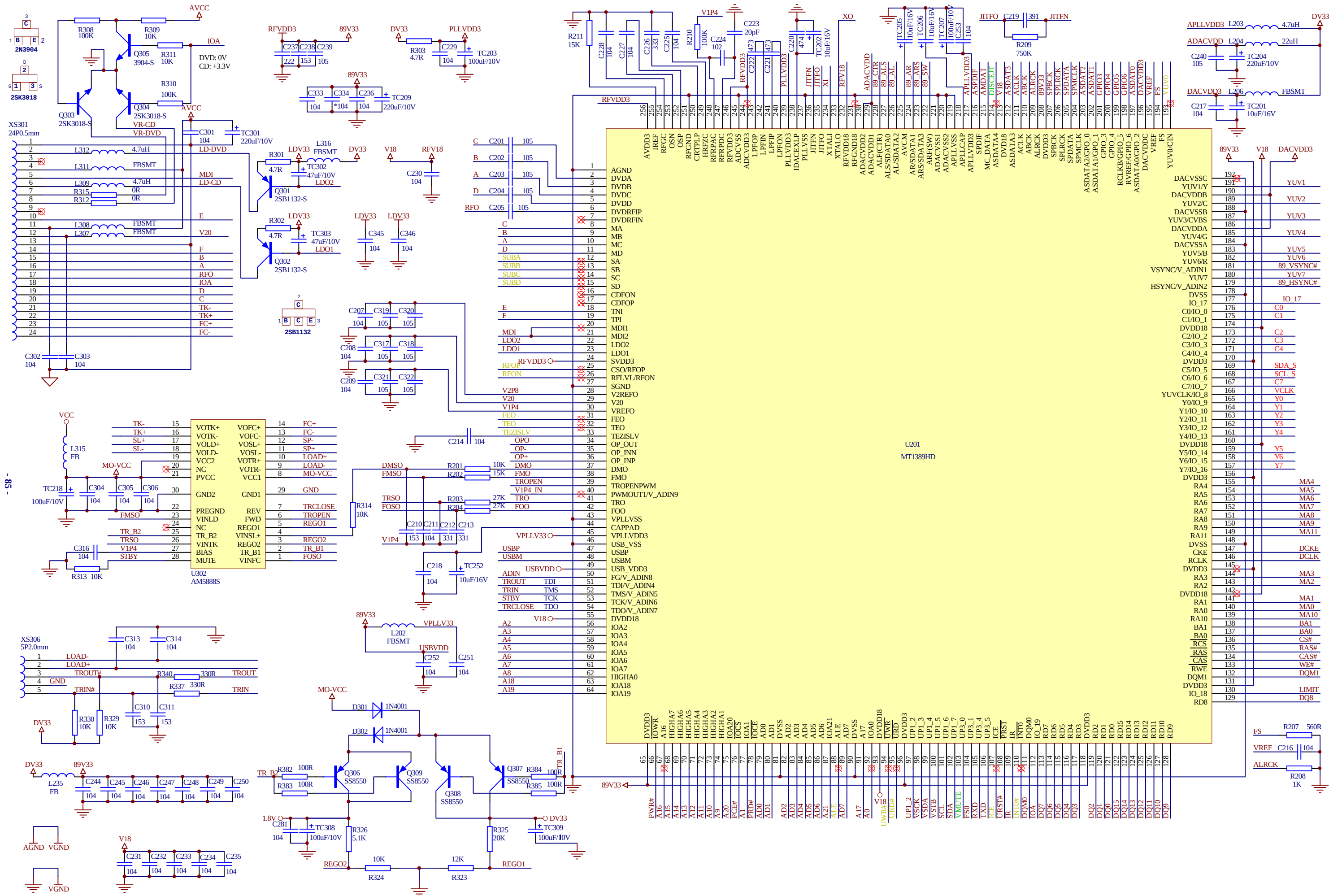
5.1.7 POWER Board

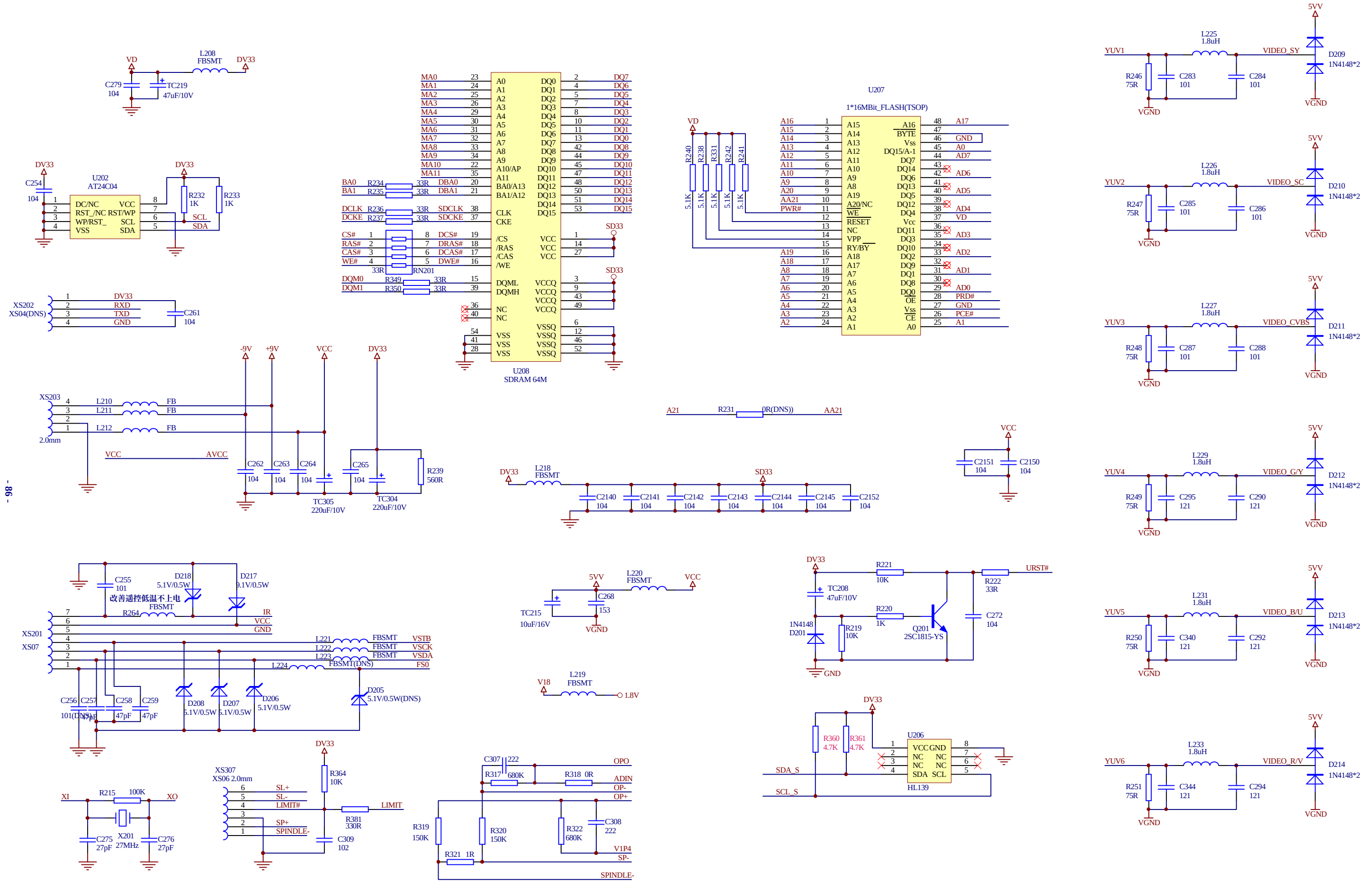


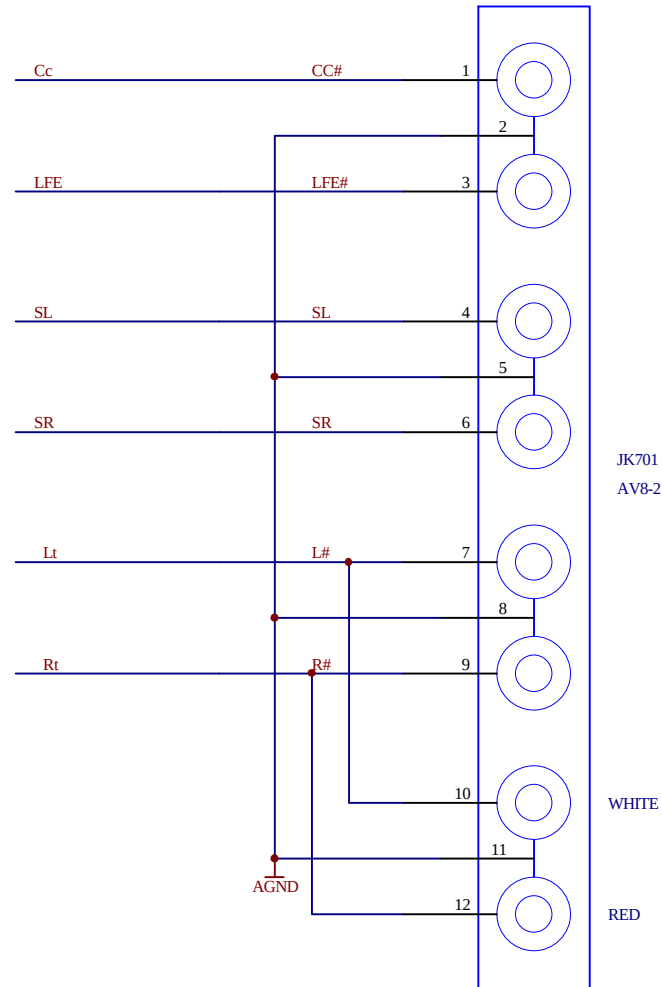
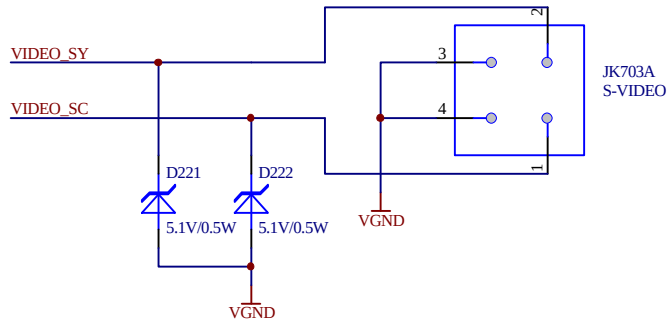
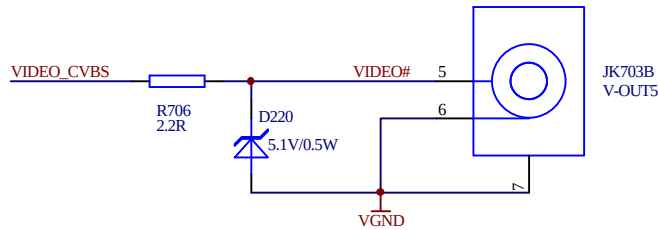
