# DK1910SI & DK1930SI

# DK1810SI & DK1830SI

# & DK1840SI

# service manual

# Catalog


Chapter One About Maintenance ····· 1

1.1 Safety precautions ····· 1

1.1.1 Power supply ····· 1

1.1.2 Precautions for antistatic ····· 1

1.1.3 Precautions for laser head ····· 1

1.1.4 About placement position ····· 2

1.2 Maintenance method ····· 2

1.2.1 Visualized method ····· 2

1.2.2 Electric resistance method ····· 2

1.2.3 Voltage method ····· 2

1.2.4 Current method ····· 2

1.2.5 Cutting method ····· 2

1.2.6 Element substitution method ····· 3

1.2.7 Comparison method ····· 3

1.3 Required device for maintenance ····· 3

Chapter Two Functions and Operation Instructions ····· 4

2.1 Features ····· 4

2.2 Controls and functions ····· 5

2.2.1 Front Panel controls ····· 5

2.2.2 Rear panel connections ····· 5

2.2.3 VFD display general view ····· 6

2.2.4 Remote control general view ····· 6

2.3 FUNCTION SETTINGS ····· 8

2.3.1 Function selection and change ····· 8

2.3.2 Language settings ····· 8

2.3.3 Image settings menu ····· 8

2.3.4 Sound settings menu ····· 9

2.3.5 Playback settings ····· 10

2.3.6 Karaoke settings menu ····· 10

2.3.7 Preference settings ..... 11
2.3.8 Parental Control ..... 11
2.3.9 Initial setup menu ..... 11
2.3.10 reset to defaults ..... 11
2.3.11 Exit settings menu ..... 11
2.3.12 Channel delay set-up ..... 11
2.4 Technical characteristics ..... 13

Chapter Three Principle and Servicing ..... 15
Section One Principle of the Player ..... 15
3.1.1 Function and features ..... 15
3.1.2 Block diagram of the player ..... 15
3.1.3 Introduction to IC used in this player ..... 17
Section Two Unit Circuit Principle ..... 18
3.2.1 Introduction to laser head ..... 18
3.2.2 Servo circuit ..... 20
3.2.3 Main axis braking control circuit ..... 23
3.2.4 Disc identification circuit ..... 24
3.2.5 Disc in/out circuit ..... 25
3.2.6 Reset circuit ..... 26
3.2.7 Mute circuit ..... 27
3.2.8 Video circuit ..... 28
3.2.9 Audio power amplifying circuit block diagram ..... 29
3.2.10 Input/output circuit ..... 29
3.2.11 Control panel components ..... 31
3.2.12 Power supply circuit ..... 32
Section Three Servicing Cases ..... 35
3.3.1 Servicing cases ..... 35
3.3.2 Troubleshooting flow chart ..... 38
Section Four Waveform diagram ..... 44
Section Five Function Introduction to IC ..... 49
3.5.1 function introduction to MT1389HD ..... 49
3.5.2 function introduction to AT24C02 ..... 65
3.5.3 function introduction to 74HCU04 ..... 66
3.5.4 function introduction to Lm1117 ..... 66

3.5.5 function introduction to 29LV160BE ..... 67
3.5.6 function introduction to HY57V641620HGT -7 ..... 68
3.5.7 function introduction to D5954 ..... 69
3.5.8 function introduction to 4558 ..... 70
3.5.9 function introduction to SN74LVC ..... 71
3.5.10 function introduction to 74HCT125 ..... 71
3.5.11 function introduction to Cd4052 ..... 72
3.5.12 function introduction to SAA6588 ..... 73
3.5.13 function introduction to 5340 ..... 75
3.5.14 function introduction to TLV272 ..... 76
3.5.15 function introduction to Lm4880 ..... 77
3.5.16 function introduction to TAS5508PAG ..... 78
3.5.17 function introduction to TAS5112DFD ..... 80
3.5.18 function introduction to Ad7312 ..... 83
3.5.19 function introduction to VIPer22ADIP ..... 85
3.5.20 function introduction to Hs817 ..... 85
3.5.21 function introduction to TL431A ..... 86
3.5.22 function introduction to KA1M0880BTU ..... 86

Chapter Four Disassembly and Assembly Process ..... 88

Chapter Cinque PCB board & Circuit diagram ..... 89
Section One PCB board ..... 89
Section Two circuit diagram ..... 98

Chapter six BOM List ..... 104

# 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

Formats:

#Digital video playback of DVD-Video, Super VCD and VCD formats
#MPEG-4 compatibility: playback of DivX 3.11, DivX 4, DivX 5, DivX Pro and XviD formats
#Playback of music discs in DVD-Audio format
#Playback of musical compositions in CD-DA and HDCD formats
#Playback of compressed musical files in Mp3 and CD+G formats
#Playback of Karaoke-discs in DVD, VCD and CD+G formats
#Playback of photo albums, recorded in Kodak Picture CD and JPEG digital formats

Audio:

#192 kHz/12 bit audio D/A converter
#Coaxial and optical audio outputs, providing digital sound playback in Dolby Digital/DTS/LPC formats
#Coaxial and optical audio inputs, providing connection of external digital signal sources
#Stereophonic audio output for connection to TV and amplifier
#Integrated digital multi-channel sound decoders, providing playback of Dolby Digital and DTS audio tracks
#Integrated Dolby Pro Logic II decoder, providing transformation of stereophonic signal to multi-channel one
#Microphone input providing karaoke functions
#Headphones output

Video:

#108kHz/12 bit video D/A converter
#Progressive scan(Y Pb Pr)video signal output, securing high resolution and absence of image flicker
#Composite and component(Y Cb Cr), S-Video and RGB/SCART video outputs, providing advanced switching capabilities
#NTSC/PAL transcoder
#Support of many camera angels, dubbed languages and subtitles
#Sharpness, Gamma, Brightness, Contrast, Hue and Saturation adjustment.

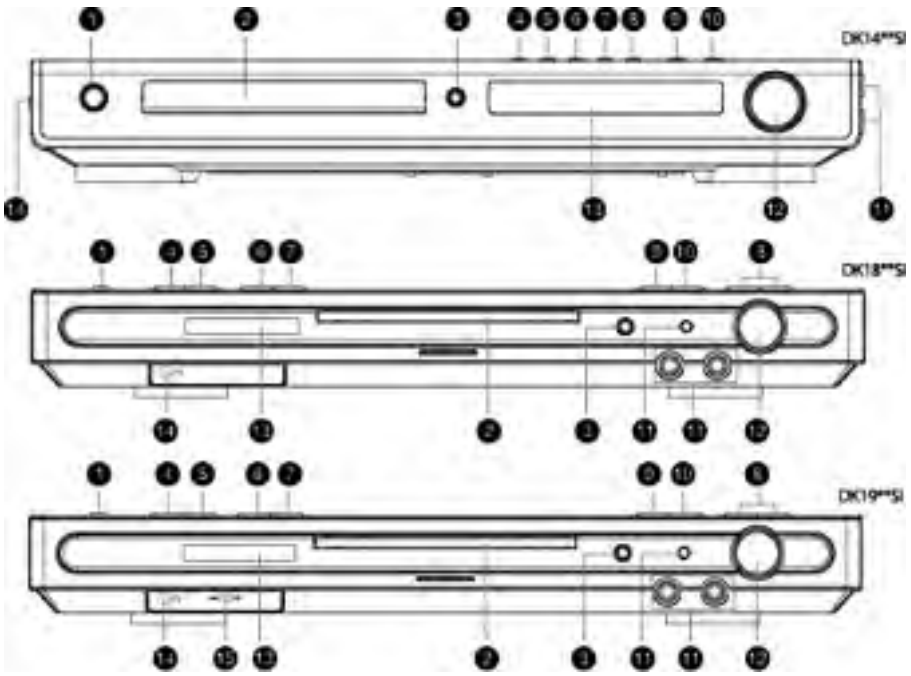
Miscellaneous:

#Support of CD-R/CD-RW, DVD-R/DVD-RW, DVD+R/DVD+RW
#FM/AM tuner with RDS support
#USB port, providing playback of files of supported formats from external flash-memory devices
#KARAOKE+, providing extended karaoke features
#Easy to use on-screen menu in Russian
#Support of Russian file names, Id3 tags and CD-text
#"Memory" function which can load the last disc position on stop

#"Capture" function, auto loading selected bookmarked image as the wallpaper
#Q-Play function that will bring you to the main movie title and skip unskippable commercials
#Virtual control panel function makes your control of the device much easier when playing the movie
#Browser function displays information about playback modes
#Auto protection of TV screen
#Child lock, parental control(protection against playing undesirable 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 Open/close button
Press to open/close the disc tray

④ PREV button
Press to playback from the previous bookmark

⑤ NEXT button
Press to playback from the next bookmark

⑥ PEW button
Press to fast reverse/radio station tuning

⑦ Forward button
Press to fast forward/radio station tuning

⑧ SOURCE button
Press to switch between DVD-receiver/Audio input/Tuner/Digital audio input

⑨ PLAY/PAUSE button
Press to playback/pause

⑩ STOP button
Press to stop the playback

⑪ Microphone input

⑫ VOLUME adjuster
Press to adjust volume

⑬ VFD display window

⑭ Headphones input

⑮ USB port

### 2.2.2 Rear panel connections

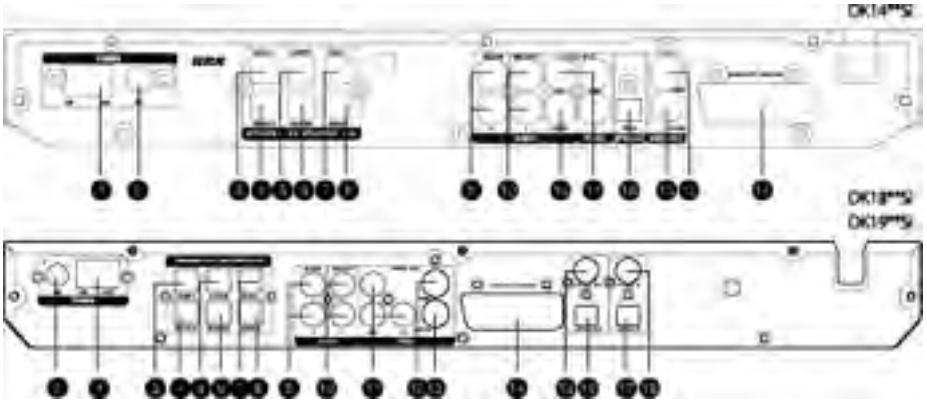
① AM Antenna input

② FM Antenna input

③ Left front speaker input(output from the build-in amplifier)

④ Right front speaker input(output from the build-i n amplifier)

⑤ Center speaker input(output from the build-in amplifier



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

⑦ Left Surround speaker input(output from the build-in amplifier)

⑧ Right Surround speaker input(output from the build-in amplifier)

⑨ Audio input

⑩ Stereophonic audio output

⑪ Component video output Y Cb(Pb)Cr(Pr)

⑫ Composite video output

⑬ S-Video output

⑭ SCART-type V connector

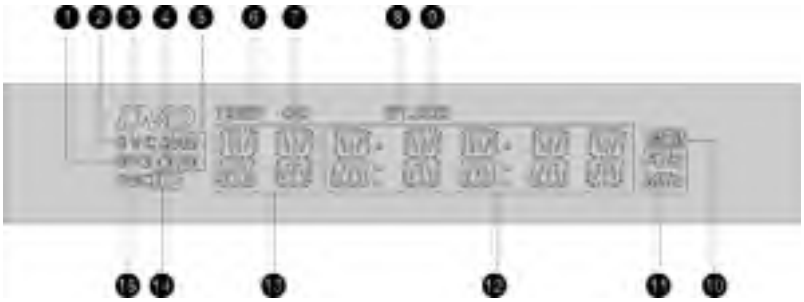
⑮ Coaxial digital audio output

⑯ Optical digital audio output

⑰ Optical digital audio input

⑱ Coaxial digital audio input

## 2.2.3 VFD display general view



① MP3-disc

② CD-, VCD- or SVCD-disc

③ DVD-disc

④ Repeat

⑤ AM/FM

⑥ Radio tuning mode

⑦ Tuner mode

⑧ Stereo

⑨ Dolby Digital

⑩ Programmed radio station

⑪ Friquency

⑫ Playback time

⑬ Chapters or tracks

⑭ Playback or pause

⑮ PBC

## 2.2.4 Remote control general view

① EJECT button
Press to open/close the disc tray

② DVD button
Press to switch to DVD mode

③ AUDIO button
Press to display the disc information

④ DISP button
Press to display the disc information

⑤ LANG button
Press to change the language

⑥ SLEEP button
Press to turn the sleep mode on

⑦ Q-PLAY button

Press to turn the Q-Play mode on.

⑧ EQ button

Press to adjust the equalizer

⑨ BASS +/- button

Press to adjust subwoofer

⑩ BOOST button

Press to bass boosting

⑪ BROWSER button

Press to turn on/off the browser function

⑫ JOG DIAL wheel

Functions are set manually. Default function: ZOOM

⑬ SETUP button

Press to switch to setup mode

⑭ Button

Press to capture and bookmark image for the wallpaper

⑮ Buttons

Press to start reverse or forward scanning.

⑯ SKIP/PRESET +/-

Press to switch between files on disc/tuned radio stations.

⑰ A-B buttons

Press to repeat the selected portion

⑱ REPEAT button

Press to repeat playback

⑲ CH +/CH - button

Press to change the acoustic channel

⑳ MUTE button

Press to turn on/off the sound

㉑ VOLUME +/- button

Press to adjust the volume

㉒ SLOW button

Press to switch to slow down the playback

㉓ PLAY/PAUSE button

Press to Play/pause the playback

㉔ STOP button

Press to stop the playback

㉕ Button

Press to trun on/off the virtual control panel

㉖ CANCEL button

Press to go one level back/cancel current operation

㉗ OK button

Press OK for confirmation or use it like joystick during navigating in MENU.

㉘ MENU button

DVD-disc menu/PBC function

㉙ GOTO button

Press to playback from the target place.

㉚ Numeric buttons

㉛ ST/5.1 button

Press to switch between STEREO/5.1CH

㉜ Treble +/- button

Press to adjust the tone

㉝ ECHO button

Press to adjust the echo function of the microphone.

㉞ MEM button

Press to memorize the point where playback was stopped/playback from the previously memorized point.

㉟ HDMI button

Press to switch to HDMI mode

㊱ SUBT button

Press to change the subtitles language

㊲ ANGLE button

Press to change the camera angel

㊳ RADIO button

Press to switch to radio mode

㊴ KARAOKE button

Press to set the karaode functions

㊵ USB button

Press to switch to USB mode

㊶ Button

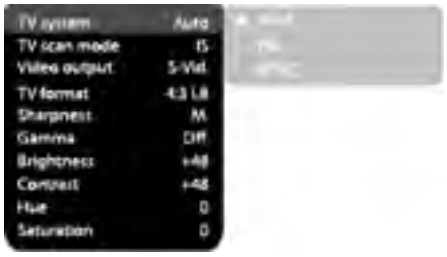
Press to switch the device on/into standby

## 2.3 FUNCTION SETTINGS

### 2.3.1 Function selection and change

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

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




2.Using the jog Dial, select the desired item and press OK or RIGHT key of the cursor joystick. For example, select the Sharpness item. Settings will appear on the screen. Then select the desired sharpness level and press OK for confirmation.

3.Press LEFT key of the cursor joystick for exit to previous menu level.

4.Press SETUP to exit setup menu.

### 2.3.2 Language settings

1.Menu: interface language setup

#Options: Russian, English, Ukrainian

#Default option: English

2.DVD-menu: selection of disc menu language

3.Soundtrack: selection of translation language

#Options: Russian, English, Estonian, Lithuanian, Kazakh, Romanian, Belarusian, Ukrainian, Chinese.

#Default: English

#Selection of other languages: select the OTHERS item using the jog Dial 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 jog Dial 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.

### 2.3.3 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.

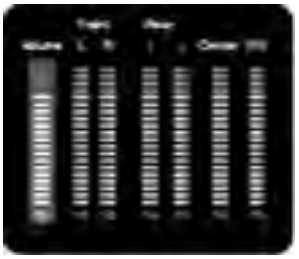
3.TV Format: image ratio settings
#Options: 4:3 pan&scan, 4:3 letterbox and 16:9 TV.
#Default option: 4:3 letterbox.
#Some discs are recorded with support of only one ratio. The selected ratio must comply with the TV screen.
4.Video output: selection of video signal
#Options: S-Video(only for DK14**SI Series), Comp, SCART.
#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
#Default option: Off
7.Brightness: adjustment of image brightness
8.Contrast: adjustment of image contrast
9.Hues: adjustment of image hues
10.Saturation: adjustment of image saturation
Adjustment of image brightness, contrast, hues and saturation:
#Select the desired item of the image adjustment section using the jog Dial. Press OK or RIGHT key to start adjusting the relevant option
#Change the option value using the jog Dial.
#Upon completion press the LEFT key of the cursor joystick to return to image setup menu.

## 2.3.4 Sound settings menu

1.Mixer
a)Configuragion: setting of the mode 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 th4e 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+R, 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: Off
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.(only for DK14**SI Series)
#Select the channel you want.
#Adjust the sound volume of each channel using the wheel.
#Press the OK 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 jog Dial, select the channel for which you want to set up the delay, and press OK for confirmation.
#Using the jog Dial set up the desired distance from the listener to each speaker(detailed description of this operation see on page 32).

#Press LEFT key of the cursor joystick 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 an d receivers
#Options: 48kHz 16 bit, 96 kHz 24 bit .
#Default option: 48kHz 16 bit.
3.Sound correction
a)Max volume: max volume limiting(only for DK14**SI Series)
#Using the jog Dial, adjust the max volume level.
#Press the LEFT key of the cursor joystick to sound correction setup menu.
b)Equalizer: equalizer modes
#Options: Rock, Pop, Live, Dance, Techno, Classic, Soft.
#Default option: Off.
c)Echo; echo effects
#Options: Off, Concert, Living room, Hall Bathroom Cave, Arena, Church
#Default option: Off
d)Tone balance: adjustment of tone balance level.
#Adjust the tone balance level using the jog Dial
#Press the LEFT key of the cursor joystick to return to sound correction setup menu.

## 2.3.5 Playback settings

1.DVD
Advertisment skip: skip the unskippable block while playing a DVD disc.
#Options; Yes, No
#Default option: Number
#Press LEFT key of the cursor joystick to return to speaker configuration menu.

2.VCD/SVCD
PBS menu: PBC menu on/off
#Options: On, Off
#Default option: On
#If On option is set, while erproducing 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 All types.
#Default option: All types
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.

## 2.3.6 Karaoke settings menu

1.Microphone: microphone on/off
#Options: On, Off
#Default option: Off

2.Kar.help: karaoke-disc playback mode
#Options: L Channel, R Channel, No ast, No voc
#Default option: No vocal mode
3.Volume:
Microphone: microphone sound volume level
#Using the jog Dial adjust the microphone volume level.

#Press LEFT key of the cursor joystick to return to karaoke settings menu.

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

#Adjust the echo level Using the jog Dial

#Press LEFT key of the cursor joystick to return to karaoke settings menu.

## 2.3.7 Preference settings

1.Backlight: Selection of open/colse button LED

#Options: On, Off.

#Default option: On

2.Gr.Equalizer: spectrum analyzer

#Options: On, Off

#Default option: Off

3.Background: selection of an image as TV screen wallpaper

#Options: Standard, Saved

#Default option: Standard

4.Screensaver: screen saver on/off

#Options; On, Off

#Default option: On

5.Jog Dial

#Options: Zoom, Step, Fast, Skip, Volume

#Default: Zoom

## 2.3.8 Parental Control

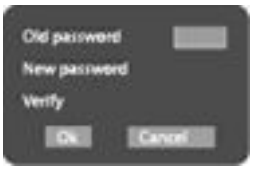
1.Category: setup of age restrictions to prevent children from seeing undesirable discs

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

#Default option: Any

2.Set password: setup of a four-digit password to change the level of age restrictions

#Default option: 7890

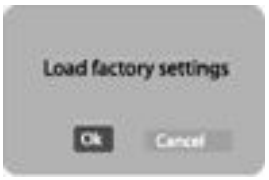



## 2.3.9 Initial setup menu

#Press the RIGHT key of the cursor joystick to enter the initial setup menu, then select the desired item using the jog Dial and press OK key for confirmation.

## 2.3.10 reset to defaults

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




## 2.3.11 Exit settings menu

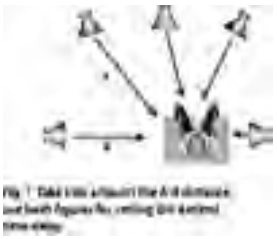
#Select the exit item using the jog Dial and press the OK to exit the menu.

## 2.3.12 Channel delay set-up

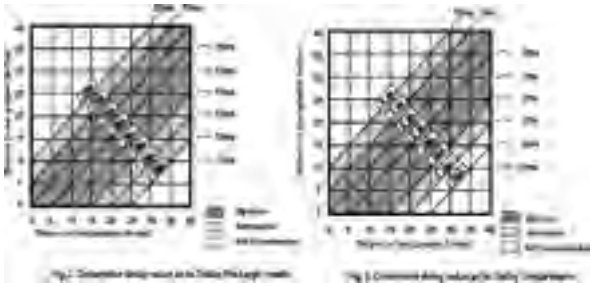
Set-up of time delay in the surround channel

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 tie 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.



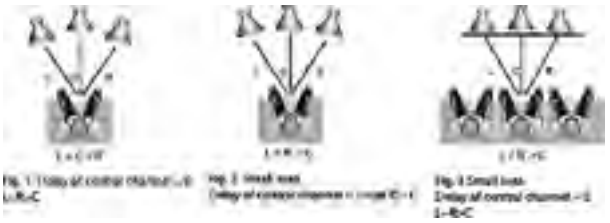
Set-up of time delay in the central channel

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, or 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.

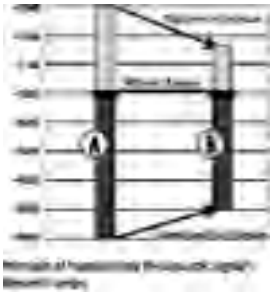
For instance, as shown in Fig.2, if the line C is by 1 foot shorter than the lines R and L, the delay value is to be set at 1 ms. If your sofa is broad enough, and there are several listeners sittings on it.

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”.

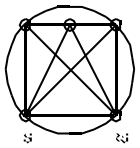
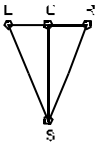


“Night” mode

The 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  |
| Sound field distribution | 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. |

## 2.4 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<br>FM antenna input<br>AM antenna input<br>Stereo audio input(AUX) | |
| DVD receiver | Output | Audio output | Analog audio output: Stereo<br>Digital audio output: Coaxial, Optical |
| | Video characteristics | Video amplitude: 1.0Vp-p(75□)<br>S-Video amplitde: Y:0.7vP-P(75□)<br>Component video amplitude: C:0.286vP-P(75□)<br>1.0vP-P(75□) | |
| | Audio characteristics | Frequency response 20-20000Hz(±1 Db)<br>Signal-to-noise ratio >90(dB)<br>THD <1% | |
| | Operating voltage<br>Power consumption | ~220V,50/60 Hz<br>250W | |
| FM Tuner | Frequency range<br>Channel separation | 87.5-108 MHz<br>>35dB | |
| AM Tuner | Frequency range | 522-1611kHz | |

| | | | | |
|---|---|---|---|---|
| Speaker system | Output power RMS, 10% THD, 1 kHz<br>Subwoofer (40Hz)<br>Front channel<br>Rear channel<br>Center channel | DK1110SI<br>25<br>12<br>12 | DK1112SI<br>25<br>12 | DK1114SI<br>25<br>12 |
| | Maximum power<br>Subwoofer<br>Front channel<br>Rear channel<br>Center channel | <br>40<br>20<br>20 | <br>50<br>20<br>20 | <br>50<br>20<br>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 | <br>Subwoofer<br>Front channel<br>Rear channel<br>Center channel | DK1110SI<br>325×310×200<br>80×101×165<br>80×101×165<br>80× | DK1112SI<br>325×310×200<br>80×101×165<br>80×101×165 | DK1114SI<br>325×310×200<br>150×90×86<br>150×90×86 |

# ChapterThreePrincipleandServicing

## SectionOnePrincipleofthePlayer

### 3.1.1 Function and features

# Progressive scanning output to produce steadier and clearer pictures without flickering.

# Composite video, S-video, component video output.

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

# Built-in Dolby digital decoder. Karaoke function.

# Hi-Fi stereo headphone output. 5.1CH output.

# Power amplifier adopts high performance large power IC with complete protection function and perfect sound quality.

# Compatible with DIVX, MPEG4 format disc.

# Subwoofer adopts large diameter bass unit matched with large capacity speaker body.

### 3.1.2 Block diagram of the player

Its internal structure is mainly composed of decode & servo board, power amplifier board, input/otuput board, panel, headphone board, tuner, power board and loader. The principle block diagram is shown as the figure 3.1.2.1. All other signal flow is shown in figure except power board. The function of loader is to read disc information and transmit it to Mt1389, which performs servo function through D5954 on decode board and other supplementary circuit, and ensues the normal working of loader. FLASH on decode board is to store system program, SDRAM is to store program and sound/image information read from disc when the player is working to ensure their smooth output. The main function of power amplifier board is to perform audio D/A conversion, amplify analog signal and output 5.1CH to ensure the normal working of external speakers. The main function of AV board is to output various audio signals. This player is also with headphone and microphone to meet customers' demand. Further more, it also has external sound input, which may amplify power by use of power amplifier board of this player to output to speaker. Tuner in this player makes it have tuning function. It is also equipped with SAA6558 chip to realize RDS function of Europe and RBDS function of US.

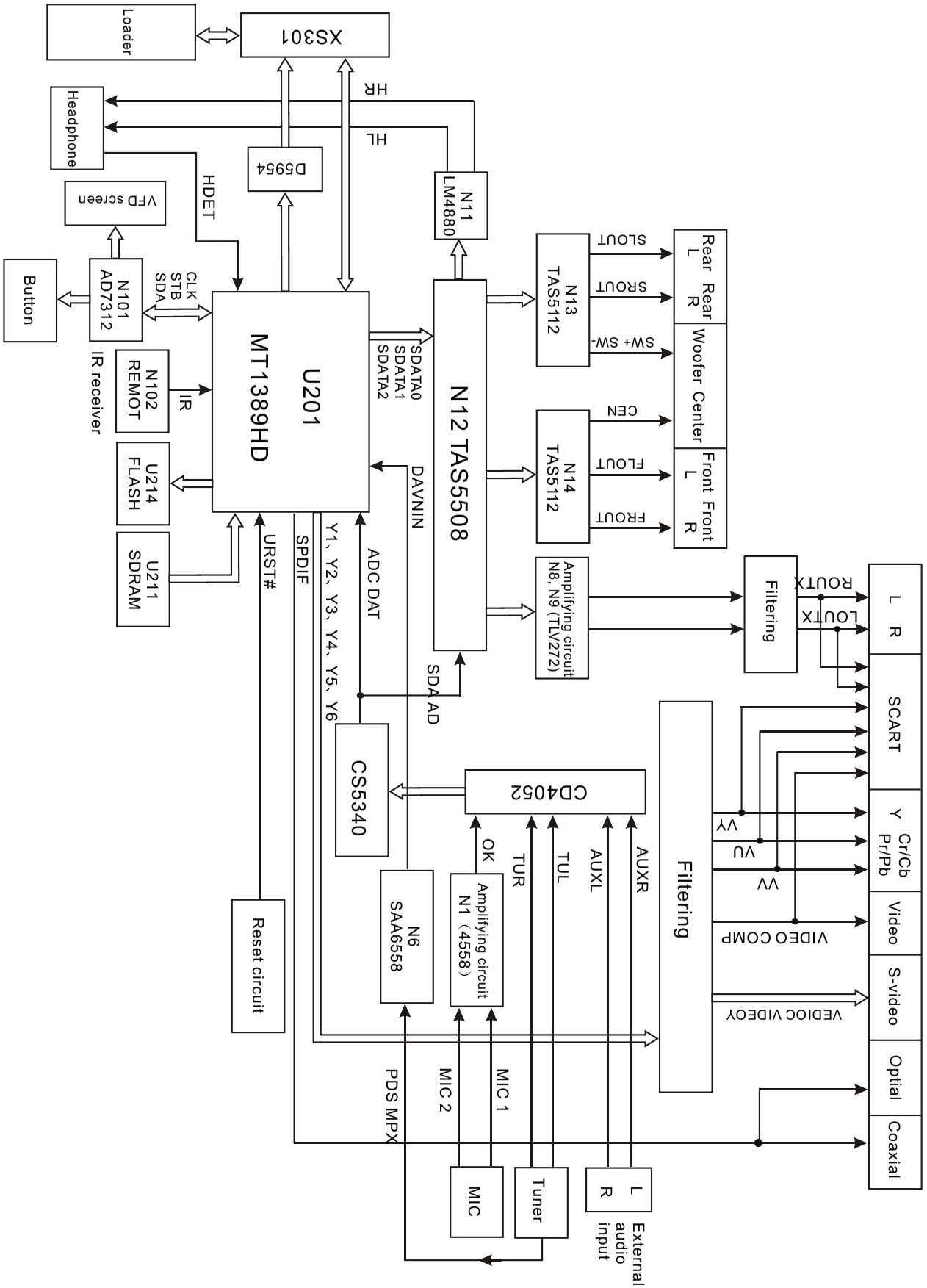



Figure 3.1.2.1 Block diagram of the player

## 3.1.3 Introduction to IC used in this player

Introduction to IC used in DK1910SI is shown in the following table:

| PCB semi-finished product name | IC model | Location | Function |
|---|---|---|---|
| decode board | MT1389HD | U201 | Decode chip |
| | 24C02 | U202 | EEPROM |
| | RT9701 | U203 | |
| | HCU04 | U205 | Phase inverter |
| | LM1117 | U209 | Precision voltage stabilizer |
| | HY57V641620HGT-7 | U211 | 64M SDRAM |
| | 29LV160BE | U214 | 16M FLASH |
| | D5954 | U302 | Servo drive |
| Power amplifier board | 4558 | N1 | Audio amplifying |
| | SN74LVC | N2 | Phase inverter |
| | 74HCT125 | N3,N4 | Buffer |
| | CD4052 | N5 | Audio mixing |
| | SAA6588 | N6 | Tuning IC |
| | CS5340 | N7 | A/D conversion |
| | TLV272 | N8,N9 | Operational amplifier |
| | LM4880 | N11 | Audio amplifying |
| | TAS5508PAG | N12 | Pulse width adjuster |
| | TAS5112DFD | N13,N14 | Digital power amplifier |
| | PT2597 | N15 | |
| Main panel | AD7312 | N101 | Panel control IC |
| | REMOT | N102 | Remote control receiver |
| Power board | VIPER22 | 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 Introduction to laser head

