

DV718SI

service manual

Catalog

Chapter One About Maintenance	1
1.1 Safety precautions	1
1.1.1 Power supply	1
1.1.2 Precautions for antistatic	1
1.1.3 Precautions for laser head	1
1.1.4 About placement position	2
1.2 Maintenance method	2
1.2.1 Visualized method	2
1.2.2 Electric resistance method	2
1.2.3 Voltage method	2
1.2.4 Current method	2
1.2.5 Cutting method	2
1.2.6 Element substitution method	3
1.2.7 Comparison method	3
1.3 Required device for maintenance	3
Chapter Two Functions and Operation Instructions	4
2.1 Features	4
2.2 Control Button Locations and Explanations	5
2.2.1 Front Panel Illustration	5
2.2.2 Rear Panel Illustration	5
2.2.3 LED Display Window Illustration	5
2.2.4 Remote Control Illustration	5
2.3 Accessories	6
2.4 FUNCTION SETUP	6
2.4.1 Function Setup	6
2.4.2 Language	7
2.4.3 Image	7
2.4.4 Sound	8
2.4.5 Playback	9

2.4.6 Karaoke	9
2.4.7 Preference	10
2.4.8 Parental control	10
2.4.9 Initial setup	10
2.4.10 Rest to defaults	10
2.4.11 Exit	10
2.5 Specifications	10
 Chapter Three Principle and Servicing	13
Section One Principle of the Player	13
3.1.1 Functions and features	13
3.1.2 Block diagram of the player	13
3.1.3 Introduction to IC of the player	15
Section Two Unit Circuit Principle	16
3.2.1 Introduction to laser head	16
3.2.2 Servo circuit	17
3.2.3 CD/DVD conversion circuit	19
3.2.4 Laser power control circuit	20
3.2.5 Open/close door drive circuit	21
3.2.6 Main axis control circuit	22
3.2.7 Decode circuit	24
3.2.8 Video circuit	25
3.2.9 Reset circuit	26
3.2.10 Audio circuit	26
3.2.11 Mute circuit	27
3.2.12 Power circuit	28
3.1.13 USB jack circuit	29
3.2.14 AV output board circuit	30
3.2.15 Panel control circuit	31
3.2.16 HDMI circuit	32
Section Three Servicing Cases	34
3.3.1 Servicing cases	34
3.3.2 Troubleshooting flow chart	38
Section Four Waveform diagram	45
Section Five Function Introduction to IC	53

3.5.1 function introduction to MT1389HD	53
3.5.2 function introduction to AT24C02	69
3.5.3 function introduction to Cs5340	70
3.5.4 function introduction to 74HCU04	71
3.5.5 function introduction to FLASH	71
3.5.6 function introduction to SDRAM	72
3.5.7 function introduction to 4580	73
3.5.8 function introduction to D5954	74
3.5.9 function introduction to Pt6961	75
3.5.10 function introduction to VIPer22ADIP	77
3.5.11 function introduction to PH817	78
3.5.12 function introduction to LM431A	78
3.5.13 Function introduction to 455 8	79
3.5.14 Function introduction to TDA1308	80
3.5.15 Function introduction to MT1392E	81
 Chapter Four Disassembly and Assembly Process	 85
 Chapter Cinque PCB board & Circuit diagram	 86
Section One PCB board	86
Section Two circuit diagram	97
 Chapter six BOM List	 106

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.

Brand-new AVEffects

#Compatible with DivX, MPEG4 discs to produce wonderful pictures.

#108MHz/12bit video DAC, with more vivid and brilliant pictures.

#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

#Brightness, chroma and contrast adjustment functions to render your eyes more comfortable.

#Digital echo Karaoke to enable your singing easier.

#Composite Video, S-Video and Component Video outputs.

#Built-In Dolby Digital decoder, separate 5.1Ch Outputs.

#Dolby output for 2channel(DOWNMIX)

#DVD-Audio decoding output to reproduce original and realistic sound effects.

High Quality Digital Audio

#Optical and coaxial outputs for Digital audio.

#DTS, Dolby Digital, PCM Digital audio outputs to satisfy the fans's acoustic requirements.

Many Convenient Features

#Screen saver protects your TV set carefully.

#The novel Mp3 playback window GUI provides you a new way to appreciate Mp3 music.

#Multi-angle playback function makes it possible for you to view a scene from different camera angles.

#It's possible to select the desired beginning, development and ending of a story.

#Direct entry into desired scenes(title/chapter/track search).

#Zooming function to zoom up any playing picture.

#Capable of playing PAL/NTSC discs.

#Multiple aspect ratios to fit TV sets of various screen ratios.

#Parental lock function to prevent children from watching unsuitable discs.

#Multiple dubbing languages and subtitle languages bring you the best entertainment status all the time.

Super Compatibility with super VCD, VCD, CD, CD-R, MP3, HDCD, KODAK PICTURE CD etc.

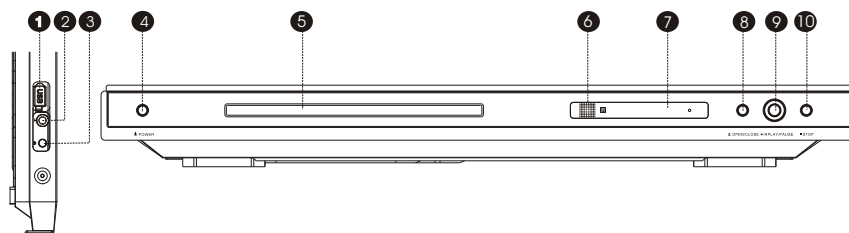
NOTE: DivX version is still upgrading continuously and the latest version of this unit is DivX 5.1.

Some discs labelled with MPEG4 on the market actually are others, with which are incompatible.

Please take care when buying discs.

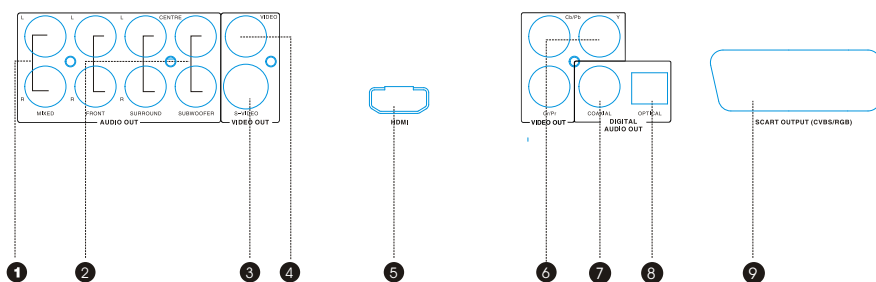
2.2 Control Button Locations and Explanations

2.2.1 Front Panel Illustration



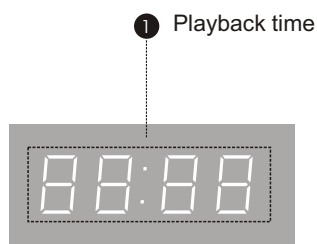
- | | |
|---------------------|---------------------|
| ① Slot flap for USB | ⑥ IR SENSOR |
| ② MIC jack | ⑦ Display window |
| ③ Headphone jack | ⑧ OPEN/CLOSE button |
| ④ POWER switch | ⑨ PLAY/PAUSE button |
| ⑤ Disc tray | ⑩ STOP button |

2.2.2 Rear Panel Illustration



- | | |
|-----------------------|--------------------------------------|
| ① Mixed Audio outjack | ⑥ Video Component /Y Pb Pr out jacks |
| ② 5.1CH Audio Outjack | ⑦ Digital Audio Coaxial Out jack |
| ③ S-Video | ⑧ Digital Audio Optical Out jack |
| ④ Video Out jack | ⑨ SCART out jack |
| ⑤ HDMI Out jack | |

2.2.3 LED Display Window Illustration



2.2.4 Remote Control Illustration

- | | |
|--|--|
| ① [▲]Button
Open or close the disc tray. | ④ DISP Button
Display or hide disc information. |
| ② LANG Button
Change the audio language or audio channel. | ⑤ NUMBER Buttons |
| ③ MEMORY Button
Save the playing point or jump to the saved point . | ⑥ BROWSE Buttons
switch new user interface. |
| | ⑦ CURSOR Buttons |



②⑤ [□] Button

Stop playback.

②⑥ [▶▶] Button

Skip forward.

②⑦ USB DVD Button

②⑧ VOL +/- Button

Increase/decrease volume level.

②⑨ MUTE Button

Press once to mute, twice to unmute.

⑧ ETUP Button

Function Setup.

⑨ [👁] Button

Open/close the virtual keyboard function.

⑩ KARAOKE Button

Karaoke operation menu.

⑪ [◀◀] Button

Fast backward play.

⑫ [⏮] Button

Skip backward.

⑬ PEPEAT Button

Repeat play.

⑭ A-B Button

Repeat the select.

⑮ [⏸] Button

Press once to stand by, Press twice to play.

⑯ SUBT Button

Change subtitle language.

⑰ HDMI Button

Switch output mode of HDMI.

⑱ Q-PLAY Button

Skip the advertisement/warning and play the DVD directly.

⑲ MENU Button

Display DVD menu or open/close PBC.

⑳ OK Button

㉑ Cancel Button

㉒ ZOOM Button

Zoom in/out the displayed frame.

㉓ [▶] Button

Play or pause playback.

㉔ [◀◀] Button

Fast backward play.

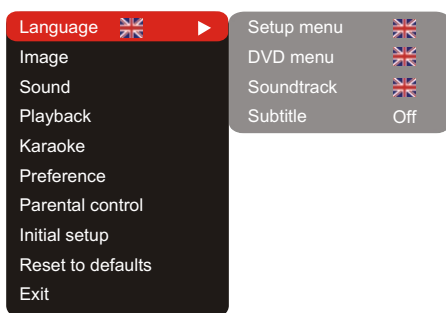
2.3 Accessories

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

2.4 FUNCTION SETUP

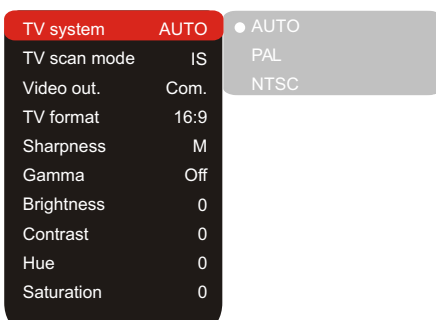
2.4.1 Function Setup

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

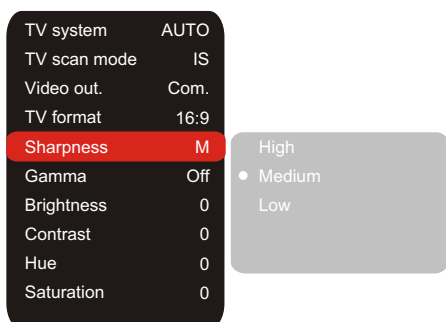


2. Press the [CURSOR] button to select the menu to be entered and press the [OK] or button to confirm. Or press the [CURSOR] button to Exit item and then press the [OK] button to exit.
3. Press [UP/DOWN] arrow to select the desired item you want to set and press [OK].

For example, press [UP/DOWN] arrows to select IMAGE and press [OK]. The Image setting page appears on the screen.

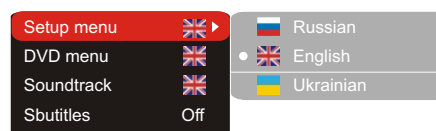


4. Press [UP/DOWN] arrow to select the SHARPNESS item. Press [OK] to confirm it. And then press [UP/DOWN] arrow to select the desired value. For example: Press [UP/DOWN] arrow to select "Medium", then press [OK], the TV screen display.



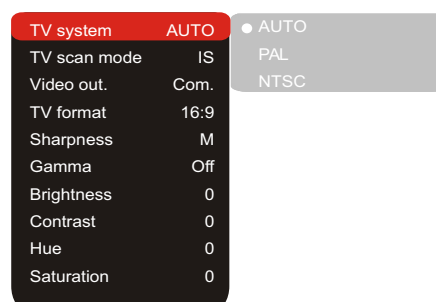
5. Press [LEFT] button if you want to return to the previous setup page.
6. Press [SETUP] to exit the setup menu.

2.4.2 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. Soundtrack: 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.

2.4.3 Image

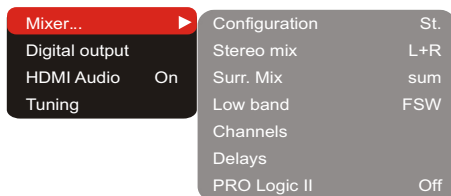


1. TV system: This item is used to the video output system of this unit.
#Optional setting: Auto, PAL, NTSC.
#Default: AUTO.
2. TV scan mode: To set Progressive scan, Interlaced scan mode.
#Optional settings: Progressive, Interlaced.
#Default: Interlaced.
3. Video output: To set the types of SCART out connector.
#Optional setting: Component, SCART.
#Default: Component.
#When using RGB outputs from the SCART interface, please select RGB. Otherwise, please select Component.

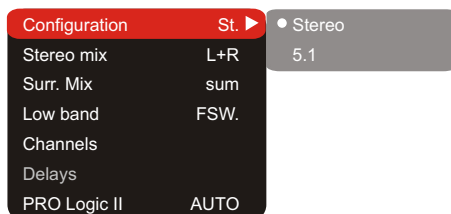
4. TV format: To set the aspect ratio of this player's output image.
 #Optional setting: 4:3 Pan-scan, 16:9 letterb., 16:9 TV, Wide/SQZ.
 #Default: 16:9 TV.
5. Sharpness: Used to set the sharpness of video outputs.
 #Optional setting: High, Medium, Low.
 #Default: Medium.
6. Gamma emendation: This item 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 adjustment.
- B. Press [UP/DOWN] arrow to adjust the setting value.

2.4.4 Sound

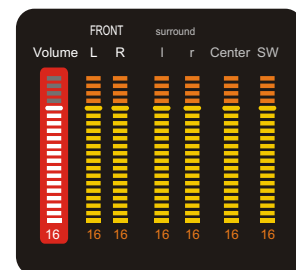


1. Mixer...

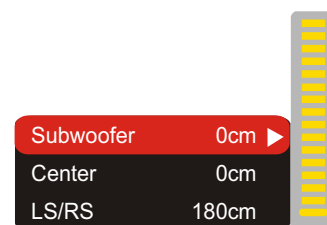


- A. Configuration: To set this player's DOWNMIX mode to change multi-channel audio into two channel audio.
 #Optional setting: Stereo, 5.1.
 #Default: Stereo.
- B. Stereo mix: To set the output means of the left or right audio when playing a Dolby disc with separate two-channel audio.

- #Optional setting: L+R, L, R.
 #Default: L+R.
- C. Surr. Mix: To set output means of the surround left and 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 the desired item. 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:3Optional setting: RAW format, SPDIF/PCM.

#Default: RAW format.

B. LPCM

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

#Default: 48 kHz 16bit.

NOTE

If HDMI Audio is set in ON, this item is not adjustable.

3. HDMI Audio: This item is to set whether the HDMI Audio output is allowed.

#Optional settings: SPDIF、 Multi Channel、 off.

#Default: Multi.

4. 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

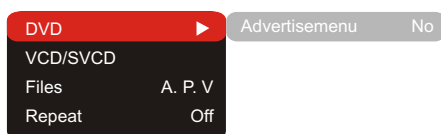
#Method to adjust tone control:

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.

2.4.5 Playback



1. DVD:set whether information of advertisement and warnings at the beginning of DVD disc is

skipped to play the movie directly.

Advertisemenu

#Optional setting: Yes, NO

#Default: Number

2.VCD/SVCD: To set the PBC 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 file type.

#Optional setting: Audio, Picture, Video.

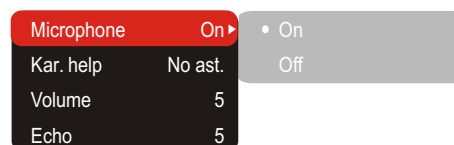
#Default: Audio, Picture, Video.

4. Repeat : select the repeat playback mode.

#Optional setting: Off, Single, all.

#Default: Off.

2.4.6 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.

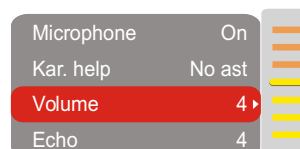
#Default: Channels No ast.

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.

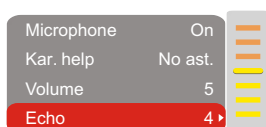


4.Echo:

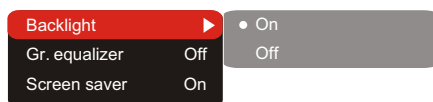
A.In microphone setup page, press [UP/DOWN] cursor to select "Echo" item, and then press [OK] button to enter the adjustment menu.

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

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



2.4.7 Preference



1.Backlight:This item is used set color of led on the front panel.

#Optional setting: On, Off.

#Default: On.

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

#Optional setting: On, Off.

#Default: Off.

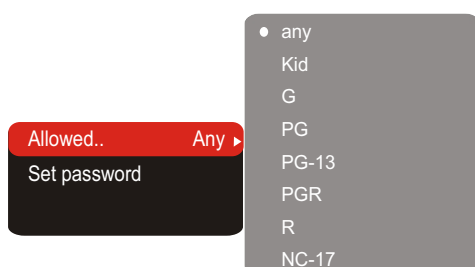
#Dynamic Spectrum display is invalid in Data disc、 DVD AUDIO playback.

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

#Optional setting: On, Off.

#Default: On.

2.4.8 Parental control



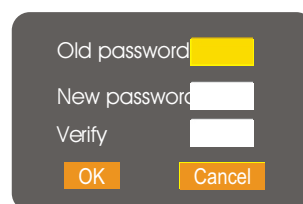
1.Allowed..: To set the parental control ratings to prevent children from watching the restricted contents.(In case the disc supports this function.)

#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.



2.4.9 Initial setup

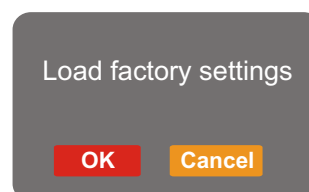


Press [UP/DOWN] arrow to select the desired option and Press [OK] button to confirm it.

NOTE

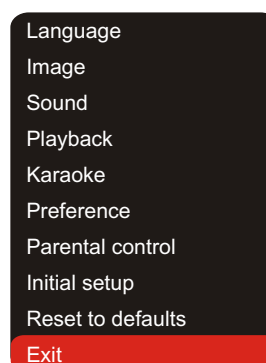
In this setup state, you may not press [LEFT] button to return to the previous menu.

2.4.10 Rest to defaults



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

2.4.11 Exit



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

2.5 Specifications

Playable discs	DVD-Video, Super VCD, VCD, DivX 3.11, DivX 4, DivX 5, Divx Pro, XviD, CD-DA, CD+G, DVD-Audio, HDCD, MP3, WMA, Kodak Picture CD, JPEG		
Inputs	MIC input		
Outputs	Audio outputs	Analog audio output: Digital audio output:	Stereo, output 5.1CH Coaxial, Opical

Playable discs	DVD-Video, Super VCD, VCD, DivX 3.11, DivX 4,DivX 5, Divx Pro, XviD, CD-DA, CD+G, DVD-Audio,HDCD, MP3, WMA, Kodak Picture CD, JPEG		
Inputs	MIC input		
Outputs	Audio outputs	Analog audio output: Digital audio output:	Stereo, output 5.1CH Coaxial,Opcical
Outputs	Video outputs	Composite, S-Video, component Y Cb Cr, progressive scan output Y Pb Pr, RGB/SCART	
	Headphones output		
Video Characteristics	Video amplitude S-Video amplitude Component Video amplitude	1.0Vp-p(75 Ω) Y:1.0Vp-p(75 Ω) C:0.286Vp-p(75 Ω) Y:1.0Vp-p(75 Ω) Cb/Cr:0.7Vp-p(75 Ω)	
Audio characteristions	Frequency response SIGNAL-to-noise ratio THD	20~20KHz(±1 dB) >100(dB) <0.01%	
Operating voltage	~110V-250V, 50/60 Hz		
Power consumption	14W		
General Specifications	Dimensions: Mass:	380mm × 250mm × 41.5mm 1.86kg	
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.

Playable discs	DVD-Video, Super VCD, VCD, DivX 3.11, DivX4, DivX5, Divx Pro, XviD, CD-DA, CD+G, HDCD, MP3, WMA, Kodak Picture, 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 Cb Cr, progressive scan output Y Pb Pr, RGB/SCART	
	Headphones output		
Video Characteristics	Video amplitude	1.0Vp-p(75 Ω)	
	S-Video amplitude	Y:1.0Vp-p(75 Ω), C:0.286Vp-p(75 Ω)	
	Component Video amplitude	Y:1.0Vp-p(75 Ω), Cb/Cr:0.7Vp-p(75 Ω)	
Audio characteristions	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 Specifications	Dimensions: 380mm × 258mm × 41.5mm Mass: 2kg
Operating Temperature	5~35℃
Operating Humidity	15~75%(no condensation)

#Design and specifications are subject to change without notice.

#We so 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 Functions and features

This player adopts new generation DVD decode chip, with built-in Dolby decoder, which creates vivid surround sound effect to bring you to taste cinema effect. It has the following features:

- ◆ Progressive scanning output produces steadier and clearer pictures with flickering.
- ◆ HDMI jack.
- ◆ 5.1CH output.
- ◆ Composite video, S-video and component video output.
- ◆ Digital picture adjustment to the sharpness, brightness, contrast, chroma and saturation of picture, gamma correction.
- ◆ Built-in Dolby digital decoder.
- ◆ Karaoke function.
- ◆ Headphone output function.
- ◆ USB jack.
- ◆ Compatible with DIVX, MPEG4 format movie.

3.1.2 Block diagram of the player

Its internal structure is mainly composed of decode & servo board, HDMI high definition board, input/output board, power board and loader components. Block diagram of the player is shown in the figure 3.1.2.1, except for power board, other signal flow are all shown in the figure. Main function of loader is to read disc information and transmit to Mt1389, Mt1389 fulfills servo function through D5954 on decode board and other subsidiary circuit to ensure the normal working of loader. FLASH on decode board is to save system program, SDRAM is to save program when machine is working and read sound and picture information from disc to ensure smooth output. Main function of AV board is to output various video signals.

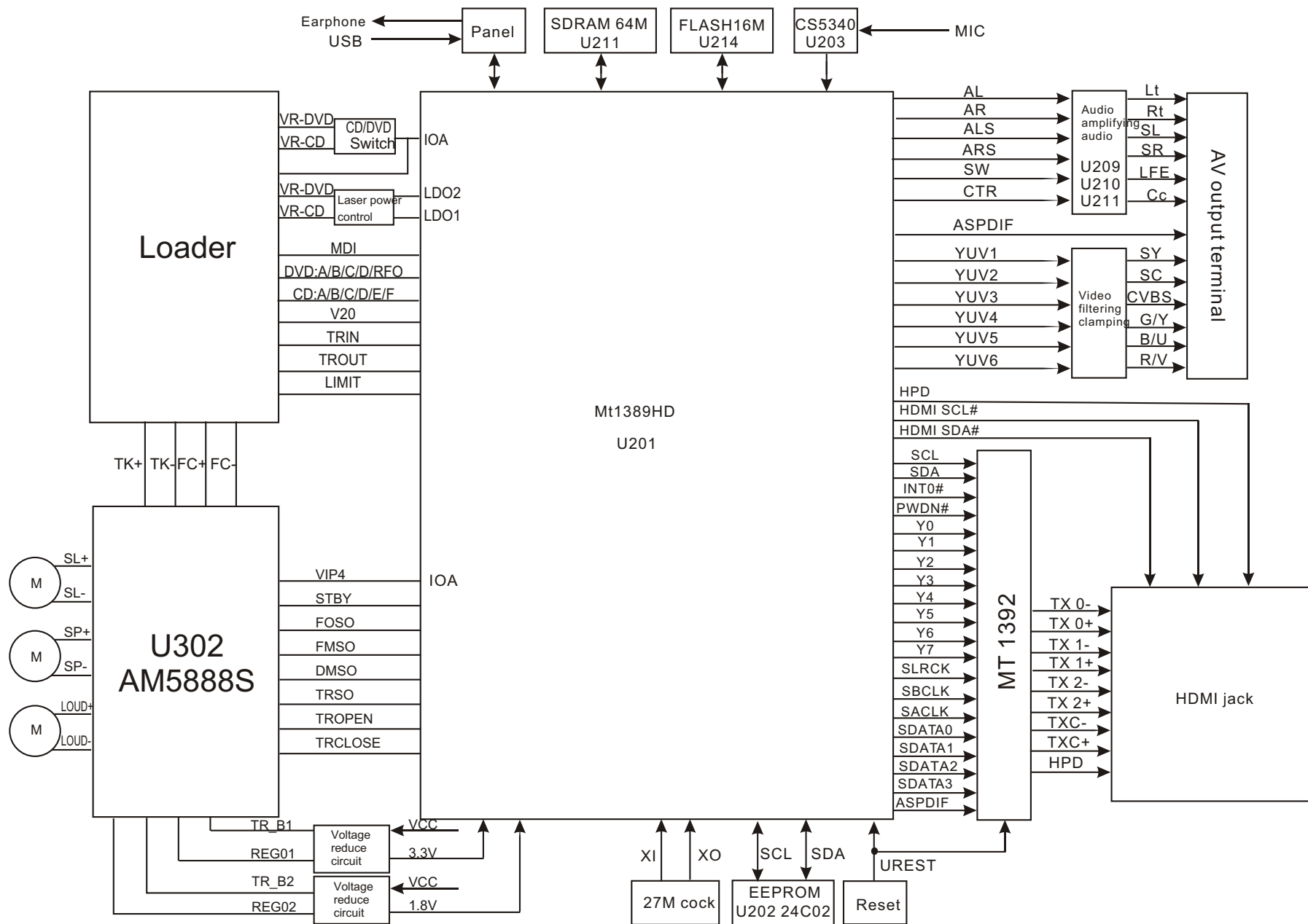


Figure 3.1.2.1 Block diagram of the player

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 name	IC model	Location	Function
Decode board	MT1389HD	U201	Decode chip
	24C02	U202	EEPROM
	CS5340	U203	
	HCU04	U205	Phase inverter
	FLASH	U207	16M FLASH
	SDRAM	U208	64M SDRAM
	4580	U209, U210, U211	Operational amplifier (audio amplifying)
	D5954	U302	Servo drive
Main panel	PT6961	U401	Panel control IC
	HS0038B3V	U402	Remote control receiver
Power board	VIPER22	U501	Power switch IC
	PHB17	U502	Photoelectric coupler
	LM431A	U503	Precision voltage stabilizer
MIC board	4558	U601	Operational amplifier (audio amplifying)
	TDA1308	U603	Operational amplifier (headphone audio amplifying)
High definition board	MT1392E	U701	HDMI control
	TVS_RCLAMP0514M	U703, U704	