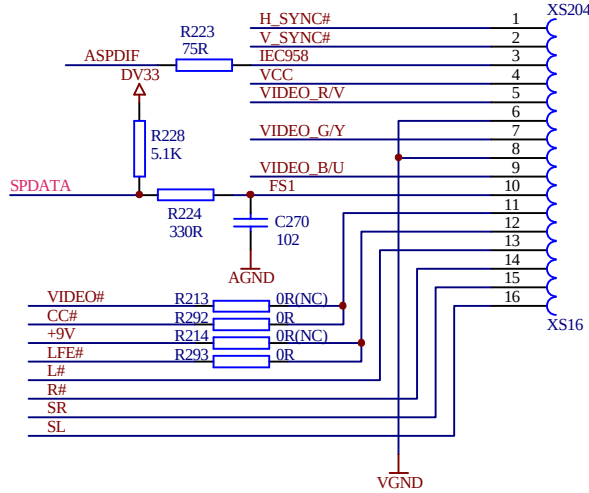
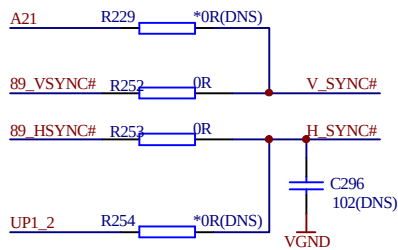
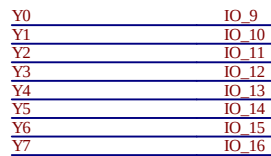
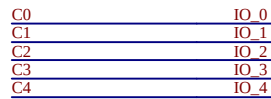
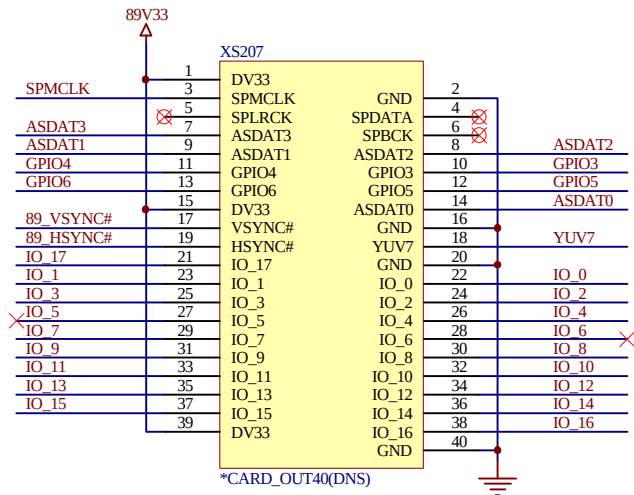
Section Two circuit diagram