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

| Pin | Name | Signal flow direction | DVD disc | CD disc | No disc | Function description |
|---|---|---|---|---|---|---|
| 1 | F- | Input loader | 2.52 | 2.34 | 0.46 | Focus error signal is added to two sides of pick-up focus coil |
| 2 | F+ | Input loader | 2.49 | 2.49 | 0.93 | |
| 3 | T+ | Input loader | 2.53 | 2.51 | 0.94 | Trace error signal is added to two sides of pick-up trace coil |
| 4 | T- | Input loader | 2.58 | 2.51 | 0.93 | |
| 5 | C | Input MT1389 | 2.2 | 2.25 | 2.04 | Disc data signal |
| 6 | D | Input MT1389 | 2.2 | 3.2 | 2.04 | Disc data signal |
| 7 | IOA | Input MT1389 | 0.01 | 3.2 | 3.21 | Disc identification signal, CD is 3.3V, DVD is 0V |
| 8 | RF | Input MT1389 | 2.21 | 2.53 | 1.28 | The sum of disc data signal |
| 9 | A | Input MT1389 | 2.17 | 2.22 | 2.04 | Disc data signal |
| 10 | B | Input MT1389 | 2.19 | 2.27 | 2.04 | Disc data signal |
| 11 | F | Input MT1389 | 2.07 | 2.44 | 2.03 | Supplementary signal used in trace |
| 12 | GND | Ground | 0.01 | 0.01 | 0 | Grounding |
| 13 | V20 | Input loader | 2.04 | 2.06 | 2.03 | Reference voltage |
| 14 | Vcc | Input loader | 5.04 | 5.04 | 5.02 | Supply voltage for loader |
| 15 | E | Input MT1389 | 2.06 | 2.45 | 2.03 | Disc data signal |
| 16 | Blanking | haning in air | 0.01 | 0 | 0 | unused |

| | | | | | | |
|---|---|---|---|---|---|---|
| 17 | VR-CD | Input loader | 0.21 | 0.01 | 0 | Through the handling inside loader, make sure MD11 is 180mV when reading CD |
| 18 | VR-DVD | Input loader | 0.01 | 0.2 | 0 | Through the handling inside loader, make sure MD11 is 180mV when reading DVD |
| 19 | LD-CD | Input loader | 0.09 | 2.1 | 0 | CD laser power control signal |
| 20 | MDII | Input MT1389 | 0.21 | 0.2 | 0 | CD and DVD laser power monitoring signal |
| 21 | HFM | Input loader | 5.04 | 5.04 | 5.02 | High frequencyoverlapping signal produces laser with different wave length inside loader |
| 22 | Blanking | unused | 0.01 | 0.1 | 0 | |
| 23 | LD-DVD | Input loader | 2.21 | 0.1 | 0 | DVD laser power control signal |
| 24 | GND | unused | 0.01 | 0.01 | 0 | Grounding |

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

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

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

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

2. Working principle

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

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

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

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

## 3.2.2 Servo circuit

1. DK1910S adopts SANYO 62 decoder and MTK decode solution (MT1389+FLASH (16M)+SDRAM (64M)). The servo circuit is mainly composed of front signal processing, digital servo processing, signal processing IC T1389 and drive circuit D5954, in which MT1389 is the main component of decode circuit at the same time, shown as the figure 3.2.3.1:

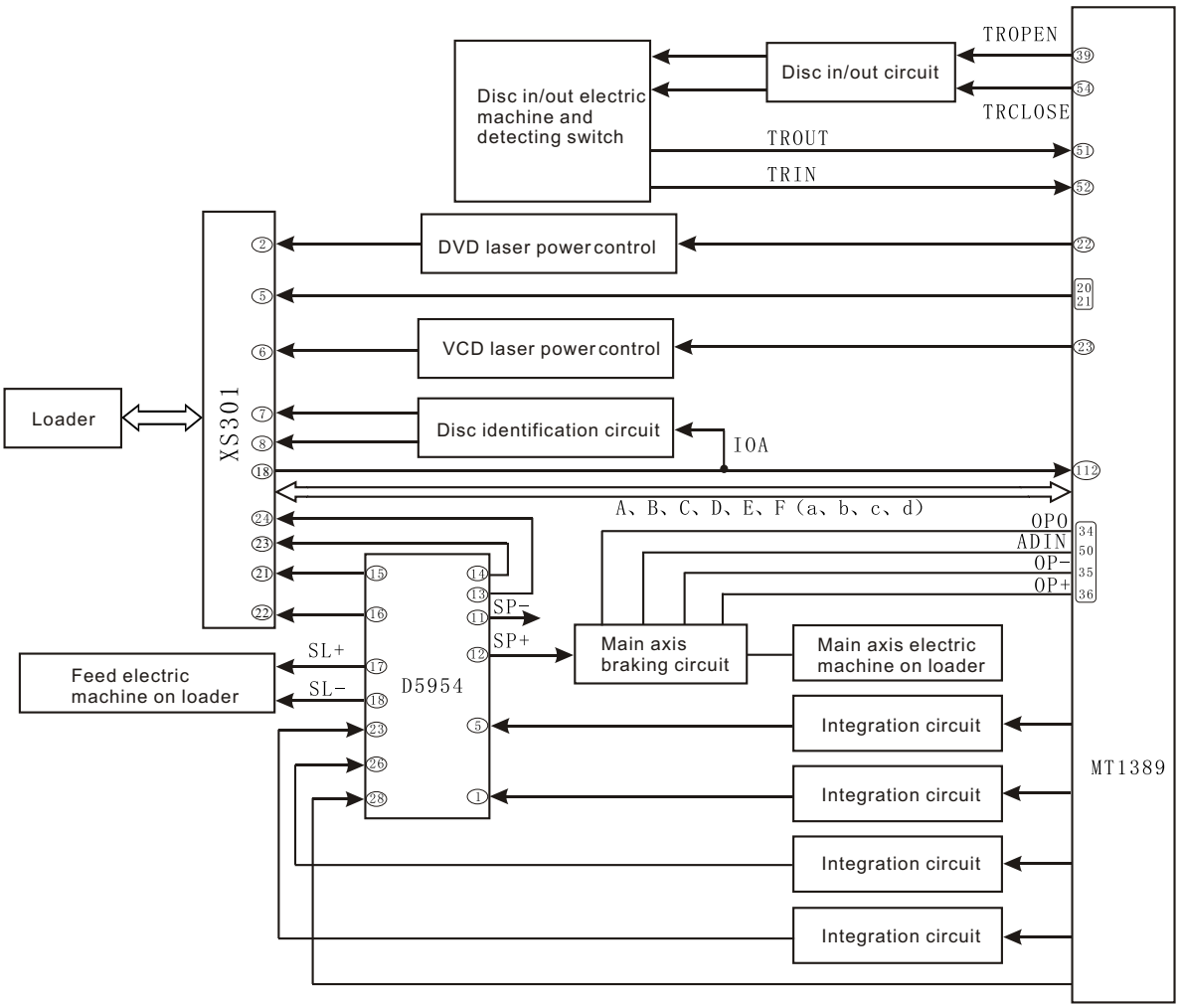



Figure 3.2.2.1 Servo circuit diagram

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 MT1389 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), Mt1389 pulls LOD1 of V302 base electrode in laser tube power control connected to VCD down to about 2.2V to make V302 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), MT1389 pulls LOD2 of V301 base electrode in laser tube power control connected to

DVD down to about 2.2V to make V301 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 MDIAfter loader reading disc information, A, B, C, D, E, F signals are sent out to Mt1389 (DVD only has A, B, C, D signals), and then inputted from pin 2~11, 18, 19 of MT1389. After being amplified and processed by the pre-amplifier inside MT1389, now signals are separated to two part s for processing inside Mt1389.

After being processed by digital servo signal circuit inside MT1389, 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 Mt1389 respectively, then change into analog servo control signal FOSO, TRSO, DMSO, FMSO through integration circuit composed by resistor capacitor, and send to driver circuit BA5954 for amplification to bring along focus coil, trace coil, 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 MT1389, another part of signals are changed into digital signals through internal A/D converter. When loader is reading CD/VCD signals, these signals are conducted EFM demodulation inside MT1389, and then outputted to latter stage for AV decoding after finishing CIRC (Cross-Interleaved Reed-Solomon Code) error correction inside. When loader is readingDVD signals, these signals are conducted ESM demodulation inside MT1389, 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 toMT1389, in usual conditions, TROPEN and TRCLOSE sent out by pin 39, 51 of Mt1389 are both low level, when signal of “open” comes, after Mt1389 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, MT1389 pulls down TRCLOSE and open/close electric machine stop running. When MT1389 receiving “close” signal, TROPEN is set high level by MT1389, 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, MT1389 pulls down TROPEN and electric machine stops running to finish “close” process.

3. Explanation to servo terms

FOO: when rotating, disc may probably move upwards or downwards slightly to make the focus of laser emitted by pick-up cannot justly fall on data pit of disc, so pick-up is required to move upwards or

Downwards to make focus aim at data pit justly. When pick-up is moving upwards or downwards, it means that pick-up is making focus acts.

TRO: data information is save in disc in form of tracks. The process when pick-up moves from one track to another one to read data is trace. In this process, it is objective, but the entire pick-up, that moves forwards or backwards, and the moving range is very small.

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.

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. Hint: In order to observe these processes, you may take down upper cover of the machine, and then the loader cover board. When power on with no disc in or disc in after disc out, you may observe that pick-up returns to inner ring firstly and then springs back for a little distance, which is feed process. Then pick-up will emit light and you may notice the objective moves upwards and downwards, which is focus process. In face, in the same time of focus, the objective also moves upwards and backwards to make trace acts. Because the range is small, it is not easy to observe, and meanwhile DEMO disc tray also rotates slightly, which is DEMO acts.

4. Voltage of key point is shown as follows:

| Name | When reading disc normally | When disc out | When disc in | When no disc in |
|---|---|---|---|---|
| TROPEN | 0 | There is about 1 second 3.3V pulse when at the moment of disc out | 0 | 0 |
| TRCLOSE | 0 | 0V | There is about 1 second 3.3V pulse when at the moment of disc out | 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 Main axis braking control circuit

1. Main axis braking control circuit is shown as the following figure 3.2.3.1:

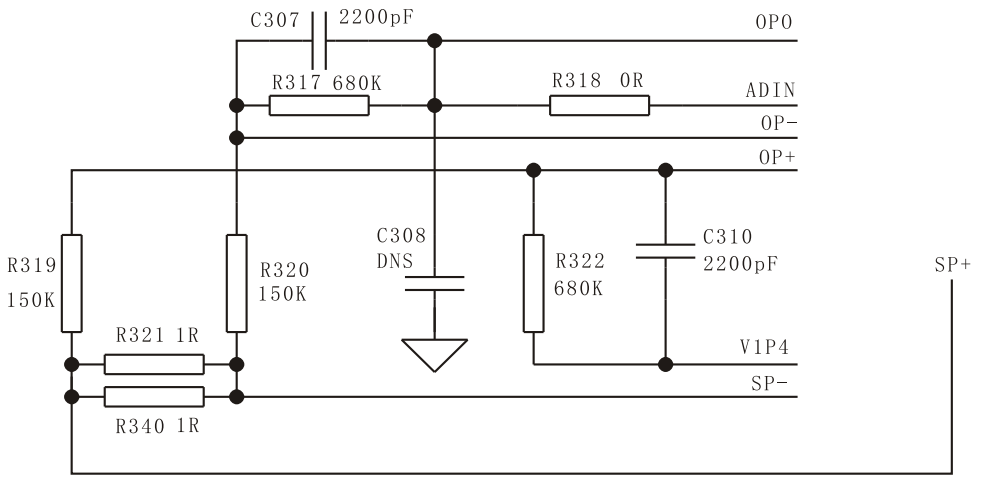



Figure 3.2.3.1 Main axis braking control circuit diagram

The equivalent circuit is shown as the following figure 3.2.3.2:

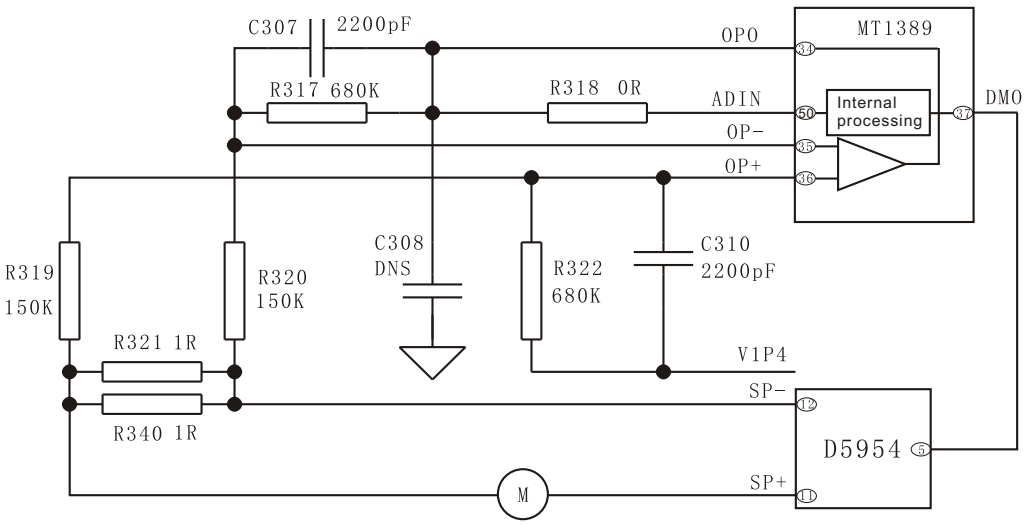



Figure 3.2.3.2 Main axis braking control equivalent circuit diagram

2. Working principle: To prolong the service life of electric machine and decrease the influence of start-up concussion current to the machine, when there is disc in, the development personnel design the main axis electric machine in running state always. Even though “STOP” button is pressed, disc will not stop running immediately. Thus when pressing “OPEN” button, a braking signal is required to make the main axis electric machine stop running to fulfill the completion of opening disc tray in a short period.

In the course of playback, press “OPEN" button and main axis drive signal disappears. For the reason of inertia, the main axis electric machine is still in running state, and now the induced voltage achieved by the induced electromotive force which is generated by electric machine's running on sampling resistor R321 and R340 outputs from pin 34 through resistor R319, R320 and pin 35, 36 of MT1389 after being processed inside MT1389 and magnified, then sends to pin 50 of MT1389 through R13; after A/D conversion and the corresponding processing inside MT1389, an instant electric machine reversal braking signal is outputted from pin 37 of MT1389 to make the main axis electric machine decrease speed. When MT1389 detects the disc stops running, disc tray will open to ensure that disc will not run when disc tray opens.

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

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

## 3.2.4 Disc identification circuit

1. Disc identification circuit is shown as the following figure 3.2.4.1:

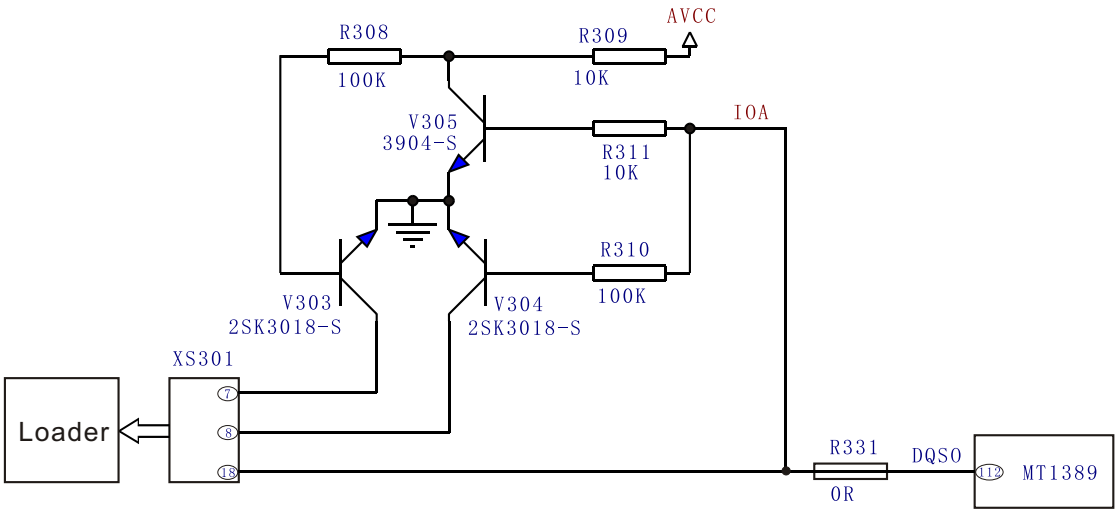



Figure 3.2.4.1 Disc identification circuit diagram

2. Working principle: the function of disc identification circuit is to identify the disc inserted to loader and judge whether the disc is VCD or DVD to perform the corresponding control acts. When disc is inserted in, decode servo control IC MT1389 defaults disc to DVD. Pin 112 of MT1389 outputs a low voltage signal, V305 and V304 are cut off, V303 is on, laser receiver tube inside loader selects DVD channel, now IOA is low level input loader to make loader in the state of reading DVD, through detecting laser power feedback signal, MT1389 analyses whether the preliminary judgment is correct (disc is defaulted DVD). When detecting correct preliminary judgment, loader runs in the state of reading DVD; when detecting incorrect preliminary judgment, MT1389 outputs a high voltage signal from its pin 112, V305 and V304 are on, V303 is cut off, laser receiver tube inside loader selects VCD channel, now IOA is high level input loader to make loader in the state of reading VCD. Whether the preliminarily defaulted disc is VCD or DVD is set by MT1389 internal software.

Note: V303 and V304 are MOS tube.

## 3.2.5 Disc in/out circuit

1. Disc in/out circuit is shown as the following figure 3.2.5.1:

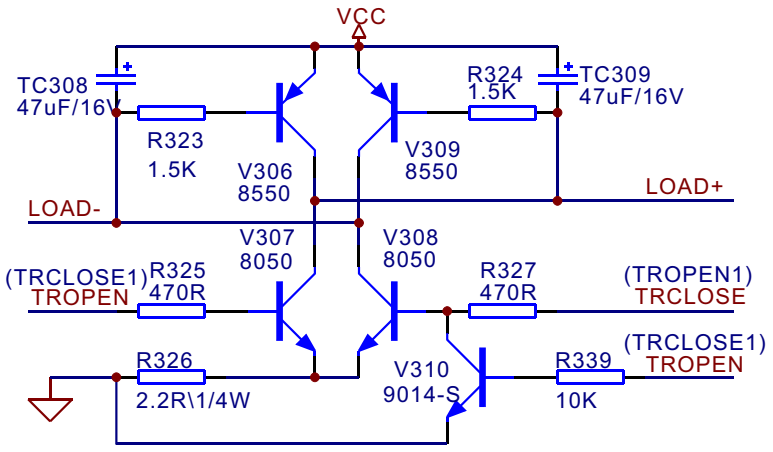



Figure 3.2.5.1 Disc in/out circuit diagram

2. Electric current when disc in/out

Open disc tray: VCC→ V306CE electrode on→ LOAD+→ Electric machine→ LOAD- → V308CE electrode on→R326→Ground

When not opening disc tray, pin 54 and 39 of MT1389 are low level. When opening disc tray, pin 54 of MT1389 sends a high level; V308 is on; V308 collector electrode changes into low level; LOAD- changes into low level; V306 base electrode changes into low level; V306 is on. V306 collector electrode changes into high level and LOAD+ changes into high level.

Close disc tray: VCC→ V309CE electrode on→ LOAD- → Electric machine→ LOAD+ → V307CE electrode on→R326→Ground

When closing disc tray, pin 39 of MT1389 sends a high level; V307 is on; collector electrode changes into low level; LOAD+ is low level; base electrode through R324 and V309 is low level; V309 is on; V309 collector electrode changes into high level; LOAD- changes into high level.

The function of V310 is interlock TRCLOSE and TROPEN signal to ensure the two are not high level at the same time. When the two are high level input, base electrode of V308 is made to low level through V310 on to ensure the normal working of disc in/out circuit. The function of electrolytic capacitor TC309 and Tc308 is to avoid the sudden change of the voltage on two ends of disc in/out electric machine to make disc in/out acts smooth.

## 3.2.6 Reset circuit

1. Reset circuit is shown as the following figure 3.2.6.1:

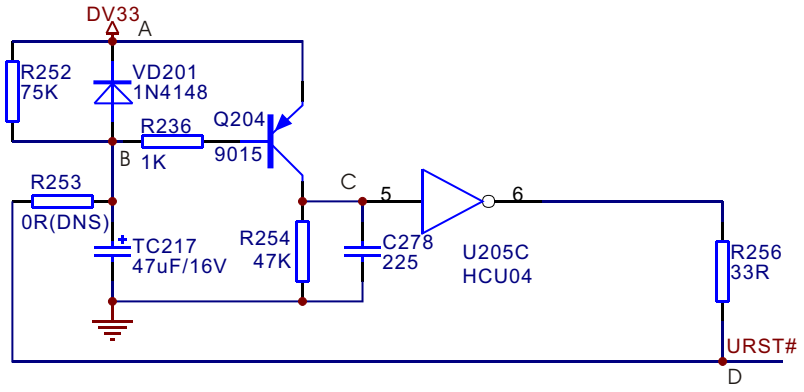



Figure 3.2.6.1 Reset circuit diagram

2. Working principle: The two ends voltage of capacitor T217 cannot change suddenly, anode of the capacitor begins charging from 0V and now triode Q204 is on. Pin 5 of phase inverterU205 (HCU04) output port is high voltage and pin 6 of it is low voltage to reset chip MT1389 FLASH, TAS5508 and Cs5340. When charge of the capacitor is close to 3.3V, triode Q204 cut off; pin 5 of phase inverter input port is low level; phase inverter outputs high voltage from pin 6 and MT1389 reset finishes. After reset of MT1389, reset signal is also given to sound D/A conversion chip CS4360 and sound A/D conversion chip CS5340V for their resetting. In the course of system working, pin 214 of MT1389 outputs reset signal to reset TAS5508 and CS5340 on power amplifier board.

3. Key point voltage is shown as the following table:

| Key point | Position | Voltage | Remark |
|---|---|---|---|
| DV33 (point A) | Diode VD201 cathode | 3.3V | TC217 may sends out current from this point after power failure |

| | | | |
|---|---|---|---|
| Point B | Diode VD201 anode | 3.3V after reset finishes | After reset finishes, voltage increases from 0V to 3.3V |
| Point C | Pin 5 of reverter | 0V after reset finishes | After reset finishes, voltage decreases from 3.3V to 0V |
| URST# (point D) | Connection place of R256 and R253 | 3.3V after reset finishes | After reset finishes, voltage increases from 0V to 3.3V |

## 3.2.7 Mute circuit

As shown in the figure 3.2.7.1, this model dose not set special mute circuit and SCMUTE signal outputted from pin 176 of Mt1389 changes into MUTE signal through flat cable X207 to control As5508. In normal times, it is kept in high level, but after pressing MUTE button, MUTE signal changes to low level to control TAS5508 and make it not output sound.

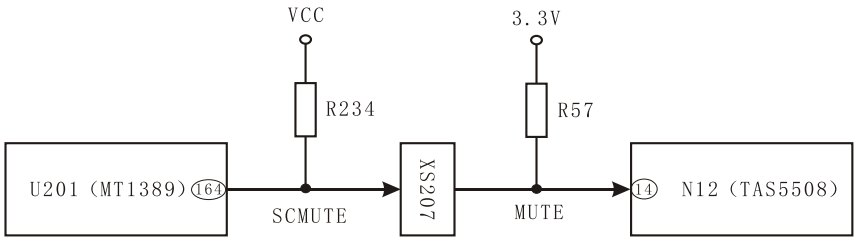



Figure 3.2.7.1 MT1389 SCMUTE signal block diagram

The other factor that causes mute in this model is that after inserting headphone, power amplifier board has no output. As shown in figure 3.2.7.2, this player has two HDET signals, in which one is outputted from headphone terminal and sent to Mt1389, and the other is sent to TAS5508 after Mt1389 receives HDET signal outputted from headphone. When headphone is not inserted, HDET signal outputted from headphone keeps in high level, after headphone being inserted, it changes into 0V and transmits to pin 184 of U201 (MT1389). Pin 174 of MT1389 also outputs RDSID signal, and signal name changes into HDET through flat cable XS201. In normal times, it is also high level, after U201 (MT1389) receives HDET outputted from headphone, it changes into low level, and HDET signal outputted from headphone also changes from high level into low level to inform N12 (TAS5508) of mute. MUTE, HDET signal change is shown as the following figure:

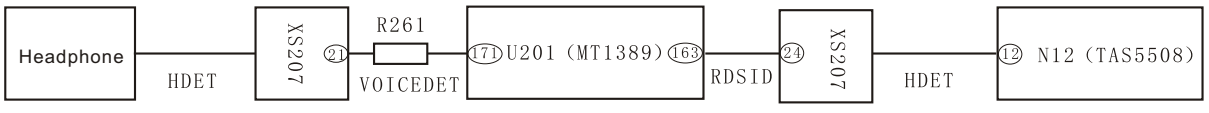



Figure 3.2.7.2 Headphone mute block diagram

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

## 3.2.8 Video circuit

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

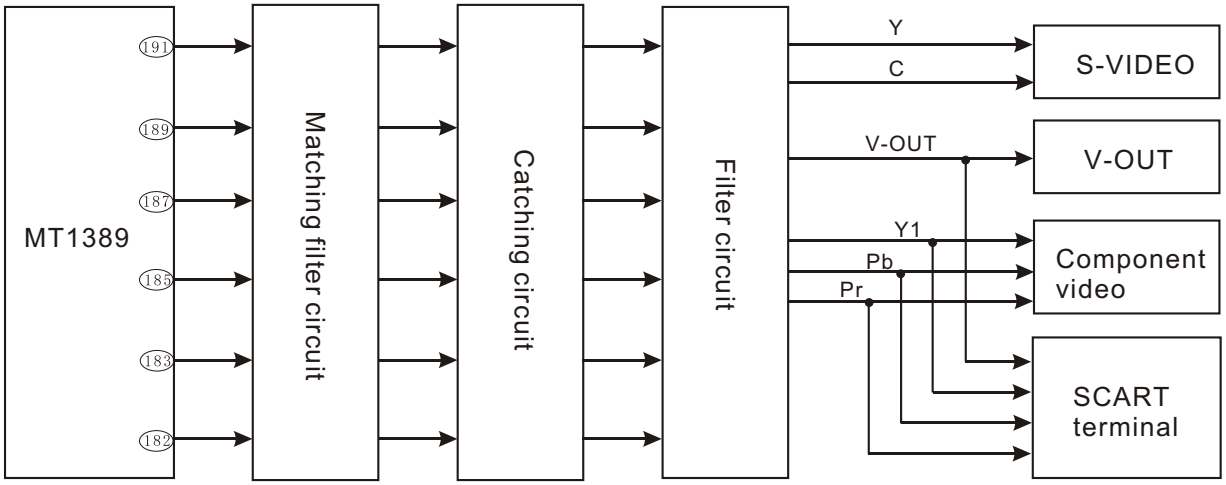



Figure 3.2.8.1 Video circuit block diagram

2. Working principle:Brightness signal, colour difference signal, CVBS signal and component video signal after being decoded by U201 (MT1389) are sent out to the corresponding terminal for output after lowpass filtering and clipping. Take Y1 signal as an instance, the following figure 3.2.8.2 shows the working principle of filtering limiter circuit.

This circuit is very simple. R261 is a matched resistor, which makes the signal achieve the maximum power on load. Capacitor C106, C108 and inductor L106 compose a lowpass filter which filters the high frequency interference signals beside useful ones; dual diode VD102 is clamping circuit. It is known from features of diode that the maximum amplitude of colour difference signal Y cannot exceed 5.7V and the minimum one cannot be under -0.7V, thus the high voltage signal from TV set can be avoided burning down the player.

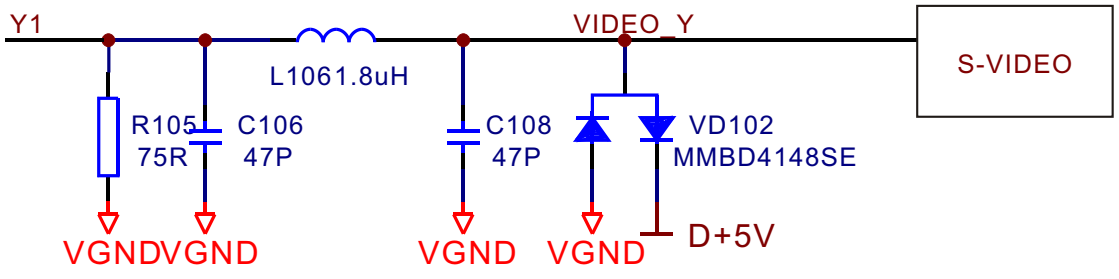



Figure 3.2.8.2 S-VIDEO output circuit diagram

## 3.2.9 Audio power amplifying circuit block diagram

1. Audio power amplifying circuit block diagram is shown as the following figure 3.2.9.1:

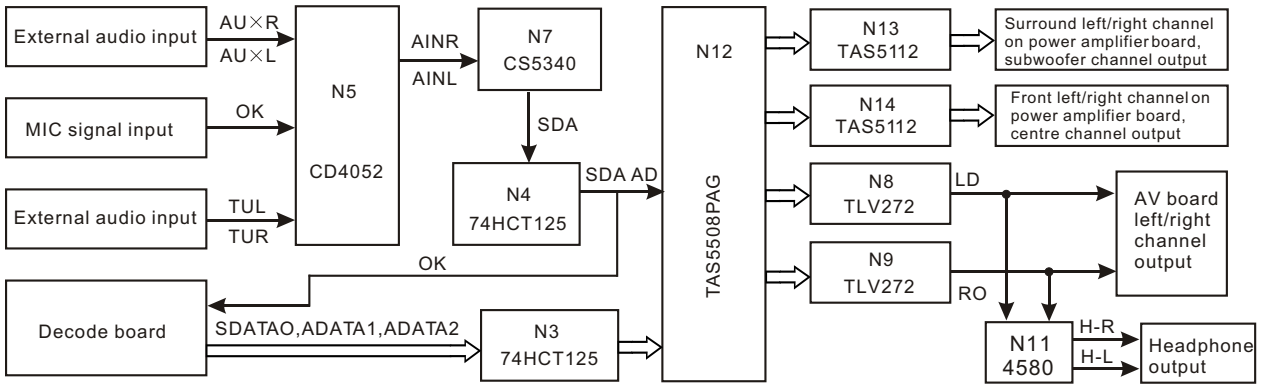



Figure 3.2.9.1 Audio power amplifying circuit block diaghram

2. Working principle:

N5 (CD4052): CD4052 is a switch for selection, which is used to select externally inputted tuning signal, MIC signal and left/right channel audio signal. When the player is in the state of playing disc, MIC signal may be on. MIC changes to digital signal after conversion of CS5340, and this digital signal outputs from pin 227 of MT1389 (ASDATO) to power amplifier board after outputting to decode for processing. Note: MIC signal through Cs5340 does not pass through N4 (74HCT125).

N7 (CS5340): converse analog signal sent out from CD4052 to digital signal for processing by back stage circuit.

N3, N4 (74HCT125): 74HCT125 is a gating IC with 4 paths in it, which can perform gating to 4 paths signals. N3 performs gating to MCLK, audio signal SDATA0, SDATA1 and SDATA2.

N12 (TAS5508): after the processing of pulse width demodulation to SDA, SDATA0, SDATA1, SDATA2 digital audio signals, 10 channel outputs generate, that is, left/right channel output on input/output board, headphone left/right channel output, front left/right channel on power amplifier board, surround left/right channel output, subwoofer channel and centre channel output.

N13, N14 (TAS5112): is a high performance amplifying IC, which demodulates and amplifies front left/right channel, surround left/right channel, centre and subwoofer after PWM of N12 (TAS5508).

## 3.2.10 Input/output circuit

Input/output circuit is also called AV board. AV board outputs video and audio signals sent from decode board and power amplifier board from the corresponding terminal after coupling and filter circuit processing. Externally inputted audio signal is sent to power amplifier board and decode board for processing also through AV board. Circuit includes composite video output terminal, S-video terminal

And component video output terminal; audio circuit includes mixed left/right channel output terminal, digital and optical output terminal, coaxial cable output terminal, SCART terminal, and also one path input terminal, that is left/right channel input terminal.

