DK1110SI

service manual

Catalog

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-scaleintegrated 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 de 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 (≥100MHE)
- ◆ TV set
- ◆ SMD rework station
- ◆ Multimeter
- ◆ Soldering iron
- ◆ Pointed-month pincers
- ◆ Cutting nippers
- ◆ Forceps
- ◆ Electric screw driver
- ◆ Terminals connecting cord
- ◆ Headphone
- ◆ Microphone

Chapter Two

Functions and Operation Instructions

2.1 Features

Compatible Disc Types:

#Digital video playback DVD-Video, Super VCD, VCD compatibility.
#MPEG-4 standard support: compatibility with DivX3.11, DivX5, DivX pro, XviD compressed video filies.
#Digital audio playback: CD-DA and HDCD compatibility.
#Fully compatible with compressed audio files such as Mp3 and WMA
#Playback of DVD, VCD, CD+G karaoke discs.
#Digital graphic albums playback: Kodak picture CD, JPEG compatibility.

Audio:

#192KHz/24 bit Audio Digital/Analog converter.
#Coaxial and optical outputs for Dolby Digital/DTS/LPCM digital audio.
#Mixed audio output for amplifier of TV connection
#Stereo signal input for external signal connection.
#Digital multi-channel decoders, providing Dolby Digital/DTS audio stream playing .
#Built-in Dolby Pro Logic II decoder makes available to convert stereo signal into multi-channel.
#Dual-channel MIC inputs for karaoke function
#Headphones output

Video:

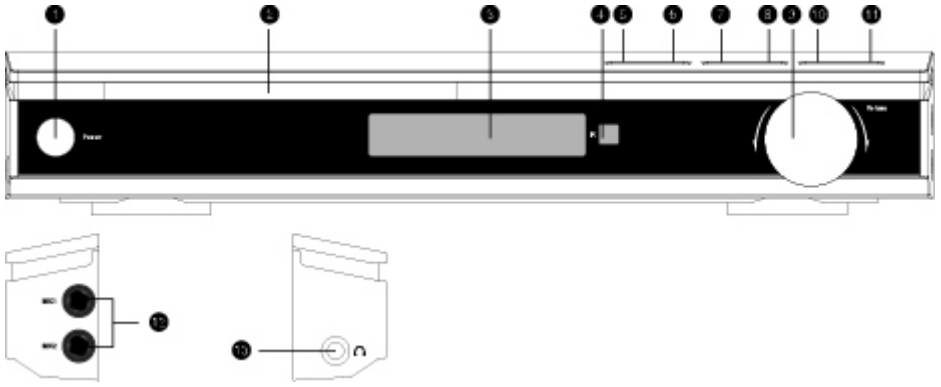
#108MHz/12 bit Video Digital/Analog converter
#Progressive Scan Output(Y Pb Pr) producing flicker-free and stable images
#Composite, component(Y Cb Cr), S-Video and RGB/SCART outputs for various types of connections
#NTSC/PAL transcoder
#Multiple dubbings, angles, subtitles support.
#Sharpness, gamma, brightness, contrast, hue , saturation adjustment.

Others:

#Compatible disc types: CD-R/CD-RW, DVD+R/DVD+RW
#Built-in digital FM/AM tuner with 20 radio stations memory
#KARAOKE+ system expanding karaoke function
#Russia, CIS and Baltic States adaptation interface and filenames, ID3-tags and CD-Text support simplifies device operation.
#”Memory” function enables to save the last point after stop playback.
#:Q-Play” function provides direct playback and allows to skip commercial that is not possible to rewind.
#”Virtual keyboard” function provides more convenient DVD playback control.
#”Browser” function provides easy access to playback control.
#Automatic screensaver function
#Parental control function to protect children from watching inappropriate discs.

2.2 Controls and functions

2.2.1 Front panel controls



① STANDBY/POWER button
Press to switch the device on/into standby.

② Disc tray

③ VFD display window

④ Infrared sensor

⑤ OPEN/CLOSE button
Press to open/close the disc tray.

⑥ PLAY/PAUSE button
Press to playback/pause

⑦ STOP button
Press to stop the playback

⑧ SOURCE button
Press to switch between DVD-receiver/Audio Input/Radio

⑨ VOLUME adjuster
Press to adjust volume

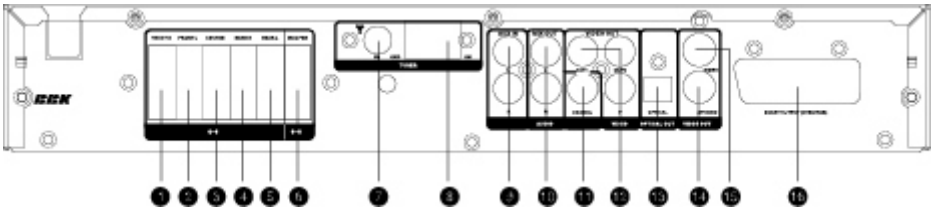
⑩ REW button
Press to fast reverse

⑪ Forward button
Press to fast forward/radio station tuning

⑫ Dual-channel MIC Inputs

⑬ Headphones outputs

2.2.2 Rear panel connections



① Right front speaker input(output from the built-in amplifier)

② Left front speaker input (output from the built-in amplifier)

③ Center speaker input(output fro the built-in amplifier)

④ Right Surround speaker input(output from the built-in amplifier)

⑤ Left Surround speaker input(output from the built-in amplifier)

⑥ Subwoofer input(output from the build-in amplifier)

⑦ FM Antenna input

⑧ AM Antenna input

⑨ Audio input

⑩ Stereo audio output

⑪ Coaxial digital audio output

⑫ Component video output Y Cb(pb)Cr(pr)

⑬ Optical digital audio output

⑭ S-Video output

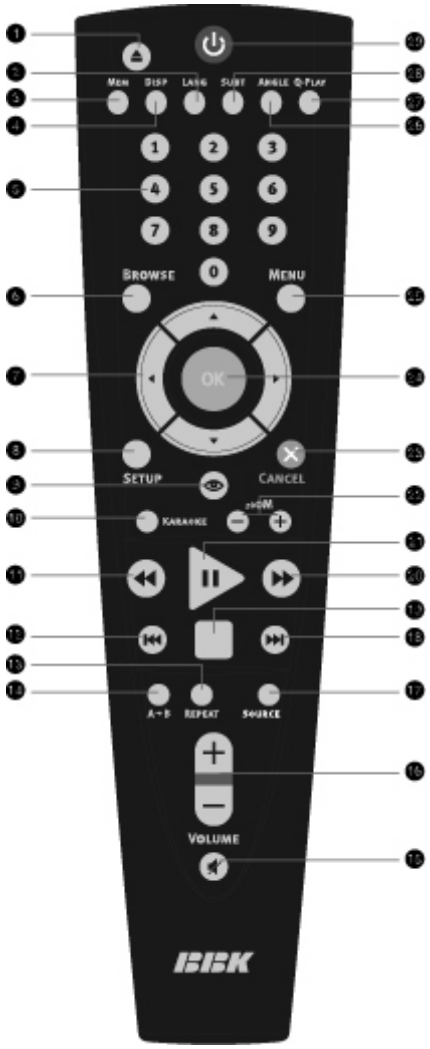
⑮ Composite video output

⑯ SCART

2.2.3 VFD display general view

1. Playback/pause
2. DVD-disc
3. CD-disc
4. DTS
5. Mp3
6. Dolby Digital
7. Repeat
8. Stereo
9. Friquency
10. Universal letter-digital indicator

2.2.4 Remote control general view



1. EJECT button
   Press to open/close the disc tray.
2. LANG button
   Press to change language.
3. NEM button
   Press to memorize the point where playback was stopped/playback fro the previously memorized point.
4. DISP button
   Press to display the disc information
5. Numeric buttons
6. BROWSE button
   Press to turn on/off the browser function.
7. CURSOR buttons
8. SETUP button
   Press to switch to setup mode.
9. Button
   Press to start rewind/rewind scanning.
10. KARAOKE button
    Press to set the karaoke functions.
11. Button
    Press to stip backward
12. Button
    Press to skip backward
13. REPEAT button
    Press to repeat playback
14. A-B button
    Press to repeat the selected protion.

⑮ Button

Press to turn on/off the sound.

⑯ VOLUME+/- button

Press to adjust the volume.

⑰ SOURCE button

Press to change the DVD/RADIO/AUX mode.

⑱ Button

Press to skip forward

⑲ Button

Press to stop the playback.

⑳ Button

Press to start forward/ffoward scanning

㉑ Button

Press to normal playback/pause

㉒ ZOOM+/- button

Press to zoom in/out

㉓ CANCEL button

Press to go one level back/cancel current operation

㉔ Ok button

㉕ MENU button

DVD disc menu/PCB function

㉖ ANGEL button

Press to change the camera angel/change the Mp3 and JPEG files playback mode

㉗ Q-PLAY button

Press to turn the Q-Play mode on.

㉘ SUBT button

Press to change the subtitles language/change the playback mode of Mp3 and JPEG files.

㉙ Button

Press to switch the device on/into standby.

2.3 Setlist

DVD receiver	1PCS
Speakers	5PCS
Subwoofer	2PCS
Audio/Video Cord	1PCS
2xRCA-Mini-Jack audio cord	1PCS
Speaker cord	6PCS
FM Antenna	1PCS
AM Antenna	1PCS
Remote control	1PCS
AAA size battery	2PCS
Warranty card	1PCS
User manual	1PCS
DM-998 microphone	1PCS
Karaoke disc	1PCS

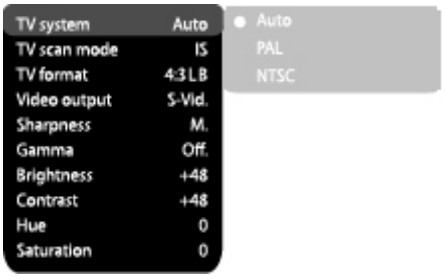
2.4 FUNCTION SETTINGS

2.4.1 Function selection and change

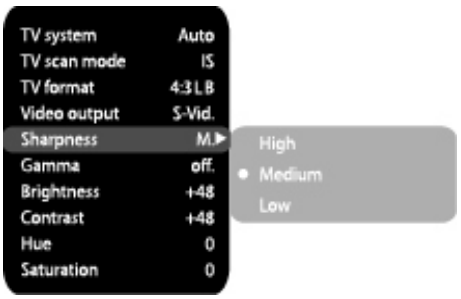
Press the SETUP key to show the setup menu. You will see the following image on the screen, as shown on the figure:

Select the desired menu item using the UP/DOWN buttons button; Press the OK key for confirmation.

1.For example, if you wish to change the image settings, you have to select the image item and press the OK or RIGHT key.

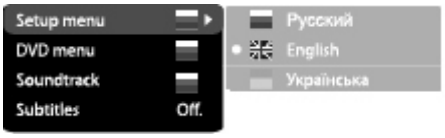


2.Using the UP/DOWN buttons, select the desired item and press OK or RIGHT button. For example, select the Sharpness item. Settings will appear on the screen. Then select the desired sharpness level and press OK for confirmation.



2.4.2 Language settings

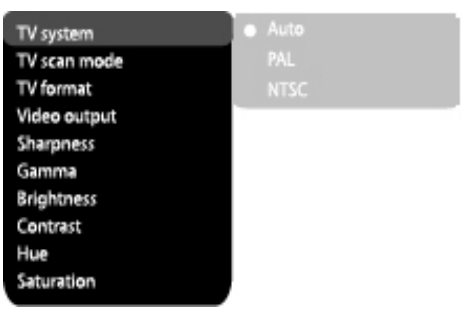
1.Menu: inteerface language set-up
#Options:Rusian, English, Ukrainian
#Default option: Englis



2.DVD-menu: selection of disc menu language
3.Sound: selection of translation language
#Disc menu/translation language options: Russian, English, Estonian, Lithuanian, Kazakh, Romanian, Belarusian, Ukrainian, Chinese.
#Default menu/translation language option: English.
#Selection of other languages: select the OTHERS item using the wheel and press OK. Enter the language code using the numeric buttons and press OK.
#If the language you selected is not recorded on the DVD disc, another available language will be used.
4.Subtitles: selection of subtitles language
#Options: Off, Russian, English, Estonian, Lithuanian, Kazakh, Romanian, Belarusian, Ukrainian, and Chinese.
#Default option: Off.
#Selection of other languages: select the OTHERS item using the wheel and press OK. Enter the language code using numeric buttons and press OK.
#If the language you selected is not recorded on the DVD disc, another available language will be displayed.

2.4.3 Image settings menu

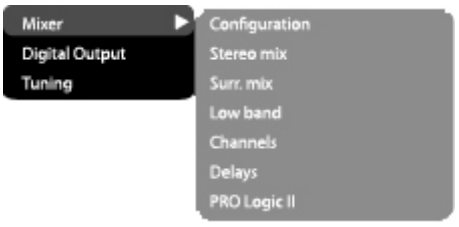
1.TV system: TV system selection
#Options: Auto, PAL, NTSC.
#Default option: PAL
2.TV scan mode: scan mode selection
#Options: progressive, interlaced.
#Default option: interlaced
#Progressive scan is transferred only via a component video output.
#Before switching to progressive scan, make sure that your TV set supports this operation mode.



3.TV Format: image ratio settings
#Options: 4:3 pan&scan, 4:3 letterbox and 16:9 TV.
#Default option: 4:3 letterbox.
#Some discs are recorded with support of only one ratio. The selected ratio must comply with the TV screen.
4.Video output: selection of video signal
#Options: S-Video, Comp, RGB.
#Default option: Comp.
5.Sharpness: image sharpness adjustment
#Options: High, Medium, Low
#Default option: Medium.
6.Gamma: adjustment of image color temperature.
#Options: High, Medium, Low, Off.
7.Brighteness: adjustment of image brightness
8.Contrast: adjustment of image contrast
9.Hues: adjustment of image hues
10.Satruation: adjustment of image saturation
Adjustment of image brightness contrast, hues and saturation:
#Select the desired item of the image adjustment section using the UP/DOWN buttons. Press OK or RIGHT key to start adjusting the relevant option.
#Upon completion press the LEFT button of the UP/DOWN buttons to return to image setup menu.

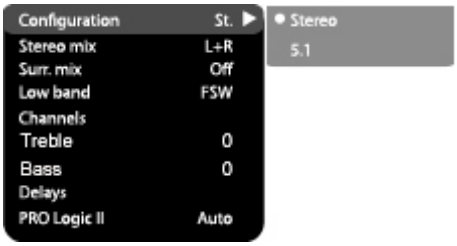
2.4.4 Sound settings menu

1.Mixer
a)Cofiguration: setting of the mode for conversion of the 5-channel signal to stereo signal
#Options: Stereo, 5.1.
#Default option: 5.1.
#5.1 mode must be supported by the disc. Number of music accompaniment channels depends on the specific disc.
#Adjustment of the central speaker and surround speakers is available only if the Configuration option is set to 5.1 position.

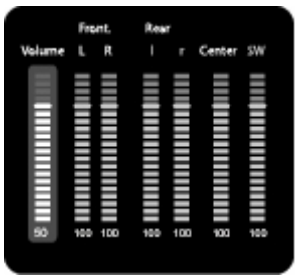


b)Stereo mix: playback set-up while playing the disc with two independent audio channels.
#Options: L+RR, L, R.

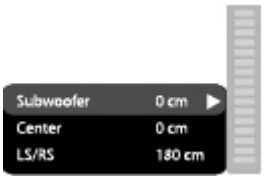
#Default options: L+R.
c)Surr.mix: set-up of surround options while playing the stereo disc.
#Options: Off, Sum. L+R, Virt. Surr.
#Default options: Sum. L+R,
d)Low band: distribution of low frequencies through channels.
#Options: Front F, Center C, Surround Sr, Subwoofer SW.
#Default options: Front F, Subwoofer SW.
#If you want the low-frequency component of the sound signal enter only the subwoofer channel, select and confirm the parameter Subwoofer SW.



e)Channel settings: separate adjusting of volume by channels.
#Select the channel you want to adjust using the cursor buttons.
#Adjust the sound volume of each channel using he cursor buttons.
#Press the OK key to return to sound settings menu.



f)Delay of the channel: set-up of signal delay in speaker channels(central, rear and subwoofer).
#Using the button of the cursor buttons, select the channel, for which you want to set up the delay, and press OK for confirmation.
#Using the cursor buttons set up the desired distance from the listener to each speaker(detailed description of this operation see on page 32).
#Press the LEFT button to return to speaker configuration menu.
g)PRO Logic II: function of stereo sound conversion to 5-channel sound.
#Options: On, Off, Auto.
#Default option: Off.
#In Auto position, the DVD receiver determines itself, when to use the PRO Logic II decoder. Some discs do not support this function.



2.Digital audio output
a)SPDIF format: set-up of digital audio output options.
#Options: RAW, PCM.
#Default options: RAW.
#When you select the RAW option, the not decoded signal is transferred to the DVD receiver's digital outputs, the decoded signal is transferred to analog outputs. Decoding is performed by the built-in decoder of the DVD receiver. This feature is meant to ensure that signal decoding at digital outputs is performed by an external device(e.g.an amplifier).
#If you select the PCM option, a PCM coded signal will be transferred to the DVD receiver's digital outputs.
b)LPCM: set-up of digital audio output options to comply with different amplifiers and receivers.
#Options: 48 kHz 16 bit, 96kHz 24 bit.
#Default option: 48 kHz 16 bit.
3.Sound correction
A)Max volume: max volume limiting
#Using the cursor buttons, adjust the max volume level.
#Press the LEFT key to return to sound correction set-up menu.
b)Equalixer: equalizer modes
#Options: Off, rock, pop, live sound, dance music, techno, classics, soft sound.
#Default option: Off.
c)Echo: echo effects
#Options: Off, concert, living room, hall, bathroom, cave, arena, cathedral.
#Default option: Off.
d)Tone balance: adjustment of tone balance level.
#Adjust the tone balance level using the cursor buttons.
#Press the LEFT button to return to sound correction set-up menu.

2.4.5 Playback settings

1.DVD

Advertisment skip: skip the unskippable block while playing a DVD disc.

#Options: Yes, number

#Default option: No.

2.VCD/SVCD

PBS menu: PBC menu on/off

#Options: On, Off.

#Default option: On.

#If On option is set, while reproducing discs, a menu will appear, in which you can select the order of playing the disc content. If the Off option is set, the reproducing of content is performed in the order, in which it is recorded on the disc.

3.Files: selection of reproduced files on the disc

#Options: Audio, Pictures, Video.

#Default option: A.P.V.

4.Repeat: file repeat mode

#Options: Off, Single, All.

#Default option: Off.

5.Load effect: type of transition from one JPEG file to another.

#Options: Off, from Top, from Bottom.

#Default option: Off

2.4.6 Karaoke settings menu

1.Microphone: microphone on/off

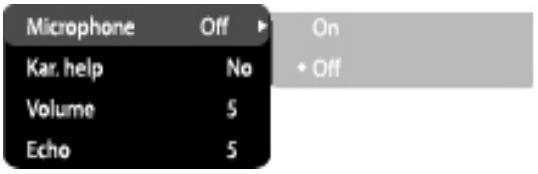
#Options: On, Off.

#Default option: Off.

2.Kar.help: karaoke-disc playback mode

#Options: channels L, channels R, No ast, No voc.

#Default option: Without solo.



3.Volume:

Microphone: microphone sound volume level.

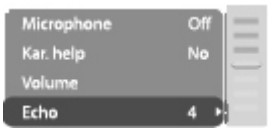
#Using the wheel adjust the microphone volume level.

#Press the LEFT button to return to karaoke settings menu.

4.Echo: echo level while playing the karaoke-disc

#Adjust the echo level Using the cursor buttons.

#Press the LEFT button to return to karaoke settings menu.



2.4.7 Preference settings

1.Equalizer: spectrum analyzer

#Options: On, Off.

#Default option: Off.

2.Sccreensaver: screen saver on/off

#Options: On, Off.

#Default option: On.

2.4.8 Family filter settings

1.Category: set-up of age restrictions to prevent children fro seeing undesirable discs.

#Options: Any, Kid, G, PG, PG-13, PGR, R, NC-17.

#Default option: Any.

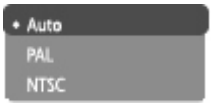
2.Change password: set-up of a four-digit password to change the level of age restrictions.

#Default option: 7890

2.4.9 Initial settings menu

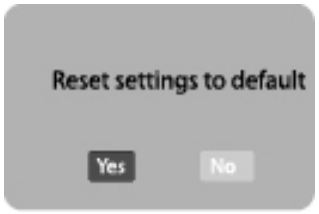
#Press the RIGHT key to enter the initial settings menu, then select the desired item using the cursor buttons and press OK key for confirmation.

#While being in this menu section, you cannot return to the previous level by pressing the LEFT key.



2.4.10 Reset settings to default

Resetting all settings and restoring default options, except age restrictions level and password.



2.4.11 Exit settings menu

#Select the exit item using the UP/DOWN buttons and press the OK key to exit the menu.

2.4.12 Channel delay set-up

Set-up of time delay in the surround channel

Usually, time delay in the Dolby Digital decoding system is preset to ensure best effect while installing the Home Theater. However, in case you wish to adjust your system more precisely, please consult instructions given in this manual. Set up of time delay for this device is possible in both Dolby Digital and Dolby Pro Logic modes...

To set the desired delay you have to know the distance from the place where you are, to the front speakers and Surround speakers as shown in Fig.1. Consult Fig.2(Dolby Pro Logic mode) and 3(Dolby Digital mode)in order to determine the distance to Surround speakers (axis Y in the figure)and the distance to the front speakers (axis X in the figure). Crossing point of those two lines on the chart will give the recommended delay value.

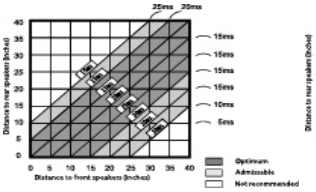


Fig. 2. Determine delay value as to Dolby Pro Logic mode.

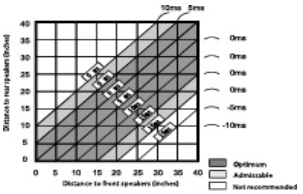


Fig. 3. Determine delay value as to Dolby Digital mode.

Set-up of time delay in the central channel

Sometimes several people are listening to the music, and the space is limited. In this case, you can install three speakers(two front ones and a central one)as shown in Fig.1 with the distance to the listener being approximately the same. The central channel delay is to be set at “0”.

Should the central speaker be in close proximity to left and right front speakers as shown in Fig.2, of the central speaker be nearer to listeners when compared with front speakers’ location, or the central speaker be nearer to the listener by 1 foot, in all these cases you may set the delay value for the central channel at 1 ms.

For instance, as shown in Fig.2, if the line C is by 1 foot shorter than the lines R and L, the delay value is to be set at 1 ms. If you sofa is broad enough, and there are several listeners sitting on it, it makes sense to locate the speakers in one line, as shown in Fig.3 with the delay value of the central channel to be set at “0”.

Finally, if it will be necessary to install the central speaker behind the left and right front speakers, the delay value shall be set at “0”.

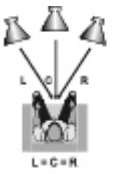


Fig. 1. Delay of central channel = 0
L=R=C

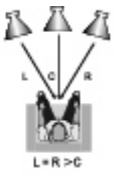


Fig. 2. Small area
Delay of central channel = L=(or R) - C

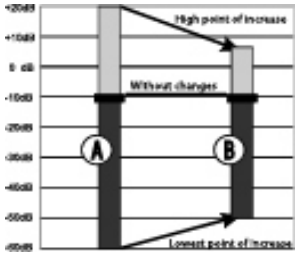
Fig. 3 Small area
Delay of central channel = 0
L=R>C

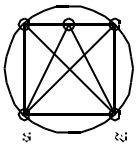
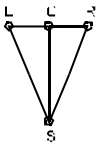
2.4.13 “Night” mode

He Dolby Digital system provides an extremely broad dynamic range of playback sound-from gentle to roaring. It creates the presence effect, especially while seeing motion pictures. However, at night a powerful sound with a broad dynamic range may give pleasure to you, but disturb and annoy your family and neighbors. If you just decrease the volume, you will immediately notice that you ceased to hear, e.g., Dialogues as clear as you do at normal volume, and such sound effects as rustle, whisper etc have merely disappeared.

To avoid this, you just have to decrease the volume of “loud”sounds by simultaneously increasing the volume of “soft”sounds with the volume of “average”sounds left unchanged, i.e. Just decrease the dynamic range of sound accompaniment. Only Dolby Digital system provides for such a method of sound control. It uses the principle of compressing the acoustic signal’s dynamic range while recording; therefore, while playing an inverse transformation(volume expansion)takes place.

This is called “night” mode. The regulation limits are restricted, however, to avoid distortions of resultant signal.



	Dolby Digital	Dolby Pro Logic surround
Rear channel	Stereo 20 Hz-20khz	Mono channel with limited friquency range(100 Hz-7khz)
Low-frequency channel(subwoofer)	Available, 20-120Hz	N/a
Sound field distribution	multivariate 	From left to right, from right to left, from front to rear, from rear to front 
Channels	6 Independent channels, each reproducing its own signal at a time	4 segmented channels. Only one channel is decoded at a time.
Miscellaneous	Creates an optimum sound field with illusion of an equal distance from listener to each speaker.	The most cost-efficient way to ensure high-quality surround effect.
	Allows adjusting the decompression degree of an equal distance from listener to ecach speaker.	Surround sound may be received from any signal source.
	Possilility of programmable control of the decoder to transfer basses into low-frequency channel in systems equipped with broad-band speakers and a subwoofer.	Compatible with existing and future two-channel(stereo)formats.
	Undoubted progress in sound recording technology, especially important for program directors, film directors, sound engineers and actors.	Big progress in comparison with conventional stereo, the world's most popular surround format.

2.5 Technical characteristics

DVD receiver	Playback discs	DVD-Video, Super VCD, VCD, DivX 4, DivX 5, DivX Pro, XviD, CD-DA, CD+G, HDCD, MP3, WMA, Kodak Picture CD, JPEG
	Input	2 MIC jacks FM antenna input AM antenna input Stereo audio input(AUX)

DVD receiver	Output	Audio output	Analog audio output: Stereo Digital audio output: Coaxial, Optical	
	Video characteristics	Video amplitude: S-Video amplitde: Component video amplitude:	1.0Vp-p(75Ω) Y:0.7vP-P(75Ω) C:0.286vP-P(75Ω) 1.0vP-P(75Ω) Cb/Cr:0.7Vp-p(75Ω)	
	Audio characteristics	Frequency response Signal-to-noise ratio THD	20-20000Hz(±1 Db) >90(dB) <1%	
	Operating voltage Power consumption	~220V,50/60 Hz 250W		
FM Tuner	Frequency range Channel separation	87.5-108 MHz >35dB		
AM Tuner	Frequency range	522-1611kHz		
Speaker system	Output power RMS, 10% THD, 1 kHz	DK1110SI	DK1112SI	DK1114SI
	Subwoofer(40Hz)	25	25	25
	Front channel	12	12	12
	Rear channel	12	12	12
	Center channel	12	12	12
	Maximum power			
	Subwoofer	40	50	50
	Front channel	20	20	20
	Rear channel	20	20	20
	Center channel	20	20	20
Operating temperature	5-35℃			
Operating humidity	15-75%(no condensation)			
Dimensions of DVD-receiver	60□380□350mm			
Weight of DVD-receiver	3.4kg			
Dimensions of speakers		DK1110SI	DK1112SI	DK1114SI
	Subwoofer	325×310×200	325×310×200	325×310×200
	Front channel	80×101×165	80×101×165	150×90×86
	Rear channel	80×101×165	80×101×165	150×90×86
	Center channel	80×101×165	80×101×165	150×90×86

#We are permanently improving the quality of our products; hence the product's design, functionality and technical characteristics may be modified without prior notice.