5.2.1 DECODE & SERVO Board

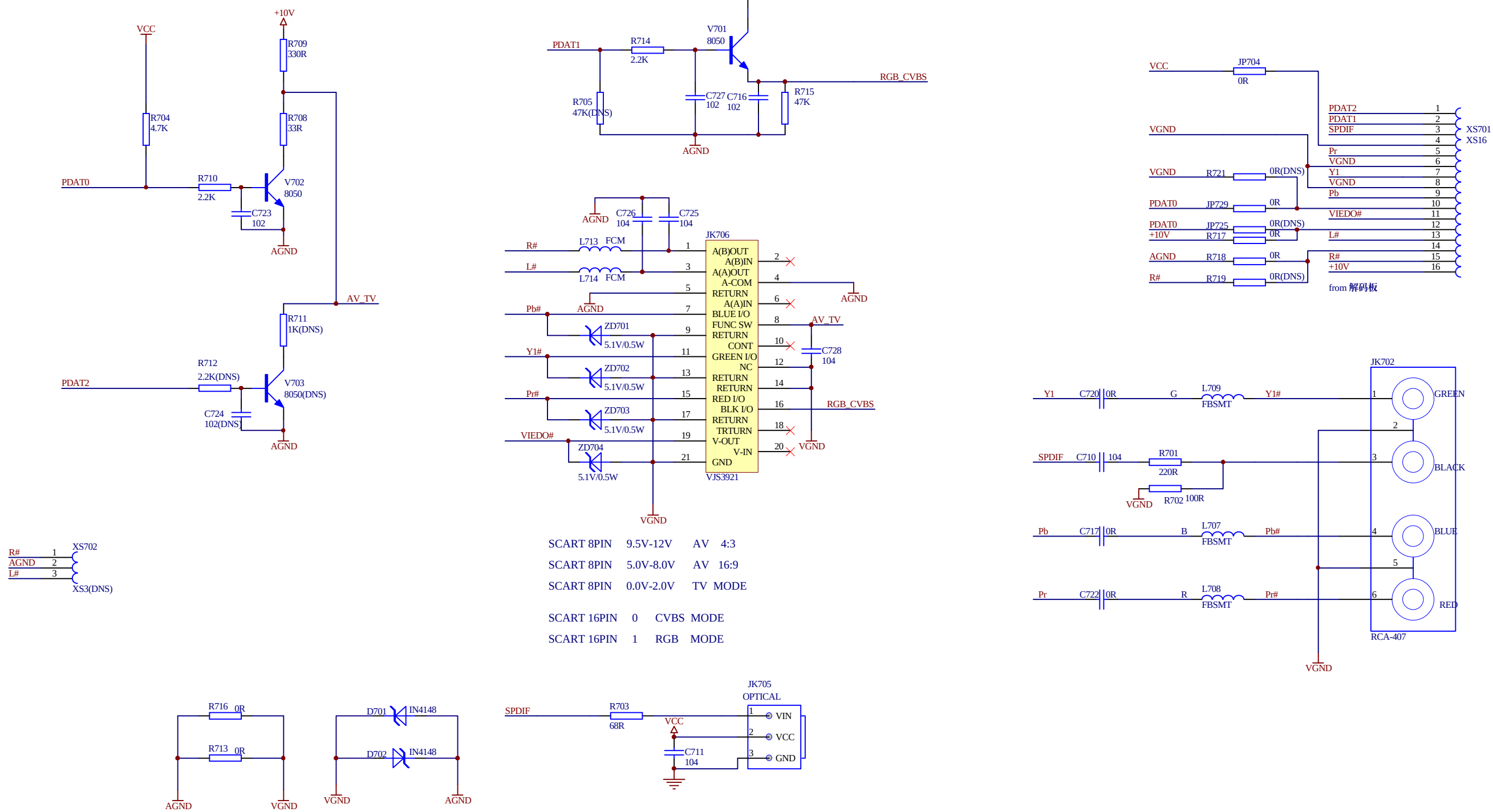


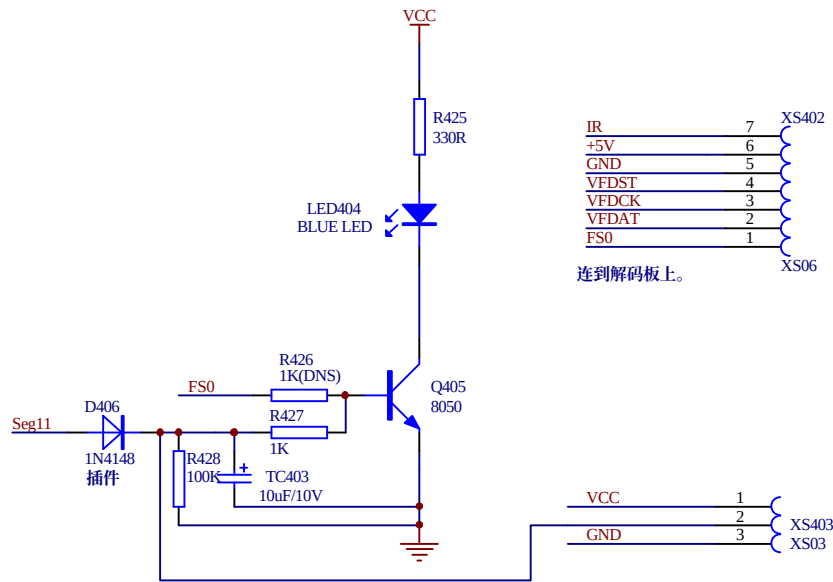