1. SCART terminal

SCART is a terminal that integrates video and audio together, which can transmit video and audio signals at the same time and operation is very convenient. It has 21 pins in all and lies in the middle part at rear side of the player. Pin function is shown as the following table:

| Pin | Name | Signal direction | Function description | Pin | Name | Signal direction | Function description |
|---|---|---|---|---|---|---|---|
| 1 | A(B)OUT | I | Audio right channel input | 12 | NC | | Network communication data line 2 |
| 2 | A(B)IN | O | Audio right channel output | 13 | RETURN | | Pr signal ground |
| 3 | A(A)OUT | I | Audio left channel input | 14 | RETURN | | Blanking signal ground |
| 4 | A-COM | | Audio signal ground | 15 | RED I/O | I/O | Pr signal I/O interface |
| 5 | RETURN | | Pb signal ground | 16 | BLK I/O | I/O | Blanking signal I/O interface |
| 6 | A(A)IN | O | Audio left channel output | 17 | RETURN | | Blanking signal ground |
| 7 | BLUE I/O | I/O | Pb signal I/O interface | 18 | TRTURN | | Composite video signal ground |
| 8 | FUNCSW | I | Function selection interface | 19 | V-OUT | I | Composite video signal input |
| 9 | RETURN | | Y1 signal ground | 20 | V-IN | O | Composite video signal output |
| 10 | CONT | I/O | Network communication data line 2 | 21 | GND | | Common |
| 11 | GREEN I/O | I/O | Y1 signal I/O interface | | | | |

Note: Blanking signal of pin 16 is used to select RGB or CVBS mode. I means inout, O means output and I/O means input/output.

2. SCART terminal function selection is shown as the following figure:

| 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: PDAT0 and PDAT2 are used to control the input voltage on pin 8 of SCART terminal. PDAT1 is used to control the voltage change on pin 16 of SCART terminal. The voltage on pin 16 controls and decides SCART selects whether RGB or CVBS mode.

## 3.2.11 Control panel components

1. Control panel components block diagram is shown as the following figure 3.2.11.1:

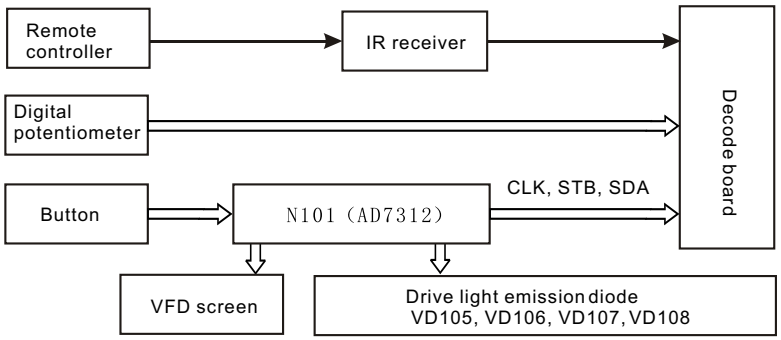



Figure 3.2.11.1 Control panel components block diagram

2. Working principle: panel is mainly composed of VFD screen, drive chip Ad7312, remote controller IR receiver, digital potentiometer, MIC jack, button and indicator light.

VFD is a vacuum fluorescence display screen and the working principle is the same with that of CRT TV set, that is, emit light and display through electron bombarding fluorescent powder. Pin 1, 2, 34 and 35 of VFD are filament power supply pin, GRID1GRID8 is segment control equal to grid, which speeds up electro emission and is responsible for display selection within reticular scope in display screen. SEG1SEG16 is bit control connected to single character with fluorescent powder on it. When electro is bombarding it, it emits light and displays character or strokes.

The function of N101 (Ad7312) is to drive display to display the corresponding state after processing data signal sent from decode board, meanwhile scan panel buttons matrix and sends it to CPU in digital signal means after processing button information to control the player and perform the corresponding acts.

Pin 3 of remote control IR receiver is 5V power supply pin, pin 2 grounds, and pin 1 is output pin. After processing remote controller buttons information, remote control receiver outputs from pin 1 and then sends to decode board directly.

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

## 3.2.12 Power supply circuit

1. Power supply circuit block diagram is shown as the following figure 3.2.12.1:

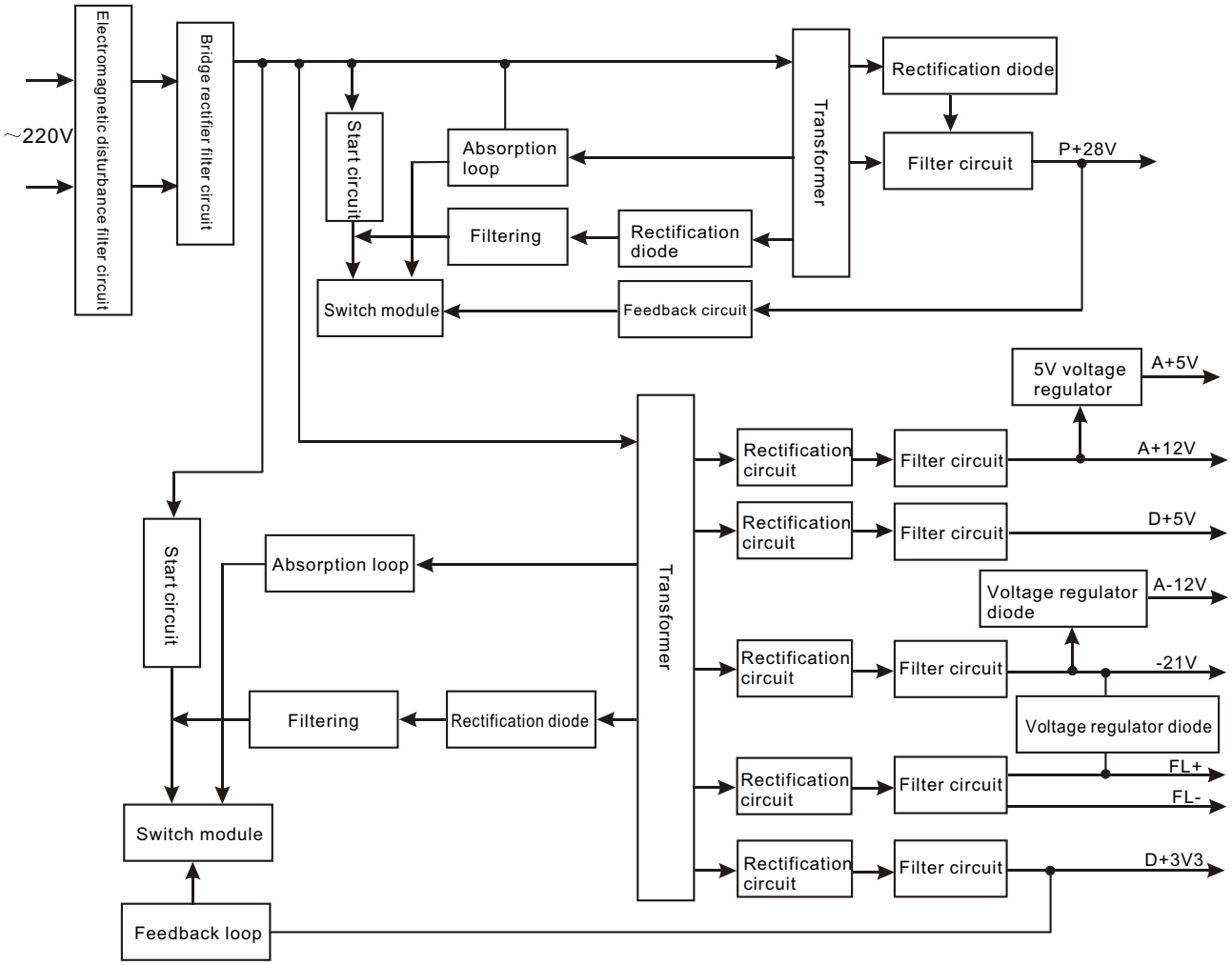



Figure 3.2.12.1 Power supply circuit block diagram

2. Working principle: this power supply circuit is composed of two parts that use electromagnetic disturbance filter circuit, bridge rectification circuit and other module circuit commonly. The first part circuit generates P+28V DC voltage used for power amplifier circuit power supply; the other part is responsible for power supply of other module circuit of this player. Working principle of each composed part is shown as follows:

(1) Electromagnetic disturbance filter circuit: for various electromagnetic radiation exist outside, the input AC will be affected. The function of electromagnetic disturbance filter capacitor is to filter these disturbance to make those that enter bridge rectification circuit are pure 220V AC.

(2) Bridge rectification and filter circuit: the function of this circuit is to generate a 310V DC to supply usage for back stage circuit.

(3) Start circuit: when power on and transformer has not started to work, start circuit provides a power supply voltage for switch module to make it work. When transformer begins to work, the voltage provided by power supply circuit for switch module is used to maintenance the working of switch module.

(4) Absorption loop: switch module performs on/off action in a very high frequency, so a very strong self induction voltage in the preliminary coil of transformer, which may probably cause the damage of switching module. The function of absorption is to form a loop for this self induction to ensure the normal working of circuit.

5) Switch module: the input from transformer is 310V DC. To make transformer work, AC shape voltage must be presented. The function of switch module is to control this 310V DC to make it on for a while and off for another while to make the input terminal of transformer generate high and low change, thus the transformer can work.

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

(7) Rectification diode: the voltage outputted from transformer just now is pulse DC. The function of rectification diode is to change pulse DC into DC together with the back filter circuit.

(8) Feedback loop: the time length of “on” and “off” inside switch module 5L0380R is decided bu feedback loop. Feedback loop samples +3.3V output voltage; when output voltage is too high, voltage sampled is on high side, through feedback loop, the space occupation ration of pin 5 of 5L0380R is changed, “on” time decreases and output voltage begins to reduce; when output voltage is too low, voltage sampled is on low side, through feedback loop, the space occupation ratio of 5L0380R increases, and output voltage increases, through the function of feedback loop, power board outputs stable voltage. LM431 used in this power is a 2.5V comparator; compare sampling voltage with this 2.5V voltage, when sampling voltage is over 2.5V (that is output voltage is high), LM431 is on, light emission diode in photoelectric coupler begins to emit light to make the other end of photoelectric coupler begin to be on; the light emission is stronger, the degree of “on” is stronger, “on” time of switch module 5L0380R decreases, output voltage begins to decrease; when sampling voltage is less than 2.5V (that is, output voltage is low), LM431 cuts off, “on” time of VEPR22 increases, output voltage increases, thus, through the auto control function of feedback loop, power board outputs stable voltage.

(9) Filter circuit: the function of it is to generate a stable and small ripple DC voltage. “ ⊓⊓ " filter is mostly used in filter circuit. The feature of capacitor filtering is that when load resistance is high and current is small, the filtering is obvious; for inductor filtering, when load resistance is small and current is big, filtering is obvious. Form capacitor to “⊓⊓ “ filter and it can exert better filtering effect.

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

(1) FL+, FL-: supply power for filament of panel display screen.

(2) D+5V: supply power for N101, servo drive chip U302 (D5954) and open/close door circuit.

(3) P+28V: supply power for audio power amplifying chip N13, N14 (TAS5112).

(4) A-10V, A+10V: supply power for audio power amplifying chip N1 (F4558) on power amplifier board. A+12V: supply power for tuning data processing chip N6 (SAA6558) and tuner.

(5) D+3V3: supply power for U201 (MT1389), U214 (FLASH), U211 (SDRAM) and U205 (74HCU04).

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

(7) A+5V (XS504 pin 1): supply power for power amplifier board A/D conversion chip N7 (CS5340), digital audio pulse width modulating chip N12 (TAS5508), power amplifier board data selection chip N5 (CD4052), audio power amplifying chip N8 and N9 (TLV272).

# Section Three Service Cases

## 3.3.1 Servicing cases

【Example 1】Symptom: power not on

Description: connect with power, power indicator light is not on and the player cannot be switched on.

Analysis and troubleshooting: test power board 5V, 3.3V voltage and they are both normal, check decode board 1389 chip power supply and it is 3.3V, 1.8V, which is normal; then use oscillograph to check the crystal oscillator that provides 1389 chip with 27MHZ clock frequency; check oscillation frequency and this frequency is on lower side, so we doubt that the crystal oscillator has trouble; after changing it, trouble is removed.

【Example 2】Symptom: not read DVD disc

Description: laser head focus, feed, main axis and trace are all normal, but no light emission

Analysis and troubleshooting: disconnect power supply, use multimeter to check triode Q301 and it is not damaged; LD02 and 1389HD communication is normal; power on and check working of V301 and find that V301 emitter electrode has no 3.3V power; check 3.3V power of the player and it is normal; seeing from circuit diagram, 3.3V is added to V301 emitter electrode through R301, so we doubt that the trouble is caused by R301; use resistance level (2K) of multimeter to test and find that resistance value is infinite; after changing it, V301 emitter electrode is 3.3V, which is normal, laser head emits DVD laser light normally, and trouble is removed.

【Example 3】Symptom: front power amplifier has no sound output

Description: mixed sound output of DVD AV board is normal, front power amplifier has no sound output.

Analysis and troubleshooting: use multimeter to test voltage of pin 1 of power board XS101 and it is 28V, which is normal; then test pin 1 voltage of CON4 on power amplifier board and it is also +28V, so we may judge that IC power supply is normal; use oscillograph to test whether vertical screen-shielded filtering inductor L2, L3 have waveform and find there is no waveform output, so we judge that power amplifier IC N14 may be invalid; after changing N14, trouble is removed.

【Example 4】Symptom: waveform is small

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

Analysis and troubleshooting: left and right output waveform of mixed audio terminal are both small, when this situation appears, the possibility for the element commonly used by two branch terminals is large. Firstly check whether the flat cable between AV board and power amplifier board is well connected or disconnected, after removing the above factor, check power supply on IC with location number N8, N9 on power amplifier board and they are both +5V, N12 power supply is 3.3V, which is normal; check flat cable between power amplifier board and decode board and it is also normal; check audio signal AD conversion voltage ADACVDD3 and it is 2.4V, which is slightly small, which should be 3.3V in normal conditions; check and find that resistance on two ends of C235, C231 are infinite, so seeing from this, L207 has damaged; after changing it, trouble is removed.

【Example 5】Symptom: headphone has no sound

Description: after inserting headphone, two sides of headphone have no sound

Analysis and troubleshooting: after inserting headphone, test voltage of pin 8 on pow amplifier board X104 and it is 0, which is normal; test pin 8 voltage of N11, N8, N9 and it is +5V, which is also normal; then check pin 36 of N12 and voltage is 0, this pin is IC power supply pin and it should be 3.3V in normal conditions; use multimeter to test R113 resistance and it is infinite, this resistor has trouble; after changing it, trouble is removed.

【Example 6】Symptom: tuning has no sound

Description: when tuning, connect left channel of power amplifier and there is no sound output.

Analysis and troubleshooting: adjust in tuning state firstly, use probe of oscillograph to test pin 3, 13 of N15 and find that there is audio signals; then test pin 4 of N7 and there is no audio signals; but test pin 10, 12 and there is audio signals. Observe and find that N7 is invalid; after changing N7, trouble is removed.

【Example7】Symptom: the player not power on

Description: connect with power, blue power indicator light is on, red standby indicator light also emits light; press POWER button on the panel and the player cannot start up, red indicator light will not flash and is in standby state all the time.

Analysis and troubleshooting: check STBY signal at the moment of power on according to symptom and there will be a pulse without abnormality; seeing from this, tis trouble should lie in standby control circuit of panel; check CPU5V power voltage and it is normal; when pressing POWER button to switch on the player, check STBY signal from decode board to power board and there is no change; check power light touch switch and it is not damaged; test pin 39 of panel IC6317, after pressing POWER button, there is no 5V voltage, so we confirm that trouble should be caused by panel IC; after changing panel IC6312, trouble is removed.

【Example 8】Symptom: no MIC

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

Analysis and troubleshooting: insert microphone and speak, use probe of oscillograph to test pin 7 of power amplifier board N1 and there is signal output; test pin 3, 13 of N5 and there is also signals; test pin 4 of N7 and there is signals; check flat cable pin 28 between power amplifier board and decode board and there is also signal; but test pin 215 of MT1389 and there is no signal; judging from this, R268 is disconnected, after changing it, trouble is removed.

【Example 9】Symptom: remote control has no function

Description: when pressing remote controller, there is not any function.

Analysis and troubleshooting: insert probe of oscillograph into pin 12 of decode board XP900; when pressing remote controller, there is not any response on oscillograph, which means remote control signals are not received; check L233, R230 and find that there is no disconnection and joint welding; contact probe with pin 1 of N102 receiver on main panel, press remote controller and there is signal skipping, which means receiver has no trouble; then connect to pin 2 of N101, press remote controller and there is no signal skipping on oscillograph; carefully observe and find that R110 has rosin joint; after welding again, trouble is removed.

【Example 10】Symptom: power amplifier has no sound

Description: line output sound is normal, when switching to tuning state, there is no sound output; after power on of this player, switch on power amplifier volume, power amplifier output has small noise.

Analysis and troubleshooting: the symptom has indicated that trouble lies in the common channel around power amplifier; check SD signal of power amplifier IC and it is 0V all the time, now power amplifier IC has been in over-current or over-heat protection state; use multimeter to test voltage to ground of each lead wire of power amplifier output end and find that voltage to ground of subwoofer channel are 9V and 5V (14.5V in normal conditions); take down L10 of this channel and test, sound restores to be normal, so we confirm that trouble is caused by L10, after changing it, trouble is removed.

【Example 11】Symptom: no OSD

Description: connect with power, panel indicator light emits light normally, press POWER button and the player starts up normally, video signal output is normal, but there is no OSD.

Analysis and troubleshooting: check display screen filament and it has ben lighted with red light emission, but without function display; use multimeter to test panel IC power supply and voltage around and they are normal; test CLK, STB, SDA signal from decode board to main panel and they are normal; test pin of main panel IC 6317 and there is no SDA signal; check main panel R112 and there is no abnormality; test resistance to ground of pin 5, 6 of panel IC 6317 and it is 1.5-ohm; after changing 6317, trouble is removed.

## 3.3.2 Troubleshooting flow chart

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

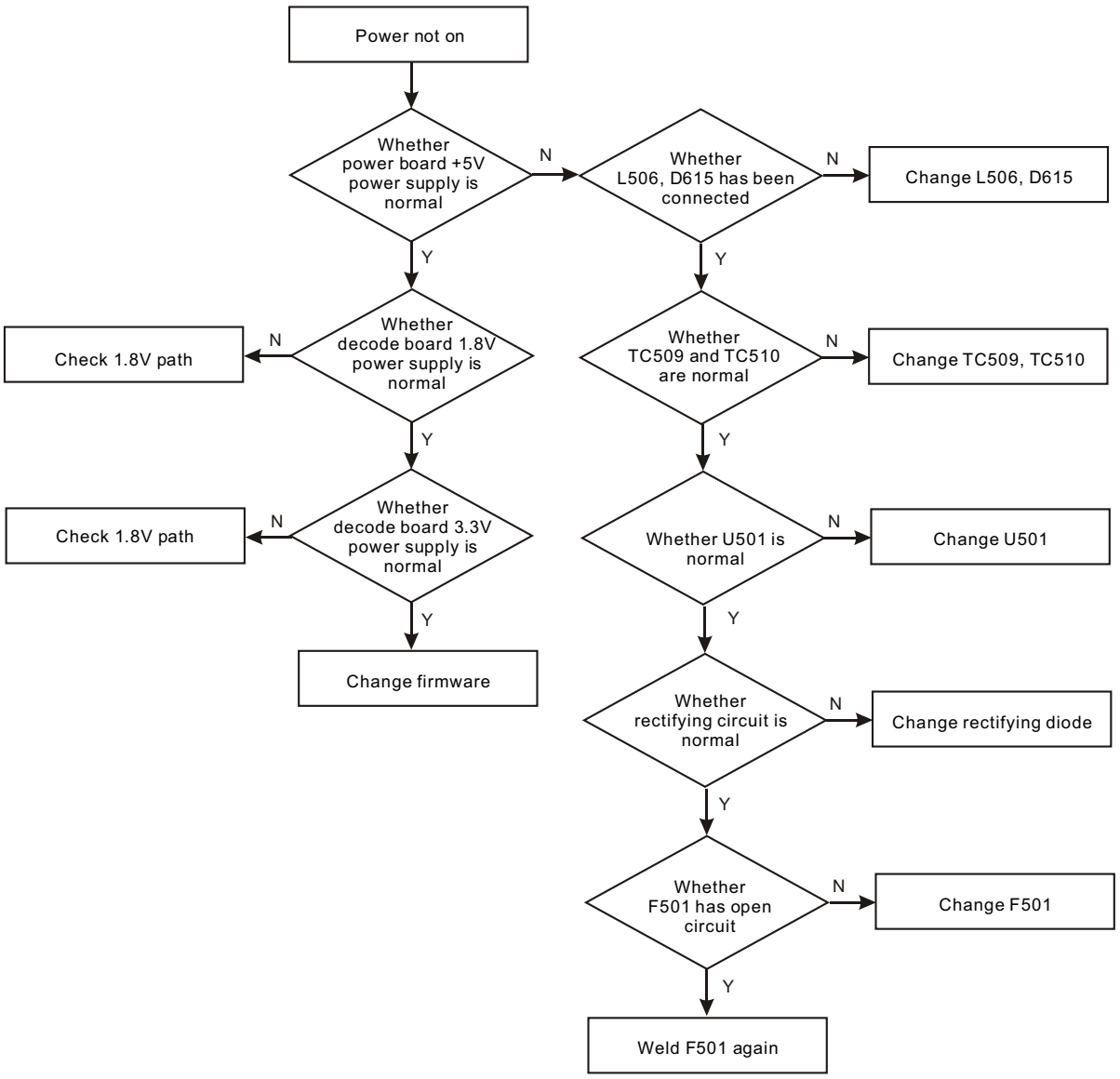



Figure 3.3.2.1 Troubleshooting flow chart for “Power not on”

2. Troubleshooting process for “Power amplifier has no output” is shown in the figure 3.3.2.2:

Figure 3.3.2.2 Troubleshooting flow chart for “Power amplifier has no output”

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

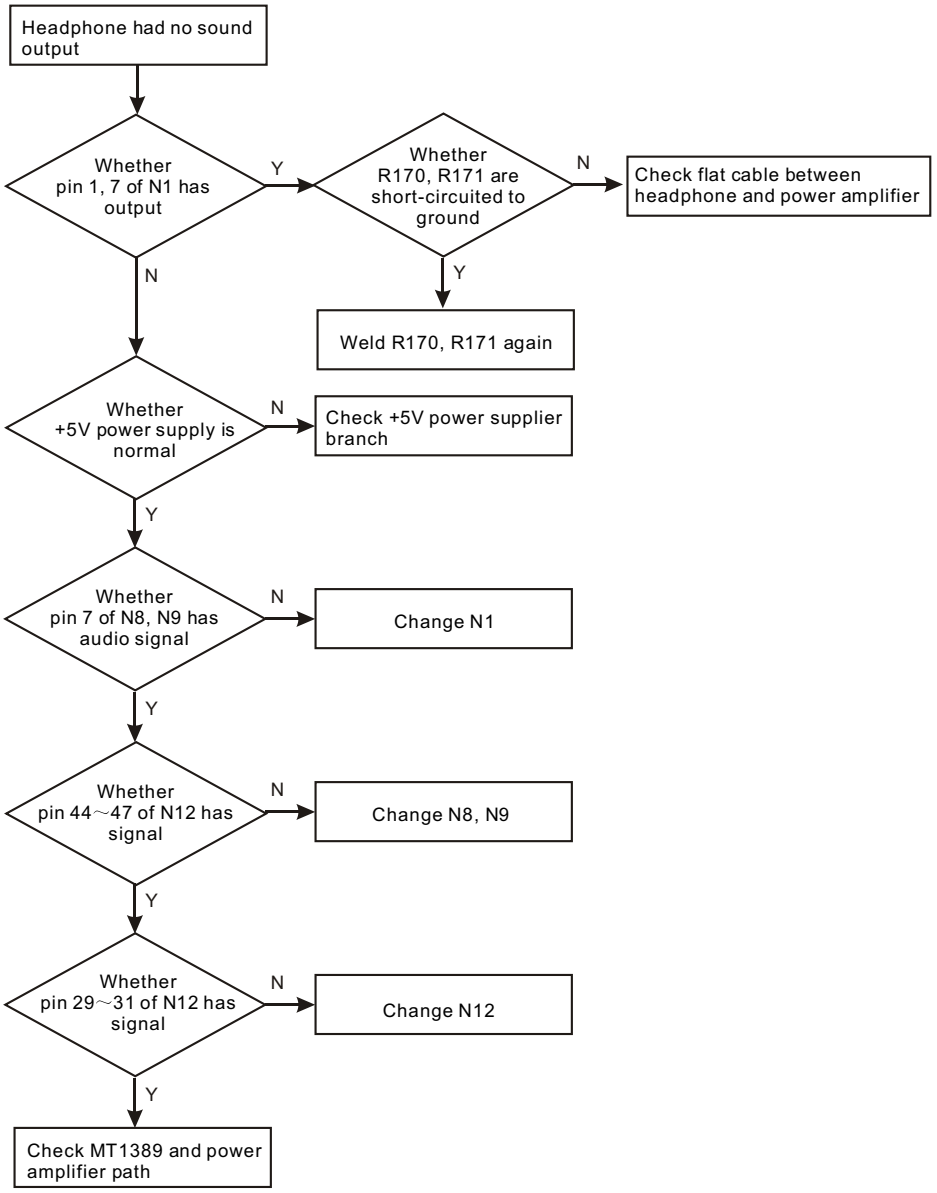



Figure 3.3.2.3 Troubleshooting flow chart for “Headphone has no sound output”

4. Troubleshooting process for “Power amplifier external input has no sound” is shown in the figure 3.3.2.4:

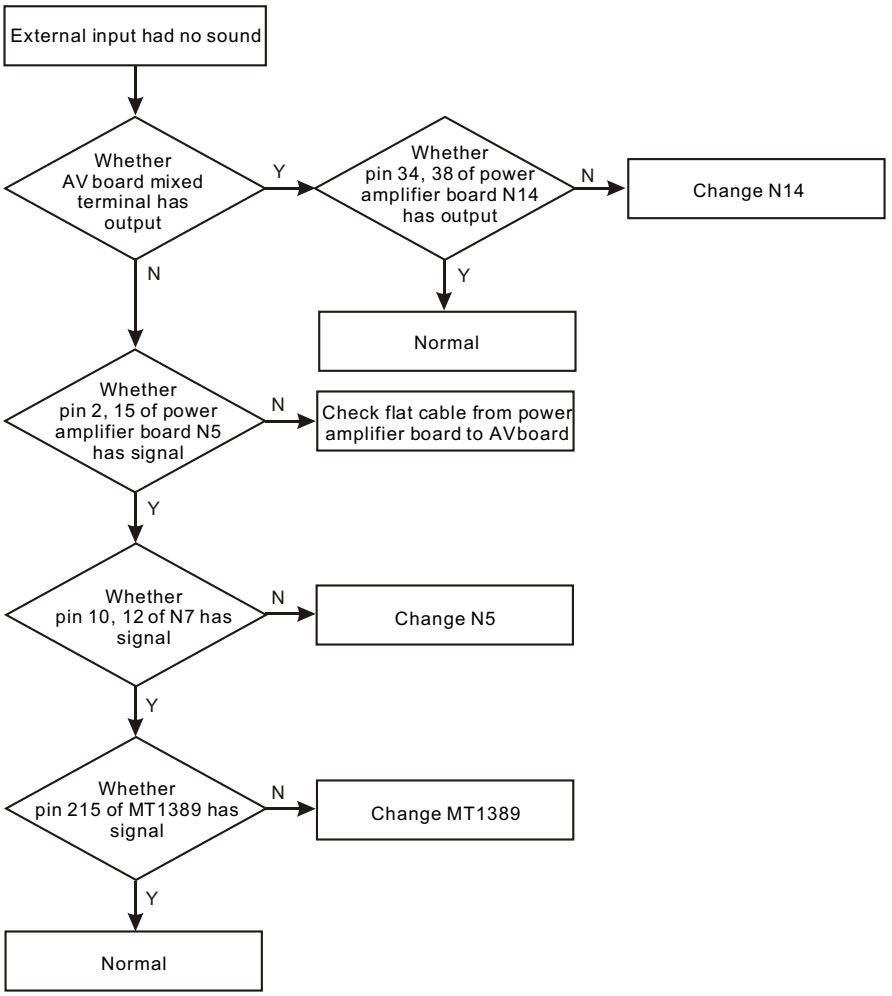



Figure 3.3.2.4 Troubleshooting flow chart for “Power amplifier external input has no sound”

5. Troubleshooting process for “Not read disc” is shown in the figure 3.3.2.5:

Figure 3.3.2.5 Troubleshooting flow chart for “Not read disc”

6. Troubleshooting process for “Power not on for the player” is shown in the figure 3.3.2.6:

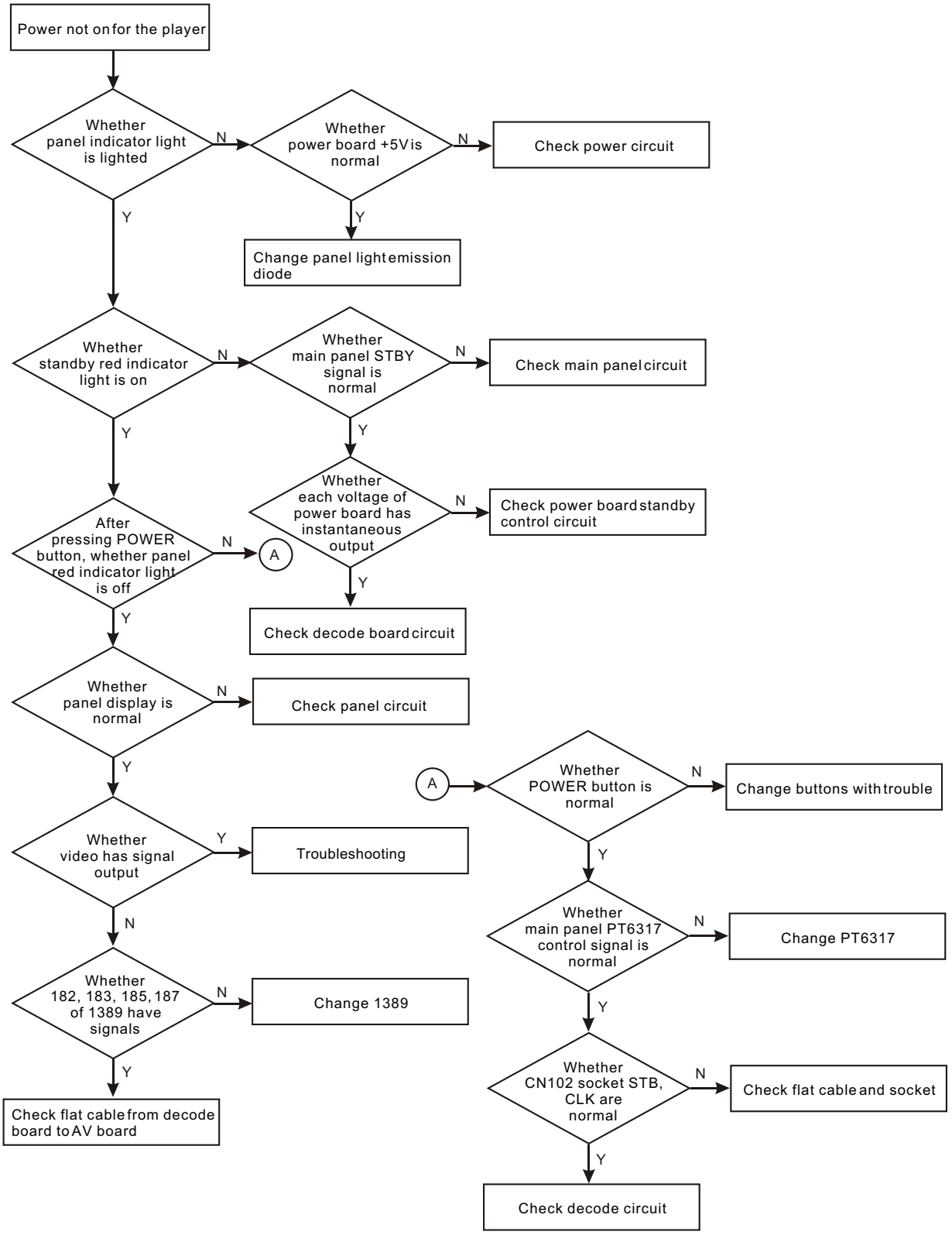
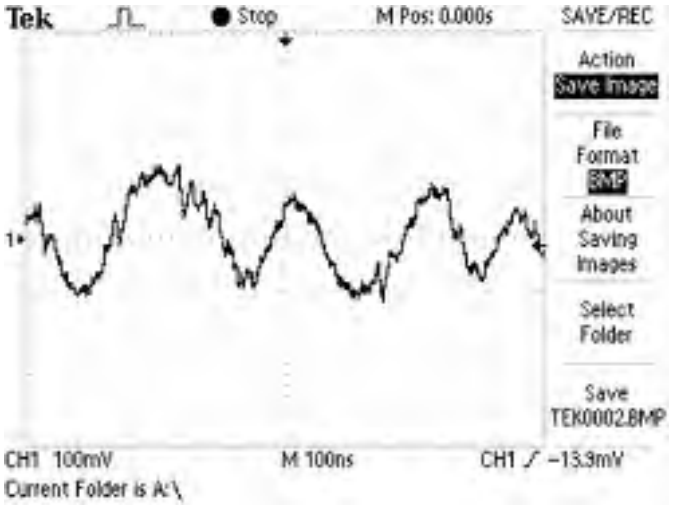