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

Chapter Three Principle and Servicing

Section One Principle of the Player

3.1.1 Features of the player

◆ Progressive scanning output to produce steadier and clearer pictures

◆ Composite video, S-video and component video output. 5.1CH output

◆ Digital picture adjustment to the sharpness, brightness, contrast, chroma and saturation of pictures, gamma correction

◆ Karaoke function. Built-in Dolby digital decoder

◆ Hi-Fi stereo headphone output

◆ FM/AM digital tuning function, capable of storing (memorizing) 20 FM/AM radio stations each

◆Power amplifier adopts high-performance large-power IC, with complete protection function and perfect sound quality

◆ Compatible with DIVX, MPEG4 format movie

◆ Subwoofer adopts large-diameter bass unit with large-capacity body, with deep and dynamic bass effect

3.1.2 Block diagram of the player

This player is composed of decode & servo board, power amplifier board, input/output board, panel, headphone board, tuner, power board and loader. Block diagram of the player is shown in the figure 3.1.2.1. Except that power board is not shown, other signal flow is shown in the figure basically. Main function of loader is to read disc information and transmit to MT1389E, MT1389E fulfils servo function through Ba5954 on decode board and other subsidiary circuit; and ensures normal working of loader through other circuits. FLASH on decode board is to save system program, SDRAM is to save program when the player is working and read sound and picture information from disc to ensure smooth output. The main function of power amplifier board is to perform DA conversion and amplification of analog signals to output 5.1CH and ensure normal working of external speaker. The main function of AV board is to output various audio and video signals. This player is also with headphone and microphone to meet client's requirements. In addition, there is external sound input , power amplifier board of this player may be used to amplify power to facilitate to output to speaker. Tuner in this player also makes it have tuning function.

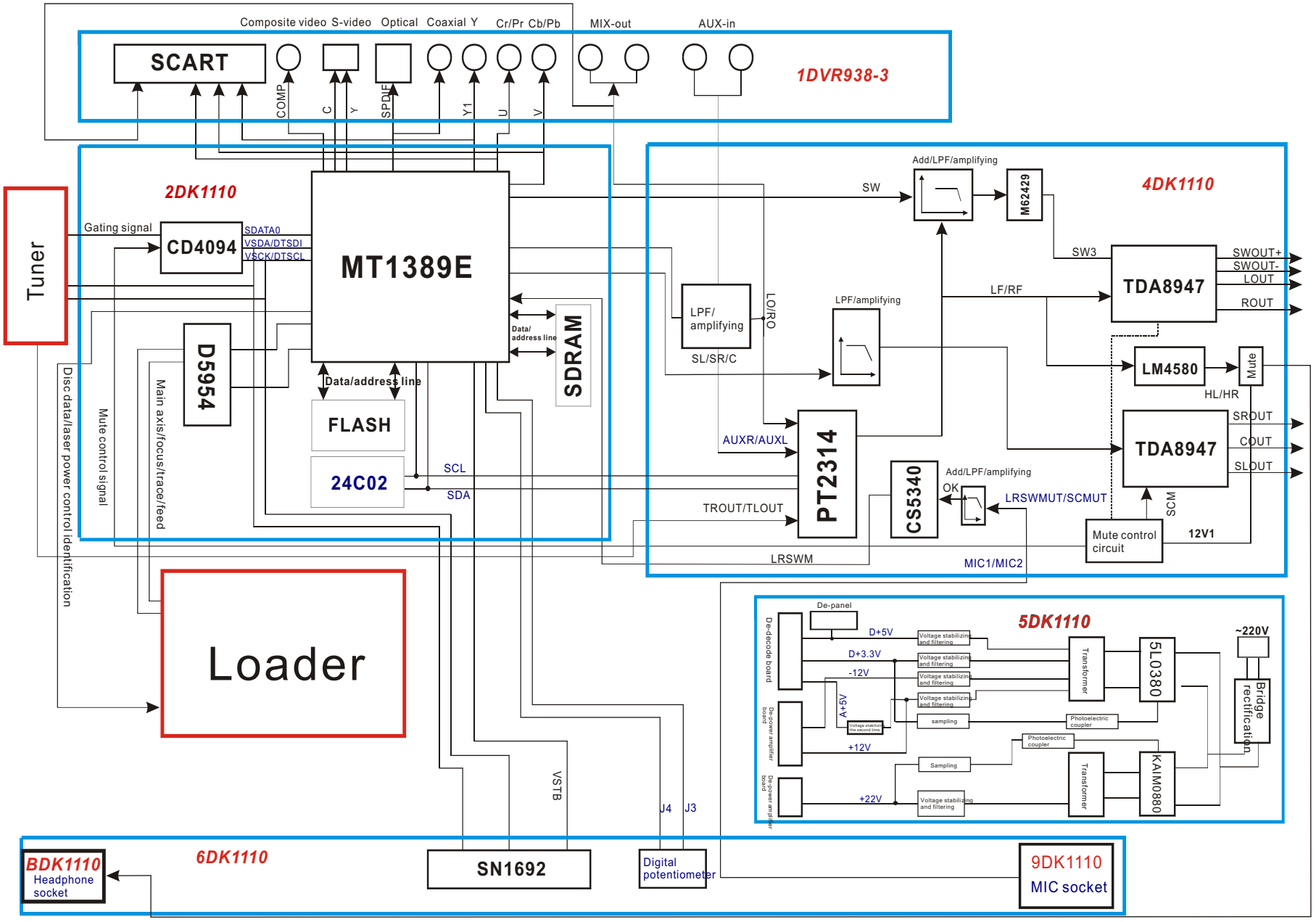


Figure 3.1.2.1 Block diagram of the player

3.1.3 PCB board composition diagram of the player

PCB board composition diagram of the player is shown in the figure 3.1.3.1:

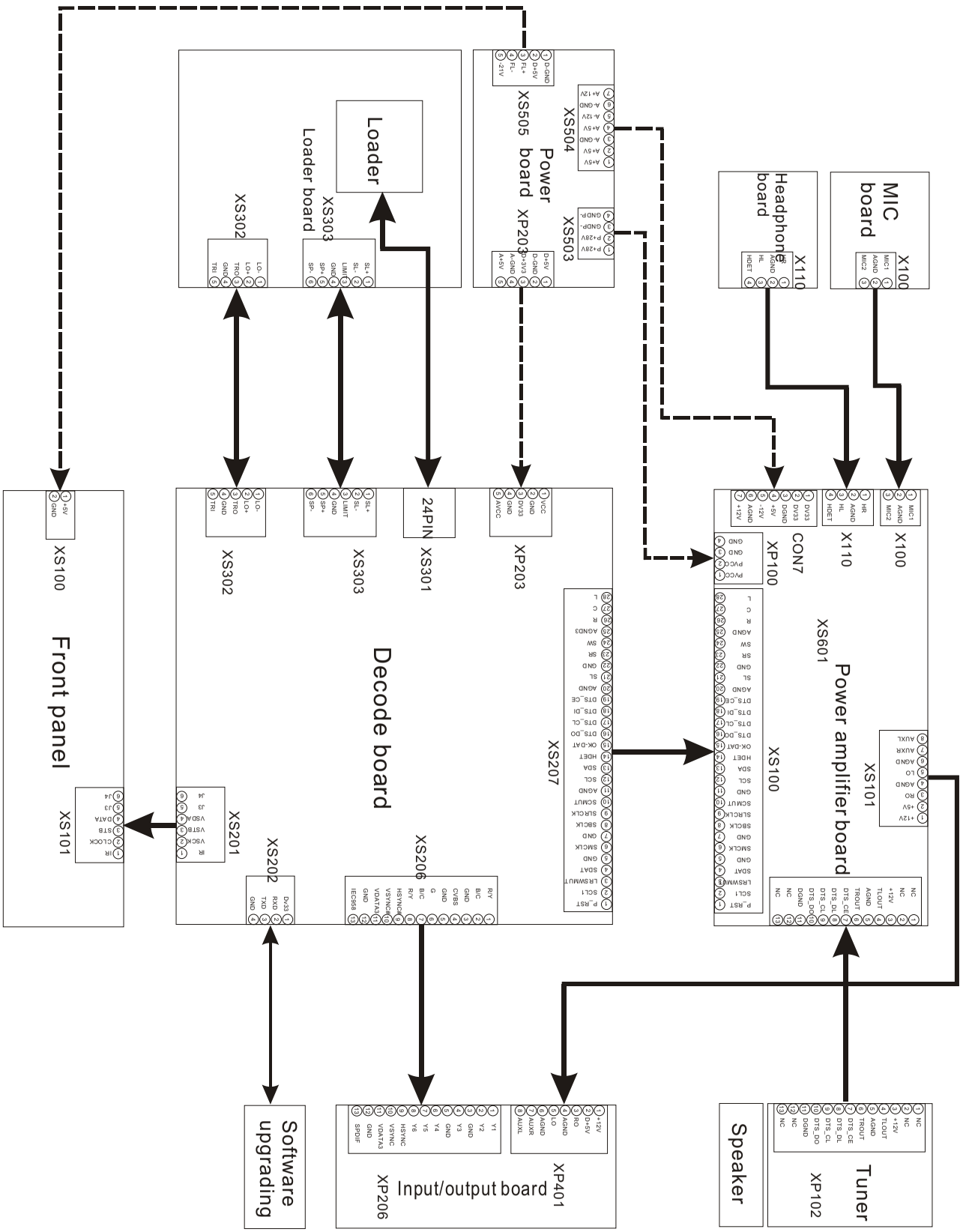


Figure3.1.2.1PC Bboard block diagram of the player

3.1.4 Introduction to IC used in this player

Introduction to IC used in DK1110SI is shown in the following table:

PCB semi-finished product	IC model	Location	Function
Decode board	MT1389E	U201	Decode chip
	24C02	U202	EEPROM
	HCU04	U205	Phase inverter
	LM1117	U206	Precision voltage stabilizer
	29LV160BE	U207	16M FLASH
	HY57V641620HGT-7	U208	64M SDRAM
	CD4094	U213	Serial and parallel connection conversion
	D5954	U301	Servo drive
Power amplifier board	4558	N101，N102,N103,N104	Audio amplifying
	M62429	N105	Volume control
	TDA8947J	N106,N110	Digital power amplifier
	RC4580	N107	Audio amplifying
	CS5340	N108	A/D conversion
	PT2314	N111	Audio processing
Mainpanel	PT6961	N100	Panel control IC
	HS0038A2	N101	Remote control receiver
Powr board	KA5L0380R	U501	Power switch IC
	HS817	U502,U506	Photoelectric coupler
	TL431	U503,U507	Precision voltage stabilizer
	LM7805	U504	Voltage stabilizing tube
	KA1M0880BTU	U505	Power switch IC

Section Two Unit Circuit Principle

3.2.1 Loader signal explanation

Loader signals explanation is shown in 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.

3.2.2 Servo circuit

1. DK1110SI adopts SANYO HD62 loader and MTK decode solution (MT1389E+FLASH (16M)+SDRAM (64M)). Its servo circuit is mainly composed of front signal processing and digital servo processing, digital signal processing IC MT1389E and drive circuit D5954, in which MT1389E is also the main part of decode circuit, shown in the figure 3.2.2.1:

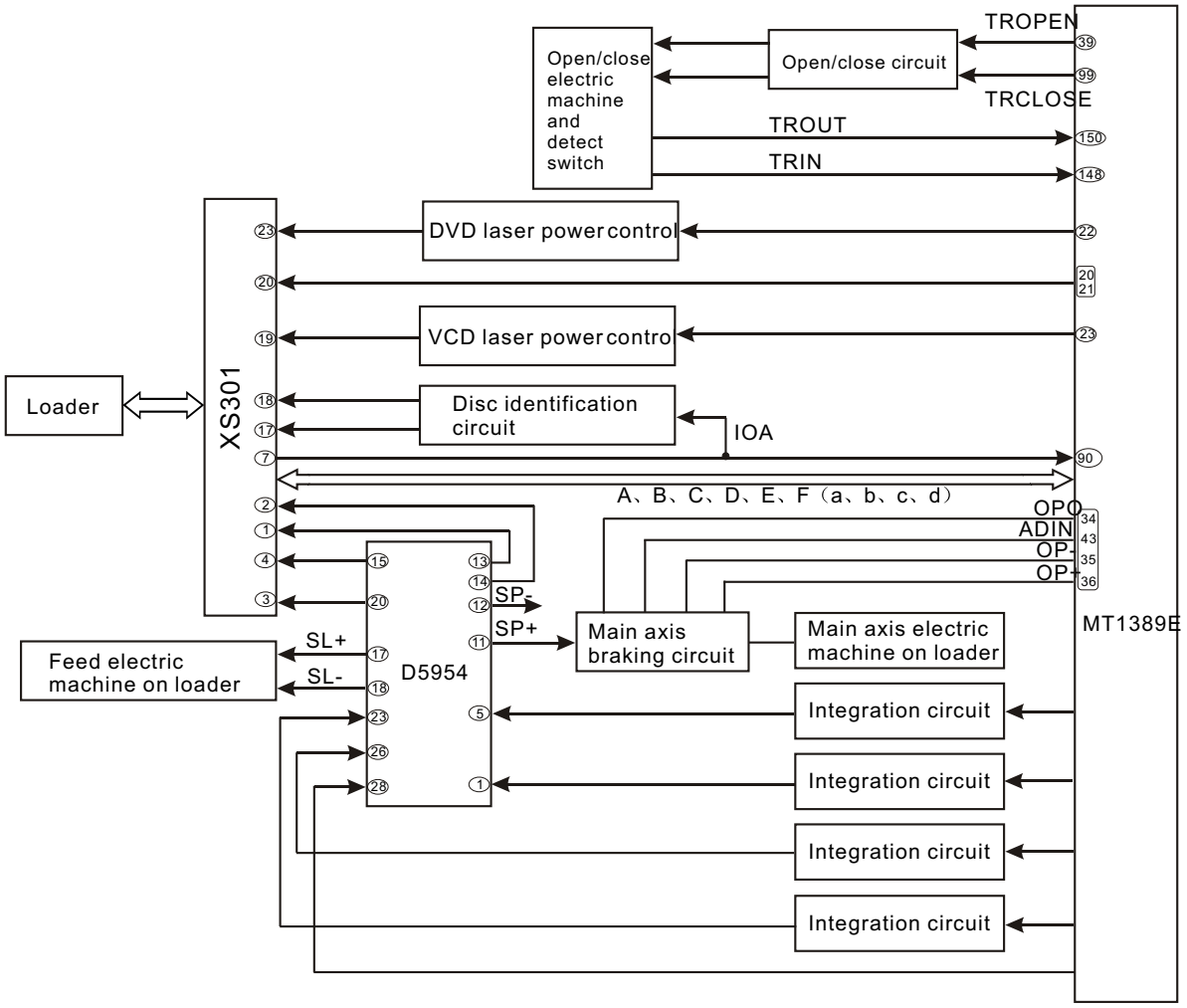


Figure 3.2.2.1 Servo circuit block diagram

2. Working principle: after powering on or disc in, according to IOA signal, disc identification circuit decides through which path of variable resistor the laser detecting diode gets path to the ground, meanwhile MT1389E decides whether DVD laser or VCD laser is emitted according to IOA signal, which can be fulfilled through laser power control circuit. When IOA is high level (3.3V), Mt1389E pulls LOD1 of Q302 base electrode in laser tube power control connected to VCD down to about 2.2V to make Q302 on and to make VCD laser tube emit beam; then decides whether to pull up or pull down LOD1 according to voltage after the feedback from MDI1 to control the power of light emission diode. Similarly, when IOA is low level (0V), MT1389E pulls LOD2 of Q301 base electrode in laser tube power control connected to DVD down to about 2.2V to make Q301 on and to make DVD laser tube emit beam; then decides whether to pull up or down LOD2 according to the voltage after the feedback from MDI1.

After loader reading disc information, A, B, C, D, E, F signals are sent out to Mt1389E (DVD only has A, B, C, D signals), and then inputted from pin 2~11, 18, 19 of MT1389E. After being amplified and processed by the pre-amplifier inside MT1389E, now signals are separated to two part s for processing inside Mt1389E.

After being processed by digital servo signal circuit inside MT1389E, one part of signal form corresponding servo control signals and output FOO, TRO, DMO, FMO digital servo control signals from pin 42, pin 41, pin 37, pin 38 of MT1389E respectively, then change into analog servo control signal FOSO, TRSO, DMSO, FMSO through integration circuit composed by resistor capacitor, and send to driver circuit D5954 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 pick-up position; and main axis servo is used to control main axis electric machine to make it read signals in means of constant linear velocity and bring along disc to rotate.

After processing of amplification by VGA voltage control amplifier and equalization frequency compensation inside MT1389E, 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 MT1389E, 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 MT1389E, and then sent to latter stage for decoding after finishing RSPC error correction inside.

The other part of servo is open/close disc tray circuit. After panel or remote controller emits open/close disc tray signal to MT1389E, in usual conditions, TROPEN and TRCLOSE sent out by pin 39, 99 of Mt1389E are both low level, when signal of “open” comes, after Mt1389E makes disc stop rotating through main axis braking circuit, TRCLOSE is set high to make open/close electric machine on loader frame run to bring along dist tray to eject. After disc tray ejecting to proper signal of opening to proper position (TR_OUT) is set high level (0V) through the detecting switch on loader frame, MT1389E pulls

down TRCLOSE and open/close electric machine stop running. When MT1389E receiving “close” signal, TROPEN is set high level by MT1389E, open/clode electric machine tuns conversely to bring along disc Tray to close. After disc tray closing to proper position, signal of closing to proper position (TR_IN) is set low level through the detecting switch on loader frame, MT1389E pulls down TROPEN and electric machine stops running to finish “close” process.

3. Explanation to servo terms

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

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

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

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

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

Name	when reading disc normally	when opening door	when closing door	when no disc in
TROPEN	0	There is about 3.3V pulse with 1S at the moment of opening door	0	0
TRCLOSE	0	0V	There is about 3.3V pulse with 1S at the moment of opening door	0
TROUT	3.41V	3.3V→0V	0V→3.3V	3.3V
TRIN	0	0V→3.3V	3.3V→0V	0
OPO	2.61V	2.75V	2.64V	2.61V
ADIN	2.61V	2.76V	2.61V	2.61V
OP+	1.66V	1.81V	1.27V	1.81V
OP-	1.85V	2.12V	1.47V	2.04V

3.2.3 Mute circuit

DK1110SI mute control circuit includes power-on mute control, power-off mute control and usual mute function.

1. Power-on mute is shown in the figure 3.2.3.1. When voltage of pin 5, 10 of power IC TDA8947 is lower than power supply voltage 3.5V of this IC, this IC enters MUTE mode, from 0 to 0.8V, it is STANBY mode.

When power on, due to the function of Tc147 charge, V102 cuts off at the beginning, V103 is on, HERDM is low level, shown in the figure 3.2.3.2. Seen from the figure, when HARDM is low, SCM, LRSWM are pulled down to fulfil power-on mute.

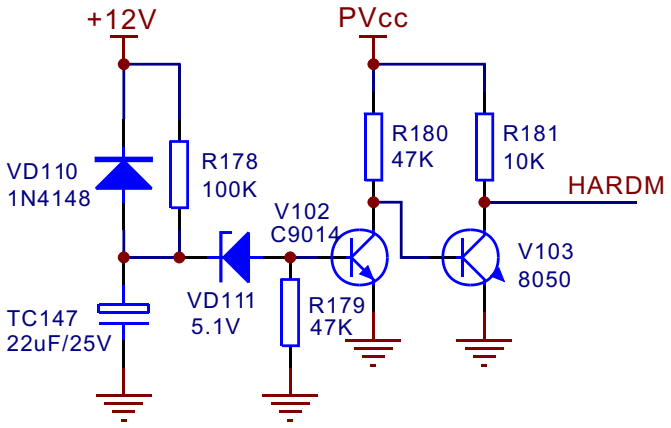


Figure 3.2.3.1 Power-on mute circuit

2. Usual mute: 1389 sends out control signal SCMUT, LRSWMUT to control the on of triode V101, V104 to make SCM, LRSWM be low level to fulfill mute function.

3. Power-off mute: V100 realizes power-off mute function. When +12V power failure, Tc136 still keeps high level, now base electrode of V100 is low, V100 is on, base electrode of V101, V104 gets high level and they are on to realize power-off mute function.

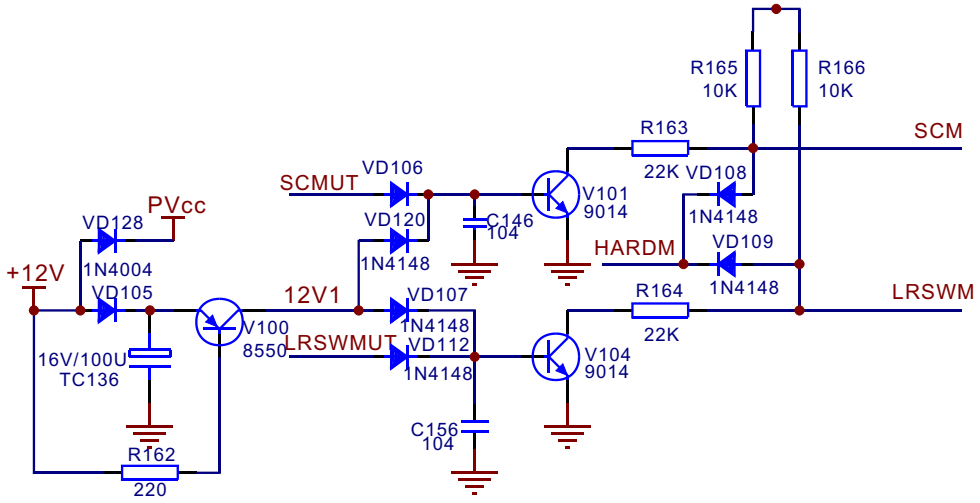


Figure 3.2.3.2 Mute circuit

4. When inserting headphone, friction will produce noise, so these noise should be filtered. When inserting, HDET pin is grounded and low level, which is sent to 188 pin of 1389E, 1389E receives HDET low level and sends out control signal to TDA8947, output stops and mute function is realized.

Note: when inserting headphone, mixed left/right channel on AV board has output, audio signals on power amplifier board have no output; when in mute, all has no output.

3.2.4 Open/close door circuit

1. Open/close door circuit diagram is shown in the figure 3.2.4.1:

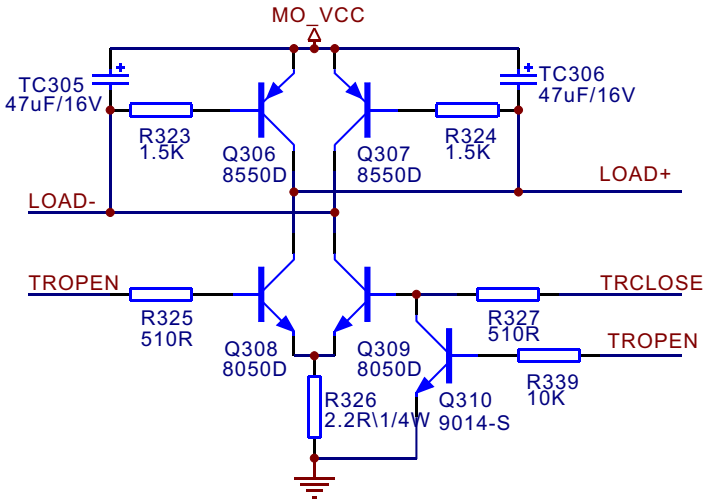


Figure 3.2.4.1 Open/close door circuit diagram

2. Working principle:

Open door, VCC→ Q306CE electrode is on → LOAD+ → electric machine → LOAD- → Q309CE electrode is on → R326 → ground

When action of opening door is not performed, pin 99 and 39 of MT1389E are low level. When opening door, pin 99 of MT1389E send out a high level, Q309 is on, collector electrode of Q309 changes to low level, LOAD- changes to low level, base electrode of Q306 changes to low level, Q306 is on, collector electrode of Q306 changes to high level and LOAD+ changes to high level.

Close door: VCC→ Q307CE electrode is on→ LOAD- → electric machine→ LOAD+ → Q308CE eklectrode is on→R326→ground

When closing door, pin 39 of Mt1389 sends out a high level, Q308 is on, collector electrode changes to low level, LOAD+ is low level, base electrode of Q307 changes to low level through R324, Q307 is on, collector electrode of Q307 changes to high level, LOAD- changes to high level.

The function of Q310 is to interlock TRCLOSE and TROPEN signals to ensure that the two are not high level at the same time. When the two are high level input, the on of Q310 makes base electrode of Q309 be low level to ensure the normal working of open/clode door circuit, electrolyte capacitor TC306 and TC305 are used to prevent the sudden change of two ends of in/out control electric machine and make the action gentle.

3.2.5 Reset circuit

1. Reset circuit is shown in the figure 3.2.5.1:

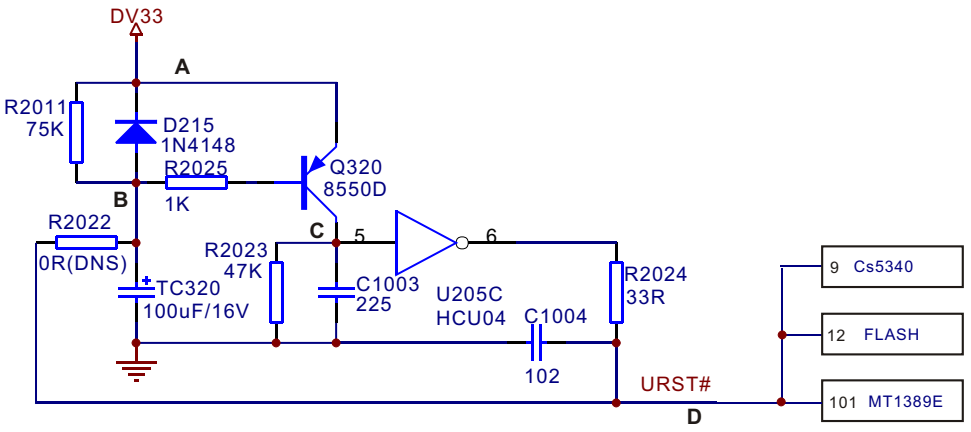


Figure 3.2.5.1 Reset circuit diagram

2. Working principle: when power on, voltage on two ends of capacitor Tc320 cannot change suddenly, anode of capacitor begins charging from 0V, now triode Q320 is on, pin 5 of input end of phase inverter U205C (HCU04) is high level, pin 6 of output end is low level and performs reset to chip MT1389E, FLASH, TAS5508 and Cs5340; when capacitor charge is close to 3.3V, triode Q320 cuts off, pin 5 of input end of phase inverter is low level, phase inverter outputs high level from pin 6 and system reset finishes.