Section Two Unit Circuit Principle

3.2.1 Introduction to laser head

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

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

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

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

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

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

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

2. Working principle

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

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

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

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

3.2.2 Servo circuit

1. Servo system of this player adopts SANYO 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 Am58888, in which Mt1389 is also the main part of decode circuit. Servo circuit block diagram is shown in the figure 3.2.2.1:

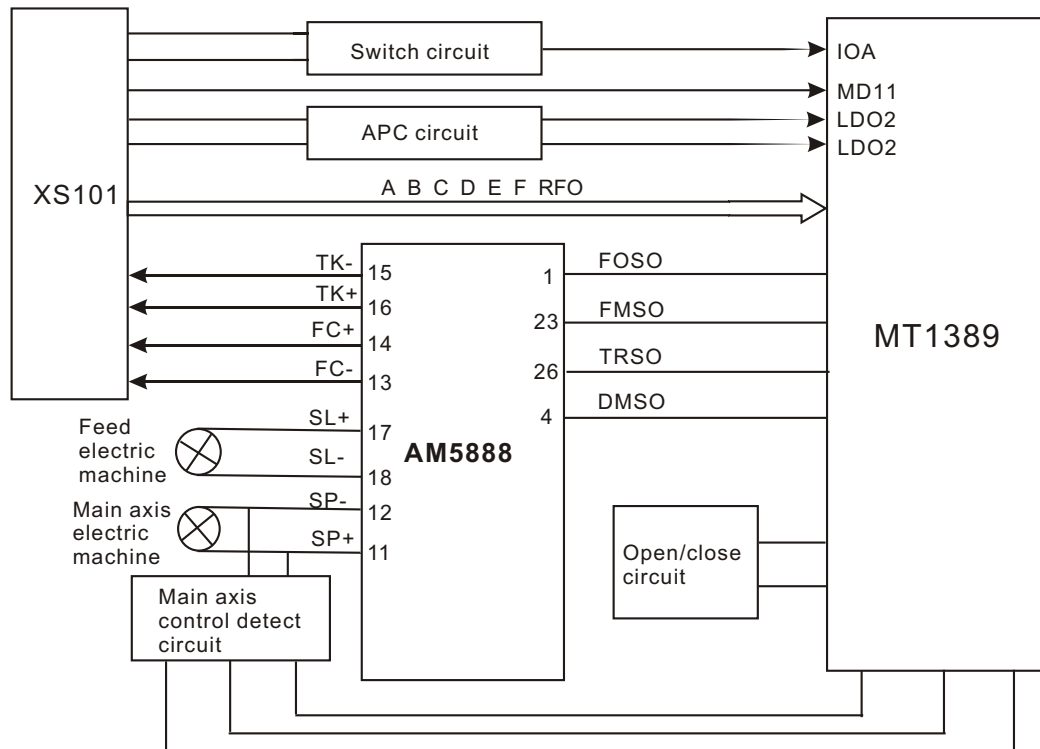


Figure 3.2.2.1 Servo circuit block diagram

2. Working principle: after power on or close to proper position, 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 servoControl 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 bringAlong 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 pwer 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 CD/DVD conversion circuit

1. CD/DVD conversion circuit is shown as in the following figure 3.2.3.1:

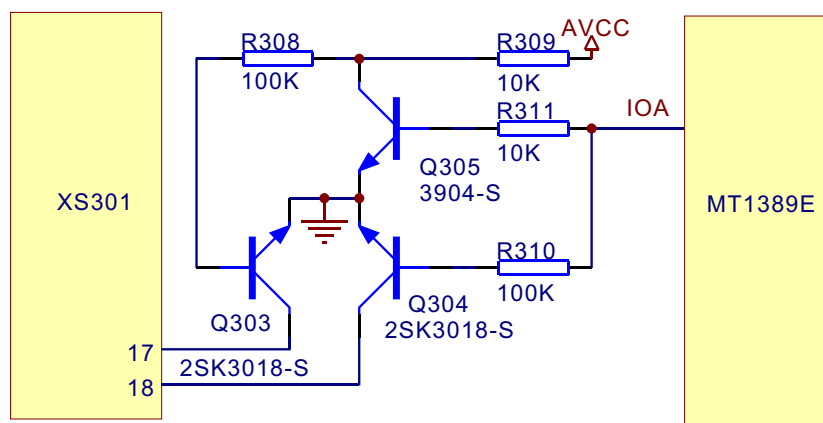


Figure 3.2.3.1 CD/DVD conversion circuit diagram

2. Working principle

After loading disc in the player, IOA port of MT1389 is defaulted high level to make Q305 saturation on and form loop together with CD laser power control circuit on CD. At the same time, IOA also goes to loader PD IC to switch, disc begins to rotate, when servo management system recognizes that the disc in player is not CD disc, IQA pin outputs low level to make Q305 cut off and make Q303 on, and form loop together with DVD laser power control circuit on loader to perform disc reading acts. After disc tray door opens, IOA keeps the state before opening disc tray door. If the player cannot recognize which disc it is, IQA pin will switch continuously until reading disc or system judges that there is no disc.

Note: Q303 and Q304 are MOS tube

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

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

3.2.4 Laser power control circuit

1. Laser power control circuit is shown as in the following figure 3.2.4.1:

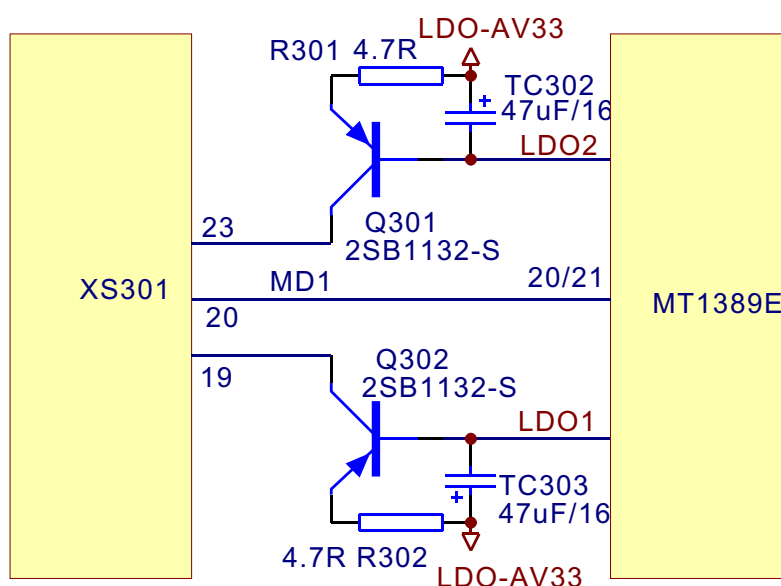


Figure 3.2.4.1 Laser power control circuit diagram

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

When reading VCD disc, laser power becomes weak, voltage of MDII pin decreases, voltage decrease of pin 23 of MT1389 makes voltage of pin 19 of XS301 increase to reach the purpose of raising laser power. When laser power is too strong, voltage of MDII pin increases to lead to voltage of pin 23 of MT1389 increase to make voltage of pin 19 of 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 input pin, and the working principle is the same with that when playing VCD disc.

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

Location number	Read DVD disc	Read VCD disc	Location number	Read DVD disc	Read VCD disc
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			

3.2.5 Open/close door drive circuit

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

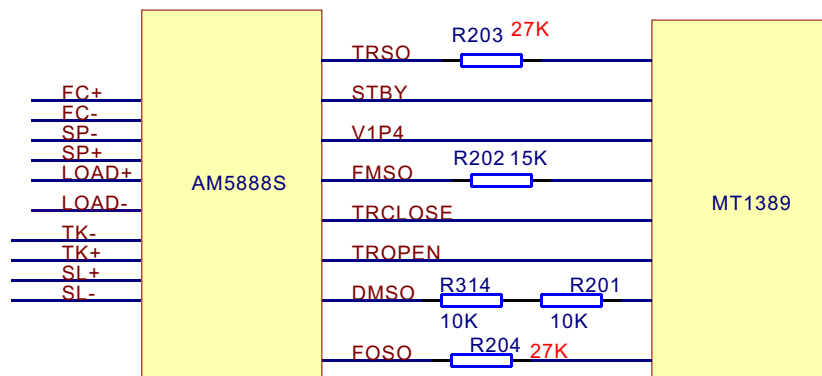


Figure 3.2.5.1 Open/close drive circuit diagram

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

3. Key point voltage (unit: V) is shown as 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 trayto 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 dis c 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 trayto 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 dis c 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 trayto proper position	0	0	0	0	0	
Open disc tray	0→0.63→0	0	0	0→3.12→0	0	
Close dis c 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 as in the following figure 3.2.6.1:

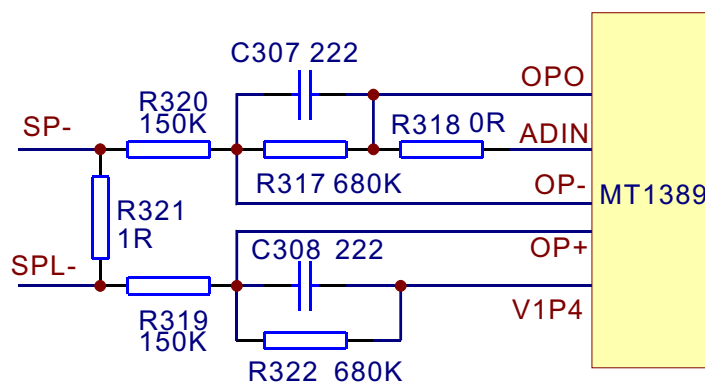


Figure 3.2.6.1 Main axis control circuit diagram

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

3. Working principle: MT1389 has a comparator inside composed of operational amplifier, in which OP+ is the in-phase input end of operational amplifier, OP- is reverse input end, OPO is output end, when playing disc normally, for electric machine is positive direction rotating, voltage of OP+ is higher than that of OP-, voltage of OPO is more than 1.4V. When disc out is needed, main axis drive signal stops, for electric machine is permanent magnetic, when in rotating, induced electromotive force produces in two ends to give to decode chip through R320, R319 sampling to make OPO output less than 1.4V voltage and transmit to input pin of MT1389 ADIN through R318. When ADIN is high level, main axis drive output end has not any drive signal output, when ADIN is low level, MT1389 outputs a reversing drive signal to main axis drive circuit to make main axis electric machine speed down. Thus circular working goes on until main axis stops rotating. PDVD is manual disc out means, so after disc out, disc is still rotating, but will stop very soon.

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

Key point	Position	Normal working voltage (V)	Voltage change when disc out (V)
SP+	Pin 11 of D5954, pin 5 of XS307	3.79	3.79→0.70→1.80
SP-	Pin 2 of D5954, pin 6 of XS307	1.38	1.38→3.40→1.80
OP+	Pin 36 of MT1389	1.38	1.38→3.10→1.80
OP-	Pin 35 of MT1389	1.53	1.53→3.08→1.98
OPO	Pin 34 of MT1389	2.44	2.44→0.40→2.50
ADIN	Pin 47 of MT1389	2.44	2.41→0.41→2.44
DMSO	Pin 5 of D5954	1.42	1.42
VIP4	Pin 30 of MT1389	1.41	1.41

3.2.7 Decode circuit

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

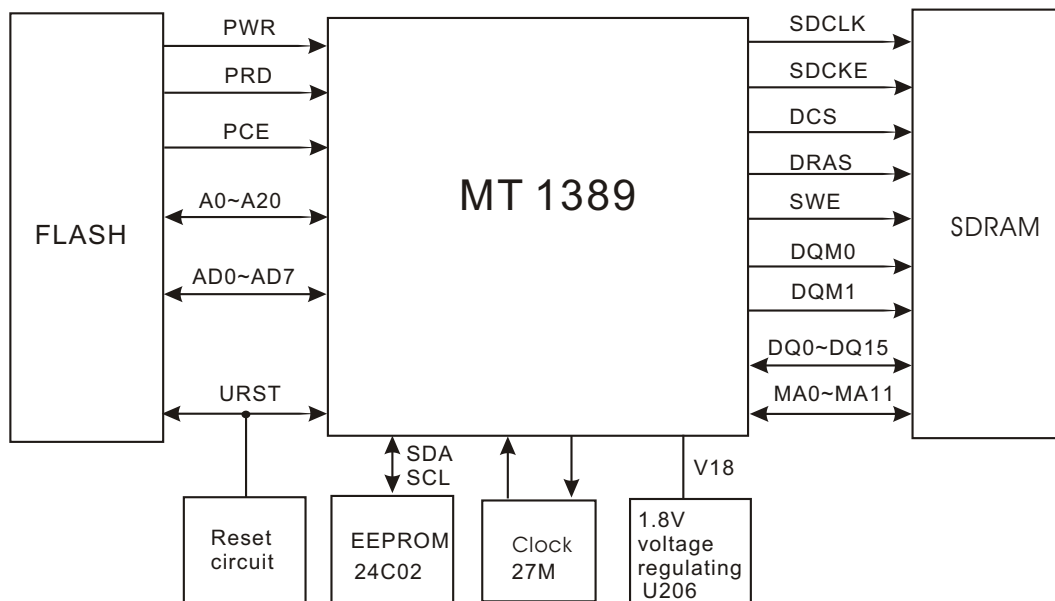


Figure 3.2.7.1 Decode circuit block diagram

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

Working condition of decode circuit has:

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

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

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

After power on, reset circuit performs reset to MT1389 built-in CPU (8032) and FLASH, decode chip outputs reset signal at the same time and performs reset to other circuit. After system reset, it firstly sends out read signal to FLASH to read out information saved in FLASH, the machine displays power-on picture, servo system begins to work to check whether machine closes door to proper position and whether detect switch has been closed, if not, the door close action is performed. After detect switch of door is closed, the machine begins to perform preparations of disc reading and performs panel display at the same time of working.

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

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

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

3.2.8 Video circuit

1. Video signal flow chart diagram is shown as in the following figure 3.2.8.1:

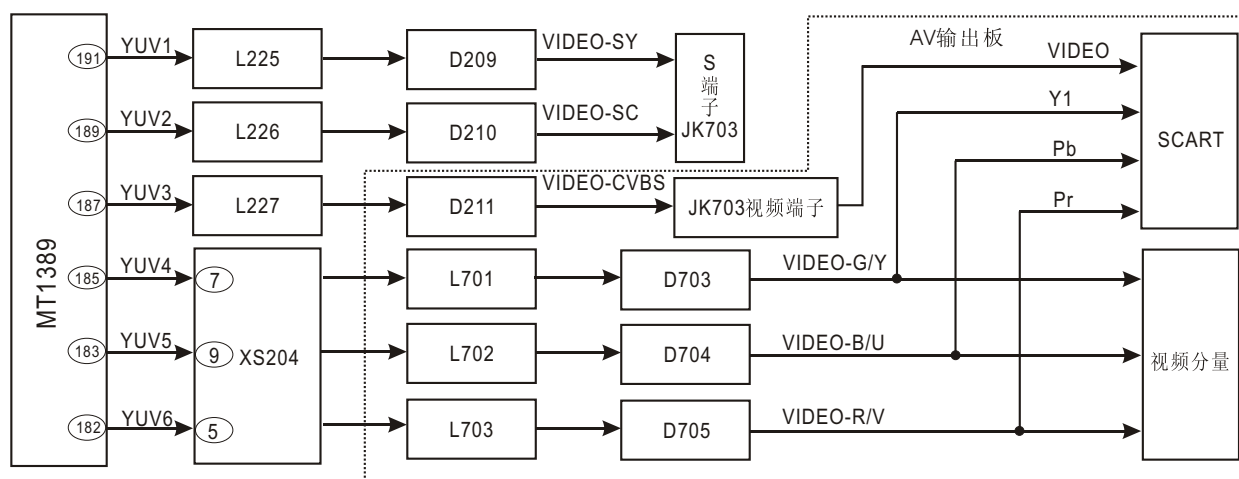


Figure 3.2.8.1 Video signal flow chart

2. Working principle: MT1389E 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 the switch through software. CVBS is a separate output mode, 4-path video signal outputted by MT1389, through video filtering clamping, output to AV board.

Shown as in the figure 3.2.8.2, capacitor C287, C288 and inductor L227 compose a low-pass filter to filter high frequency disturbance signal except useful signal; dual diode D211 composes a limiter circuit, known from features of diode that the max amplitude of composite video signal CVBS cannot be over 5.7, and the mix cannot be less than -0.7, thus the high voltage signal from TV set can be avoided burning down the player.

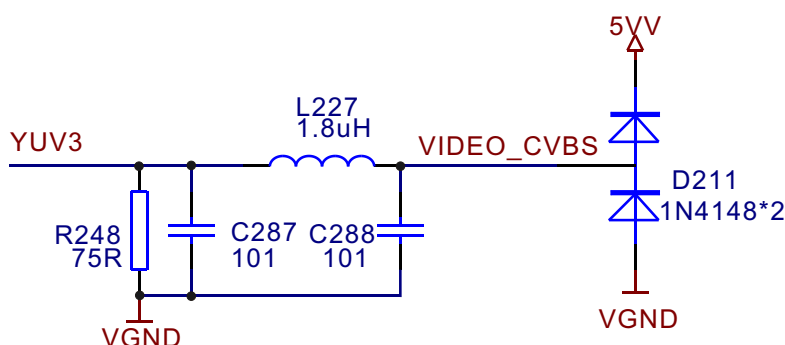


Figure 3.2.8.2 Video output circuit

3.2.9 Reset circuit

1. Reset circuit is shown in the figure 3.2.9.1:

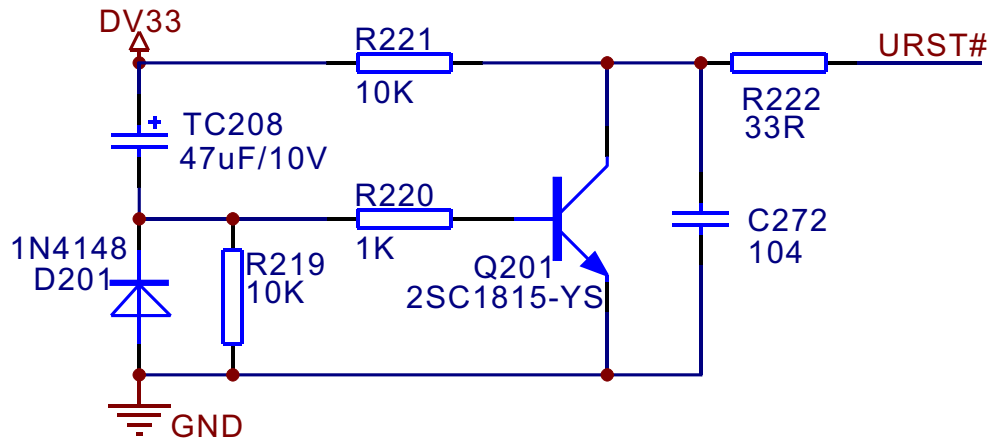


Figure 3.2.9.1 Reset circuit diagram

2. Working principle: after power on, voltage of DV33 increases to 3.3V, main chip power supply is normal, because voltage of DV33 cannot change suddenly, Q201 base electrode has current in, Q201 is saturated on, URST is low level; DV33 charges TC208 through R219 and Q201 emitter electrode to make TC208 cathode voltage decrease slowly. When this voltage reduces 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, DV33 voltage reduces, TC208 and DV33 voltage reduce together, D201 performs surge discharge and clamping to Tc208.

3.2.10 Audio circuit

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

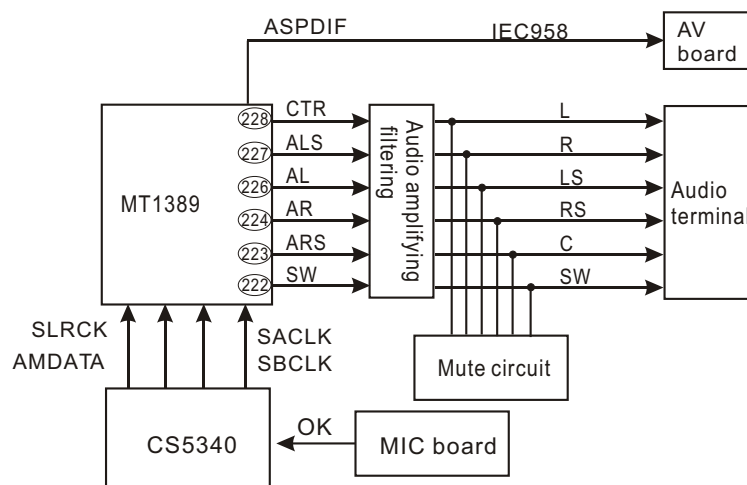


Figure 3.2.10.1 Audio circuit block diagram

2. Working principle: MT1389 has built-in DAC conversion circuit, which stimulates audio signals to output from decode chip directly, through audio amplifying and filtering circuit, directly output audio signals to audio terminal. Another path of L/R signal outputs to headphone circuit of MIC board for processing and then output from headphone.

3. External Karaoke input and output

Trough CS5340 A/D conversion circuit, MIC signals switches to digital audio signals to input to decode chip for echo and volume processing and then output together with audio signals L/R to fulfill the purpose of Karaoke.

3.2.11 Mute circuit

1. Mute circuit is shown in the figure 3.2.11.1:

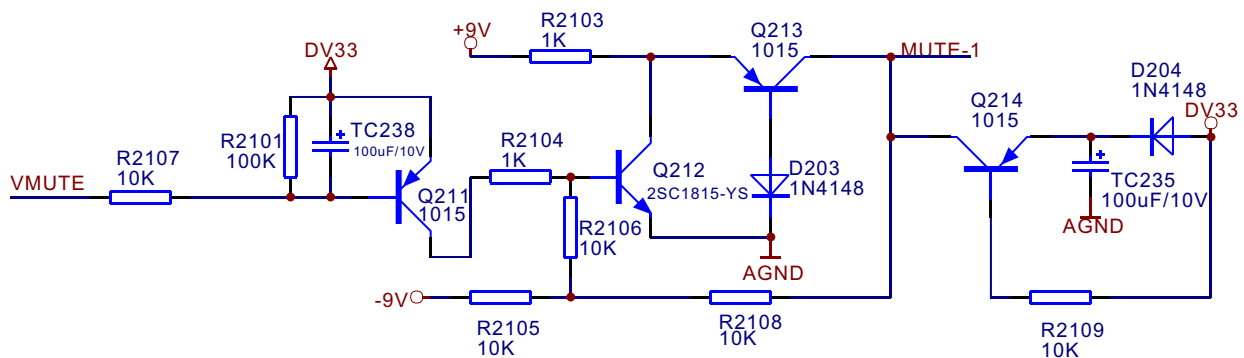


Figure 3.2.11.1 Mute circuit

2. Working principle of quieting circuit:

When the player is playing normally, shown in the figure 2.11.1, chip outputs analog audio signals and 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 tube of audio output end to make mute tube cutoff, audio signals output through being amplified by 4580. When in mute, MT1389E has no audio signals to output to operational amplifier, so audio output end of the player has no audio output, because electrical elements and IC in circuit will produce some noise to send to audio output end of the player, in order to filter these noise, decode chip outputs a high level to VMUTE to make Q211 cutoff, so Q212 cuts off, +5V power transmits to base electrode of switch pipe Q205 - Q210 through E, C electrode of Q213 and circuit is in mute.

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

3. Working principle of power-off quieting:

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 Q214 emitter electrode is lower than that of base electrode, Q214 cuts off. When power off, +5V disappears, base electrode of Q214 changes to low level, And the emitter electrode changes to high level due to discharge of TC235, now Q214 is on, Q214 collector electrode (AMUTE) outputs high level to add to base electrode of switch pipe Q205 - Q210, switch pipe is saturated, noises that produce in the course of power off is bypassed to ground, that is power off quieting function is realised.

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

Key point	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 as in the following figure 3.2.12.1:

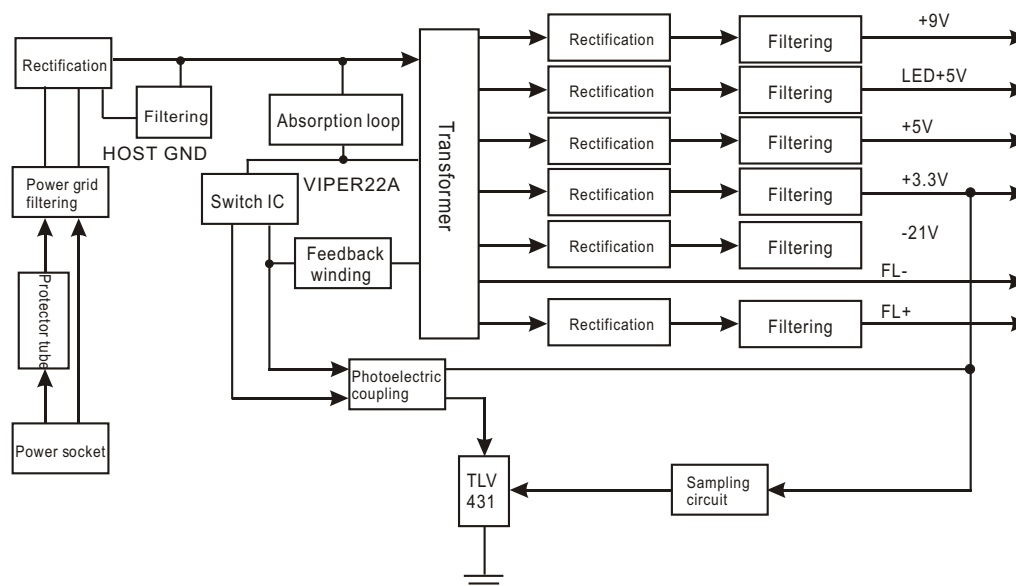


Figure 3.2.12.1 Power circuit block diagram

2. Working principle

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

(2) Bridge rectification and filtering circuit: the function of this circuit is to converse electric supply into DC power, the voltage after being rectified and filtered is 1.414 times of input power, so the DC voltage at the two ends of TC501 is about equal to 300V。

(3) Absorption loop: for power is always working in on/off state and will produce very high peak voltage, in order to well protect switch IC, a peak absorption loop is added.

(4) Filtering circuit: the function is to produce a stable and slamm-wave DC voltage. In filtering circuit, “II” type filter is mostly adopted. The feature of capacitor filtering is high load resistance, when current is small, filtering is obvious, but inductor filtering is small load resistance, when current is large, filtering is obvious. To compose capacitor into “II” type filter can make better filtering effect.