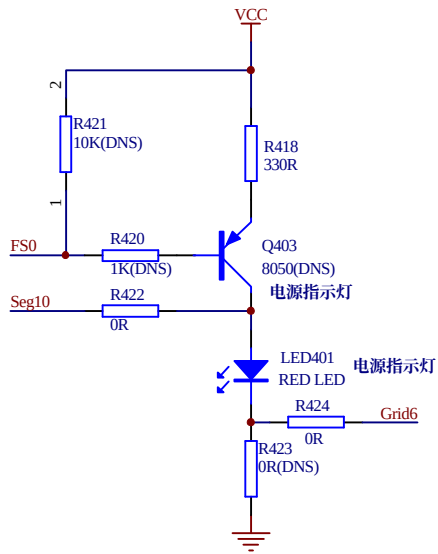
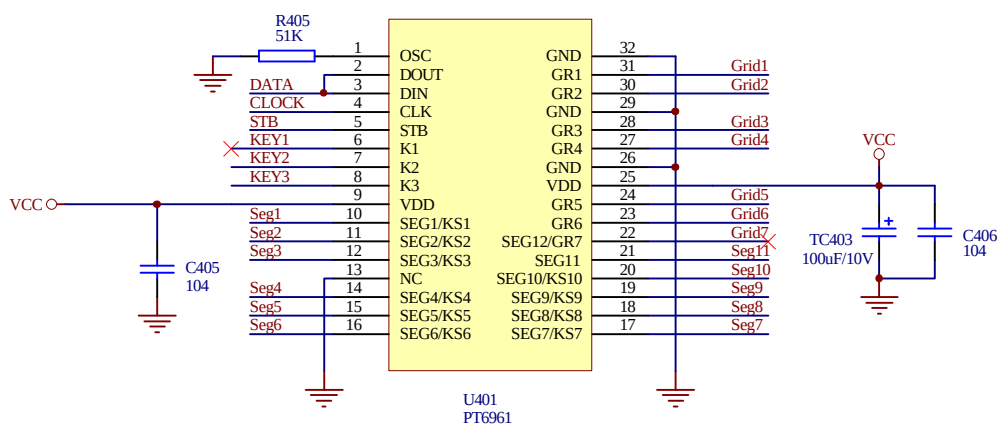
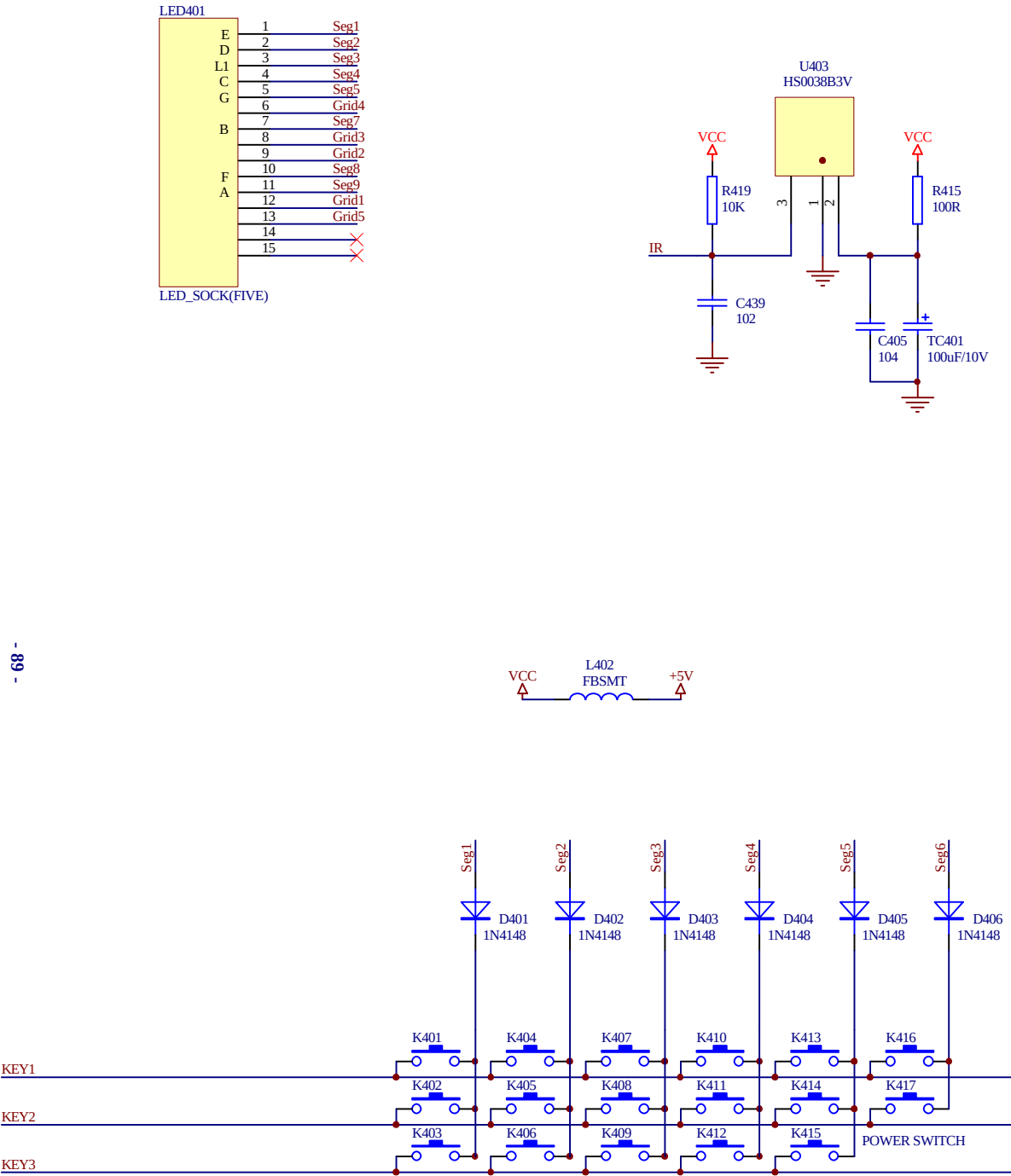