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

Key point	Position	Voltage	Remark
DV33 (point A)	Diode D215 cathode	3.3V	After power off, TC320 discharge current from this point
point B	Diode D215 anode	After reset finishes, 3.3V	After reset finishes, voltage increases to 3.3V from 0V
point C	Phase inverter pin 5	After reset finishes, 0V	After reset finishes, voltage decreases to 0V from 3.3V
URST# (point D)	Joint place of R256 and R253	After reset finishes, 3.3V	After reset finishes, voltage increases to 3.3V from 0V

3.2.6 Main axis braking control circuit

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

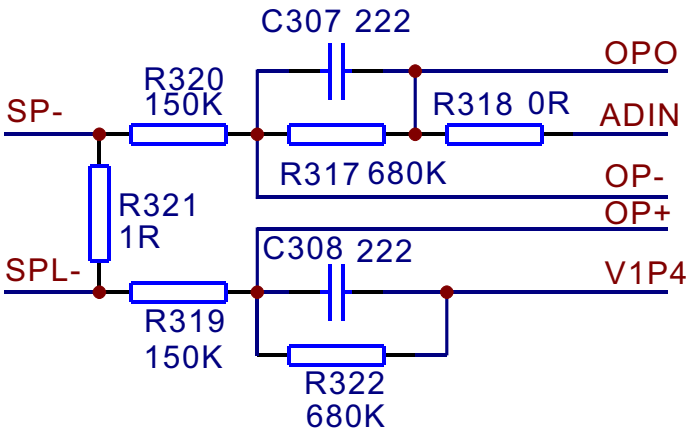


Figure 3.2.6.1 Mai axis braking control circuit

Equivalent circuit is shown in the figure 3.2.6.2:

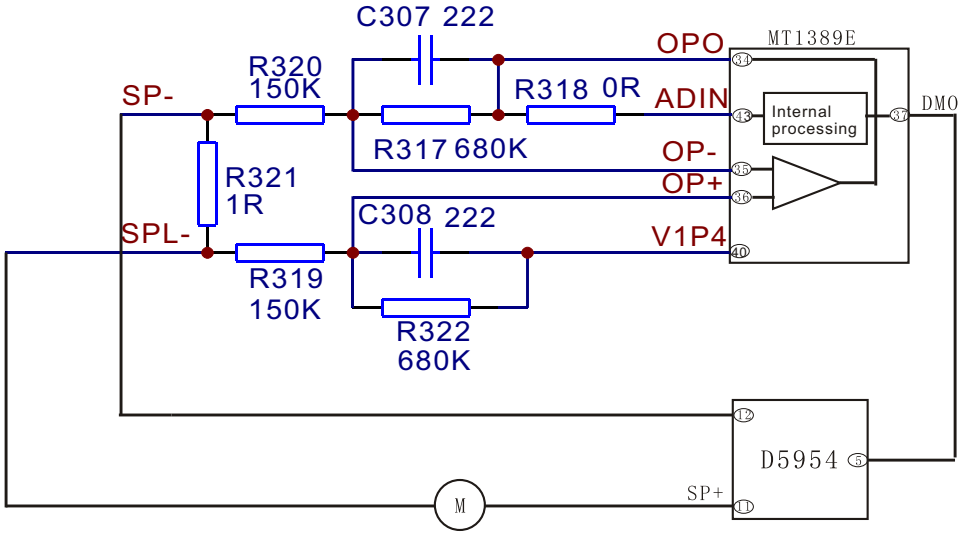


Figure 3.2.6.2 Main axis braking control equivalent circuit diagram

2. In order to prolong the usage life of electric machine and increase the influence of start-up current to electric machine, when disc is in, R&D personnel design main axis electric machine into running state all the time, even though STOP button is pressed. Thus, when pressing OPEN button, a braking signal is required to make main axis electric machine stop rotating immediately to fulfill door opening in short period.

During the course of playing, if OPEN button is pressed, main axis braking signal disappears, but main axis electric machine is still in rotating state due to the function of inertia, now the inductive electromotive force that produces from the rotation of electric machine achieves inductive voltage on

sampling resistor R321, through resistor R319, R320 with pin 35, 36 of MT1389E, after being processed and amplified inside, output from pin 34, then through R318, send to pin 47 of MT1389E, through MT1389E internal D/A conversion and relevant processing, pin 37 of MT1389E outputs an instant electric machine reverse braking signal to make main axis electric machine speed down, when MT1389E detects that disc stops rotating, disc tray will be out to ensure that disc will not rotate when door opens.

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

Key point	Position	Normal working voltage (V)	Voltage variation when opening door (V)
SP+	pin 11 of D5954, pin 5 of XS303	3.79	3.79→0.70→1.80
SP-	pin 12 of D5954, pin 6 of XS303	1.38	1.38→3.40→1.80
OP+	MT1389E pin 36/B	1.38	1.38→3.10→1.80
OP-	MT1389E pin 35/A	1.53	1.53→3.08→1.98
OPO	MT1389E pin 34/C	2.44	2.44→0.40→2.50
ADIN	MT1389E pin 43/D	2.44	2.41→0.41→2.44
DMSO	D5954 pin 5	1.42	1.42
VIP4	MT1389E pin 40	1.41	1.41

3.2.7 Disc identification circuit

1. Disc identification circuit is shown in the figure 3.2.7.1:

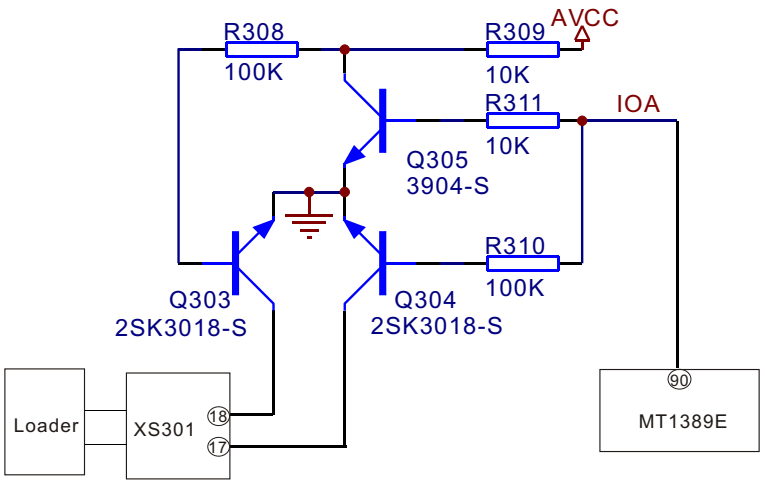


Figure 3.2.7.1 Disc identification circuit

2. Working principle: the function of disc identification circuit is to recognise the disc inserted into loader to judge whether the disc is VCD or DVD to make the relevant control action. When disc is inserted, decode servo control IC MT1389E defaults disc to be DVD, pin 90 of MT1389E sends out a low

Voltage signal, Q305 and Q304 cut off, Q303 is on, laser receiving tube inside loader selects DVD channel, now IOA is low level input loader to make loader in DVD reading state, MT1389E analyses whether initial judgment(DVD is the default disc) is correct through the detection of laser power feedback signal, when initial judgment is correct through detection, loader runs in DVD reading state; when initial judgment is incorrect through detection, MT1389E sends out a high voltage signal from pin 90, Q305 and Q304 are on, Q303 cuts off, laser receiving tube inside loader selects VCD channel, now IOA is high level input loader to make loader in VCD reading state. Whether default disc is VCD or DVD is set by internal software of MT1389E.

Note: Q303, Q304 are MOS tube.

3.2.8 Panel control components

1. Panel control components block diagram is shown in the figure 3.2.8.1:

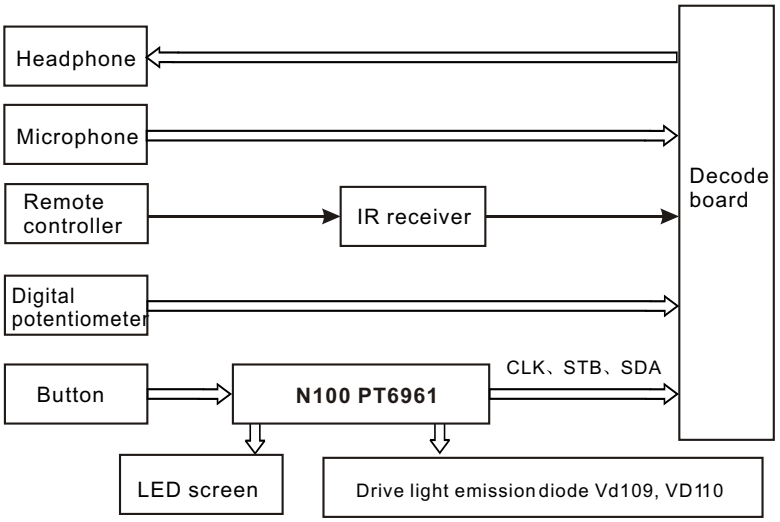


Figure 3.2.8.1 Panel control components block diagram

2. MIC board schematic diagram is shown in the figure 3.2.8.2:

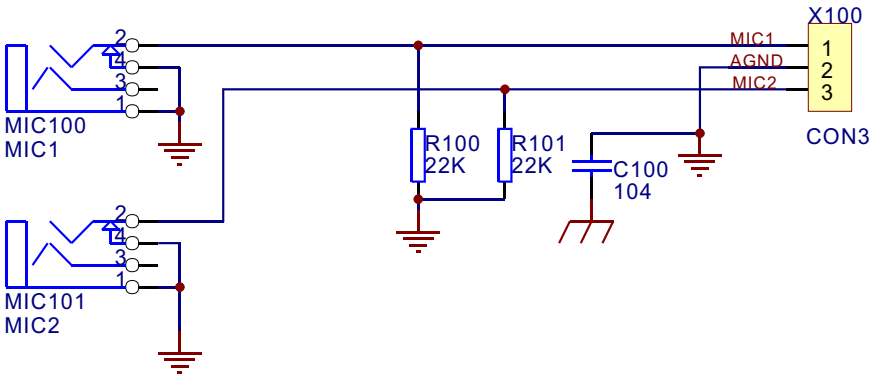


Figure 3.2.8.2 MIC board schematic diagram

3. Headphone board schematic diagram is shown in the figure 3.2.8.3:

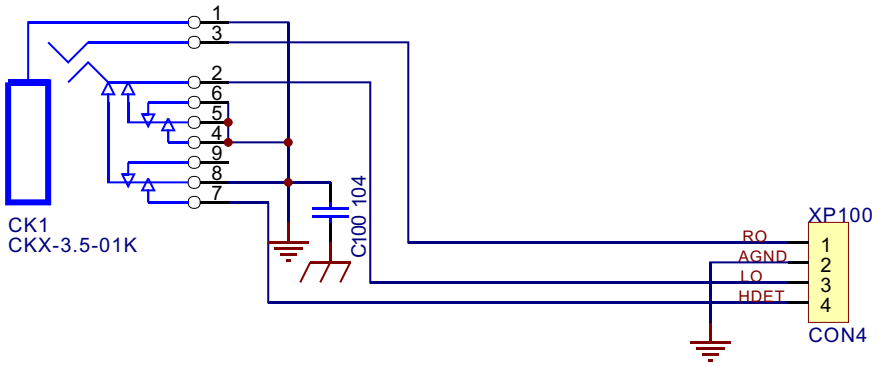


Figure 3.2.8.3 Headphone board schematic diagram

4. Working principle: panel is mainly composed of LED screen, drive chip Pt6961, remote control IR receiver, digital potentiometer, MIC jack, button and indicator light.

The function of N100 (PT6961) is to process data signals sent from decode board to drive display screen to display relevant state, and scan panel button matrix at the same time, after processing button information, send to CPU in the means of digital signals to control the player and make it perform the relevant action.

Pin 3 of remote control IR receiver HS0038A2 is 5V power supply pin, pin 2 is grounded, pin 1 is output pin; remote control receiver processes button information of remote controller and then outputs from pin 1 to decode board directly.

Digital potentiometer RP100 is used to adjust volume, which uses the phase difference of pulse sent from pin 1 and 3 to realize volume adjustment.

3.2.9 Video circuit

1. Video circuit block diagram is shown in the figure 3.2.9.1:

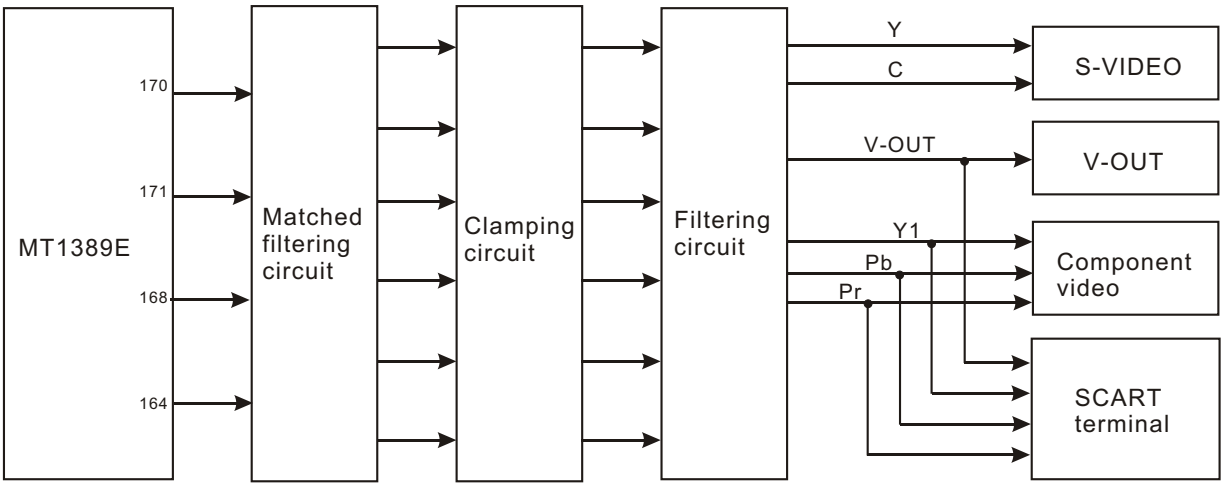


Figure 3.2.9.1 Video circuit block diagram

2. Working principle: brightness, chroma, CVBS and component video signals decoded by U201 (MT1389E), through low-pass filtering and clamping, are sent to the relevant terminal for output. Take Y signal as instance, we will introduce working principle of clamping circuit, shown in the figure 3.2.9.2:

This circuit is very simple. R105 is a matched resistor to make signals achieve max power on load, capacitor C106, C108 and inductor L106 compose a low-pass filter to filter high frequency interference signals except for useful signals; diode VD108 and VD109 compose a clamping circuit, we know from features of diode, the max range of chroma signal cannot exceed 5.7V, and cannot be lower than -0.7V in minimum, thus the high voltage signals from TV set can be prevented from burning down the player.

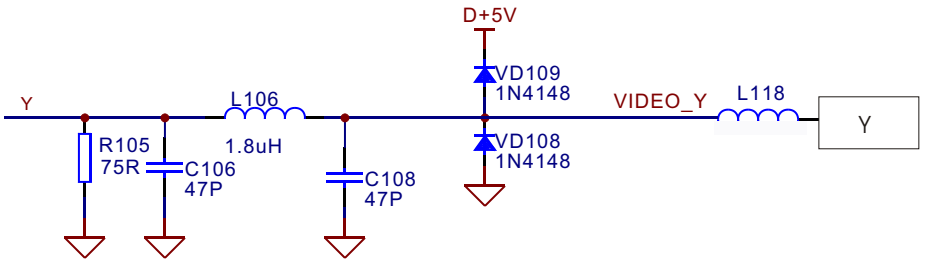


Figure 3.2.9.2 S-VIDEO output circuit diagram

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

Signal	Function	Trouble	DC voltage without disc in
Y	S-VIDEO brightness	S-video no picture/ picture bright/picture dark	0.74
C	S-VIDEO chroma	S-video no color/color distortion	1.48
VIDEO	Component video composite signal	Composite video no picture/picture bright/picture dark	0.74
Y1	Component video brightness signal	Component video no picture/picture bright/picture dark	0.76
Pb	Component video chroma signal	Component video color distortion	1.46
Pr			1.75

Note: in actual measurement, voltage of the above signals Y, C, VEDIEO, Y1, Pb, Pr will have some change, thus the main troubleshooting method is to measure waveform of each signal during the course of playback.

3.2.10 Input/output circuit

Input/output circuit is often called AV board. AV board processes the video and audio signals sent from decode board and power amplifier board through coupling and filtering circuit and then outputs from the relevant terminal, externally-inputted audio signals are sent to power amplifier board and decode board for processing through AV board. DK1110SI AV board video output (refer to 3.2.9 video

Circuit) circuit includes composite video output terminal, S-video and component video output terminal; audio circuit includes mixed left/right channel output terminal, digital optical output terminal, coaxial cable output terminal, SCART terminal and also one channel input terminal, that is left/right channel input terminal.

1. SCART terminal

SCART is a terminal that integrates video and audio transmission into one. It may transmit video and audio signals at the same time and it is very convenient for operation. It has 21 pins in all and locates in the centre at rear side of the player. Pin function is shown in the following table:

Pin	Name	Signal direction	Function description	Pin	Name	Signal direction	Function description
1	A(B)OUT	I	Audio right channel input	12	NC		Network cimmnication 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 cimmnication data line 2	21	GND		Common ground
11	GREEN I/O	I/O	Y1 signal I/O port				

Note: pin 16 is blanking signal and used for the selection of RGB and CVBS mode. I means input, O means output and I/O means input and output.

2. SCART terminal function selection is shown in the following table:

PDAT0	PDAT1	PDAT2	pin 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: 1. PDAT0 and PDAT2 are used to control the input voltage on pin 8 of SCART terminal. PDAT1 is used to control the voltage variation on pin 16 of SCART terminal. The voltage on pin 16 controls whether RGB mode or CVBS mode is selected by SCART.

2. 4:3 and 16:9 mean the display mode of screen and is controlled by voltage on pin 8.

3.2.11 Audio power amplifying circuit block diagram

1. Audio power amplifying circuit block diagram is shown in the figure 3.2.11.1:

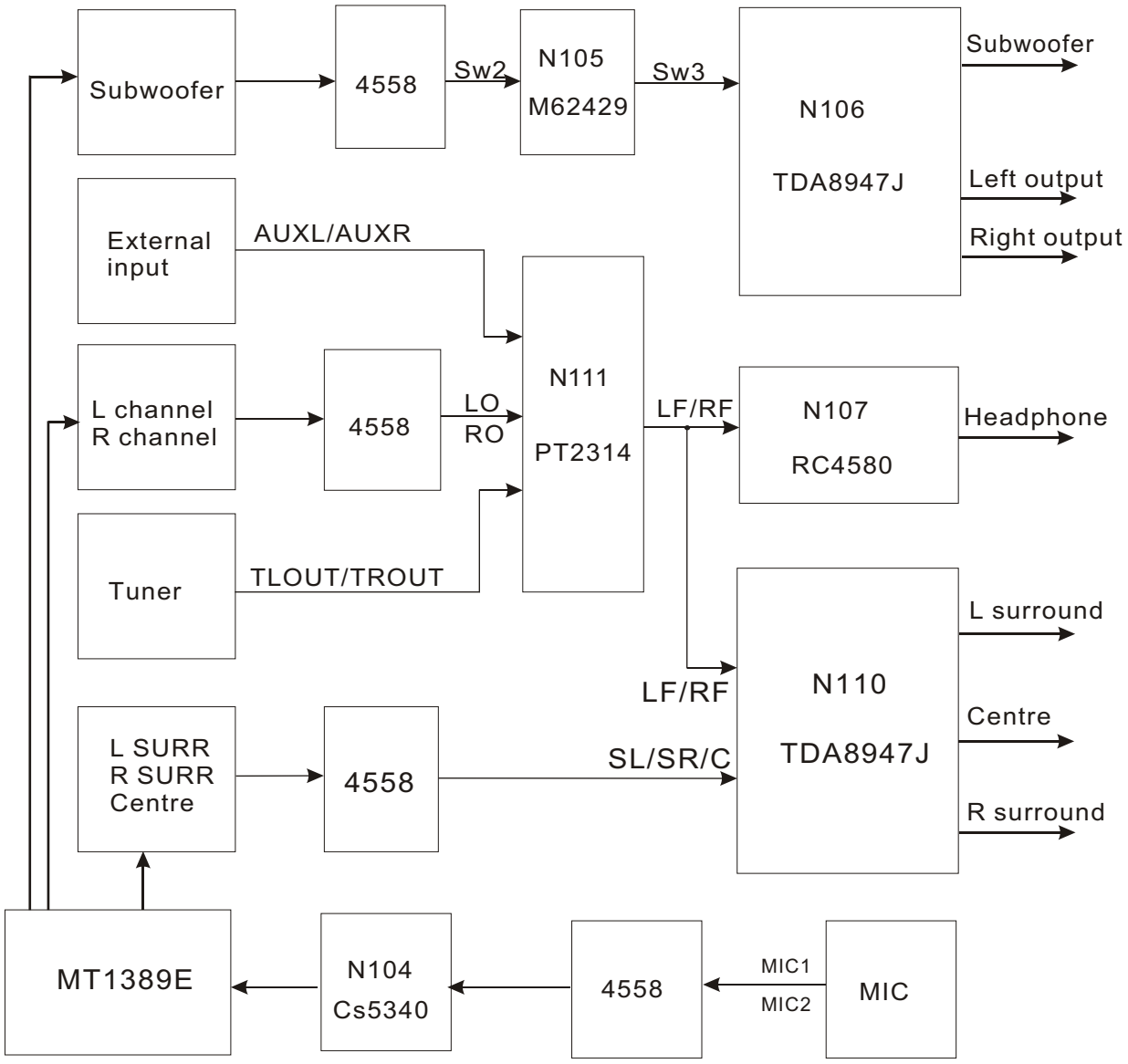


Figure 3.2.11.1 Audio power amplifying circuit diagram

2. Working principle

In power amplifier part, Karaoke processing circuit, external input circuit, headphone output circuit, power amplifying circuit and mute circuit can be divided. Mute circuit has been introduced in section 2, so here we will not say it again.

2-channel microphone input signals performs mixed amplification through an addition circuit composed of operational amplifier N104 (F4558), through the clamping composed of VD122 and VD123, prevents microphone inputting too large signals to damage rear stage circuit. Through preliminary addition, amplified MIC signals enter an ADC conversion ship N108 (CS5340) which is controlled by I2S signal; MO, M1 add pull-up resistor to 3.3V, select Clock Slave mode, output pin (pin 4) adds 10K resistor to ground, select left align mode; MIC signals, after being processed by CS5340, change into digital signals to input to 1389E, through 1389E internal processing, mix to left and tight channels for output.

N111 (PT2314) is a selection switch, which selects left/right channel information of disc signal, external input signal and tuning signals (external input and tuning only have left and right channels signals input). In special mode, there is special sound output. PT2314 may process tweeter/bass and volume adjustment. This player uses 3 of the channels, which are used as left/right channel information, tuning signal, selection of external input signal and volume/tone adjustment. Through being selected by PT2314, signals of left/right channel has 3 flow directions: one channel inputs power IC N106 (TDA8947), one channel inputs to headphone amplifying chip RC4580, one channel inputs to pin 5 of N100 (F4558) and mix with subwoofer.

Power IC N106 (TDA8947) is a 4-channel power amplifying IC, if single channel outputs, output power range is from 1W to 25W; if all channels output, output power range is from 4W to 50W, in this player, take channel 1 and 2 of N106 as the all channels output of subwoofer, rated output power is 15W; take channel 3 and 4 as power output of lect and right channels, rated output power is 6W. The 3rd channel is reverse output, so right channel output is reversely connected, its pin 5, 10 are mode selection pin, this player uses them all together to make it as mute control pin.

RC4580is a dual-channel operational amplifier, as the amplifying output of headphone, its input is directly connected with output signals of PT2314, after being amplified, output to the output socket of headphone, mute control circuit is added on its output end.

Subwoofer output of this player is divided into two parts: one part is the subwoofer signals of decode output to discs inside 1389E and the other part is mixed by left and right channel information gated by PT2314. When in external input and tuning, without subwoofer signals outputted by 1389, now all subwoofer is mixed from left and right channels. In subwoofer output channel, another chip M62429 is used. It is a 2-channel electric volume control IC and controlled by I2C signal; subwoofer signals outputted from M62429, through first level buffer circuit, are sent to power IC for power amlifying, similarly, in order to protect rear stage circuit, a clamping circuit is added. Power output of subwoofer is fulfilled by the full connection of channel 1 and 2 of N106 (TDA8947).

Centre and surround power output is fulfilled by N110 (TDA8947). 1389E outputs analog audio signals directly, after pre-amplifying and low-pass, outputted by N110 power amplifying. Similarly, the 3rd channel is reverse output, so centre is reversely connected to output. Its pin 5 and 10 are connected together, as mute control pin.

3.2.12 Power circuit

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

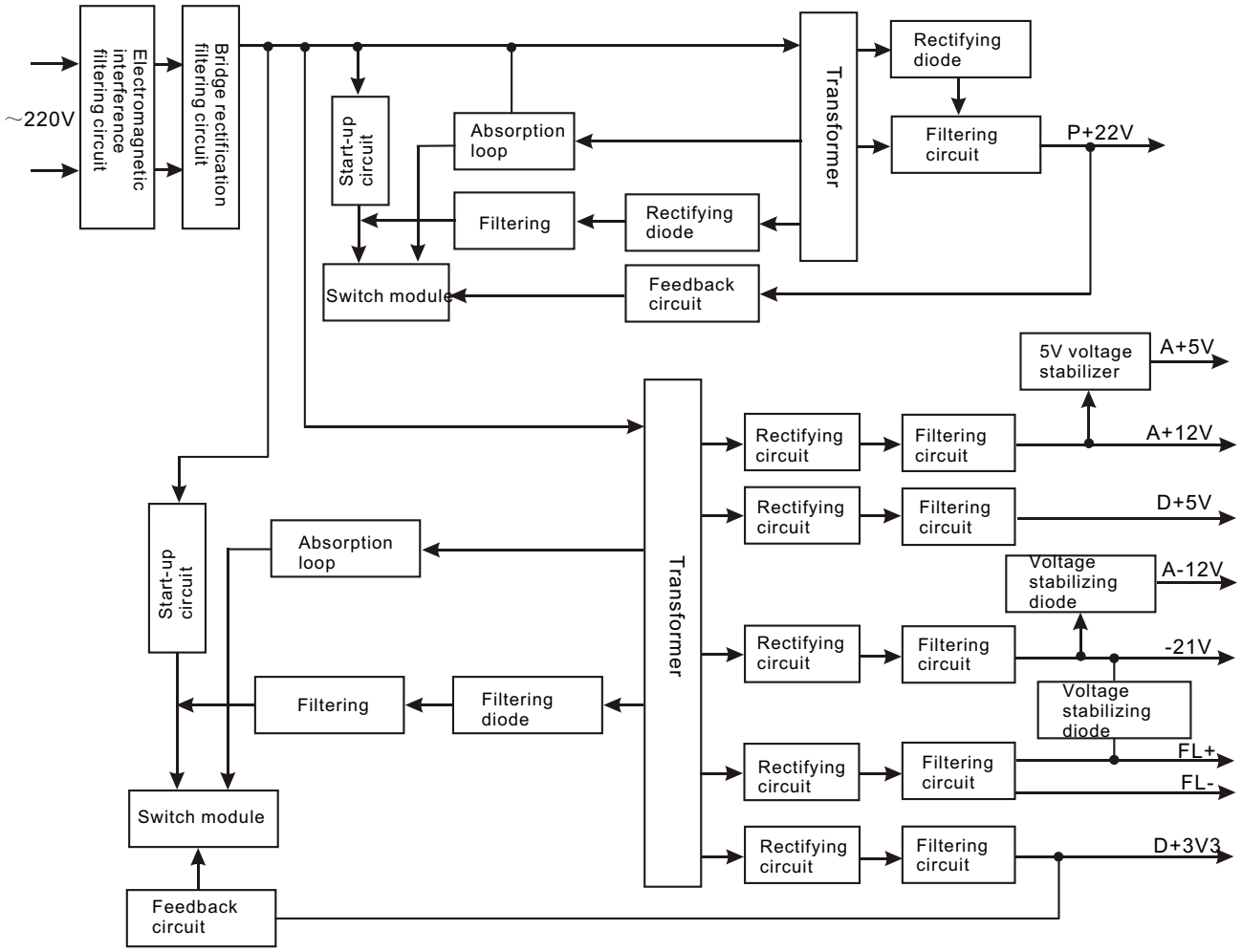


Figure 3.2.12.1 Power circuit block diagram

2. Working principle: this power circuit is composed of two parts, with electromagnetic interference filtering circuit and bridge rectification filtering circuit commonly used. The first part circuit produces P+22V DC power and uses in power supply of power amplifier circuit; the other part is responsible for power supply of other module circuit.