(5) Feedback loop: the time length of “on” and “off” within the same cycle inside switch module VEPR22 is decided by feedback loop. Feedback loop performs sampling to +3.3V output stage voltage, when output stage voltage is too high, the sampled voltage is on high side, through feedback loop, to change the duty ratio of pin 3 signal of VEPR22 and reduce on time, and output voltage begins to reduce. When output voltage is too low, the sampled voltage is on low side, through feedback loop, to make duty radio of VEPR22 increase, output voltage increases, through the function of feedback loop, power board is made to output stable voltage. The used LM431 in this power is a 2.5V comparator, sampling voltage is compare with this 2.5V voltage, when sampling voltage is more than 2.5V (means that output voltage is on high side), LM431 is on, light emitting diode in photoelectric diode begins to emit light to make the other end of photoelectric coupler begin to be on, light emitting diode is stronger, the on degree bigger, the on time of switch module VEPR22 decreases, output voltage begins to decrease. When sampling voltage is less than 2.5V (means output stage voltage is on low side), Lm431 is cut off, on time of VEPR22 increases, output voltage increases. Thus through auto control function of feedback loop, power board is made to output stable voltage.

3.2.13 USB jack circuit

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

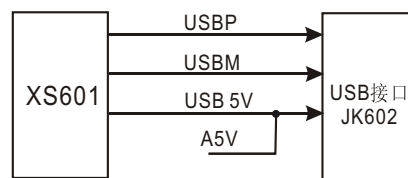


Figure 3.2.13.1 USBjack circuit block diagram

2. Working principle: USB jack is composed of two data lines of USBP and USBM, one power supply line USB5V and grounding line (outside casing). Pin 48,49 of MT1389 is USB data jack, which outputs to USB jack through XS601 and can read data inside USB device.

3.1.14 AV output board circuit

1. AV output board is mainly composed of audio/video output terminal, SCART output terminal, mode switch circuit and filtering circuit. AV output board outputs different signals to connect with the corresponding external equipment. AV output board circuit block diagram is shown as in the following figure 3.1.14.1:

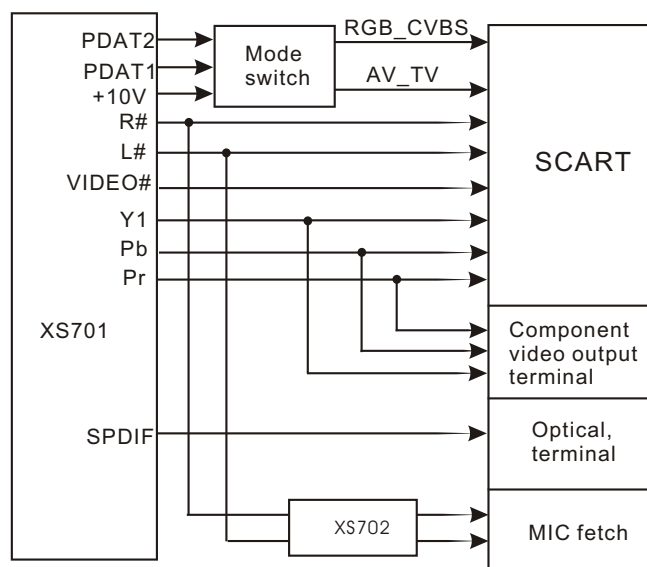


Figure 3.1.14.1 AV output board circuit block diagram

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:

P _{in}	Name	Signal direction	Function description	P _{in}	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	Pn 8 of SCART terminal	Function
0	×	0	10V	AV4:3
0	×	1	7.5V	AV16:9
1	×	0	0.90V	TV
1	×	1	0.85V	TV
×	0	×	×	CVBS MODE
×	1	×	×	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.

3.2.15 Panel control circuit

1. Panel control circuit block diagram is shown in the figure 3.2.15.1:

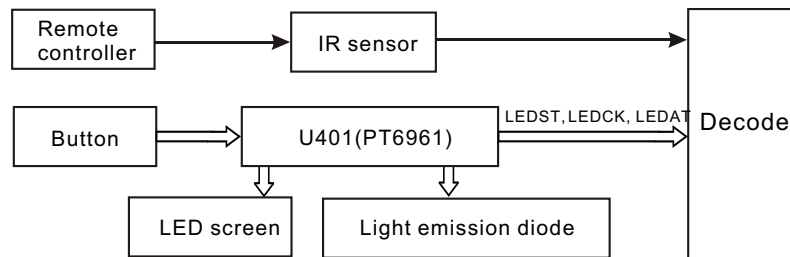


Figure 3.2.15.1 Panel control circuit block diagram

2. Working principle

Panel control components are divided into main panel and subsidiary board parts. Main panel is mainly composed of LED screen, drive chip PT6961, remote control IR sensor, buttons and indicator light; and subsidiary board is mainly composed of power button and power indicator light.

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

Pin 2 of remote control IR sensor HS0038B3V is 5V power supply pin, pin is grounded, pin 3 is output pin. After receiver processes button information of remote control, it outputs from pin 3 to send to decode board directly.

3.2.16 HDMI circuit

1. HDMI circuit block diagram is shown in the figure 3.2.16.1, “Source” refers to device with HDMI output jack and “Sink” refers to device with HDMI input.

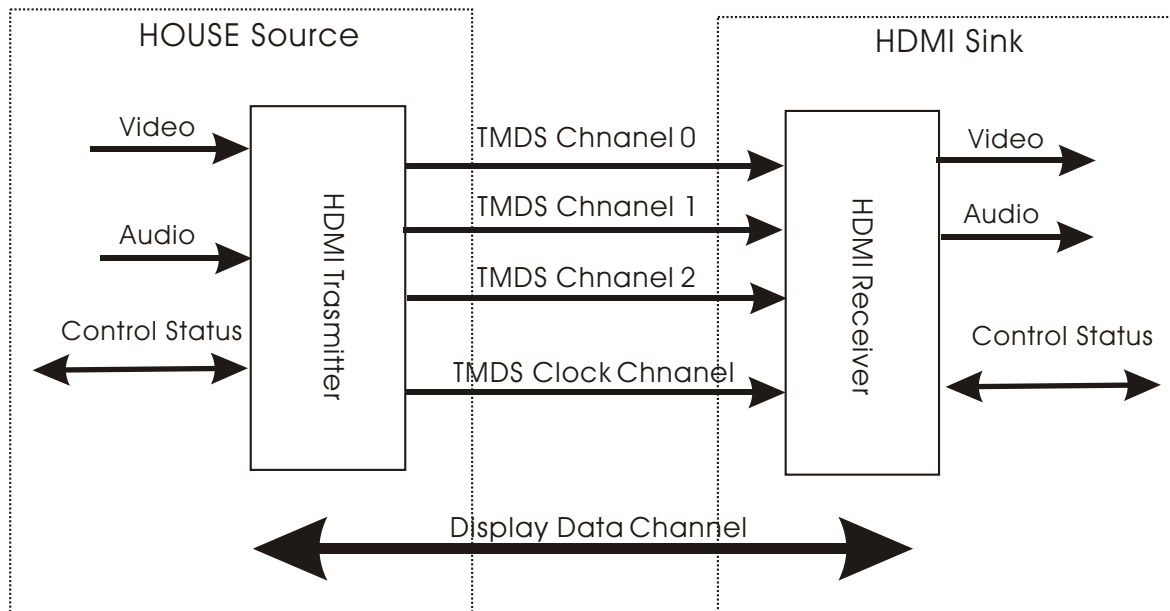


Figure 3.2.16.1 HDMI circuit block diagram

2. Working principle: besides from normal AV output, this player also has HDMI output. Normal AV output is the same with that of other normal DVD players: process the analog audio and video signals decode by, and then send to analog output terminal; digital audio output signal ASPDIF is directly send to digital output terminal. Analog video signal and digital video signal sent by 1389 are sent to MT1392E (U701) for processing, and digital audio signal is sent to MT1392E; MT1392E is a format conversion processor, which switches normal audio and video signals into HDMI standard format, HDMI switches 8-bit data into 10-bit signal through decoding and outputs in the means of differential transmission. Audio and video signals transmit through 3 TMDS data channels. Signals outputted from MT1392E are directly sent to HDMI jack to fulfill HDMI output. The working principle of HDMI jack is to transmit digital high definition signals without any damage with advantages that no extra loss in the course of transmission, digital signal and analog signal can be transmitted at the same time, transmission speed may be increased, resolution is not controlled by SXGA, usage is simple ans cost is reduced. Digital video signal Y0-Y7 outputs from pin 157-165 of 1389 to send to pin 13-20 of 1392E. 8-channel digital audio signals output from pin 197, 202, 203, 209-212 of 1389 to send to pin 73-79 of 1392E, and YNC digital audio ASPDIF of 1389 outputs from pin 216 to send to pin 72 of 1392E. Pin 182, 185, 183 of 1389 output analog video signal R, G, B which are sent to pin 68, 70, 71 of 1392E. Clock signal 1392 VCK of 1392E is produced by 1389 and outputs from pin 166, the communication format between 1389 and 1392E is

I2C bus from pin 101, 102 of 1389B to pin 21, 22 of 1392E. Line synchronous signal HSYNC# and field synchronous signal VSYNC# outputted by 1389 from 179, 181 are sent to pin 38, 39 of 1392E. Pin 110 of 1389 outputs signal to send to pin 27 of 1392E to fulfill the control to 1392E. HDMI_SCL#, HDMI_SDA# are display data channel, which outputs from pin 103, 104 of 1389 to HDMI jack, DDC (display data channel) is responsible to report information about the setup and performance of receiving device to other device, which needs E-EDID (Enhanced Extended Display Identification Data) that reads receiving device to fulfill.

Section Three Servicing Cases

3.3.1 Servicing cases

【Example 1】 Symptom: power not on

Description: insert power plug, standby indicator light is not on and the player cannot be switched on.

Analysis and troubleshooting: test power board 5V, 3.3V voltage and they are normal; check decode board 1389 chip power supply and they are 3.3V and 1.8V, which is normal; use oscillograph to check clock frequency 27MHZ crystal oscillator of 1389 chip and observe whether oscillation frequency is normal; we find that crystal oscillator has trouble, after changing it, trouble is removed.

【Example 2】 Symptom: power not on

Description: insert power plug, standby indicator light is not on and the player cannot be switched on.

Analysis and troubleshooting: test power board 5V, 3.3V voltage and they are normal; check decode board 27MHZ crystal oscillator frequency and it is normal; test 1389 chip power supply voltage 3.3V, 1.8V and find that there is no 1.8V power supply voltage; check Q306, Q309 and find that Q306 has rosin joint; weld again and trouble is removed.

【Example 3】 Symptom: no mute function

Description: when playing, press MUTE button, there is mute icon but no mute function.

Analysis and troubleshooting: when playing, test Q213 collector electrode C pin voltage and it is -2.24V, which is normal; press MUTE button on remote control, use voltage level of multimeter to test Q213 collector electrode C pin voltage and it is negative voltage, which should be 1.4V in normal conditions; check 9V power supply voltage and it is normal; test Vd203 anode voltage and it is 0, 7V, which is normal, so we doubt trouble is caused by Q213; change Q213 and trouble is removed.

【Example 4】 Symptom: no MIC

Description: when reading disc, sound is normal, there is picture but no microphone function.

Analysis and troubleshooting: power on, use remote control to switch on microphone, insert microphone, use probe of oscillograph to test OK pin of MIC board Xs206, speak and there is signal

Output; check decode board U203 OKR, OKL and there is signal input; test U210 power supply 3.3V and it is normal; use oscillograph to test three data clock of SACLK, SBCLK, SLRCK that 1389 chip outputs to U210 and they are normal, so we doubt that the trouble may be caused by U203 or rosin joint; weld U203 again, test and trouble is removed.

【Example 5】 Symptom: HDMI has no sound output

Description: HDMI has piture but no sound, AV is normal

Analysis and troubleshooting: check U701 Mt1392 power supply voltage 1.8V, DV3.3V and they are normal; check pin 25 reset voltage of U701 and it is 3.3V, which is normal; check 3 audio data outputted by 1389 chip; use oscillograph to test pin 75 of U701 and find SDATA1 has no audio data input; check 1389 chip SDATA1 and there is data output; use resistance level of multimeter to test the line from 1389 chip to U203 and it is not well connected, and a segment of copper line cuts off; after repair the line, connect and trouble is removed.

【Example 6】 Symptom: not read CD disc

Description: when reading CD disc, "NO DISC" displays

Analysis and troubleshooting: load CD disc an test; check Q302, pin E voltage is 3.3V, pin B voltage is 0V, pin c voltage is 3.3V, but, when reading CD disc normally, pin E voltage is 3.14V, pin B voltage is 2.2V, pin C voltage is 2.45V, so we doubt Q302 or circuit around has trouble; take down decode board and find TC303 of B panel is joint welding; weld again and trouble is removed.

【Example 7】 Symptom: not read disc

Description: not read CD disc and DVD disc

Analysis and troubleshooting: check laser head and there is laser output, and also focus, trace, feed and man axis actions, but feed act has abnormality; the normal feed act is to bring laser head to make small distance movement, but feed range of trouble machine is nearly up to frame terminal, so firstly check feed circuit, and capacitance of C211 becomes small; after changing capacitor, trouble is removed.

【Example 8】 Symptom: surround has no waveform

Description: surround has no waveform output

Analysis and troubleshooting: check pin 1, 7 of U210 and there is waveform output; check Tc248, Tc249 and they both have waveform output; when checking Q207, Q208, we find that Q207 has rosin joint; after welding again, trouble is removed.

【Example 9】 Symptom: disc reading is slow

Description: when reading CD, DVD disc, it is slow.

Analysis and troubleshooting: when checking nerve line and nerve line jack, we find that resistance

Value on two ends of nerve line and nerve line jack is large; change nerve line jack XS301 and trouble is removed.

【Example 10】 Symptom: not read disc

Description: not read any discs

Analysis and troubleshooting: not read any discs, observe laser head action carefully and find there is no focus action; test focus signal outputted by decode chip and it is normal; this signal is m\normal until 5888, so change 5888 of the same model, trouble is removed.

【Example 11】 Symptom: power not on

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

Analysis and troubleshooting: check power board and find each path voltage has no output; check and find 220V voltage input is normal, and bridge rectifying 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 Tc501 anode and there is still no voltage output, fuse tube is burnt down; check 4 diodes of bridge rectifying circuit and they are all normal, Tc501 has no abnormalities of liquid leakage and stricken through; test pin 1 and 8 of U501 (switch IC) and it has short circuit; this IC has been stricken through; after changing IC, trouble is removed.

【Example 12】 Symptom: power not on

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

Analysis and troubleshooting: test each path voltage output of power board and find there is no +3.3V voltage output; check C510, TC506, TC505, L507, D507 and they are all normal; check D509 cathode and find there is no voltage output; test D509 and there is open circuit; after changing D509, trouble is removed.

【Example 13】 Symptom: HDMI has no output

Description: connect with HDMI and there is no display

Analysis and troubleshooting: test H601 and V601 signal on decode board and they are normal; test H601 and V601 on high definition board and find H601 signal is not normal; test R701 and it has open circuit; change R701 and trouble is removed.

【Example 14】 Symptom: noise appears when power on

Description: when power on, only right channel has a bump sound, after increasing volume, there is current sound and sound quality is abnormal, and other channels are normal.

Analysis and troubleshooting: according to symptom, in audio signal outputted by right channel, there is some DC component and trouble lies in audio part. Use multimeter to check right channel audio

output and there is 2.45V voltage; check each signal output pin of U209 and there is 2.5V voltage; check two ends of Tc240 capacitor and there are 2.5V voltage; power off and test Tc240 capacitor and there is 200-ohm resistance; after changing this capacitor, trouble is removed.

【Example 15】 Symptom: HDMI has no output

Description: other video channel output is normal, only HDMI port has no output

Analysis and troubleshooting: when this trouble appears, check pin 18 of HDMI output terminal, +5V detect voltage is only 1V; then test voltage in L715 and find voltage on two ends of L715 inductor have 4V voltage difference; use multimeter to test L715 resistance and it is about 1K Ω , now inductor has totally become resistance; 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:

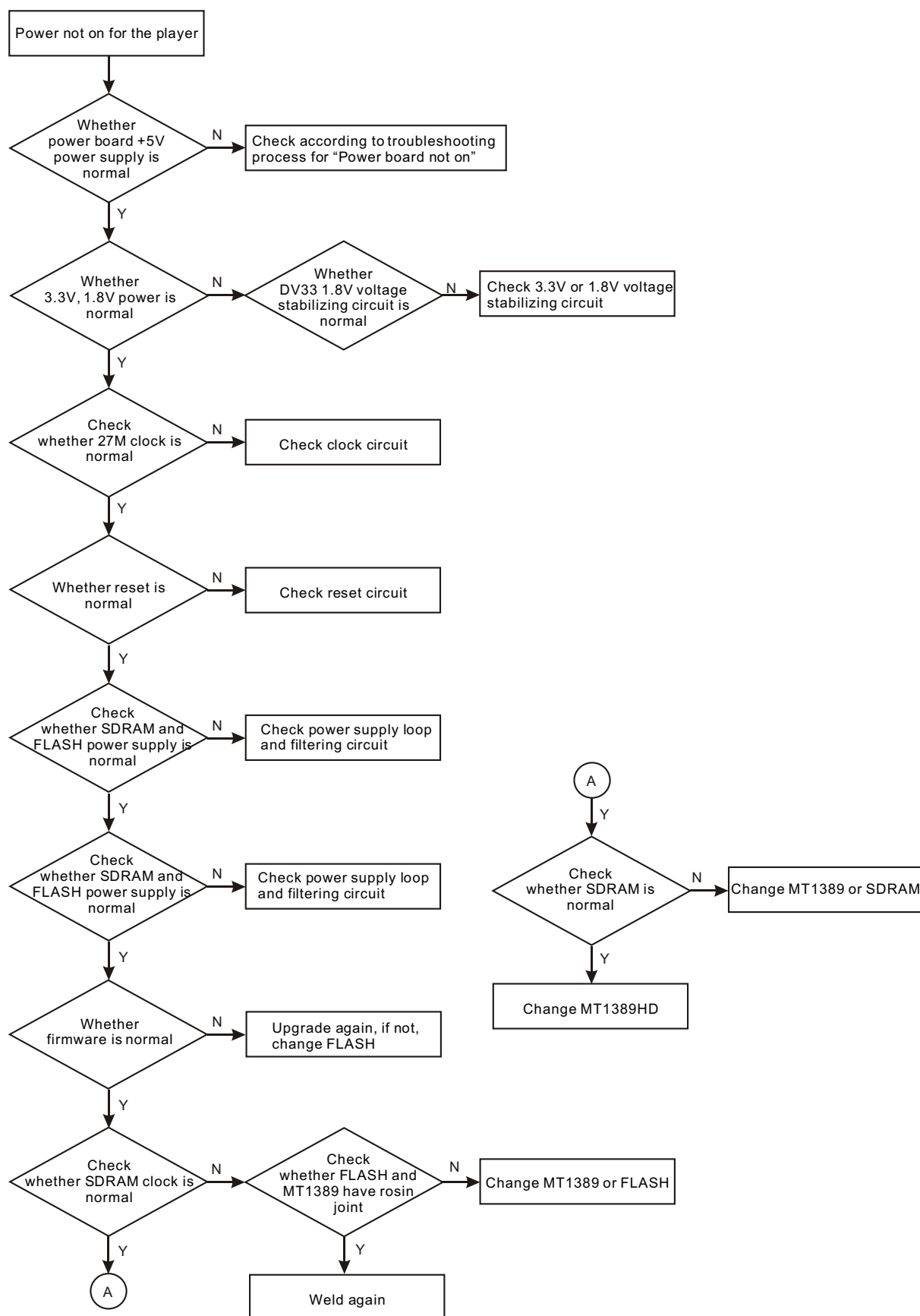


Figure 3.3.2.1 Troubleshooting flow chart for “Power not on”

2. Troubleshooting process for “Video has no output” is shown in the figure 3.2.2.2:

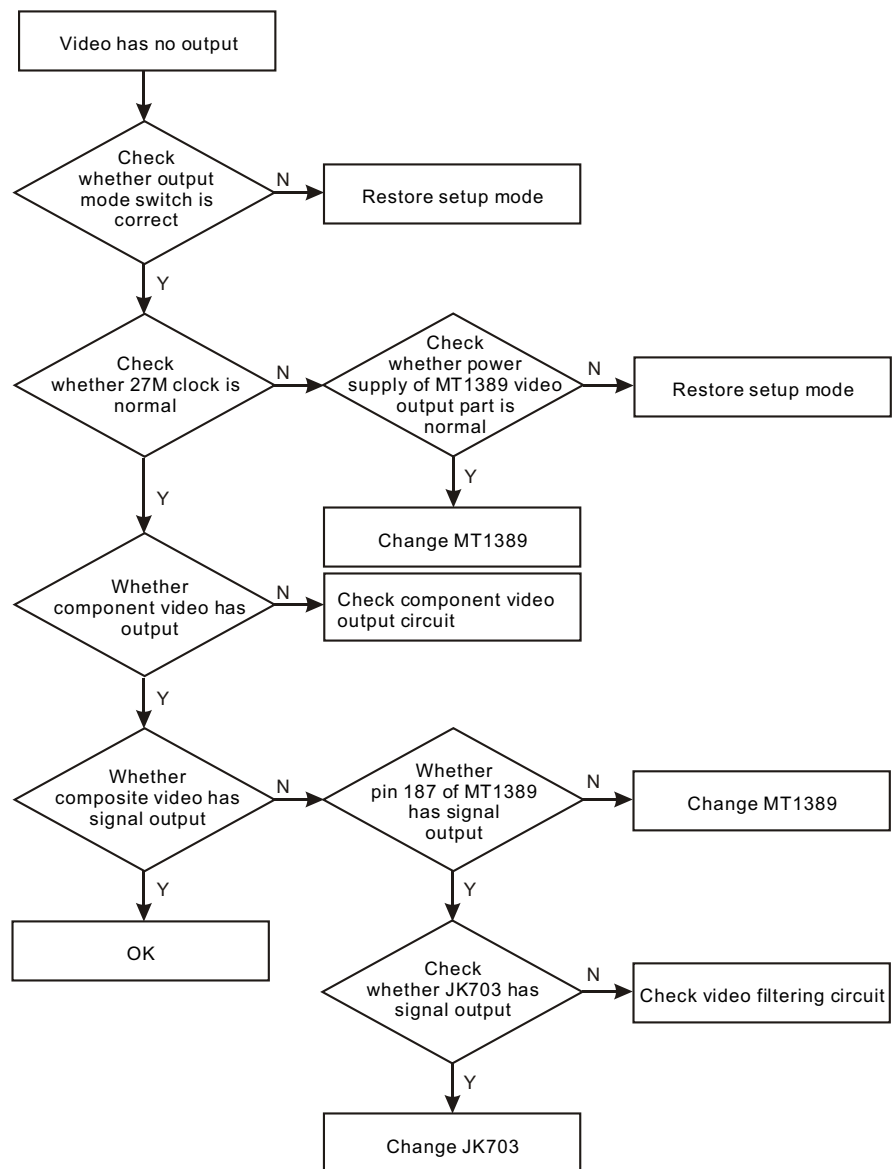


Figure 3.2.2.2 Troubleshooting flow chart for “Video has no output”

3. Troubleshooting process for “No sound output” is shown in the figure 3.2.2.3:

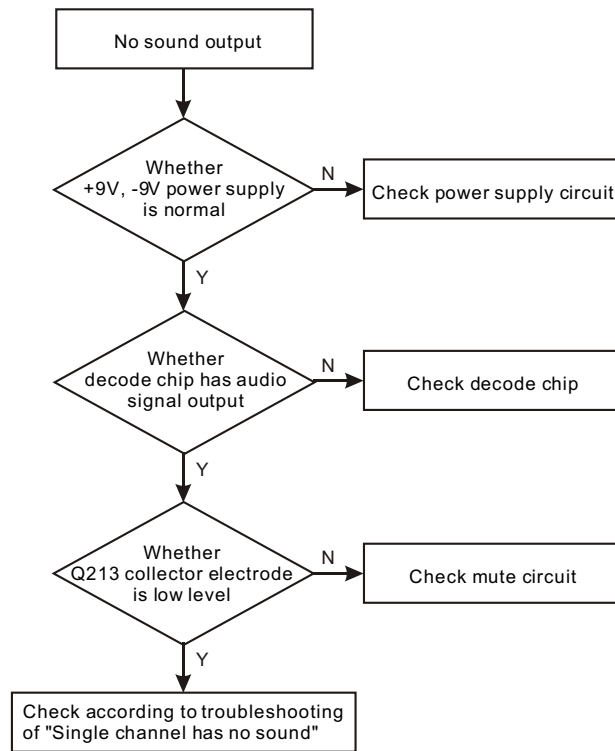


Figure 3.2.2.3 Troubleshooting flow chart for “No sound output”

4. Troubleshooting process for “Left channel has no sound” is shown in the figure 3.2.2.4:

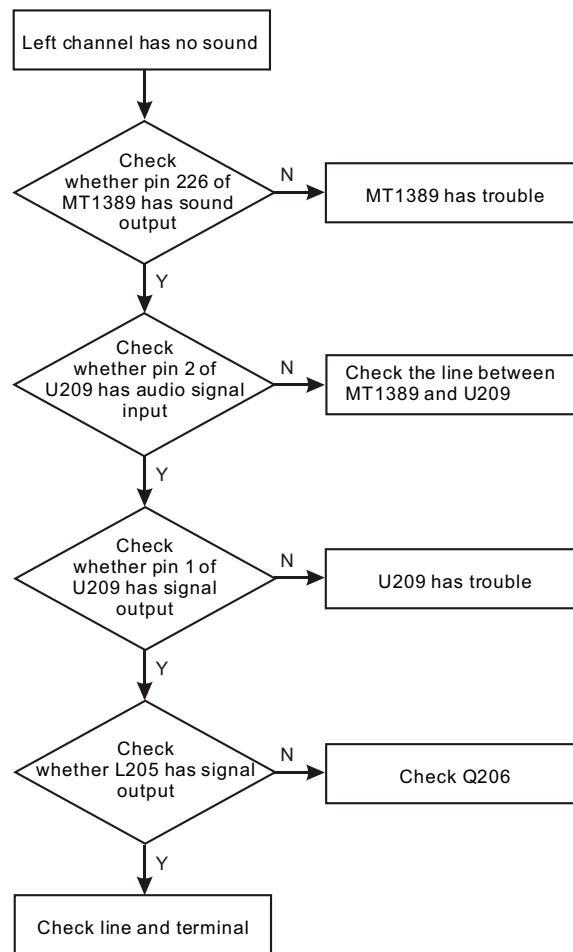


Figure 3.2.2.4 Troubleshooting flow chart for “Left channel has no sound”