Figure 3.3.2.6 Troubleshooting flow chart for “Power not on for the player”

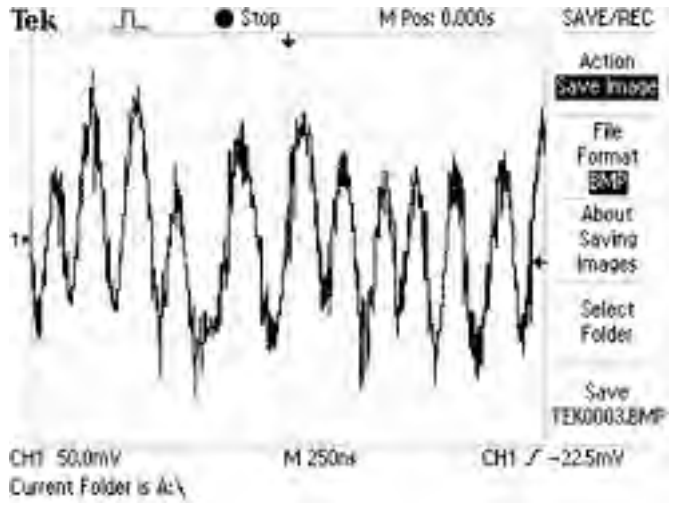
# Section Four Waveform diagram

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

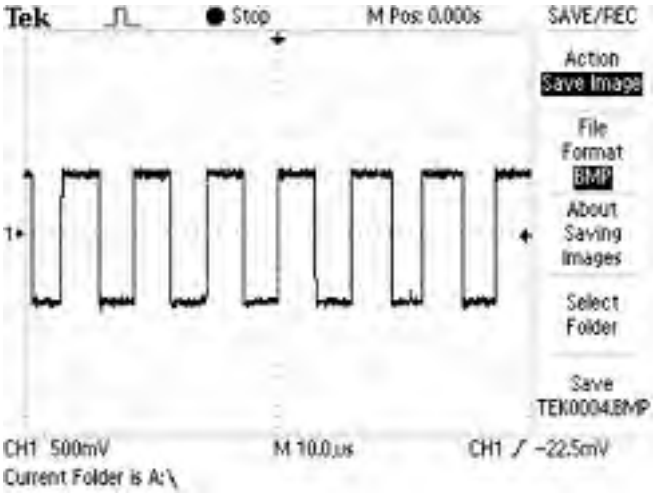
1. RFO signal waveform diagram of pin 17 of Xs301



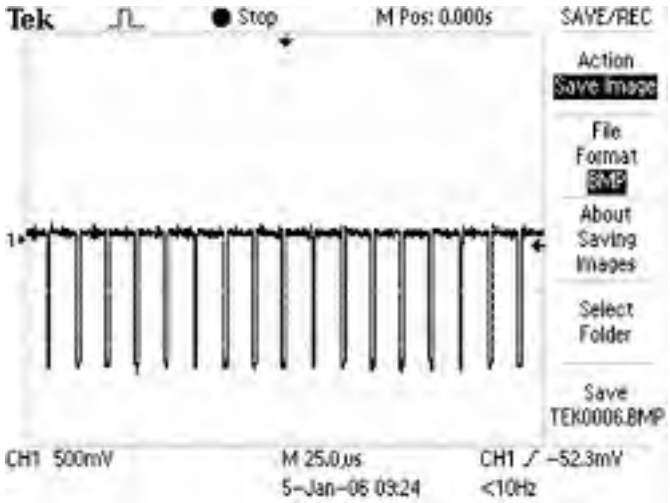

2. A signal waveform diagram of pin 16 of XS301(B、C、D、E、F）



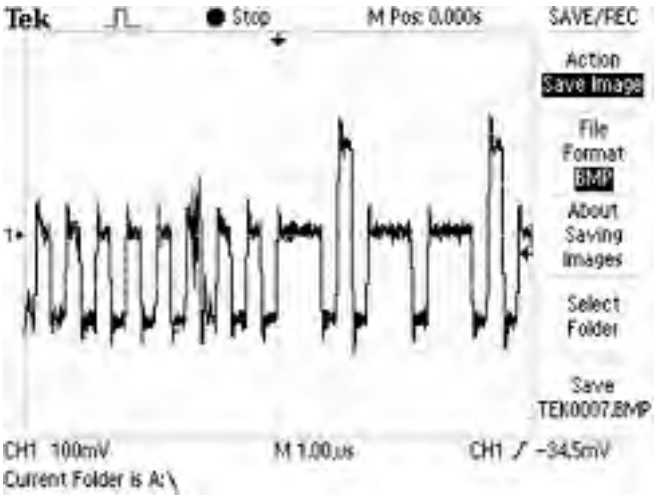
3. DMO signal (when there is main axis rotation) waveform diagram of pin 37 of U201 (MT1389)



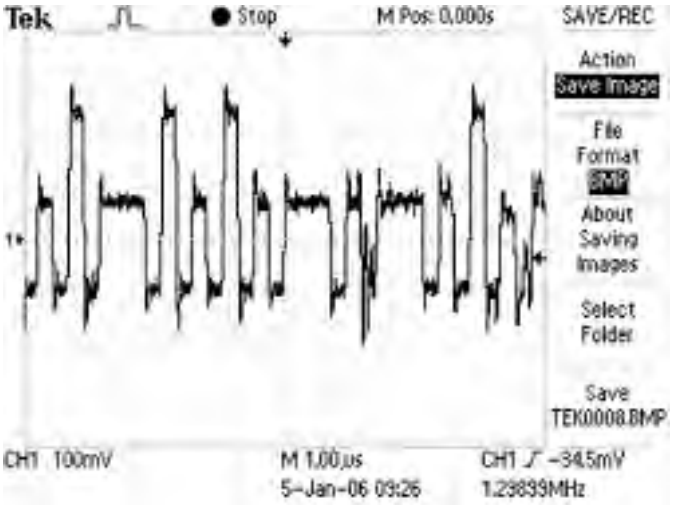

4. FMO signal (when there is feed) waveform diagram of pin 38 of U201 (MT1389)



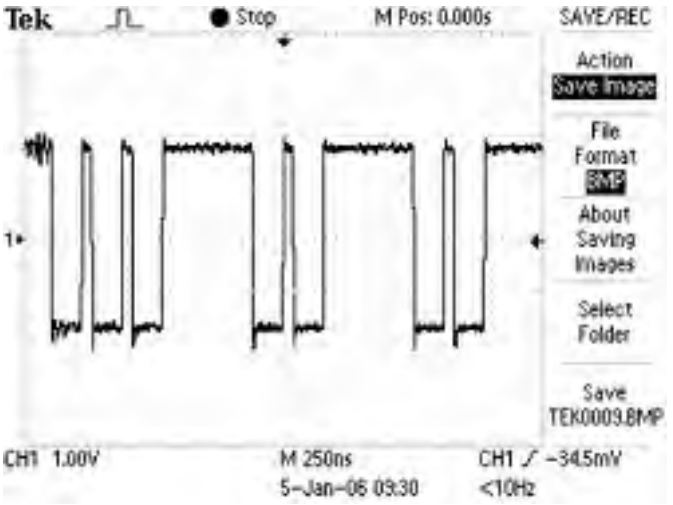

5. TRO signal (when there is trace) waveform diagram of pin 41 of U201 (MT1389)



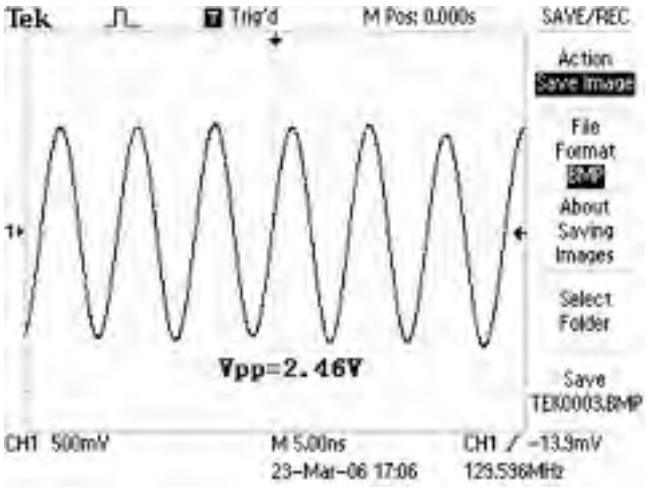
6. FOO signal (when there is focus) waveform diagram of pin 42 of U201 (MT1389)



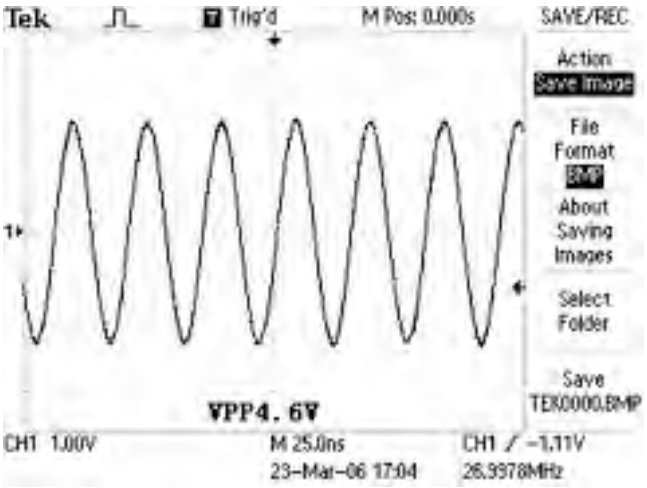

7. Waveform diagram of pin 29 (when no disc in) of U214 (FLASH)



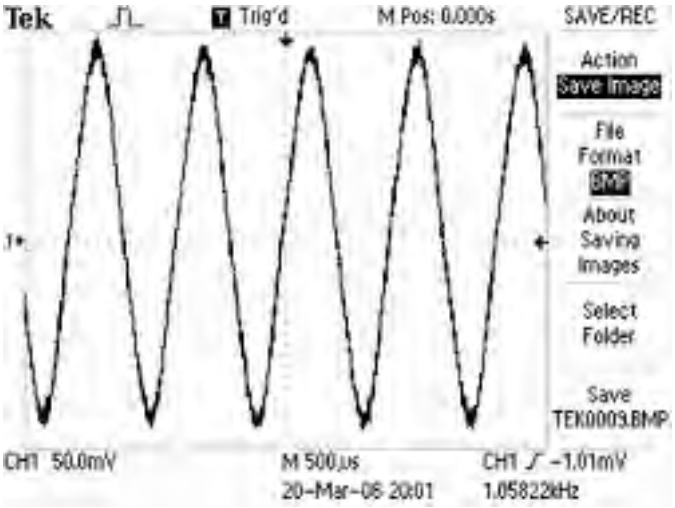

8. Waveform diagram of pin 38of U211 (SDRAM)



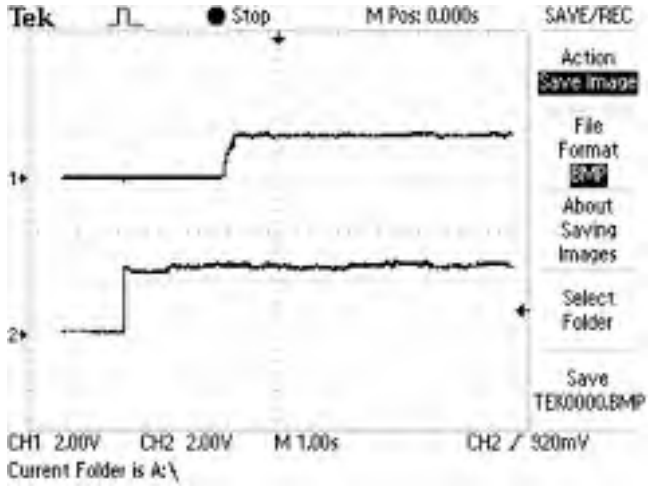
9. 27M clock signal waveform diagram



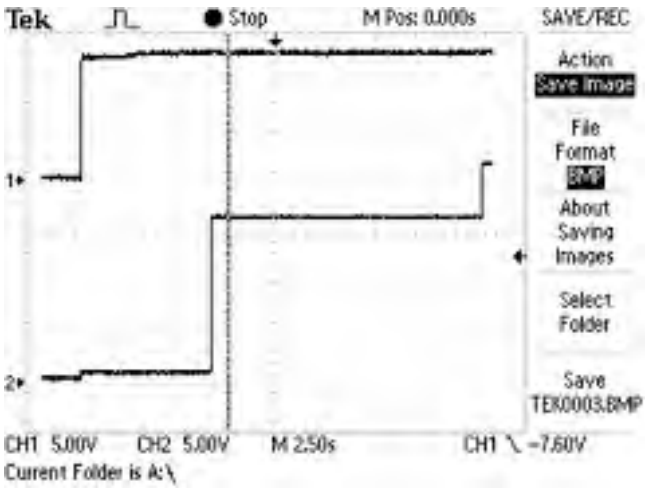

10. 1KHZ signal waveform diagram. It is suggested to use test disc, if not, the tested waveform will change at any time to affect judgment.



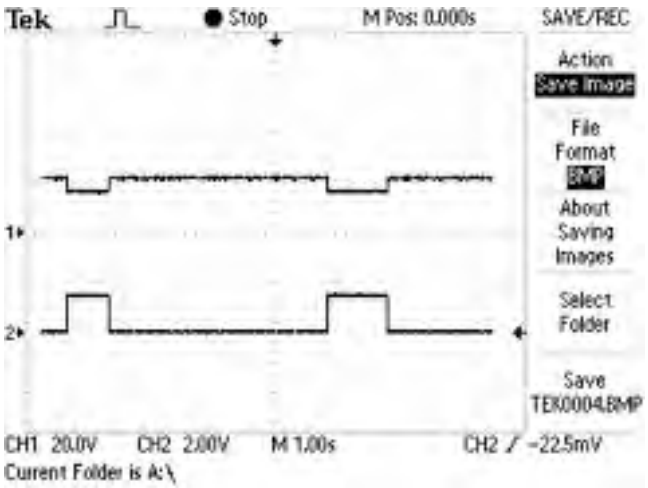

11. Waveform diagram of the comparison between reset signal (channel 1) and 3.3V voltage (channel 2)



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




13. Waveform diagram of the comparison between LRSWM signal (channel 1) and LRSWMUT signal (channel 2). When turning on mute, 1389 sends out low level signal LRSWMUT more than 310ms to make LRSWM signal level pull down and output mute. 1389 is muted from inside to make all channels have no output. Mute means of centre/surround channel is the same with that of main channel.



# Section Five Function Introduction to IC

## 3.5.1 Function introduction to MT1389HD

**1. Description**

MT1389HD (U201) is a cost-effective DVD system-on-chip (SOC) which incorporates advanced features like MPEG-4 video decoder, high quality TV encoder and state-of-art de-interlace processing.

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

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

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

**2. General Feature lists**

(1)Integration DVD player single chip

High performance analog RF amplifier

Servo controller and data channel processing

MPEG-1/MPEG-2/JPEG video

Dolby AC-3/DTS Decoder

Unified memory architecture

Versatile video scaling & quality enhancement

OSD & Sub-picture

Built-in clock generator

Built-in high quality TV encoder

Built-in progressive video processor

Audio effect post-processor

Built-in 5.1-ch Audio DAC

(2)High Performance A nalog RF Amplifier

Programmable fc

Dual automatic laser power control

Defect and blank detection

RF level signal generator

(3)Speed Performance on Servo/Channel Decoding

DVD-ROM up to 4XS

CD-ROM up to 24XS

(4)Channel Data Processor

Digital data slicer for small jitter capability

Built-in high performance data PLL for channel data demodulation

EFM/EFM+ data demodulation

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

(5)Servo Control and Spindle Motor Control

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

Built-in ADCs and DACs for digital servo control

Provide 2 general PWM

Tray control can be PWM output or digital output

(6)Embedded Micro controller

Built-in 8032 micro controller

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

1024-bytes on-chip RAM

Up to 2M bytes FLASH-programming interface

Supports 5/3.3-Volt. FLASH interface

Supports power-down mode

Supports additional serial port

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

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

Automatic sector Mode and Form detection

Automatic sector Header verification

Decoder Error Notification Interrupt that signals various decoder errors

Provide error correction acceleration

(8)Buffer Memory Controller

Supports 16Mb/32Mb/64Mb SDRAM

Supports 16-bit SDRAM data bus

Provides the self-refresh mode SDRAM

Block-based sector addressing

(9)Video Decode

Decodes MPEG1 video and MPEG2 main level, main profile video (720/480 and 720x576)Decodes MPEG-4 Advanced Simple Profile

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

Support Nero-Digital

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

Baseline, extended-sequential and progressive JPEG image decoding

Support CD-G titles

(10)Video/OSD/SPU/HLI Processor

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

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

256/16 color RLC format OSD

Automatic scrolling of OSD image

(11)Audio Effect Processing

Dolby Digital (AC-3)/EX decoding

DTS/DTS-ES decoding

MPEG-1 layer 1/layer 2 audio decoding

MPEG-2 layer1/layer2 2-channel audio

High Definition Compatible Digital (HDCD)

Windows Media Audio (WMA)

Dolby ProLogic II

Concurrent multi-channel and downmix out

IEC 60958/61937 output

PCM / bit stream / mute mode

Custom IEC latency up to 2 frames

Pink noise and white noise generator

Karaoke functions

Microphone echo

Microphone tone control

Vocal mute/vocal assistant

Key shift up to +/- 8 keys

Chorus/Flanger/Harmony/Reverb

Channel equalizer

3D surround processing include virtual surround and speaker separation

(12)TV Encoder

Four 108MHz/12bit DACs

Support NTSC, PAL-BDGHINM, PAL-60

Support 525p, 625p progressive TV format

Automatically turn off unconnected channels

Support PC monitor (VGA)

Support Macrovision 7.1 L1, Macrovision 525P and 625P

CGMS-A/WSS

Closed Caption

(13)Progressive Scan Video

Automatic detect film or video source

3:2 pull down source detection

Advanced Motion adaptive de-interlace

Minimum external memory requirement

(14)Outline

216-pin LQFP package

3.3/1.8-Volt. Dual operating voltages

### 3. Pin Definitions

| PIN | Main | Alt | Type | Description |
|---|---|---|---|---|
| **RF interface (26)** | | | | |
| 231 | RFGND18 | | Ground | Analog ground |
| 132 | RFVDD 18 | | Power | Analog power 1.8V |
| 252 | OSP | | Analog output | RF Offset cancellation capacitor connecting |
| 253 | OSN | | Analog output | RF Offset cancellation capacitor connecting |
| 254 | RFGC | | Analog output | RF AGC loop capacitor connecting for DVD-ROM |
| 255 | IREF | | Analog input | Current reference input. It generates reference current for RF path. Connect an external 15K resistor to this pin and AVSS |
| 256 | AVDD3 | | Power | Analog power 3.3V |
| 1 | AGND | | Ground | Analog ground |
| 2 | DVDA | | Analog input | AC couple input path A |
| 3 | DVDB | | Analog input | AC couple input path B |
| 4 | DVDC | | Analog input | AC couple input path C |
| 5 | DVDD | | Analog input | AC couple input path D |
| 6 | DVDRFIP | | Analog input | AC coupled DVD RF signal input RFIP |
| 7 | DVDRFIN | | Analog input | AC coupled DVD RF signal input RFIN |
| 8 | MA | | Analog input | DC coupled main beam RF signal input A |

| | | | | |
|---|---|---|---|---|
| 9 | MB | | Analog input | DC coupled main beam RF signal input B |
| 10 | MC | | Analog input | DC coupled main beam RF signal input C |
| 11 | MD | | Analog input | DC coupled main beam RF signal input D |
| 12 | SA | | Analog input | DC coupled sub-beam RF signal output A |
| 13 | SB | | Analog input | DC coupled sub-beam RF signal output B |
| 14 | SC | | Analog input | DC coupled sub-beam RF signal output C |
| 15 | SD | | Analog input | DC coupled sub-beam RF signal output D |
| 16 | CDFON | | Analog input | CD focusing error negative input |
| 17 | CDFOP | | Analog input | CD focusing error positive input |
| 18 | TNI | | Analog input | 3 beam satellite PD signal negative input |
| 19 | TPI | | Analog input | 3 beam satellite PD signal positive input |
| **ALPC (4)** | | | | |
| 20 | MIDI1 | | Analog input | Laser power monitor input |
| 21 | MIDI2 | | Analog input | Laser power monitor input |
| 22 | LDO2 | | Analog output | Laser driver output |
| 23 | LDO1 | | Analog output | Laser driver output |
| **ADC Power ( 2 )** | | | | |
| 244 | ADCVDD3 | | Power | Analog 3.3V Power for ADC |
| 245 | ADCVSS | | Ground | Analog ground for ADC |
| **VPLL (3)** | | | | |
| 43 | VPLLVSS | | Ground | Analog ground for VPLL |
| 44 | CAPPAD | | Analog Inout | VPLL External Capacitance connection |
| 45 | VPLLVDD3 | | Power | Analog 3.3V Power for VPLL |
| **Reference voltage (3)** | | | | |
| 28 | V2REFO | | Analog output | Reference voltage 2.8V |
| 29 | V20 | | Analog output | Reference voltage 2.0V |
| 30 | VREFO | | Analog output | Reference voltage 1.4V |
| **Analog monitor output (7)** | | | | |
| 24 | SVDD3 | | Power | Analog power 3.3V |
| 25 | CSO | RFOP | Analog output | 1) Central servo<br>2) Positive main beam summing output |
| 26 | RFLVL | RFON | Analog output | 1) RFRP low pass, or<br>2) Negative main beam summing output |
| 27 | SGND | | Ground | Analog ground |

| | | | | |
|---|---|---|---|---|
| 31 | FEO | | Analog output | Focus error monitor output |
| 32 | TEO | | Analog output | Tracking error monitor output |
| 33 | TEZISLV | | Analog output | TE slicing Level |
| **Analog monitor output (6)** | | | | |
| 246 | RFVDD3 | | Analog output | Analog Power |
| 247 | RFRPDC | | Analog Input | RF ripple detect output |
| 248 | RFRPAC | | Analog output | RF ripple detect input(through AC-coupling) |
| 249 | HRFZC | | Analog output | High frequency RF ripple zero crossing |
| 250 | CRTPLP | | Analog output | Defect level filter capacitor connecting |
| 251 | RFGND | | Ground | Analog Power |
| **RF Data PLL Interface (9)** | | | | |
| 235 | JITFO | | Analog output | Output terminal of RF jitter meter |
| 236 | JITFN | | Analog Input | Input terminal of RF jitter meter |
| 237 | PLLVSS | | Ground | Ground pin for data PLL and related analog circuitry |
| 238 | IDACEXLP | | Analog output | Data PLL DAC Low-pass filter |
| 239 | PLLVDD3 | | Power | Power pin for data PLL and related analog circuitry |
| 240 | LPFON | | Analog Output | Negative output of loop filter amplifier |
| 241 | LPFIP | | Analog input | Positive input terminal of loop filter amplifier |
| 242 | LPFIN | | Analog input | Negative input terminal of loop filter amplifier |
| 243 | LPFOP | | Analog output | Positive output of loop filter amplifier |
| **Motor and Actuator Driver Interface (10)** | | | | |
| 34 | OP_OUT | | Analog output | Op amp output |
| 35 | OP_INN | | Analog input | Op amp negative input |
| 36 | OP_INP | | Analog input | Op amp positive input |
| 37 | DMO | | Analog output | Disk motor control output. PWM output |
| 38 | FMO | | Analog output | Feed motor control. PWM output |
| 39 | TROPENPWM | | Analog output | Tray PWM output/Tray open output |
| 40 | PWMOUT1 | ADIN0 | Analog output | 1) 1st General PWM output<br>2) AD input 0 |
| 41 | TRO | | Analog output | Tracking servo output. PDM output of tracking servo compensator |
| 42 | FOO | | Analog output | Focus servo output. PDM output of focus servo compensator |

| | | | | |
|---|---|---|---|---|
| 50 | FG<br>(Digital pin) | ADIN1<br>GPIO | LVTTL3.3 Input,<br>Schmitt input, pull up,<br>with analog input path<br>for ADIN1 | 1) Monitor hall sensor input<br>2) AD input 1<br>3) GPIO |
| **General Power/Ground (18)** | | | | |
| 55<br>93<br>142<br>160<br>174<br>213 | DVDD18 | | Power | 1.8V power pin for internal digital circuitry |
| 81<br>178 | DVSS | | Ground | 1.8V ground pin for internal digital circuitry |
| 65<br>96<br>118<br>131<br>145<br>156<br>170<br>208 | DVDD3 | | Power | 3.3V power pin for internal digital circuitry |
| 90<br>148 | DVSS | | Ground | 3.3V ground pin for internal digital circuitry |
| **Micro Controller and Flash Interface (48)** | | | | |
| 62 | HIGHA0 | | InOut 4~16mA,SRPU | Microcontroller address 8 |
| 74 | HIGHA1 | | InOut 4~16mA,SRPU | Microcontroller address 9 |
| 73 | HIGHA2 | | InOut 4~16mA,SRPU | Microcontroller address 10 |
| 72 | HIGHA3 | | InOut 4~16mA,SRPU | Microcontroller address 11 |
| 71 | HIGHA4 | | InOut 4~16mA,SRPU | Microcontroller address 12 |
| 70 | HIGHA5 | | InOut 4~16mA,SRPU | Microcontroller address 13 |
| 69 | HIGHA6 | | InOut 4~16mA,SRPU | Microcontroller address 14 |
| 68 | HIGHA7 | | InOut 4~16mA,SRPU | Microcontroller address 15 |
| 89 | AD7 | | InOut 4~16mA,SRPU | Microcontroller address/data 7 |
| 86 | AD6 | | InOut 4~16mA,SRPU | Microcontroller address/data 6 |
| 85 | AD5 | | InOut 4~16mA,SRPU | Microcontroller address/data 5 |

| | | | | |
|---|---|---|---|---|
| 84 | AD4 | | InOut 4~16mA,SRPU | Microcontroller address/data 4 |
| 83 | AD3 | | InOut 4~16mA,SRPU | Microcontroller address/data 3 |
| 82 | AD2 | | InOut 4~16mA,SRPU | Microcontroller address/data 2 |
| 80 | AD1 | | InOut 4~16mA,SRPU | Microcontroller address/data 1 |
| 79 | AD0 | | InOut 4~16mA,SRPU | Microcontroller address/data 0 |
| 92 | IOA 0 | | InOut 4~16mA,SRPU | Microcontroller address |
| 77 | IOA 1 | | InOut 4~16mA,SRPU | Microcontroller address 1/ IO |
| 56 | IOA 2 | | InOut 4~16mA,SRPU | Microcontroller address 2/ IO |
| 57 | IOA 3 | | InOut 4~16mA,SRPU | Microcontroller address 3/ IO |
| 58 | IOA 4 | | InOut 4~16mA,SRPU | Microcontroller address 4/ IO |
| 59 | IOA 5 | | InOut 4~16mA,SRPU | Microcontroller address 5/ IO |
| 60 | IOA 6 | | InOut 4~16mA,SRPU | Microcontroller address 6/ IO |
| 61 | IOA 7 | | InOut 4~16mA,SRPU | Microcontroller address 7/ IO |
| 67 | A16 | | InOut 4~16mA,SRPU | Flash address 16 |
| 91 | A17 | | InOut 4~16mA,SRPU | Flash address 17 |
| 63 | A18 | | InOut 4~16mA, SRPD,SMT | Flash address 18 /IO |
| 64 | A19 | | InOut 4~16mA, SRPD,SMT | Flash address 19 /IO |
| 75 | A20 | YUV0 | InOut 4~16mA, SRPD,SMT | 5) Flash address 20 /IO<br>6) While External Flash size <= 1MB:<br>I) Alternate digital video YUV output 0 |
| 87 | A21 | YUV7<br>GPIO | InOut 4~16mA, SRPD,SMT | 7) Flash address 21 /IO<br>8) While External Flash size <= 2MB:<br>I) Digital video YUV output 7 II) GPIO |
| 88 | ALE | | InOut 4~16mA, SRPD,SMT | Microcontroller address latch enable |
| 78 | IOOE# | | InOut 4~16mA, SRPD,SMT | Flash output enable, active low / IO |
| 66 | IOWR# | | InOut 4~16mA, SRPD,SMT | Flash write enable, active low / IO |
| 76 | IOCS# | | InOut 4~16mA, SRPD,SMT | Flash chip select, active low / IO |
| 94 | UWR# | | InOut 4~16mA, SRPD,SMT | Microcontroller write strobe, active low |