Working principle of each part is shown as follows:

(1)Electromagnetic interference filtering circuit: various electromagnetic radiation exits in surroundings, the input AC power will be disturbed. The function of electromagnetic interference filtering circuit is to filter these interference to make those that enters bridge rectification circuit is pure AC power.

(2) Bridge rectifying and filtering circuit: the function of this circuit is to produce a DC power about 310V to supply for rear stage.

(3) Start circuit: wen power on, transformer does not begin working, now start circuit provides switch module with a power supply voltage to make it work, after transformer begins to work, the voltage supplied by power supply circuit to switch module maintains the working of switch module.

(4) Absorption loop: switch module perform “on” and “off” action in very high frequency, so a strong self-inductive voltage will produce in transformer primary winding to cause damage to switch module. The function of absorption loop is to form loop for inductor to ensure normal working of circuit.

(5) Switch module: 310V DC power inputs from transformer. To make transformer work, AC shape voltage must be shown. Function of switch module is to control this 310V DC power to make it on for a whole and then off for a while to make a high/low level variation produce in input level of transformer, thus transformer can work.

(6) Power supply circuit: provides switch module with a power supply voltage.

(7) Rectifying diode: voltage that outputs from transformer is pulse DC, the function of rectifying diode is to change pulse DC into DC together with filtering circuit.

(8) Feedback loop: the time length of “on” of switch module is decided by feedback loop. Feedback loop samples output level. When output voltage is too high, voltage sampled is on high side, through feedback, to make the “on” time of switch module decrease, coupling of transformer reduces and output voltage decreased. When output voltage is too low, voltage sampled is on low side, through feedback loop, to make the “on” time of switch module increases, coupling of transformer increases and output voltage increases, thus through auto control function of feedback loop, power board may output stable voltage.

(9) Filtering circuit: the function is to produce a stable DC voltage with small ripple. “∏"-type filter is mostly adopted in filtering circuit. Features of capacitor filtering are that when load resistence is high and current is small, filtering is obvious; as for inductor filtering, when load resistence is small and current is large, filtering is obvious. Constitute capacitor to “∏"-type filter to get better filtering effect.

3. Main function of each voltage of power output board:

(1) +22V: output to power amplifier board and supply power for power amplifier circuit.

(3) D+5V: supply power for panel N100, servo drive chip U301 (D5954) and open/close door circuit.

(4) A-12V, A+12V: supply power for audio power amplifying ship N100～N104 (IC4558), N107 (RC4580) on power amplifier board.

(6) D+3V3：U201 (MT1389E), U207 (FLASH), U208 (SDRAM) and U205 (74HCU04) power supply.

(7) A+5V (pin 5 of XP203): supply power for loader.

(8) A+5V (pin 4 of XS504): supply power for power amplifier board A/D conversion chip N108 (Cs5340).

Section Three Servicing Cases

3.3.1 Servicing cases

[Example 1] Symptom: not read disc

Description: not read any disc

Analysis and troubleshooting: check laser, light emission, feed, main axis, trace and they are all normal, but there is no focus action; use multimeter to test pin 13, 14 of U301 (5954), voltage is normal (about 1.4V); test pin 1, 2 of XS301 and voltage is normal; check nerve flat cable and contact is good, so we judge that laser head focus winding is burnt down; after changing loader, trouble is removed.

[Example 2] Symptom: waveform is small

Description: left and right output waveform of mixed audio terminal are small

Analysis and troubleshooting: left and right output waveform of mixed left and right audio terminal are small, if this kind of case appears, the elements used by two terminals commonly are easier to have trouble. Firstly check whether the flat cable between AV board and power amplifier board has well contacted, after removing the above factors, then check power supply of IC with location number N101 on power amplifier board and they are +12V, -12V, which are normal; check flat cable between power amplifier board and decode board and it is normal; check AD conversion voltage ADACVDD3 of audio signals and find that it is 2.4V, which should be 3.3V in normal conditions; check and find that resistance on two ends of C240, Tc210 is infinite, so we can confirm that L204 has trouble, after changing is, trouble is removed.

[Example 3] Symptom: headphone has no sound

Description: after inserting headphone, two sides have no sound

Analysis and troubleshooting: after inserting headphone, test voltage of pin 4 on power amplifier board X110 is 0V, which is normal; test voltage of pin 4, 8 of N107 are -12V and +12V, which is normal; test pin 1 of N111 and find that voltage is 0V, this pin is power supply pin of IC, which should be 9V in normal conditions, observe carefully and find that R155 has trouble, after changing it, trouble is removed.

[Example 4] Symptom: no MIC

Description: when inserting microphone and speaking, there is no audio output

Analysis and troubleshooting: insert microphone and speak, use oscillograph to test pin 6 and 7 of power amplifier board N104 and there is signal output; test pin 10 of N108 and there is also signal; test pin 4 and there is no signal, so we can judge that N108 has been damaged, after changing it, trouble is removed.

[Example 5] Symptom: panel indicator light is not on

Description: after power on, panel indicator light is not on

Analysis and troubleshooting: power on, use multimeter to test voltage of base electrode of V110 and it is 5V; test voltage on two ends of R110 and it is also 5V, thus only V100 has trouble, after changing it, trouble is removed.

[Example 6] Symptom: display screen flickers when reading disc

Description: when reading disc or opening door, display on screen is not stable, and panel indicator light flickers

Analysis and troubleshooting: when this kind of case appears, start from power supply. When checking display screen 5V power supply, after no disc in or disc reading is normal, voltage keeps in stable state, this voltage varies from 3.5 to 5.5V when reading discs, so the trouble should be caused by power, voltage also varies the same when checking 5V output voltage of power board, check 5V voltage filtering circuit elements and there is no abnormality, so we doubt that performance of the diode with location number D510 is not stable, after changing it, trouble is removed.

[Example 7] Symptom: speed of opening door is fast

Description: when opening and closing door, speed is fast, disc reading is normal, picture and sound output is normal.

Analysis and troubleshooting: when this trouble appears, trouble should lie in power circuit, check power supply voltage of open/close door drive circuit and it increases to 7.5V; check voltage of other circuit and it also increases, so trouble should lie in output voltage adjustment circuit; test voltage of IC with location number U503 of power board and it is 3.3V; it is known from working principle of U503, voltage of this pin is 2.5V when in normal conditions, change IC with location number U503, voltage resumes to be normal and trouble is removed.

[Example 8] Symptom: picture has mosaic when playing DVD

Description: when playing other discs, picture output is normal; only when playing DVD disc, two parallel interfering lines appear on picture

Analysis and troubleshooting: this trouble appears in video decode part always. After power off,

Picture output is normal; after playing for a period (about 5 minutes), picture has interference. To analyse this trouble, firstly play DVD disc normally after power on, use electric iron to heat chip 1389, picture has interference after heating; after changing chip 1389, trouble is remove.

[Example 9] Symptom: power amplifier has no sound output

Description: after playing any disc for one hour, line and headphone sound output is normal, only power amplifier channel has no sound output with slight noise; power on again after power off for a period, the player resumes to be normal, after about 1 hour, there is no sound output again.

Analysis and troubleshooting: when this trouble appears, trouble lies in power amplifier output circuit. Test power supply voltage of power amplifier IC TDA9847 and it is 23V, which is normal; use oscillograph to test waveform of pin 6, 8, 9, 12 of TDA8947 and they are normal; it is known from symptom, when there is no sound output, IC should lie on over-heat or over-current protection state; test SCM control signal and there is no abnormality, so it means that trouble should be caused by power amplifier IC itself; after changing TDA8947, trouble is removed.

[Example 10] Symptom: power amplifier has no sound output

Description: when playing disc, player has no sound output, line and headphone have no sound output; when rotate volume knob, panel display variation is normal, power amplifier output end has no noise or current sound, disc playing is normal, after switching to tuning state, there is still sound output.

Analysis and troubleshooting: it is known from circuit principle, line, headphone and power amplifier audio signal are the same signals , which are divided into three-channel signals through PT2314, so trouble should lie in common channel. In addition, trouble should lie in surroundings of PT2314. Use oscillograph to test TC145, TC146 location capacitor and there is no audio signal output, then test TC141, TC132 location capacitor and waveform is normal, test N111 location IC power supply and SDA, SCL signal and they are all normal; after changing PT2314IC, trouble is removed.

3.3.2 Troubleshooting flow chart

1. Troubleshooting process for “Player has no output” is shown in the figure 3.3.2.1:

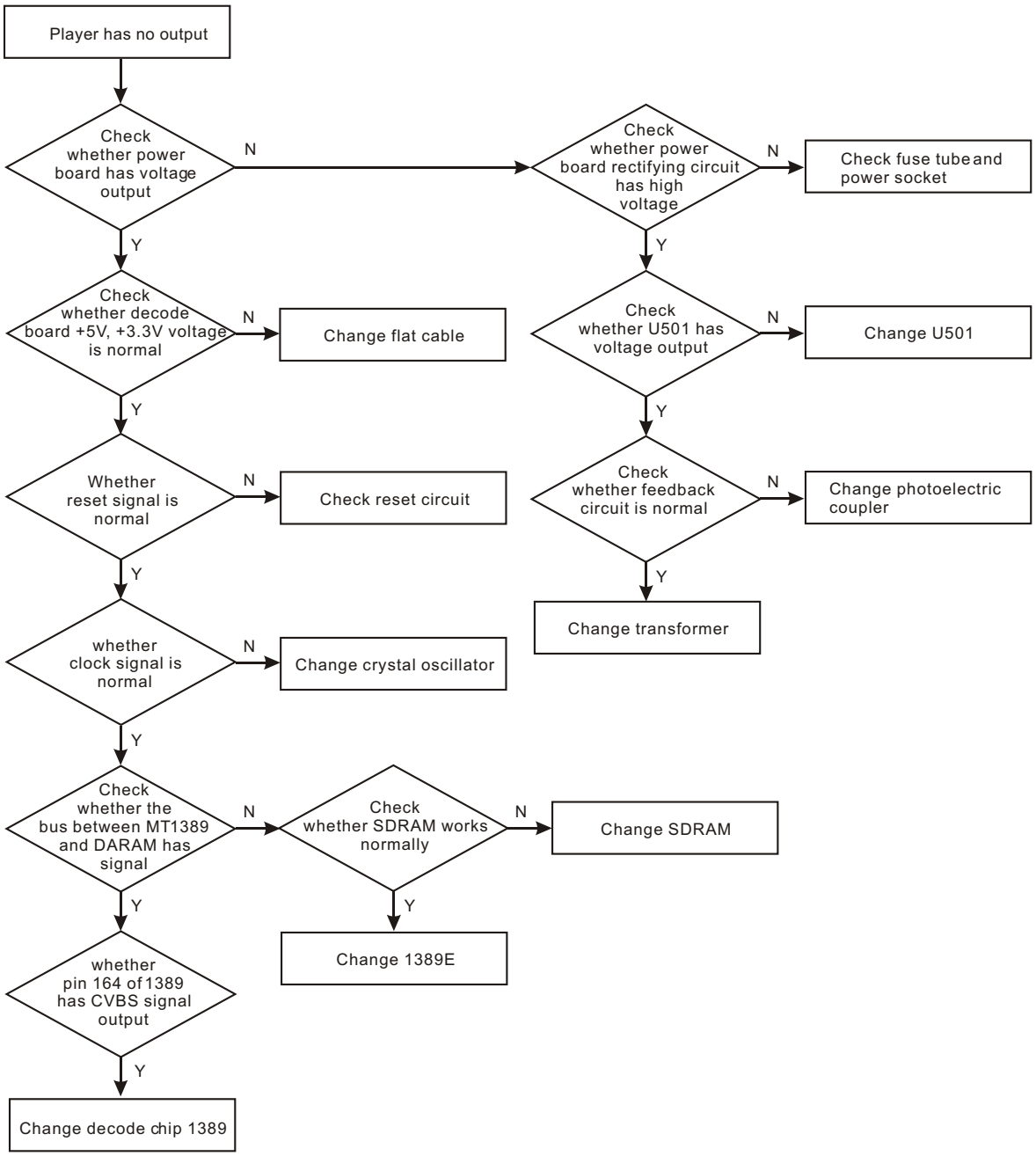


Figure 3.3.2.1 Troubleshooting flow chart for “Player has no output”

2. Troubleshooting process for “No sound output” is shown in the figure 3.3.2.2:

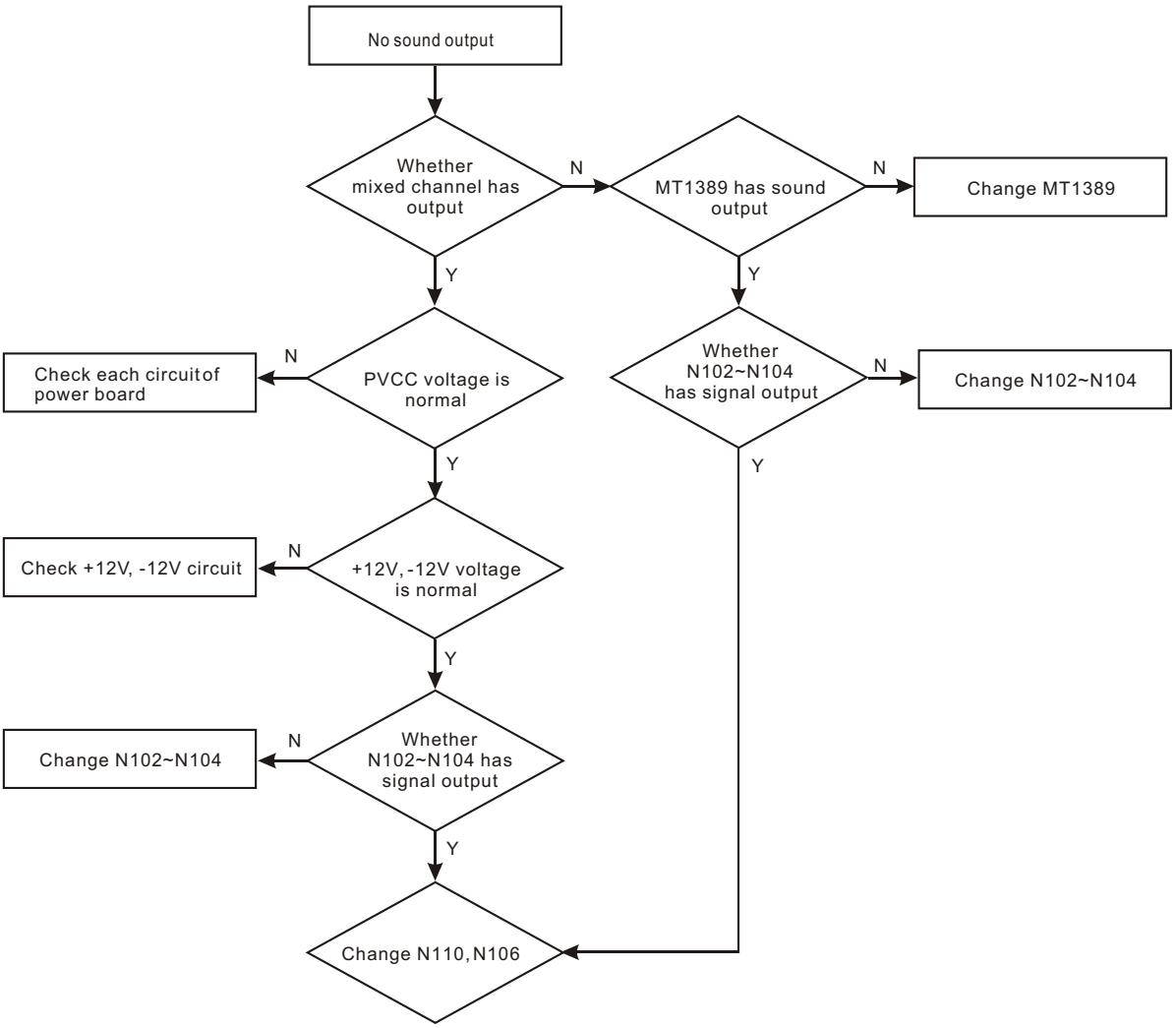


Figure 3.3.2.2 Troubleshooting flow chart for “No sound output”

3. Troubleshooting process for “Power amplifier volume invalid” is shown in the figure 3.3.2.3:

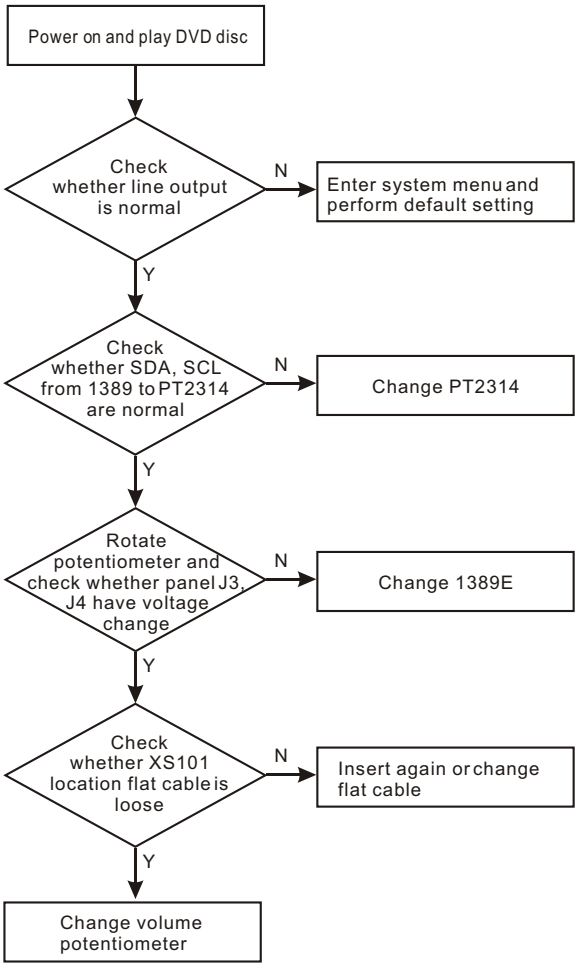


Figure 3.3.2.3 Troubleshooting flow chart for “Power amplifier volume is invalid”

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

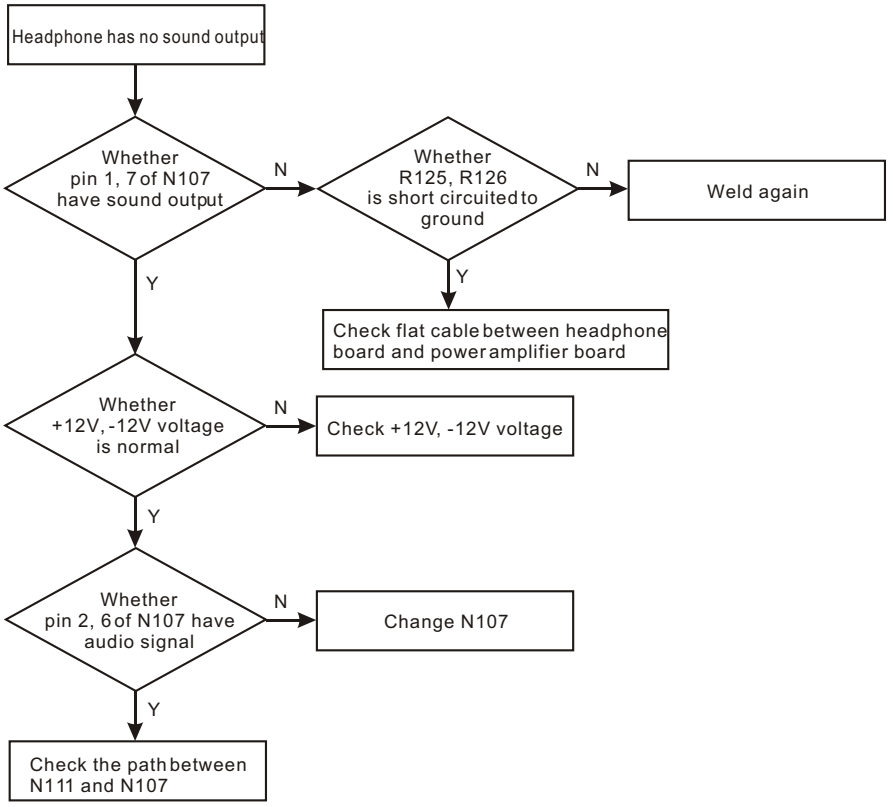


Figure 3.3.2.4 Troubleshooting flow chart for “Headphone has no sound output”

5. Troubleshooting process for “Power not on” is shown in the figure 3.3.2.5:

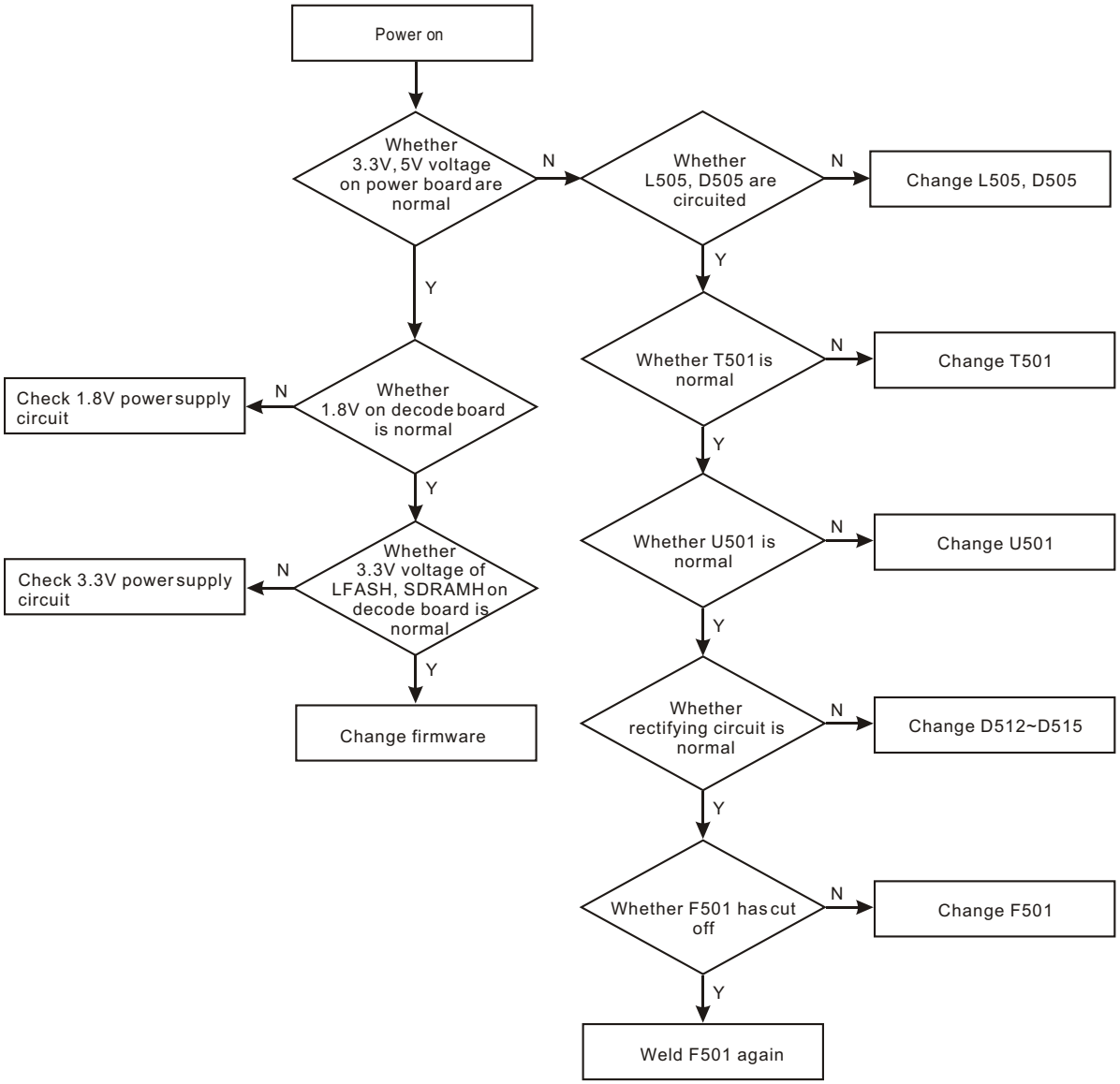
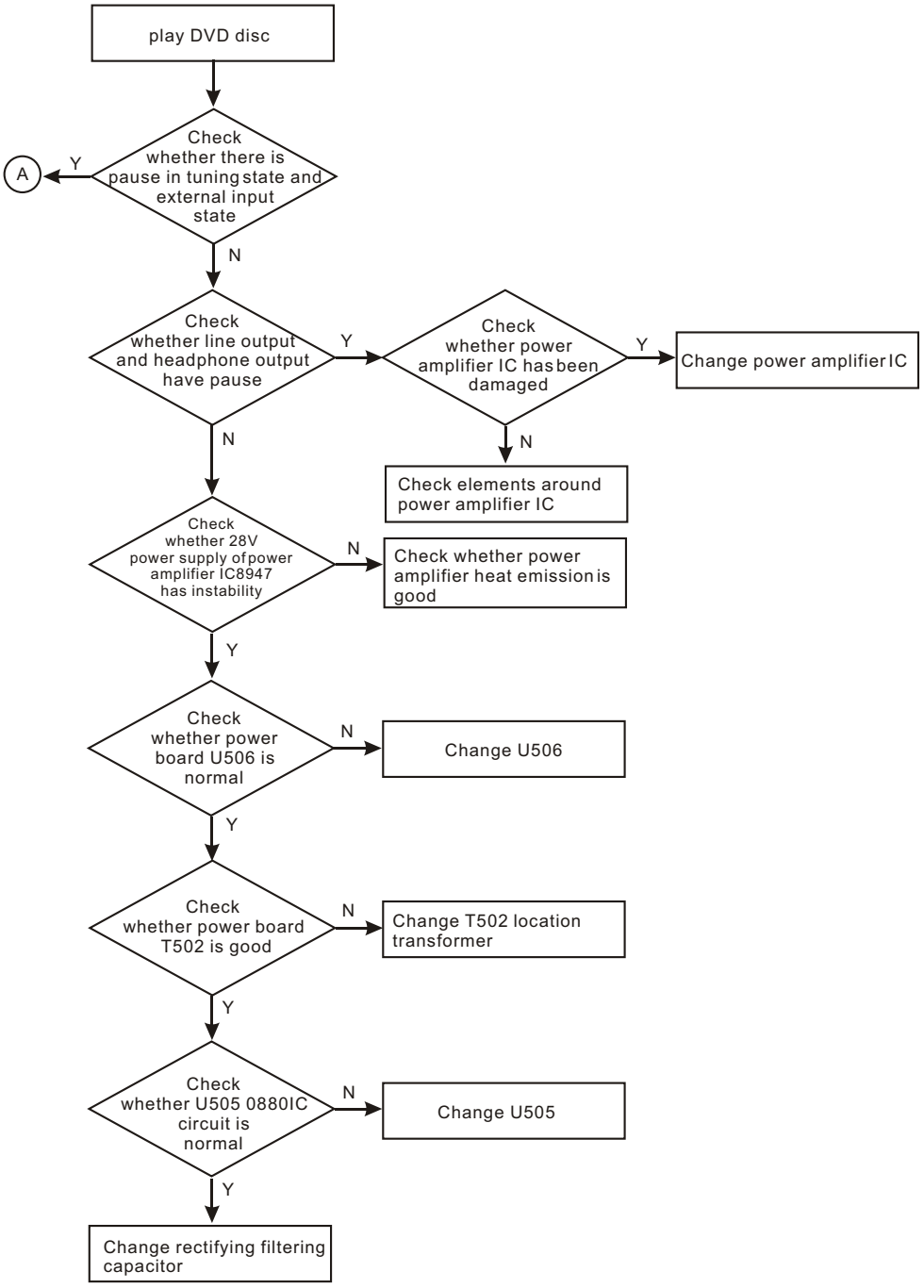