5. Troubleshooting process for “Power not on” is shown in he figure 3.2.2.5:

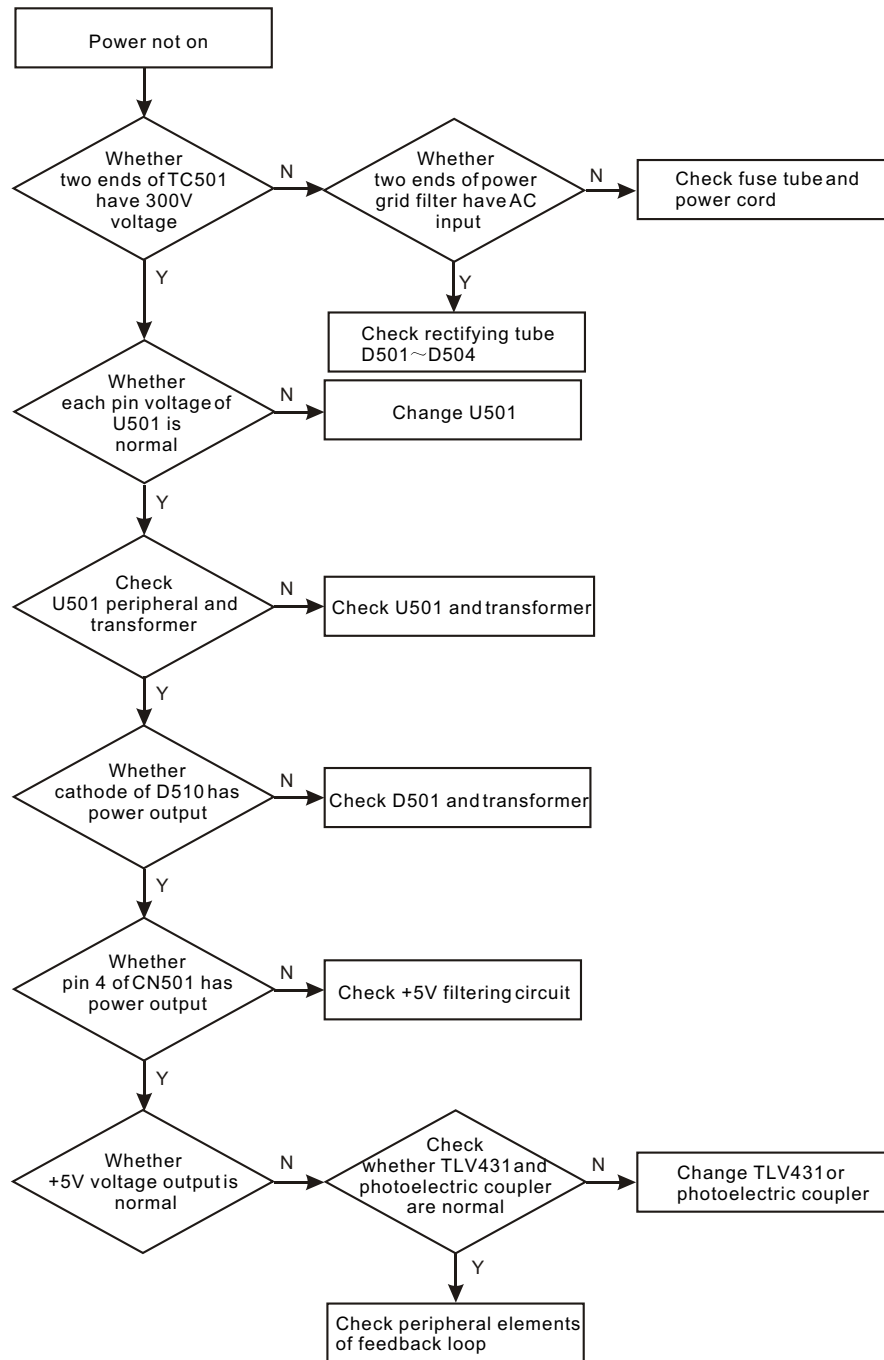
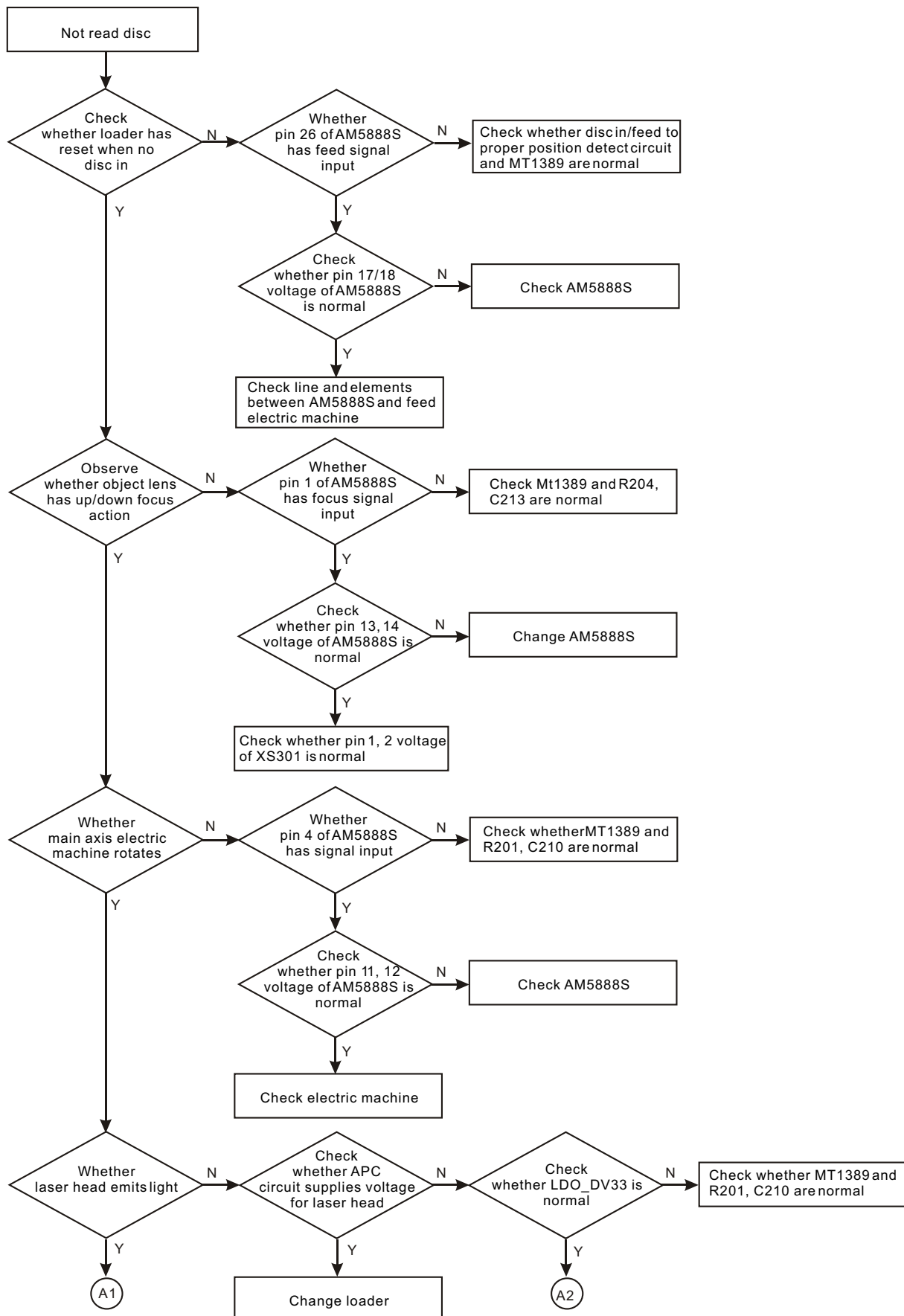


Figure 3.2.2.5 Troubleshooting flow chart for “Power not on”

6. Troubleshooting process for “Not read disc” is shown in the figure 3.2.2.6:



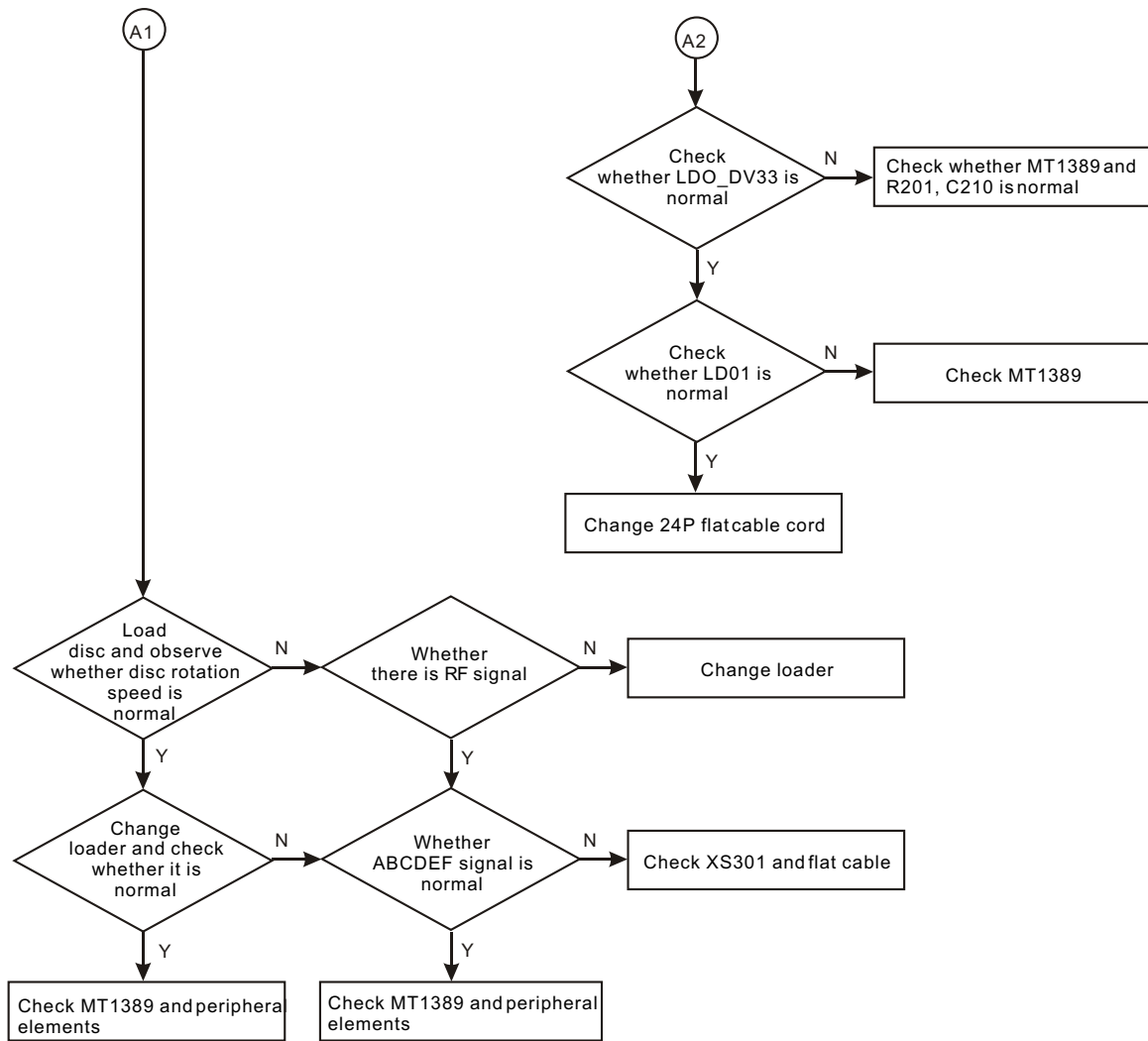
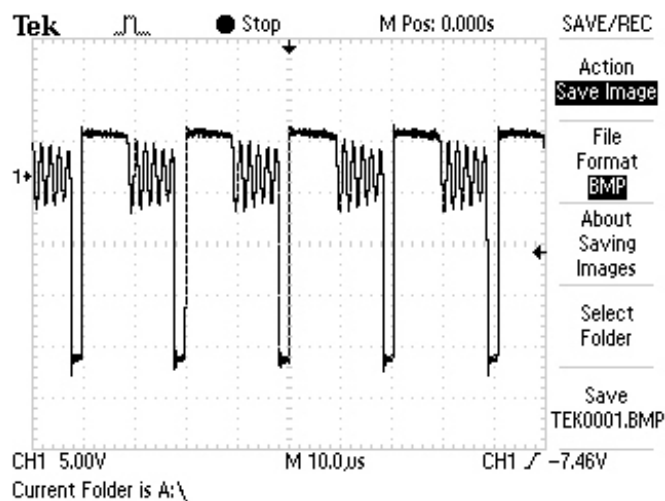


Figure 3.2.2.6 Troubleshooting flow chart for "Notread disc"

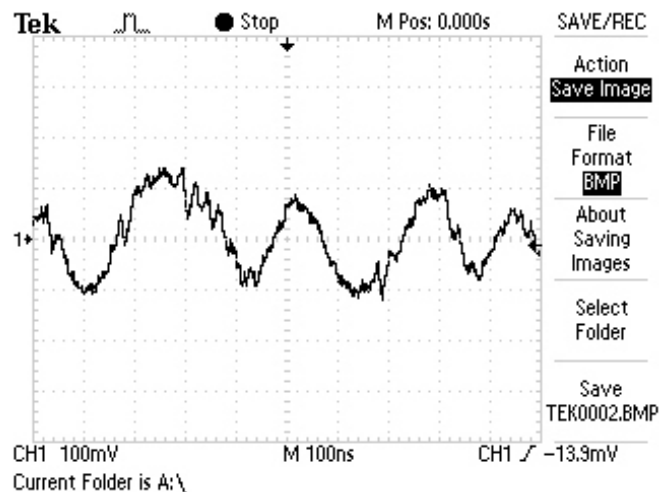
Section Four Waveform diagram

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.

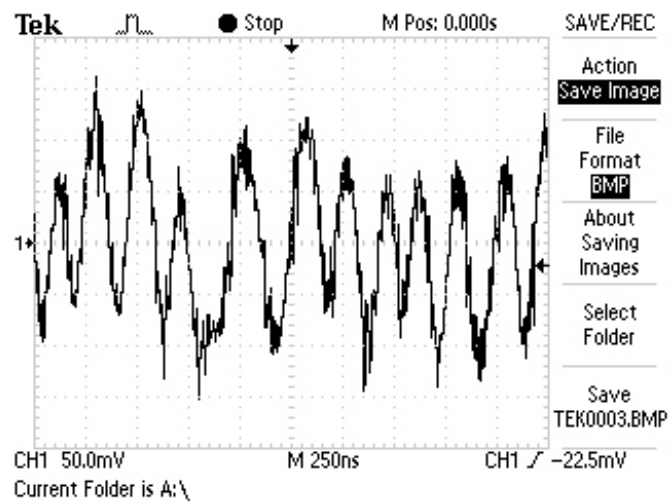
1. Waveform diagram for pulse DC of power board D513 anode



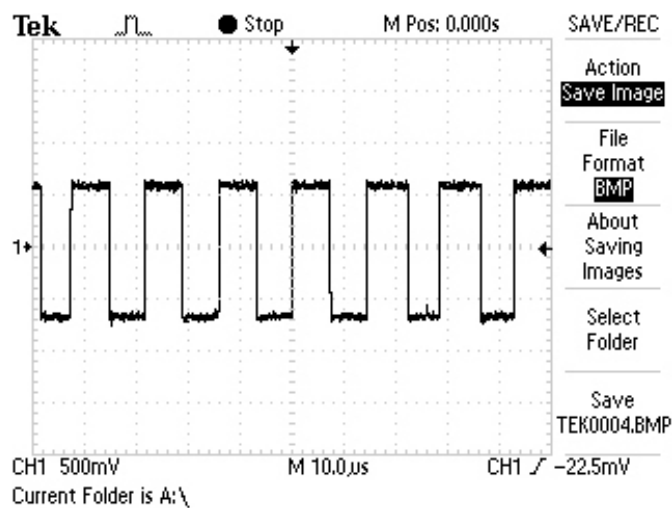
2. RFO signal waveform diagram of pin 17 of XS301



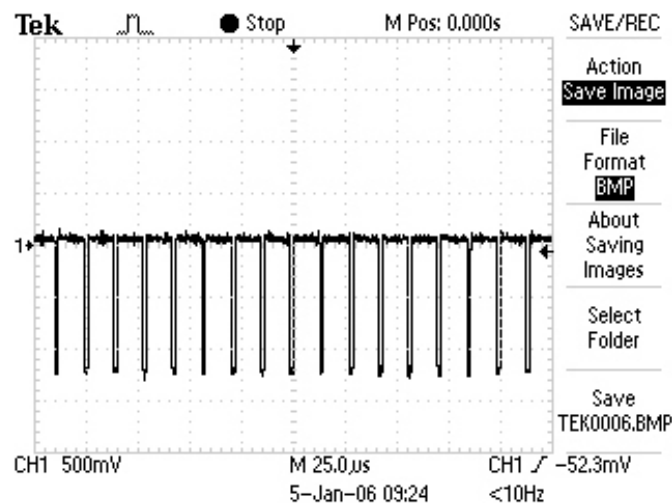
3. Asignal waveform diagram of pin 15 of XS301(B、C、D、E、F)



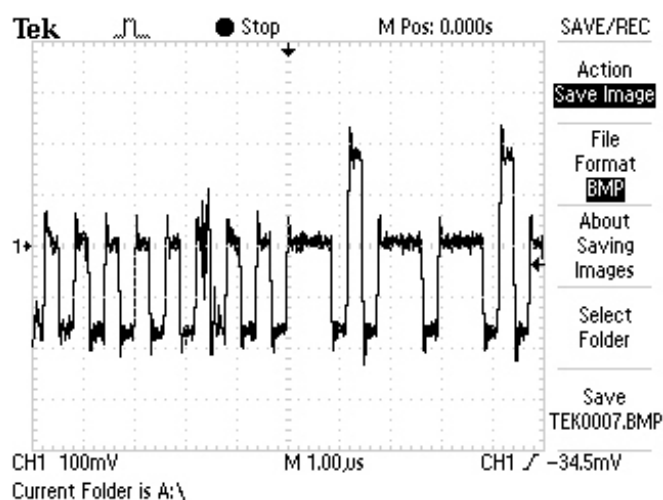
4. DMO signal (when there is main axis rotation) waveform diagram of pin 37 of U201 (Mt1389)



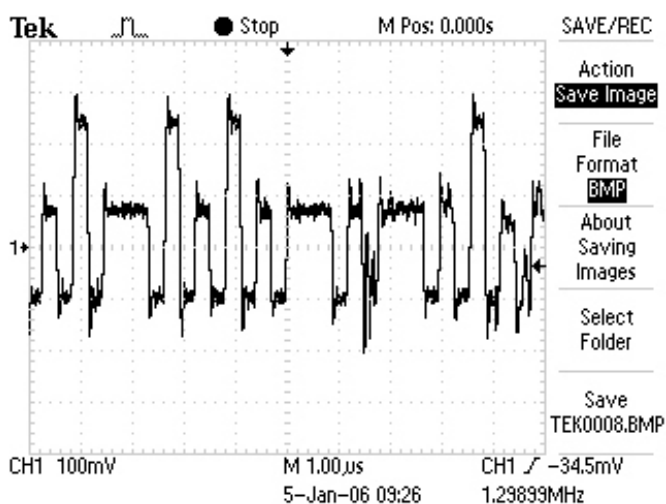
5. FMO signal (when there is feed) waveform diagram of pin 38 of U201 (MT1389)



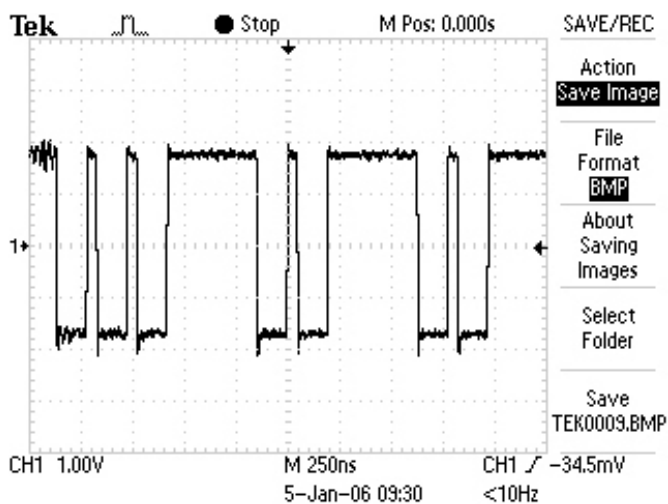
6. TRO signal (when there is trace) waveform diagram of pin 41 of U201 (MT1389)



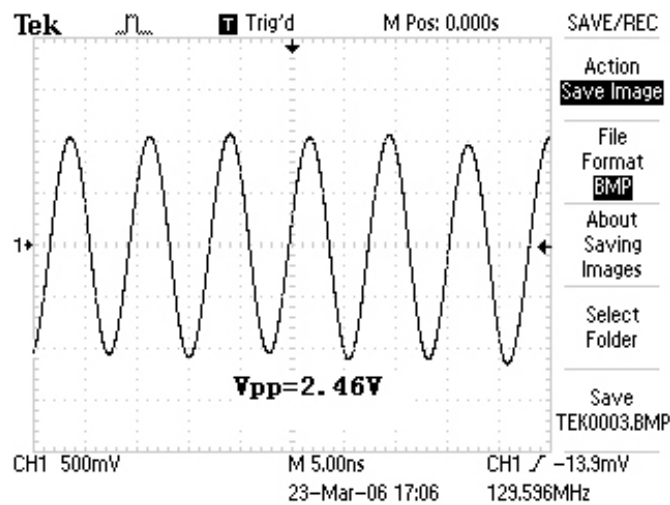
7. FOO signal (when there is focus) waveform diagram of pin 42 of U201 (MT1389)



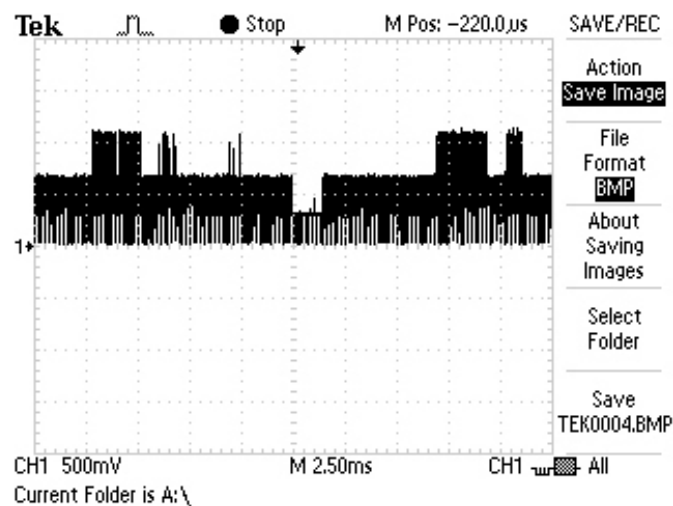
8. Waveform diagram of pin 29 (when no disc in) of U207(FLASH)



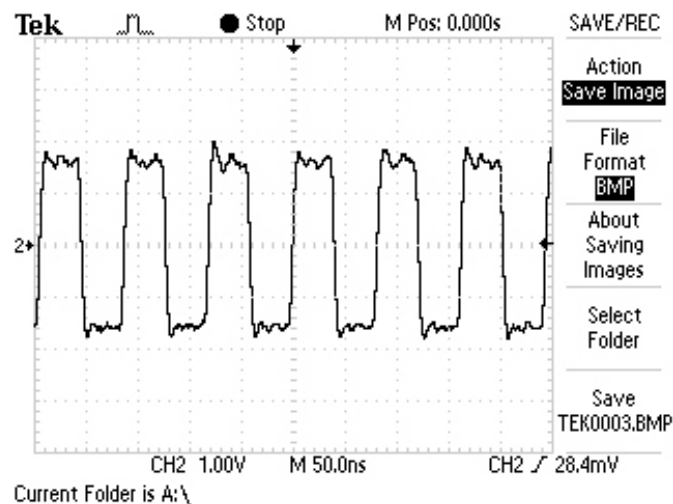
9. Waveform diagram of pin 38 of U208 (SDRAM)



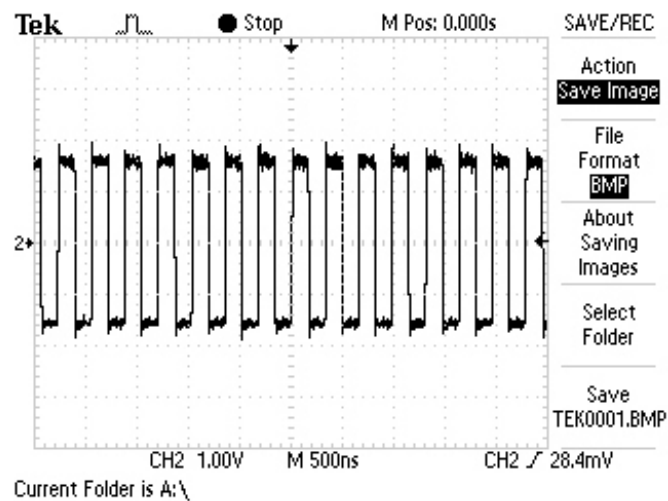
10. Video signal waveform diagram



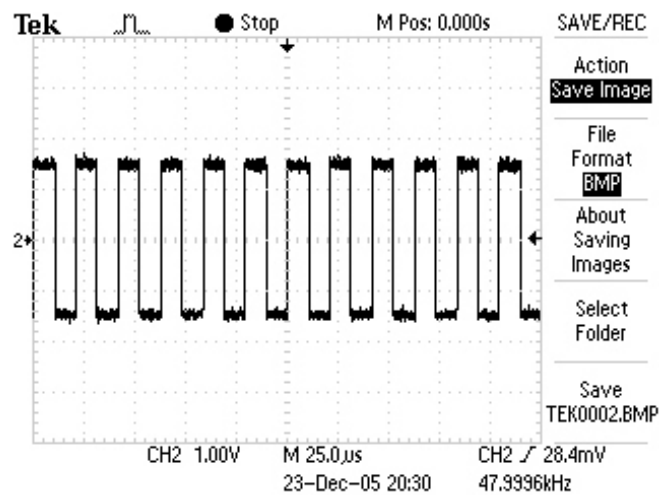
11. ACLK (12.2878MHz): waveform diagram for external clock signal