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

| | | | | |
|---|---|---|---|---|
| 206 | SPLRCK | SDO0 | Inout | 1) Audio left/right channel clock of SPDIF input<br>2) While SPDIF input is not used:<br>I) Serial interface port 0 data-out II) GPIO |
| 207 | SPBCK | SDCS0<br>ASDATA<br>5 | Inout | 1) Audio bit clock of SPDIF input<br>2) While SPDIF input is not used:<br>I) Serial interface port 0 chip select<br>II) Audio serial data 5 part I : DSD data sub-woofer Channel or Microphone output III) GPIO |
| 209 | ALRCK | | InOut 4mA,<br>PD,SMT | 1) Audio left/right channel clock<br>2) Trap value in power-on reset:<br>I) 1: use external 373<br>II) 0: use internal 373 |
| 210 | ABCK | Fs64 | InOut 4mA,<br>SMT | 1) Audio bit clock<br>2) Phase de-modulation |
| 211 | ACLK | | InOut 4mA,<br>SMT | Audio DAC master clock |
| 197 | ASDATA0 | | InOut 4mA,<br>PD,SMT | 1) Audio serial data 0 (Front-Left/Front-Right)<br>2) DSD data left channel<br>3) Trap value in power-on reset:<br>I) 1: manufactory test mode<br>II) 0: normal operation<br>4) While using external channels: ) GPO_2 |
| 202 | ASDATA1 | | InOut 4mA,<br>PD,SMT | 2) Audio serial data 0 (Front-Left/Front-Right)<br>2) DSD data right channel<br>3) Trap value in power-on reset:<br>I) 1: manufactory test mode<br>II) 0: normal operation<br>4) While using external channels:<br>I) GPO_2 |
| 203 | ASDATA2 | | InOut 4mA,<br>PD,SMT | 1) Audio serial data 1 (Left-Surround/Right-Surround)<br>2) DSD data left surround channel<br>3) Trap value in power-on reset:<br>I) 1: manufactory test mode<br>II) 0: normal operation<br>4) While using external channels:<br>I) GPO_1 |

| | | | | |
|---|---|---|---|---|
| 212 | ASDATA3 | | InOut 4mA,<br>PD,SMT | 1) Audio serial data 2 (Center/LFE)<br>2) DSD data right surround channel<br>3) Trap value in power-on reset:<br>I) 1: manufactory test mode<br>II) 0: normal operation<br>4) While only 2 channels output:<br>I) GPO_0 |
| 214 | ASDATA4 | INT1# | InOut 4mA,<br>PD,SMT | 1) Audio serial data 3 (Center-back/<br>Center-left-back/Center-right-back, in 6.1 or 7.1 mode)<br>2) DSD data center channel<br>18) While only 2 channels output:<br>I) Digital video YUV output 6<br>II) GPIO |
| 215 | MC_DATA | INT2# | InOut 2mA,<br>PD,SMT | 1) Microphone serial input<br>2) While not support Microphone:<br>I) Microcontroller external interrupt 2<br>II) GPIO |
| 216 | SPDIF | | Output<br>4~16mA,<br>SR: ON/OFF | S/PDIF output |
| 217 | APLLVDD3 | | Power | 3.3V Power pin for audio clock circuitry |
| 218 | APLLCAP | | Analog inout | APLL External Capacitance connection |
| 219 | APLLVSS | | Ground | Ground pin for audio clock circuitry |
| 220 | ADACVSS2 | | Ground | Ground pin for AUDIO DAC circuitry |
| 221 | ADACVSS1 | | Ground | Ground pin for AUDIO DAC circuitry |
| 222 | ARF | | Output | 1) AUDIO DAC Sub-woofer channel output<br>2) While internal AUDIO DAC not used: GPIO |
| 223 | ARS | GPIO | Output | 1) AUDIO DAC Right Surround channel output<br>2) While internal AUDIO DAC not used:<br>a. SDATA3<br>b. GPIO |
| 224 | AR | GPIO | Output | 1) AUDIO DAC Right channel output<br>2) While internal AUDIO DAC not used:<br>a. SDATA1<br>b. GPIO |
| 225 | AVCM | | Analog | AUDIO DAC reference voltage |

| | | | | |
|---|---|---|---|---|
| 226 | AL | GPIO | Output | 1) AUDIO DAC Left Surround channel output<br>2) While internal AUDIO DAC not used:<br>a. SDATA2<br>b. GPIO |
| 227 | ALS | GPIO | Output | 1) AUDIO DAC Left Surround channel output<br>2) While internal AUDIO DAC not used:<br>a.SDATA0<br>b. GPIO |
| 228 | ALF | GPIO | Output | 1) AUDIO DAC Center channel output<br>2) While internal AUDIO DAC not used: GPIO |
| 229 | ADACVDD1 | | Power | 3.3V power pin for AUDIO DAC circuitry |
| 230 | ADACVDD2 | | Power | 3.3V power pin for AUDIO DAC circuitry |
| **Video Interface ( 18 )** | | | | |
| 196 | DACVDDC | | Power | 3.3V power pin for VIDEO DAC circuitry |
| 195 | VREF | | Analog | Bandgap reference voltage |
| 194 | FS | | Analog | Full scale adjustment |
| 193 | YUV0 | CIN | Output<br>4MA, SR | 1) Video data output bit 0<br>2) Compensation capacitor |
| 192 | DACVSSC | | Ground | Ground pin for VIDEO DAC circuitry |
| 191 | YUV1 | Y | Output<br>4MA, SR | 1) Video data output bit 1<br>2) Analog Y output |
| 190 | DACVDDB | | Power | 3.3V power pin for VIDEO DAC circuitry |
| 189 | YUV2 | C | Output<br>4MA, SR | 1) Video data output bit 2<br>2) Analog chroma output |
| 188 | DACVSSB | | Ground | Ground pin for VIDEO DAC circuitry |
| 187 | YUV3 | CVBS | Output<br>4MA, SR | 1) Video data output bit 3<br>2) Analog composite output |
| 186 | DACVDDA | | Power | 3.3V power pin for VIDEO DAC circuitry |
| 185 | YUV4 | Y/G | Output<br>4MA, SR | 1) Video data output bit 4<br>2) Green or Y |
| 184 | DACVSSA | | Ground | Ground pin for VIDEO DAC circuitry |
| 183 | YUV5 | B/Cb/Pb | Output<br>4MA, SR | 1) Video data output bit 5<br>2) Blue or CB |
| 182 | YUV6 | R/Cr/Pr | Output<br>4MA, SR | 1) Video data output bit 6<br>2) Red or CR |

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

| | | | | |
|---|---|---|---|---|
| 108 | PRST# | | InOut<br>PD,SMT | Power on reset input, active low |
| 107 | ICE | | InOut PD,SMT | Microcontroller ICE mode enable |
| 233 | XTALO | | Output | 27MHz crystal output |
| 234 | XTALI | | Input | 27MHz crystal input |
| 46 | USB_VSS | | USB Ground | USB ground pin |
| 47 | USBP | | Analog Inout | USB port DPLUS analog pin |
| 48 | USBM | | Analog Inout | USB port DMINUS analog pin |
| 49 | USB_VDD3 | | Analog Inout | USB Power pin 3.3V |
| 201 | GPIO3 | | InOut Pull-Down | GPIO |
| 200 | GPIO4 | | InOut Pull-Down | GPIO |
| 199 | RCLKB | GPIO5 | InOut Pull-Down | GPIO |
| 198 | RVREF | GPIO6 | InOut Pull-Down | GPIO |
| **Dram Interface (58) (Sorted by position)** | | | | |
| 176 | C_0 | IO_0(RD16) | InOut Non-pull | 1) Digital Video output C bit 0<br>2) GPIO |
| 175 | C_1 | IO_1(RD17) | InOut Non-pull | 1) Digital Video output C bit 1<br>2) GPIO |
| 173 | C_2 | IO_2(RD18) | InOut Non-pull | 1) Digital Video output C bit 2<br>2) GPIO |
| 172 | C_3 | IO_3(RD19) | InOut Non-pull | 1) Digital Video output C bit 3<br>2) GPIO |
| 171 | C_4 | IO_4(RD20) | InOut Non-pull | 1) Digital Video output C bit 4<br>2) GPIO |
| 169 | C_5 | IO_5(RD21) | InOut Non-pull | 1) Digital Video output C bit 5<br>2) GPIO |
| 168 | C_6 | IO_6(RD22) | InOut Non-pull | 1) Digital Video output C bit 6<br>2) GPIO |
| 167 | C_7 | IO_7(RD23) | InOut Non-pull | 1) Digital Video output C bit 7<br>2) GPIO |
| 177 | IO_17 | (DQM2) | InOut Pull- Up | GPIO |
| 166 | YUVCLK | IO_8(DQM3) | InOut Pull- Up | 1) Digital Video output Clock<br>2) GPIO |
| 165 | Y_0 | IO_9(RD24) | InOut Non-pull | 1) Digital Video output Y bit 0<br>2) GPIO |

| | | | | |
|---|---|---|---|---|
| 164 | Y_1 | IO_10(RD 25) | InOut Non-pull | 1) Digital Video output Y bit 1<br>2) GPIO |
| 163 | Y_2 | IO_11(RD 26) | InOut Non-pull | 1) Digital Video output Y bit 2<br>2) GPIO |
| 162 | Y_3 | IO_12(RD 27) | InOut Non-pull | 1) Digital Video output Y bit 3<br>2) GPIO |
| 161 | Y_4 | IO_13(RD 28) | InOut Non-pull | 1) Digital Video output Y bit 4<br>2) GPIO |
| 159 | Y_5 | IO_14(RD 29) | InOut Non-pull | 1) Digital Video output Y bit 5<br>2) GPIO |
| 158 | Y_6 | IO_15(RD 30) | InOut Non-pull | 1) Digital Video output Y bit 6<br>2) GPIO |
| 157 | Y_7 | IO_16(RD 31) | InOut Non-pull | 1) Digital Video output Y bit 7<br>2) GPIO |
| 155 | RA4 | | InOut | DRAM address 4 |
| 154 | RA5 | | InOut | DRAM address 5 |
| 153 | RA6 | | InOut | DRAM address 6 |
| 152 | RA7 | | InOut | DRAM address 7 |
| 151 | RA8 | | InOut | DRAM address 8 |
| 150 | RA9 | | InOut | DRAM address 9 |
| 149 | RA11 | | InOut | DRAM address bit 11 |
| 147 | CKE | | InOut Pull-Down | DRAM clock enable |
| 146 | RCLK | | InOut | Dram clock |
| 144 | RA3 | | InOut | DRAM address 3 |
| 143 | RA2 | | InOut | DRAM address 2 |
| 141 | RA1 | | InOut | DRAM address 1 |
| 140 | RA0 | | InOut | DRAM address 0 |
| 139 | RA10 | | InOut | DRAM address 10 |
| 138 | BA1 | | InOut | DRAM bank address 1 |
| 137 | BA0 | | InOut | DRAM bank address 0 |
| 136 | RCS# | | output | DRAM chip select, active low |
| 135 | RAS# | | output | DRAM row address strobe, active low |
| 134 | CAS# | | output | DRAM column address strobe, active low |
| 133 | RWE# | | output | DRAM Write enable, active low |

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

## 3.5.2 function introduction to AT24C02

1. Description

The AT24C02 (U202) provides 2048 bits of serial electrically erasable and programmable read-only memory (EEPROM) organized as 256 words of 8 bits each. The device is optimized for use in many industrial and commercial applications where low-power and low-voltage operation are essential. The AT24C02 is available in space-saving 8-lead PDIP,

8-lead MAP, 8 lead TSSOP and 8-ball 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(U209) 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 (U214) 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 (U211) 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 D5954

1. DESCRIPTION

D5954 (U302) 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 |

## 3.5.8 function introduction to 4558

1. Description

The RC4558 and RM4558 devices (N1) 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 |

## 3.5.9 function introduction to SN74LVC

1. Description

The SN74LVC16373A (N2) is particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

The device can be used as two 8-bit latches or one 16-bit latch. When the latch-enable (LE) input is high, the Q outputs follow the data (D) inputs. When LE is taken low, the Q outputs are latched at the levels set up at the D inputs.

2. FEATURES

- Operates From 1.65 V to 3.6 V
- Inputs Accept Voltages to 5.5 V
- Max $t_{pd}$ of 4.2 ns at 3.3 V
- Typical $V_{OLP}$ (Output Ground Bounce)

<0.8 V at $V_{CC}$ = 3.3 V, $T_A$ = 25 ° C

- Typical $V_{OHV}$ (Output $V_{OH}$ Undershoot)

>2 V at $V_{CC}$ = 3.3 V, $T_A$ = 25 ° C

- $I_{off}$ Supports Partial-Power-Down Mode Operation
- Supports Mixed-Mode Signal Operation

(5-V Input and Output Voltages With 3.3-V $V_{CC}$)

- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
- 2000-V Human-Body Model (A114-A)
- 1000-V Charged-Device Model (C101)

## 3.5.10 function introduction to 74HCT125

1. Description

The Harris CD74HC125 and CD74HCT125 contain 4 independent three-state buffers, each having its own output enable input, which when “HIGH” puts the output in the high impedance state.

2. FEATURES

◆ Three-State Outputs

◆ Separate Output Enable Inputs

◆ Fanout (Over Temperature Range)

Standard Outputs : 10 LSTTL Loads

Bus Driver Outputs: 15 LSTTL Loads

◆ Wide Operating Temperature Range . . . -55oC to 125oC

◆ Balanced Propagation Delay and Transition Times

◆ Significant Power Reduction Compared to LSTTL Logic ICs

◆ HC Types

2V to 6V Operation

High Noise Immunity: NIL = 30%, NIH = 30% of VCC at VCC = 5V

◆ HCT Types

4.5V to 5.5V Operation

Direct LSTTL Input Logic Compatibility, VIL= 0.8V (Max), VIH = 2V (Min)

CMOS Input Compatibility, Il £ 1mA at VOL, VOH

## 3.5.11 function introduction to CD4052

1. Description

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

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

2. FEATURES

◆ Wide Range of Digital and Analog Signal Levels

Digital : 3V to 20V

Analog: ≤20VP-P

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

- High OFF Resistance, Channel Leakage of ± 100pA (Typ) at $V_{DD}$-$V_{EE}$ = 18V
- Logic-Level Conversion for Digital Addressing Signals of 3V to 20V ($V_{DD}$-$V_{SS}$ = 3V to 20V) to Switch Analog Signals to 20VP-P ($V_{DD}$-$V_{EE}$ = 20V)
- Matched Switch Characteristics, $r_{ON}$ = 5W (Typ) for $V_{DD}$-$V_{EE}$ = 15V
- Very Low Quiescent Power Dissipation Under All Digital-Control Input and Supply Conditions, 0.2mW (Typ) at $V_{DD}$-$V_{SS}$ = $V_{DD}$-$V_{EE}$ = 10V
- Binary Address Decoding on Chip
- 5V, 10V and 15V Parametric Ratings
- 10% Tested for Quiescent Current at 20V
- Maximum Input Current of 1mA at 18V Over Full Package Temperature Range, 100nA at 18V and 25 ℃
- Break-Before-Make Switching Eliminates Channel Overlap

## 3.5.12 function introduction to SAA6588

1. DESCRIPTION

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

The RDS/RBDS system offers a large range of applications by its many functions to be implemented. For car radios the most important are:

- Program Service (PS) name
- Traffic Program (TP) identification
- Traffic Announcement (TA) signal
- Alternative Frequency (AF) list
- Program Identification (PI)
- Enhanced Other Networks (EON) information.

The RDS/RBDS pre-processor is a CMOS device that integrates all RDS/RBDS relevant functions in one chip. The IC contains filtering and demodulation of the RDS/RBDS signal, symbol decoding, block synchronization, error detection, error correction and additional detectors for multi-path, signal quality and audio signal pauses. The pre-processed RDS/RBDS information is available via the I2C-bus.

The RDS/RBDS pre-processor replaces a number of Ics and peripheral components used nowadays in car radio concepts with RDS or RBDS features. The integration of the relevant RDS/RBDS data processing functions provides, in an economic manner, high performance of RDS/RBDS processing and reduces the real-time requirements for the main radio microcontroller considerably. In addition it simplifies the development of the RDS specific software for the main controller of the radio set.

Compared with standard radio systems, RDS/RBDS controlled radio systems additionally require an RDS/RBDS demodulator with a 57 kHz band-pass filter, information about the current reception situation (reception quality, multi-path disturbance etc.), and additional microcontroller power for RDS/RBDS data processing, decoding and radio control.

The new RDS/RBDS pre-processor includes all these specific functions and meets all requirements of a high end RDS/RBDS radio. Moreover the timing requirements of the set controller, regarding RDS/RBDS data processing are reduced due to the integration of decoder functions, so that the development of radio control software can be concentrated specifically on radio set features.

## 2. FEATURES

- Integrated switched capacitor filters
- Demodulation of the European Radio Data System (RDS) or the USA Radio Broadcast Data System (RBDS) signal
- RDS and RBDS block detection
- Error detection and correction
- Fast block synchronization
- Synchronization control (flywheel)
- Mode control for RDS/RBDS processing
- Different RDS/RBDS block information output modes (e.g. A-block output mode)
- Fast I2C-bus interface
- Multi-path detector
- Signal quality detector with sensitivity adjustment
- Pause detector with pause level and time adjustment
- Alternatively oscillator frequency: n ´ 4.332 MHz (n = 1 to 4)
- UART compatible with 17.328 MHz (n = 4)
- CMOS device
- Single supply voltage
- Extended temperature range (-40 to +85 °C).

## 3. PIN DESCRIPTION

| PIN No. | Symbol | I/O | Description |
|---|---|---|---|
| 1 | MRO | O | multi-path rectifier output |
| 2 | MPTH | O | multi-path detector output |
| 3 | TCON | I | test control input pin |
| 4 | OSCO | O | oscillator output |
| 5 | OSCI | I | oscillator input |

| | | | |
|---|---|---|---|
| 6 | VSSD | I | digital ground (0 V) |
| 7 | VDDD | I | digital supply voltage (5 V) |
| 8 | DAVN | O | data available output (active LOW) |
| 9 | SDA | I/O | I2C-bus serial data I/O |
| 10 | SCL | I | I2C-bus serial clock input |
| 11 | PSWN | O | pause switch output (active LOW) |
| 12 | MAD | I | slave address (LSB) input |
| 13 | AFIN | I | audio signal input |
| 14 | VDDA | I | analog supply voltage (5 V) |
| 15 | VSSA | I | analog ground (0 V) |
| 16 | MPX | I | multiplex input signal |
| 17 | Vref | O | reference voltage output |
| 18 | SCOUT | O | band-pass filter output |
| 19 | CIN | I | comparator input |
| 20 | LVIN | I | level input |

## 3.5.13 function introduction to 5340

1. DESCRIPTION

The CS5340 (N7) 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.

3. PIN DESCRIPTION

| PIN No. | Symbol | I/O | Description |
|---|---|---|---|
| 1 | M0 | I | Mode selection 0 |
| 2 | MCLK | I | Master clock |
| 3 | VL | I | Logic power |
| 4 | SDOUT | O | Serial audio data output |
| 5 | GND | I | GND |
| 6 | VD | I | Digital power |
| 7 | SCLK | I | Serial clock |
| 8 | LRCK | I | Left right clock |
| 9 | /RST | I | Reset |
| 10 | AINL | I | Analog input L |
| 11 | VQ | O | Quiescent voltage |
| 12 | AINR | I | Analog input R |
| 13 | VA | I | Analog power |
| 14 | REF_GND | I | GND |
| 15 | FILT+ | I | Positive voltage reference |
| 16 | M1 | I | Mode selection 1 |

## 3.5.14 function introduction to TLV272

1. DESCRIPTION

The TLV27x (N8, N9) takes the minimum operating supply voltage down to 2.7 V over the extended industrial temperature range while adding the rail-to-rail output swing feature. This makes it an ideal alternative to the TLC27x family for applications where rail-to-rail output swings are essential. The TLV27x also provides 3-MHz bandwidth from only 550μA.

Like the TLC27x, the TLV27x is fully specified for 5-V and ±5-V supplies. The maximum recommended supply voltage is 16 V, which allows the devices to be operated from a variety of rechargeable cells (±8 V supplies down to ±1.35 V).

The CMOS inputs enable use in high-impedance sensor interfaces, with the lower voltage operation making an attractive alternative for the TLC27x in battery-powered applications.

All members are available in PDIP and SOIC with the singles in the small SOT-23 package, duals in the

MSOP, and quads in the TSSOP package.

The 2.7-V operation makes it compatible with Li-Ion powered systems and the operating supply voltage range of many micro power microcontrollers available today including TI's MSP430.

2. FEATURES

- ◆ Rail-To-Rail Output
- ◆ Wide Bandwidth . . . 3 MHz
- ◆ High Slew Rate . . . 2 .4 V/μs
- ◆ Supply Voltage Range . . . 2.7 V to 16 V
- ◆ Supply Current . . . 550 μA/Channel
- ◆ Input Noise Voltage . . . 39 nV/vHz
- ◆ Input Bias Current . . . 1 pA
- ◆ Specified Temperature Range

  0°C to 70°C . . . Commercial Grade

  -40°C to 125°C . . . Industrial Grade
- ◆ Ultrasmall Packaging

  8 Pin MSOP (TLV272)

## 3.5.15 function introduction to LM4880

1. DESCRIPTION

The LM4880 (N11) is a dual audio power amplifier capable of delivering typically 250mW per channel of continuous average power to an 8O load with 0.1% THD+N using a 5V power supply.

Boomer audio power amplifiers were designed specifically to provide high quality output power with a minimal amount of external components using surface mount packaging. Since the LM4880 does not require bootstrap capacitors or snubber networks, it is optimally suited for low-power portable systems.

The LM4880 features an externally controlled, low-power consumption shutdown mode, as well as an internal thermal shutdown protection mechanism.

The unity-gain stable LM4880 can be configured by external gain-setting resistors.

2. FEATURES

- ◆ No bootstrap capacitors or snubber circuits are necessary
- ◆ Small Outline (SO) and DIP packaging
- ◆ Unity-gain stable
- ◆ External gain configuration capability

## 3.5.16 function introduction to TAS5508PAG

1. DESCRIPTION

The TAS5508 (N12) is an eight channel digital pulse width modulator (PWM) that provides both advanced performance and a high level of system integration. The TAS5508 is designed to interface seamlessly with most audio digital signal processors. In crystal mode, the TAS5508 automatically adjusts control configurations in response to clock and data rate changes and idle conditions. This enables the TAS5508 to provide an easy to use control interface with relaxed timing requirements.

The TAS5508 can drive eight channels of H-bridge power stages. Texas Instruments H-bridge parts TAS5111, TAS5112, or TAS5182 + FETs are designed to work seamlessly with the TAS5508. The TAS5508 supports both single-ended or bridge tied load configurations. The TAS5508 also provides a high performance differential output to drive an external differential input analog headphone amplifier (such as the TPA112).

The TAS5508's uses an AD modulation operating at a 384-kHz switching rate for 48-, 96-, and 192-kHz data. The 8x over sampling combined with the 5th order noise shaper provides a broad flat noise floor and excellent dynamic range from 20 Hz to 20 kHz.

The TAS5508 is clock slave only device. The TAS5508 receives MCLK, SCLK and LRCLK from other system components. The TAS5508 accepts master clock rates of 64, 128, 192, 256, 384, 512, and 768 Fs. The TAS5508 accepts a 64-Fs bit clock.

The TAS5508 allows for extending the dynamic range by providing a power supply volume control (PSVC) output signal.

2. FEATURES

- Automated Operation With an Easy to Use Control Interface
- $I^2C$ Serial Control Slave Interface
- Integrated AM Interference Avoidance Circuitry
- Single 3.3-V Power Supply
- 64-Pin TQFP Package
- 5-V Tolerant Inputs
- Supports Two PLL Input Modes:
- Crystal Mode
- No-Crystal Mode

3. PIN DESCRIPTION

| PIN | Symbol | I/O | Description |
|---|---|---|---|
| 1 | VRA_PLL | | Voltage reference for PLL analog supply 1.8 V |
| 2 | PLL_FLT_RET | AO | PLL external filter return |

| | | | |
|---|---|---|---|
| 3 | PLL_FLTM | AO | PLL negative input |
| 4 | PLL_FLTP | AI | PLL positive input |
| 5 | AVSS | P | Analog ground |
| 6 | AVSS | P | Analog ground |
| 7 | VRD_PLL | P | Voltage reference for PLL digital supply 1.8 V |
| 8 | AVSS_PLL | P | Analog ground for PLL |
| 9 | AVDD_PLL | P | 3.3-V analog power supply for PLL |
| 10 | VBGAP | P | Band gap voltage reference |
| 11 | RESET | DI | System reset input |
| 12 | HP_SEL | DI | Headphone in/out |
| 13 | PDN | DI | Power down |
| 14 | MUTE | DI | Soft mute of outputs |
| 15 | DVDD | P | Digital power 3.3-V supply for digital core |
| 16 | DVSS | P | Digital ground for digital core |
| 17 | VR_DPLL | P | Voltage reference for digital PLL supply 1.8 V |
| 18 | OSC_CAP | AO | Oscillator capacitor in crystal mode |
| 19 | XTL_OUT | AO | 1.8-V output drive to the crystal |
| 20 | XTL_IN | AI | 1.8-V input port for the oscillator circuit |
| 21 | RESERVED | | Connect to digital ground |
| 22 | TBASE_SEL | | Connect to digital ground in crystal mode |
| 23 | RESERVED | | Connect to digital ground |
| 24 | SDA | DIO | I2C serial control data interface input / output |
| 25 | SCL | DI | I2C serial control clock input output |
| 26 | LRCLK | DI | Serial audio data left / right clock |
| 27 | SCLK | DI | Serial audio data clock |
| 28 | SDIN4 | DI | Serial audio data 4 input |
| 29 | SDIN3 | DI | Serial audio data 3 input |
| 30 | SDIN2 | DI | Serial audio data 2 input |
| 31 | SDIN1 | DI | Serial audio data 1 input |
| 32 | PSVC | O | Power supply volume control PWM output |
| 33 | VR_DIG | P | Voltage reference for digital core supply 1.8 V |
| 34 | DVSS | P | Digital ground |
| 35 | DVSS | P | Digital ground |

| | | | |
|---|---|---|---|
| 36 | DVDD | P | 3.3-V digital power supply |
| 37 | /BKND_ERR | DI | |
| 38 | DVSS | P | Digital ground |
| 39 | VALID | DO | Output indicating validity of PWM outputs |
| 40 | PWM_M_1 | DO | PWM 1 output (differential -) |
| 41 | PWM_P_1 | DO | PWM 1 output (differential +) |
| 42 | PWM_M_2 | DO | PWM 2 output (differential -) |
| 43 | PWM_P_2 | DO | PWM 2 output (differential +) |
| 44 | PWM_M_3 | DO | PWM 3 output (differential -) |
| 45 | PWM_P_3 | DO | PWM 3 output (differential +) |
| 46 | PWM_M_4 | DO | PWM 4 output (differential -) |
| 47 | PWM_P_4 | DO | PWM 4 output (differential +) |
| 48 | VR_PWM | P | Voltage reference for digital PWM core supply |
| 49 | PWM_M_7 | DO | PWM 7 (Line out L) output (differential -) |
| 50 | PWM_P_7 | DO | PWM 7 (Line out L) output (differential +) |
| 51 | PWM_M_8 | DO | PWM 8 (Line out R) output (differential -) |
| 52 | PWM_P_8 | DO | PWM 8 (Line out R) output (differential +) |
| 53 | DVSS_PWM | P | Digital ground for PWM |
| 54 | DVDD_PWM | P | 3.3-V digital power supply for PWM |
| 55 | PWM_M_5 | DO | PWM 5 output (differential -) |
| 56 | PWM_P_5 | DO | PWM 5 output (differential +) |
| 57 | PWM_M_6 | DO | PWM 6 output differential -) |
| 58 | PWM_P_6 | DO | PWM 6 output (differential +) |
| 59 | PWM_HPML | DO | PWM left channel headphone (differential -) |
| 60 | PWM_HPPL | DO | PWM left channel headphone (differential +) |
| 61 | PWM_HPMR | DO | PWM right channel headphone (differential -) |
| 62 | PWM_HPPR | DO | PWM right channel headphone (differential +) |
| 63 | MCLK | DI | MCLK is a 3.3-V clock master clock input |
| 64 | RESERVED | | Connect to digital ground |

## 3.5.17 function introduction to TAS5112DFD

1. DESCRIPTION

The TAS5112 (N13, N14) is a high-performance, integrated stereo Digital Amplifier Power Stage

designed to drive 6_ speakers at up to 50W per channel. The device incorporates TI's equibit™ technology and is used in conjunction with a Digital Audio PWM processor (TAS50XX) and a simple passive demodulation filter to deliver high-quality, high efficiency True Digital Audio Amplification.

The efficiency of this digital amplifier is typically 88%, reducing the size of both the power supplies and heat sinks needed. Heat sink should have thermal resistance of at least 3.5 C/W and mass of 140 grams. When running both channels full power continuously, adequate thermal design is required. Over-Current Protection, Over-Temperature Protection and Under-Voltage Protection are built into the TAS5112, safeguarding the device and speakers against fault conditions that could damage the system.

## 2. FEATURES

- 2x50W (BTL) into 6Ω
- 95 dB SNR (TDAA system with TAS5026)
- < 0.06% THD+N (TDAA system - 1W RMS into 6Ω)
- < 0.2% THD+N (TDAA system - 50W RMS into 6Ω)
- Power efficiency typical 88% @ 6Ωload
- Self-protection design (including under voltage, over temperature and short condition) with error reports
- 56-pin DFD PowerPad™ package
- 3.3 V Digital Interface
- Internal Gate Drive Supply voltage Regulator
- EMI compliant when used with recommended system design
- Four matched DMOS power transistors

## 3. PIN DESCRIPTION

| PIN | Symbol | I/O | Description |
|---|---|---|---|
| 28 | GND | | Power ground |
| 27 | GND | P | Power ground |
| 26 | GREG | P | Gate drive voltage regulator decoupling pin |
| 25 | DVDD | P | I/O refernece supply input (3.3V) |
| 24 | GND | | Power ground |
| 23 | DGND | P | Digital I/O reference ground |
| 22 | GND | | I/O reference ground |
| 21 | PWM AP | I | Input signal (positive), Half-bridge A |
| 20 | PWM AM | I | Input signal (negative), Half-bridge A |
| 19 | /RESET AB | I | Reset signal, active low |

| | | | |
|---|---|---|---|
| 18 | PWM BM | I | Input signal (negative), Half-bridge B |
| 17 | PWM BP | I | Input signal (positive), Half-bridge B |
| 16 | DREG | P | Digital supply voltage regulator decoupling pin |
| 15 | M1 | I | Mode selection pin |
| 14 | M2 | I | Mode selection pin |
| 13 | M3 | I | Mode selection pin |
| 12 | DREG RTN | P | Digital supply voltage regulator decoupling return pin |
| 11 | PWM CP | I | Input signal (positive), Half-bridge C |
| 10 | PWM CM | I | Input signal (negative), Half-bridge C |
| 9 | /RESET CD | I | Reset signal, active low |
| 8 | PWM DM | I | Input signal (negative), Half-bridge D |
| 7 | PWM DP | I | Input signal (positive), Half-bridge D |
| 6 | /SD AB | O | Shutdown signal for half-bridge A and B |
| 5 | /SD CD | O | Shutdown signal for half-bridge C and D |
| 4 | /OTW | O | Over temperature warning output |
| 3 | GREG | P | Gate drive voltage regulator decoupling pin |
| 2 | GND | P | Power ground |
| 1 | GND | | Power ground |
| 56 | GND | | Power ground |
| 55 | GVDD | P | Voltage supply |
| 54 | BST D | P | HS bootstrap supply (BST) |
| 53 | PVDD D | P | Power supply input for half-bridge D |
| 52 | PVDD D | P | Power supply input for half-bridge D |
| 51 | OUT D | O | Output, half-bridge D |
| 50 | OUT D | O | Output, half-bridge D |
| 49 | GND | P | Power ground |
| 48 | GND | P | Power ground |
| 47 | OUT C | O | Output, half-bridge C |
| 46 | OUT C | O | Output, half-bridge C |
| 45 | PVDD C | P | Power supply input for half-bridge C |
| 44 | PVDD C | P | Power supply input for half-bridge C |
| 43 | BST C | P | HS bootstrap supply (BST) |
| 42 | BST B | P | HS bootstrap supply (BST) |

| | | | |
|---|---|---|---|
| 41 | PVDD B | P | Power supply input for half-bridge B |
| 40 | PVDD B | P | Power supply input for half-bridge B |
| 39 | OUT B | O | Output, half-bridge B |
| 38 | OUT B | O | Output, half-bridge B |
| 37 | GND | P | Power ground |
| 36 | GND | P | Power ground |
| 35 | OUT A | O | Output, half-bridge A |
| 34 | OUT A | O | Output, half-bridge A |
| 33 | PVDD A | P | Power supply input for half-bridge A |
| 32 | PVDD A | P | Power supply input for half-bridge A |
| 31 | BST A | P | HS bootstrap supply (BST) |
| 30 | GVDD | P | Voltage supply |
| 29 | GND | | Power ground |

## 3.5.18 Function introduction to AD7312

1. DESCRIPTION

The AD7312 (N101) is a VFD (Vacuum Fluorescent Display) controller/driver with STANDBY controller. It is driven on a 1/4 to 1/11 duty factor (include key scan). It consists of 5 segment output lines, 6 segment/key scan output lines, 6 grid output lines, 5 segment/grid output drive lines, 2 LED output ports, a display memory, a control circuit, and a key scan circuit. In addition, it includes 2 input ports, RMIN and SKEY, RMIN receives the signal form the STANDBY-KEY of remote sensor, SEKY can be controlled by an external switch. Both of them and STANBY SCAN-KEY can control the output level (High) of PSV port to realize the STANDBY function. To leave the standby mode, we can use the 2 remote WAKE_UP-KEY, 3 WAKE_UP SCAN-KEY, remote STANDBY-KEY, STANDBY-KEY and STANDBY SCAN-KEY to control the output level (Low) of PSV port to realize the Wake Up function. Serial data is input to the AD7312 through a four-line serial interface.