Figure 3.3.2.5 Troubleshooting flow chart for “Power not on”

6. Troubleshooting process for “power amplifier sound output pauses” is shown in the figure 3.3.2.6:



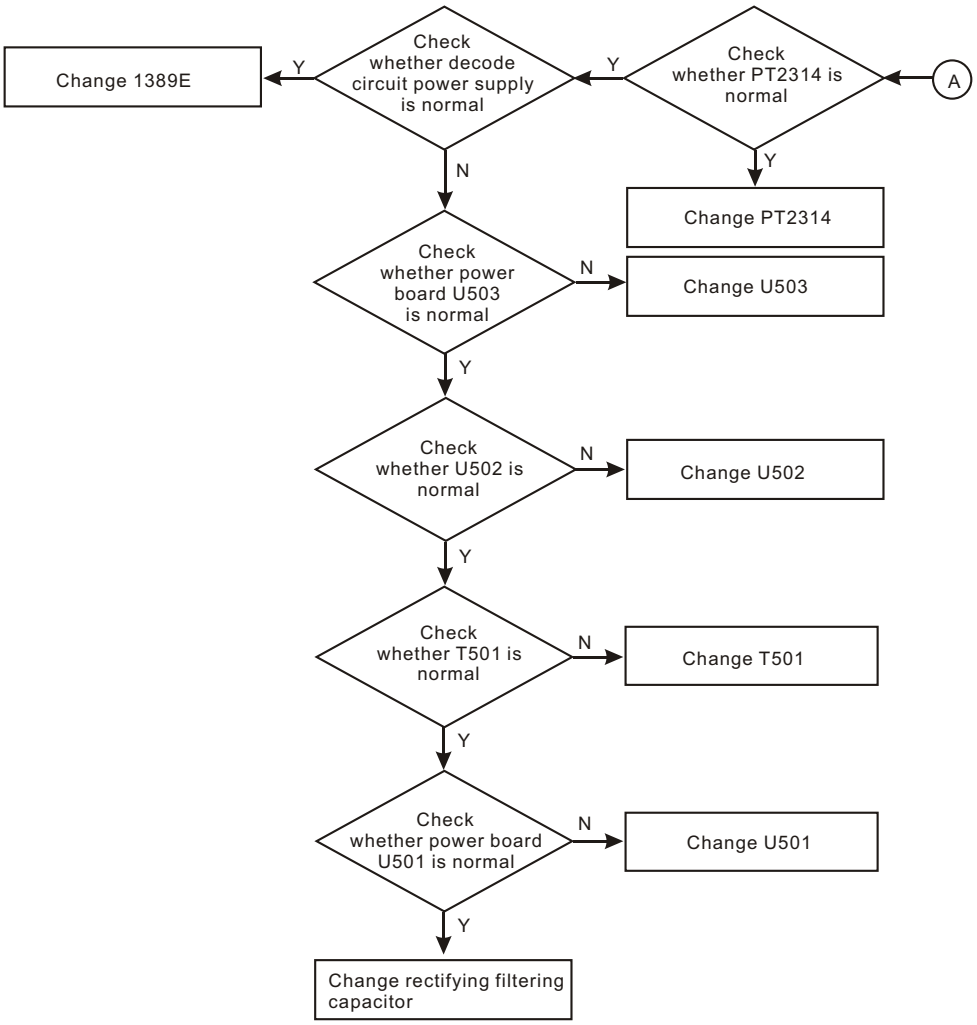
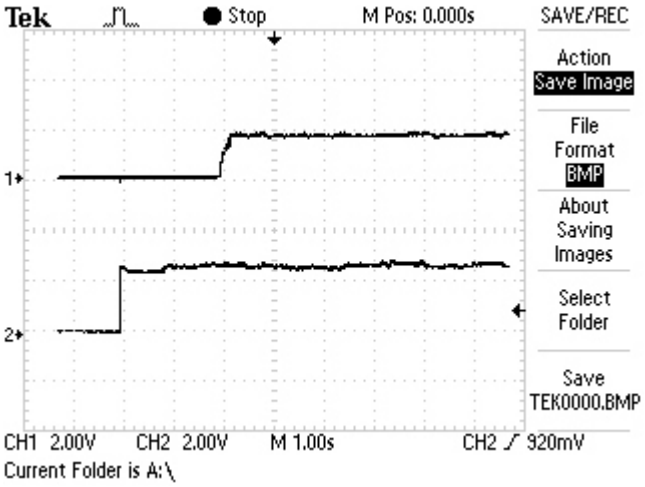


Figure 3.3.2.6 Troubleshooting flow chart for "power amplifier sound output pauses"

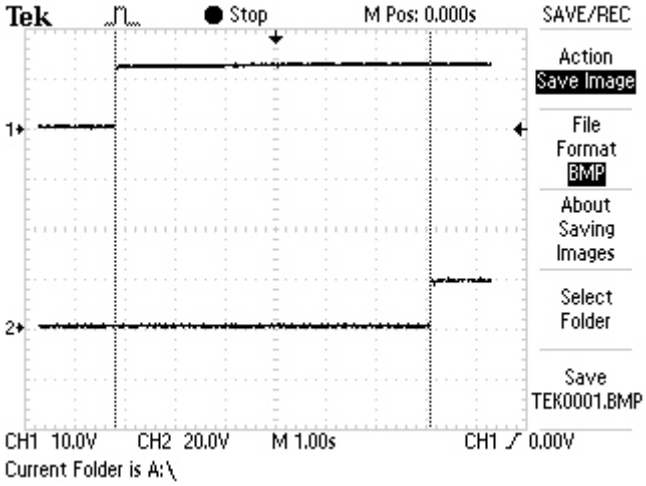
Section Four Signal waveform diagram

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.

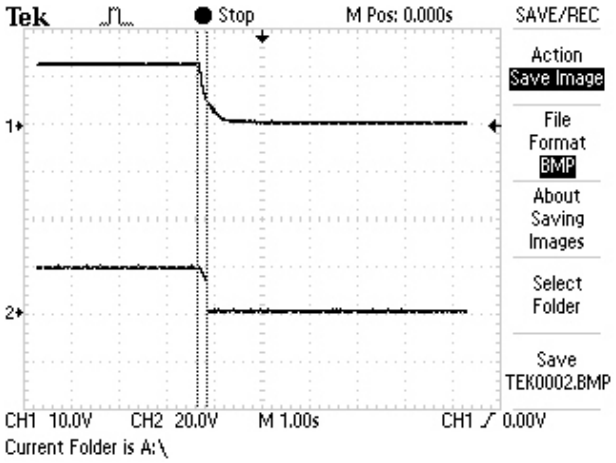
1. Waveform diagram of comparison between reset signal (channel 1) and 3.3V voltage (channel 2):



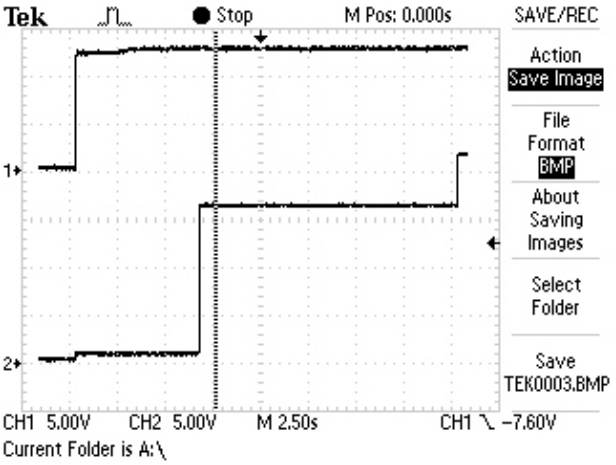
2. Waveform diagram of the comparison between power-on mute signal (channel 1) and +12V (channel 2) power supply:



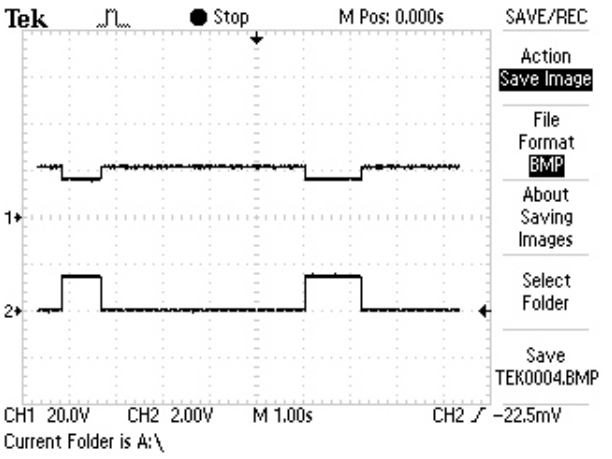
3. Waveform diagram of the comparison between HARDM signal (channel 2) and +12V power (channel 1) when power off:



4. Waveform diagram of the comparison between LRSWM signal (channel 2) and +12 power (channel 1) when power on. The increase of LRSWM signal goes through 2 steps: the first is 0.6V with durable time 6.5 S; the second is 16V with duration time 13.5 S.



5. Waveform diagram of the comparison between LRSWM signal (channel 1) and LRSWMUT signal (channel 2). When mute is on, 1389 gives out low level signal LRSWMUT mote than 310ms to make LRSWM signal level pull down to make mute output, and 1389 is mute from inside to make all channels have no output. Centre, surrond channel mute means is the same with that of main channel.



Section Five Function Introduction to IC

3.5.1 function introduction to MT1389E

1. DESCRIPTION

MT1389E (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 MT1389E 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. Key Features

RF/Servo/MPEG Integration

Embedded 6ch Audio DAC

Embedded 2ch Audio ADC for Karaoke

High Performance Audio Processor

High Performance Progressive Video Processor

Support Nero-Digital

High Quality 108MHz/12-bit, 4 CH TV Encoder

3. 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

Built-in 2-ch Audio ADC for Karaoke

(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

4. PIN DESCRIPTION

PIN	Main	Alt	Type	Description
RF interface (26)				
191	RFGND18		Ground	Analog ground
192	RFVDD		Power	Analog power 1.8V
212	OSP		Analog output	RF Offset cancellation capacitor connecting
213	OSN		Analog output	RF Offset cancellation capacitor connecting
214	RFGC		Analog output	RF AGC loop capacitor connecting for DVD-ROM
215	IREF		Analog input	Current reference input. It generates reference current for RF path. Connect an external 15K resistor to this pin and AVSS
216	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
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 Servo Interface (8)				
204	ADCVDD3		Power	Analog 3.3V power for ADC
205	ADCVSS		Ground	Analog ground for ADC
206	RFVDD3		Power	Analog power
207	RFRPDC		Analog output	RF ripple detect output
208	RFRPAC		Analog input	RF ripple detect input (through AC-coupling)
209	HRFZC		Analog input	High frequency RF fipple zero crossing
210	CRTPLP		Analog output	Defect level filter capacitor connecting
211	RFGND		Ground	Analog power
RF Data PLL Interface (9)				
195	JITFO		Analog output	Output terminal of RF jitter meter
196	JITFN		Analog Input	Input terminal of RF jitter meter
197	PLLVSS		Ground	Ground pin for data PLL and related analog circuitry
198	IDACEXLP		Analog output	Data PLL DAC Low-pass filter
199	PLLVDD3		Power	Power pin for data PLL and related analog circuitry
200	LPFON		Analog Output	Negative output of loop filter amplifier
201	LPFIP		Analog input	Positive input terminal of loop filter amplifier

202	LPFIN		Analog input	Negative input terminal of loop filter amplifier
203	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	TROPENPWM		Analog output	Tray PWM output/Tray open output
40	PWMOUT1	ADIN0	Analog output	3) 1st General PWM output 4) 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
43	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 (11)				
48 84 132 146	DVDD18		Power	1.8V power pin for internal digital circuitry
74 120	DVSS		Ground	1.8V ground pin for internal digital circuitry
60 87 108 137	DVDD3		Power	3.3V power pin for internal digital circuitry
149	DVSS		Ground	3.3V ground pin for internal digital circuitry
Micro Controller and Flash Interface (48)				
54	HIGHA0		In/Out 4~16mA, SRPU	Microcontroller address 8

66	HIGHA1		In/Out 4~16mA, SRPU	Microcontroller address 9
65	HIGHA2		In/Out 4~16mA, SRPU	Microcontroller address 10
64	HIGHA3		In/Out 4~16mA, SRPU	Microcontroller address 11
63	HIGHA4		In/Out 4~16mA, SRPU	Microcontroller address 12
62	HIGHA5		In/Out 4~16mA, SRPU	Microcontroller address 13
61	HIGHA6		In/Out 4~16mA, SRPU	Microcontroller address 14
59	HIGHA7		In/Out 4~16mA, SRPU	Microcontroller address 15
81	AD7		In/Out 4~16mA, SRPU	Microcontroller address/data 7
78	AD6		In/Out 4~16mA, SRPU	Microcontroller address/data 6
77	AD5		In/Out 4~16mA, SRPU	Microcontroller address/data 5
76	AD4		In/Out 4~16mA, SRPU	Microcontroller address/data 4
75	AD3		In/Out 4~16mA, SRPU	Microcontroller address/data 3
73	AD2		In/Out 4~16mA, SRPU	Microcontroller address/data 2
72	AD1		In/Out 4~16mA,	Microcontroller address/data 1
71	AD0		In/Out 4~16mA, SRPU	Microcontroller address/data 0
83	IOA 0		In/Out 4~16mA, SRPU	Microcontroller address
69	IOA 1		In/Out 4~16mA, SRPU	Microcontroller address 1/ IO
47	IOA 2		In/Out 4~16mA, SRPU	Microcontroller address 2/ IO
49	IOA 3		In/Out 4~16mA,	Microcontroller address 3/ IO

			SRPU	
50	IOA 4		In/Out 4~16mA, SRPU	Microcontroller address 4/ IO
51	IOA 5		In/Out 4~16mA, SRPU	Microcontroller address 5/ IO
52	IOA 6		In/Out 4~16mA, SRPU	Microcontroller address 6/ IO
53	IOA 7		In/Out 4~16mA, SRPU	Microcontroller address 7/ IO
58	A16		In/Out 4~16mA, SRPU	Flash address 16
82	A17		In/Out 4~16mA, SRPU	Flash address 17
55	A18		In/Out 4~16mA, SRPD,SMT	Flash address 18 /IO
56	A19		In/Out 4~16mA, SRPD,SMT	Flash address 19 /IO
67	A20	YUV0	In/Out 4~16mA, SRPD,SMT	5) Flash address 20 /IO 6) While External Flash size <= 1MB: I) Alternate digital video YUV output 0
79	A21	YUV7 GPIO	In/Out 4~16mA, SRPD,SMT	7) Flash address 21 /IO 8) While External Flash size <= 2MB: I) Digital video YUV output 7 II) GPIO
80	ALE		In/Out 4~16mA, SRPD,SMT	Microcontroller address latch enable
70	IOOE#		In/Out 4~16mA, SRPD,SMT	Flash output enable, active low / IO
57	IOER#		In/Out 4~16mA, SRPD,SMT	Flash write enable, active low / IO
68	IOCS#		In/Out 4~16mA, SRPD,SMT	Flash chip select, active low / IO
85	UWR#		In/Out 4~16mA, SRPD,SMT	Microcontroller write strobe, active low
86	URD#		In/Out 4mA, SRPD,SMT	Microcontroller read strobe, active low

88	UP1_2		In/Out 4~16mA, SRPD,SMT	Microcontroller port 1-2
89	UP1_3		In/Out 4mA, SRPD,SMT	Microcontroller port 1-3
91	UP1_4		In/Out 4mA, SRPD,SMT	Microcontroller port 1-4
92	UP1_5		In/Out 4mA, SRPD,SMT	Microcontroller port 1-5
93	UP1_6	SCL	In/Out 4mA, SRPD,SMT	9) Microcontroller port 1-6 10) I2C clock pin
94	UP1_7	SDA	In/Out 4mA, SRPD,SMT	11) Microcontroller port 1-7 12) I2C data pin
95	UP3_0	RXD	In/Out 4mA, SRPD,SMT	13) Microcontroller port 3-0 14) 8032 RS232 RxD
96	UP3_1	TXD	In/Out 4mA, SRPD,SMT	15) Microcontroller port 3-1 16) 8032 RS232 TxD
97	UP3_4	RXD SCL	In/Out 4mA, SRPD,SMT	17) Microcontroller port 3-4 18) Hardwired RD232 RxD 19) I2C clock pin
98	UP3_5	RXD SDA	In/Out 4~16mA, SRPD,SMT	20) Microcontroller port 3-5 21) Hardwired RD232 TxD 22) I2C data pin
102	IR		Input SMT	IR control signal input
103	INT0#		In/Out 4~16mA, SRPD,SMT	Microcontroller external interrupt 0, active low
153	ALRCK	YUV1 GPO	In/Out 4mA, PD,SMT	1) Audio left/right channel clock 2) Trap value in power-on reset: I) 1: use external 373 II) 0: use internal 373 3) While internal audio DAC used: I) Digital video YUV output 1 II) GPO
151	ABCK	YUV0 GPIO	In/Out 4mA, SMT	4) Audio bit clock 5) While internal audio DAC used: I) Digital video YUV output 0 II) GPIO

152	ACLK	YUV0 GPIO	In/Out 4mA, SMT	6) Audio DAC master clock 7) While internal audio DAC used: I) Alternate digital video YUV output 0 II) GPIO
154	ASDATA0	YUV2 GPO	In/Out 4mA, PD,SMT	8) Audio serial data 0 (Front-Left/Front-Right) 9) Trap value in power-on reset: I) 1: manufactory test mode II) 0: normal operation 10) While internal audio DAC used: I) Digital video YUV output 2 II) GPO
155	ASDATA1	YUV4 GPO	In/Out 4mA, PD,SMT	11) Audio serial data 1 (Left-Surround/Right-Surround) 12) Trap value in power-on reset: I) 1: manufactory test mode II) 0: normal operation 13) While only 2 channels output: I) Digital video YUV output 4 II) GPO
156	ASDATA2	YUV5 GPO	In/Out 4mA, PD,SMT	14) Audio serial data 2 (Center/LFE) 15) Trap value in power-on reset: I) 1: manufactory test mode II) 0: normal operation 16) While only 2 channels output: I) Digital video YUV output 5 II) GPO
157	ASDATA3	YUV6 GPIO	In/Out 4mA, PD,SMT	17) Audio serial data 3 (Center-back/ Center-left-back/Center-right-back, in 6.1 or 7.1 mode) 18) While only 2 channels output: I) Digital video YUV output 6 II) GPIO
158	MC_DATA	INT2# YUV0	In/Out 2mA,	19) Microphone serial input 20) While not support Microphone: I) Microcontroller external interrupt 2 II) Digital video YUV output 0 III) GPIO
159	SPDIF		Output 4~16mA,	S/PDIF output

			SR: ON/OFF	
172	AADVSS		Ground	Ground pin for 2ch audio ADC circuitry
173	AKIN2		Analog	Audio ADC input 2
174	ADVCM		Analog	2ch audio ADC reference voltage
175	AKIN1		Analog	Audio ADC input 1
176	AADVDD		Power	3.3V power pin for 2ch audio ADC circuitry
177	APLLVDD3		Power	3.3V Power pin for audio clock circuitry
178	APLLCAP		Analog In/Out	APLL external capacitance connection
179	APLLVSS		Ground	Ground pin for audio clock circuitry
180	ADACVSS2		Ground	Ground pin for audio DAC circuitry
181	ADACVSS1		Ground	Ground pin for audio DAC circuitry
182	ARF	GPIO	Output	21) Audio DAC sub-woofer channel output 22) While internal audio DAC not used: GPIO
183	ARS	GPIO	Output	23) Audio DAC right Surround channel output 24) While internal audio DAC not used: GPIO
184	AR	GPIO	Output	25) Audio DAC right channel output 26) While internal audio DAC not used: a. SDATA1 b. GPIO
185	AVCM		Analog	Audio DAC reference voltage
186	AL		Output	27) Audio DAC left channel output 28) While internal audio DAC not used: a. SDATA2 b. GPIO
187	ALS		Output	29) Audio DAC left Surround channel output 30) While internal audio DAC not used: c. SDATA0 d. GPIO
188	ALF		Output	31) Audio DAC center channel output 32) While internal audio DAC not used: GPIO
189	ADACVDD1		Power	3.3V power pin for audio DAC circuitry
190	ADACVDD2		Power	3.3V power pin for audio DAC circuitry
Video Interface (12)				
160	DACVDDC		Power	3.3V power pin for video DAC circuitry
161	VREF		Analog	Bandgap reference voltage
162	FS		Analog	Full scale adjustment
163	DACVSSC		Ground	Ground pin for video DAC circuitry

164	CVBS		In/Out 4mA, SR	Analog composite output
165	DACVDDB		Power	3.3V power pin for video DAC circuitry
166	DACVSSB		Ground	Ground pin for video DAC circuitry
167	DACVDDA		Power	3.3V power pin for video DAC circuitry
168	Y/G		In/Out 4mA, SR	Green, Y, SY, or CVBS
169	DACVSSA		Ground	Ground pin for video DAC circuitry
170	B/CB/PB		In/Out 4mA, SR	Blue, CB/PB, or SC
171	R/CR/PR		In/Out 4mA, SR	Red, CR/PR, CVBS, or SY
MISC (12)				
101	PRST#		In/Out PD,SMT	Power on reset input, active low
100	ICE		In/Out PD,SMT	Microcontroller ICE mode enable
193	XTALO		Output	27MHz crystal output
194	XTALI		Input	27MHz crystal input
44	GPIO0	VSYN YUV1	In/Out 4mA, SR,SMT	33) General purpose IO 0 34) Vertical sync for video input 35) Digital video YUV output 1
45	GPIO1	HSYN INT4# YUV2	In/Out 4mA, SR,SMT	36) General purpose IO 1 37) Horizontal sync for video input 38) Microcontroller external interrupt 4 39) Digital video YUV output 2
46	GPIO2	SPMCLK	In/Out 2mA	40) General purpose IO 2 41) Audio S/PDIF SPMCLK input
147	GPIO3	INT1# SPDATA	In/Out 2mA	42) General purpose IO 3 43) Microcontroller external interrupt 1 44) Audio S/PDIF SPDATA input
148	GPIO4	SPLRCK	In/Out 2mA	45) General purpose IO 4 46) Audio S/PDIF SPLRCK input
150	GPIO5	INT3# SPBCK	In/Out 2mA	47) General purpose IO 5 48) Microcontroller external interrupt 3 49) Audio S/PDIF SPBCK input

90	GPIO6	YUVCLK	In/Out 4mA , SR,SMT	50) General purpose IO 6 51) Digital video clock output
99	GPIO7	YUV3	In/Out 4mA, SR,SMT	52) General purpose IO 7 53) Digital video YUV output 3
Dram Interface (38) (Sorted by position)				
145	RA4		In/Out	DRAM address 4
144	RA5		In/Out	DRAM address 5
143	RA6		In/Out	DRAM address 6
142	RA7		In/Out	DRAM address 7
141	RA8		InOu	DRAM address 8
140	RA9		In/Out	DRAM address 9
139	RA11		In/Out Pull-Down	DRAM address bit 11
138	CKE		Output	DRAM clock enable
136	RCLK		In/Out	Dram clock
135	RA3		In/Out	DRAM address 3
134	RA2		In/Out	DRAM address 2
133	RA1		In/Out	DRAM address 1
131	RA0		In/Out	DRAM address 0
130	RA10		In/Out	DRAM address 10
129	BA1		In/Out	DRAM bank address 1
128	BA0		In/Out	DRAM bank address 0
127	RCS#		Output	DRAM chip select, active low
126	RAS#		Output	DRAM row address strobe, active low
125	CAS#		Output	DRAM column address strobe, active low
124	RWE#		Output	DRAM Write enable, active low
123	DQM1		In/Out	Data mask 1
122	RD8		In/Out	DRAM data 8
121	RD9		In/Out	DRAM data 9
119	RD10		In/Out	DRAM data 10
118	RD11		In/Out	DRAM data 11
117	RD12		In/Out	DRAM data 12
116	RD13		In/Out	DRAM data 13
115	RD14		In/Out	DRAM data 14

114	RD15		In/Out	DRAM data 15
113	RD0		In/Out	DRAM data 0
112	RD1		In/Out	DRAM data 1
111	RD2		In/Out	DRAM data 2
110	RD3		In/Out	DRAM data 3
109	RD4		In/Out	DRAM data 4
107	RD5		In/Out	DRAM data 5
106	RD6		In/Out	DRAM data 6
105	RD7		In/Out	DRAM data 7
104	DQM0		In/Out	Data mask 0

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 dBGA2 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 dBGA2™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 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

3.5.4 function introduction to LM1117

1. Description

The LM1117(U206) series of adjustable and fixed voltage regulators are designed to provide 1A output current and to operate down to 1V input-to-output differential. The dropout voltage of the device is guaranteed maximum 1.3V at maximum output current, decreasing at lower load currents.