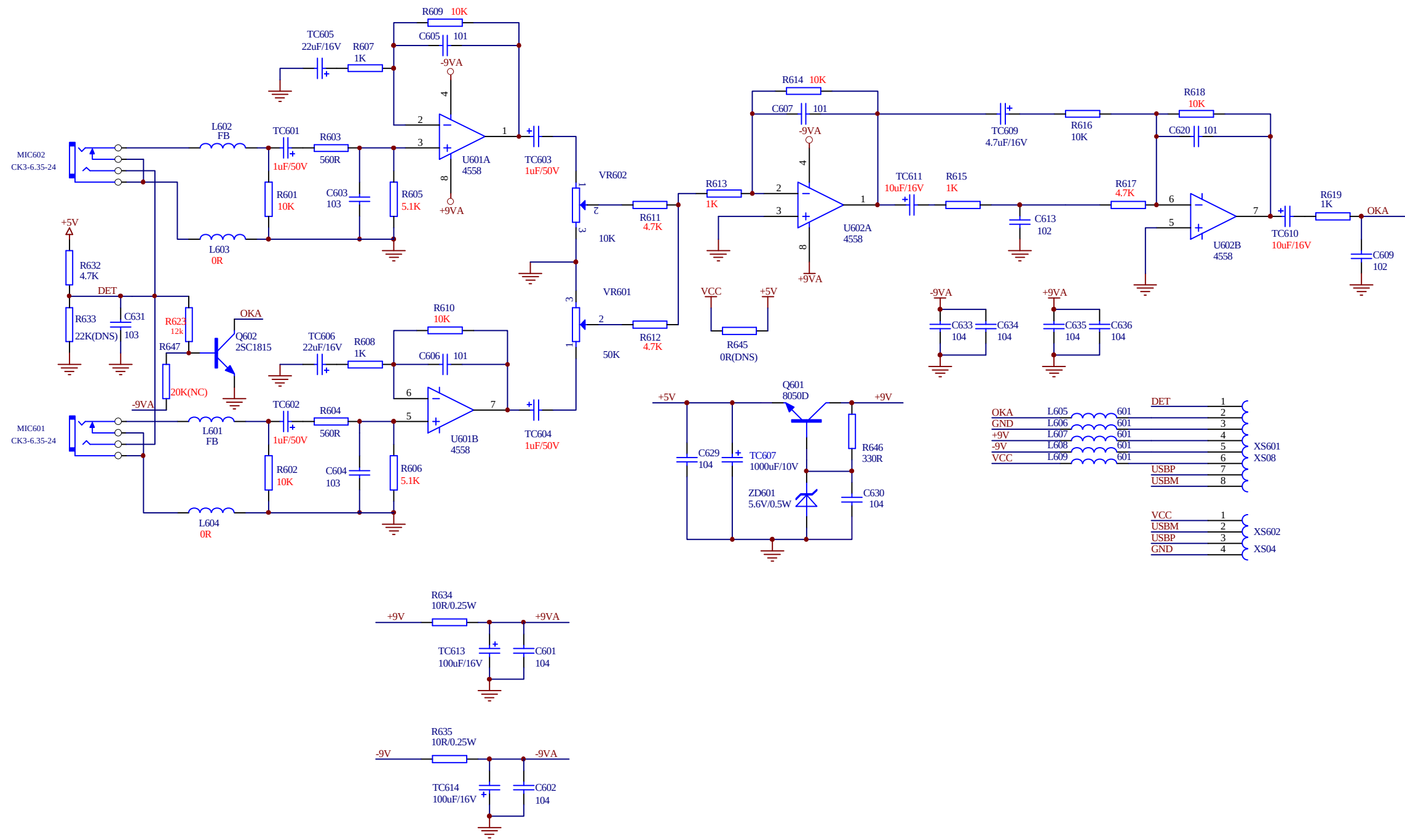


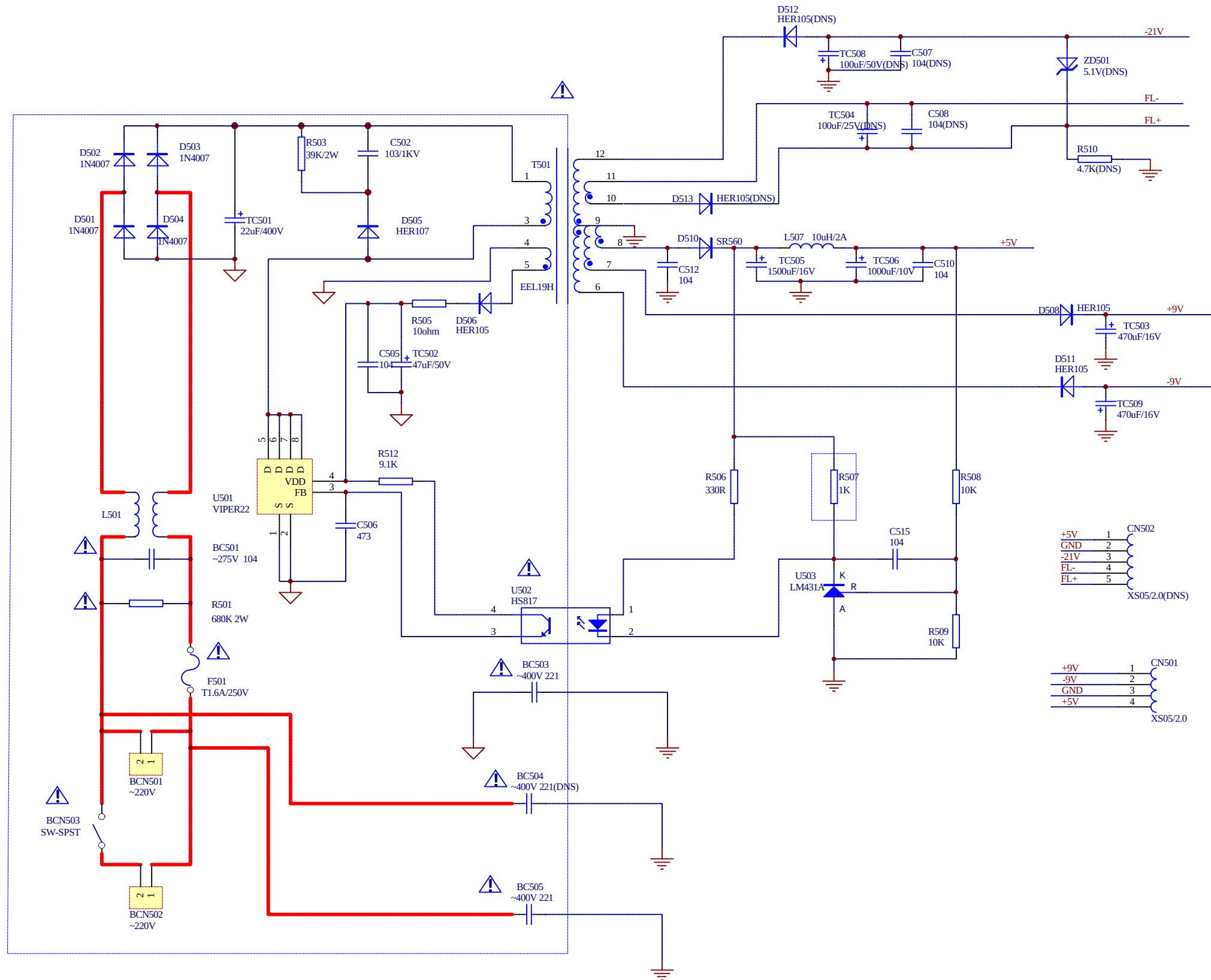
5.2.2 AV OUT Board





5.2.3 KEY SCAN Board





5.2.5 POWER Board

Chapter six BOM List

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
DV828X(RU)SILVER[1389H]			
AV BOARD 5449257			
0090001	SMD RESISTOR	1/16W 00±5% 0603	C717,C720,C722,R717,R713,R716,R718
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R702
0700007	SMD DIODE	14148	D701,D702 ①
0700001	SMD DIODE	LS4148	D701,D702 ①
0700002	SMD DIODE	LL4148	D701,D702 ①
0090238	SMD RESISTOR	1/16W 68O±5% 0603	R703
0310207	SMD CAPACITOR	50V 104 ±20% 7R 0603	C710,C728 ②
0310543	SMD CAPACITOR	50V 104±10% 7R 0603	C710,C728 ②
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C711
0090008	SMD RESISTOR	1/16W 220O±5% 0603	R701
0390095	SMD MAGNETIC BEADS	FC160822105	L707,L708,L709
1090045	ELECTRO-OPTIC TRANSFORMER	179ATW	JK705 ③
1090024	ELECTRO-OPTIC TRANSFORMER	179AT	JK705 ③
1910078	TERMINAL SOCKET	4-8.4-6G-3	JK702
2122457	FLAT CABLE	14-15P110 2.0 2 TOGETHER DIRECTION,WITH NEEDLE,14 CORD	XS701
2100010	LEAD	F 0.6 SHAPED 5mm	JP723~JP724,JP726,JP727,JP712,JP719,JP728,JP729,JP721,JP722
2100003	LEAD	F 0.6 SHAPED 7.5mm	JP718,JP720,JP704
2100004	LEAD	F 0.6 SHAPED 10mm	JP709
2100006	LEAD	F 0.6 SHAPED 12.5mm	JP702
0780050	TRIODE	S8050D	V701,V702
0390057	MAGNETIC BEADS INDUCTOR	RH354708	L713,L714
0700004	SMD VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W	ZD701,ZD702,ZD703,ZD704
0000273	CARBON FILM RESISTOR	1/433O±5% SHAPED 10	R708
0000278	CARBON FILM RESISTOR	1/4330O±5% SHAPED 10	R709
1860029	SCART SOCKET	SCAR01	JK706
0310598	SMD CAPACITOR	50V 102±20% 7R 0603	C716,C723,C727
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R715
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R704

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090017	SMD RESISTOR	1/16W 2.2K±5% 0603	R710,R714
0090006	SMD RESISTOR	1/16W 75O±5% 0603	R706
1564337	PCB	7231-1-1	
DV828X(RU)SILVER[1389H]			
DECODE BOARD:2DV985-5 1.4/Ver5.2			
0090394	SMD RESISTOR	1/16W 27K±5% 0402	R203,R204
0090389	SMD RESISTOR	1/1615K±5% 0402	R202,R211
0090387	SMD RESISTOR	1/1612K±5% 0402	R323
0090378	SMD RESISTOR	1/16W 5.1K±5% 0402	R228,R326
0090507	SMD RESISTOR	1/16W 4.7O±5% 0402	R301,R302,R303
0090377	SMD RESISTOR	1/16W 4.7K±5% 0402	R2117~R2122
0090457	SMD RESISTOR	1/162.2O±5% 0402	R706
0090445	SMD RESISTOR	1/16W 1O±5% 0402	R321
0090362	SMD RESISTOR	1/16W 1K±5% 0402	R232,R233,R286,R2103,R2104,R2135~R2146
0310415	SMD CAPACITOR	50V 20P±5% NPO 0402	C223
02607829	CD	C11C 10V220U±20%6×12 C5 BELT	TC204,TC209,TC301,TC304,TC305
02601889	CD	C11 16V100U±20%6×12 C5 BELT	TC222,TC223