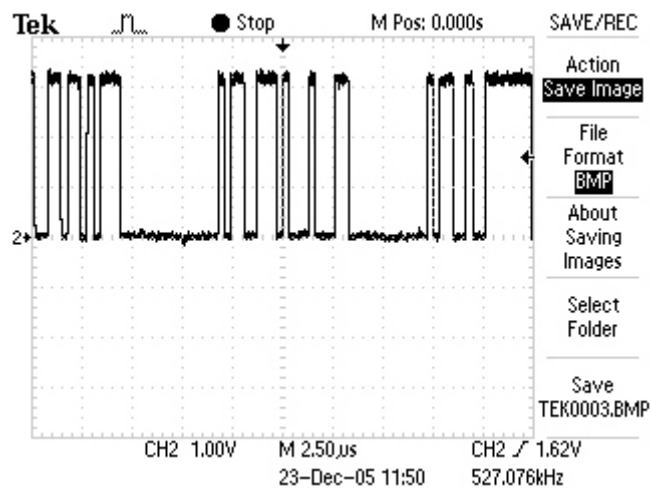
12. ABCK (3.07195MHZ): waveform diagram for bit clock signal



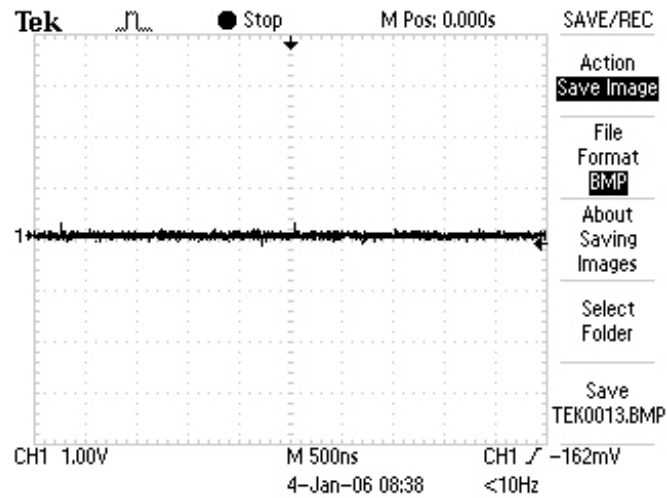
13. ALRCK (48KHZ): waveform diagram for left/right channel clock signal



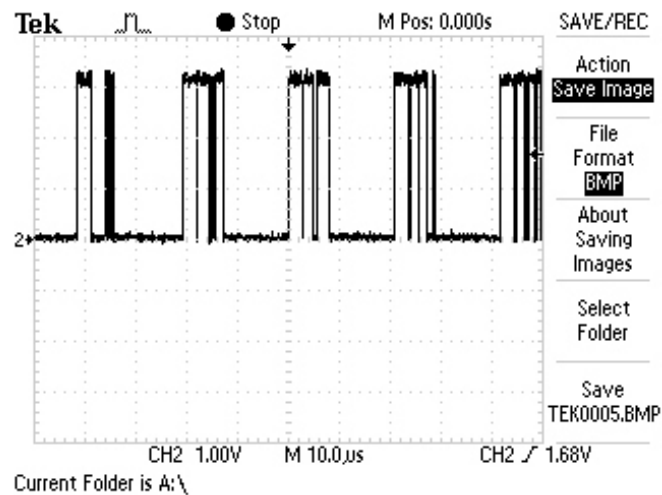
14. SDATA0: waveform diagram for mixed left/right channel digital signal



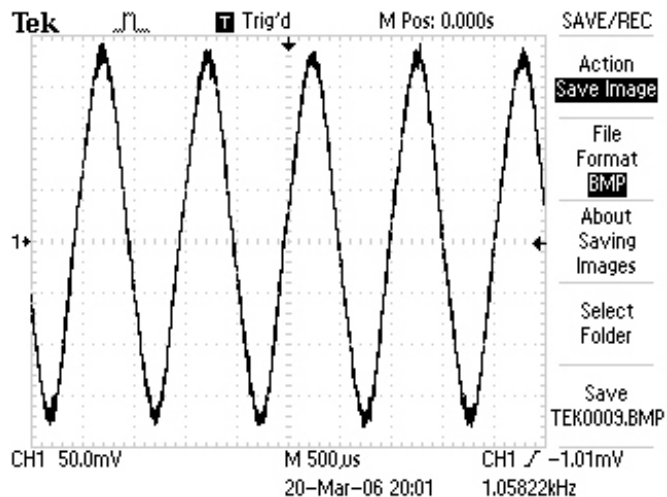
15. SDATA1: waveform diagram for surround left/right channel digital signal (now the disc being played is 2.1CH, and this signal has no output; if 5.1CH, the form is the same with that of SDATA0)



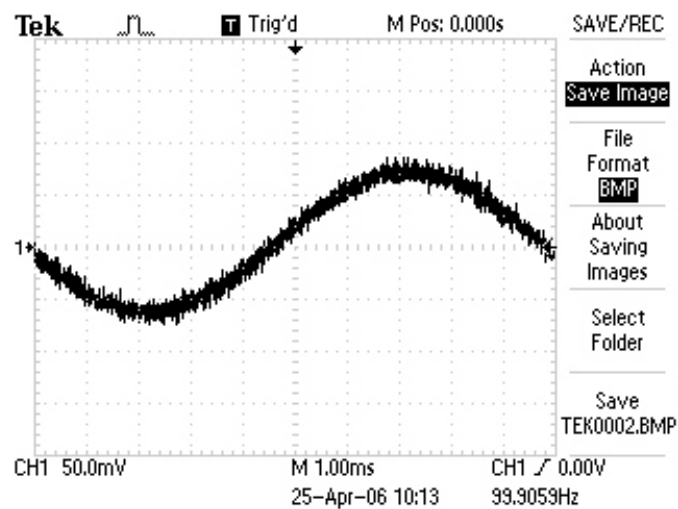
16. SDATA2: waveform diagram for centre subwoofer digital signal



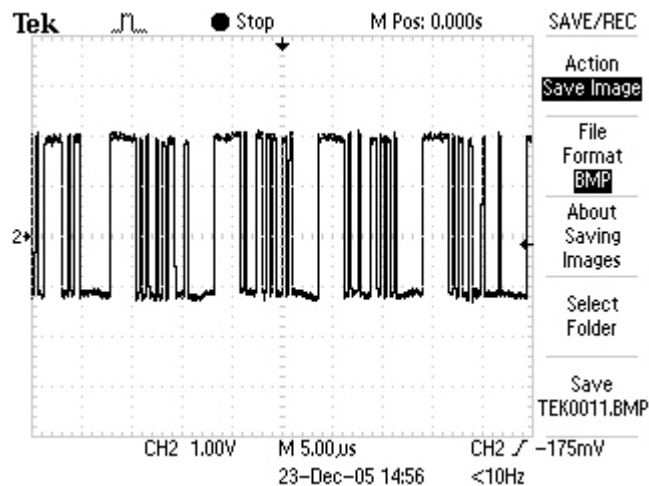
17. 1KHZ audio signal output waveform diagram (it is suggested to use test disc, if not, waveform tested will change at any time, which will affect your judgment).



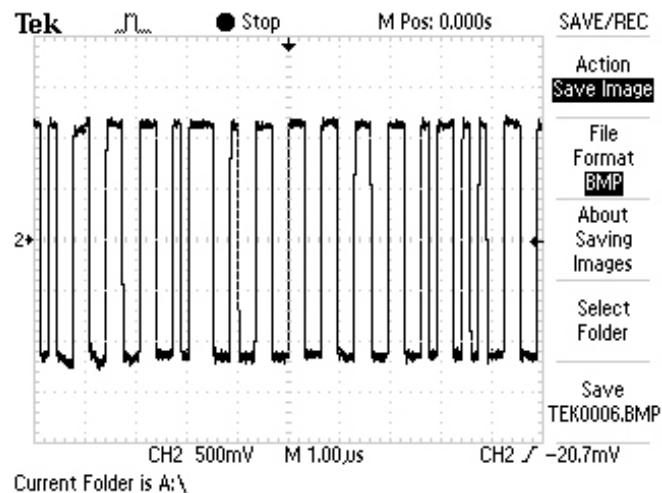
18. LEF#: waveform diagram for subwoofer channel analog signal



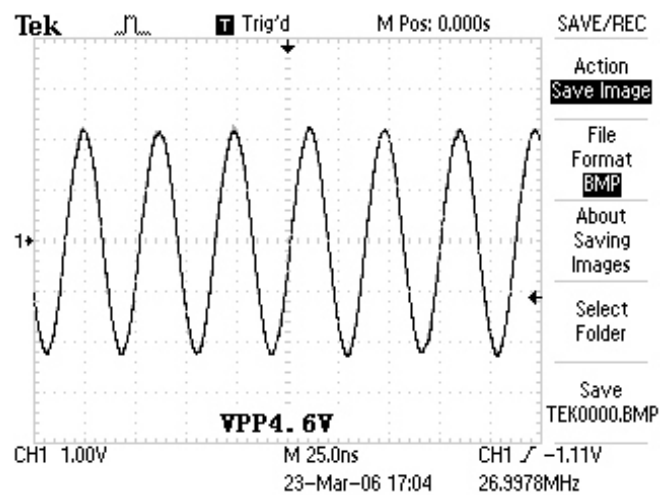
19. AMDAT: waveform diagram for microphone signal after 5340 A/D conversion



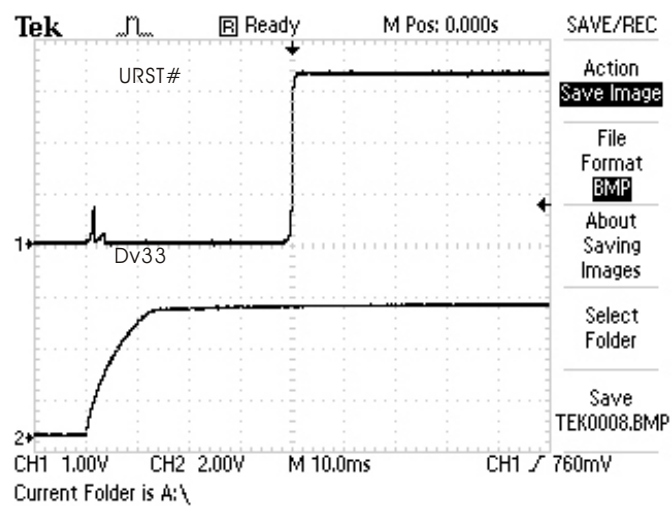
20. SPDIF: waveform diagram for optical/coaxial digital audio signal



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 (U201) 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 (HDCD)

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 Macrovision 7.1 L1, Macrovision 525P and 625P

CGMS-A/WSS

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 Inout	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	LVTTL3.3 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		InOut 4~16mA,SRPU	Microcontroller address 8
74	HIGHA1		InOut 4~16mA,SRPU	Microcontroller address 9
73	HIGHA2		InOut 4~16mA,SRPU	Microcontroller address 10
72	HIGHA3		InOut 4~16mA,SRPU	Microcontroller address 11
71	HIGHA4		InOut 4~16mA,SRPU	Microcontroller address 12
70	HIGHA5		InOut 4~16mA,SRPU	Microcontroller address 13
69	HIGHA6		InOut 4~16mA,SRPU	Microcontroller address 14
68	HIGHA7		InOut 4~16mA,SRPU	Microcontroller address 15
89	AD7		InOut 4~16mA,SRPU	Microcontroller address/data 7

86	AD6		InOut 4~16mA,SRPU	Microcontroller address/data 6
85	AD5		InOut 4~16mA,SRPU	Microcontroller address/data 5
84	AD4		InOut 4~16mA,SRPU	Microcontroller address/data 4
83	AD3		InOut 4~16mA,SRPU	Microcontroller address/data 3
82	AD2		InOut 4~16mA,SRPU	Microcontroller address/data 2
80	AD1		InOut 4~16mA,SRPU	Microcontroller address/data 1
79	AD0		InOut 4~16mA,SRPU	Microcontroller address/data 0
92	IOA 0		InOut 4~16mA,SRPU	Microcontroller address
77	IOA 1		InOut 4~16mA,SRPU	Microcontroller address 1/ IO
56	IOA 2		InOut 4~16mA,SRPU	Microcontroller address 2/ IO
57	IOA 3		InOut 4~16mA,SRPU	Microcontroller address 3/ IO
58	IOA 4		InOut 4~16mA,SRPU	Microcontroller address 4/ IO
59	IOA 5		InOut 4~16mA,SRPU	Microcontroller address 5/ IO
60	IOA 6		InOut 4~16mA,SRPU	Microcontroller address 6/ IO
61	IOA 7		InOut 4~16mA,SRPU	Microcontroller address 7/ IO
67	A16		InOut 4~16mA,SRPU	Flash address 16
91	A17		InOut 4~16mA,SRPU	Flash address 17
63	A18		InOut 4~16mA, SRPD,SMT	Flash address 18 /IO
64	A19		InOut 4~16mA, SRPD,SMT	Flash address 19 /IO
75	A20	YUV0	InOut 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	InOut 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		InOut 4~16mA, SRPD,SMT	Microcontroller address latch enable
78	IOOE#		InOut 4~16mA, SRPD,SMT	Flash output enable, active low / IO
66	IOWR#		InOut 4~16mA, SRPD,SMT	Flash write enable, active low / IO
76	IOCS#		InOut 4~16mA, SRPD,SMT	Flash chip select, active low / IO

94	UWR#		InOut 4~16mA, SRPD,SMT	Microcontroller write strobe, active low
95	URD#		InOut 4mA, SRPD,SMT	Microcontroller read strobe, active low
97	UP1_2		InOut 4~16mA, SRPD,SMT	Microcontroller port 1-2
98	UP1_3		InOut 4mA, SRPD,SMT	Microcontroller port 1-3
99	UP1_4		InOut 4mA, SRPD,SMT	Microcontroller port 1-4
100	UP1_5		InOut 4mA, SRPD,SMT	Microcontroller port 1-5
101	UP1_6	SCL	InOut 4mA, SRPD,SMT	1) Microcontroller port 1-6 2) I2C clock pin
102	UP1_7	SDA	InOut 4mA, SRPD,SMT	1) Microcontroller port 1-7 1) I2C data pin
103	UP3_0	RXD	InOut 4mA, SRPD,SMT	1) Microcontroller port 3-0 2) 8032 RS232 RxD
104	UP3_1	TXD	InOut 4mA, SRPD,SMT	1) Microcontroller port 3-1 2) 8032 RS232 TxD
105	UP3_4	RXD SCL	InOut 4mA, SRPD,SMT	1) Microcontroller port 3-4 2) Hardwired RD232 RxD 3) I2C clock pin
106	UP3_5	RXD SDA	InOut 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#		InOut 4~16mA, SRPD,SMT	Microcontroller external interrupt 0, active low
Audio interface (28)				
204	SPMCLK	SCLK0	Inout	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	Inout	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	Inout	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	Inout	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		InOut 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	InOut 4mA, SMT	1) Audio bit clock 2) Phase de-modulation
211	ACLK		InOut 4mA, SMT	Audio DAC master clock
197	ASDATA0		InOut 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		InOut 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		InOut 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		InOut 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#	InOut 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#	InOut 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 inout	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	YUV 6	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	YUV 7	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		InOut 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		InOut 4mA, SR	Green, Y, SY, or CVBS
169	DACVSSA		Ground	Ground pin for video DAC circuitry
170	B/CB/PB		InOut 4mA, SR	Blue, CB/PB, or SC
171	R/CR/PR		InOut 4mA,	Red, CR/PR, CVBS, or SY

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

165	Y_0	IO_9(RD2 4)	InOut Non-pull	1) Digital Video output Y bit 0 2) GPIO
164	Y_1	IO_10(RD 25)	InOut Non-pull	1) Digital Video output Y bit 1 2) GPIO
163	Y_2	IO_11(RD 26)	InOut Non-pull	1) Digital Video output Y bit 2 2) GPIO
162	Y_3	IO_12(RD 27)	InOut Non-pull	1) Digital Video output Y bit 3 2) GPIO
161	Y_4	IO_13(RD 28)	InOut Non-pull	1) Digital Video output Y bit 4 2) GPIO
159	Y_5	IO_14(RD 29)	InOut Non-pull	1) Digital Video output Y bit 5 2) GPIO
158	Y_6	IO_15(RD 30)	InOut Non-pull	1) Digital Video output Y bit 6 2) GPIO
157	Y_7	IO_16(RD 31)	InOut Non-pull	1) Digital Video output Y bit 7 2) GPIO
155	RA4		InOut	DRAM address 4
154	RA5		InOut	DRAM address 5
153	RA6		InOut	DRAM address 6
152	RA7		InOut	DRAM address 7
151	RA8		InOut	DRAM address 8
150	RA9		InOut	DRAM address 9
149	RA11		InOut	DRAM address bit 11
147	CKE		InOut Pull-Down	DRAM clock enable
146	RCLK		InOut	Dram clock
144	RA3		InOut	DRAM address 3
143	RA2		InOut	DRAM address 2
141	RA1		InOut	DRAM address 1
140	RA0		InOut	DRAM address 0
139	RA10		InOut	DRAM address 10
138	BA1		InOut	DRAM bank address 1
137	BA0		InOut	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		InOut	Data mask 1
130	IO_18	(DQS1)	InOut Non-pull	GPIO
129	RD8		InOut	DRAM data 8
128	RD9		InOut	DRAM data 9
127	RD10		InOut	DRAM data 10
126	RD11		InOut	DRAM data 11
125	RD12		InOut	DRAM data 12
124	RD13		InOut	DRAM data 13
123	RD14		InOut	DRAM data 14
125	RD15		InOut	DRAM data 15
121	RD0		InOut	DRAM data 0
120	RD1		InOut	DRAM data 1
119	RD2		InOut	DRAM data 2
117	RD3		InOut	DRAM data 3
116	RD4		InOut	DRAM data 4
115	RD5		InOut	DRAM data 5
114	RD6		InOut	DRAM data 6
113	RD7		InOut	DRAM data 7
112	IO_19	(DQS0)	InOut	GPIO
111	DQM0		InOut Non-pull	Data mask 0
JTAG Interface(4)				
51	TDI	V_ADIN4	InOut Non-pull	1) Serial interface port 3 data-out 2) Version AD input port 4 3) GPIO
52	TMS	V_ADIN5	InOut Non-pull	1) Serial interface port 3 data-out 2) Version AD input port 5 3) GPIO
53	TCK	V_ADIN6	InOut Non-pull	1) Serial interface port 3 data-out 2) Version AD input port 6 3) GPIO
54	TDO	V_ADIN7	InOut 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 (U202) 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 (U203) is 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 200 kHz per channel.

The CS5340 uses a 5th-order, multi-bit delta-sigma modulator followed by digital filtering and decimation, which removes 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, DVD recorders, A/V receivers, and automotive applications.

2. FEATURES

Advanced multi-bit Delta-Sigma architecture

24-bit conversion.

Supports all audio sample rates including 192kHz.

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..

Linear phase digital anti-alias filtering.

Auto-mode selection.

Pin compatible with the cs5341

3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	MO	I	Mode selection 0
2	MCLK	I	Master clock
3	VL	I	Logic power
4	SDOUT	O	Serial audio data output
5	GND	I	GND
6	VD	I	Digital power
7	SCLK	I	Serial clock

8	LRCK	I	Left right clock
9	/RST	I	Reset
10	AINL	I	Analog input L
11	VQ	O	Quiescent voltage
12	AINR	I	Analog input R
13	VA	I	Analog power
14	REF_GND	I	GND
15	FILT+	I	Positive voltage reference
16	M1	I	Mode selection 1

3.5.4 function introduction to 74HCU04

1. Description

The 74HCU04 (U205) is a high-speed Si-gate CMOS device and is pin compatible with low power Schottky TTL (LSTTL). It is specified in compliance with JEDEC standard no. 7A.

The 74HCU04 is a general purpose hex inverter. Each of the six inverters is a single stage

2. Features

Output capability: Standard

ICC category: SSI

3. PIN CONFIGURATION

PIN NO.	SYMBOL	I/O	Description
1, 3, 5, 9, 11, 13	1A to 6A	I	data inputs
2, 4, 6, 8, 10, 12	1Y to 6Y	O	data outputs
7	GND		ground (0 V)
14	VCC		positive supply voltage

3.5.5 Function introduction to FLASH

1. DESCRIPTION

FLASH (U207) 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.

2. PIN DESCRIPTION

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

3.5.6 Function introduction to SDRAM

1. DESCRIPTION

64M 16-bit memorizer SDRAM (U208) 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.

2. PIN DESCRIPTION

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	

3.5.7 function introduction to 4580

1. Description

NJM4580 (U209, U210, U211) 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. FEATURES

Operating Voltage ($\pm 2V \sim \pm 18V$)

Low Input Noise Voltage ($0.8\mu V_{rms}$ typ.)

Wide Gain Bandwidth Product ($15MHz$ typ.)

Low Distortion (0.0005% typ.)

Slew Rate ($5V/\mu s$ typ.)

Package Outline DIP8,SIP8,EMP8,SSOP8,DMP8

Bipolar Technology

3. PIN Description

PIN No	Symbol	I/O	Description
1	1OUT	O	Output 1
2	1IN-	I	Inverting Input Pin 1
3	1IN+	I	Non-Inverting Input Pin 1
4	VCC-	I	Negative Power Supply
5	2IN+	I	Non-Inverting Input Pin 2
6	2IN-	I	Inverting Input Pin 2
7	2OUT	O	Output 2
8	VCC+	I	Positive Power Supply

3.5.8 function introduction to D5954

1. DESCRIPTION

D5954 (U302) is a servo drive IC with built-in 4-channel drive circuit. Digital focus, trace, feed and main axis drive signal outputted by MT1389E is sent to D5954 for amplifying through RC integration circuit. The focus, trace, feed and main axis drive signal being amplified by D5954 is sent to loader to fulfill the corresponding servo work.

2. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	VINFC	I	Focus control signal input
2	CF1	I	External feedback loop
3	CF2	I	External feedback loop
4	VINSL+	I	Forward control input, connected to reference voltage
5	VINSL-	I	Main axis control signal input

6	VOSL	O	External feedback resistor
7	VINFFC	I	Focus feedback signal input
8	VCC	I	5V power supply
9	PVCC1	I	5V power supply
10	PGND	I	Ground
11	VOSL-	O	Main axis drive reverse voltage output
12	VO2+	O	Main axis drive forward direction voltage output
13	VOFC-	O	Focus drive reverse voltage output
14	VOSC+	O	Focus drive forward voltage output
15	VOTK+	O	Trace drive forward direction voltage output
16	VOTK-	O	Trace drive reverse voltage output
17	VOLD+	O	Feed drive forward direction voltage output
18	VOLD-	O	Feed drive reverse voltage output
19	PGND	I	Ground
20	VINFTK	I	Trace feedback signal input
21	PVCC2	I	5V power supply
22	PREGND	I	Ground
23	VINLD	I	Feed control signal input
24	CTK2	I	External feedback loop
25	CTK1	I	External feedback loop
26	VINTK	I	Trace control signal input
27	BIAS	I	1.4V reference voltage input
28	STBY	I	Enable control signal

3.5.9 function introduction to PT6961

1. DESCRIPTION

PT6961 (U401) 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

3.5.10 function introduction to VIPer22ADIP

1. DESCRIPTION

The VIPer22A (U501) 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.

Over voltage 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.

3.5.11 Function introduction to PH817

PH817 (U502) is a photoelectric coupler, shown as the figure 3.5.11.1. 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.

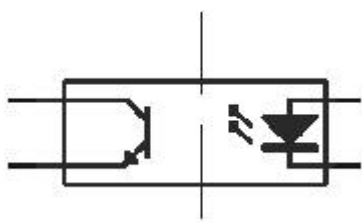


Figure 3.5.11.1 PH817 outside drawing

3.5.12 Function introduction to LM431A

LM431A (U503) is a 2.5V comparator, shown as the figure 3.5.12.1. 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.

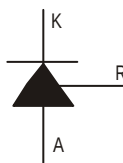


Figure 3.5.12.1 LM431A outside drawing

3.5.13 Function introduction to 4558

1. Description

The RC4558 and RM4558 devices (U601) are dual general-purpose operational amplifiers with each half electrically similar to the A741 except that offset null capability is not provided.

The high common-mode input voltage range and the absence of latch-up make these amplifiers ideal for voltage-follower applications. The devices are short-circuit protected and the internal frequency compensation ensures stability without external components.

The RC4558 is characterized for operation from 0 C to 70 C, and the RM4558 is characterized for operation over the full military temperature range of –55 C to 125 C.

2. FEATURES

Continuous-Short-Circuit Protection

Wide Common-Mode and Differential

Voltage Ranges

No Frequency Compensation Required

Low Power Consumption

No Latch-Up

Unity-Gain Bandwidth ,3 MHz Typ

Gain and Phase Match Between Amplifiers

Low Noise ,8 nV/√Hz Typ at 1 kHz

Designed To Be Interchangeable With

Raytheon RC4558 and RM4558 Devices

3. PIN CONFIGURATION

PIN No	Symbol	I/O	Description
1	1OUT	O	Output 1
2	1IN–	I	Inverting Input Pin 1
3	1IN+	I	Non-Inverting Input Pin 1
PIN No.	Symbol	I/O	Description
PIN No.	Symbol	I/O	Description
4	VCC–	I	Negative Power Supply
5	2IN+	I	Non-Inverting Input Pin 2
6	2IN–	I	Inverting Input Pin 2
7	2OUT	O	Output 2
8	VCC+	I	Positive Power Supply

3.5.14 Function introduction to TDA1308

1. DESCRIPTION

The TDA1308 (U603) is an integrated class AB stereo headphone driver contained in an SO8, DIP8 or a TSSOP8 plastic package. The device is fabricated in a 1 mmCMOS process and has been primarily developed for portable digital audio applications.

The difference between the TDA1308 and the TDA1308A is that the TDA1308A can be used at low supply voltages.

2. FEATURES

Wide temperature range

? No switch ON/OFF clicks

? Excellent power supply ripple rejection

? Low power consumption

Short-circuit resistant

? High performance

– high signal-to-noise ratio

– high slew rate

– low distortion

? Large output voltage swing.

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	OUTA	O	output A
2	INA(neg)	I	inverting input A
3	INA(pos)	I	non-inverting input A
4	VSS	I	negative supply
PIN	Symbol	I/O	Description
5	INB(pos)	I	non-inverting input B
6	INB(neg)	I	inverting input B
7	OUTB	O	output B
8	VDD	I	positive supply

3.5.15 Function introduction to MT1392E

1. Description

MediaTek MT1392E (U701) is a multi-resolution HDMI transmit processor, which incorporates video scaler, high definition TV encoder, audio sampling rate converter, audio packer, HDCP processor and HDMI transmitter. This IC can accept digital video in various definition, including standard-definition video such as 480i, 576i, 480p, 576p, and high-definition video such as 720p (50/59.94Hz), 1080i(50/59.94Hz), and converts the standard definition video into high-definition ones. MT1392 can support up to 8 channel I2S or SPDIF. It is also fully compatible with DVI 1.0, HDMI 1.0 and HDCP 1.1.