2. FEATURES

- ◆ Serial interface (CLK, STB, $D_{IN}$, $D_{OUT}$)
- ◆ Key scanning (6× 4 matrices)
- ◆ Programming display modes (11-digit & 11-segment to 6-digit & 16-segment)
- ◆ Programming dimming step
- ◆ High-voltage output ($V_{DD}$-35V max).
- ◆ LED ports (2 channels., 20 mA max).
- ◆ 2-pin General-purpose input port

- Built-in oscillator
- No external resistor necessary for driver outputs (provides PMOS open-drain and pull-low resistor output)
- Remote signal input port
- Remote signal output port
- 3 STANDBY master output ports (controlled by remote STANDBY-KEY, STANDBY-KEY and STANDBY SCAN-KEY)
- 8 WAKE UP master output ports (controlled by 2 remote WAKE_UP -KEY, 3 WAKE_UP SCANKEY, remote STANDBY-KEY, STANDBY-KEY and STANDBY SCAN-KEY)
- NEC 6121/6122 infrared protocol support

3. PIN DESCRIPTION

| PIN | Symbol | I/O | Description |
|---|---|---|---|
| 6 | DIN | I | Data input |
| 5 | DOUT | O | Data output |
| 9 | STB | O | Strobe |
| 8 | CLK | I | Clock input |
| 44 | OSC | | Oscillator pin |
| 21 to 25 | Seg7 to Seg11 | O | High-voltage output (Segment) |
| 15 to 20 | Seg1/KS1 to Seg6/KS6 | O | High-voltage output |
| 32 to 37 | Grid1 to Grid6 | O | High-voltage output (Grid) |
| 26, 28 to 31 | Seg12/Grid11 to Seg16/Grid7 | O | High-voltage output (Segment/grid) |
| 39 and 42 | LED1 and LED4 | O | LED output |
| 40 | RMBUF | I | Remote Control Buffer |
| 41 | PSV | O | Power Saving Output |
| 10 to 13 | KEY1 to KEY4 | I | Key data input |
| 14, 38 | VDD | I | Logic power |
| 7, 43 | VSS | I | Logic ground |
| 27 | VEE | I | Pull-down level |
| 1 and 4 | SW1 and SW4 | I | Switch input |
| 2 | RMIN | I | Remote Control Input |
| 3 | SKEY | I | Standby Key Input |

## 3.5.19 function introduction to VIPer22ADIP

1. DESCRIPTION

The VIPer22A (U501) combines a dedicated current mode PWM controller with a high voltage Power MOSFET on the same silicon chip. Typical applications cover off line power supplies for battery charger adapters, standby power supplies for TV or monitors, auxiliary supplies for motor control, etc. The internal control circuit offers the following benefits:

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

Automatic burst mode in low load condition.

Over voltage protection in hiccup mode.

2. FEATURES

- ◆ FIXED 60 KHZ SWITCHING FREQUENCY
- ◆ 9V TO 38V WIDE RANGE VDD VOLTAGE
- ◆ CURRENT MODE CONTROL
- ◆ AUXILIARY UNDERVOLTAGE LOCKOUT WITH HYSTERESIS
- ◆ HIGH VOLTAGE START UP CURRENT SOURCE
- ◆ OVERTEMPERATURE, OVERCURRENT AND OVERVOLTAGE PROTECTION WITH AUTORESTART

3. PIN DESCRIPTION

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

## 3.5.20 Function introduction to HS817

HS817 (U502, U506) is a photoelectric coupler, shown as the figure 3.5.20.1. 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.

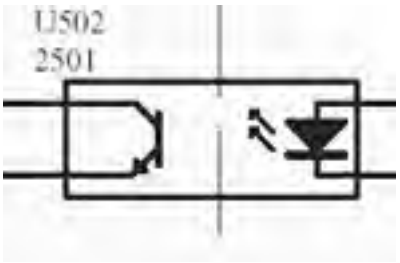



Figure 3.5.20.1 2501 outside drawing

## 3.5.21 Function introduction to TL431A

TL431A (U503, U507) is a 2.5V comparator, shown as the figure 3.5.21.1. 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.

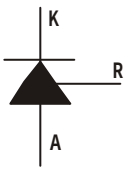



Figure 3.5.21.1 LM431A outside drawing

## 3.5.22 function introduction to 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 |

# Chapter Four

# Disassembly and Assembly Process

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

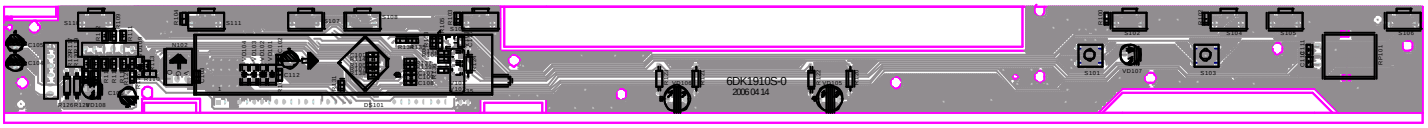
The pictures of this model are shown as follows:

# Chapter Cinque

# PCB board & Circuit diagram

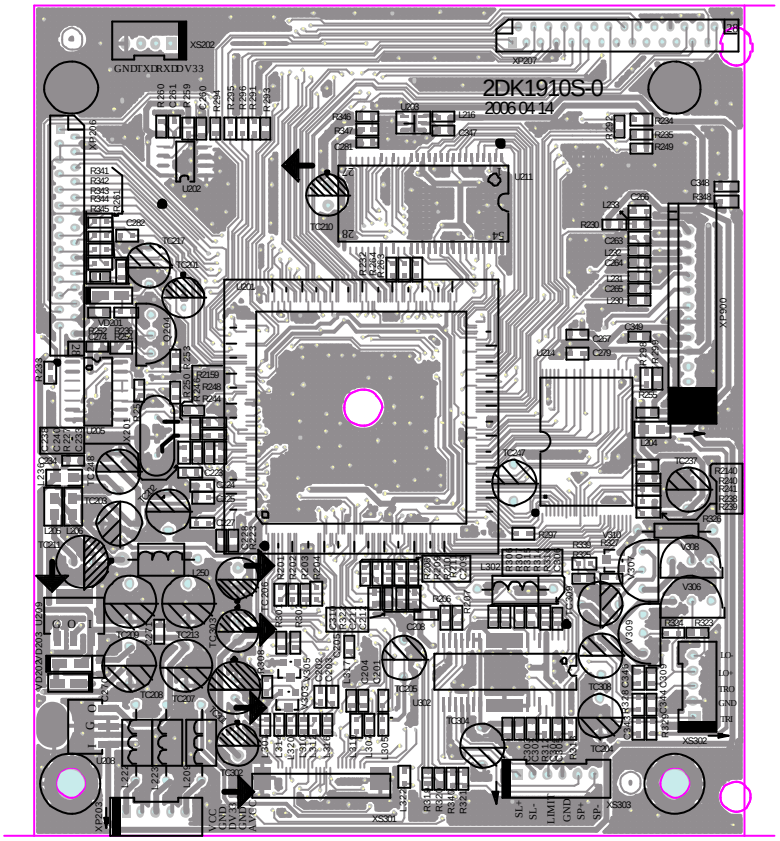
## Section One PCB board

### 5.1.1 Surface layer of KEY SCAN Board

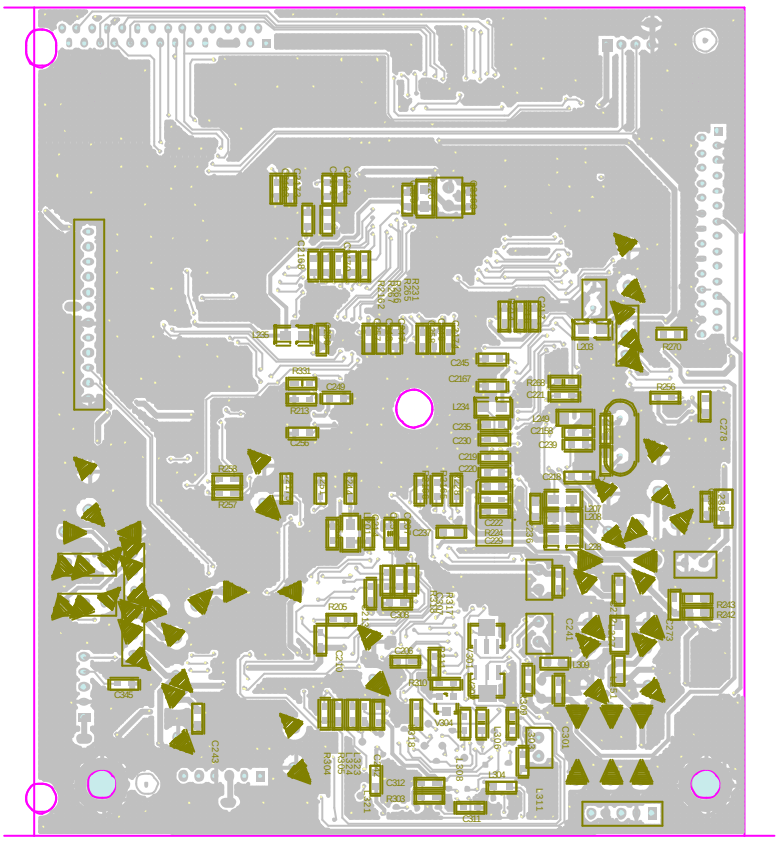


## 5.1.2 Bottom layer of KEY SCAN Board

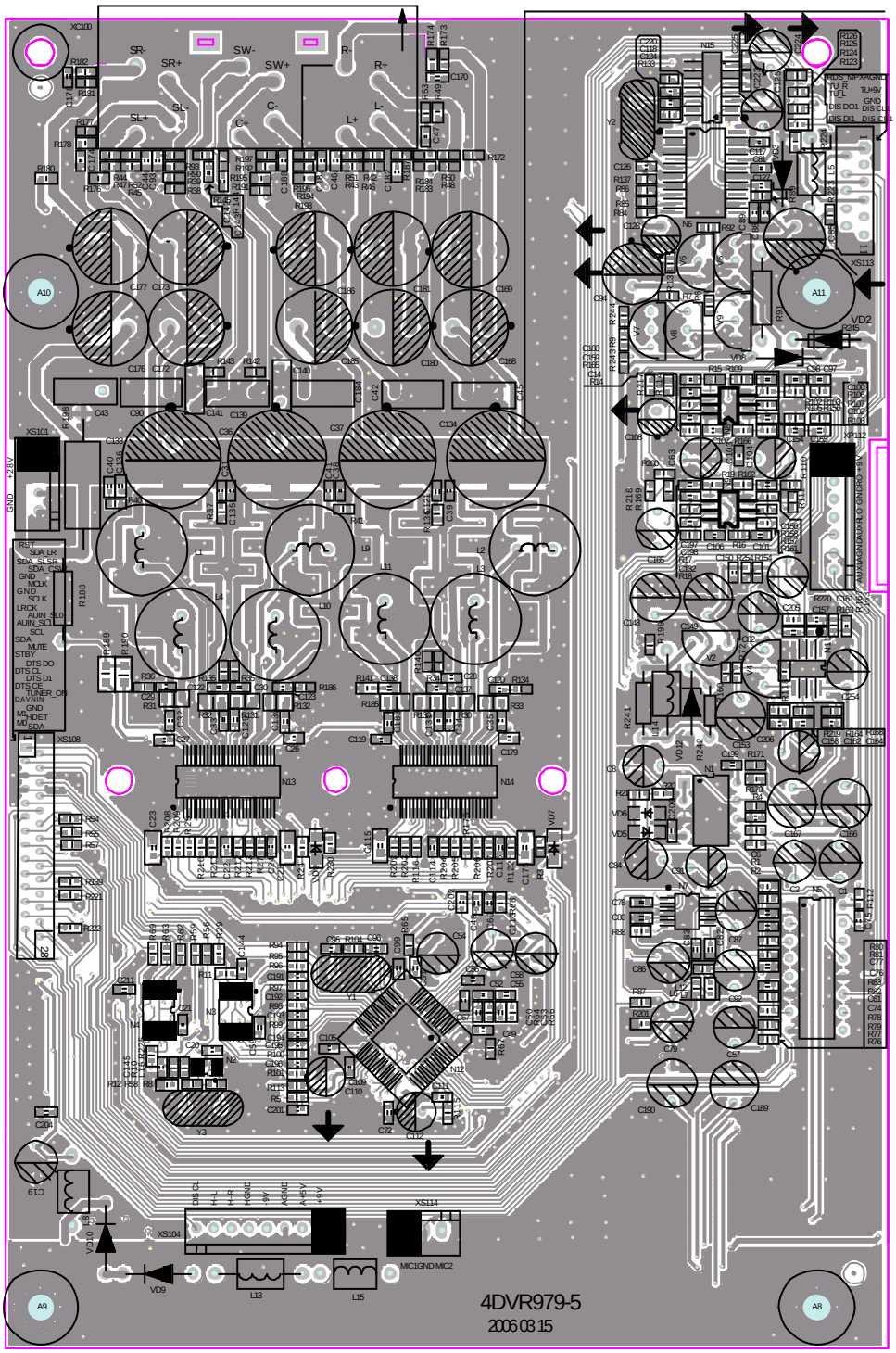
## 5.1.3 Surface layer of DECODE&SERVO Board



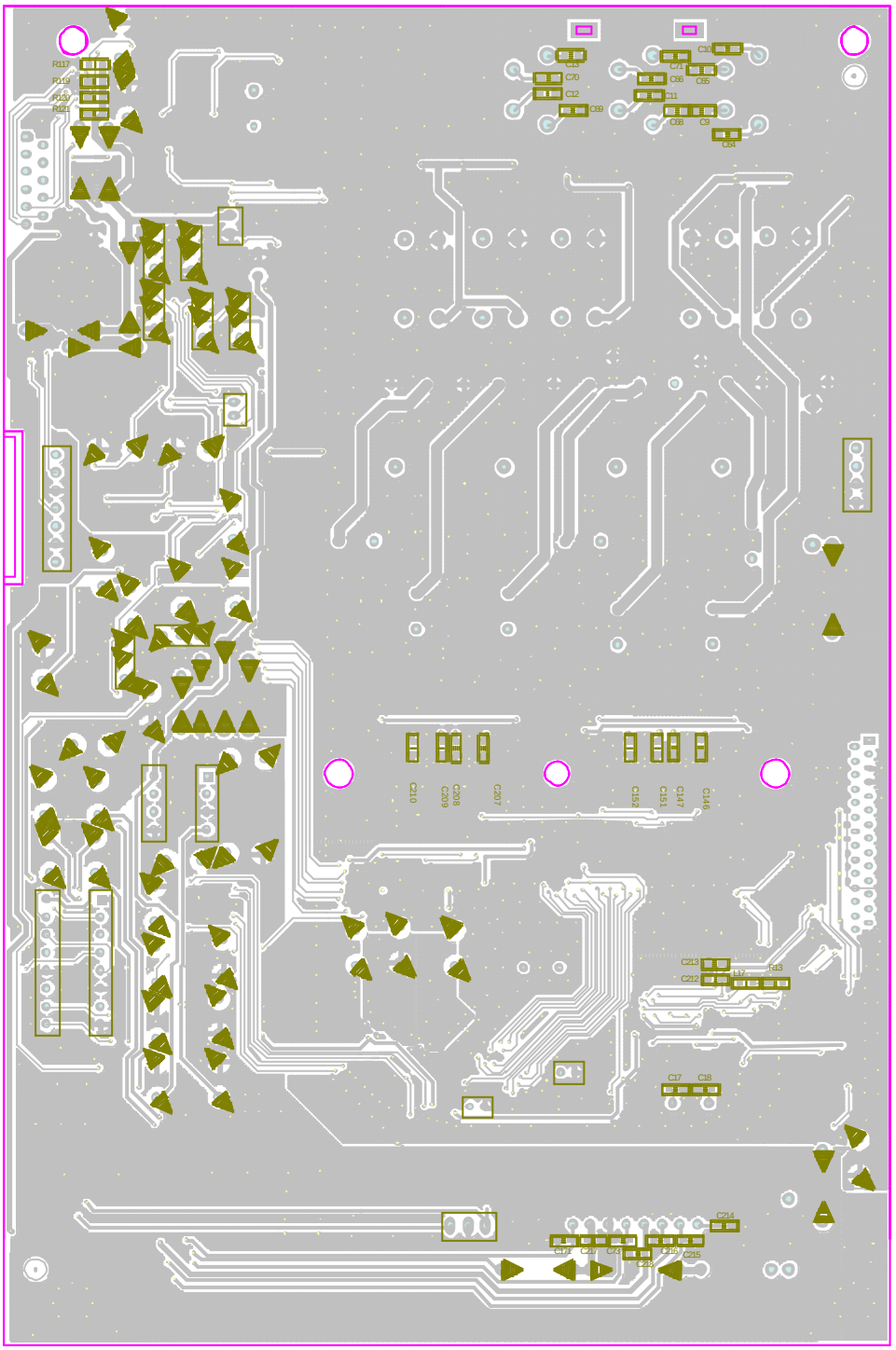
## 5.1.4 Bottom layer of DECODE&SERVO Board



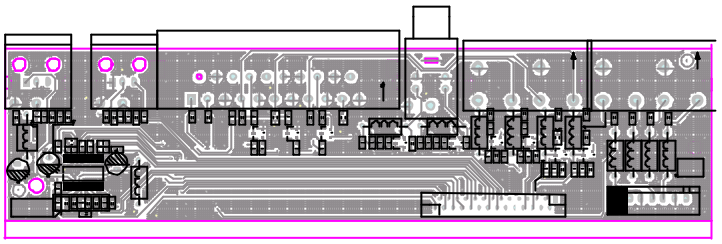
## 5.1.5 Surface layer of audio power amplifying Board



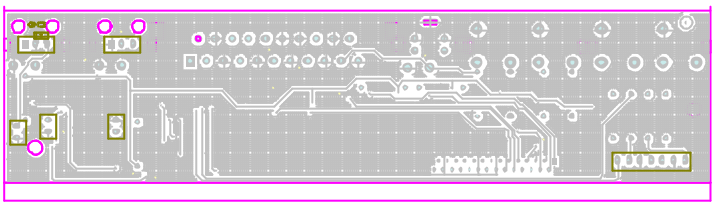
## 5.1.6 Bottom layer of audio power amplifying Board



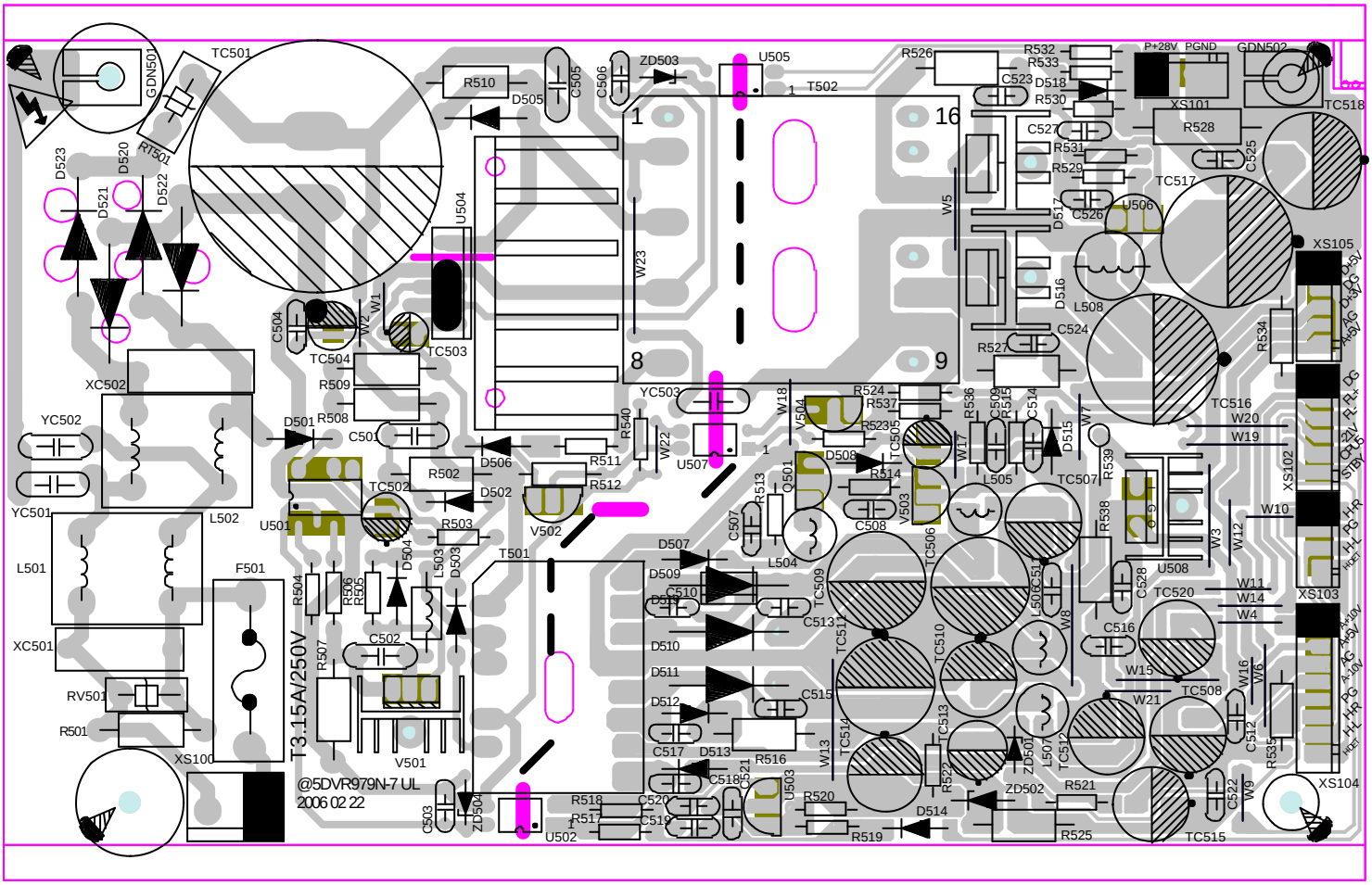
## 5.1.7 Surface layer of AV Board



### 5.1.8 Bottom layer of AV Board

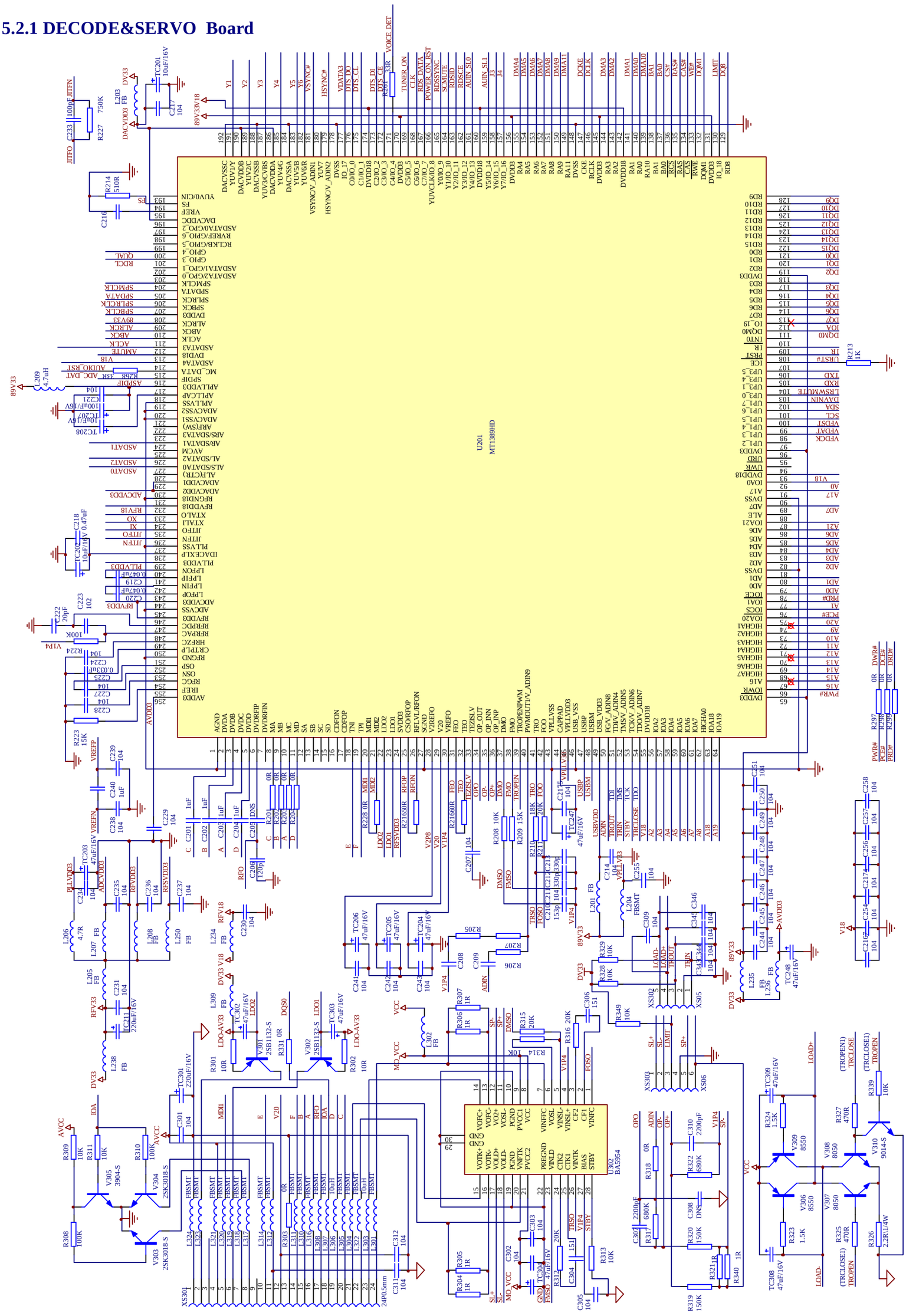


## 5.1.9 POWER Board



# Section Two circuit diagram

## 5.2.1 DECODE&SERVO Board



DV33 L226 FB SD33 TC210 47uF/16V
C281 104 C2162 104 C2163 104 C2168 104 C2170 104 C2171 104 C2173 104

XP900 CON12
USBP USBM USB_VBUS DV33 J4 J3
L230 FBSMT VFDAT
L231 FBSMT VFDST
L232 FBSMT VFDCK
L233 FBSMT JR
R230 4.7K
C263 47pF C264 47pF C265 47pF C266 47pF VCC

XS202 DV33 RXD TXD GND C267 104 XS04(DNS)

U202 AT24C16X4050
DC/NC RST_/NC WP/RST_ VSS VCC RST/WP SCL SDA
DV33 R259 680R R260 680R C259 104 SCL SDA
C260 102(DNS) C261 102(DNS)

U211 SDRAM 64M
DMA0 DMA1 DMA2 DMA3 DMA4 DMA5 DMA6 DMA7 DMA8 DMA9 DMA10 MA11 BA0 #BA1
BA1 DMA11 R231 33R R232 33R
DCLK R263 33R SDCLK DCKE R264 33R SDCKE
CS# R265 33R DCS# RAS# R266 33R DRAS# CAS# R267 33R DCAS# WE# R2162 33R DWE#
DQM0 DQM1
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10/AP A11 BA0/A13 BA1/A12 CLK CKE /CS /RAS /CAS /WE DQML DQMH NC NC VSS VSS VSS
DQ0 DQ1 DQ2 DQ3 DQ4 DQ5 DQ6 DQ7 DQ8 DQ9 DQ10 DQ11 DQ12 DQ13 DQ14 DQ15 VCCQ VCCQ VCCQ VCCQ VSSQ VSSQ VSSQ VSSQ
SD33 SD33 C2160 104

XP207 XS28
AUDIO_RST SDATA0 SDATA1 SDATA2 GND SACLK GND SBCLK SLRCK AUIN_SL0 AUIN_SL1 SCL SDA SCMUTE LRSWMUTE DTS_DO DTS_CL DTS_DI DTS_CE TUNER_ON DAVNIN GND RDSSYNC RDSID RDSCE RDCL QUAL ADC_DAT
VCC R234 4.7K R235 4.7K VCC R249 4.7K

XP206
Y1 Y2 Y3 Y4 Y5 Y6 HSYNC# VSYNC# VDATA3 IEC958 DGND SPDAT SPLRCK SPBCK DGND AUDIO_RST INT DVCC SCL SDA DGND XO DV33
VGND R233 75R C282 104
SPDATA R341 SPLRCLK R342 SPBCLK R343 SPMCLK R344 VOICE_DET R345 33R
VCC L251 FB

XP203 XS05
L222 FB L223 FB L209 FB AVCC
VCC DV33 DV33A L227 FB C272 104 TC213 220uF/16V
C270 104 TC208 220uF/16V C271 104 TC207 220uF/16V

U214 8M_FLASH(TSOP)
A16 A15 A14 A13 A12 A11 A10 A9 A8 AA20 AA21 DWR# URST# VP NC NC RY/BY A18 A17 A7 A6 A5 A4 A3 A2
BYTE Vss DQ15/A-1 DQ7 DQ14 DQ6 DQ13 DQ5 DQ12 DQ4 Vcc DQ11 DQ3 DQ10 DQ2 DQ9 DQ1 DQ8 DQ0 OE Vss CE A0
A17 GND A0 AD7 AD6 AD5 AD4 VD AD3 AD2 AD1 AD0 DRD# GND DCE# A1
VD A21 A20 4.7K 4.7K 4.7K 4.7K 0R 0R R238 R239 R240 R2140 R258 R257
R241 4.7K(DNS)

U208 BA033FP(DNS) IN GND OUT
VCC DV33
ACLK ABCK ALRCK ASDAT0 ASDAT1 ASDAT2 R291 R292 R293 R294 R295 R296 33R SACLK SBCLK SLRCK SDATA0 SDATA1 SDATA2