02607819	CD	C11C 10V100U±20%5×11 C2.5 BELT	TC203,TC207,TC218,TC308,TC309,TC235,TC238
02607809	CD	C11C 10V47U±20%4×7 C2.5 BELT	TC208,TC219,TC302,TC303
02607799	CD	C11C 16V10U±20%4×7 C2.5 BELT	TC201,TC202,TC205,TC206,TC215,TC240~TC252
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R210
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R219,R221,R314
0090020	SMD RESISTOR	1/16W 5.1K±5% 0603	R238,R240,R241,R242,R331,R360, R361
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R208,R220
0090012	SMD RESISTOR	1/16W 560O±5% 0603	R207
0090005	SMD RESISTOR	1/16W 33O±5% 0603	R222
0090668	PRECISION SMD RESISTOR	1/16W 750K±1% 0402	R209
0100019	SMD RESISTOR NETWORKS	1/16W 33O±5% 8P	RN201,RN202
0090429	SMD RESISTOR	1/16W 680K±5% 0402	R317,R322
0090356	SMD RESISTOR	1/16560O±5% 0402	R239
0090408	SMD RESISTOR	1/16W 100K±5% 0402	R215,R281~R284,R308,R310,R2101,R2147~R2152
0090350	SMD RESISTOR	1/16330O±5% 0402	R224,R227,R337,R340,R381,R2160,R2161

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090759	SMD RESISTOR	1/16W 150O±5% 0402	R287
0090412	SMD RESISTOR	1/16W 150K±5% 0402	R319,R320
0090336	SMD RESISTOR	1/1675O±5% 0402	R223,R246~R251
0090330	SMD RESISTOR	1/16W 330±5% 0402	R350,R234,R349,R265,R235~R237,R274,R275
0090385	SMD RESISTOR	1/16W 10K±5% 0402	R201,R285,R288,R297,R309,R311,R313,R324,R329,R330,R364,R2105~R2109,R2123~R2128
0390453	SMD MAGNETIC BEADS	GZ1005D221T 0402	R264
0090395	SMD RESISTOR	1/16W 30K±5% 0402	R2111~R2116
0090391	SMD RESISTOR	1/16W 20K±5% 0402	R325
0310418	SMD CAPACITOR	50V 27P±5% NPO 0402	C275,C276
0090324	SMD RESISTOR	1/16W 0O±5% 0402	R213,R214,R318,R252,R253,R312, R315
0310482	SMD CAPACITOR	16V 473±10% 7R 0402	C221,C222
0310570	SMD CAPACITOR	16V 333±10% 7R 0402	C226
0310454	SMD CAPACITOR	16V 153±10% 7R 0402	C210,C268,C310,C311
0310394	SMD CAPACITOR	50V 222±10% 7R 0402	C307,C308
0310392	SMD CAPACITOR	50V 102±10% 7R 0402	C224,C270,C309,C2135,C2117~C2122,C705,C706
0310795	SMD CAPACITOR	16V 391±5% NPO 0402	C219
0310794	SMD CAPACITOR	16V 331±5% NPO 0402	C212,C213
0310493	SMD CAPACITOR	50V 121±5% NPO 0402	C295,C340,C344,C290,C292,C294
0310432	SMD CAPACITOR	50V 101±5% NPO 0402	C255,C283~C288,C2111~C2116
0310424	SMD CAPACITOR	50V 47P±5% NPO 0402	C257~C259
0882353	IC	C5340 TSSOP	U203
08828028	IC	A5888S L/ HSOP\$	U302
0882644	IC	1389FE/H(HD) QFP	U201
0881415	IC	HY57V641620HG7 TSOP	U208
0700113	SMD VOLTAGE REGULATOR DIODE	9.1V±5% 1/2W	D217
0700004	SMD VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W	D205~D208,D218,D220~D222
0780115	SMD TRIODE	2SB1132	Q301,Q302
0780193	SMD TRIODE	2S3018	Q303,Q304
0780040	SMD TRIODE	3904(100-300) SO23	Q305
0780198	SMD TRIODE	2S1015	Q211,Q213,Q214
0780197	SMD TRIODE	C1815	Q201,Q205~Q210,Q212