On-chip trimming adjusts the reference voltage to within 1% accuray. Current limit is also trimmed, minimizing the stress under overload conditions on both the regulator and power source circuitry.

The BM1117 devices are pin compatible with other three-terminal SCSI regulators and are offered in the low profile surface mount SOT-223 package and in the TO-252 (DPAK) plastic package.

2. Features

Three Terminal Adjustable or Fixed Voltages 1.5V, 1.8V, 2.5V, 2.85V, 3.3V and 5.0V

Output Current of 1A

Operates Down to 1V Dropout

Line Regulation: 0.2% Max.

Load Regulation: 0.4% Max.

SOT-223 and TO-252 package available

3.PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	GND/adjust	I	Ground (fixed)/adjust (adjustable)
2	Vout	O	Voltage output
3	Vin	I	Voltage input

3.5.5 Function introduction to 29LV160BE

29LV160BE (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. Pin function is shown as the following table:

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

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

3.5.6 Function introduction to HY57V641620HGT-7

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. Pin function introduction is shown as the following table:

Pin	Name	Function	Signal flow	Pin	Name	Function	Signal flow
1	VDD	3.3V power supply		28	VSS	Ground	
2	DQ0	Data bus	I/O	29	MA4	Address bus	I
3	VDDQ	3.3V power supply	I/O	30	MA5	Address bus	I
4	DQ1	Data bus	I/O	31	MA6	Address bus	I
5	DQ2	Data bus	I/O	32	MA7	Address bus	I
6	VSSQ	Ground		33	MA8	Address bus	I
7	DQ3	Data bus	I/O	34	MA9	Address bus	I
8	DQ4	Data bus	I/O	35	MA11	Address bus	I
9	VDDQ	3.3V power supply		36	NC	Blank	
10	DQ5	Data bus	I/O	37	CKE	Clock enable signal	I
11	DQ6	Data bus	I/O	38	CLK	System clock input	I
12	VSSQ	Ground		39	UDQM	Data input/output screen-shielded signal	I
13	DQ7	Data bus	I/O	40	NC	Blank	
14	VDD	3.3V power supply		41	VSS	Ground	

15	LDQM	Data input/output screen-shielded signal	I	42	DQ8	Data bus	I/O
16	WE	Write control signal	I	43	VDDQ	3.3V power supply	
17	CAS	Line address gating signal	I	44	DQ9	Data bus	I/O
18	RAS	Row address gating signal	I	45	DQ10	Data bus	I/O
19	CS	Chip selection signal	I	46	VSSQ	Ground	
20	SD-BS0	Segmanr address 0 gating signal	I	47	DQ11	Data bus	I/O
21	SD-BS1	Segmanr 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 CD4094

1. DESCRIPTION

The CD4094BC (U213) consists of an 8-bit shift register and a 3-STATE 8-bit latch. Data is shifted serially through the shift register on the positive transition of the clock. The output of the last stage (QS) can be used to cascade several devices. Data on the QS output is transferred to a second output, Q'S, on the following negative clock edge.

The output of each stage of the shift register feeds a latch, which latches data on the negative edge of the STROBE input. When STROBE is HIGH, data propagates through the latch to 3-STATE output gates. These gates are enabled when OUTPUT ENABLE is taken HIGH.

2. FEATURES

- Wide supply voltage range: 3.0V to 18V
- High noise immunity: 0.45 VDD (typ.)
- Low power TTL compatibility:

  Fan out of 2 driving 74L or 1 driving 74LS
- 3-STATE outputs

3. PIN DESCRIPTION

Pin	Name	Function	Description	Pin	Name	Function	Description

1	STROBE	Store enable		9	QS		Nc
2	DATA	Data input	VS data input:VSDA	10	Q'S		Nc
3	CLOCK	clock	Clock input:VSCK	11	Q8		Nc
4	Q1		Reset inpit: RSR	12	Q7		Mute: LRSWMUT
5	Q2		Mute :SCMUT	13	Q6		VDATA3
6	Q3		AGND	14	Q5		Headphone mute output: HDET
7	Q4			15	OUTB	Output enable	
8	VSS	ground		16	VDD	Power supply	

3.5.8 Function introduction to D5954

1. DESCRIPTION

D5954 (U301) is a servo drive IC with built-in 4-channel drive circuit. Digital focus, trace, feed and mainaxis 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 fulfil 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 4558

1. Description

The RC4558 and RM4558 devices (N101, N102, N103, N104) 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
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

3.5.10 function introduction to M62429

1. Description

The M62429 (N105) is a dual channel electronic volume controlled with 2-wire serial data.

The built-in reference circuit can compose of an electronic volume with less external parts.

2. FEATURES

◆ Built-in reference circuit

◆ Control with serial data

Volume 0 to -83dB (1dB/step), $-\infty$

(Independent control is allowed in each channel)

◆ Low noise and low distortion

VNO = 5μVrms (ATT = - , JIS-A)

THD = 0.01% Typ. (V0 = 0.5Vrms, DIN-AUDIO)

3. PIN CONFIGURATION

PIN No	Symbol	I/O	Description
1	Vin1	I	1-ch input pin
2	Vout1	O	1-ch output pin
3	GND	I	Ground pin

4	DATA	I	Control data input pin. Inputs data in synchronization with clock
5	CLOCK	I	Clock input pin for transferring serial data.
6	Vcc	I	Power supply pin. Stabilize the pin with decoupling capacitor
7	Vout2	O	2-ch output pin
8	Vin2	I	1-ch input pin

3.5.11 function introduction to TDA8947J

1. Description

The TDA8947J (N106, N110) contains four identical audio power amplifiers. The TDA8947J can be used as: four Single-Ended (SE) channels with a fixed gain of 26 dB, two times Bridge-Tied Load (BTL) channels with a fixed gain of 32 dB or two times SE channels (26 dB gain) plus one BTL channel (32 dB gain) operating as a 2.1 system.

The TDA8947J comes in a 17-pin Dil-Bent-Sil (DBS) power package. The TDA8947J is pin compatible with the TDA8944AJ and TDA8946AJ.

The TDA8947J contains a unique protection circuit that is solely based on multiple temperature measurements inside the chip. This gives maximum output power for all supply voltages and load conditions with no unnecessary audio holes. Almost any supply voltage and load impedance combination can be made as long as thermal boundary conditions (number of channels used, external heatsink and ambient temperature) allow it.

2. FEATURES

- ◆ SE: 1 W to 25 W, BTL: 4 W to 50 W operation possibility (2.1 system)
- ◆ Soft clipping
- ◆ Standby and mute mode
- ◆ No on/off switching plops
- ◆ Low standby current
- ◆ High supply voltage ripple rejection
- ◆ Outputs short-circuit protected to ground, supply and across the load
- ◆ Thermally protected
- ◆ Pin compatible with TDA8944AJ and TDA8946AJ.

3. PIN CONFIGURATION

PIN No	Symbol	I/O	Description
1	OUT1+	O	non inverted loudspeaker output of channel 1
2	GND1	I	ground of channels 1 and 2

3	VCC1	I	supply voltage channels 1 and 2
4	OUT2-	O	inverted loudspeaker output of channel 2
5	MODE2	I	mode selection 2 input: mute and on for channels 3 and 4
6	IN2+	I	input channel 2
7	SGND	I	signal ground
8	IN1+	I	input channel 1
9	IN3+	I	input channel 3
10	MODE1	I	mode selection 1 input: standby, mute and on for all channels
11	SVR	I	half supply voltage decoupling (ripple rejection)
12	IN4+	I	input channel 4
13	CIV	I	common input voltage decoupling
14	OUT3-	O	inverted loudspeaker output of channel 3
15	GND2	I	ground of channels 3 and 4
16	VCC2	I	supply voltage channels 3 and 4
17	OUT4+	O	non inverted loudspeaker output of channel 4

3.5.12 function introduction to 4580

1. Description

RC4580(N107) 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 (±2V~±18V)
- ◆ Low Input Noise Voltage (0.8μVrms typ.)
- ◆ Wide Gain Bandwidth Product (15MHz typ.)
- ◆ Low Distortion (0.0005% typ.)
- ◆ Slew Rate (5V/μs typ.)
- ◆ Package Outline DIP8,SIP8,EMP8,SSOP8,DMP8
- ◆ Bipolar Technology

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
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

3.5.13 function introduction to 5340

1. DESCRIPTION

The CS5340 (N108) is complete analog-to-digital converter for digital audio systems. It performs sampling, analog-to-digital conversion and anti-alias littering, 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	Symbol	I/O	Description	PIN	Symbol	I/O	Description

1	M0	I	Mode selection 0	9	/RST	I	Reset
2	MCLK	I	Master clock	10	AINL	I	Analog input L
3	VL	I	Logic power	11	VQ	O	Quiescent voltage
4	SDOUT	O	Serial audio data output	12	AINR	I	Analog input R
5	GND	I	GND	13	VA	I	Analog power
6	VD	I	Digital power	14	REF_GND	I	GND
7	SCLK	I	Serial clock	15	FILT+	I	Positive voltage reference
8	LRCK	I	Left right clock	16	M1	I	Mode selection 1

3.5.14 function introduction to PT2314

1. DESCRIPTION

PT2314 (N111) is a four-channel input digital audio processor utilizing CMOS Technology. Volume, Bass, Treble and Balance are incorporated into a single chip. Loudness Function and Selectable Input Gain are also provided to build a highly effective electronic audio processor having the highest performance and reliability with the least external components. All functions are programmable using the I2C Bus. The pin assignments and application circuit are optimized for easy PCB layout and cost saving advantage for audio application.

2. FEATURES

- ◆ CMOS Technology
- ◆ Least External Components
- ◆ Treble and Bass Control
- ◆ Loudness Function
- ◆ 4 Stereo Inputs with Selectable Input Gain
- ◆ Input/Output for External Noise Reduction System/Equalizer
- ◆ 2 Independent Speaker Controls for Balance Control
- ◆ Independent Mute Function
- ◆ Volume Control in 1.25 dB/step
- ◆ Low Distortion
- ◆ Low Noise and DC Stepping
- ◆ Controlled by I2C Bus Micro-Processor Interface
- ◆ Available in 28 Pins, DIP/SO Package

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	VDD	-	Supply Input Voltage

2	AGND	-	Analog Ground
3	TREB_L	I	Left Channel Input for Treble Controller
4	TREB_R	I	Right Channel Input for Treble Control
5	RIN	I	Audio Processor Right Channel Input
6	ROUT	O	Gain Output and Input Selector for Right Channel
7	LOUD_R	I	Right Channel Loudness Input
8	RIN4	I	Right Channel Input 4
9	RIN3	I	Right Channel Input 3
10	RIN2	I	Right Channel Input 2
11	RIN1	I	Right Channel Input 1
12	LOUD_L	I	Left Channel Loudness Input
13	LIN4	I	Left Channel Input 4
14	LIN3	I	Left Channel Input 3
15	LIN2	I	Left Channel Input 2
16	LIN1	I	Left Channel Input 1
17	LIN	I	Audio Processor Left Channel Input
18	LOUT	O	Gain Output and Input Selector for Left Channel
19	BIN_L	I	Left Channel Input for Bass Controller
20	BOUT_L	O	Left Bass Controller Output Channel
21	BIN_R	I	Right Channel Input for Bass Controller
22	BOUT_R	O	Right Channel Output for Bass Controller
23	OUT_R	O	Right Speaker Output
24	OUT_L	O	Left Speaker Output
25	DGND	-	Digital Ground
26	DATA	I	Control Data Input
27	CLK	I	Clock Input for Serial Data Transmission
28	REF	-	Analog Reference Voltage (1/2 VDD)

3.5.15 function introduction to PT6961

1. DESCRIPTION

PT6961 (N100) 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

3.5.16 function introduction to KA5L0380R & KA1M0880BTU

1. DESCRIPTION

The Fairchild Power Switch(FPS) product family is specially designed for an off-line SMPS with minimal external components. The Fairchild Power Switch(FPS) consist of high voltage power SenseFET and current mode PWM IC. Included PWM controller features integrated fixed frequency oscillator, under voltage lock-out, leading edge blanking, optimized gate turn-on/turn-off driver, thermal shutdown protection, over voltage protection, and temperature compensated precision current sources for loopcompensation and fault protection circuitry. Compared to discrete MOSFET and PWM controller or RCC solution, a Fairchild Power Switch(FPS) can reduce total component count, design size, weight and at the same time increase efficiency, productivity, and system reliability. It has a basic platform well suited for cost effective design in either a flyback converter or a forward converter.

2. FEATURES

- ◆ Precision fixed operating frequency (100/67/50kHz), KA1M0880BTU (70Hz)
- ◆ Low start-up current(typ. 100uA)
- ◆ Pulse by pulse current limiting
- ◆ Over current protection
- ◆ Over voltage protecton (Min. 25V), KA1M0880BTU (Min. 23V)
- ◆ Internal thermal shutdown function
- ◆ Under voltage lockout
- ◆ Internal high voltage sense FET
- ◆ Auto-restart mode

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	GND	I	ground
2	Drain	O	Voltage output
3	Vcc	I	Voltage input
4	FB	I	Feed back

3.5.17 Function introduction to HS817

HS817 (U502, U506) is a photoelectric coupler, shown as the figure 3.5.17.1. 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.

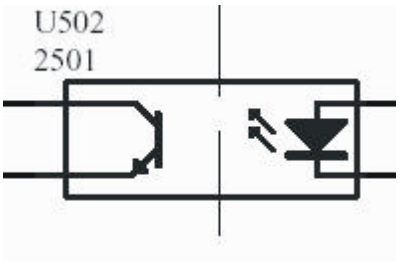


Figure 3.5.17.1 2501 outside drawing

3.5.18 Function introduction to TL431A

TL431A (U503, U507) is a 2.5V comparator, shown as the figure 3.5.18.1. 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.

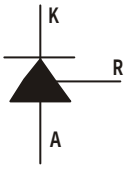


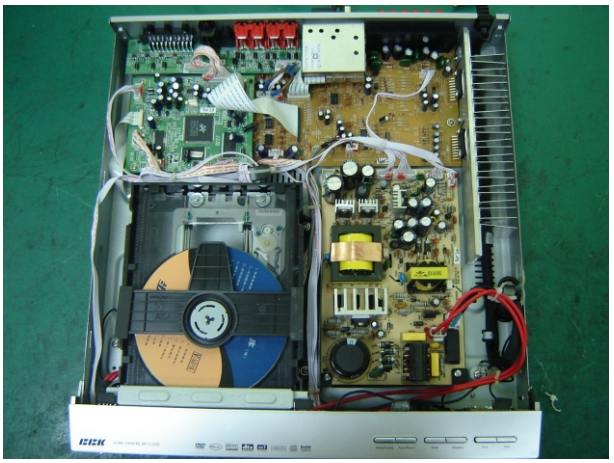
Figure 3.5.18.1 LM431A outside drawing

Chapter Four

Disassembly and Assembly Process

DVD players manufactured in BBK are largely identical but with minor differences and are mainly composed of loader components, control panel components, decode and servo board components, power board components, power amplifier board components, MIC board components and AV board components. In order to speed up the compilation of “Service Manual”, we shall not give repeat explanation to model with minor differences in chapter four “Disassembly and Assembly Process” for the later compiled service manuals. For disassembly and assembly process in this chapter, please refer to chapter 4 of “DK1005S Service Manual” or “DK1020S Service” .

The pictures of this model are shown as follows:

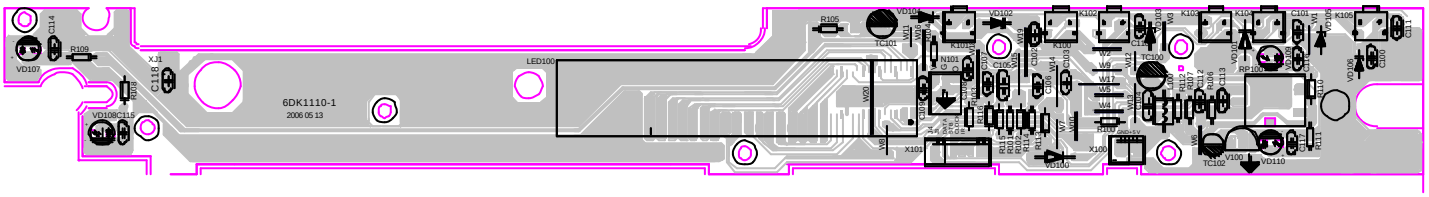


Chapter Cinque

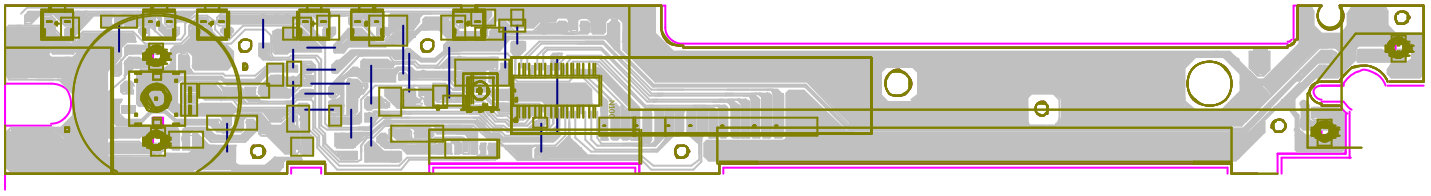
PCB board & Circuit diagram

Section One PCB board

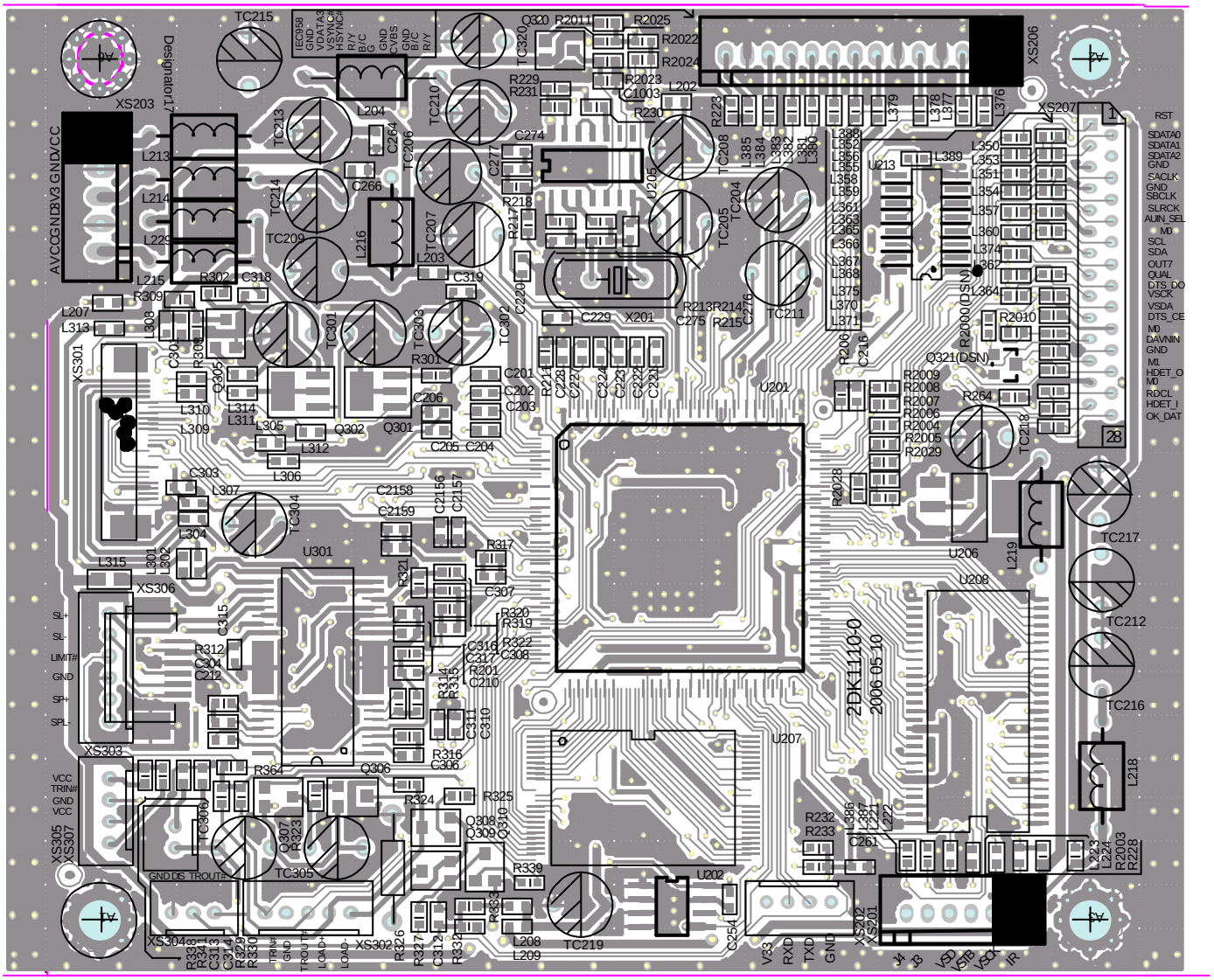
5.1.1 Surface layer of KEY SCAN Board



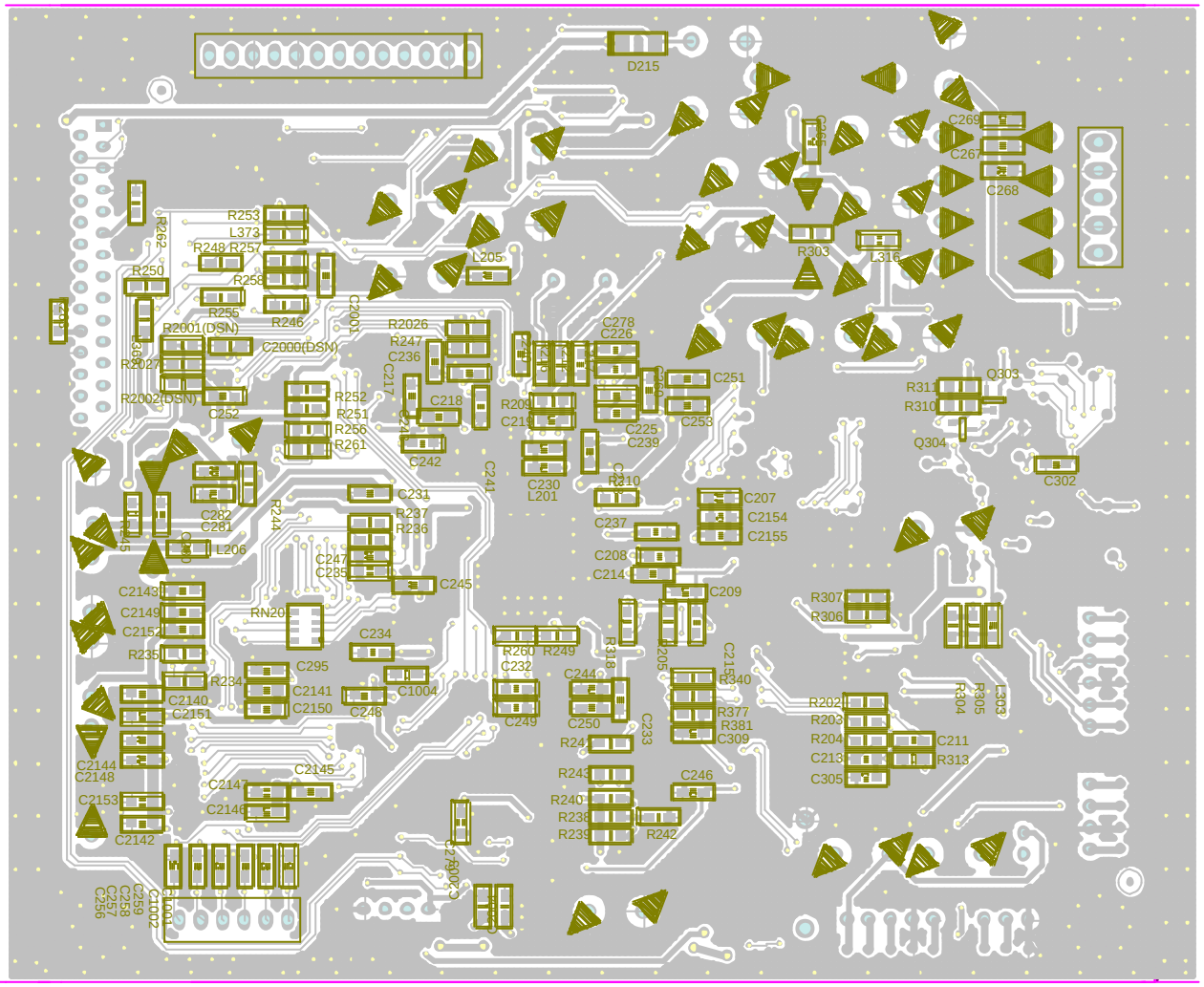
5.1.2 Bottom layer of KEY SCAN Board



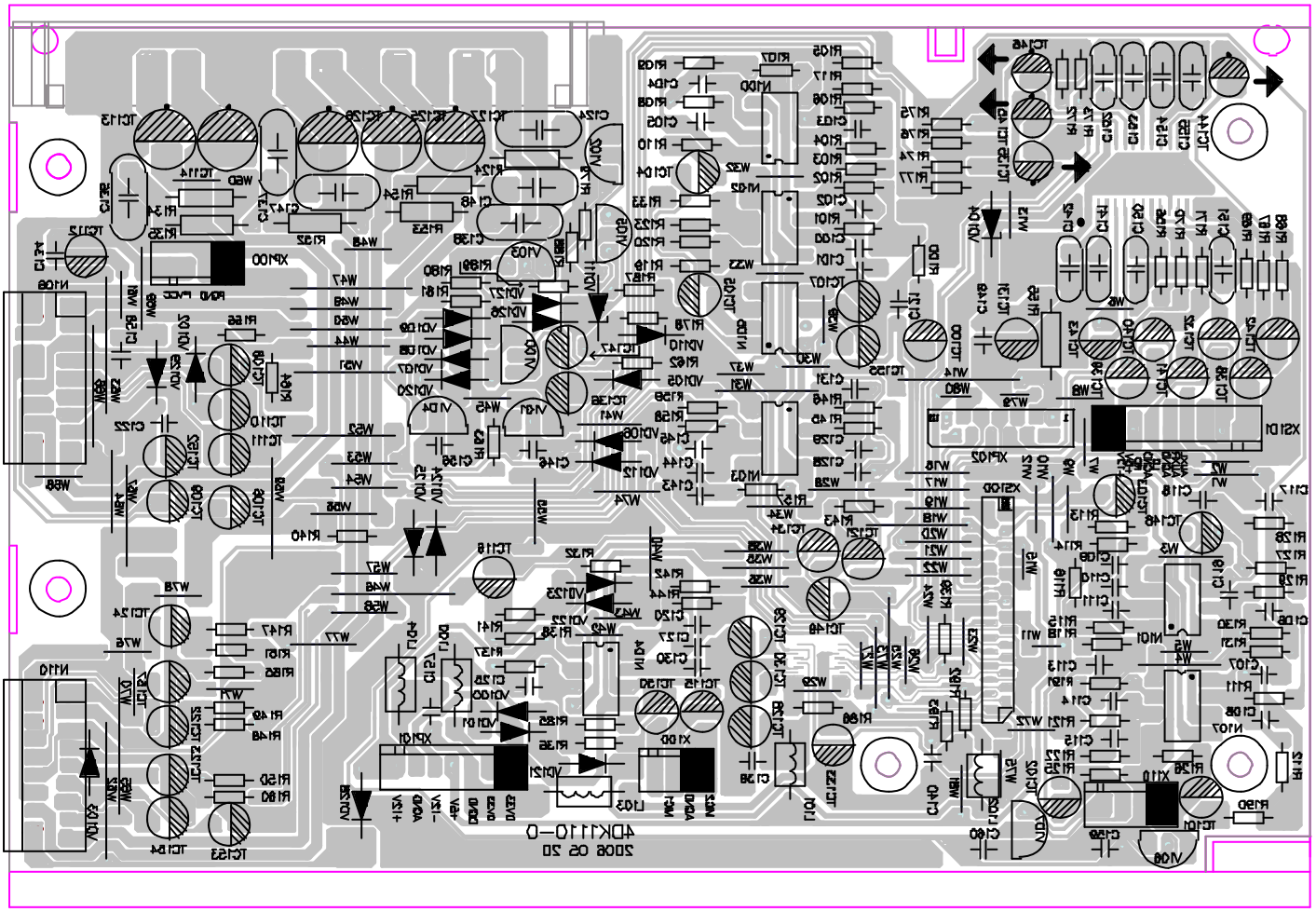
5.1.3 Surface layer of MPEG&SERVO Board



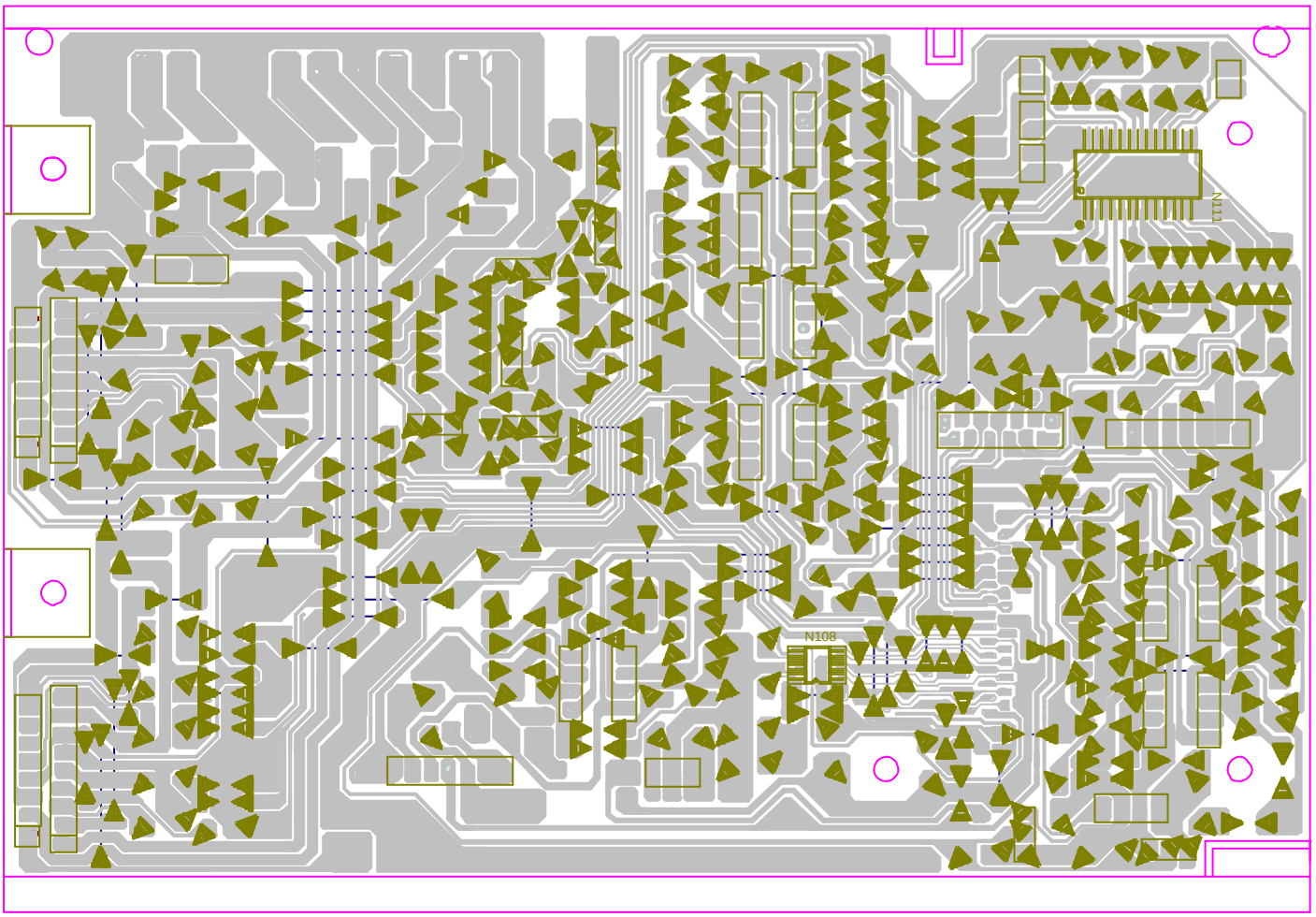
5.1.4 Bottom layer of MPEG&SERVO Board



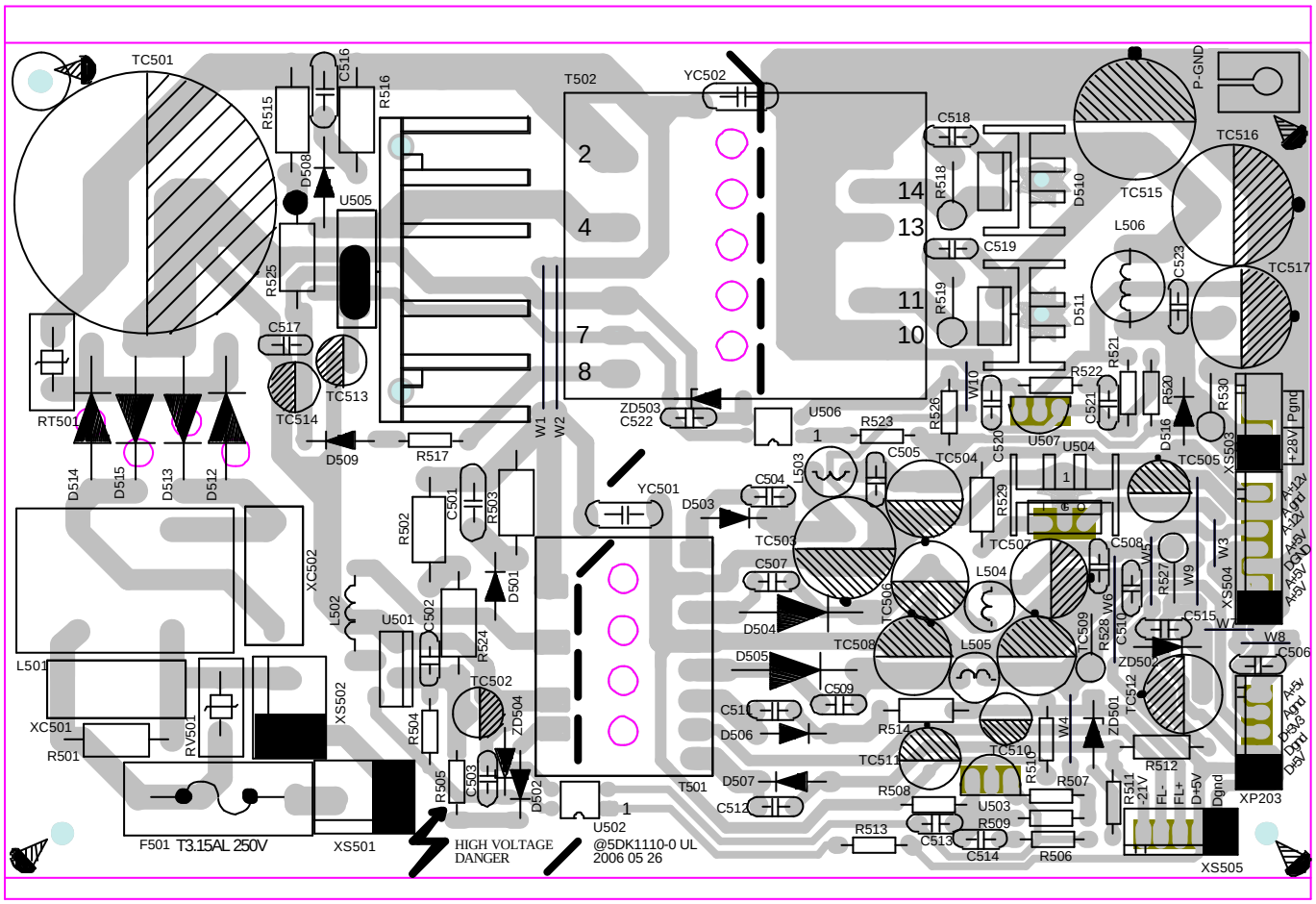
5.1.5 Surface layer of AMPLIFIER POWER Board



5.1.6 Bottom layer of AMPLIFIER POWER Board

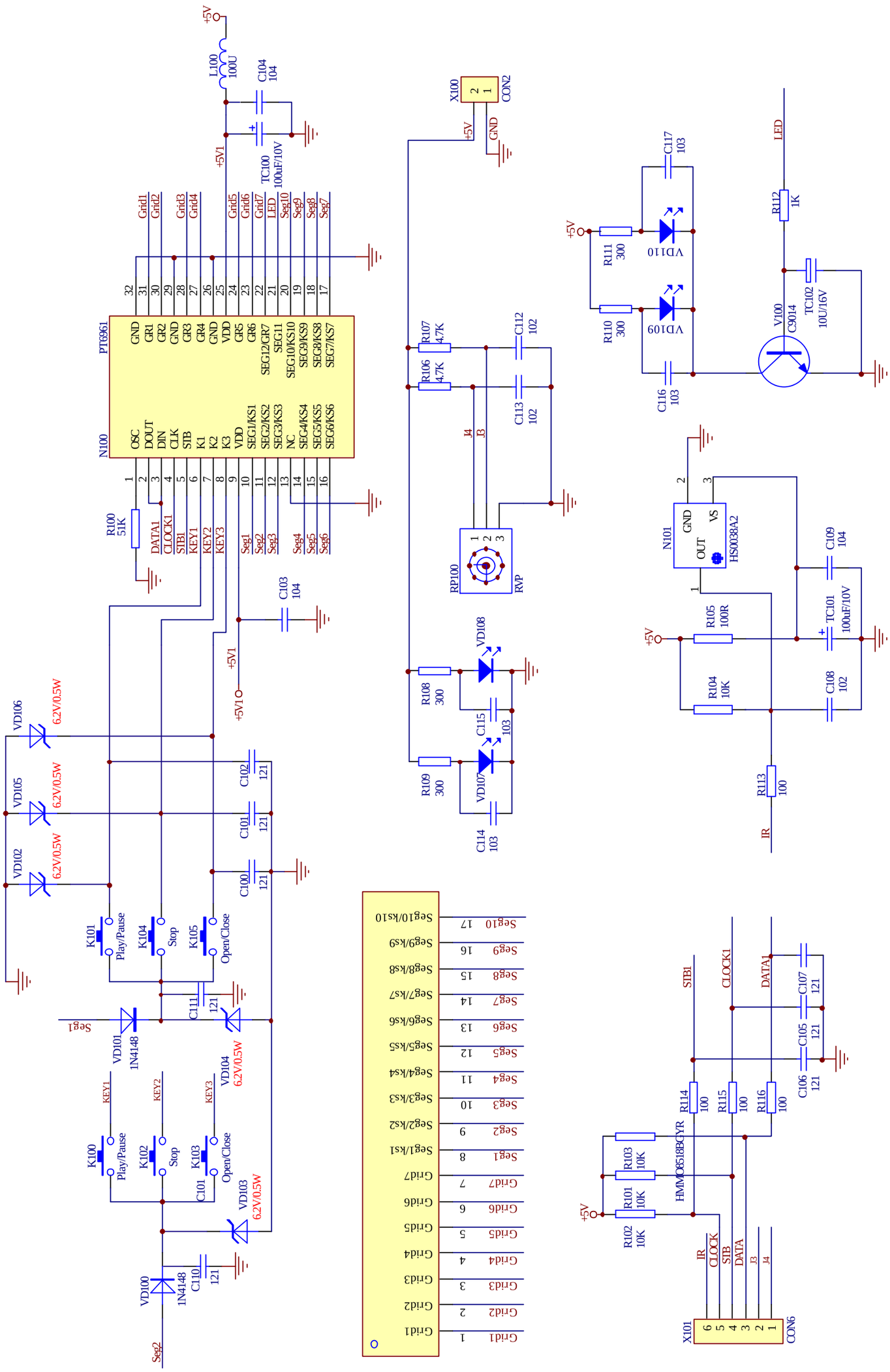


5.1.7 POWER Board

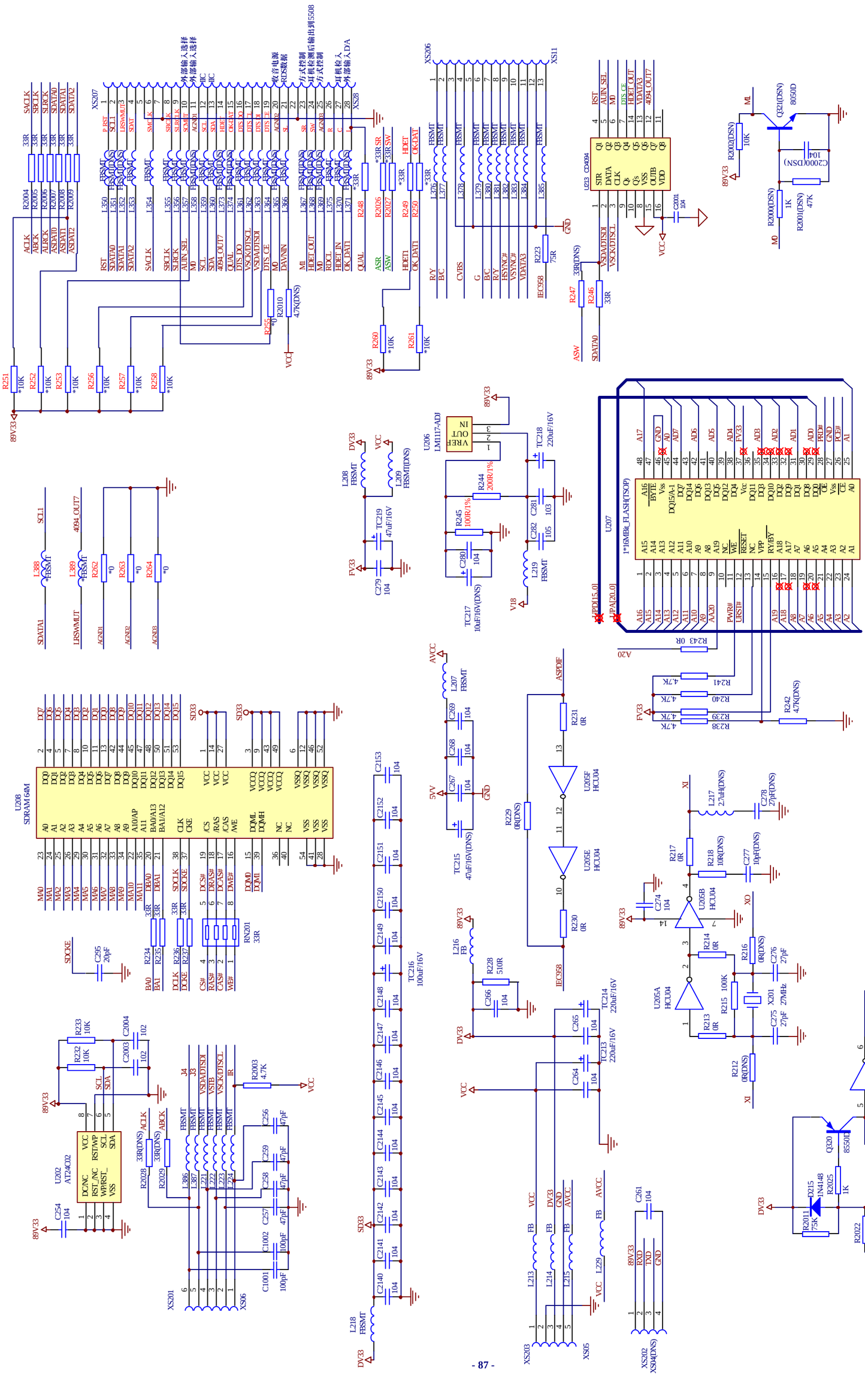


Section Two circuit diagram

5.2.1 KEY SCAN Board



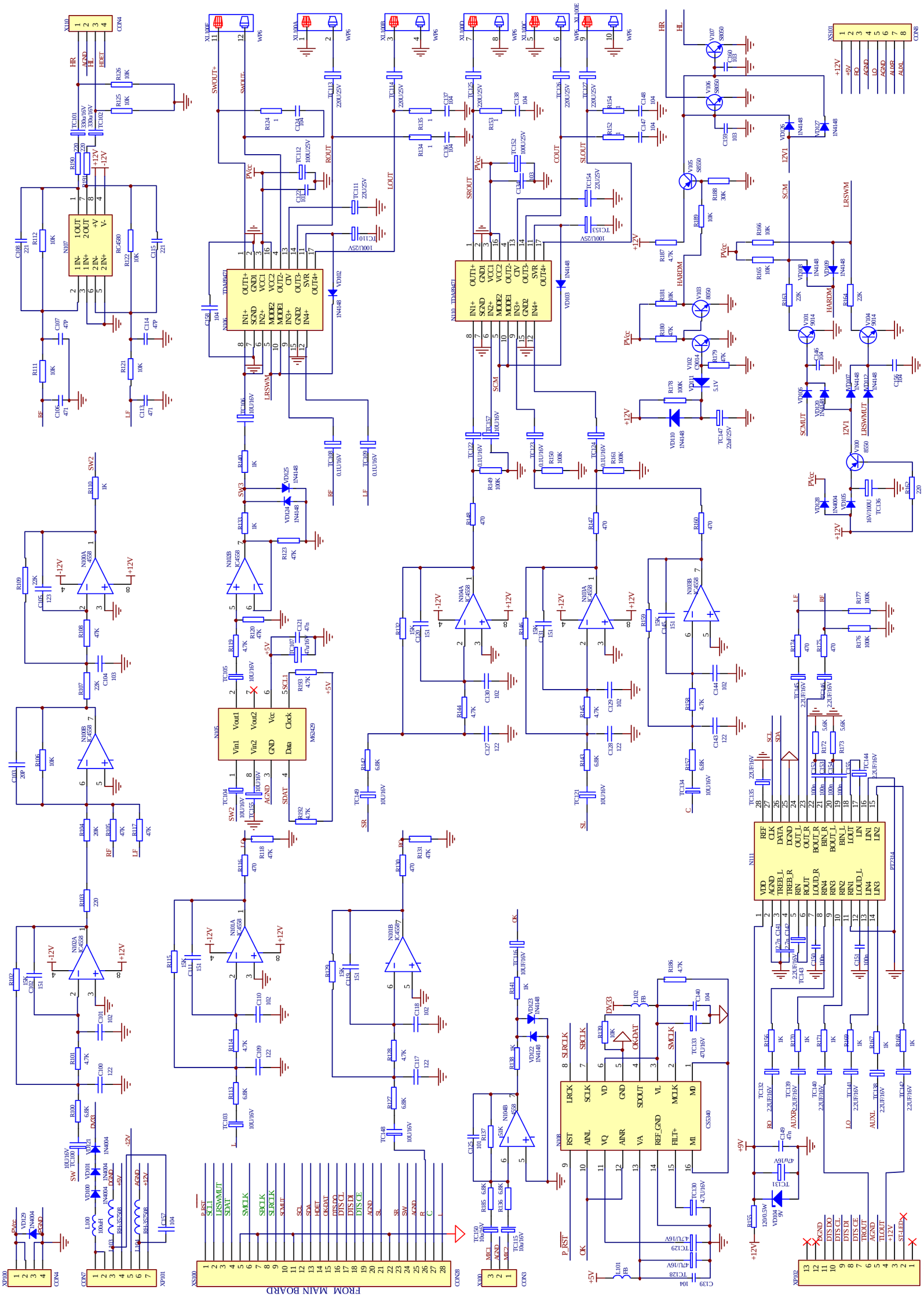
5.2.2 MPEG&SERVO Board



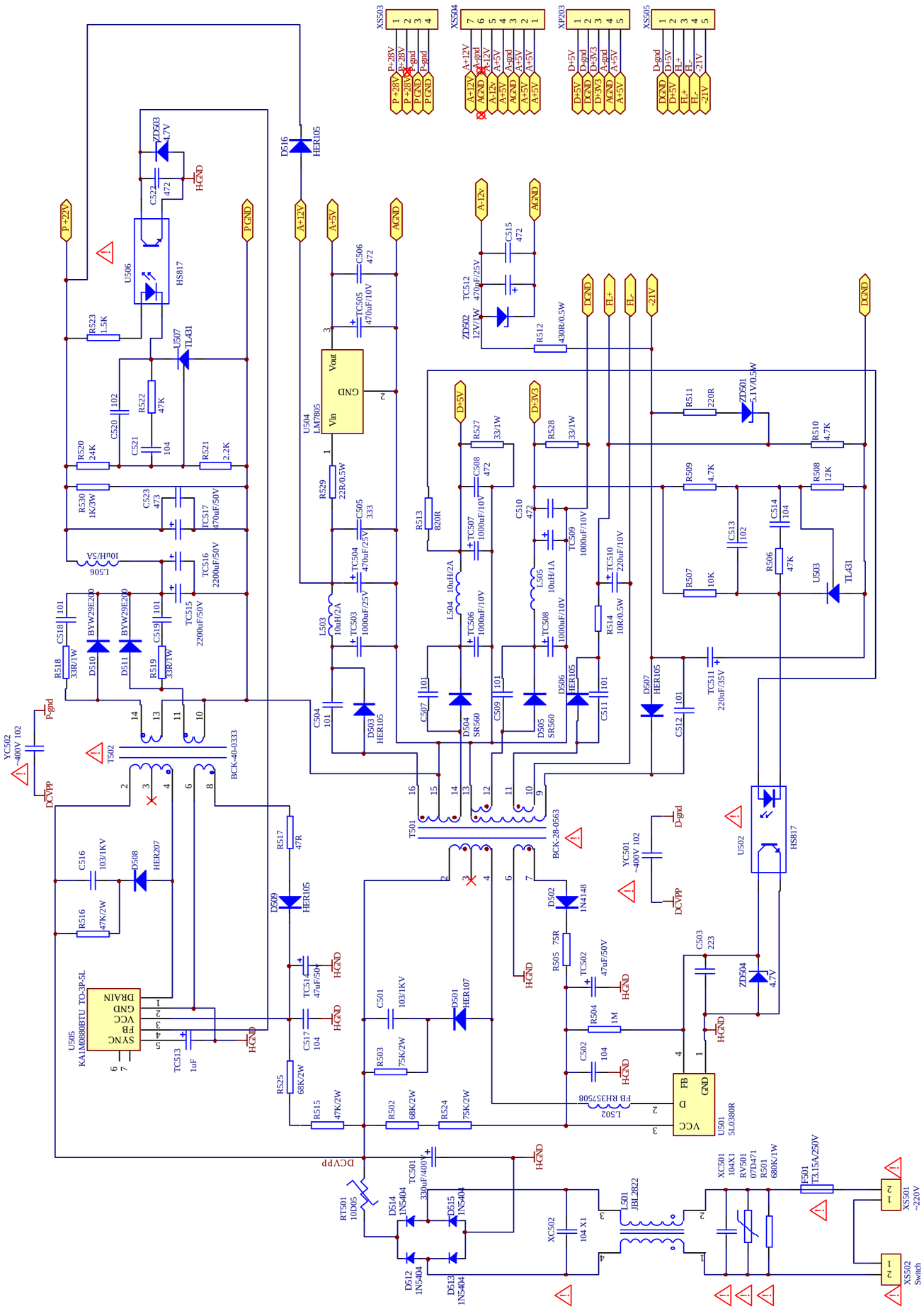
U201
MT1389E
LQFP216/SMD

U301
BA5954

5.2.3 AMPLIFIER POWER Board



5.2.4 POWER Board



Chapter six BOM List

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
DK1110SI（RU）SILVER WHITE			
AMPLIFIER BOARD:		5448657	
0210216	TERYLENE CAPACITOR	50V 104±5% 7mm	C124,C136,C137,C138,C147,C148,C161
0260117	CD	CD11 50V2.2U±20%5×11 C5	TC144,TC145,TC146
0260003	CD	CD11 25V22U±20%5×11 C5	TC135
0260004	CD	CD11 25V220U±20%8×12 C5	TC113,TC114,TC125,TC126,TC127
0000675	CARBON FILM RESISTOR	1/2W 1O±5% SHAPED 12.5	R124,R134,R135,R152,R153,R154,R194
0390154	MAGNETIC BEADS INDUCTOR	RH-357508	L100
0390009	INDUCTOR	10UH±10% 0307	L101,L102
0570004	DIODE	1N4004	VD101,VD121,VD128,VD129
0881743	IC	F4558 DIP	N100,N101,N102,N103,N104 ①
0881227	IC	RC4558P DIP	①
0880445	IC	4558C DIP	①
0880124	IC	NJM4558D DIP	①
0881393	IC	IL4558N DIP	①
0882375	IC	RC4580 DIP	N107
0882353	IC	CS5340 TSSOP	N108
0881370	IC	PT2314 SOP	N111
1940003	SOCKET	4P 2.5mm	X110
1940002	SOCKET	3P 2.5mm	X100
1940009	SOCKET	8P 2.5mm	XS101
1940140	CABLE SOCKET	14P 1.0mm DUAL RANK STRAIGHT INSERT	XS100
1940365	CABLE SOCKET	7/6 P 1.25mm DUAL RANK STRINGHT INSERT	XP102
1990019	EXTERNAL SOURCES SOCKET	WP12-11	XL100
2122261	FLAT CABLE	4P160 2.5 2 PIN,WHIT NEEDLE REVERSE	XP100
2120643	FLAT CABLE	7P80 2.5 2 SOCKET WITH NEEDLE	XP101
0210121	METAL POLYESTER FILM CAPACITOR	CL21X 63V 272±5% 5	C141,C142
0210111	METAL POLYESTER FILM CAPACITOR	CL21X 63V 104±5% 5	C150,C151,C152,C153,C154,C155
2100010	LEAD	F 0.6 SHAPED 5mm	W11,W15,W79,W80,W82