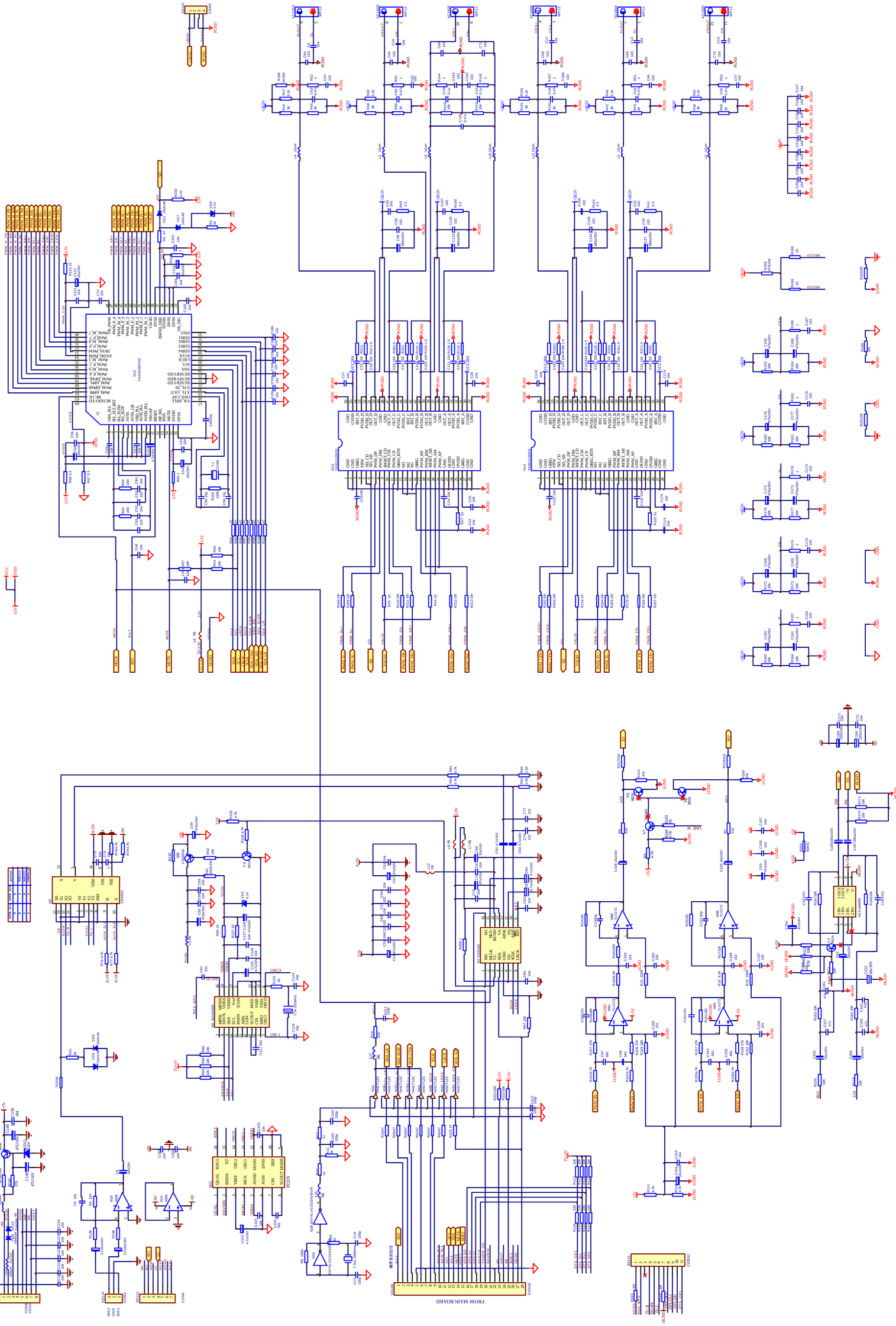
R246 100K XI R244 0R XO R248 0R L249 2.7uH(DNS) X201 27MHz C275 27pF C276 27pF C2158 27pF(DNS)

R250 0R(DNS) DV33 C274 104 IEC958 R251 0R U205E HCU04 U205F HCU04 R2159 0R ASPDIF
DV33 VCC C347 104 R347 10K CLK R346 330 L216 FB U203 RT9701 vin ce GND vout vout USB_VBUS C348 104 C349 025 R348 10R(DNS)

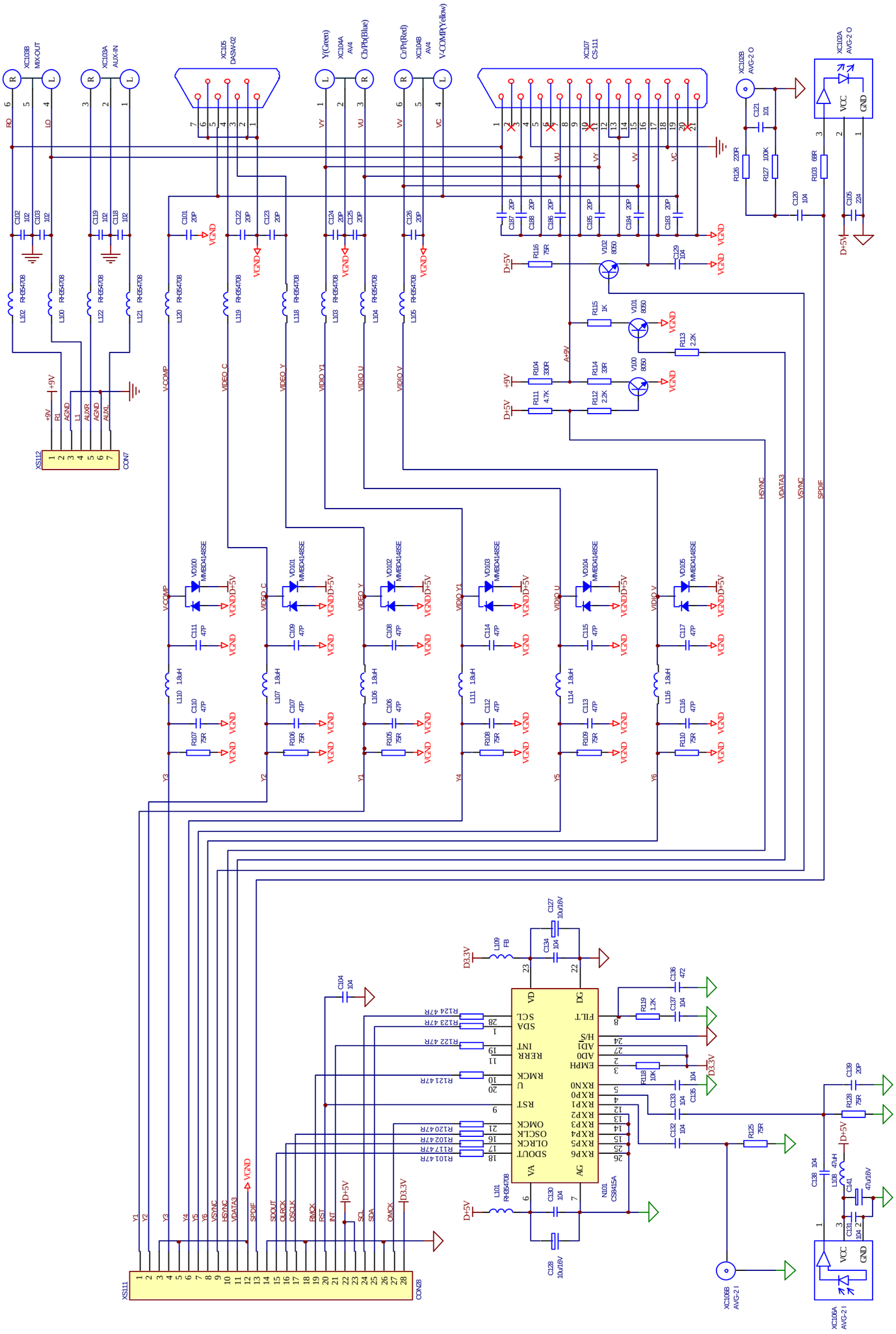
VD202 1N4004(DNS) VD203 1N4004(DNS) DV33
U209 LM1117MP-1.8 GND OUT IN
V18 L228 FB C273 104 TC209 220uF/16V R242 3.3K R243 1.2K

DV33 R252 75K VD201 1N4148 R236 1K Q204 9015 R253 0R(DNS) TC217 47uF/16V
VD C279 104 TC237 47uF/16V R254 47K C278 225 U205C HCU04
DV33 R255 0R VCC L204 FB(DNS) R256 33R URST#