2. Features

High Definition Video Process

Support 480i, 576i, 480p, 576p digital video input According to CCIR656 or CCIR601 spec.

Support 720p (50/59.94Hz), 1080i (50/59.94Hz) digital video input According to SMPTE-293M spec.

Programmable scaler converts standard-definition video to 720p, 1080i high-definition video.

TV encoder support 480p, 576p, 720p, 1080i (50 and 59.94Hz) component analog output including RGB and YCbCr.

Audio Input Formats

Support Industry-standard S/PDIF for digital audio using IEC 60958 2-channel PCM, and compressed (encoded) audio data (DTS, AC3, MPEG Audio) using IEC 61937 format.

Support I²S audio interface up to 4 channels.

Sampling rate conversion for stereo I²S audio

HDMI & HDCP

Fully backward

Compatible with DVI, and compliant with HDMI 1.0, DVI1.0, EIA/CEA-861B, HDCP 1.1.

Integrate High-Bandwidth Content Protection (HDCP 1.1) for both video and audio.

Optional I²C master interface for HDCP key set loading.

Serial Interface

I²C slave programming interface.

Outline

80-pin LQFP package

3.3/1.8-Volt. Dual operating voltages

3. PIN Description

PIN	Symbol	I/O	Description
1	DVSS	GND	Digital ground

2-9	C0-C7	I,PD	Normal : Digital chroma input VDAC test DAC test mode [0:7] input. BIST mode : BIST data input
10	DVDD33	VDD	Digital power, 3.3V
11	VCK	I	Clock of digital video input
12	DVSS	GND	Digital ground
13-20	Y0-Y7	I, PD	Normal : Digital luma input VDAC test : DAC test data [0:7] input. BIST mode : BIST address input
21	SSCK	I	Normal : Slave serial interface clock input SCAN mode : scan reset active low
22	SSD	IO	Slave serial interface data input output
23	DVDD18	VDD	Power of digital core, 1.8V
24	PWDN#	I, PD	Power down, active low
25	RST#	I, PD	Reset, active low.
26	XTAL	I	Normal : clock input VDAC test : VDAC test clock input
27	INT	O	Interrupt output
28	DVSS	GND	Digital ground
29	A7/GPO0	IO,PD IO,PD	Power ON : Serial interface address 7 BIST mode : SRAM fail output Normal : General purpose output
30	A6/GPO1	IO,PD	Power ON : Serial interface address 6 BIST mode : SRAM fail output Normal : General purpose output
31	TRAP2/GPO2	IO,PD	Power ON : Hardware trap Bit 2 BIST mode : SRAM fail output Normal : General purpose output
32	TRAP1/GPO3	IO,PD	Power ON : Hardware trap bit BIST mode : SRAM fail output Normal : General purpose output
33	TRAP0/GPO4	I O,PD	Power ON : Hardware trap Bit BIST mode : SRAM fail output Normal : General purpose output
			MasterI2C on : Master serial interface clock output

34	MSCK/GPO5	O	BIST mode : SRAM fail output Normal : General purpose output
35	MSD/GPO6	IO,PU	MasterI2C on : Master serial interface data input output BIST mode : SRAM fail output Normal : General purpose output
36	GPO7	IO,PD	Power ON : EPROM word-address type 1 : 16bit , 0 : 8bit BIST mode : SRAM fail output Normal : General purpose output
37	GPIO8	IO	BIST mode : SRAM fail Output Normal : General purpose output / HDMI test Input / down mixed audio input
38	GPIO9	IO	BIST mode : SRAM fail output Normal : General purpose output / V- sync in out HDMI test Input VDAC test : PLL test Enable
39	GPIO10	O	BIST mode SRAM fail output Normal : General purpose output H-sync in out / HDMI test input VDAC test : PLL test calibration
40	HTPLG	I,PD	HDMI Hot-Plug detection
41	AVSS	GND	Analog ground
42	PLLC0	A	PLL Capacitor ground
43	PLLC1	A	PLL Capacitor
44	AVDD	VDD	Analog power, 3.3V
45	AVDD	VDD	Analog power, 3.3V
46	AVSS	GND	Analog Ground
47	AVSS	GND	Analog Ground
48	TCK-	AO	HDMI Tx clock
49	TCK+	AO	HDMI Tx clock
50	AVDD	VDD	Analog power, 3.3V
51	TX0-	AO	HDMI Tx channel 0
52	TX0+	AO	HDMI Tx channel 0
53	AVSS	GND	Analog Ground
54	TX1-	AO	HDMI Tx channel 1
55	TX1+	AO	HDMI Tx channel 1
56	AVDD	VDD	Analog power 3.3V
57	TX2-	AO	HDMI Tx channel 2
58	TX2+	AO	HDMI Tx channel 2

59	AVSS	GND	Analog Ground
60	SWING	AI	HDMI output swing adjustment
61	AVDD	VDD	Power of DAC, 3.3V
62	VREF	A	Voltage reference of DAC
63	FS	A	DAC full scale adjustment
64	AVSS	GND	Ground of DAC
65	AVDD	VDD	Power of DAC, 3.3V
66	AVSS	GND	Ground of DAC
67	AVDD	VDD	Power of DAC, 3.3V
68	G	AO	Component analog video output Y/Green
69	AVSS	GND	Ground of DAC
70	B	AO	Component analog video output Cb/Blue
71	R	AO	Component analog video output Cr/Red
72	SPDIF	I	Normal : S/PDIF audio input SCAN mode : test_se input VDAC test : VDAC test reset, active low BIST mode : BIST reset, active low.
73	AD3	I	Normal : I2S data of channel 6/7 VDAC test VDAC test data bit 11 input
74	AD2	I	Normal : I2S data of channel 4/5 VDAC test : VDAC test data bit 10 input BIST mode : BIST reset active low
75	AD1	I	Normal: I2S data of channel 2/3 VDAC test VDAC test Data bit 9 input BIST mode : BIST verify pulse
76	AD0	I	Normal : I2S data of channel 0/1 VDAC test : VDAC test data bit 8 input BIST mode : BIST write pulse
77	ACK	I	Normal : S/PDIF clock VDAC test : VDAC test reset, active high.
78	ABCK	I	I2S bit clock
79	ALRCK	I	I2S Left/Right channel flag
80	DVDD18	VDD	Power of digital core 1.8V

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:

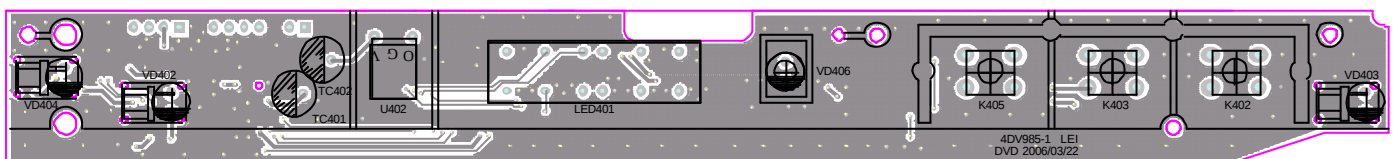


Chapter Cinque

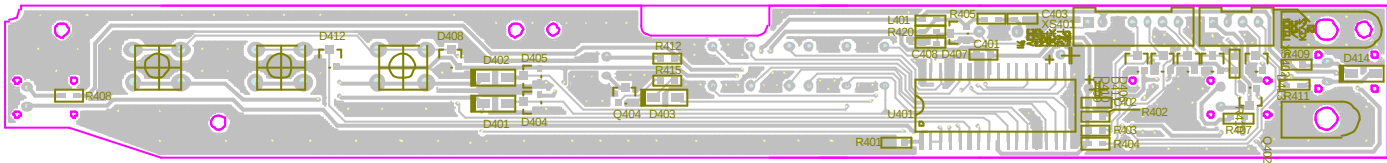
PCB board & Circuit diagram

Section One PCB board

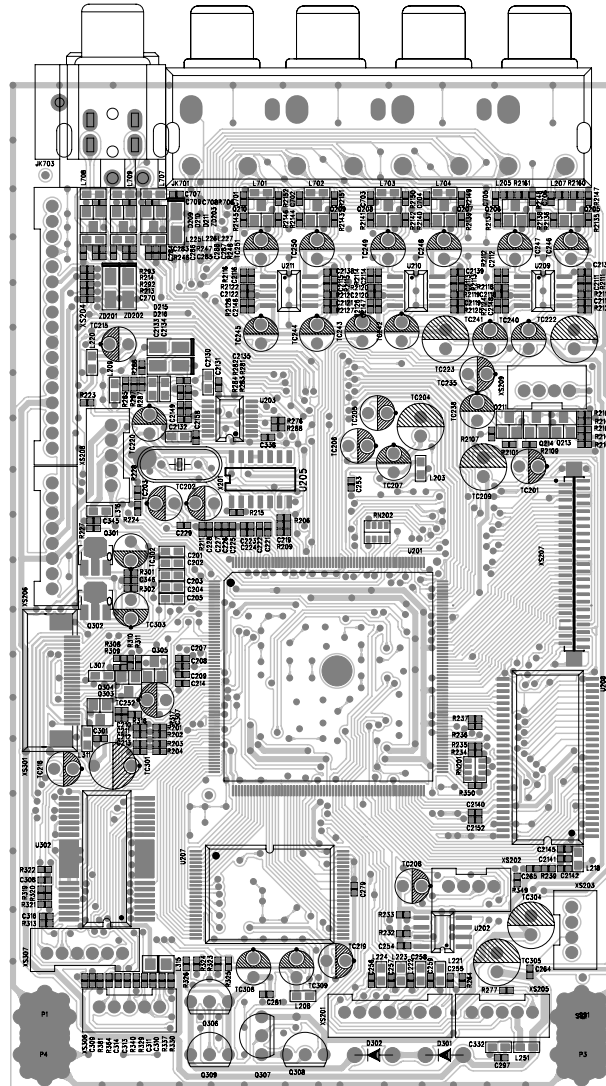
5.1.1 Surface layer of KEY SCAN Board



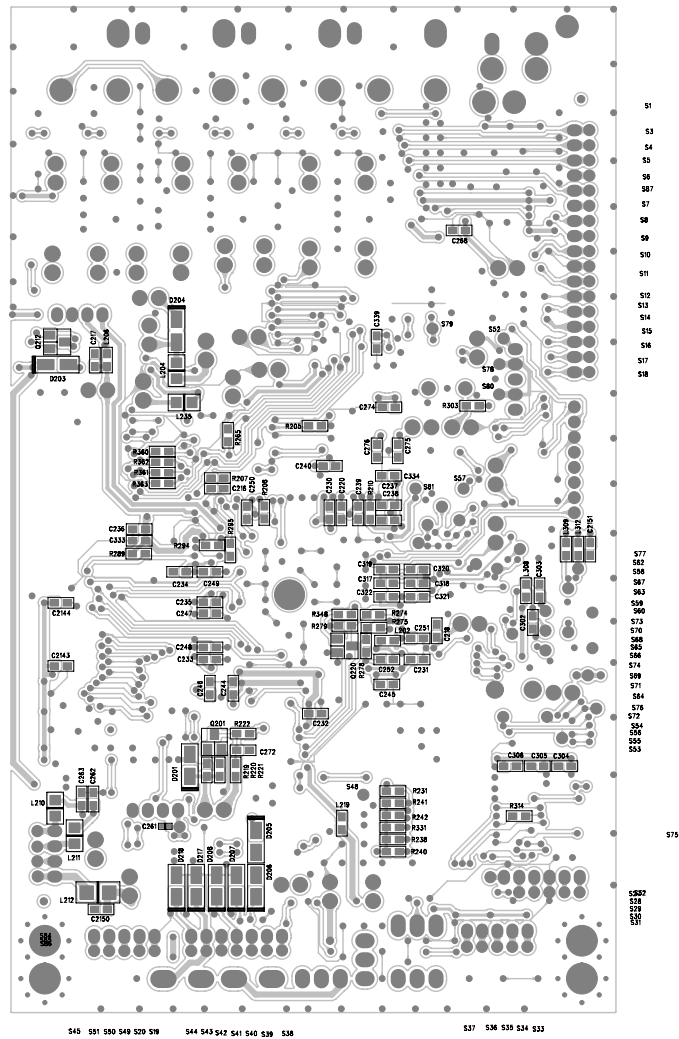
5.1.2 Bottom layer of KEY SCAN Board



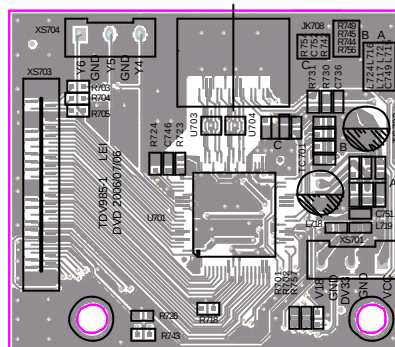
5.1.3 Surface layer of DECODE&SERVO Board



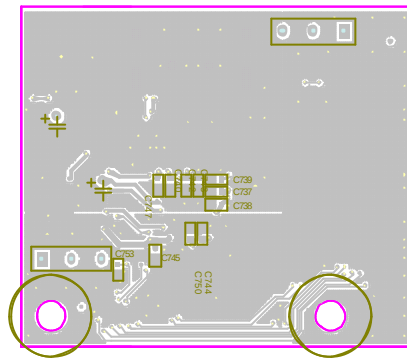
5.1.4 Bottom layer of DECODE&SERVO Board