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
2100003	LEAD	F 0.6 SHAPED 7.5mm	W2,W5,W7,W8,W9,W12,W13,W23,W24,W26,W27,W29,W30,W32,W33,W36,W37,W39,W42,W43,W45,W48,W60,W61,W68,W70,W71,W72,W75,W76,W78,R103,W81
2100004	LEAD	F 0.6 SHAPED 10mm	W1,W3,W10,W17,W19,W20,W21,W22,W28,W34,W35,W38,W40,W41,W53,W54,W55,W56,W57,W58,W74,W77,W6
2100006	LEAD	F 0.6 SHAPED 12.5mm	W4,W44,W64,W69,W73
2100007	LEAD	F 0.6 SHAPEN 15mm	W18,W25,W31,W49,W50,W51,W52,W59,W67
2100016	LEAD	F 0.6 SHAPEN 18mm	W14,W46,W47,W66
2100017	LEAD	F 0.6 SHAPED 20mm	W62,W63,W65
00003239	CARBON FILM RESISTOR	1/2W150O±5% BELT	R155
00000119	CARBON FILM RESISTOR	1/6W220O±5% BELT	R162
00000169	CARBON FILM RESISTOR	1/6W470O±5% BELT	R116,R130,R147,R148,R160,R174,R175
00000229	CARBON FILM RESISTOR	1/6W1K±5% BELT	R110,R141,R156,R168,R169,R170,R171,R140,R167
00000349	CARBON FILM RESISTOR	1/6W4.7K±5% BELT	R101,R114,R128,R144,R145,R158,R186,R119,R187
00000369	CARBON FILM RESISTOR	1/6W5.6K±5% BELT	R172,R173,R113,R127
00000379	CARBON FILM RESISTOR	1/6W6.8K±5% BELT	R100,R136,R142,R143,R157,R185
00000409	CARBON FILM RESISTOR	1/6W10K±5% BELT	R111,R121,R125,R126,R139,R165,R166,R181,R189,R182
00000439	CARBON FILM RESISTOR	1/6W15K±5% BELT	R102,R115,R129,R132,R146,R159,R137
00000459	CARBON FILM RESISTOR	1/6W20K±5% BELT	R104,R106
00000469	CARBON FILM RESISTOR	1/6W22K±5% BELT	R107,R109,R163,R164,R112,R122
00000499	CARBON FILM RESISTOR	1/6W30K±5% BELT	R188
00000529	CARBON FILM RESISTOR	1/6W47K±5% BELT	R105,R108,R117,R118,R120,R123,R131,R179,R180
00004089	CARBON FILM RESISTOR	1/6W30O±5% BELT	R190,R191
00000139	CARBON FILM RESISTOR	1/6W330O±5% BELT	R133,R138
00000599	CARBON FILM RESISTOR	1/6W100K±5% BELT	R149,R150,R161,R176,R177,R178
02000319	PORCELAIN CAPACITOR	50V 20P±10% NPO 5mm BELT	C103
02003069	PORCELAIN CAPACITOR	50V 47P±10% SHAPED 5mm BELT	C107,C114
02003079	PORCELAIN CAPACITOR	50V 101±10% SHAPED 5mm BELT	C125
02003089	PORCELAIN CAPACITOR	50V 221±10% SHAPED 5mm BELT	C108,C115
02003309	PORCELAIN CAPACITOR	50V151±10% SHAPED 5mm BELT	C102,C111,C119,C120,C131,C145
02003129	PORCELAIN CAPACITOR	50V 471±10% SHAPED 5mm BELT	C106,C113
02001239	PORCELAIN CAPACITOR	50V 102±10% 5mm BELT	C101,C110,C118,C129,C130,C144

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
02003359	PORCELAIN CAPACITOR	50V 122±10% 5mm BELT	C100,C109,C117,C127,C128,C143
02003109	PORCELAIN CAPACITOR	50V 103±10% SHAPED 5mm BELT	C104,C122,C134,C159,C160
02001389	PORCELAIN CAPACITOR	50V 104±20% 5mm BELT	C139,C140,C146,C156,C158,C162
02102289	TERYLENE CAPACITOR	100V 822±10% SHAPED 5mm BELT	C105
02101489	TERYLENE CAPACITOR	100V 473±10% SHAPED 5mm BELT	C149
02600059	CD	CD11 50V1U±20%5×11 C5 BELT	TC108,TC109,TC122,TC123,TC124
02601179	CD	CD11 50V2.2U±20%5×11 C5 BELT	TC132,TC138,TC139,TC140,TC141,TC142,TC143
02604389	CD	CD11 16V4.7U±20%5×11C5 BELT	TC129,TC130
02601309	CD	CD110 16V10U±20%5×11 C5 BELT	TC100,TC103,TC105,TC106,TC115,TC116,TC121,TC134,TC148,TC149,TC150,TC157
02600039	CD	CD11 25V22U±20%5×11 C5 BELT	TC111,TC154
02600029	CD	CD11 16V47U±20%5×11 C5 BELT	TC128,TC131,TC133
02601829	CD	CD11 25V100U±20%6×12 C5 BELT	TC110,TC112,TC136,TC152,TC153,TC147
02607369	CD	CD11 16V330U±20%8×12 C5 BELT	TC101,TC102
05800069	VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W BELT	VD111
05800099	VOLTAGE REGULATOR DIODE	9.1V±5% 1/2W BELT	VD104
05700069	DIODE	1N4148 BELT	VD105,VD106,VD107,VD108,VD109,VD110,VD112,VD120,VD122,VD123,VD124,VD125,VD126,VD100,VD130,VD131,VD132,VD133
07800499	TRIODE	S8550D BELT	V100,V105
07800329	TRIODE	9014C BELT	V101,V102,V104
07800299	TRIODE	C8050 BELT	V103,V106,V107
1564440	PCB	4DK1110-2	
DK1110SI（RU）SILVER WHITE			
DECODE BOARD 2DK1110-0 Ver2.0			
0000375	CARBON FILM RESISTOR	1/4W2.2O±5%	R326
0260437	CD	CD11 16V10U±20%5×11C5	TC204~TC206,TC212,TC217
0260002	CD	CD11 16V47U±20%5×11 C5	TC219,TC302,TC303,TC305,TC306,TC215
0260188	CD	CD11 16V100U±20%6×12 C5	TC207,TC211,TC216,TC304,TC320
0260181	CD	CD11 16V220U±20%6×12 C5	TC208,TC209,TC210,TC213,TC214,TC218,TC301
0390057	MAGNETIC BEADS INDUCTOR	RH354708	L213~L216,L218,l219
0390429	INDUCTOR	330UH±10% 0410	L204
0960020	CMETAL OXIDE FILM RESISTORSTAL OSCILLATOR	27.00MHz 49-S	X201
1940140	CABLE SOCKET	14P 1.0mm DUAL RANK STRAIGHT INSERT	XS207

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1940065	SOCKET	13P 2.0mm	XS206
1940005	SOCKET	6P 2.0mm	XS303,XS201
1940024	SOCKET	5P 2.0mm	XS302
1940004	SOCKET	5P 2.5mm	XS203
1940094	CABLE SOCKET	24P 0.5mm SMD SUBMIT MEET WITH CLASP	XS301
0090001	SMD RESISTOR	1/16W 0O±5% 0603	L305,L309,L310,L312,R213,R214,R217,R230,R231,R243,R318,R255,R262,R263,R264
0090272	SMD RESISTOR	1/16W 1O±5% 0603	R304~R307,R321
0090106	SMD RESISTOR	1/16W 4.7O±5% 0603	R301,R302
0090003	SMD RESISTOR	1/16W 10O±5% 0603	R303
0090005	SMD RESISTOR	1/16W 33O±5% 0603	R246,R248,R249,R250,R234~R237,R2004~R2009,R2024,R2026,R2027
0090006	SMD RESISTOR	1/16W 75O±5% 0603	R223
0090016	SMD RESISTOR	1/16W 1.5K±5% 0603	R323,R324
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R340,R377,R381
0090249	SMD RESISTOR	1/16W 510O±5% 0603	R228,R325,R327
0090012	SMD RESISTOR	1/16W 560O±5% 0603	R206
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R2025
0090020	SMD RESISTOR	1/16W 5.1K±5% 0603	R232,R233
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R238~R241,R2003
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R201,R309,R311,R313,R314,R329,R330,R339,R364,R253,R256,R257,R258,R260
0090024	SMD RESISTOR	1/16W 15K±5% 0603	R202,R211
0090188	SMD RESISTOR	1/16W 18K±5% 0603	R203
0090025	SMD RESISTOR	1/16W 20K±5% 0603	R204,R312,R315,R316
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R2023
0090030	SMD RESISTOR	1/16W 56K±5% 0603	R2011
0090197	SMD RESISTOR	1/16W 150K±5% 0603	R319,R320
0090211	SMD RESISTOR	1/16W 680K±5% 0603	R317,R322
0090212	SMD RESISTOR	1/16W 750K±5% 0603	R209
0090609	PRECISION SMD RESISTOR	1/16W 100O±1% 0603	R245
0090626	PRECISION SMD RESISTOR	1/16W 200O±1% 0603	R244
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R210,R215,R308,R310
0100019	SMD RESISTOR NETWORKS	1/16W 33O±5% 8P	RN201
0310085	SMD CAPACITOR	50V 20P±5% NPO 0603	C223,C295

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0310190	SMD CAPACITOR	50V 27P±5% NPO 0603	C275,C276
0310045	SMD CAPACITOR	50V 47P±5% NPO 0603	C257~C259
0310047	SMD CAPACITOR	50V 101±5% NPO 0603	C206,C256,C1001,C1002
0310051	SMD CAPACITOR	50V 331±5% NPO 0603	C212,C213
0310048	SMD CAPACITOR	50V 151±5% NPO 0603	C304,C306
0310052	SMD CAPACITOR	50V 391±5% NPO 0603	C219
0310207	SMD CAPACITOR	50V 104 ±20% X7R 0603	C207~C209,C211,C214,C216,C217,C225,C227~C234,C239,C241,C246~C254,C260~C261,C264~C269,C274,C279,C280,C301~C303,C305,C313~C319,C2001,C2140~C2153 ②
0310543	SMD CAPACITOR	50V 104±10% X7R 0603	C207~C209,C211,C214,C216,C217,C225,C227~C234,C239,C241,C246~C254,C260~C261,C264~C269,C274,C279,C280,C301~C303,C305,C313~C319,C2001,C2140~C2153 ②
0310234	SMD CAPACITOR	16V 105 +80%-20% Y5V 0603	C201~C204,C235,C243,C245,C282,C2154~C2159
0310066	SMD CAPACITOR	50V 102±10% X7R 0603	C224,C309,C1004,C2003,C2004
0310067	SMD CAPACITOR	50V 152±10% X7R 0603	C218
0310068	SMD CAPACITOR	50V 222±10% X7R 0603	C237,C307,C308
0310072	SMD CAPACITOR	50V 103±10% X7R 0603	C236,C238,C240,C242,C244,C281,C310,C311
0310201	SMD CAPACITOR	50V 153±10% X7R 0603	C210
0310055	SMD CAPACITOR	16V 333±10% X7R 0603	C226
0310056	SMD CAPACITOR	16V 473±10% X7R 0603	C221,C222
0310362	SMD CAPACITOR	16V474 +80%-20% Y5V 0603	C220
0310566	SMD CAPACITOR	10V 225 +80%-20% Y5V 0603	C1003
0390355	SMD INDUCTOR	4.7UH±10% 1608	L202,L205,L311,L314
0390095	SMD MAGNETIC BEADS	FCM1608K-221T05	L201,L203,L206~L208,L221~L224,L301~L304,L306~L308,L313,L315,L316,L350,L353~L357,L359~L364,L366,L370,L375,L376~L387,L388,L389
0700007	SMD DIODE	1N4148	D215
0780085	SMD TRIODE	8050D	Q308,Q309
0780129	SMD TRIODE	8550D	Q306,Q307,Q320
0780062	SMD TRIODE	9014C	Q310
0780040	SMD TRIODE	3904(100-300) SOT-23	Q305
0780193	SMD TRIODE	2SK3018	Q303,Q304
0780115	SMD TRIODE	2SB1132	Q301,Q302
0882756	IC	HEF4094BT SOP	U213

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0880165	IC	74HCU04D SOP	U205 ③
0880322	IC	MM74HCU04M SOP	U205 ③
0880513	IC	HCU04 SOP	U205 ③
0881157	IC	HY57V641620HGT-H TSOP	U208 ④
0881661	IC	IC42S16400-7T TSOP	U208 ④
0881969	IC	IP1117-ADJ SOT-223	U206 ⑤
0881182	IC	LM1117MP-ADJ SOT-223	U206 ⑤
0881079	IC	AT24C04 SOP	U202
0882643	IC	MT1389FE/E(E) QFP	U201
0881378	IC	BA5954FP HSOP	U301 ⑥
0881459	IC	D5954 SOP	⑥
1633237	PCB	2DK1110-0	
DK1110SI（RU）SILVER WHITE			
EARPHONE BOARD		5448659	
0200178	PORCELAIN CAPACITOR	50V 104±20% 2.5mm	C100
2122263	FLAT CABLE	4P350 2.5 2 PIN,WHIT NEEDLE TOGETHER DIRECTION	XP100
1980061	EARPHONE SOCKET	CKX-3.5-01K	CK1
1564470	PCB	BDK1110-2	
2110484	LEAD	22# 140mm BLACK,WITHf 3 WELD PIECE	XJ1
DK1110SI（RU）SILVER WHITE			
INPUT OUTPUT BOARD:		5448656	
0390057	MAGNETIC BEADS INDUCTOR	RH354708	L100,L102~L105,L118~L122
0780028	TRIODE	8050C(120-200) TO-92	V100~V102
1910225	TERMINAL SOCKET	AV4-8.4-13/PB-1	XC103
1910182	TERMINAL SOCKET	AV4-8.4-13/PB-25	XC104
1860059	SCART SOCKET	CS-111	XC107
1910159	TERMINAL SOCKET	CS TERMINAL DASW-02	XC105
1090024	ELECTRO-OPTIC TRANSFORMER	TX179AT	XC106 ⑦
1090045	ELECTRO-OPTIC TRANSFORMER	TX179ATW	XC106 ⑦
2150292	FLAT CABLE	8P60 2.5 T2 2×2P SHIELD WHIT NEEDLE TOGETHER DIRECTION	XP401
2122258	SOFT FLAT CABLE	13P60 2.5/2.0 2 PIN,WHIT NEEDLE TOGETHER DIRECTION	XP206

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
DK1110SI（RU）SILVER WHITE			
MIKE BOARD:		5448658	
0200178	PORCELAIN CAPACITOR	50V 104±20% 2.5mm	C100
0000046	CARBON FILM RESISTOR	1/6W22K±5%	R100,R101
2150293	FLAT CABLE	3P380 2.5 2 PIN,2P SHIELD WHIT NEEDLE REVERSE	X100
1980081	MICROPHONE SOCKET	CK3-6.35-19B	MIC100,MIC101
1564357	PCB	9DK1110-0	
2110484	LEAD	22# 140mm BLACK,WITHf 3 WELD PIECE	XJ1
DK1110SI（RU）SILVER WHITE			
POWER BOARD:		5448660	
2100017	LEAD	F 0.6 SHAPED 20mm	W1,W2
2100003	LEAD	F 0.6 SHAPED 7.5mm	W3,W7,W8
2100004	LEAD	F 0.6 SHAPED 10mm	W4,W5,R514
2100016	LEAD	F 0.6 SHAPEN 18mm	W9
2100007	LEAD	F 0.6 SHAPEN 15mm	W6
0000274	CARBON FILM RESISTOR	1/4W47O±5% SHAPED 10	R517
0000431	CARBON FILM RESISTOR	1/4W75O±5% SHAPED 10	R505
0000362	CARBON FILM RESISTOR	1/4W220O±5% SHAPED 10	R511
0000282	CARBON FILM RESISTOR	1/4W820O±5% SHAPED 10	R513
0000284	CARBON FILM RESISTOR	1/4W1.5K±5% SHAPED 10	R523
0000289	CARBON FILM RESISTOR	1/4W4.7K±5% SHAPED 10	R510
0000294	CARBON FILM RESISTOR	1/4W10K±5% SHAPED 10	R507
0000301	CARBON FILM RESISTOR	1/4W47K±5% SHAPED 10	R506,R522
0000310	CARBON FILM RESISTOR	1/4W1MO±5% SHAPED 10	R504
0010310	METAL OXIDE FILM RESISTOR	2W180O±5% SHAPED FLAT 15×7	R512
0010062	METAL FILM RESISTOR	1/4W2.2K±1% SHAPED 10	R521
0010063	METAL FILM RESISTOR	1/4W4.7K±1% SHAPED 10	R509
0010101	METAL FILM RESISTOR	1/4W12K±1% SHAPED 10	R508
0000297	CARBON FILM RESISTOR	1/4W18K±5% SHAPED 10	R520
0010279	METAL OXIDE FILM RESISTOR	1W680K±5% SHAPED 15	R501
0010226	METAL OXIDE FILM RESISTOR	1/2W22O±5% SHAPED 12.5	R529
0010275	METAL OXIDE FILM RESISTOR	1W33O±5% SHAPED VERTICAL 7.5	R518,R519

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0010147	METAL OXIDE FILM RESISTOR	2W47K±5% SHAPED FLAT 15×7	R516,R515
0010157	METAL OXIDE FILM RESISTOR	2W68K±5%SHAPED FLAT 15×7	R502,R525
0010263	METAL OXIDE FILM RESISTOR	2W75K±5% SHAPED FLAT 15×7	R503,R524
0010281	METAL OXIDE FILM RESISTOR	3W1K±5% SHAPED VERTICAL 7.5	R530
0010288	METAL OXIDE FILM RESISTOR	1W100O±5% SHAPED VERTICAL 7.5	R527
0200105	PORCELAIN CAPACITOR	50V 100P±10% 5mm	C504,C507,C509,C511,C512,C518,C519
0200123	PORCELAIN CAPACITOR	50V 102±10% 5mm	C513,C520
0200134	PORCELAIN CAPACITOR	50V 223±20% 5mm	C503
0200138	PORCELAIN CAPACITOR	50V 104±20% 5mm	C502,C514,C517,C521
0200224	PORCELAIN CAPACITOR	1000V 103 +80%-20% 7.5mm	C501,C516
0210158	TERYLENE CAPACITOR	100V 472±10% SHAPED 5mm	C506,C508,C510,C515
0210024	TERYLENE CAPACITOR	100V 333±10% 5mm	C505
0210148	TERYLENE CAPACITOR	100V 473±10% SHAPED 5mm	C523,C522
0210204	ANTI-JAMMING CAPACITOR	@MKP61 X2 275VAC 104M 15 UL	XC501,XC502
0200381	CERAMIC CAPACITOR	@Y1 400VAC 221 ±10% 10mm CB	YC501,YC502
0260749	CD	EZ 400V220U±20% 30×30 10	TC501
0260664	CD	CD11K 16V220U±20% 6.3×11 2.5	TC510
0260653	CD	CD11K 16V470U±20%8×14 3.5	TC505
0260597	CD	CD11 105℃ 16V1000U±20%10×20 5	TC506,TC507
0260654	CD	CD11K 16V2200U±20% 10×25 5	TC508,TC509
0260558	CD	CD11T 25V470u±20%10×16 5	TC504,TC512
0260665	CD	CD11K 25V1000U±20% 13×20 5	TC503
0260667	CD	CD11K 50V1U±20% 5×11 2	TC513
0260663	CD	CD11K 35V220U±20% 8×12 3.5	TC511
0260666	CD	CD11K 50V47U±20% 6.3×11 2.5	TC514
0260601	CD	CD11C 105℃ 50V22U±20%6×7 2.5	TC502
0260668	CD	CD11K 50V470U±20% 13×20 5	TC517
0260677	CD	CD11K 50V2200U±20% 16×30 7.5	TC515,TC516
0390154	MAGNETIC BEADS INDUCTOR	RH-357508	L502
0390340	VERTICAL INDUCTOR	10uH±10% 5A 12.5×26.5 10mm	L506
0410010	CHOKE COIL	VERTICAL 10UH 1A 5mm	L505
0410011	CHOKE COIL	VERTICAL 10UH 2A 5mm	L503,L504

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1000010	POWER GRID FILTER	JBL2822 30mH±20%	L501
0460513	SWITCH POWER TRANSFORMER	@BCK-28-0563 VDE	T501
0460630	SWITCH POWER TRANSFORMER	@BCK-40-0360 VDE	T502
0680065	SCHOTTKY DIODE	SR560 DO-27 SHAPED 20mm	D504,D505
0570006	DIODE	1N4148	D502
0570013	DIODE	HER105	D503,D506,D507,D509,D516
0570014	DIODE	HER107	D501
0570042	DIODE	HER207 SHAPED 12.5mm	D508
0570045	DIODE	BYW29E-200 TO-220	D510,D511
05800069	VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W BELT	ZD501
0580022	VOLTAGE REGULATOR DIODE	12V±5% 1W	ZD502
0570032	DIODE	1N5408	D512~D515
0880379	IC	LM7805 GOLD SEALED TO-220	U504 ⑧
0880247	IC	MC7805CT GOLD SEALED TO-220	U504 ⑧
0880499	IC	L7805CV GOLD SEALED TO-220	U504 ⑧
0880863	IC	HA17431VP TO-92	U503 ⑨
0882041	IC	MIK431C TO-92	U503 ⑨
0880553	IC	LM431ACZ TO-92	U507
0880765	IC	5L0380R YDTU	U501
0881500	IC	KA1M0880BTU TO-3P-5L	U505
1030007	PRESS SENSITIVITY RESISTOR	7D 471±10% 5mm	RV501
1050002	HEAT SENSITIVITY RESISTOR	NTC SCK-104MS±20%	RT501
1080032	PHOTOELECTRIC COUPLER	@HS817 VDE	U502,U506
0580005	VOLTAGE REGULATOR DIODE	4.7V±5% 1/2W	ZD503,ZD504
1940003	SOCKET	4P 2.5mm	XS503
1940001	SOCKET	2P 2.5mm	XS505
1940007	SOCKET	7P 2.5mm	XS504
1940074	SOCKET	2P 7.92mm	XS501,XS502
2122264	FLAT CABLE	5P390 2.5 2 PIN,WHIT NEEDLE TOGETHER DIRECTION	XP203
2300033	FUSE	@T3.15AL 250V VDE	F501
3020402	FUSE HOLDER	BLX-2	F501
3580195	HEAT RADIATION BOARD	11×15×25 SINGLE HOLE,NOT OXIDATION	D510,D511,U504

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
3580194	HEAT RADIATION BOARD	40×20×35 DVR938-2 NOT OXIDATION	U505
4000453	SELF-TAPPING SCREW	BT 3×8H WHITE NICKEL	
4000564	SELF-TAPPING SCREW	PWT 3×12×7H WHITE NICKEL	
4000627	SELF-TAPPING SCREW	PWT 2.6×6×5H BLACK ZINC	
1570171	PCB	@5DK1110-0 UL	
3870591	GROUNDING PIECE	AV100	
5234628	PVC PIECE	45×25×0.5 SINGLE-FACED WITH GLUE IN REAR SIDE	
DK1110SI（RU）SILVER WHITE			
REMOTE CONTROL		5471769	
0310048	SMD CAPACITOR	50V 151±5% NPO 0603	C802,C803
0630009	EMISSION PIPE	TSAL4400	LED801
0700007	SMD DIODE	1N4148	D801~D803 ⑩
0700001	SMD DIODE	LS4148	D801~D803 ⑩
0700002	SMD DIODE	LL4148	D801~D803 ⑩
0780130	SMD TRIODE	STC3265	Q801
0970003	CERAMIC RESONATOR	455E	X801
0090272	SMD RESISTOR	1/16W 1O±5% 0603	R801
0880220	IC	PT2222 SOP	U801 ⑾
0882379	IC	S0102B SOP	U801 ⑾
4000038	SELF-TAPPING SCREW	PB 2.3×6 COLOR ZINC	
1564324	PCB	8516SI-3	
3031876	SURFACE CASING OF REMOTE CONTROL	RC026-06R BLACK	
3051319	BATTERY CASE DOOR OF REMOTE CONTROL	RC026 BLACK 2#	
3041399	BOTTOM CASING 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	
DK1110SI（RU）SILVER WHITE			

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
SURFACE CONTROL BOARD:		5448655	
2100010	LEAD	F 0.6 SHAPED 5mm	W12
2100003	LEAD	F 0.6 SHAPED 7.5mm	W1,W2,W3,W4,W5,W6,W7,W8,W9,W10,W11
2100004	LEAD	F 0.6 SHAPED 10mm	W13~W17
2100006	LEAD	F 0.6 SHAPED 12.5mm	W18,W19
2100016	LEAD	F 0.6 SHAPEN 18mm	W20
0000122	CARBON FILM RESISTOR	1/6W100O±5% SHAPED 7.5	R105,R113~R116
0000726	CARBON FILM RESISTOR	1/6W300O±5% SHAPED 7.5	R108~R111
0000129	CARBON FILM RESISTOR	1/6W1K±5% SHAPED 7.5	R112
0000133	CARBON FILM RESISTOR	1/6W4.7K±5% SHAPED 7.5	R106,R107
0000137	CARBON FILM RESISTOR	1/6W10K±5% SHAPED 7.5	R101~R104
0000145	CARBON FILM RESISTOR	1/6W51K±5% SHAPED 7.5	R100
0200061	PORCELAIN CAPACITOR	50V 121±10% 2.5mm	C100,C101,C102,C105,C106,C107,C110,C111
0200077	PORCELAIN CAPACITOR	50V 102±10% 2.5mm	C112,C113,C108
0200092	PORCELAIN CAPACITOR	50V 103±20% 2.5mm	C114~C117
0200138	PORCELAIN CAPACITOR	50V 104±20% 5mm	C103,C104,C109,C118
2110484	LEAD	22# 140mm BLACK,WITHf 3 WELD PIECE	XJ1
0260019	CD	CD11 16V10U±20%5×11 2	TC102
0260027	CD	CD11 16V100U±20%6×12 2.5	TC100,TC101
0390013	INDUCTOR	100UH±10% 0307	L100
0620101	RADIATION DIODE	3O 3PC COLORLESS WITH ORANGE	VD107~VD110
0570036	DIODE	1N4148 SHAPED 10mm	VD100,VD101
0580007	VOLTAGE REGULATOR DIODE	6.2V±5% 1/2W	VD102,VD103,VD105,VD106
0780032	TRIODE	9014C	V100
0881687	IC	SN1692 SOP	N100
2360021	IR SENSOR	AT138BV3	N101
1200799	LED DISPLAY SCREEN	HMMOY85186B15	LED100
1340064	LIGHT TOUCH RESTORE SWITCH	KFC-A06-2WB L3.8	K100~K105
0160201	DIGITAL POTENTIOMETER	EC12P24L25F12	RP100
2122381	FLAT CABLE	6P360 2.0 2 PIN,WITH L NEEDLE REVERSE MAGNETISM RING	X101
2122260	FLAT CABLE	2P450 2.5 2 PIN,WHIT L NEEDLE,TOGETHER DIRECTION	X100
3072152	LED BRACKET	DK1110SI	

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
5235156	SOFT SPONGE SPACER	6×6×11.5 DOUBLE-FACED,HARD	
5233552	SOFT SPONGE SPACER	15×15×8.5 DOUBLE-FACED,HARD	
1564439	PCB	6DK1110-2	
DK1110SI（RU）SILVER WHITE			
PROGRAM FLASH ROMDK1110SIRU-0A(16M) 0911761			
881998	IC	AT49BV162A 70TI TSOP	U207 (12)
881754	IC	29LV160BE-70NC TSOP	U207 (12)