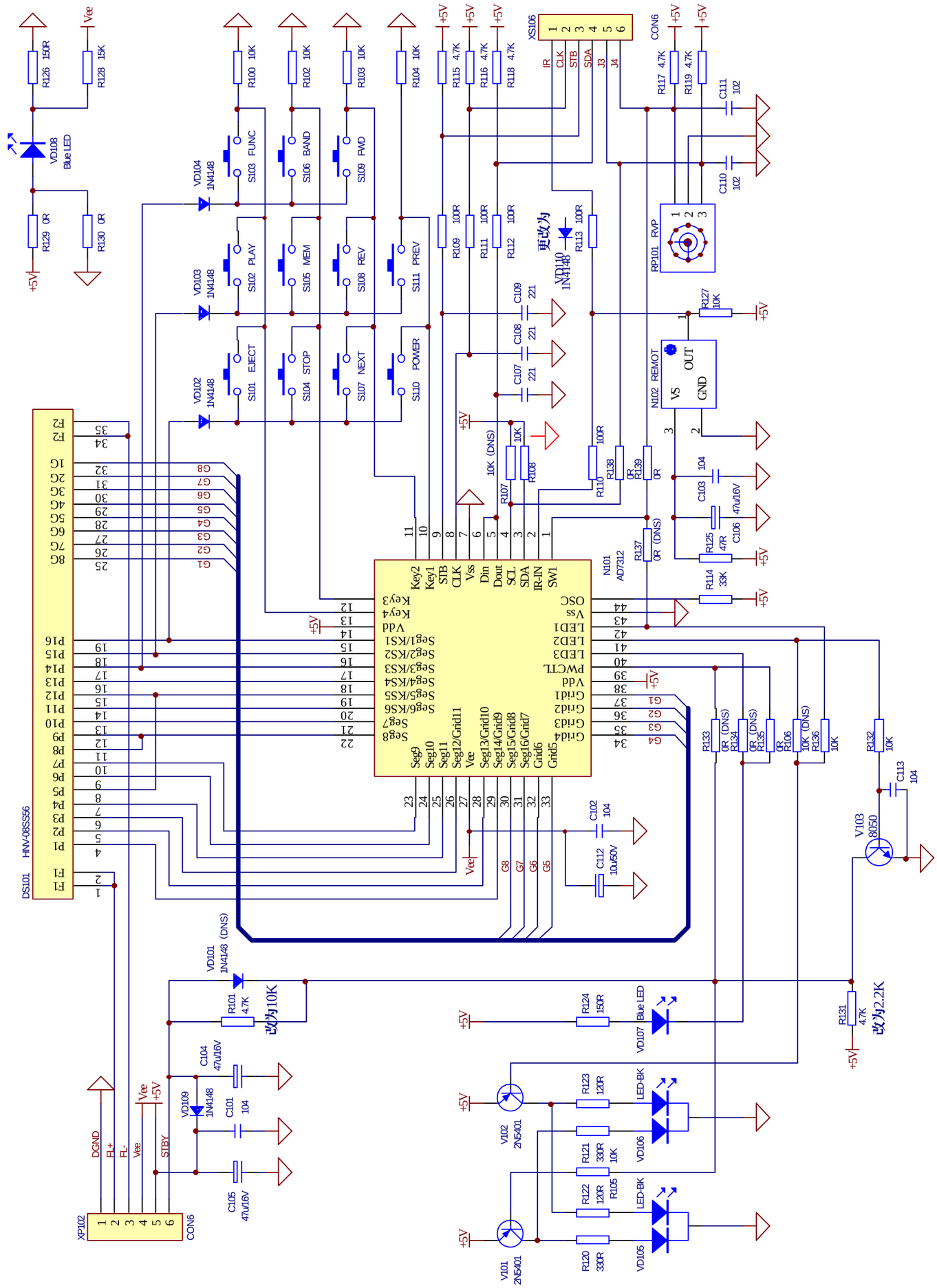
## 5.2.2 audio power amplifying Board



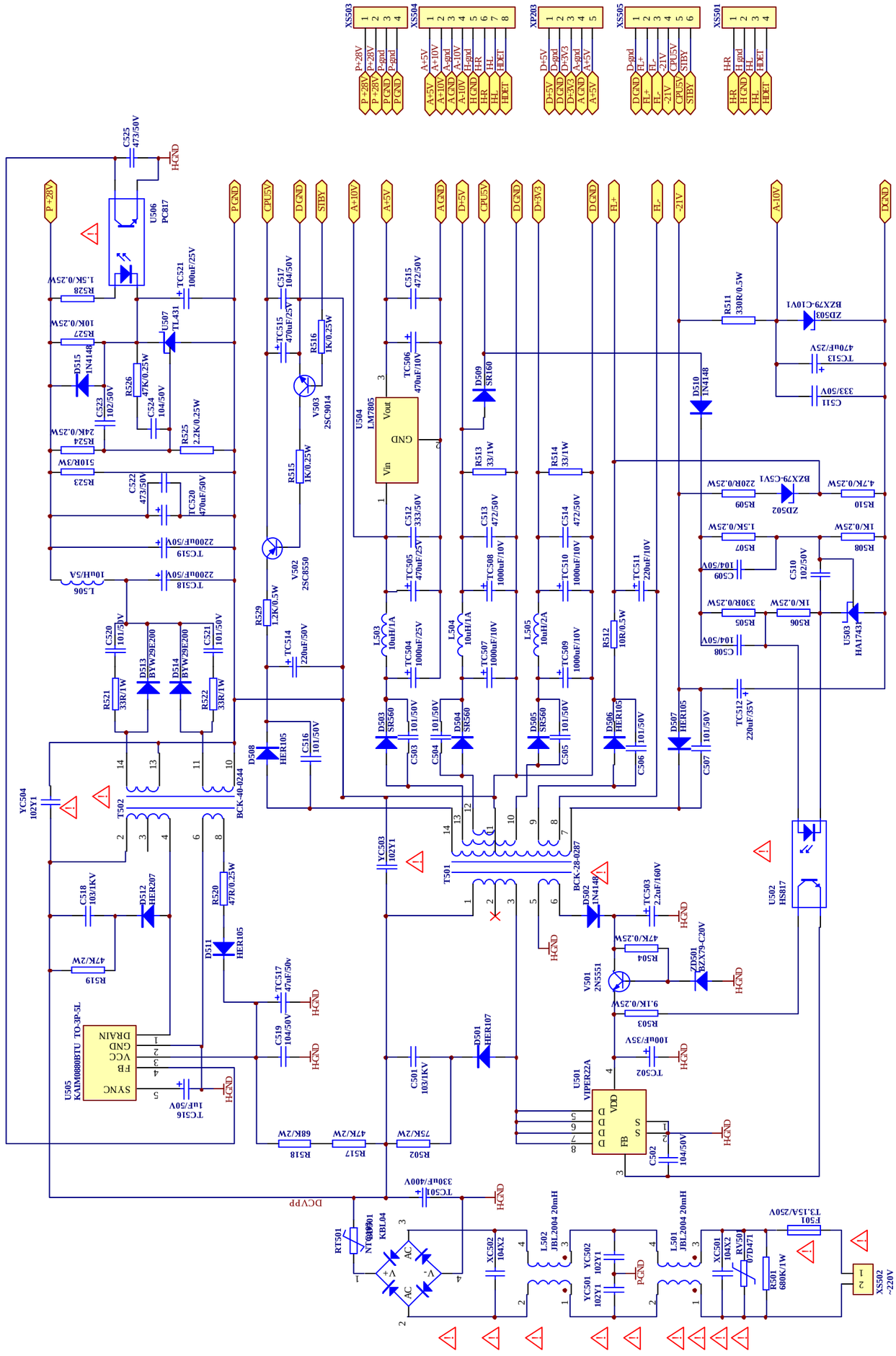
## 5.2.3 AV IN\ OUT Board



## 5.2.4 KEY SCAN Board



## 5.2.5 PWOER Board



# Chapter six BOM List

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| DK1910SI（RU）SILVER WHITE | | | |
| MICROPHONE HOLDER BOARD | | 5446645 | |
| 1980030 | MICROPHONE SOCKET | CK3-6.35-19 | MIC1,MIC2 |
| 0000140 | CARBON FILM RESISTOR | 1/6W22K±5% SHAPED 7.5 | R100,R101 |
| 0200174 | PORCELAIN CAPACITOR | 50V 103±10% 2.5mm | C101 |
| 2110329 | LEAD | 22# 70mm BLACK,WITH WELD PIECE | |
| 2120534 | FLAT CABLE | 3P80 2.5 2 SOCKET WITH NEEDLE | XP114 |
| 1563711 | PCB | 91070-0 | |
| DK1910SI（RU）SILVER WHITE | | | |
| AMPLIFIER BOARD: | | 5448507 | |
| 0000466 | CARBON FILM RESISTOR | 1/2W220O±5% SHAPED 12.5 | R91 |
| 0000274 | CARBON FILM RESISTOR | 1/4W47O±5% SHAPED 10 | R241 |
| 0000679 | CARBON FILM RESISTOR | 1/6W270O±5% SHAPED 7.5 | R242 |
| 0010233 | METAL OXIDE FILM RESISTOR | 1/2W47O±5% SHAPED 12.5 | R188 |
| 0210145 | METAL POLYESTER FILM CAPACITOR | CL21X 100V 104K C5 | C140,C141 |
| 0210165 | METAL POLYESTER FILM CAPACITOR | CL23X 63V 474±5% 5 | C42,C43,C45,C90,C139,C184 |
| 0010282 | METAL OXIDE FILM RESISTOR | 3W1K±5% SHAPED R 20×8 | R198 |
| 0260127 | CD | CD11 16V4.7U±20%5×11 2 | C84,C87,C91,C92,C113,C224 |
| 0260019 | CD | CD11 16V10U±20%5×11 2 | C1,C2,C8,C54,C58,C62,C86,C104,C108,C110,C112,C165,C153,C205,C206 |
| 0260025 | CD | CD11 16V47U±20%5×11 2 | C19,C57,C63,C79,C128,C148,C149,C254 |
| 0260028 | CD | CD11 16V220U±20%6×12 2.5 | C189,C190 |
| 0260618 | CD | CD11 10V330U±20%6.3×11 2.5 | C166,C167 |
| 0260029 | CD | CD11 16V470U±20%8×123.5 | C94,C85 |
| 0260048 | CD | CD11 35V470U±20%10×20 5 | C168,C169,C172,C173,C176,C177,C180,C181,C185,C186 |
| 0260491 | CD | CD11K 35V680U±20% 13×20 5 | C36,C37,C133,C134 |
| 0390057 | MAGNETIC BEADS INDUCTOR | RH354708 | L5,L8,L15 |
| 0410176 | VERTICAL SCREEN SHIELD FILTERING INDUCTOR | 10uH±10% 4A 5mm | L1~L4,L9~L11 |
| 0570004 | DIODE | 1N4004 | VD9,VD10,R245 |
| 05800069 | VOLTAGE REGULATOR DIODE | 5.1V±5% 1/2W BELT | VD8,VD3 |
| 05800339 | VOLTAGE REGULATOR DIODE | 5.6V±5% 1/2W BELT | VD12 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0780032 | TRIODE | 9014C | V4 |
| 0780025 | TRIODE | 2N5401 | V7 |
| 0780138 | TRIODE | 8050D | V2,V8,V9 |
| 0960226 | CMETAL OXIDE FILM RESISTORSTAL OSCILLATOR | 4.332MHz 49-s | Y2 |
| 0960182 | CMETAL OXIDE FILM RESISTORSTAL OSCILLATOR | 12.288MHz 49-S | Y3 |
| 0960171 | CMETAL OXIDE FILM RESISTORSTAL OSCILLATOR | 13.50MHZ 49-S | Y1 |
| 0881743 | IC | F4558 DIP | N1 ① |
| 0880445 | IC | 4558C DIP | N1 ① |
| 0882161 | IC | AZ4558 DIP | N1 ① |
| 0880124 | IC | NJM4558D DIP | N1 ① |
| 0881393 | IC | IL4558N DIP | N1 ① |
| 0881429 | IC | CD4052BE DIP | N5 ② |
| 0880443 | IC | CD4052BCN DIP | N5 ② |
| 1940003 | SOCKET | 4P 2.5mm | XS101 |
| 2150191 | FLAT CABLE | 7P200 2.5 T2 2×2P SHIELD,WITH NEEDLE,TOGETHER DIRECTION | XP112 |
| 1940009 | SOCKET | 8P 2.5mm | XS104 |
| 1940140 | CABLE SOCKET | 14P 1.0mm DUAL RANK STRAIGHT INSERT | XS108 |
| 1940033 | CABLE SOCKET | 11P 1.25mm DUAL RANK STRAIGHT INSERT | XS113 |
| 1990025 | EXTERNAL SOURCES SOCKET | 6PZ-7 | XC100 |
| 0390168 | INDUCTOR | 100UH±10% 0410 SHAPED 12.5mm | L13,L14 |
| 1940002 | SOCKET | 3P 2.5mm | XS114 |
| 3580186 | RADIATOR | 78×49×30 DVR938 NOT OXIDATION | |
| 5230707 | SOFT SPONGE SPACER | 10×10×2 SINGLE-FACED,HARD | |
| 4490001 | SPRING PAD | F 3 | |
| 4450012 | BOLT PAD | F 3×7.2×0.5 | |
| 5230147 | INSULATED PAD | F 8×3×0.8 WITHOUT GLUE IN REAR SIDE | |
| 4210005 | MACHINE-TAPPING SCREW | PM 3×8 BLACK | |
| 5233174 | RUBBER SPACER | 9×9×1 SINGLE-FACED WITH GLUE IN REAR SIDE,CENTER HOLE f 3 | |
| DK1910SI（RU）SILVER WHITE | | | |
| AMPLIFIER BOARD-SMD: 4DVR979-5 VER2.1 | | | |
| 0090001 | SMD RESISTOR | 1/16W 0O±5% 0603 | R199~R213,R223,R254 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0090272 | SMD RESISTOR | 1/16W 1O±5% 0603 | R51~R53,R65,R93,R113,R144,R145,R174 ,R178,R182,R187,R196,R197 |
| 0090540 | SMD RESISTOR | 1/16W1.5O±5% 0603 | R34~R37,R134~R136,R186 |
| 0090002 | SMD RESISTOR | 1/16W 2.2O ±5% 0603 | R68 |
| 0090616 | SMD RESISTOR | 1/16W 3.3O±5% 0603 | R40,R41,R67,R140,R141 |
| 0090314 | SMD RESISTOR | 1/16W 5.1O±5% 0603 | R88 |
| 0090003 | SMD RESISTOR | 1/16W 10O±5% 0603 | R24,R25,R89,R116,R137,R175 |
| 0090004 | SMD RESISTOR | 1/16W 22O±5% 0603 | R115 |
| 0090230 | SMD RESISTOR | 1/16W 47O±5% 0603 | R10,R13,R29,R56,R59,R62,R63,R69,R11, R94~R101,R225,R5 |
| 0090220 | SMD RESISTOR | 1/16W 51O±5% 0603 | R27,R122 |
| 0090017 | SMD RESISTOR | 1/16W 2.2K±5% 0603 | R80,R82 |
| 0090239 | SMD RESISTOR | 1/16W 200O±5% 0603 | R64,R66 |
| 0090008 | SMD RESISTOR | 1/16W 220O±5% 0603 | R123~R126 |
| 0090014 | SMD RESISTOR | 1/16W 1K±5% 0603 | R3,R20,R21,R133,R243,R58 |
| 0090249 | SMD RESISTOR | 1/16W 510O±5% 0603 | R6,R7,R217,R218 |
| 0090223 | SMD RESISTOR | 1/16W 2K±5% | R43,R45,R49,R90,R192 |
| 0090183 | SMD RESISTOR | 1/16W 3K±5% 0603 | R38,R42,R44,R48,R191,R1,R2 |
| 0090019 | SMD RESISTOR | 1/16W 4.7K±5% 0603 | R76~R79,R81,R83,R102,R103,R105,R110 ,R111,R138,R139,R156,R230,R244 |
| 0090016 | SMD RESISTOR | 1/16W 1.5K±5% 0603 | R9 |
| 0090020 | SMD RESISTOR | 1/16W 5.1K±5% 0603 | R39,R46,R47,R50,R195 |
| 0090022 | SMD RESISTOR | 1/16W 8.2K±5% | R166,R16 |
| 0090023 | SMD RESISTOR | 1/16W 10K±5% 0603 | R54,R55,R57,R84~R87,R92,R117,R119~ R121,R142,R143,R163,R164,R167,R168, R170,R171,R154,R72 |
| 0090187 | SMD RESISTOR | 1/16W 12K±5% 0603 | R14,R18 |
| 0090188 | SMD RESISTOR | 1/16W 18K±5% 0603 | R108,R109,R161,R162 |
| 0090025 | SMD RESISTOR | 1/16W 20K±5% 0603 | R172,R176,R180,R183,R193,R173,R177, R181,R184,R194 |
| 0090026 | SMD RESISTOR | 1/16W 22K±5% 0603 | R17,R165 |
| 0090027 | SMD RESISTOR | 1/16W 27K±5% 0603 | R106,R107,R157,R158 |
| 0090192 | SMD RESISTOR | 1/16W 51K±5% 0603 | R4 |
| 0090029 | SMD RESISTOR | 1/16W 47K±5% 0603 | R114,R169,R160,R118 |
| 0090201 | SMD RESISTOR | 1/16W 220K±5% 0603 | R15,R19 |
| 0090034 | SMD RESISTOR | 1/16W 100K±5% 0603 | R8,R104 |
| 0090147 | SMD RESISTOR | 1/10W 1O±5% 0805 | R30,R31,R32,R33,R130,R131,R132,R185 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0090039 | SMD RESISTOR | 1/10W 10O±5% 0805 | R189,R190 |
| 0310046 | SMD CAPACITOR | 50V 82P±5% NPO 0603 | C14,C132 |
| 0310042 | SMD CAPACITOR | 50V 15P±5% NPO 0603 | C95,C96,C118,C124 |
| 0310045 | SMD CAPACITOR | 50V 47P±5% NPO 0603 | C144,C145,C211 |
| 0310047 | SMD CAPACITOR | 50V 101±5% NPO 0603 | C6,C76,C77,C100~C102,C156,C191~C196,C17,C18,C212,C213 |
| 0310051 | SMD CAPACITOR | 50V 331±5% NPO 0603 | C81 |
| 0310196 | SMD CAPACITOR | 50V 471±10% 0603 | C157,C158 |
| 0310471 | SMD CAPACITOR | 50V 561±5% NPO 0603 | C225 |
| 0310054 | SMD CAPACITOR | 50V 681±5% NPO 0603 | C97,C98,C154,C155 |
| 0310066 | SMD CAPACITOR | 50V 102±10% X7R 0603 | C20,C21,C38,C39,C89,C135,C136 |
| 0310067 | SMD CAPACITOR | 50V 152±10% X7R 0603 | C159,C198 |
| 0310072 | SMD CAPACITOR | 50V 103±10% X7R 0603 | C40,C41,C44,C46,C47,C50,C53,C64~C66,C68~C71,C93,C137,C138,C142,C143,C170,C174,C178,C182,C187,C188 |
| 0310207 | SMD CAPACITOR | 50V 104 ±20% X7R 0603 | C9~C13,C22,C24,C26~C31,C48,C49,C51,C52,C55,C56,C59~C61,C67,C72~C75,C78,C80,C82,C83,C88,C99,C103,C105~C107,C109,C114,C116,C119~C123,C223,C127,C179,C199,C200~C202,C204,C150,C171 ③ |
| 0310543 | SMD CAPACITOR | 50V 104±10% X7R 0603 | C9~C13,C22,C24,C26~C31,C48,C49,C51,C52,C55,C56,C59~C61,C67,C72~C75,C78,C80,C82,C83,C88,C99,C103,C105~C107,C109,C114,C116,C119~C123,C223,C127,C179,C199,C200~C202,C204,C150,C171 ③ |
| 0310112 | SMD CAPACITOR | 16V 224±10% 0603 | C111 |
| 0310234 | SMD CAPACITOR | 16V 105 +80%-20% Y5V 0603 | C160,C197 |
| 0310673 | SMD CAPACITOR | 50V 333±5% X7R 0603 | C32~C35,C129,C130,C131,C183 |
| 0310368 | SMD CAPACITOR | 25V 105 +80%-20% Y5V 0805 | C23,C25,C115,C175 |
| 0390355 | SMD INDUCTOR | 4.7UH±10% 1608 | R219,R220 |
| 0390095 | SMD MAGNETIC BEADS | FCM1608K-221T05 | L6,L12,L16,L17 |
| 0700007 | SMD DIODE | 1N4148 | VD1,VD5,VD6,VD7 |
| 0882353 | IC | CS5340 TSSOP | N7 |
| 0882946 | IC | PT2579-SN SOP | N15 |
| 0882349 | IC | TAS5112 TSSOP | N13,N14 |
| 0882350 | IC | TAS5508 TQFP | N12 |
| 0882352 | IC | TLV272 SOP | N8,N9 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0882920 | IC | SN74LVC125APWR TSSOP | N3,N4 |
| 0882373 | IC | SN74LVC2G04DBVR SOT-23 | N2 |
| 0882398 | IC | LM4880M SOP | N11 |
| 1633181 | PCB | 4DVR979-5 | |
| DK1910SI（RU）SILVER WHITE | | | |
| DECODE BOARD：2DK1910S-1 Ver2.5 | | | |
| 0000375 | CARBON FILM RESISTOR | 1/4W2.2O±5% | R326 |
| 02604379 | CD | CD11 16V10U±20%5×11C5 BELT | TC202 |
| 02600019 | CD | CD11 16V22U±20%5×11 C5 BELT | TC217 |
| 02601819 | CD | CD11 16V220U±20%6×12 C5 BELT | TC207~TC209,TC213 |
| 0260028 | CD | CD11 16V220U±20%6×12 2.5 | TC211,TC301 |
| 02600029 | CD | CD11 16V47U±20%5×11 C5 BELT | TC205,TC203,TC204,TC247,TC248,TC237,TC304,TC308,TC309 |
| 0260200 | CD | CD11C 16V47U±20%5×7 2 | TC302,TC303,TC206,TC201,TC210 |
| 0390057 | MAGNETIC BEADS INDUCTOR | RH354708 | L209,L222,L223,L302,L250 |
| 07801389 | TRIODE | 8050D BELT | V307,V308 ④ |
| 07800299 | TRIODE | C8050 BELT | V307,V308 ④ |
| 07801519 | TRIODE | 8550D BELT | V306,V309 ⑤ |
| 07800309 | TRIODE | 8550C BELT | V306,V309 ⑤ |
| 07800339 | TRIODE | 9015C(200-600) TO-92 BELT | Q204 |
| 0960020 | CMETAL OXIDE FILM RESISTORSTAL OSCILLATOR | 27.00MHz 49-S | X201 |
| 1940140 | CABLE SOCKET | 14P 1.0mm DUAL RANK STRAIGHT INSERT | XP206 |
| 1940261 | CABLE SOCKET | 14P 1.0mm DUAL RANK TOUCH POINT,DUAL RANK FLEX INSERT | XP207 |
| 2121685 | FLAT CABLE | 5P230 2.5/2.0 2 PIN,WITH L NEEDLE,TOGETHER DIRECTION | XP203 |
| 2121686 | SOFT FLAT CABLE | 6P240 2.0 2 PIN,WITH L NEEDLE,REVERSE | XS303 |
| 2121687 | SOFT FLAT CABLE | 5P300 2.0 2 PIN,WITH L NEEDLE,TOGETHER DIRECTION | XS302 |
| 2122001 | FLAT CABLE | 12P280 2.0 2 PIN,WITH L NEEDLE,TOGETHER DIRECTION | XP900 |
| DK1910SI（RU）SILVER WHITE | | | |
| DECODE BOARD-SMD： 2DK1910S-1 Ver2.5 | | | |
| 0090001 | SMD RESISTOR | 1/16W 0O±5% 0603 | R201~R204,R244,R248,R251,R255,R297,R298,R299,R331,R228,R303,R318,R2165,R2166,R257,R258,R2159 |
| 0090006 | SMD RESISTOR | 1/16W 75O±5% 0603 | R233 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0090272 | SMD RESISTOR | 1/16W 1O±5% 0603 | R304~R307,R321,R340 |
| 0090003 | SMD RESISTOR | 1/16W 10O±5% 0603 | R301,R302 |
| 0090005 | SMD RESISTOR | 1/16W 33O±5% 0603 | R232,R256,R261,R263,R264,R268,R292~R296,R231,R265~R267,R2162,R341~R344 |
| 0090181 | SMD RESISTOR | 1/16W 100O±5% 0603 | R291 |
| 0090011 | SMD RESISTOR | 1/16W 470O±5% 0603 | R325,R327 |
| 0090014 | SMD RESISTOR | 1/16W 1K±5% 0603 | R213,R236 |
| 0090029 | SMD RESISTOR | 1/16W 47K±5% 0603 | R254 |
| 0090016 | SMD RESISTOR | 1/16W 1.5K±5% 0603 | R323,R324,R243 |
| 0090249 | SMD RESISTOR | 1/16W 510O±5% 0603 | R214 |
| 0090018 | SMD RESISTOR | 1/16W 3.3K±5% 0603 | R242 |
| 0090019 | SMD RESISTOR | 1/16W 4.7K±5% 0603 | R238~R240,R234,R235,R249,R230,R2140 |
| 0090023 | SMD RESISTOR | 1/16W 10K±5% 0603 | R208,R309,R311,R313,R314,R339,R328,R329,R259,R260,R349,R347 |
| 0090030 | SMD RESISTOR | 1/16W 56K±5% 0603 | R252 |
| 0090024 | SMD RESISTOR | 1/16W 15K±5% 0603 | R209,R223 |
| 0090025 | SMD RESISTOR | 1/16W 20K±5% 0603 | R211,R312,R315,R316 |
| 0090188 | SMD RESISTOR | 1/16W 18K±5% 0603 | R210 |
| 0090197 | SMD RESISTOR | 1/16W 150K±5% 0603 | R319,R320 |
| 0090231 | PRECISION SMD RESISTOR | 1/16W 680K±1% 0603 | R317,R322 |
| 0090319 | PRECISION SMD RESISTOR | 1/16W 750K±1% 0603 | R227 |
| 0090034 | SMD RESISTOR | 1/16W 100K±5% 0603 | R224,R308,R310,R246 |
| 0090111 | SMD RESISTOR | 1/10W 4.7O±5% 0805 | L206 |
| 0310085 | SMD CAPACITOR | 50V 20P±5% NPO 0603 | C222 |
| 0310190 | SMD CAPACITOR | 50V 27P±5% NPO 0603 | C275,C276 |
| 0310045 | SMD CAPACITOR | 50V 47P±5% NPO 0603 | C263~C266 |
| 0310051 | SMD CAPACITOR | 50V 331±5% NPO 0603 | C212,C213 |
| 0310048 | SMD CAPACITOR | 50V 151±5% NPO 0603 | C304,C306 |
| 0310222 | SMD CAPACITOR | 25V 104±20% X7R 0603 | C207,C211,C214,C216,C217,C224,C227~C231,C234~C239,C241~C251,C254,C256~C259,C267,C270~C274,C279,C281,C301~C303,C305,C309,C311,C312,C2160,C2162,C2163,C2167,C2168,C2170,C2171,C2173~C2175,C343~C345,C347,C348 ⑥ |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0310207 | SMD CAPACITOR | 50V 104 ±20% X7R 0603 | C207,C211,C214,C216,C217,C224,C227~C231,C234~C239,C241~C251,C254,C256~C259,C267,C270~C274,C279,C281,C301~C303,C305,C309,C311,C312,C2160,C2162,C2163,C2167,C2168,C2170,C2171,C2173~C2175,C343~C345,C347,C348 ⑥ |
| 0310543 | SMD CAPACITOR | 50V 104±10% X7R 0603 | C207,C211,C214,C216,C217,C224,C227~C231,C234~C239,C241~C251,C254,C256~C259,C267,C270~C274,C279,C281,C301~C303,C305,C309,C311,C312,C2160,C2162,C2163,C2167,C2168,C2170,C2171,C2173~C2175,C343~C345,C347,C348 ⑥ |
| 0310234 | SMD CAPACITOR | 16V 105 +80%-20% Y5V 0603 | C201~C204,C221,C240 |
| 0310066 | SMD CAPACITOR | 50V 102±10% X7R 0603 | C223 |
| 0310566 | SMD CAPACITOR | 10V 225 +80%-20% Y5V 0603 | C278,C349 |
| 0310068 | SMD CAPACITOR | 50V 222±10% X7R 0603 | C307,C310 |
| 0310201 | SMD CAPACITOR | 50V 153±10% X7R 0603 | C210 |
| 0310047 | SMD CAPACITOR | 50V 101±5% NPO 0603 | C233,C282 |
| 0310055 | SMD CAPACITOR | 16V 333±10% X7R 0603 | C225 |
| 0310056 | SMD CAPACITOR | 16V 473±10% X7R 0603 | C219,C220 |
| 0310362 | SMD CAPACITOR | 16V474 +80%-20% Y5V 0603 | C218 |
| 0310245 | SMD CAPACITOR | 50V 121±10% X7R 0603 | C206 |
| 0390163 | SMD INDUCTOR | 3.3uH±10% 1608 | L249 |
| 0390087 | SMD MAGNETIC BEADS | FCM2012V-221T07 | L201,L203,L205,L207,L208,L226,L227,L234,L235,L238 |
| 0390095 | SMD MAGNETIC BEADS | FCM1608K-221T05 | L309,L228,L236,L230~L233,L301,L305,L307,L310,L312,L314,L316,L317,L320,L304,L308,L318,L322,L324,L311,L321,L251,L303,L306,L216 |
| 0390170 | SMD INDUCTOR | 10UH±10% 1608 | L319,L323 |
| 0700007 | SMD DIODE | 1N4148 | VD201 ⑦ |
| 0700001 | SMD DIODE | LS4148 | VD201 ⑦ |
| 0700002 | SMD DIODE | LL4148 | VD201 ⑦ |
| 0780062 | SMD TRIODE | 9014C | V310 |
| 0780040 | SMD TRIODE | 3904(100-300) SOT-23 | V305 |
| 0780193 | SMD TRIODE | 2SK3018 | V303,V304 |
| 0780115 | SMD TRIODE | 2SB1132 | V301,V302 |
| 0880165 | IC | 74HCU04D SOP | U205 ⑧ |
| 0880322 | IC | MM74HCU04M SOP | U205 ⑧ |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0880513 | IC | HCU04 SOP | U205 ⑧ |
| 0881157 | IC | HY57V641620HGT-H TSOP | U211 ⑨ |
| 0881661 | IC | IC42S16400-7T TSOP | U211 ⑨ |
| 0881969 | IC | IP1117-ADJ SOT-223 | U209 ⑩ |
| 0881182 | IC | LM1117MP-ADJ SOT-223 | U209 ⑩ |
| 0881079 | IC | AT24C04 SOP | U202 |
| 0882644 | IC | MT1389FE/H(HD) QFP | U201 |
| 0881459 | IC | D5954 SOP | U302 (11) |
| 0881378 | IC | BA5954FP HSOP | U302 (11) |
| 0881914 | IC | RT9701CB SOT25 | U203 |
| 1940228 | CABLE SOCKET | 24P 0.5mm SMD,NEXT MEET WITH CLASP | XS301 |
| 1633380 | PCB | 2DK1910S-1 | |
| DK1910SI（RU）SILVER WHITE | | | |
| EARPHONE BOARD: | | 5448508 | |
| 0090237 | SMD RESISTOR | 1/16W 39O±5% 0603 | R17,R18 |
| 0090028 | SMD RESISTOR | 1/16W 33K±5% 0603 | R19,R20 |
| 0310543 | SMD CAPACITOR | 50V 104±10% X7R 0603 | C10 (12) |
| 0310222 | SMD CAPACITOR | 25V 104±20% X7R 0603 | C10 (12) |
| 0310207 | SMD CAPACITOR | 50V 104 ±20% X7R 0603 | C10 (12) |
| 0390095 | SMD MAGNETIC BEADS | FCM1608K-221T05 | L1,L2,L5 |
| 2120535 | FLAT CABLE | 4P60 2.5 2 SOCKET WITH NEEDLE | XP103 |
| 2120463 | FLAT CABLE | 6P80 2.5 2 SOCKET WITH NEEDLE | XP106 |
| 1940175 | SOCKET | 12P 2.0mm STRAIGHT INSERT | XS1 |
| 1860135 | USB SOCKET | 3DHM04S-30N-C | JK1 |
| 1980061 | EARPHONE SOCKET | CKX-3.5-01K | CK1 |
| 1633546 | PCB | C1910-3 | |
| 0090001 | SMD RESISTOR | 1/16W 0O±5% 0603 | R21 |
| DK1910SI（RU）SILVER WHITE | | | |
| INPUT OUTPUT BOARD | | 5446095 | |
| 0390057 | MAGNETIC BEADS INDUCTOR | RH354708 | L100~L105,L118~L122 |
| 0390147 | INDUCTOR | 47UH±5% 0410 SHAPED 10mm | L108 |
| 0260019 | CD | CD11 16V10U±20%5×11 2 | C127,C128 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0260025 | CD | CD11 16V47U±20%5×11 2 | C141 |
| 1910158 | TERMINAL SOCKET | AV4-8.4-13 | XC103 |
| 1910194 | TERMINAL SOCKET | AV4-8.4-13/PB-08B | XC104 |
| 1860059 | SCART SOCKET | CS-111 | XC107 |
| 1910159 | TERMINAL SOCKET | CS TERMINAL DASW-02 | XC105 |
| 1910195 | TERMINAL SOCKET | AVG-2-07 BLACK | XC102,XC106 |
| 1090071 | OPTIC-ELECTRO CONVERTOR | RX179AT | XC106 |
| 1090077 | ELECTRO-OPTIC TRANSFORMER | TX179AT-2 | XC102 |
| 1940007 | SOCKET | 7P 2.5mm | XS112 |
| 1940140 | CABLE SOCKET | 14P 1.0mm DUAL RANK STRAIGHT INSERT | XS111 |
| 5446090 | PCB SEMI-FINISHED PRODUCT | 7979-0-SMD DK1050S(RU) | |
| DK1910SI（RU）SILVER WHITE | | | |
| INPUT OUTPUT BOARD-SMD | | 5446090 | |
| 0090005 | SMD RESISTOR | 1/16W 33O±5% 0603 | R114 |
| 0090230 | SMD RESISTOR | 1/16W 47O±5% 0603 | R101,R102,R117,R120~R124 |
| 0090238 | SMD RESISTOR | 1/16W 68O±5% 0603 | R103 |
| 0090006 | SMD RESISTOR | 1/16W 75O±5% 0603 | R105~R110,R116,R125,R128 |
| 0090008 | SMD RESISTOR | 1/16W 220O±5% 0603 | R126 |
| 0090009 | SMD RESISTOR | 1/16W 330O±5% 0603 | R104 |
| 0090014 | SMD RESISTOR | 1/16W 1K±5% 0603 | R115 |
| 0090015 | SMD RESISTOR | 1/16W 1.2K±5% 0603 | R119 |
| 0090017 | SMD RESISTOR | 1/16W 2.2K±5% 0603 | R112,R113 |
| 0090019 | SMD RESISTOR | 1/16W 4.7K±5% 0603 | R111 |
| 0090023 | SMD RESISTOR | 1/16W 10K±5% 0603 | R118 |
| 0090034 | SMD RESISTOR | 1/16W 100K±5% 0603 | R127 |
| 0310085 | SMD CAPACITOR | 50V 20P±5% NPO 0603 | C101,C122~C126,C139,C183~C188 |
| 0310045 | SMD CAPACITOR | 50V 47P±5% NPO 0603 | C106~C117 |
| 0310066 | SMD CAPACITOR | 50V 102±10% X7R 0603 | C102,C103,C118,C119 |
| 0310198 | SMD CAPACITOR | 50V 472±10% X7R 0603 | C136 |
| 0310543 | SMD CAPACITOR | 50V 104±10% X7R 0603 | C104,C120,C129~C135,C137,C138 |
| 0310723 | SMD CAPACITOR | 16V 224±10% X7R 0603 | C105 |
| 0390095 | SMD MAGNETIC BEADS | FCM1608K-221T05 | L109 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0390096 | SMD INDUCTOR | 1.8UH±10% 1608 | L106,L107,L110,L111,L114,L116 |
| 0700056 | SMD DOUBLE DIODE | MMBD4148SE SOT-23 | VD100~VD105 |
| 0780085 | SMD TRIODE | 8050D | V100~V102 |
| 0882413 | IC | CS8415A TSSOP | N101 |
| 1632105 | PCB | 7979-1 | |
| DK1910SI（RU）SILVER WHITE | | | |
| POWER BOARD: | | 5448506 | |
| 2100003 | LEAD | F 0.6 SHAPED 7.5mm | W1,W2,W9,W10,W16,W17,W22 |
| 2100004 | LEAD | F 0.6 SHAPED 10mm | W4,W7,W11,W12,W14,W18,W21 |
| 2100006 | LEAD | F 0.6 SHAPED 12.5mm | W5,W6 |
| 2100007 | LEAD | F 0.6 SHAPEN 15mm | W3,W15,W19,W20 |
| 2100016 | LEAD | F 0.6 SHAPEN 18mm | W8,W13 |
| 2100017 | LEAD | F 0.6 SHAPED 20mm | W23 |
| 0000274 | CARBON FILM RESISTOR | 1/4W47O±5% SHAPED 10 | R511 |
| 0000431 | CARBON FILM RESISTOR | 1/4W75O±5% SHAPED 10 | R503 |
| 0000432 | CARBON FILM RESISTOR | 1/4W150O±5% SHAPED 10 | R517 |
| 0000362 | CARBON FILM RESISTOR | 1/4W220O±5% SHAPED 10 | R521 |
| 0000277 | CARBON FILM RESISTOR | 1/4W300O±5% SHAPED 10 | R505 |
| 0000278 | CARBON FILM RESISTOR | 1/4W330O±5% SHAPED 10 | R523 |
| 0000283 | CARBON FILM RESISTOR | 1/4W1K±5% SHAPED 10 | R518 |
| 0000361 | CARBON FILM RESISTOR | 1/4W1.2K±5% SHAPED 10 | R514 |
| 0000284 | CARBON FILM RESISTOR | 1/4W1.5K±5% SHAPED 10 | R506,R533 |
| 0000460 | CARBON FILM RESISTOR | 1/4W3K±5% SHAPED 10 | R540 |
| 0000289 | CARBON FILM RESISTOR | 1/4W4.7K±5% SHAPED 10 | R522 |
| 0000294 | CARBON FILM RESISTOR | 1/4W10K±5% SHAPED 10 | R515,R524,R532,R537,R536 |
| 0000299 | CARBON FILM RESISTOR | 1/4W22K±5% SHAPED 10 | R513 |
| 0000423 | CARBON FILM RESISTOR | 1/4W30K±5% SHAPED 10 | R504 |
| 0000301 | CARBON FILM RESISTOR | 1/4W47K±5% SHAPED 10 | R531 |
| 0010270 | METAL FILM RESISTOR | 1/4W1.8K±1% SHAPED 10 | R519 |
| 0010140 | METAL FILM RESISTOR | 1/4W3K±1% SHAPED 10 | R520 |
| 0010062 | METAL FILM RESISTOR | 1/4W2.2K±1% SHAPED 10 | R529 |
| 0010273 | METAL FILM RESISTOR | 1/4W24K±1% SHAPED 10 | R530 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0010138 | METAL OXIDE FILM RESISTOR | 1W330O±5% SHAPED FLAT 15×9 | R525 |
| 0010294 | METAL OXIDE FILM RESISTOR | 1W750K±5% FLAT 12.5×7 | R512 |
| 0010259 | METAL OXIDE FILM RESISTOR | 1W0.47O±5% FLAT 12.5×7 | R534,R535 |
| 0010165 | METAL OXIDE FILM RESISTOR | 1W1O±5%SHAPED FLAT 15×7 | R507,R516 |
| 0010191 | METAL OXIDE FILM RESISTOR | 1W33O±5%SHAPED FLAT 15×8 | R526,R527 |
| 0010279 | METAL OXIDE FILM RESISTOR | 1W680K±5% SHAPED 15 | R501 |
| 0010295 | METAL OXIDE FILM RESISTOR | 2W10O±5% SHAPED VERTICAL 7.5 | R539 |
| 0010219 | METAL OXIDE FILM RESISTOR | 2W10O±5% SHAPED FLAT 15×7 | R538 |
| 0010147 | METAL OXIDE FILM RESISTOR | 2W47K±5% SHAPED FLAT 15×7 | R508,R510 |
| 0010157 | METAL OXIDE FILM RESISTOR | 2W68K±5%SHAPED FLAT 15×7 | R509 |
| 0010263 | METAL OXIDE FILM RESISTOR | 2W75K±5% SHAPED FLAT 15×7 | R502 |
| 0010282 | METAL OXIDE FILM RESISTOR | 3W1K±5% SHAPED R 20×8 | R528 |
| 0200105 | PORCELAIN CAPACITOR | 50V 100P±10% 5mm | C507,C510,C513,C515,C517,C518,C523, C524 |
| 0200123 | PORCELAIN CAPACITOR | 50V 102±10% 5mm | C527,C503 |
| 0200138 | PORCELAIN CAPACITOR | 50V 104±20% 5mm | C504,C508,C519,C520,C521,C526 |
| 0200223 | PORCELAIN CAPACITOR | 1000V 101 +80%-20% 7.5mm | C502 |
| 0200224 | PORCELAIN CAPACITOR | 1000V 103 +80%-20% 7.5mm | C501,C505 |
| 0210148 | TERYLENE CAPACITOR | 100V 473±10% SHAPED 5mm | C509,C511,C512,C514,C516,C522,C525, C528,C506 |
| 0210116 | ANTI-JAMMING CAPACITOR | MKP61 X2 275VAC 104±20%15 | XC501,XC502 |
| 0200343 | CERAMIC CAPACITOR | Y1 400VAC 102±10% 10mm | YC501,YC502,YC503 |
| 0260749 | CD | EZ 400V220U±20% 30×30 10 | TC501 |
| 0260655 | CD | CD288H 16V220U±20% 8×12 3.5 | TC513 |
| 0260656 | CD | CD288H 16V470U±20% 10×12 5 | TC508,TC520 |
| 0260657 | CD | CD288H 16V1000U±20% 10×20 5 | TC507,TC510,TC512 |
| 0260661 | CD | CD288H 16V2200U±20%13×20 5 | TC506,TC509,TC511 |
| 0260662 | CD | CD288H 25V470U±20%10×16 5 | TC515 |
| 0260659 | CD | CD288H 35V220U±20%10×12 5 | TC514 |
| 0260660 | CD | CD288H 50V1U±20%5×11 2 | TC503 |
| 0260672 | CD | CD288H 50V47U±20%6.3×11 2.5 | TC502,TC504,TC505 |
| 0260673 | CD | CD288H 50V470U±20%13×20 5 | TC518 |
| 0260751 | CD | CD11K 50V1000U±20%16×25 7.5 | TC516,TC517 |
| 0390340 | VERTICAL INDUCTOR | 10uH±10% 5A 12.5×26.5 10mm | L508 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0390154 | MAGNETIC BEADS INDUCTOR | RH-357508 | L503 |
| 0410010 | CHOKE COIL | VERTICAL 10UH 1A 5mm | L504,L505,L506 |
| 0410011 | CHOKE COIL | VERTICAL 10UH 2A 5mm | L507 |
| 1000038 | FILTER OF POWER NET | SE1989 20mH +∞-0% | L501,L502 |
| 0460481 | SWITCH POWER TRANSFORMER | BCK-28-0598 | T501 (13) |
| 0460482 | SWITCH POWER TRANSFORMER | SE2017 | T501 (13) |
| 0460454 | SWITCH POWER TRANSFORMER | BCK-40-0244 | T502 (14) |
| 0460441 | SWITCH POWER TRANSFORMER | BCK-40-0726 | T502 (14) |
| 0680026 | SCHOTTKY DIODE | SR160 | D515 |
| 0680065 | SCHOTTKY DIODE | SR560 DO-27 SHAPED 20mm | D510,D511 |
| 0680078 | SCHOTTKY DIODE | SR3A0 DO-27 SHAPED 17.5 | D509 |
| 0570006 | DIODE | 1N4148 | D508,D514 |
| 0570013 | DIODE | HER105 | D503,D504,D506,D507,D512,D513 |
| 0570014 | DIODE | HER107 | D501,D502 |
| 0570042 | DIODE | HER207 SHAPED 12.5mm | D505 |
| 0570045 | DIODE | BYW29E-200 TO-220 | D516,D517 (15) |
| 0570047 | DIODE | ER802 GOLD SEALED TO-220 | D516,D517 (15) |
| 05800069 | VOLTAGE REGULATOR DIODE | 5.1V 1/2W BELT | ZD501 |
| 0580072 | VOLTAGE REGULATOR DIODE | 9.1V±5% 1W SHAPED 10mm | ZD502 |
| 0570032 | DIODE | 1N5408 | D520,D521,D522,D523 |
| 0790061 | SMD FIELD EFFECT TRANSISTOR | IRFBC20 PLASTIC SEALED TO-220 | V501 |
| 0780026 | TRIODE | 2N5551 | V502,V503,V504 |
| 0690001 | CONTROLLABLE SILICON | MCR100-6 | Q501 |
| 0880379 | IC | LM7805 GOLD SEALED TO-220 | U508 (16) |
| 0880247 | IC | MC7805CT GOLD SEALED TO-220 | U508 (16) |
| 0880499 | IC | L7805CV GOLD SEALED TO-220 | U508 (16) |
| 0880553 | IC | LM431ACZ TO-92 | U503,U506 (17) |
| 0882089 | IC | TL431 TO-92 | U503,U506 (17) |
| 0882462 | IC | AZ431AZ-A TO-92 | U503,U506 (17) |
| 0882041 | IC | MIK431C TO-92 | U503,U506 (17) |
| 0881480 | IC | NCP1200P60 DIP | U501 |
| 0881500 | IC | KA1M0880BTU TO-3P-5L | U504 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 1030007 | PRESS SENSITIVITY RESISTOR | 7D 471±10% 5mm | RV501 |
| 1050002 | HEAT SENSITIVITY RESISTOR | NTC SCK-104MS±20% | RT501 |
| 1080011 | PHOTOELECTRIC COUPLER | HS817 | U502,U505,U507 |
| 1570182 | PCB | @5DVR979N-8 UL | |
| 1940003 | SOCKET | 4P 2.5mm | XS101,XS103 |
| 1940004 | SOCKET | 5P 2.5mm | XS105 |
| 1940006 | SOCKET | 6P 2.5mm | XS102 |
| 1940009 | SOCKET | 8P 2.5mm | XS104 |
| 1940074 | SOCKET | 2P 7.92mm | XS100 |
| 2300004 | FUSE | T3.15AL 250V | F501 |
| 3020402 | FUSE HOLDER | BLX-2 | F501 |
| 3580086 | HEAT RADIATION BOARD | 11×15×25 BLACK SINGLE HOLE | D516,D517,V501 |
| 3580091 | HEAT RADIATION BOARD | 11×15×31 LFDR9905 | U508 |
| 3580156 | HEAT RADIATION BOARD | 40×20×35 DVR938-2 | U504 |
| 3870115 | GROUND CHIP OF POWER BOARD | AB903 | GND501,GND502 |
| 4000453 | SELF-TAPPING SCREW | BT 3×8H WHITE NICKEL | V501,U508,D516,D517 |
| 4000564 | SELF-TAPPING SCREW | PWT 3×12×7H WHITE NICKEL | U504 |
| 4000627 | SELF-TAPPING SCREW | PWT 2.6×6×5H BLACK ZINC | |
| DK1910SI（RU）SILVER WHITE | | | |
| REMOTE CONTROL | | 5471746 | |
| 0310222 | SMD CAPACITOR | 25V 104±20% X7R 0603 | C3 ,C5 |
| 0310191 | SMD CAPACITOR | 50V 30P±5% NPO 0603 | C1, C2 |
| 0090029 | SMD RESISTOR | 1/16W 47K±5% 0603 | R2 |
| 0090233 | SMD RESISTOR | 1/16W 4.7MO±5% 0603 | R3, R4 |
| 0090002 | SMD RESISTOR | 1/16W 2.2O ±5% 0603 | R5 |
| 0700007 | SMD DIODE | 1N4148 | VD2 |
| 0970008 | CERAMIC RESONATOR | 2.0MHz | G1 |
| 0090008 | SMD RESISTOR | 1/16W 220O±5% 0603 | R6 |
| 0260008 | CD | CD11C 10V47U±20%4×7 1.5 | TC1 |
| 0630003 | EMISSION PIPE | TSAL6200 | LED1 |
| 0160217 | DIGITAL POTENTIOMETER | EC30P16 | RP1 |
| 1340190 | LIGHT TOUCH SWITCH(FIVE DIRECTION) | SKQUCAA010 | RP2 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 0780085 | SMD TRIODE | 8050D | V1 |
| 1564473 | PCB | 81910SI-2 | |
| 2100003 | LEAD | F 0.6 SHAPED 7.5mm | W1 |
| 3031855 | SURFACE CASING OF REMOTE CONTROL | RC-073 BLACK | |
| 3041406 | BOTTOM CASING OF REMOTE CONTROL | RC-073 BLACK | |
| 3051348 | BATTERY CASE DOOR OF REMOTE CONTROL | RC-073 BLACK | |
| 3051349 | GLASS OF REMOTE CONTROL | RC-073 MING PURPLE | |
| 3850124 | ANODE SPRING | RC026 | |
| 3850125 | CATHODE SPRING | RC026 | |
| 3850126 | ANODE/CATHODE SPRING | RC026 | |
| 3072572 | 5-DIRECTION BUTTON | RC-073 GREEN | |
| 3072570 | VOLUME KNOB | RC-073 BLACK | |
| 4000179 | SELF-TAPPING SCREW | PB 2×8 BLACK | |
| 0890292 | PROGRAM CPU | CPURC073RU-0 | |
| 4631058 | CONDUCT GLUE OF REMOTE CONTROL(UPPER) | RC-073 | |
| 4631059 | CONDUCT GLUE OF REMOTE CONTROL(LOWER) | RC-073 | |
| 5071274 | GLUE BAG FOR ENVIRONMENTAL PROTEETION（WITHOUT HOLE） | 85×290×0.05 PE | |
| DK1910SI（RU）SILVER WHITE | | | |
| SURFACE CONTROL BOARD: | | 5448509 | |
| 0000619 | CARBON FILM RESISTOR | 1/6W120O±5% SHAPED 7.5 | R122,R123 |
| 0000452 | CARBON FILM RESISTOR | 1/6W150O±5% SHAPED 7.5 | R124,R126 |
| 0000123 | CARBON FILM RESISTOR | 1/6W330O±5% SHAPED 7.5 | R120,R121 |
| 0260075 | CD | CD11 50V10U±20%5×11 2 | C112 |
| 0260025 | CD | CD11 16V47U±20%5×11 2 | C104,C105,C106 |
| 0620040 | RADIATION DIODE | 3B 4SC WHITE ISSUE BLUE | VD107,VD108 |
| 0620078 | DUAL COLOR RADIATION DIODE | 3RB9SW03 RED BLUE | VD105,VD106 |
| 0881944 | PCB | AD7312 QFP | N101 |
| 1340064 | LIGHT TOUCH RESTORE SWITCH | KFC-A06-2WB L3.8 | S102,S104~S111 |
| 1340003 | LIGHT TOUCH RESTORE SWITCH | HORIZONTAL 6×6×1 | S101,S103 |
| 0160201 | DIGITAL POTENTIOMETER | EC12P24L25F12 | RP101 |

| MATERIAL CODE | MATERIAL NAME | SPECIFICATIONS | LOCATION |
|---|---|---|---|
| 2360021 | IR SENSOR | AT138BV3 | N102 |
| 1200653 | DISPLAY SCREEN | HL-D593 | DS101 (18) |
| 1200532 | DISPLAY SCREEN | HNV-08SS56 | DS101 (18) |
| 1200531 | ISPLAY SCREEN | VFD16-0801 | DS101 (18) |
| 2121688 | FLAT CABLE | 6P100 2.5 2 PIN,WITH NEEDLE,TOGETHER DIRECTION | XP102 |
| 1940006 | SOCKET | 6P 2.5mm | XS106 |
| 5233341 | SOFT SPONGE SPACER | 10×10×8 DOUBLE-FACED,HARD(35 DEGREE) | |
| DK1910SI（RU）SILVER WHITE | | | |
| SURFACE CONTROL BOARD-SMD: 6DK1910S-2 VER 2.3 | | | |
| 0090001 | SMD RESISTOR | 1/16W 0O±5% 0603 | R129,R135,R138,R139 |
| 0090230 | SMD RESISTOR | 1/16W 47O±5% 0603 | R125 |
| 0090181 | SMD RESISTOR | 1/16W 100O±5% 0603 | R109~R112 |
| 0090019 | SMD RESISTOR | 1/16W 4.7K±5% 0603 | R115~R119 |
| 0090017 | SMD RESISTOR | 1/16W 2.2K±5% 0603 | R131 |
| 0090023 | SMD RESISTOR | 1/16W 10K±5% 0603 | R100,R102~R105,R108,R127,R132,R136,R140 |
| 0090192 | SMD RESISTOR | 1/16W 51K±5% 0603 | R114 |
| 0310195 | SMD CAPACITOR | 50V 221±10% X7R 0603 | C107,C108,C109 |
| 0310066 | SMD CAPACITOR | 50V 102±10% X7R 0603 | C110,C111 |
| 0310543 | SMD CAPACITOR | 50V 104±10% X7R 0603 | C101,C102,C103,C113 |
| 0700007 | SMD DIODE | 1N4148 | VD102~VD104,VD109,VD110 |
| 0780271 | SMD TRIODE | 2N5401 SOT-23 | V101,V102 |
| 0780085 | SMD TRIODE | 8050D | V103 |
| 1633467 | PCB | 6DK1910S-2 | |
| 0090021 | SMD RESISTOR | 1/16W 6.8K±5% 0603 | R101 |
| DK1910SI（RU）SILVER WHITE | | | |
| PROGRAM FLASH ROMDK1910SIRU-0A(16M) 0911715 | | | |
| 0881998 | IC | AT49BV162A 70TI TSOP | U214 (19) |
| 0881754 | IC | 29LV160BE-70NC TSOP | U214 (19) |
| DK1910SI（RU）SILVER WHITE | | | |
| PROGRAM CPURCO73RU-0 0890292 | | | |
| 0883034 | IC | M37544G2AGP LQFP | N1 |
| 5156608 | SIGN STICKER | CPURC073RU-0 | |