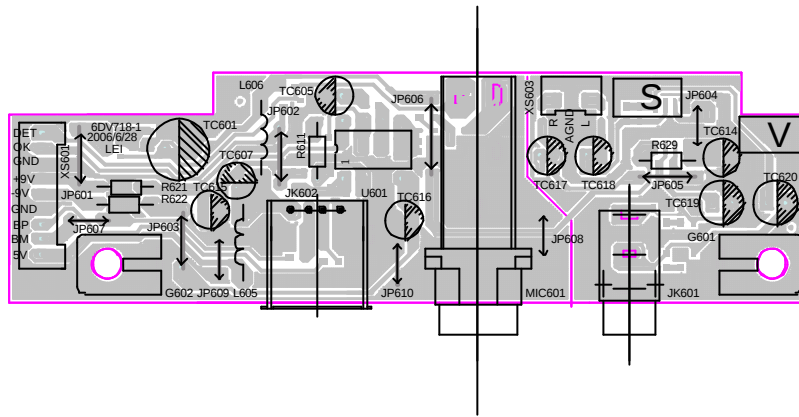
5.1.5 Surface layer of HDMI Board



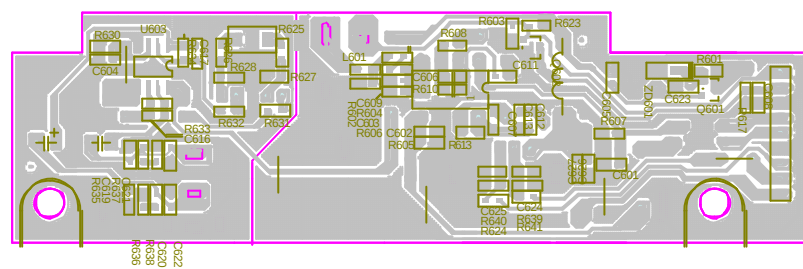
5.1.6 Bottom layer of HDMI Board



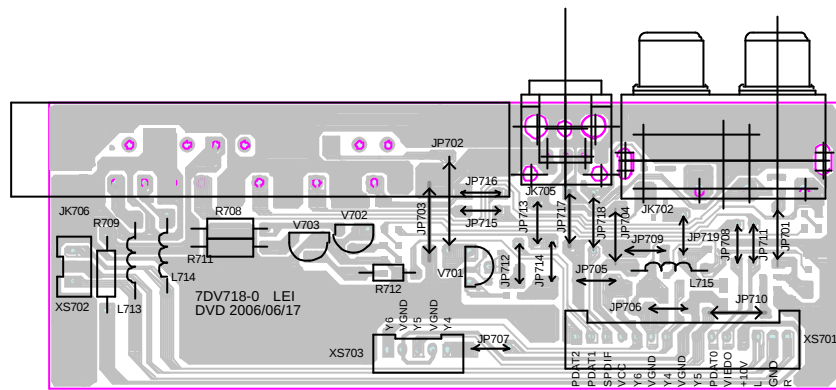
5.1.7 Surface layer of MIC Board



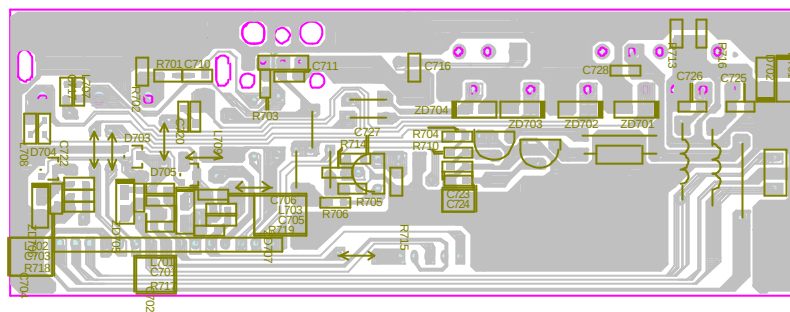
5.1.8 Bottom layer of MIC Board



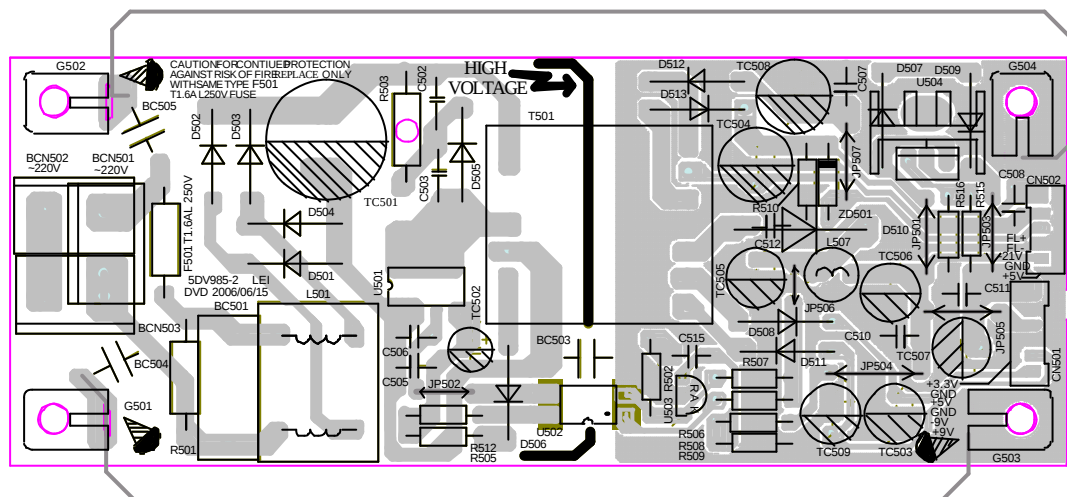
5.1.9 Surface layer of AV Board



5.1.10 Bottom layer of AV Board

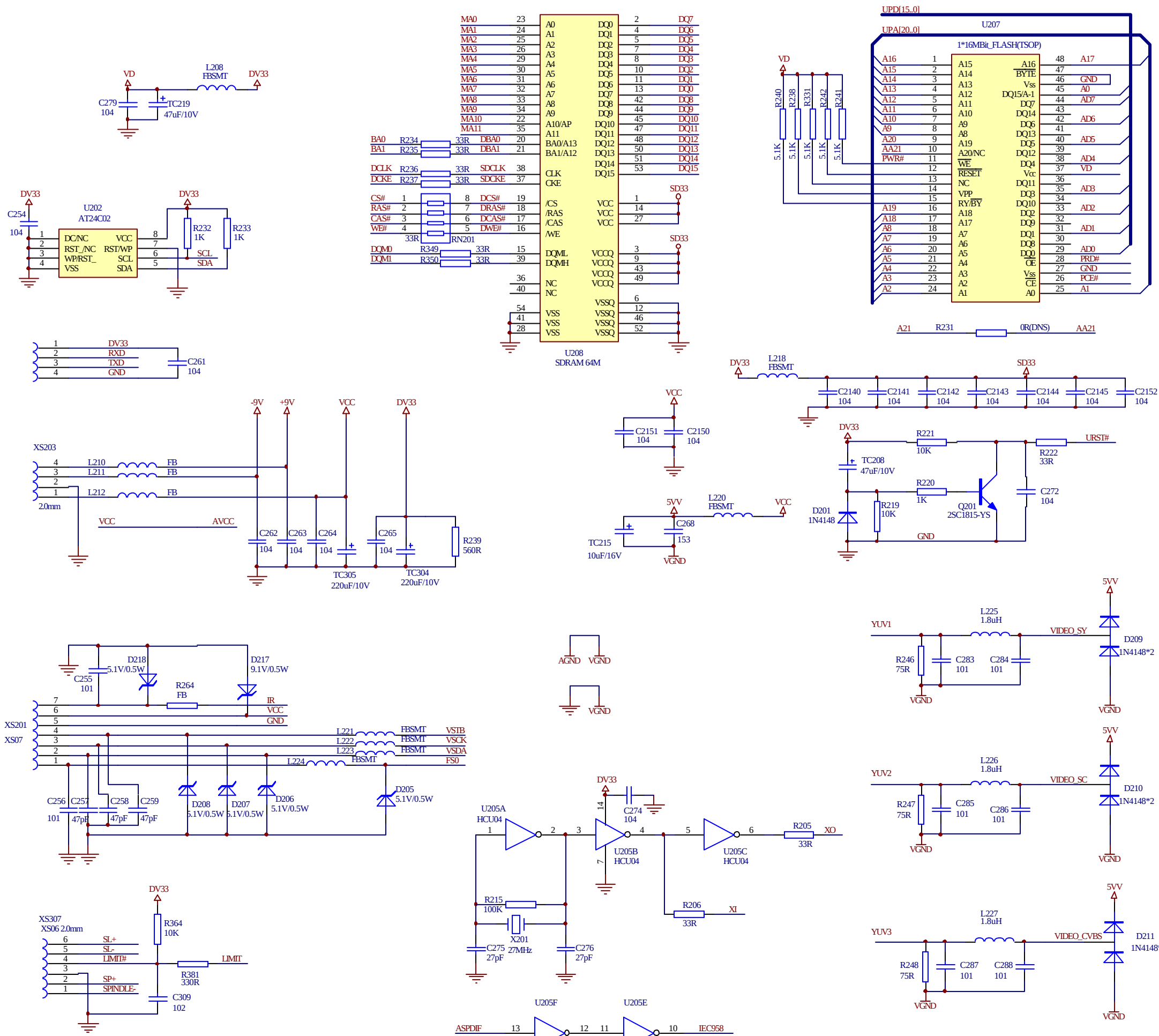


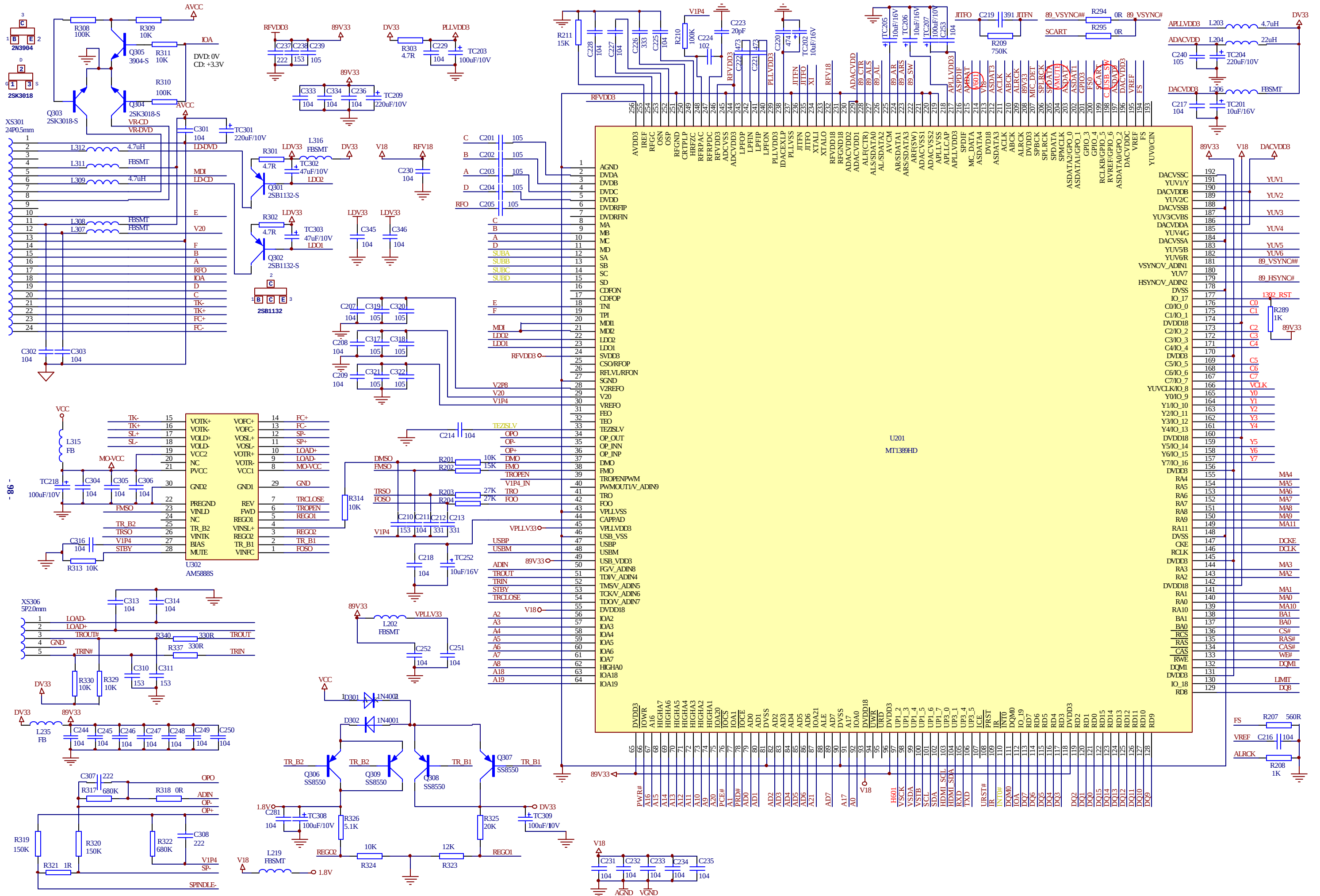
5.1.11 POWER Board

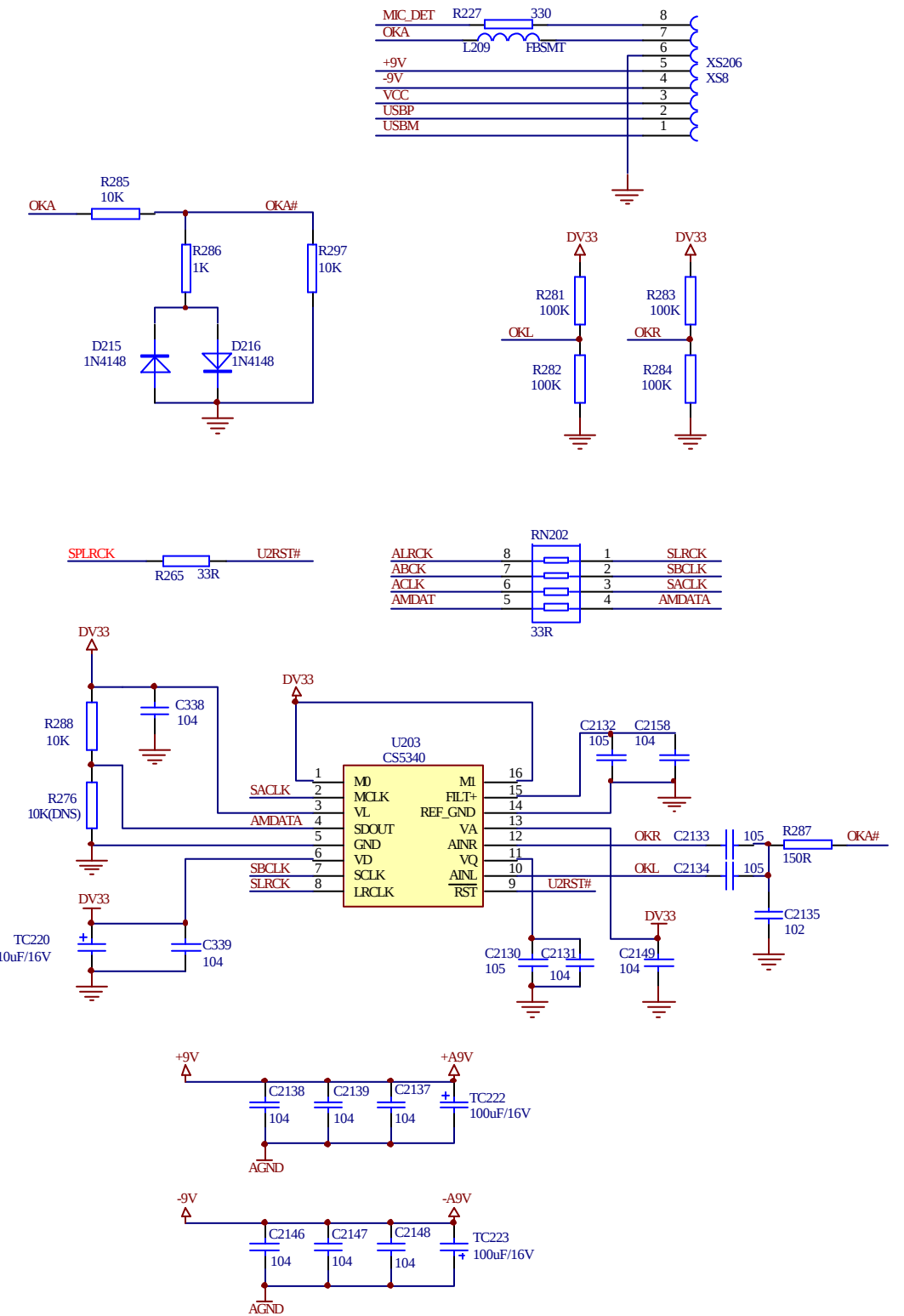
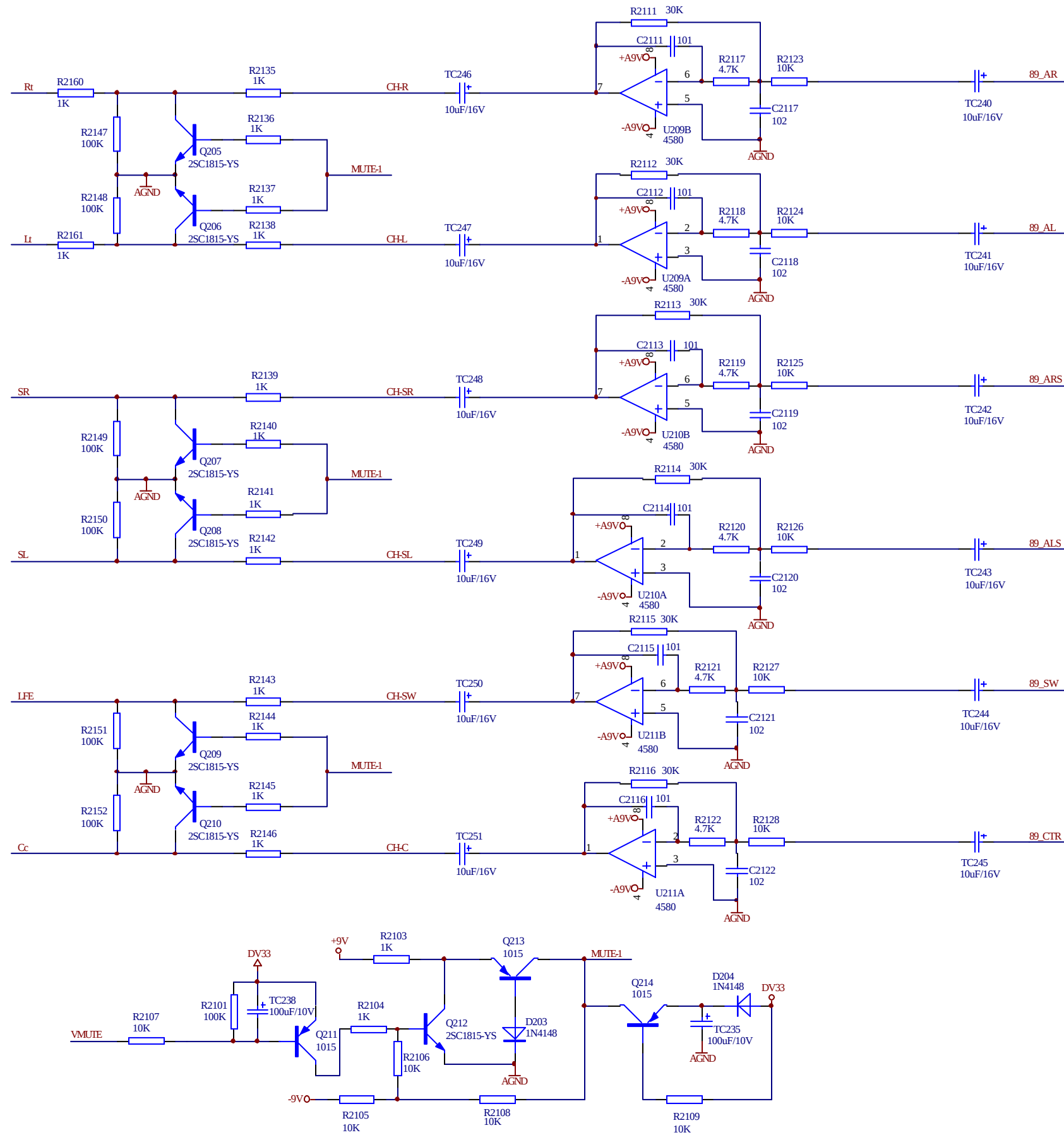


Section Two circuit diagram

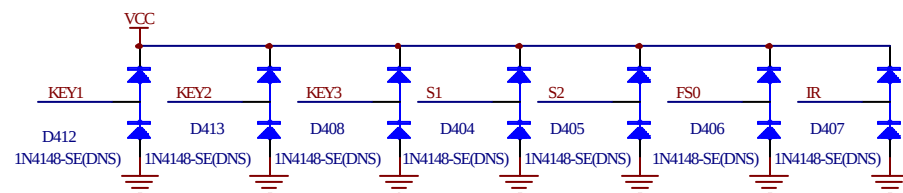
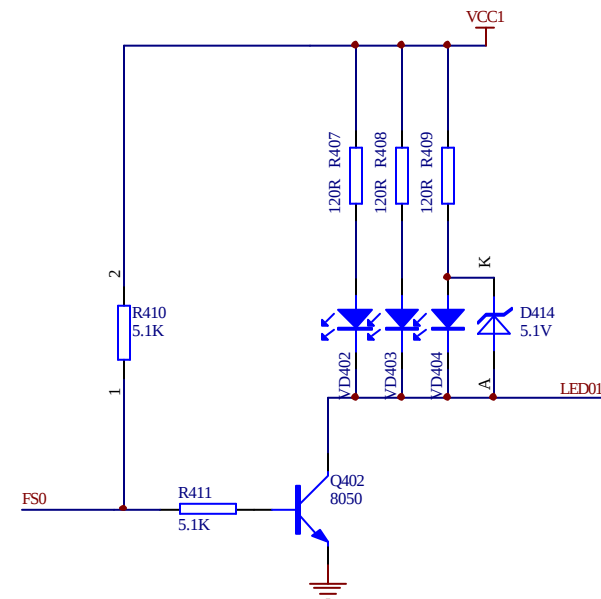
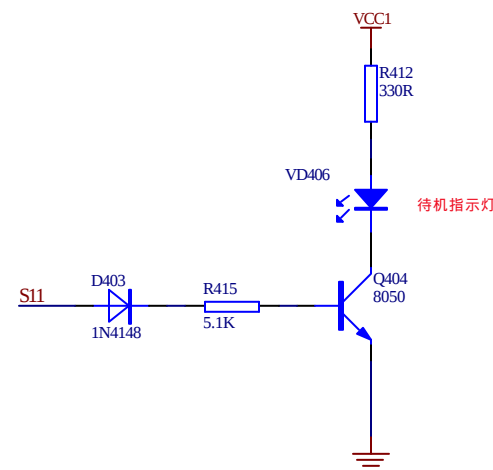
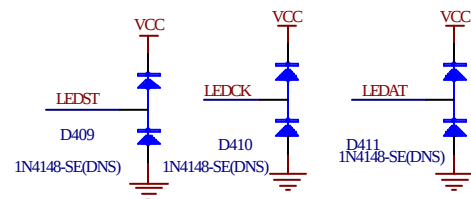
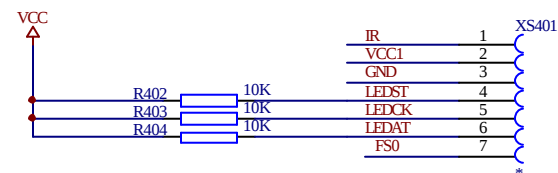
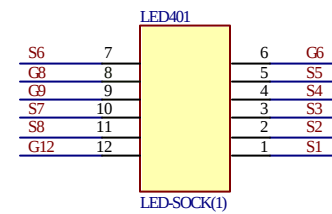
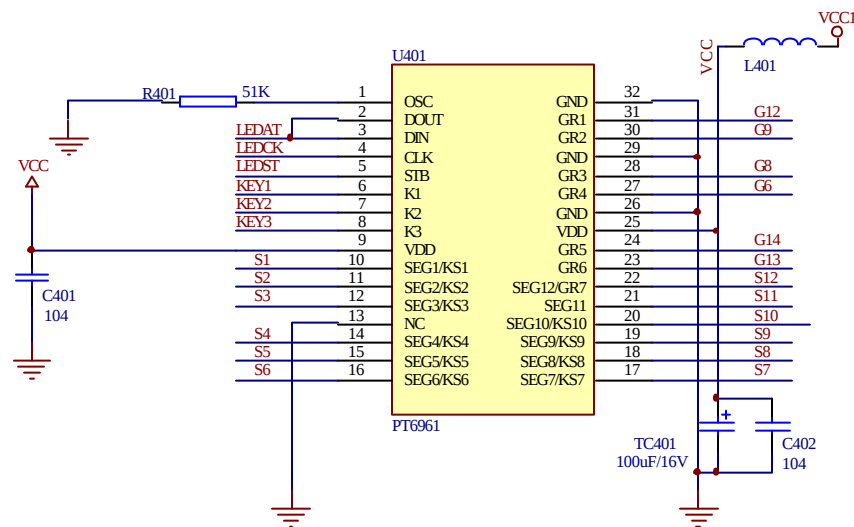
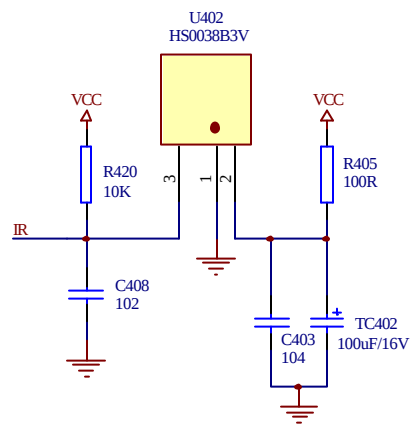
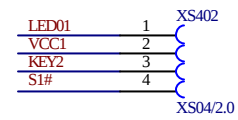
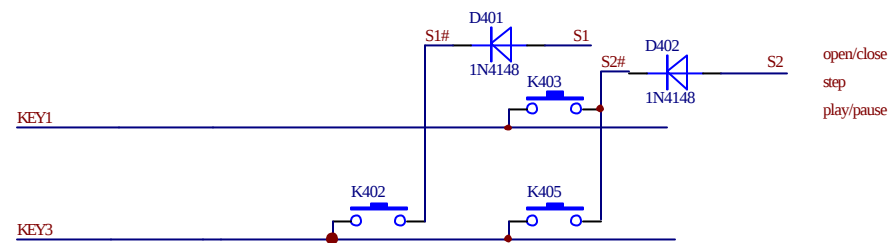
5.2.1 DECODE&SERVO Board



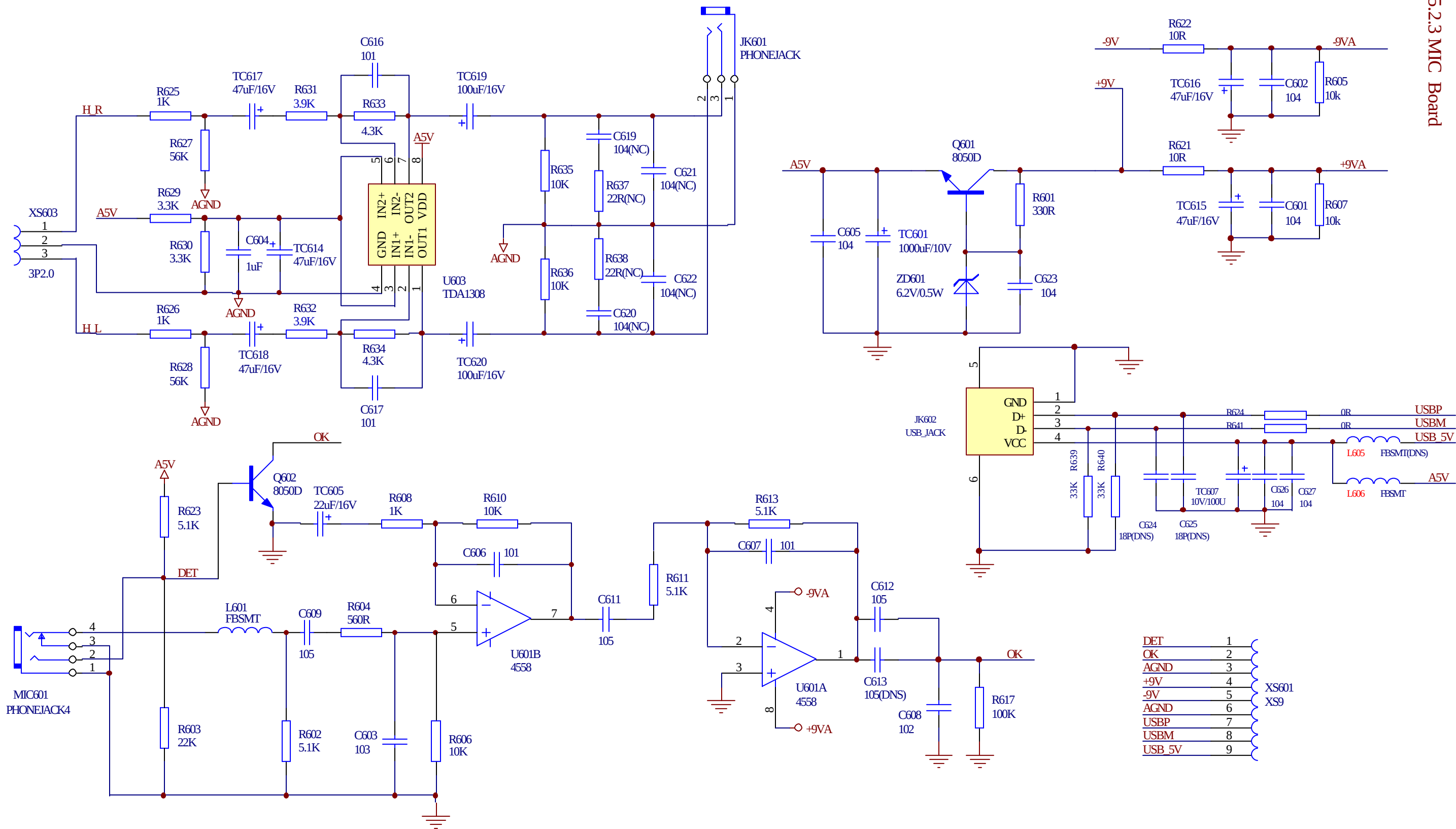


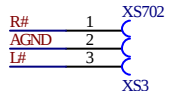
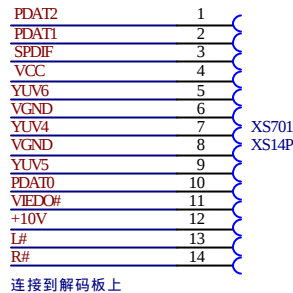
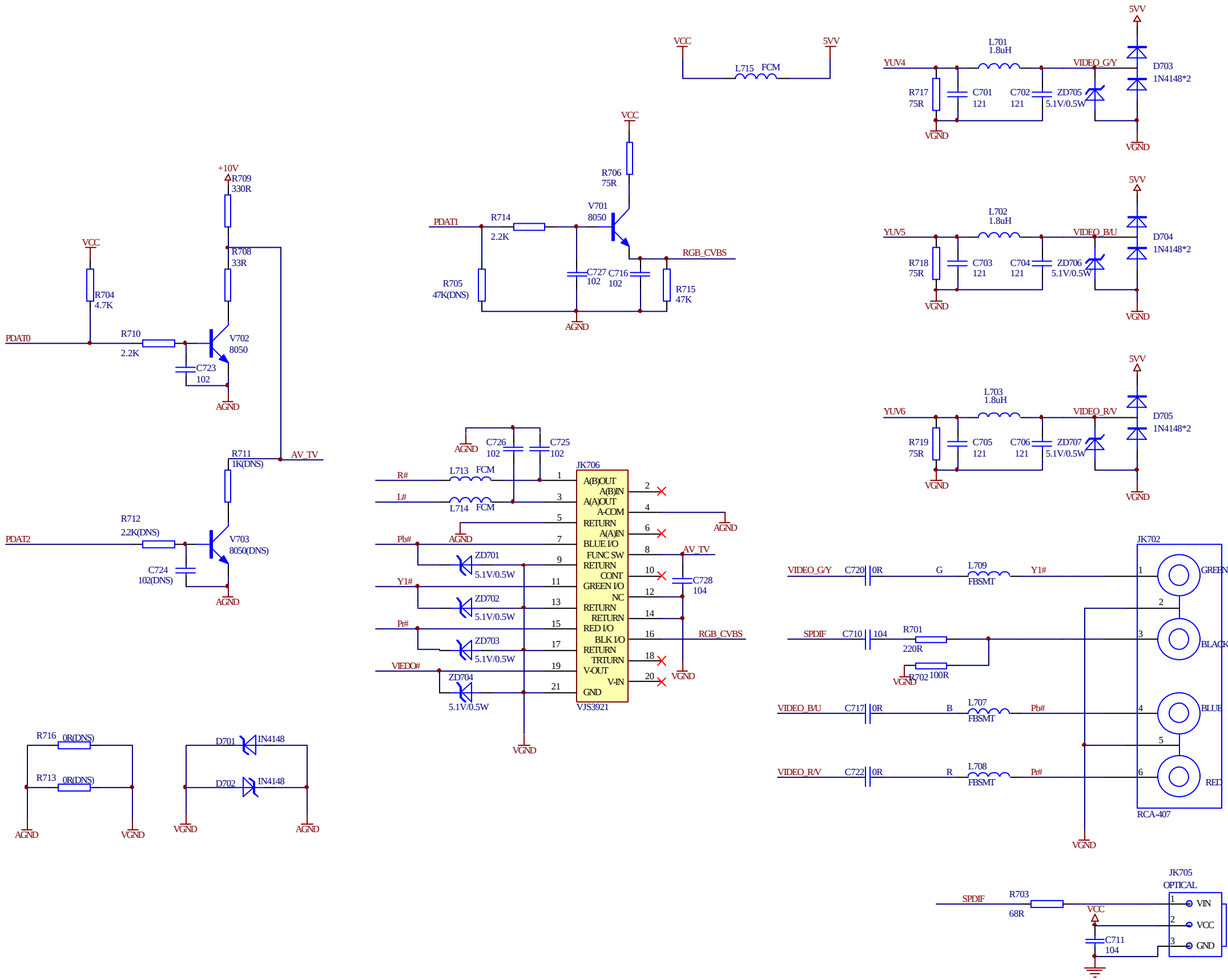