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0700056	SMD DOUBLE DIODE	MMBD4148SE SO23	D209~D214
0700007	SMD DIODE	14148	D201,D203,D204,D215,D216
0390095	SMD MAGNETIC BEADS	FC160822105	L202,L206,L208,L209,L218~L223,L307,L308,L311,L316
0390444	SMD MAGNETIC BEADS	PZ2012U121	L210,L211,L235,L315
0390385	SMD INDUCTOR	22uH±10% 2012	L204
0390355	SMD INDUCTOR	4.7UH±10% 1608	L203,L309,L312
0390096	SMD INDUCTOR	1.8UH±10% 1608	L225~L227,L231,L229,L233
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C201~C205,C239,C240,C317~C322,C2130,C2132,C2133,C2134
0310362	SMD CAPACITOR	16V474 +80%-20% Y5V 0603	C220
0310207	SMD CAPACITOR	50V 104 ±20% 7R 0603	C216~C218,C230~C235,C244~C252,C272,C302~C306
0310201	SMD CAPACITOR	50V 153±10% 7R 0603	C238
0310068	SMD CAPACITOR	50V 222±10% 7R 0603	C237
0881742	IC	4558 SOP	U209,U210,U211
0883258	IC	HL139 SO-8	U206
0883181	IC	24C04 SOP	U202
07803199	TRIODE	SS8550 TO-92 BELT	Q306,Q307,Q308,Q309
05700039	DIODE	14001 BELT	D301,D302
0310726	SMD CAPACITOR	16V 104±10% 5R 0402	C207~C209,C211,C214,C225,C227~C229,C236,C253,C254,C261~C265,C279,C281,C301,C313,C314,C316,C333,C338,C339,C345,C346,C2131,C2149,C2158,C2137~C2148,C2150~C2152
0390452	SMD MAGNETIC BEADS	PZ3216D121	L212
0960020	CMETAL OXIDE FILM RESISTORSTAL OSCILLATOR	27.00MHz 49-S	X201
1910129	TERMINAL SOCKET	S001-012 BLACK IRON PIECE,SCREESHIELDED	JK703
1910079	TERMINAL SOCKET	8-8.4-6G-3	JK701
1940008	SOCKET	8P2.0mm	XS302
1940064	SOCKET	14P 2.0mm	XS204
1940005	SOCKET	6P 2.0mm	XS307,XS201
1940024	SOCKET	5P 2.0mm	XS306
1940094	CABLE SOCKET	24P 0.5mm SMD SUBMIT MEET WITH CLASP	XS301
1940022	SOCKET	4P 2.0mm	XS203
1633642	PCB	2 985-5	

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
DV828X(RU)SILVER[1389H]			
MAIN PANEL 5449542			
5233487	SOFT SPONGE SPACER	10×10×11 DOUBLE-FACED,HARD	UNDERLAY 1PCS BETWEEN REMOTE CONTROL RECEIVER AND PANEL
5233487	SOFT SPONGE SPACER	10×10×11 DOUBLE-FACED,HARD	UNDERLAY 2PCS BETWEEN LED SCREEN AND PANEL PCB
3073572	BRACKET O INDICATOR LIGHT	828X(RU)	LED402
3073407	CONDUCT LIGHT O BRACKET	828X(RU)	LED404
0881426	IC	6961 SOP	U401
1200838	LED DISPLAY SCREEN	HMMOB6211DB-2	LED401
1340003	LIGHT TOUCH RESTORE SWITCH	HORIZONTAL 6×6×1	K401~K417
2360016	IR SENSOR	HS0038B3V	U403
02602549	CD	C11C 10V100U±20%6×5 2.5 BELT	TC401,TC402,TC403
0620025	RADIATION DIODE	3R 4SD RED	LED402
0620076	RADIATION DIODE	3B3HC COLORLESS WITH BLUE	LED404
0390095	SMD MAGNETIC BEADS	FC160822105	L402
0090001	SMD RESISTOR	1/16W 00±5% 0603	R422,R424,R427,JP409,JP410
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R415
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R425
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R426
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R419,R429,R430,R431
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R428
0090192	SMD RESISTOR	1/16W 51K±5% 0603	R405
0310598	SMD CAPACITOR	50V 102±20% 7R 0603	C439
0310207	SMD CAPACITOR	50V 104 ±20% 7R 0603	C405,C406,C407 ④
0310543	SMD CAPACITOR	50V 104±10% 7R 0603	C405,C406,C407 ④
0700007	SMD DIODE	14148	D401~D407
0780085	SMD TRIODE	8050D	Q405
2100010	LEAD	F 0.6 SHAPED 5mm	JP401,JP402,JP403,JP411,JP404,JP405
2100003	LEAD	F 0.6 SHAPED 7.5mm	JP406
2100004	LEAD	F 0.6 SHAPED 10mm	JP408
2100007	LEAD	F 0.6 SHAPEN 15mm	JP407
2121370	FLAT CABLE	6P170 2.0 2 PIN,WITH L NEEDLE,REVERSE	XS402
2122482	FLAT CABLE	3P350 2.0 2 PIN,WITH L NEEDLE,TOGETHER DIRECTION	XS403

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1564575	PCB	4 1200S-1	
DV828X(RU)SILVER[1389H]			
OK BOARD 5449258			
0000018	CARBON FILM RESISTOR	1/6560O±5%	R603,R604,R623
0000022	CARBON FILM RESISTOR	1/61K±5%	R607,R608,R619
0000040	CARBON FILM RESISTOR	1/610K±5%	R605,R606,R611,R612
0000046	CARBON FILM RESISTOR	1/622K±5%	R602,R601
0000270	CARBON FILM RESISTOR	1/410O±5% SHAPED 10	R634,R635
0000049	CARBON FILM RESISTOR	1/630K±5%	R614,R618
0000043	CARBON FILM RESISTOR	1/615K±5%	R615,R617
0000045	CARBON FILM RESISTOR	1/620K±5%	R647,R609,R610
0000013	CARBON FILM RESISTOR	1/6330O±5%	R646
0000034	CARBON FILM RESISTOR	1/64.7K±5%	R632,R613
0200039	PORCELAIN CAPACITOR	50V 101±5% NPO 5mm	C607,C620,C605,C606
0200123	PORCELAIN CAPACITOR	50V 102±10% 5mm	C613,C609
0200131	PORCELAIN CAPACITOR	50V 103±10% 5mm	C603,C604,C631
0200138	PORCELAIN CAPACITOR	50V 104±20% 5mm	C601,C602,C629,C630,C633,C634,C635,C636
0260021	CD	CD11 16V22U±20%5×11 2	TC605,TC606
0260040	CD	CD11 25V100U±20%6×12 2.5	TC613,TC614,TC607
0260127	CD	CD11 16V4.7U±20%5×11 2	TC601~TC604,TC610,TC611
0880124	IC	NJ4558D DIP	U601,U602
2122502	FLAT CABLE	4P100 2.0 2 PIN,WITH NEEDLE,TOGETHER DIRECTION	XS602
1980018	MICROPHONE SOCKET	C3-6.35-24	MIC601,MIC602
2100003	LEAD	F 0.6 SHAPED 7.5mm	JP601,JP603,JP604,JP608
2100010	LEAD	F 0.6 SHAPED 5mm	JP602,JP605,JP606,JP607
0580006	VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W	ZD601
0160184	ROTATED POTENTIOMETER	WH09JTC1Z11-1030	VR601,VR602
0390057	MAGNETIC BEADS INDUCTOR	RH354708	L601,L602,L603,L604
0780050	TRIODE	S8050D	Q602,Q601
2122483	FLAT CABLE	8P200 2.0 2 PIN,WITH NEEDLE,TOGETHER DIRECTION	XS601
1564526	PCB	6 1200-0	
DV828X(RU)SILVER[1389H]			