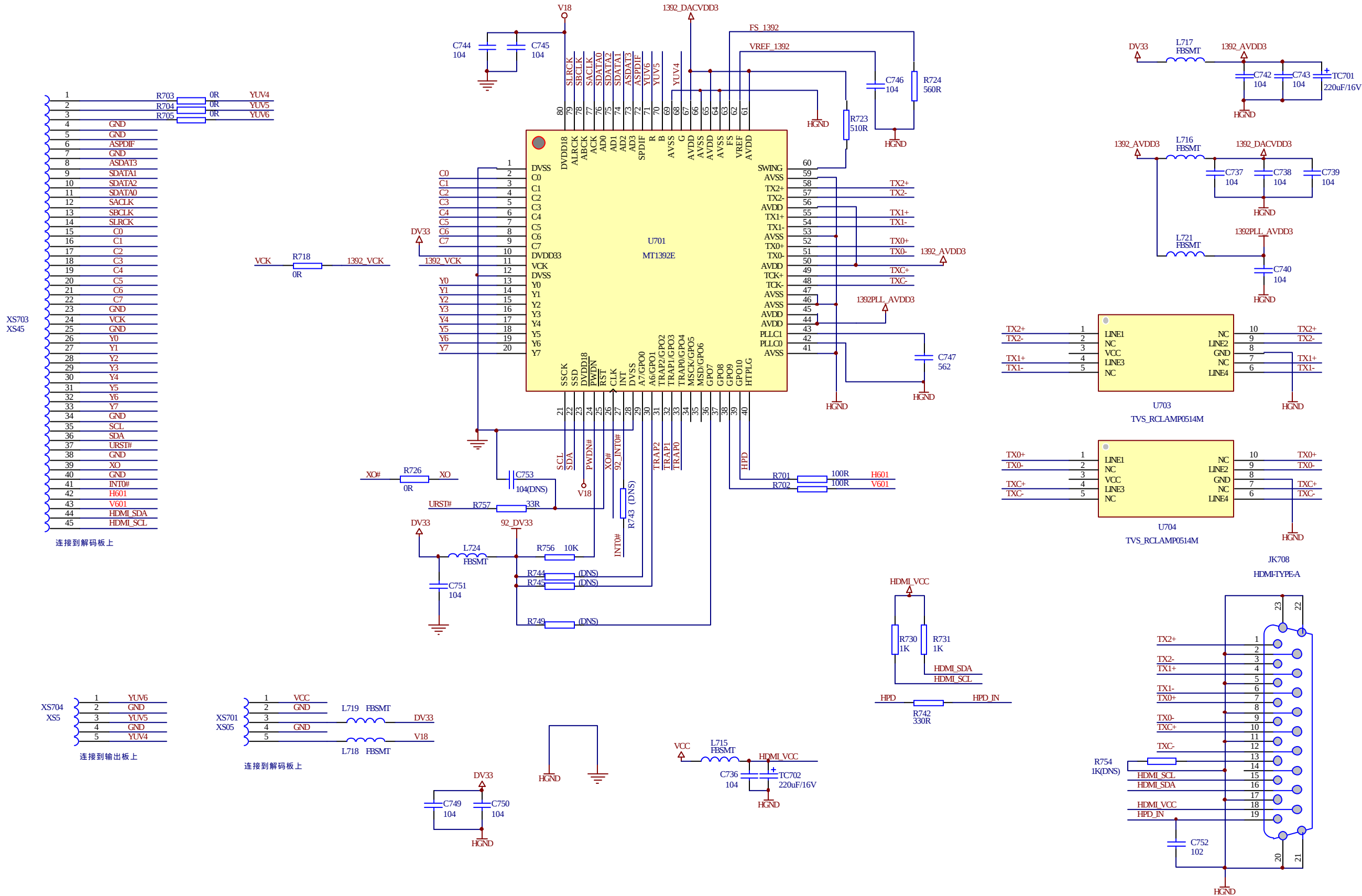
5.2.2 KEY SCAN Board

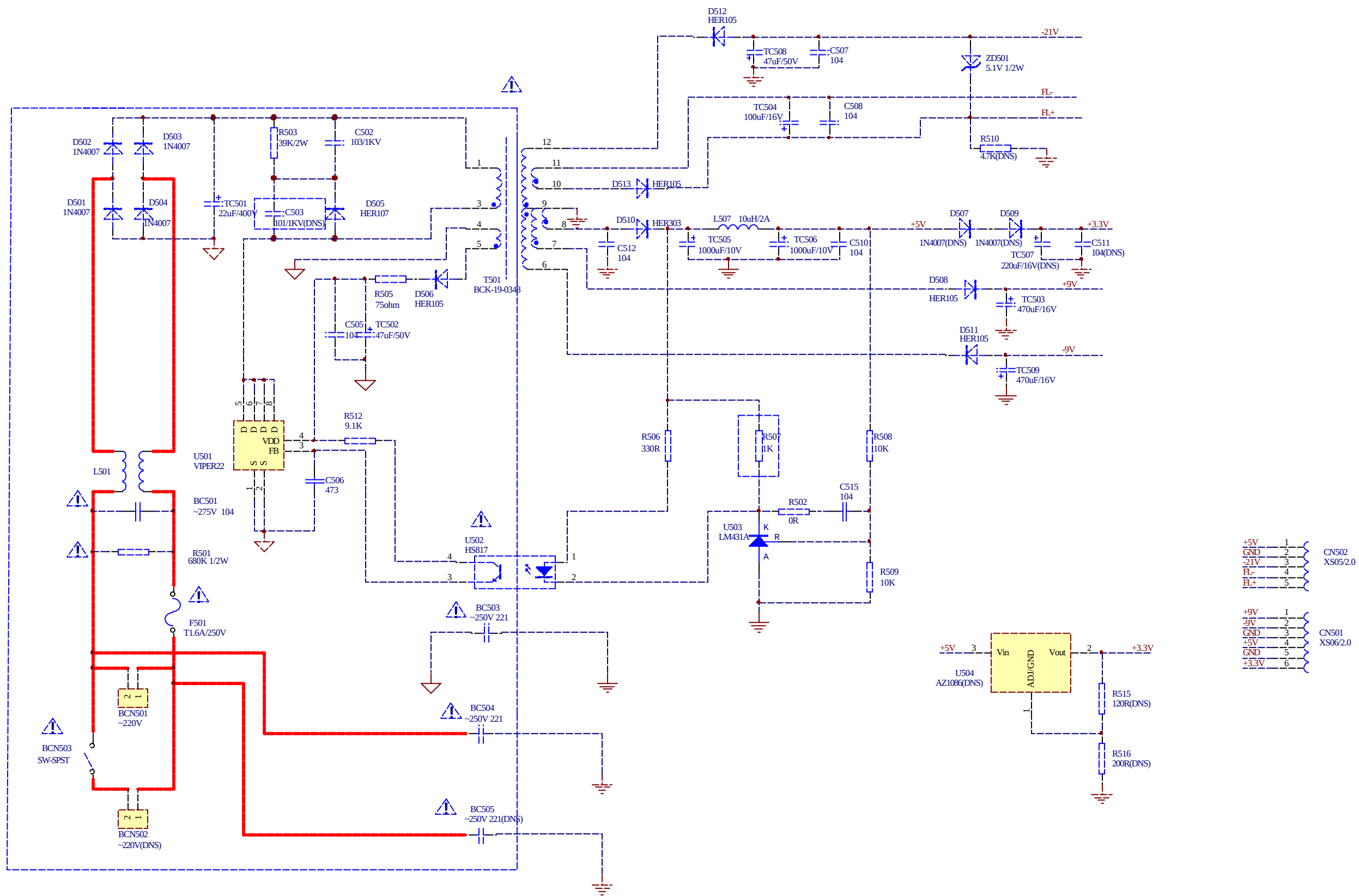


5.2.3 MIC Board









Chapter six BOM List

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
DV718SI (RU) SILVER[1389HD]			
AV BOARD : (7DV718-0 DV718SI(RU) SILVER[1389HD]) 5448709 1.3/V2.0			
0090001	SMD RESISTOR	1/16W 00±5% 0603	C717,C720,C722
0090006	SMD RESISTOR	1/16W 75O±5% 0603	R717~R719,R706
0090238	SMD RESISTOR	1/16W 68O±5% 0603	R703
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R702
0090008	SMD RESISTOR	1/16W 220O±5% 0603	R701
0090017	SMD RESISTOR	1/16W 2.2K±5% 0603	R710,R714
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R704
0700007	SMD DIODE	1N4148	D701,D702
0700001	SMD DIODE	LS4148	D701,D702
0700002	SMD DIODE	LL4148	D701,D702
0780050	TRIODE	S8050D	V701,V702
0310326	SMD CAPACITOR	50V 121±5% NPO 0603	C701~C706
0700004	SMD VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W	ZD701~ZD707
0310066	SMD CAPACITOR	50V 102±10% X7R 0603	C723,C716,C727
0310207	SMD CAPACITOR	50V 104 ±20% X7R 0603	C710,C728
0310543	SMD CAPACITOR	50V 104±10% X7R 0603	C710,C728
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C711
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R715
0390095	SMD MAGNETIC BEADS	FCM1608K-221T05	L707,L708,L709
0700056	SMD DOUBLE DIODE	MMBD4148SE SOT-23	D703~D705
0390096	SMD INDUCTOR	1.8UH±10% 1608	L701~L703
0390057	MAGNETIC BEADS INDUCTOR	RH354708	L713~L715
0000273	CARBON FILM RESISTOR	1/4W330±5% SHAPED 10	R708
0000278	CARBON FILM RESISTOR	1/4W330O±5% SHAPED 10	R709
1090045	ELECTRO-OPTIC TRANSFORMER	TX179ATW	JK705
1090024	ELECTRO-OPTIC TRANSFORMER	TX179AT	JK705
1910078	TERMINAL SOCKET	AV4-8.4-6G-3	JK702
1860029	SCART SOCKET	SCART-01	JK706

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1940026	SOCKET	3P 2.0mm	XS702
1940024	SOCKET	5P 2.0mm	XS703
1940075	SOCKET	15P 2.0mm	XS701
2100010	LEAD	F 0.6 SHAPED 5mm	JP705~JP709,JP711~JP716,JP719
2100003	LEAD	F 0.6 SHAPED 7.5mm	JP701,JP704,JP710,JP717,JP718
2100004	LEAD	F 0.6 SHAPED 10mm	JP703
2100006	LEAD	F 0.6 SHAPED 12.5mm	JP702
1564359	PCB	7DV718-0	
DV718SI (RU) SILVER[1389HD]			
DECODE BOARD : 2DV718-2 1.8/Ver2.3			
0090324	SMD RESISTOR	1/16W 00±5% 0402	R213,R214,R318
0090445	SMD RESISTOR	1/16W 10±5% 0402	R321
0090457	SMD RESISTOR	1/16W2.20±5% 0402	R706
0090507	SMD RESISTOR	1/16W 4.70±5% 0402	R301,R302
0090106	SMD RESISTOR	1/16W 4.70±5% 0603	R303
0090005	SMD RESISTOR	1/16W 330±5% 0603	R222,R265,R360~R363,R274,R275
0090330	SMD RESISTOR	1/16W 330±5% 0402	R350,R234,R349,R235~R237,R206
0090336	SMD RESISTOR	1/16W750±5% 0402	R224,R246~R248
0090759	SMD RESISTOR	1/16W 1500±5% 0402	R287
0090338	SMD RESISTOR	1/16W910±5% 0402	R223
0090350	SMD RESISTOR	1/16W3300±5% 0402	R227,R337,R340,R381,R277,R2160,R2161
0090012	SMD RESISTOR	1/16W 5600±5% 0603	R207
0090356	SMD RESISTOR	1/16W5600±5% 0402	R239
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R208,R220,R348,R289
0090362	SMD RESISTOR	1/16W 1K±5% 0402	R232,R233,R286,R2103,R2104,R2135~R2146
0090377	SMD RESISTOR	1/16W 4.7K±5% 0402	R2117~R2122
0090020	SMD RESISTOR	1/16W 5.1K±5% 0603	R238,R240,R241,R242,R331
0090378	SMD RESISTOR	1/16W 5.1K±5% 0402	R326
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R219,R221,R314
0090385	SMD RESISTOR	1/16W 10K±5% 0402	R201,R285,R288,R297,R309,R311,R313,R324,R329,R330,R364,R2105~R2109,R2123~R2128
0090387	SMD RESISTOR	1/16W 12K±5% 0402	R323

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090389	SMD RESISTOR	1/16W 15K±5% 0402	R202,R211
0090391	SMD RESISTOR	1/16W 20K±5% 0402	R325
0090394	SMD RESISTOR	1/16W 27K±5% 0402	R203,R204
0090395	SMD RESISTOR	1/16W 30K±5% 0402	R2113~R2116
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R210
0090398	SMD RESISTOR	1/16W 39K±5% 0402	R2111,R2112
0090408	SMD RESISTOR	1/16W 100K±5% 0402	R215,R281~R284,R308,R310,R2101,R2147~R2152
0090001	SMD RESISTOR	1/16W 00±5% 0603	R295
0090412	SMD RESISTOR	1/16W 150K±5% 0402	R319,R320
0090429	SMD RESISTOR	1/16W 680K±5% 0402	R317,R322
0100019	SMD RESISTOR NETWORKS	1/16W 330±5% 8P	RN201,RN202
0090668	PRECISION SMD RESISTOR	1/16W 750K±1% 0402	R209
0310415	SMD CAPACITOR	50V 20P±5% NPO 0402	C223
0310190	SMD CAPACITOR	50V 27P±5% NPO 0603	C275,C276
0310424	SMD CAPACITOR	50V 47P±5% NPO 0402	C257~C259
0310432	SMD CAPACITOR	50V 101±5% NPO 0402	C255,C256,C2111~C2116,C283~C288
0310392	SMD CAPACITOR	50V 102±10% X7R 0402	C224,C309,C2135,C2117~C2122,C705,C706
0310726	SMD CAPACITOR	16V 104±10% X5R 0402	C207~C209,C211,C214,C225,C227~C229,C253,C254,C264,C265,C279,C281,C301,C313,C314,C316,C338,C345,C346,C2131,C2149,C2158,C2137~C2142,C2145~C2148,C2152
0310207	SMD CAPACITOR	50V 104 ±20% X7R 0603	C216,C218,C230~C236,C244~C252,C272,C302~C306,C262,C263,C2150,C2151,C274,C339,C2143,C2144,C333,C334,C217
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C201~C205,C239,C240,C317~C322,C2130,C2132,C2133,C2134
0310201	SMD CAPACITOR	50V 153±10% X7R 0603	C238,C268
0310394	SMD CAPACITOR	50V 222±10% X7R 0402	C307,C308
0310068	SMD CAPACITOR	50V 222±10% X7R 0603	C237
0310454	SMD CAPACITOR	16V 153±10% X7R 0402	C210,C310,C311
0310794	SMD CAPACITOR	16V 331±5% NPO 0402	C212,C213
0310570	SMD CAPACITOR	16V 333 ±10% X7R 0402	C226
0310795	SMD CAPACITOR	16V 391±5% NPO 0402	C219
0310482	SMD CAPACITOR	16V 473 ±10% X7R 0402	C221,C222

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0310362	SMD CAPACITOR	16V474 +80%-20% Y5V 0603	C220
0390453	SMD MAGNETIC BEADS	GZ1005D221T 0402	R264,L205,L207
0390095	SMD MAGNETIC BEADS	FCM1608K-221T05	L202,L206,L208,L209,L218~L224,L307,L308,L311,L316
0390444	SMD MAGNETIC BEADS	PZ2012U121	L210,L211,L235,L315
0390452	SMD MAGNETIC BEADS	PZ3216D121	L212
0390096	SMD INDUCTOR	1.8UH±10% 1608	L225~L227
06801009	SCHOTTKY DIODE	SR260 DO-15 BELT	D301
0390274	SMD INDUCTOR	1.2UH±10% 1608	R205
0390355	SMD INDUCTOR	4.7UH±10% 1608	L203,L309,L312
0390385	SMD INDUCTOR	22uH±10% 2012	L204
0700056	SMD DOUBLE DIODE	MMBD4148SE SOT-23	D209~D211
0700004	SMD VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W	D205~D208,D218,ZD201~ZD203
0700113	SMD VOLTAGE REGULATOR DIODE	9.1V±5% 1/2W	D217
0780062	SMD TRIODE	9014C	Q220
0780115	SMD TRIODE	2SB1132	Q301,Q302
0780193	SMD TRIODE	2SK3018	Q303,Q304
0780040	SMD TRIODE	3904(100-300) SOT-23	Q305
0780198	SMD TRIODE	2SA1015	Q211,Q213,Q214
0780197	SMD TRIODE	C1815	Q201,Q205~Q210,Q212
0700007	SMD DIODE	1N4148	D201,D203,D204,D215,D216
02607829	CD	CD11C 10V220U±20%6×12 C5 BELT	TC301
02600279	CD	CD11 16V100U±20%6×12 2.5 BELT	TC222,TC223
02607819	CD	CD11C 10V100U±20%5×11 C2.5 BELT	TC203,TC207,TC218,TC308,TC309,TC235,TC238
02602229	CD	CD11C 10V220U±20%6×7 2.5 BELT	TC204,TC209,TC304,TC305
02607809	CD	CD11C 10V47U±20%4×7 C2.5 BELT	TC208,TC219,TC302,TC303
02607799	CD	CD11C 16V10U±20%4×7 C2.5 BELT	TC201,TC202,TC205,TC206,TC215,TC240~TC252
0880322	IC	MM74HCU04M SOP	U205
0880513	IC	HCU04 SOP	U205
0882353	IC	CS5340 TSSOP	U203
08828028	IC	AM5888S L/F HSOP\$	U302
0882644	IC	MT1389FE/H(HD) QFP	U201

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0881415	IC	HY57V641620HGT-7 TSOP	U208
0881742	IC	F4558 SOP	U209,U210,U211
0881947	IC	A21SC SOP	U202
0960020	CMETAL OXIDE FILM RESISTORSTAL OSCILLATOR	27.00MHz 49-S	X201
07803199	TRIODE	SS8550 TO-92 BELT	Q306,Q307,Q308,Q309
05700039	DIODE	1N4001 BELT	D302
1940022	SOCKET	4P 2.0mm	XS203
1940024	SOCKET	5P 2.0mm	XS306,XS208
1940005	SOCKET	6P 2.0mm	XS307
1940023	SOCKET	7P 2.0mm	XS201
1940008	SOCKET	8P2.0mm	XS206
1940075	SOCKET	15P 2.0mm	XS204
1940094	CABLE SOCKET	24P 0.5mm SMD SUBMIT MEET WITH CLASP	XS301
1940289	CABLE SOCKET	45P 0.5mm SMD VERTICAL REVERSE MEET WITH CLASP	XS207
1910129	TERMINAL SOCKET	SA-001-012 BLACK IRON PIECE,SCREEN-SHIELDED	JK703
1910079	TERMINAL SOCKET	AV8-8.4-6G-3	JK701
1633428	PCB	2DV718-2	
DV718SI (RU) SILVER[1389HD]			
HIGH DEFINITION SCREEN		5448708	
0090001	SMD RESISTOR	1/16W 00±5% 0603	R726
0090005	SMD RESISTOR	1/16W 33O±5% 0603	R757
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R742
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R756
0090220	SMD RESISTOR	1/16W 51O±5% 0603	R718
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R730,R731
0090249	SMD RESISTOR	1/16W 510O±5% 0603	R723
0090012	SMD RESISTOR	1/16W 560O±5% 0603	R724
0310199	SMD CAPACITOR	50V 562±10% X7R 0603	C747
0310066	SMD CAPACITOR	50V 102±10% X7R 0603	C752
0310207	SMD CAPACITOR	50V 104 ±20% X7R 0603	C740,C742~C746,C749,C750,C751,C736~C739
0310543	SMD CAPACITOR	50V 104±10% X7R 0603	C740,C742~C746,C749,C750,C751,C736~C739

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0390095	SMD MAGNETIC BEADS	FCM1608K-221T05	L715~L719,L721,L724
0260028	CD	CD11 16V220U±20%6×12 2.5	TC701,TC702
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R701,R702
0882969	IC	MT1392 QFP(C EDITION)	U701
1860102	HDMI	51U019S-333N-A	JK708
1940289	CABLE SOCKET	45P 0.5mm SMD VERTICAL REVERSE MEET WITH CLASP	XS703
1940024	SOCKET	5P 2.0mm	XS701,XS704
1633343	PCB	TDV985-1	
DV718SI (RU) SILVER[1389HD]			
MAIN PANEL		5448083	
3072182	LAMP BRACKET	DV985	
0620002	RADIATION DIODE	F 3 RED	VD406
1200788	LEDDISPLAY SCREEN	4MB40205B18	LED401
2360019	IR SENSOR	AT138B	U402
5230389	SOFT SPONGE SPACER	30×4.8×8 20×6×4.5 SINGLE-FACED,HARD	
0260201	CD	CD11C 16V100U±20%6×7 2.5	TC401,TC402
0881687	IC	SN1692 SOP	U401
1340003	LIGHT TOUCH RESTORE SWITCH	HORIZONTAL 6×6×1	K402,K403,K405
0620203	RADIATION DIODE	2B 43PC COLORLESS ISSUE BLUE 2×4×4	VD404,VD402,VD403
5235043	SOFT SPONGE SPACER	8×6×11 DOUBLE-FACED,HARD	
2122382	FLAT CABLE	7P130 2.0 2 PIN,WITH NEEDLE REVERSE 30# CORD	XS401
2122383	FLAT CABLE	4P210 2.0 2 PIN,WITH NEEDLE TOGETHER DIRECTION 30# CORD	XS402
3072183	LIGHT CAP	DV985 TRANSPARENCE	
0390095	SMD MAGNETIC BEADS	FCM1608K-221T05	L401
0780085	SMD TRIODE	8050D	Q402,Q404
0700007	SMD DIODE	1N4148	D401~D403
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R402~R404,R420
0090020	SMD RESISTOR	1/16W 5.1K±5% 0603	R410,R411,R415
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R412
0090221	SMD RESISTOR	1/16W 120O±5% 0603	R407~R409
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R405

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090192	SMD RESISTOR	1/16W 51K±5% 0603	R401
0310057	SMD CAPACITOR	16V 104±10% 0603	C401~C403
0310066	SMD CAPACITOR	50V 102±10% X7R 0603	C408
0700004	SMD VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W	D414
1633102	PCB	4DV985-1	
DV718SI (RU) SILVER[1389HD]			
OK BOARD 5448710			
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R601
0090012	SMD RESISTOR	1/16W 560O±5% 0603	R604
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R608,R625,R626
0090001	SMD RESISTOR	1/16W 0O±5% 0603	R624,R641
0090018	SMD RESISTOR	1/16W 3.3K±5% 0603	R630
0090028	SMD RESISTOR	1/16W 33K±5% 0603	R639,R640
0090224	SMD RESISTOR	1/16W 3.9K±5% 0603	R631, R632
0090184	SMD RESISTOR	1/16W 4.3K±5% 0603	R633, R634
0090020	SMD RESISTOR	1/16W 5.1K±5% 0603	R602, R613, R623
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R606,R610,R635,R636
0090026	SMD RESISTOR	1/16W 22K±5% 0603	R603
0090030	SMD RESISTOR	1/16W 56K±5% 0603	R627,R628
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R617
0310047	SMD CAPACITOR	50V 101±5% NPO 0603	C606, C607, C616, C617
0260781	CD	CD11C 10V100U±20%5×11 C2.5	TC607
0310066	SMD CAPACITOR	50V 102±10% X7R 0603	C608
0310072	SMD CAPACITOR	50V 103±10% X7R 0603	C603
0310207	SMD CAPACITOR	50V 104 ±20% X7R 0603	C601,C602,C604,C605,C623,C626,C627
0310222	SMD CAPACITOR	25V 104±20% X7R 0603	C601,C602,C604,C605,C623,C626,C627
0310543	SMD CAPACITOR	50V 104±10% X7R 0603	C601,C602,C604,C605,C623,C626,C627
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C609,C611,C612
0000118	CARBON FILM RESISTOR	1/6W100±5% SHAPED 7.5	R621,R622
03900579	MAGNETIC BEADS INDUCTOR	RH354708 BELT	L605
0000339	CARBON FILM RESISTOR	1/6W3.3K±5% SHAPED 7.5	R629

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0000134	CARBON FILM RESISTOR	1/6W5.1K±5% SHAPED 7.5	R611
0260094	CD	CD110 16V47U±20%5×11 2	TC614~TC618
0260025	CD	CD11 16V47U±20%5×11 2	TC614~TC618
0260200	CD	CD11C 16V47U±20%5×7 2	TC614~TC618
0260327	CD	GZ16V100U±20%6×12 2.5	TC619, TC620
0260027	CD	CD11 16V100U±20%6×12 2.5	TC619, TC620
0260096	CD	CD110 16V100U±20%6×12 2.5	TC619, TC620
0260175	CD	CD11C 16V100U+20%-15%6×7 2.5	TC619, TC620
0260201	CD	CD11C 16V100U±20%6×7 2.5	TC619, TC620
0260021	CD	CD11 16V22U±20%5×11 2	TC605
0260037	CD	CD11 25V22U±20%5×11 2	TC605
0390095	SMD MAGNETIC BEADS	FCM1608K-221T05	L601
0260237	CD	CD11 10V1000U±20%8×14 3.5	TC601
0260352	CD	GS 10V1000U±20%8×14 3.5	TC601
0700020	SMD VOLTAGE REGULATOR DIODE	6.2V±5% 1/2W	ZD601
0780085	SMD TRIODE	8050D	Q601,Q602
0880124	IC	NJM4558D DIP	U601
0880308	IC	KA4558 DIP	U601
0881537	IC	TDA1308 SOP	U603
1980018	MICROPHONE SOCKET	CK3-6.35-24	MIC601
2122389	FLAT CABLE	8P250 2.0 2 PIN,WITH NEEDLE REVERSE 30# CORD	XS601
2150296	FLAT CABLE	3P180 2.0 T2 1 SHIELD,WITH NEEDLE REVERSE 28# CORD	XS603
1564414	PCB	6DV718-1	
2100010	LEAD	F 0.6 SHAPED 5mm	JP604,JP607,JP608,JP609,JP610
2100003	LEAD	F 0.6 SHAPED 7.5mm	JP601,JP602,JP605,JP603
1860047	USB SOCKET	CAM-B85-4Pin	JK602
2100004	LEAD	F 0.6 SHAPED 10mm	JP606
1980046	EARPHONE SOCKET	ST-301-030-100	JK601
3870115	GROUND CHIP OF POWER BOARD	AB903	G601, G602
DV718SI (RU) SILVER[1389HD]			
POWER BOARD		5448711	

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
3870115	GROUND CHIP OF POWER BOARD	AB903	G501~G504
2300049	FUSE	@T1.6AL 250V 3.6×10 VDE	F501
1940045	SOCKET	2P 8.0mm 2#	BCN501
1940022	SOCKET	4P 2.0mm	CN501
0460623	SWITCH POWER TRANSFORMER	@BCK-19-0348 SJ	T501
1000043	POWER GRID FILTER	@UT-20 40mH±20%10×13 UL	L501
1080032	PHOTOELECTRIC COUPLER	@HS817 VDE	U502
0880863	IC	HA17431VP TO-92	U503
0881933	IC	VIPER22A DIP8	U501
05700059	DIODE	1N4007 BELT	D501~D504
0680046	SCHOTTKY DIODE	SR560 DO-27 SHAPED R 17.5×8	D510
02003809	PORCELAIN CAPACITOR	100V 152±10%5MM BELT	C512
05700149	DIODE	HER107 BELT	D505,D508,D511
05700139	DIODE	HER105 BELT	D506
0410011	CHOKE COIL	VERTICAL 10UH 2A 5mm	L507
0260341	CD	ZT 400V22μ±20%f 16×20 7.5	TC501
02606879	CD	CD11T 10V1000u±20%8×16 C5 BELT	TC505,TC506
02607989	CD	CD11T 16V470U±20%8×12 C5 BELT	TC509,TC503
02606849	CD	CD11T 50V47u±20%6×12 C5 BELT	TC502
02002249	PORCELAIN CAPACITOR	1000V 103 +80%-20% 7.5mm BLET	C502
0200359	CERAMIC CAPACITOR	@250V 221±10% 10mm VDE	BC503,BC504
02001389	PORCELAIN CAPACITOR	50V 104±20% 5mm BELT	C505,C510,C515
02001369	PORCELAIN CAPACITOR	50V 473±20% 5mm BELT	C506
0010159	METAL OXIDE FILM RESISTOR	2W39K±5%SHAPED FLAT 15×7	R503
00100159	METAL FILM RESISTOR	1/4W10K±1% BELT	R508,R509
00002159	CARBON FILM RESISTOR	1/4W9.1K±5% BELT	R512
00001959	CARBON FILM RESISTOR	1/4W1K±5% BELT	R507
00001859	CARBON FILM RESISTOR	1/4W330O±5% BELT	R506
00001639	CARBON FILM RESISTOR	1/4W10O±5% BELT	R505
2100006	LEAD	F 0.6 SHAPED 12.5mm	JP504
2100004	LEAD	F 0.6 SHAPED 10mm	JP505,R502

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
2100003	LEAD	F 0.6 SHAPED 7.5mm	JP502
2100010	LEAD	F 0.6 SHAPED 5mm	JP506
0210207	TERYLENE CAPACITOR	@275V 104±20% 15mm VDE	BC501
00700169	HIGH PRESSURE RESISTOR	@1/2W680K±5% VDE BELT	R501
1564443	PCB	@5DV985-2 UL	
DV718SI (RU) SILVER[1389HD]			
REMOTE CONTROL		5471742	
0310048	SMD CAPACITOR	50V 151±5% NPO 0603	C802,C803
0630009	EMISSION PIPE	TSAL4400	LED801
0700007	SMD DIODE	1N4148	D801~D803
0700001	SMD DIODE	LS4148	D801~D803
0700002	SMD DIODE	LL4148	D801~D803
0780130	SMD TRIODE	STC3265	Q801
0880220	IC	PT2222 SOP	U801
0882379	IC	S0102B SOP	U801
0970003	CERAMIC RESONATOR	455E	X801
4000038	SELF-TAPPING SCREW	PB 2.3×6 COLOR ZINC	
0090272	SMD RESISTOR	1/16W 10±5% 0603	R801
1564324	PCB	8516SI-3	
3031856	REMOTE CONTROLLERSURFACE CASING	RC026-05R BLACK	
3041399	BOTTOM CASING OF REMOTE CONTROL	RC026 BLACK 2#	
3051319	BATTERY CASE DOOR OF REMOTE CONTROL	RC026 BLACK 2#	
3051273	GLASS OF REMOTE CONTROLLER	RC026 MING PURPLE	
3850124	ANODE SPRING	RC026	
3850125	CATHODE SPRING	RC026	
3850126	ANODE/CATHODE SPRING	RC026	
4631052	CONDUCT GLUE OF REMOTE CONTROL	RC026-01R 4#	
5070070	GLUE BAG	85×250	
DV718SI (RU) SILVER[1389HD]			
SUBSIDIARY PANEL		5448084	

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
3072182	LAMP BRACKET	DV985	
1340003	LIGHT TOUCH RESTORE SWITCH	HORIZONTAL 6×6×1	K901
0000619	CARBON FILM RESISTOR	1/6W130K±5% BELT	R901,R902
1940022	SOCKET	4P 2.0mm	XS901
3072183	LIGHT CAP	DV985 TRANSPARENCE	
0620203	RADIATION DIODE	2B 43PC COLORLESS ISSUE BLUE 2×4×4	LED901,LED902
0700004	SMD VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W	D901
1564266	PCB	9DV985-1	
DV718SI (RU) SILVER[1389HD]			
PROGRAM FLASH ROMDV718SIRU-0A(16M) 0911767			
0881650	IC	29LV160BE-70PFTN TSOP	U207
0881651	IC	M29W160EB 70N6 TSOP	U207