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
POWER BOARD 5449256			
00002159	CARBON FILM RESISTOR	1/49.1K±5% BELT	R512
00001959	CARBON FILM RESISTOR	1/41K±5% BELT	R507
00001859	CARBON FILM RESISTOR	1/4330O±5% BELT	R506
00001729	CARBON FILM RESISTOR	1/475O±5% BELT	R505
00700169	HIGH PRESSURE RESISTOR	@1/2680K±5% VDE BELT	R501
0260821	CD	CD288H 16V1500U±20%10×20 5	TC505
02607269	CD	CD288H 10V1000U±20%8×16 C5 BELT	TC506
0260559	CD	CD11T 50V47u±20%6×12 2.5	TC502
0010159	METAL OXIDE FILM RESISTOR	239K±5%SHAPED FLAT 15×7	R503
00100159	METAL FILM RESISTOR	1/410K±1% BELT	R508,R509
05700059	DIODE	14007 BELT	D501~D504
0680046	SCHOTTKY DIODE	SR560 DO-27 SHAPED R 17.5×8	D510
05700149	DIODE	HER107 BELT	D505
05700139	DIODE	HER105 BELT	D506,D508,D511
0260341	CD	ZT 400V22μ±20%f 16×20 7.5	TC501
02607989	CD	C11T 16V470U±20%8×12 C5 BELT	TC509,TC503
0210207	TERYLENE CAPACITOR	@275V 104±20% 15mm VDE	BC501
02002249	PORCELAIN CAPACITOR	1000V 103 +80%-20% 7.5MM BELT	C502
02001389	PORCELAIN CAPACITOR	50V 104±20% 5mm BELT	C505,C510,C515
02003809	PORCELAIN CAPACITOR	100V 152±10%5MM BELT	C512
02001369	PORCELAIN CAPACITOR	50V 473±20% 5mm BELT	C506
0880863	IC	H17431VP TO-92	U503
0881933	IC	VIPER22A DIP8	U501
0460623	SWITCH POWER TRANSFORMER	@BC19-0348 SJ	T501
1000062	POWER GRID FILTER	@JLB1153 33MH +∞-0% SJ	L501
1080032	PHOTOELECTRIC COUPLER	@HS817 VDE	U502
0200359	CERAMIC CAPACITOR	@250V 221±10% 10mm VDE	BC503,BC505
0410011	CHOKE COIL	VERTICAL 10UH 2A 5mm	L507
2100004	LEAD	F 0.6 SHAPED 10mm	JP501
2100003	LEAD	F 0.6 SHAPED 7.5mm	JP502,JP503
1940045	SOCKET	2P 8.0mm 2#	BCN501

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1940022	SOCKET	4P 2.0mm	CN501
2300049	FUSE	@1.6AL 250V 3.6×10 VDE	F501
3870115	GROUND CHIP OF POWER BOARD	903	G501~G504
1564554	PCB	@5 985-4 UL	
DV828X(RU)SILVER[1389H]			
REMOTE CONTROL 5471869			
0310048	SMD CAPACITOR	50V 151±5% NPO 0603	C802,C803
0630009	EMISSION PIPE	TSAL4400	LED801
0700007	SMD DIODE	14148	D801~D803 ⑤
0700001	SMD DIODE	LS4148	D801~D803 ⑤
0700002	SMD DIODE	LL4148	D801~D803 ⑤
0780130	SMD TRIODE	STC3265	Q801
0880220	IC	P2222 SOP	U801 ⑥
0882379	IC	S0102B SOP	U801 ⑥
0970003	CERAMIC RESONATOR	455E	X801
4000038	SEL TAPPING SCREW	PB 2.3×6 COLOR ZINC	FOR CONNECTING UPPER COVER AND LOWER COVER
0090272	SMD RESISTOR	1/16W 10±5% 0603	R801
1564324	PCB	8516SI-3	
3032003	SURFACE CASING O REMOTE CONTROL	RC026-012R BLACK 2#	
3041399	BOTTOM CASING OF REMOTE CONTROL	026 BLACK 2#	
3051319	BATTERY CASE DOOR OF REMOTE CONTROL	026 BLACK 2#	
3051273	GLASS OF REMOTE CONTROLLER	026 MING PURPLE	
3850124	ANODE SPRING	26	
3850125	CATHODE SPRING	26	
3850126	ANODE/CATHODE SPRING	26	
4631052	CONDUCT GLUE O REMOTE CONTROL	RC026-01R 4#	
5070070	PLASTIC BAG	85×250	
DV828X(RU)SILVER[1389H]			
SUBSIDIARY PANEL 5449260			
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R901
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R903

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0620076	RADIATION DIODE	3B3HC COLORLESS WITH BLUE	LED901
3073407	CONDUCT LIGHT O BRACKET	828X(RU)	LED901
0780085	SMD TRIODE	8050D	Q901
1940026	SOCKET	3P 2.0mm	XS901
1564528	PCB	9DV1200-0	
DV828X(RU)SILVER[1389H]			
USB BOARD 5449259			
1860047	USB SOCKET	CAB85-4Pin	JK601
03900579	MAGNETIC BEADS INDUCTOR	RH354708 BELT	L605
02602549	CD	C11C 10V100U±20%6×5 2.5 BELT	TC607
0200139	PORCELAIN CAPACITOR	50V 104 +80%-20% 5mm	C627
0000142	CARBON FILM RESISTOR	1/633K±5% SHAPED 7.5	R627,R628
2100003	LEAD	F 0.6 SHAPED 7.5mm	R624,R625
1940022	SOCKET	4P 2.0mm	XS601
1564527	PCB	A 1200-0	
DV828X(RU)SILVER[1389H]			
PRODUCT CODE 5741193 PROGRAM FLASH ROMDV828XRU-0A(16M) 911849			
0882630	IC	8D1716UBC-PI07 TSOP	U207